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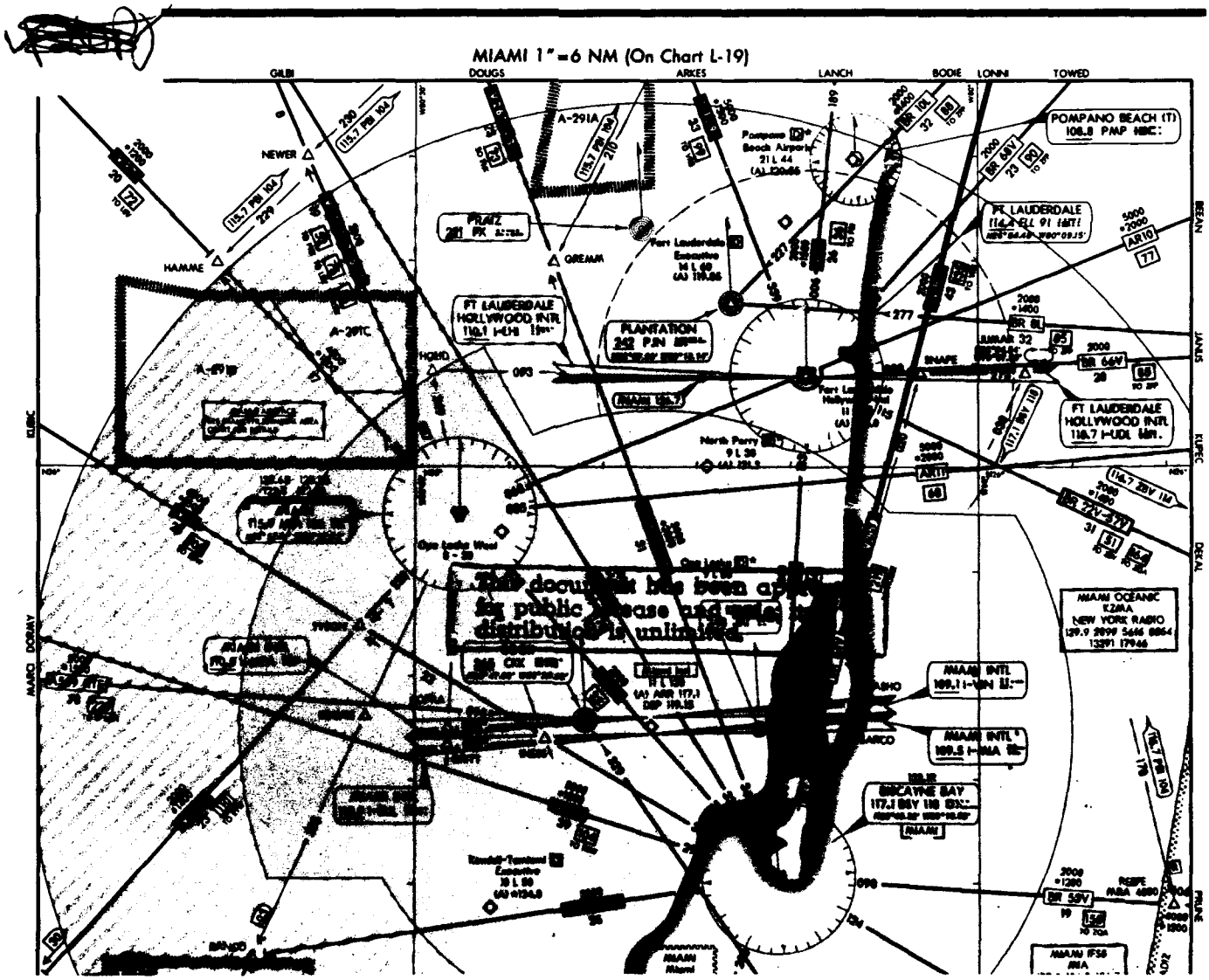
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Air Traffic Control



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RECORD OF CHANGES

DIRECTIVE NO. 7110.65H

CHANGE TO BASIC	SUPPLEMENTS			OPTIONAL	CHANGE TO BASIC	SUPPLEMENTS			OPTIONAL

EXPLANATION OF CHANGES

7110.65H – BASIC

September 16, 1993

Direct questions through appropriate facility/region staff to the Office of Primary Interest (OPI).

a. 2–53 TERMINAL DATA ENTRIES. Change will relieve terminal radar facilities of the requirement to use flight progress strips which, in today's automated environment, have become unnecessary. (ATP–120)

b. 2–120 CURRENT SETTINGS. Change will allow the U.S. Army to use the term "Estimated Altimeter" for altimeter settings.. (ATP–130)

c. 3–123 INTERSECTING RUNWAY SEPARATION. None, for U.S. Air Force use only. (ATP–120)

d. 10–3 PROVIDING ASSISTANCE. Change states explicitly the action to take at non–FSS air traffic facilities when receiving telephone calls or other inquiries related to overdue or missing VFR flights. (ATP–130)

e. 10–14 EMERGENCY SITUATIONS. Change emphasizes the need to begin emergency procedures immediately if there is an unexpected loss of radar and radio contact with an aircraft. (ATP–130)

f. 10–30 OVERDUE AIRCRAFT. Change emphasizes and clarifies when an aircraft should be considered overdue and requires that an ALNOT be issued for these aircraft. (ATP–130)

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AIR TRAFFIC CONTROL
7110.65H
FOREWORD

This handbook prescribes air traffic control procedures and phraseology for use by personnel providing air traffic control services. Controllers are required to be familiar with the provisions of this handbook that pertain to their operational responsibilities and to exercise their best judgment if they encounter situations not covered by it.

William H. Pollard
Associate Administrator for Air Traffic

AIRSPACE RECLASSIFICATION

On September 16, 1993, the United States will implement those International Civil Aviation Organization (ICAO) airspace classes that were adopted with the Airspace Reclassification Final Rule.

The Air Traffic Rules and Procedures Service has distributed basic editions of FAA Orders 7110.10, 7110.65, 7210.3, and 7930.2, as well as the Pilot/Controller Glossary. These orders are being provided in advance of their normally scheduled dates to ensure for sufficient preparation for the Airspace Reclassification change. The orders and associated briefing guides shall serve as the fundamental training material to meet this preparatory requirement for Airspace Reclassification.

Briefing guides and a review of the Airspace Reclassification Videotape (if available) will assist you in the briefing efforts. Emphasis should be placed on how the change will impact your facility's particular airspace.

Please direct any questions to the Terminal Procedures Branch, ATP–120, (202) 267–8460.

The following definitions are included in this section to aid the training preparation of all personnel for airspace reclassification.

AIRSPACE HIERARCHY: Within the airspace classes, there is a heirarchy and, in the event of an overlap of airspace: Class A preempts Class B, Class B preempts Class C, Class C preempts Class D, Class D preempts Class E, and Class E preempts Class G.

CONTROLLED AIRSPACE

An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.

Note 1 – Controlled airspace is a generic term that covers Class A, Class B, Class C, Class D, and Class E airspace.

Note 2 – Controlled airspace is also that airspace within which all aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements in FAR Part 91 (for specific operating requirements, please refer to FAR Part 91). For IFR operations in any class of controlled airspace, a pilot must file an IFR flight plan and receive an appropriate ATC clearance. Each Class B, Class C, and Class D airspace area designated for an airport contains at least one primary airport around which the airspace is designated (for specific designations and descriptions of the airspace classes, please refer to FAR Part 71).

Controlled airspace in the United States is designated as follows:

CLASS A: Generally, that airspace from 18,000 feet MSL up to and including FL600, including the airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska. Unless otherwise authorized, all persons must operate their aircraft under IFR.

CLASS B: Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspaces areas resemble upside–down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace. An ATC clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace. The cloud clearance requirement for VFR operations is "clear of clouds."

CLASS C: Generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Although the configuration of each Class C airspace area is individually tailored, the airspace usually consists of a surface area with a 5 nm radius, and an outer area with a 10 nm radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Each person must establish two–way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace. VFR aircraft are only separated from IFR aircraft within the airspace.

CLASS D: Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures. Arrival extensions for instrument approach procedures may be Class D or Class E airspace. Unless otherwise authorized, each person must establish two–way radio communications with the ATC facility providing air traffic services prior entering the airspace and thereafter maintain those communications while in the airspace. No separation services are provided to VFR aircraft.

CLASS E: Generally, if the airspace is not Class A, Class B, Class C, or Class D, and it is controlled airspace, it is Class E airspace. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Also in this class are Federal airways, airspace beginning at either 700 or 1,200 feet AGL used to transition to/from the terminal or enroute environment, enroute domestic, and offshore airspace areas designated below 18,000 feet MSL. Unless designated at a lower altitude, Class E airspace begins at 14,500 MSL over the United States, including that airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska. Class E airspace does not include the airspace 18,000 MSL or above.

CLASS G: That airspace not designated as Class A, B, C, D, or E (uncontrolled airspace).

SERVICE: A generic term that designates functions or assistance available from or rendered by air traffic control. For example, Class C service would denote the ATC services provided within a Class C airspace area.

SURFACE AREA: The airspace contained by the lateral boundary of the Class B, C, D, or E airspace designated for an airport that begins at the surface and extends upward.

The following airspace areas indicate the present terminology and their new class where appropriate.

OLD	NEW
Airport Traffic Area	Delete
Additional Control Area	Offshore Airspace Areas: Below 18,000 MSL – Class E airspace At or above 18,000 MSL – Class A airspace Enroute domestic airspace – Class E airspace
Airport Radar Service Area (ARSA)	Class C Airspace
Control Zone: Towered	Class D airspace

Nontowered	Class E airspace
Note: Control Zones at TCA and ARSA airports become part of the Class B or C surface area.	
Federal Airways:	Will retain current terminology
Colored	Class E airspace
Hawaiian	Class E airspace
VOR or Victor	Class E airspace
Jet Routes	Class A – Will retain current terminology
Jet Routes outside the U.S.	Delete
Positive Control Area	Class A airspace
Terminal Control Area	Class B airspace
Terminal Radar Service Area (TRSA)	No change
Uncontrolled Airspace	Class G airspace

The following is an explanation of the changes generated by the reclassification of the airspace. The current terms, definitions, types of airspace, phraseology, that are being deleted are indicated by a black background with white letters ARSA. The new terms, classes, phraseology, etc. are indicated by a light gray shading with black letters Class C service and are inserted immediately following the words they are replacing. These briefing guides as well as the orders should assist facility managers and training specialists in conducting the briefing of all personnel.

On January 6, 1994 Change 1 will be distributed and all shading will be removed, only the new airspace classification will remain. The following are examples of how the paragraph will appear for the Basic Order and how the paragraph will appear for Change 1.

Example 1. September 16, 1993, Basic Order

7–100 APPLICATION

Apply ARSA Class C service procedures within the designated Airport Radar Service Area Class C airspace and the associated outer area. The ARSA program is Class C services are designed to keep ATC informed of all aircraft within the ARSA Class C airspace not to exclude operations. Two way radio communications are normally required for operations within ARSA Class C airspace, but operations without radio communications can be conducted by letter of agreement, facility directive, or special arrangement with the ARSA Class C airspace controlling facility

7–100 Reference.—Visual Separation, paragraph 7–10.

Example 2. January 6, 1994, Change 1

7–90 APPLICATION

Apply Class C service procedures within the designated Class C airspace and the associated outer area. Class C services are designed to keep ATC informed of all aircraft within Class C airspace, not to exclude operations. Two way radio communications are normally required for operations within Class C airspace, but operations without radio communications can be conducted by letter of agreement, facility directive, or special arrangement with Class C airspace controlling facility

7–90 Reference.—Visual Separation, paragraph 7–10.

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Chapter 1. INTRODUCTION

Section 1. GENERAL

1–1 PURPOSE

This order prescribes air traffic control procedures and phraseology for use by personnel providing air traffic control services. Controllers are required to be familiar with the provisions of this order that pertain to their operational responsibilities and to exercise their best judgment if they encounter situations that are not covered by it.

1–2 DISTRIBUTION

This order is distributed to selected offices in Washington Headquarters, Regional Offices, the Technical Center, and the Aeronautical Center. Also, copies are sent to all air traffic control facilities, all international aviation field offices, and the interested aviation public.

1–3 CANCELLATION

Order 7110.65G, Air Traffic Control, dated March 5, 1992, and all changes, is canceled.

1–4 EXPLANATION OF MAJOR CHANGES

The significant changes to the basic order will be published and included in the Explanation of Changes page(s). It is advisable to retain the page(s) throughout the duration of the Basic Order. If further information is desired, direct questions through the appropriate facility/region staff to the office shown in parentheses following the explanation of change.

1–5 EFFECTIVE DATE

This order is effective September 16, 1993.

1–6 RECOMMENDATIONS FOR PROCEDURAL CHANGES

a. Personnel should submit recommended changes in procedures to their Facility Advisory Board (FAB). Where no FAB has been established, recommended changes should be submitted directly to facility management.

b. Recommendations from other sources should be submitted through appropriate FAA, military, or industry/user channels to Headquarters, FAA; Associate Administrator for Air Traffic, attention ATP–100.

1–7 PUBLICATION AND DELIVERY DATES

a. This order and its changes are scheduled to be published every 112 days. (See Table 1–7[1] for effective dates).

Table 1–7[1]

Basic or Change	Scheduled Date
7110.65H	September 16, 1993
Change 1	January 6, 1994
Change 2	April 28, 1994
Change 3	August 17, 1994
Change 4	December 8, 1994
Change 5	March 30, 1995
Change 6	July 20, 1995
Change 7	November 9, 1995
7110.65J	February 29, 1996

b. If an FAA facility has not received the order/changes at least 30 days before the above effective dates, the facility shall notify its regional distribution officer.

c. If a military facility has not received the order/changes at least 30 days before the above effective dates, the facility shall notify its appropriate military headquarters. (See Table 1–7[2]).

Table 1–7[2]

Military Headquarters	DSN	Commercial
U.S. Army, USAASA	284–7773	(703) 274–7773
U.S. Air Force		Contact Local DMA Customer Account Representative
U.S. Navy, CNO (N885F)	224–2710	(703) 614–2710

1–8 PROCEDURAL LETTERS OF AGREEMENT

Procedures/minima which are applied jointly or otherwise require the cooperation or concurrence of more than one facility/organization must be documented in a letter of agreement. Letters of agreement only supplement this order. Any minima they specify must not be less than that specified herein unless appropriate military authority has authorized application of reduced separation between military aircraft.

1–8 Reference.—ATC Service, paragraph 2–1b. Order 7210.3, Letters of Agreement, paragraph 4–30.

1–9 CONSTRAINTS GOVERNING SUPPLEMENTS AND PROCEDURAL DEVIATIONS

a. Exceptional or unusual requirements may dictate procedural deviations or supplementary procedures to this order. Prior to implementing supplemental or any procedural deviation that alters the level, quality, or degree of service, obtain prior approval from the Associate Administrator for Air Traffic.

b. If military operations or facilities are involved, prior approval by the following appropriate headquarters is required for subsequent interface with FAA. (See Table 1–9[1]).

Table 1–9[1]

Branch	Address
U.S. Navy:	CNO (OP–554)

Table 1–9[1]—CONTINUED

Branch	Address
U.S. Air Force:	AFFSA ATSC/DO
U.S. Army:	Director USAASA (MOAS-AS) Cameron Station, Alexandria, VA 22304–5050

1–9 Note.—*TERMINAL:* Headquarters USAF has delegated to major air commands authority to authorize base commanders to reduce same runway separation standards for military aircraft. These are specified and approved by affected ATC and user units. When applied, appropriate advisories may be required; e.g., "(Ident) continue straight ahead on right side; F–16 landing behind on left." "(Ident) hold position on right side; F–5 behind on left."

1–9 Reference.—Use of Active Runways, paragraph 3–3.

1–10 thru 1–19 RESERVED

Section 2. TERMS OF REFERENCE

1–20 WORD MEANINGS

As used in this manual:

a. *Shall,* or an action verb in the imperative sense, means a procedure is mandatory.

1–20 Examples.—

The transferring controller *shall forward* this data to the receiving controller.

Issue an alternative clearance.

Authorize the aircraft to taxi.

Do not clear an aircraft to land or takeoff from a closed runway.

b. *Should* means a procedure is recommended.

c. *May* or *need not* means a procedure is optional.

d. *Will* means futurity, not a requirement for the application of a procedure.

e. Singular words include the plural.

f. Plural words include the singular.

g. *Aircraft* means the airframe, crew members, or both.

h. *Approved separation* means separation in accordance with the applicable minima in this manual.

i. *Altitude* means indicated altitude mean sea level (MSL), flight level (FL), or both.

j. *Miles* means nautical miles unless otherwise specified, and means statute miles in conjunction with visibility.

k. *Course, bearing, azimuth, heading, and wind direction* information shall always be magnetic unless specifically stated otherwise.

l. *Time,* when used in the context of a clock reading, is the hour in Coordinated Universal Time (UTC) or the local equivalent, as appropriate, and the minutes. Change to the next minute is made at the minute plus 30 seconds, except time checks are given to the nearest quarter minute.

m. *Runway* means the runway used by aircraft (see Pilot/Controller Glossary term—Runway), and in discussions of separation standards is applicable to helipads with accompanying takeoff/landing courses.

n. Flight in accordance with the *due regard* or *operational* option obligates the authorized state aircraft commander to:

1. Separate his aircraft from all other air traffic; and

2. Assure that an appropriate monitoring agency assumes responsibility for search and rescue actions; and

3. Operate under at least one of the following conditions:

(a) In visual meteorological conditions (VMC); or

(b) Within radar surveillance and radio communications of a surface radar facility; or

(c) Be equipped with airborne radar that is sufficient to provide separation between his aircraft and any other aircraft he may be controlling and other aircraft; or

(d) [redacted].

1–20n Note. — A pilot's use of the phrase *"Going Tactical"* does not indicate *"Due Regard."* An understanding between the pilot and controller regarding the intent of the pilot and the status of the flight should be arrived at before the aircraft leaves air traffic control (ATC) frequency.

1–20n Reference. — The above conditions provide for a level of safety equivalent to that normally given by International Civil Aviation Organization (ICAO) ATC agencies and fulfills U.S. Government obligations under Article 3 of the Chicago Convention of 1944 (reference (d)), which stipulates there must be "due regard for the safety of navigation of civil aircraft" when flight is not being conducted under ICAO flight procedures.

1–21 COURSE DEFINITION

The following definitions shall be used in the application of the separation criteria in this order.

a. *SAME COURSES* are courses whose protected airspaces are coincident, overlap, or intersect and whose angular difference is less than 45 degrees. (See Figure 1–21[1]).

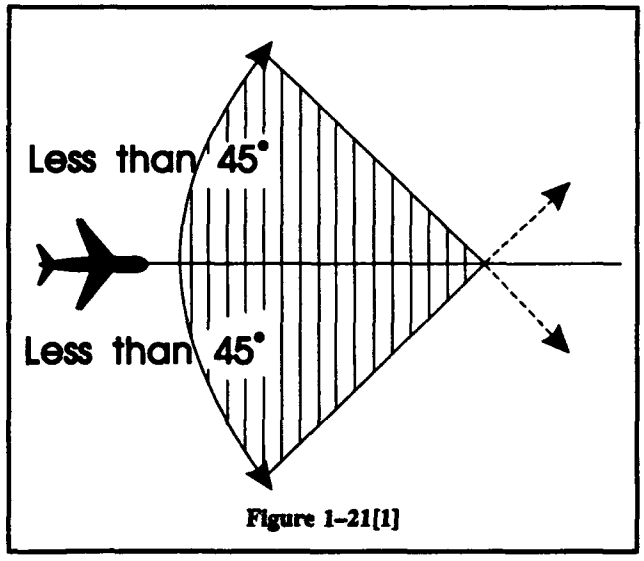


Figure 1–21[1]

b. *CROSSING COURSES* are intersecting courses whose angular difference is 45 through 135 degrees inclusive. (See Figure 1–21[2]).

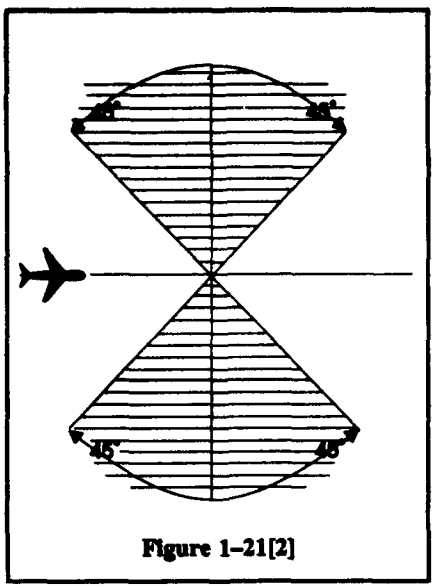


Figure 1–21[2]

c. *OPPOSITE/RECIPROCAL COURSES* are courses whose protected airspaces are coincident, overlap, or intersect and whose angular difference is 136 through 180 degrees inclusive. (See Figure 1–21[3]).

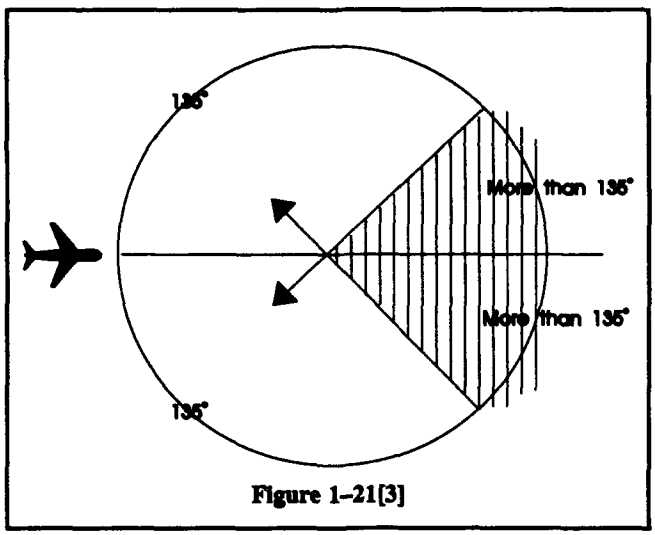


Figure 1–21[3]

1–22 NOTES

Statements of fact, or of a prefatory or explanatory nature relating to directive material, are set forth as notes.

1–23 REFERENCES

As used in this order, references direct attention to an additional source of information.

1–24 ANNOTATIONS

Revised, reprinted, or new pages are marked as follows:

a. The change number and the effective date are printed on each revised or additional page.

b. A page that does not require a change is reprinted in its original form.

c. Bold vertical lines in the margin of changed pages indicate the location of substantive revisions to the order. Bold vertical lines adjacent to the title of a chapter, section, or paragraph means that extensive changes have been made to that chapter, section, or paragraph.

d. Paragraphs/sections annotated with *EN ROUTE* or *TERMINAL* are only to be applied by the designated type facility. When they are not so designated, the paragraphs/sections apply to both type (en route and terminal) facilities.

e. The annotation, *USAF* for the U.S. Air Force, *USN* for the U.S. Navy, and *USA* for the U.S. Army denotes that the procedure immediately following the annotation applies only to the designated service.

1–24e Reference.—Military Procedures, paragraph 2–12.

f. *WAKE TURBULENCE APPLICATION* inserted within a paragraph means that the remaining information in the paragraph requires the application of wake turbulence procedures.

g. The annotation PHRASEOLOGY denotes the prescribed words and/or phrases to be used in communications

1–24g Note.—Controller may, after first using the prescribed phraseology for a specific procedure, rephrase the message to ensure the content is understood. Good judgement shall be exercised when using non-standard phraseology.

h. The annotation EXAMPLE provides a sample of the way the prescribed phraseology associated with the preceding paragraph(s) will be used. IF the preceding paragraph(s) does (do) not include specific prescribed phraseology, the EXAMPLE merely denotes suggested words and/or phrases that may be used in communications.

1–24h Note.—The use of the exact text contained in an EXAMPLE not preceded with specific prescribed phraseology is not mandatory. However, the words and/or phrases are expected, to the extent practical, to approximate those used in the example.

1–25 ABBREVIATIONS

As used in this manual, the following abbreviations have the meanings indicated. (See Table 1–25[1]).

Table 1–25[1]

Abbreviation	*Meaning*
A/A	Air-to-Air
AAL	Above aerodrome level
AAR	Airport acceptance rate
AAT	Associate Administrator for Air Traffic
ABM	Abeam
ABN	Aerodrome beacon
ABT	About
AC	Altocumulus
ACC	Area Control Center
ACCID	Notification of an aircraft accident
ACLS	Automatic Carrier Landing System
ACP	Area Command Post
ADC	Aerospace Defense Command
ADIZ	Air defense identification zone (to be pronounced "AY-DIZ")
ADJ	Adjacent
ADR	Advisory route
ADZ	Advise
ADZY	Advisory
A/FD	Airport/Facility Directory
AFI	ICAO African-Indian Ocean Region
AFIL	Flight plan filed in the air
AFIS	Aerodrome flight information service
AFM	Yes or affirm or affirmative or that is correct
AIM	Airman's Information Manual
AIP	Aeronautical Information Publication
AIREP	Air report
AIRMET	Airmen's meteorological information
ALERFA	Alert Phase code (Alerting Service)
ALNOT	Alert notice
ALS	Approach light system
ALTRV	Altitude reservation
AMB	Ambiguity—A disparity greater than 2 miles exists between the position declared for a target by ARTS and another facility's computer declared position during interfacility handoff
AMS	Aeronautical mobile service
AMSL	Above mean sea level
AMVER	Automated Mutual-Assistance Vessel Rescue System
ANG	Air National Guard
ANS	Answer
APREQ	Approval request
AR	Atlantic Route
ARAC	Radar approach control facility (USA)
ARCP	Air refueling control point
ARINC	Aeronautical Radio Incorporated
ARIP	Air refueling initial point
ARSA	[illegible]
ARSR	Air route surveillance radar
ARTCC	Air route traffic control center
ASD	Aircraft situation display
ASDE	Airport surface detection equipment
ASP	Arrival sequencing program
ASR	Airport surveillance radar
ATC	Air traffic control
ATCAA	ATC assigned airspace

Table 1–25[1]—CONTINUED

Abbreviation	*Meaning*
ATCSCC	Air Traffic Control System Command Center
ATCRBS	Air traffic control radar beacon system
ATCT	Airport traffic control tower
ATD	Actual time of departure
ATH	Office of Air Traffic System Effectiveness
ATIS	Automatic terminal information service
ATM	Office of Air Traffic System Management
ATPAC	Air Traffic Procedures Advisory Committee
ATP	Air Traffic Rules and Procedures Service
ATR	Air Traffic Plans and Requirements Service
ATS	Air Traffic Service
ATS	Office of Air Traffic Evaluations and Analysis
ATZ	Office of Air Traffic Program Management
AVSNFO	Aviation Standards National Field Office
BASE	Cloud base
BR	Bahama Route
CACT	Civil air carrier turbojet
CAR	ICAO Caribbean Region
CARF	Central Altitude Reservation Function
CAT	Clear air turbulence
CAVOC	Visibility, cloud and present weather better than prescribed values or conditions (to be pronounced "KAV-OH-KAY")
CCC	Regional Communications Control Center
CELNAV	Celestial navigation training
CENPAC	Central North Pacific
CENRAP	Center Radar Presentation
CEP	Central East Pacific
CERAP	Combined Center/RAPCON
CFWSUM	Central flow weather service unit meteorologist
CH	Channel
CHG	Modification (message type designator)
CI	Cirrus
CIT	Near or over large towns
CIV	Civil
CM	Centimetre
CMB	Climb
CMPL	Completion or comleted or complete
CNL	Cancel or cancelled
CNL	Flight plan cancellation (message type designator)
CNS	Continuous
COM	Communications
CONC	Concrete
COP	Change-over point
CPL	Current Flight Plan
CTA	Control Area
CVFP	Charted Visual Flight Procedure
CWA	Center Weather Advisory
DETRESFA	Distress Phase code (Alerting Service)
DF	Direction finder
DH	Decision height
DMAAC	Defense Mapping Agency Aerospace Center
DMAHC	Defense Mapping Agency Hydrographic Center
DME	Distance measuring equipment compatible with TACAN
DOE	Department of Energy
DR	Dead Reckoning
DSP	Departure sequencing program
DVFR	Defense Visual Flight Rules

Table 1–25[1]—CONTINUED

Abbreviation	*Meaning*
EB	Eastbound
ECM	Electronic counter measure
EET	Estimated elapsed time
EFAS	En route flight advisory service
EFC	Expect further clearance
EFM	En Route flow management
EHF	Extremely high frequency [30,000 to 300,000 MHz]
ELBA	Emergency location beacon - aircraft
ELT	Emergency locator transmitter
EOVM	Emergency obstruction video map
ESP	En Route spacing program
ETA	Estimated time of arrival
EUR	ICAO European Region
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FDEP	Flight data entry and printout
FIFO	Flight Inspection Field Office
FIR	Flight information region
FL	Flight level
FLIP	Flight Information Publication
FLY	Fly or flying
FM	From
FNA	Final approach
FPL	Filed flight plan (message type designator)
FRC	Full route clearance necessary
FRONT	Front (relating to weather)
FSDO	Flight Standards District Office
FSS	Flight service station
FTS	Federal Telecommunications System
FW/SVFR	Fixed-Wing Special Visual Flight Rules
GCA	Ground controlled approach
GEN	General
GEO	Geographic of true
GLD	Glider
GND	Ground
GNDCK	Ground check
GP	Glide path
GR	Hail or soft hail
GRADU	Gradual or gradully
HIRL	High intensity runway lights
ICAO	International Civil Aviation Organization
IDENT	Aircraft identification
IFIM	International Flight Information Manual
IFR	Instrument flight rules
IFSS	International flight service station
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
INCERFA	Uncertainty Phase code (Alerting Service)
INF	Inland Navigation Facility
INREQ	Information request
INS	Inertial Navigation System
IR	IFR military training route
JATO	Jet assisted takeoff
LAWRS	Limited aviation weather reporting station
LLWAS	Low level windshear alert system
LORAN	Long-range Navigation System
L/MF	Low/medium frequency
MACH	MACH Number
MALS	Medium intensity approach light system
MALSR	Medium approach light system with runway alignment indicator lights
MAP	Missed approach point

Table 1–25[1]—CONTINUED

Abbreviation	*Meaning*
MARSA	Military authority assumes responsibility for separation of aircraft
MCA	Minimum crossing altitude
MDA	Minimum descent altitude
MEA	Minimum en route (IFR) altitude
MIA	Minimum IFR altitude
MID/ASIA	ICAO Middle East/Asia Region
MIRL	Medium intensity runway lights
MIT	Miles-in trail
MITO	Minimum interval takeoff
MLS	Microwave Landing System
MNPS	Minimum Navigation Performance Specifications
MNPSA	Minimum Navigation Performance Specification Airspace
MNT	Monitor or monitoring or monitored
MNTN	Maintain
MOA	Military operations area
MOC	Minimum obstacle clearance (required)
MOCA	Minimum obstruction clearance altitude
MOD	Moderate (used to qualify icing, turbulence, interference or static reports)
MRA	Minimum reception altitude
MSAW	Minimum Safe Altitude Warning
MSL	Mean sea level
MTI	Moving target indicator
MTR	Military training route
MVA	Minimum vectoring altitude
NAM	ICAO North American Region
NAR	North American Route
NAT	ICAO North Atlantic Region
NAS	National Airspace System
NAT	Not ARTS tracked (ARTS is not tracking the target and no ambiguity check can be made)
NBCAP	National Beacon Code Allocation Plan
NDB	Nondirectional radio beacon
NM	Nautical Mile
NOAA	National Oceanic and Atmospheric Administration
NOPAC	North Pacific
NORAD	North American Aerospace Defense Command
NOS	National Ocean Service
NOTAM	Notice to Airmen
NWS	National Weather Service
NTZ	No transgression zone
OALT	Operational acceptable levels of traffic
ODALS	Omnidirectional approach lighting system
ODAPS	Oceanic Display and Planning System
ONER	Oceanic Navigational Error Report
OTR	Oceanic Transition Route
OTS	NAT Organized Track System
PAC	ICAO Pacific Region
PAR	Precision approach radar
PAR	Preferential arrival route (Stage A)
PBCT	Proposed Boundary Crossing Time
PCA	[redacted]
PDAR	Preferential departure arrival route
PDR	Preferential departure route
PIDP	Programmable Indicator Data Processor
PO	Dust devils
POB	Persons on board

Table 1–25[1]—CONTINUED

Abbreviation	*Meaning*
PPI	Plan position indicator
PPR	Prior permission required
PTS	Polar Track Structure
RAC	Department of Energy special flight
RAIL	Runway alignment indicator lights
RAPCON	Radar approach control facility (USAF)
RATCF	Radar air traffic control facility (USN)
RBS	Radar bomb scoring
RCC	Rescue Coordination Center
RCLS	Runway centerline system
RCR	Runway condition reading
RE	Recent (used to qualify weather phenomena such as rain, e.g. recent rain = RERA)
REC	Receive or receiver
REDL	Runway edge light(s)
REF	Reference to...or refer to...
REIL	Runway end identifier lights
RITE	Right (direction of turn)
RL	Report leaving
RLA	Relay to
RLLS	Runway lead-in lighting system
RMK	Remark
RNAV	Area Navigation
RNG	Radio range
ROBEX	Regional OPMET bulletin exchange (scheme)
RRTE	Reroute
RVR	Runway visual range
RVV	Runway visibility value
SAC	Strategic Air Command
SAFI	Semi-automatic flight inspection
SAM	ICAO South American Region
SAR	Search and rescue
SARPS	Standards and Recommended Practices (ICAO)
SAT	Saturday
SB	Southbound
SC	Stratocumulus
SELCAL	Selective calling system
SFA	Single frequency approach
SFO	Simulated flameout
SID	Standard instrument departure
SIGMET	Significant meteorological information
STAR	Standard terminal arrival

Table 1–25[1]—CONTINUED

Abbreviation	*Meaning*
STMC	Supervisory traffic management coordinator
STMP	Sector traffic management program
STOL	Short takeoff and landing
STR	Strategic Training Range
SURPIC	Surface Picture
SVFR	Special Visual Flight Rules
SWAP	Severe weather avoidance plan
TACAN	TACAN-UHF navigational aid (omnidirectional course and distance information)
[redacted]	[redacted]
TCAS	Traffic Alert and Collision Avoidance System
TDZL	Touchdown zone light system
TMC	Traffic management coordinator
TMCIC	Traffic management coordinator in charge
TMU	Traffic management unit
TRACAB	Terminal radar approach control in tower cab
TRACON	Terminal radar approach control
TRSA	Terminal radar service area
UHF	Ultra high frequency
USA	United States Army
USAF	United States Air Force
USN	United States Navy
UTC	Coordinated Universal Time
UTM	Unsuccessful transmission message
VFR	Visual flight rules
VHF	Very high frequency
VLF	Very Low Frequency
VMC	Visual Meteorological Conditions
VOR	VHF navigational aid (omnidirectional course information)
VOR-DME	Collocated VOR and DME navigational aids (VHF course and UHF distance information)
VORTAC	Collocated VOR and TACAN navigation aids (VHF and UHF course and UHF distance information)
VR	VFR military training route
WATRS	West Atlantic Route System
WSFO	Weather Service Forecast Office
WSO	Weather Service Office

Chapter 2. GENERAL CONTROL

Section 1. GENERAL

2–1 ATC SERVICE

Provide air traffic control service in accordance with the procedures and minima in this order except when:

a. Deviation is necessary to conform with ICAO Documents, National Rules of the Air, or special agreements where the United States provides air traffic control service in airspace outside the United States and its possessions.

2–1a Note.—Pilots are required to abide by FAR's or other applicable regulations regardless of the application of any procedure or minima in this order.

b. Other procedures/minima are prescribed in a letter of agreement or an FAA or a military document.

2–1b Note.—These procedures may include altitude reservations, air refueling, and fighter interceptor operations.

2–1b Reference.—Procedural Letters of Agreement, paragraph 1–8.

2–2 DUTY PRIORITY

a. Give first priority to separating aircraft and issuing safety alerts as required in this order. Good judgment shall be used in prioritizing all other provisions of this order based on the requirements of the situation at hand.

2–2a Reference.—Safety Alert, paragraph 2–6 Note 1.

2–2a Note.—Because there are many variables involved, it is virtually impossible to develop a standard list of duty priorities that would apply uniformly to every conceivable situation. Each set of circumstances must be evaluated on its own merit, and when more than one action is required, the controller shall exercise his best judgment based on the facts and circumstances known to him. That action which is most critical from a safety standpoint is performed first.

b. Provide additional services to the extent possible, contingent only upon higher priority duties and other factors including limitations of radar, volume of traffic, frequency congestion, and workload.

2–2b Note.—The primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic. In addition to its primary function, the ATC system has the capability to provide (with certain limitations) additional services. The ability to provide additional services is limited by many factors, such as the volume of traffic, frequency congestion, quality of radar, controller workload, higher priority duties, and the pure physical inability to scan and detect those situations that fall in this category. It is recognized that these services cannot be provided in cases in which the provision of services is precluded by the above factors. Consistent with the aforementioned conditions, controllers shall provide additional service procedures to the extent permitted by higher priority duties and other circumstances. The provision of additional services is not optional on the part of the controller, but rather is required when the work situation permits.

2–3 PROCEDURAL PREFERENCE

a. Use automation procedures in preference to nonautomation procedures when workload, communications, and equipment capabilities permit.

b. Use radar separation in preference to nonradar separation when it will be to an operational advantage and workload, communications, and equipment permit.

c. Use nonradar separation in preference to radar separation when the situation dictates that an operational advantage will be gained.

2–3c Note.—One situation may be where vertical separation would preclude excessive vectoring.

2–4 OPERATIONAL PRIORITY

Provide air traffic control service to aircraft on a "first come, first served" basis as circumstances permit, except the following:

2–4 Note.—It is solely the pilot's prerogative to cancel his IFR flight plan. However, a pilot's retention of an IFR flight plan does not afford priority over VFR aircraft. For example, this does not preclude the requirement for the pilot of an arriving IFR aircraft to adjust his flight path, as necessary, to enter a traffic pattern in sequence with arriving VFR aircraft.

2–4 Reference.—An aircraft in distress has the right of way over all other air traffic, Part 91.113(c).

a. Provide priority to civilian air ambulance flights (LIFEGUARD). When verbally requested, provide priority to military air evacuation flights (AIR EVAC, MED EVAC) and scheduled air carrier/air taxi flight. Assist the pilots of air ambulance/evacuation aircraft to avoid areas of significant weather and turbulent conditions. When requested by a pilot, provide notifications to expedite ground handling of patients, vital organs, or urgently needed medical materials.

2–4a Note.—Air carrier/taxi usage of "LIFEGUARD" call sign, indicates that operational priority is requested.

b. Provide maximum assistance to SAR aircraft performing a SAR mission.

2–4b Reference.—Providing Assistance, paragraph 10–3.

c. Provide special handling, as required to expedite Flight Check and SAFI aircraft.

2–4c Note.—It is recognized that unexpected wind conditions, weather, or heavy traffic flows may affect controller's ability to provide priority or special handling at the specific time requested.

2–4c Reference.—Flight Check and SAFI Aircraft, paragraph 9–3.

d. Expedite the movement of Presidential aircraft and entourage and any rescue support aircraft as well as related control messages when traffic conditions and communications facilities permit.

2–4d Note.—As used herein the terms Presidential aircraft and entourage include aircraft and entourage of the President, Vice President, or other public figures when designated by the White House.

2–4d Reference.—Presidential and Vice Presidential Aircraft, paragraph 2–88f and g. FAA Order 7210.3, Advance Coordination, paragraph 6–1.

e. Expedite movement of NIGHT WATCH aircraft when NEACP (pronounced KNEECAP) is indicated in the remarks section of the flight plan or in air/ground communications.

2–4e Note.—The term "NEACP" will not be a part of the call sign but may be used when the aircraft is airborne to indicate a request for special handling.

2–4e Reference.—FAA Order 7610.4, paragraph 12–1.

f. Provide expeditious handling for any civil or military aircraft using the code name "FLYNET."

2–4f Reference.—FLYNET, paragraph 9–25. FAA Order 7610.4, paragraph 12–41.

g. Provide expeditious handling of aircraft using the code name "Garden Plot" only when CARF notifies you that such priority is authorized. Refer any questions regarding flight procedures to CARF for resolution.

2–4g Note.—Garden Plot flights require priority movement and are coordinated by the military with CARF. State authority will contact the Regional Director to arrange for priority of National Guard troop movements within a particular State.

h. Provide special handling for USAF aircraft engaged in aerial sampling missions using the code name "SAMP".

2–4h Reference.—SAMP, paragraph 9–33. FAA Order 7210.3, Atmosphere Sampling for Nuclear Contamination, paragraph 6–33. FAA Order 7610.4, paragraph 12–43.

i. IFR aircraft shall have priority over SVFR aircraft.

2–4i Reference.—Chapter 7, Section 5—Special VFR.

j. Provide maximum assistance to expedite the movement of interceptor aircraft on active air defense missions until the unknown aircraft is identified.

k. Expedite movement of Special Air Mission aircraft when SCOOT is indicated in the remarks section of the flight plan or in air/ground communications.

2–4k Note.—The term "SCOOT" will not be part of the call sign but may be used when the aircraft is airborne to indicate a request for special handling.

2–4k Reference.—Law Enforcement Operations by Civil and Military Organizations, paragraph 9–28. FAA Order 7610.4, paragraph 12–71.

2–5 EXPEDITIOUS COMPLIANCE

a. Use the word "immediately" only when expeditious compliance is required to avoid an imminent situation.

b. Use the word "expedite" only when prompt compliance is required to avoid the development of an imminent situation.

c. In either case and if time permits, include the reason for this action.

2–5 Reference.—Sequence/Spacing Application, paragraph 3–90.

2–6 SAFETY ALERT

Issue a safety alert to an aircraft if you are aware the aircraft is at an altitude which, in your judgment, places it in unsafe proximity to terrain, obstructions, or other aircraft. Once the pilot informs you action is being taken to resolve the situation, you may discontinue the issuance of further alerts. Do not assume that because someone else has responsibility for the aircraft that the unsafe situation has been observed and the safety alert issued; inform the appropriate controller.

2–6 Note 1.—The issuance of a safety alert is a first priority (see paragraph 2–2) once the controller observes and recognizes a situation of unsafe aircraft proximity to terrain, obstacles, or other aircraft. Conditions, such as workload, traffic volume, the quality/limitations of the radar system, and the available lead time to react are factors in determining whether it is reasonable for the controller to observe and recognize such situations. While a controller cannot see immediately the development of every situation where a safety alert must be issued, the controller must remain vigilant for such situations and issue a safety alert when the situation is recognized.

2–6 Note 2.—Recognition of situations of unsafe proximity may result from MSAW/E-MSAW/LAAS, automatic altitude readouts, Conflict/Mode C Intruder Alert, observations on a PAR scope, or pilot reports.

2–6 Note 3.—Once the alert is issued, it is solely the pilot's prerogative to determine what course of action, if any, he will take.

a. Terrain/Obstruction Alert—Immediately issue/initiate an alert to an aircraft if you are aware the aircraft is at an altitude which, in your judgment, places it in unsafe proximity to terrain/obstructions. Issue the alert as follows:

Phraseology:

(Identification) LOW ALTITUDE ALERT,

CHECK YOUR ALTITUDE IMMEDIATELY.

THE, *as appropriate,* MEA/MVA/MOCA/MIA

IN YOUR AREA IS (altitude),

or if past the final approach fix (nonprecision approach), or the outer marker, or the fix used in lieu of the outer marker (precision approach),

THE, *as appropriate,* MDA/DH (if known) IS (altitude).

b. Aircraft Conflict/Mode C Intruder Alert—Immediately issue/initiate an alert to an aircraft if you are aware of another aircraft at an altitude which you believe places them in unsafe proximity. If feasible, offer the pilot an alternate course of action.

2–6b Note.—When an alternate course of action is given, end the transmission with the word "IMMEDIATELY."

Phraseology:

(Identification) TRAFFIC ALERT (position of traffic if time permits),

ADVISE YOU TURN LEFT/RIGHT (specific heading, if appropriate),

and/or

CLIMB/DESCEND (specific altitude if appropriate), IMMEDIATELY.

2–6 Reference.—Conflict Mode C Intruder Alert, paragraph 5–190. En Route Minimum Safe Altitude Warning (E-MSAW), paragraph 5–191. Conflict Alert, paragraph 5–215. Altitude Filters, paragraph 5–225.

2–7 IN-FLIGHT EQUIPMENT MALFUNCTIONS

a. When a pilot reports an in-flight equipment malfunction, determine the nature and extent of any special handling desired.

2–7a Note.—In-flight equipment malfunctions include partial or complete failure of equipment which may affect either safety and/or the ability of the flight to proceed under IFR in the air traffic control system. Controllers may expect reports form pilots regarding VOR, TACAN, ADF, or low frequency navigation receivers, impairment of air-ground communications capability, or other equipment deemed appropriate by the pilot (e.g. airborne weather radar). Pilots should communicate the nature and extent of any assistance desired from air traffic control.

b. Provide the maximum assistance possible consistent with equipment, workload, and any special handling requested.

c. Relay to other controllers or facilities who will subsequently handle the aircraft all pertinent details concerning the aircraft and any special handling required or being provided.

2–8 MINIMUM FUEL

If an aircraft declares a state of "minimum fuel," inform any facility to whom control jurisdiction is transferred of the minimum fuel problem and be alert for any occurrence which might delay the aircraft en route.

2–8 Note.—Use of the term "minimum fuel" indicates recognition by a pilot that his fuel supply has reached a state where, upon reaching destination, he cannot accept any undue delay. This is not an emergency situation but merely an advisory that indicates an emergency situation is possible should any undue delay occur. A minimum fuel advisory does not imply a need for traffic priority. Common sense and good judgment will determine the extent of assistance to be given in minimum fuel situations. If, at any time, the remaining usable fuel supply suggests the need for traffic priority to ensure a safe landing, the pilot should declare an emergency and report fuel remaining in minutes.

2–9 REPORTING ESSENTIAL FLIGHT INFORMATION

Report as soon as possible to the appropriate FSS, airport manager's office, ARTCC, approach control facility, operations office, or military operations office any information concerning components of the NAS or any flight conditions which may have an adverse effect on air safety.

2–9 Note.—FSS's are responsible for classifying and disseminating Notices to Airmen.

2–9 Reference.—Timely Information, paragraph 3–32. Service Limitations, paragraph 5–6. FAA Order 7210.3, Periodic Maintenance, paragraph 3–2. USN, see OPNAVINST 2112.2D.

2–10 NAVAID MALFUNCTIONS

When an aircraft reports a NAVAID malfunction, take the following actions:

2–10 Note.—The sequence of the actions are not intended to circumvent good judgment should the circumstances so dictate.

2–10 Reference.—FAA Order 7210.3, System Component Malfunctions, paragraph 3–51.

a. Request a report from a second aircraft.

b. If the second aircraft reports normal operations, continue use and inform the first aircraft. Record the incident on FAA Form 7230–4 or appropriate Military Form.

c. If the second aircraft confirms the malfunction or in the absence of a second aircraft report, activate the standby equipment or request the monitor facility to activate.

d. If normal operation is reported after the standby equipment is activated, continue use, record the incident on FAA Form 7230–4 or appropriate Military Form, and notify Airway Facilities (AF) personnel (the Systems Engineer of the ARTCC when an en route aid is involved).

e. If continued malfunction is reported after the standby equipment is activated or the standby equipment cannot be activated, inform AF personnel and request advice on whether or not the aid should be shut down. In the absence of a second aircraft report, advise the AF personnel of the time of the initial aircraft report and the estimated time a second aircraft report could be obtained.

2–11 USE OF MARSA

a. MARSA may only be applied to military operations specified in a letter of agreement or other appropriate FAA or military document.

2–11a Note.—Application of MARSA is a military command prerogative. It will not be invoked indiscriminately by individual units or pilots. It will be used only for IFR operations requiring its use. Commands authorizing MARSA will ensure that its implementation and terms of use are documented and coordinated with the control agency having jurisdiction over the area in which the operations are conducted. Terms of use will assign responsibility and provide for separation among participating aircraft.

b. ATC facilities do not invoke or deny MARSA. Their sole responsibility concerning the use of MARSA is to provide separation between military aircraft engaged in MARSA operations and other nonparticipating IFR aircraft.

c. DOD shall ensure that military pilots requesting special-use airspace/ATCAA's have coordinated with the scheduling agency, have obtained approval for entry, and are familiar with the appropriate MARSA procedures. ATC is not responsible for determining which military aircraft are authorized to enter special-use airspace/ATCAA's.

2–11 Reference.—Military Aerial Refueling, paragraph 9–29.

2–12 MILITARY PROCEDURES

a. Military procedures in the form of additions, modifications, and exceptions to the basic FAA procedure are prescribed herein when a common procedure has not been attained or to fulfill a specific requirement. They shall be applied by:ATC facilities operated by that service.

2–12a Examples.—

An Air Force facility providing service for an Air Force Base would apply USAF procedures to all traffic regardless of class.

A Navy facility providing service for a Naval Air Station would apply USN procedures to all traffic regardless of class.

b. ATC facilities, regardless of their parent organization (FAA, USAF, USN, USA), supporting a designated military airport exclusively. This designation determines which military procedures are to be applied.

2–12b Examples.—

An FAA facility supports a USAF Base exclusively—USAF procedures are applied to all traffic at that base.

An FAA facility provides approach control service for a Naval Air Station as well as supporting a civil airport—Basic FAA procedures are applied at both locations by the FAA facility.

A USAF facility supports a USAF Base and provides approach control service to a satellite civilian airport—USAF procedures are applied at both locations by the USAF facility.

2–12b Reference.—Annotations, paragraph 1–24.

c. Other ATC facilities when specified in a letter of agreement.

2–12c Example.—

A USAF unit is using a civil airport supported by an FAA facility—USAF procedures will be applied as specified in a letter of agreement between the unit and the FAA facility to the aircraft of the USAF unit. Basic FAA procedures will be applied to all other aircraft.

2–13 FORMATION FLIGHTS

Control formation flights as a single aircraft. When individual control is requested, issue advisory information which will assist the pilots in attaining separation. When pilot reports indicate separation has been established, issue control instructions as required.

2–13 Note 1.—Separation responsibility between aircraft within the formation during transition to individual control rests with the pilots concerned until standard separation has been attained.

2–13 Note 2.—Formation join-up and breakaway will be conducted in VFR weather conditions unless prior authorization has been obtained from ATC or individual control has been approved.

2–13 Reference.—Additional Separation for Formation Flights, paragraph 5–74. Pilot/Controller Glossary term—Formation Flight.

2–14 COORDINATE USE OF AIRSPACE

a. Ensure that the necessary coordination has been accomplished before you allow an aircraft under your control to enter another controller's area of jurisdiction.

b. Before you issue control instructions directly to an aircraft which is within another controller's area of jurisdiction that will change that aircraft's heading, route, speed, or altitude, ensure that coordination has been accomplished with each of the controllers listed below whose area of jurisdiction is affected by those instructions unless otherwise specified by a letter of agreement or a facility directive:

1. The controller within whose area of jurisdiction the control instructions will be issued.

2. The controller receiving the transfer of control.

3. Any intervening controller(s) through whose area of jurisdiction the aircraft will pass.

c. If you issue control instructions to an aircraft through a source other than another controller (e.g. ARINC, FSS, another pilot) ensure that the necessary coordination has been accomplished with any controllers listed in paragraphs 2–14b1, 2–14b2, and 2–14b3 whose area of jurisdiction is affected by those instructions unless otherwise specified by a letter of agreement or a facility directive.

2–14 Reference.—Control Transfer, paragraph 2–15. Adjacent Airspace, paragraph 5–76. Transferring Controller Handoff, paragraph 5–64. Receiving Controller Handoff, paragraph 5–65.

2–15 CONTROL TRANSFER

a. Transfer control responsibility at a prescribed or coordinated location, time, fix, or altitude and only after eliminating any potential conflict with

other aircraft for which you have separation responsibility.

2–15 Reference.—Coordinate Use of Airspace, paragraph 2–14. Transfering Controller Handoff, paragraph 5–64. Receiving Controller Handoff, paragraph 5–65.

b. When you transfer control of an aircraft while it is within your area of jurisdiction, issue any instructions to the receiving controller that may be necessary to provide separation from other aircraft for which you have separation responsibility.

c. Assume control of an aircraft only after it is in your area of jurisdiction unless specifically coordinated or as specified by letter of agreement or a facility directive.

2–16 AIRPORT TRAFFIC AREAS SURFACE AREAS

a. Coordinate with the appropriate nonapproach control tower on an individual aircraft basis before issuing a clearance which would require flight within an airport traffic area a surface area for which the tower has responsibility unless otherwise specified in a letter of agreement.

2–16a References.—FAA Order 7210.3, Letters of Agreement, paragraph 4–30. Operating on or in the Vicinity of an Airport, [illegible] Part 91.127. Pilot/Controller Glossary term—Airport traffic area Surface Area.

b. Coordinate with the appropriate control tower for transit authorization when you are providing radar traffic advisory service to an aircraft that will enter another facility's airport traffic area airspace.

2–16b Note.—The pilot is not expected to obtain his own authorization through each area when in contact with a radar facility.

c. Transfer communications to the appropriate facility, if required, prior to operation within the airport traffic area a surface area for which the tower has responsibility.

2–16c References.—Radio Communications Transfer, paragraph 2–17. Operation at Airports With Operating Control Towers, FAR 91.87 Operations in Class D airspace, FAR 91.129.

2–16 Reference.—Airport traffic area Surface Area Restrictions, paragraph 3–11. Application, paragraph 7–60.

2–17 RADIO COMMUNICATIONS TRANSFER

a. Transfer radio communications before an aircraft enters the receiving controller's area of jurisdiction unless otherwise coordinated or specified by a letter of agreement or a facility directive.

b. Transfer radio communications by specifying the following:

2–17b Note.—Radio communications transfer procedures may be specified by a letter of agreement or contained in the route description of an MTR and as published in the DOD Planning AP/1B (AP/3).

1. The facility name or location name and terminal function to be contacted. *TERMINAL:* Omit the location name when transferring communications to another controller within your facility except as required in paragraph 5–137.

2. Frequency to use except the following may be omitted:

(a) FSS frequency.

(b) Departure frequency if previously given or published on a SID chart for the procedure issued.

(c) *TERMINAL:*

(1) Ground or local control frequency if in your opinion the pilot knows which frequency is in use.

(2) The numbers preceding the decimal point if the ground control frequency is in the 121 mHz bandwidth.

2–17b Examples.—

"Contact tower."

"Contact ground."

"Contact ground point seven."

"Contact ground, one two zero point eight."

"Contact Huntington Radio."

"Contact departure."

"Contact Los Angeles Center, one two three point four."

3. Time, fix, altitude, or specifically when to contact a facility. You may omit this when compliance is expected upon receipt.

2–17b3 Note.—Airman's Information Manual, ARTCC Communications, paragraph 5–31, informs pilots that they are expected to maintain a listening watch on the transferring controller's frequency until the time, fix, or altitude specified.

Phraseology:

CONTACT (facility name or location name and terminal function), (frequency).

If required,

AT (time, fix, or altitude).

c. In situations where an operational advantage will be gained, and following coordination with the receiving controller, you may instruct aircraft on the ground to monitor the receiving controller's frequency.

2–17c Examples.—

"Monitor tower."

"Monitor ground."

"Monitor ground point seven."

"Monitor ground, one two zero point eight."

d. In situations where a sector has multiple frequencies or when sectors are combined using multiple frequencies and the aircraft will remain under your jurisdiction, transfer radio communication by specifying the following:

Phraseology:

(Identification) CHANGE TO MY FREQUENCY (state frequency).

2–17d Example.—
"United Two Twenty-two change to my frequency one two three point four."

2–17d Reference.—Airman's Information Manual, Contact Procedures, paragraph 4–33d(2).

e. Avoid issuing a frequency change to helicopters known to be single-piloted during air-taxiing, hovering, or low-level flight. Whenever possible, relay necessary control instructions until the pilot is able to change frequency.

2–17e Note.—Most light helicopters are flown by one pilot and require the constant use of both hands and feet to maintain control. Although flight control friction devices assist the pilot, changing frequency near the ground could result in inadvertent ground contact and consequent loss of control. Pilots are expected to advise ATC of their single-pilot status if unable to comply with a frequency change.

2–17e Reference.—Airman's Information Manual, Communications, paragraph 4–64.

f. In situations where the controller does not want the pilot to change frequency but the pilot is expecting or may want a frequency change, use the following phraseology.

Phraseology:
REMAIN THIS FREQUENCY.

2–17 Reference.—Clearance Information, paragraph 4–80. Communication Transfer, paragraph 5–167.

2–18 OPERATIONAL REQUESTS

Respond to a request from another controller, a pilot or vehicle operator by one of the following verbal means:

a. Restate the request in complete or abbreviated terms followed by the word "APPROVED." The phraseology "APPROVED AS REQUESTED" may be substituted in lieu of a lengthy readback.

Phraseology:
(Requested operation) APPROVED.

or

APPROVED AS REQUESTED.

b. State restrictions followed by the word "APPROVED."

Phraseology:
(Restriction and/or additional instructions, requested operation) APPROVED.

c. State the word "UNABLE" and, time permitting, a reason.

Phraseology:
UNABLE (requested operation)

and when necessary,

(reason and/or additional instructions.)

d. State the words "STAND BY."

2–18d Note.– "Stand by" is not an approval or denial. The controller acknowledges the request and will respond at a later time.

2–18 Reference.—Route or Altitude Amendments, paragraph 4–14. Traffic Advisories, paragraph 2–21. Methods, paragraph 7–112.

2–19 WAKE TURBULENCE

a. Apply wake turbulence procedures to aircraft operating behind heavy jets and, where indicated, to small aircraft behind large aircraft.

2–19a Note.—Paragraph 5–72e specifies increased radar separation for small type aircraft landing behind large or heavy aircraft because of the possible effects of wake turbulence.

b. The separation minima shall continue to touchdown for all IFR aircraft not making a visual approach or maintaining visual separation.

2–19 Reference.—Approach Separation Responsibility, paragraph 5–124.

2–20 WAKE TURBULENCE CAUTIONARY ADVISORIES

a. Issue wake turbulence cautionary advisories and the position, altitude if known, and direction of flight of the heavy jets to:

2–20a Reference.—AC 90–23, Pilot Responsibility, paragraph 12D.

1. *TERMINAL:* VFR aircraft not being radar vectored but are behind heavy jets. (See Figure 2–20[1]).

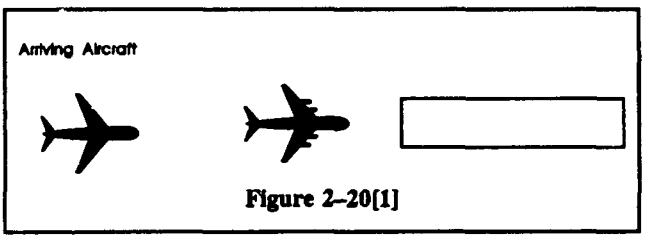


Figure 2–20[1]

2. IFR aircraft that accept a visual approach or visual separation.

2–20a2 Reference.—Visual Approach, paragraph 7–30.

3. *TERMINAL:* VFR arriving aircraft that have previously been radar vectored and the vectoring has been discontinued.

b. Issue cautionary information to any aircraft if in your opinion wake turbulence may have an adverse effect on it. When traffic is known to be a heavy aircraft, include the word *heavy* in the description.

2–20b Note.—Wake turbulence may be encountered by aircraft in flight as well as when operating on the airport movement area. Because wake turbulence is unpredictable, the controller is not responsible for anticipating its existence or effect. Although not mandatory during ground operations, controllers may use the words *jet blast, propwash,* or *rotorwash,* in lieu of *wake turbulence,* when issuing a caution advisory.

2–20b Reference.—AC 90–23. Pilot/Controller Glossary terms—Aircraft Classes and Wake Turbulence.

Phraseology:
CAUTION WAKE TURBULENCE (traffic information).

2–20 Reference.—Visual Separation, paragraph 7–10.

2–21 TRAFFIC ADVISORIES

Unless an aircraft is operating within [redacted] or omission is requested by the pilot, issue traffic advisories to all aircraft (IFR or VFR) on your frequency when in your judgment their proximity may diminish to less than the applicable separation minima. Where no separation minima applies, such as for VFR aircraft outside [redacted] issue traffic advisories to those aircraft on your frequency when in your judgment their proximity warrants it. Provide this service as follows:

a. To radar identified aircraft:

1. Azimuth from aircraft in terms of the 12–hour clock, or

2. When rapidly maneuvering aircraft prevent accurate issuance of traffic as in 1 above, specify the direction from an aircraft's position in terms of the eight cardinal compass points (N, NE, E, SE, S, SW, W, and NW). This method shall be terminated at the pilot's request.

3. Distance from aircraft in miles.

4. Direction in which traffic is proceeding and/or relative movement of traffic.

2–21a4 Note.—Relative movement includes closing, converging, parallel same direction, opposite direction, diverging, overtaking, crossing left to right, crossing right to left.

5. If known, type of aircraft and altitude.

2–21a5 Reference.—Description of Aircraft Types, paragraph 2–88.

Phraseology:

TRAFFIC, (number) O'CLOCK,

or when appropriate,

(direction) (number) MILES, (direction)-BOUND *and/or* (relative movement),

and if known,

(type of aircraft and altitude).

or when appropriate,

(type of aircraft and relative position), (number of feet) FEET ABOVE/BELOW YOU.

If altitude is unknown,

ALTITUDE UNKNOWN.

2–21a Examples.—

"Traffic, eleven o'clock, one zero miles, southbound, converging, DC–8, one seven thousand."

"Traffic, twelve o'clock, one five miles, opposite direction, altitude unknown."

"Traffic, ten o'clock, one two miles, southeast bound, one thousand feet below you."

6. When requested by the pilot, issue radar vectors to assist in avoiding the traffic, provided the aircraft to be vectored is within your area of jurisdiction or coordination has been effected with the sector/facility in whose area the aircraft is operating.

7. If unable to provide vector service, inform the pilot.

2–21a7 Reference.—Operational Requests, paragraph 2–18.

8. Inform the pilot of the following when traffic you have issued is not reported in sight:

(a) The traffic is no factor.

(b) The traffic is no longer depicted on radar.

Phraseology:

TRAFFIC NO FACTOR/NO LONGER OBSERVED,

or

(number) O'CLOCK TRAFFIC NO FACTOR/NO LONGER OBSERVED,

or

(direction) TRAFFIC NO FACTOR/NO LONGER OBSERVED.

b. To aircraft that are not radar identified:

1. Distance and direction from fix.

2. Direction in which traffic is proceeding.

3. If known, type of aircraft and altitude.

4. ETA over the fix the aircraft is approaching, if appropriate.

Phraseology:

TRAFFIC, (number) MILES/MINUTES (direction) OF (airport or fix), (direction)-BOUND,

and if known,

(type of aircraft and altitude),

ESTIMATED (fix) (time),

or

TRAFFIC, NUMEROUS AIRCRAFT VICINITY (location).

If altitude is unknown,

ALTITUDE UNKNOWN.

2–21b Examples.—

"Traffic, one zero miles east of Forsythe V-O-R, southbound, M–D Eighty, descending to one six thousand."

"Traffic, reported one zero miles west of Downey V-O-R, northbound, Apache, altitude unknown, estimated Joliet V-O-R one three one five."

"Traffic, eight minutes west of Chicago Heights V-O-R, westbound, Mooney, eight thousand, estimated Joliet V-O-R two zero three five."

"Traffic, numerous aircraft, vicinity of Delia Airport."

c. For aircraft displaying Mode C, not radar identified, issue indicated altitude.

2–21c Example.—

"Traffic, one o'clock, six miles, eastbound, altitude indicates six thousand five hundred."

2–21 Reference.—Traffic Information, paragraph 3–6 Visual Separation, paragraph 7–10. VFR Departure Information, paragraph 7–69.

2–22 BIRD ACTIVITY INFORMATION

a. Issue advisory information on pilot-reported, tower-observed, or radar-observed and pilot-verified bird activity. Include position, species or size of birds, if known, course of flight, and altitude. Do this for at least 15 minutes after receipt of such information from pilots or from adjacent facilities unless visual observation or subsequent reports reveal the activity is no longer a factor.

2–22a Examples.—

"Flock of geese, one o'clock, seven miles, northbound, last reported at four thousand."

"Flock of small birds, southbound along Mohawk River, last reported at three thousand."

"Numerous flocks of ducks, vicinity Lake Winnebago, altitude unknown."

b. Relay bird activity information to adjacent facilities and to FSS's whenever it appears it will become a factor in their areas.

2–23 TRANSFER OF POSITION RESPONSIBILITY

The transfer of position responsibility shall be accomplished in accordance with the "Standard Operating Practice (SOP) for the Transfer of Position Responsibility," and the appropriate facility directives each time the operational responsibility for a position is transferred from one specialist to another.

2–24 WHEELS DOWN CHECK

USA/USAF/USN

Remind aircraft to check wheels down on each approach unless the pilot has previously reported wheels down for that approach.

2–24 Note.—The intent is solely to remind the pilot to lower the wheels, not to place responsibility on the controller.

a. Tower shall issue the wheels down check at an appropriate place in the pattern.

Phraseology:

CHECK WHEELS DOWN.

b. Approach/arrival control, GCA shall issue the wheels down check as follows:

1. To aircraft conducting ASR, PAR, or radar monitored approaches, before the aircraft starts descent on final approach.

2. To aircraft conducting instrument approaches and remaining on the radar facility's frequency, before the aircraft passes the outer marker/final approach fix.

Phraseology:

WHEELS SHOULD BE DOWN

2–25 SUPERVISORY NOTIFICATION

Ensure supervisor/controller–in–charge (CIC) personnel are aware of conditions which impact sector/position operations including, but not limited to, the following:

a. Weather.

b. Equipment status.

c. Potential sector overload.

d. Emergency situations.

e. Special flights/operations.

2–26 thru 2–29 RESERVED

Section 2. FLIGHT PLANS AND CONTROL INFORMATION

2–30 RECORDING INFORMATION

a. Record domestic flight plans on flight plan forms or flight progress strips. Enter information required by the type of flight plan, existing circumstances, and future communications since all items are not necessary in each instance and not all entered will be transmitted when the flight plan is processed. Use authorized abbreviations when possible. When accepting flight plans for random RNAV routes, ensure that the route is defined by waypoints in terms of degree-distance fixes.

2–30a Note.—Generally, all military overseas flights are required to clear through a specified military base operations office (BASOPS). Pilots normally will not file flight plans directly with an FAA facility unless a BASOPS is not available. BASOPS will, in turn, forward the IFR flight notification message to the appropriate center.

b. When accepting flight plans for random routes that are defined by latitude/longitude coordinates, ensure that the route is identified by waypoints in terms of latitude/longitude fixes and departure/arrival fix identifiers. Latitude/longitude coordinates shall be recorded in degrees and minutes as follows: four figures describing latitude in degrees and minutes, followed by a solidus (/), and five figures describing longitude in degrees and minutes.

2–30b Example.—
"3559/11451"

c. *EN ROUTE:* When flight plans are filed directly with the center, record all items given by the pilot either on a flight progress strip or on a voice recorder. If the latter, enter in box 26 of the initial flight progress strip the sector or position number to identify where the information may be found in the event SAR activities become necessary.

2–30 Reference.—En Route Data Entries, paragraph 2–52.

2–31 FORWARDING INFORMATION

a. Except during Stage A operation, forward the flight plan information to the appropriate ATC facility, FSS, or BASOPS and record the time of filing and delivery on the form.

b. *EN ROUTE:* During Stage A operations, the above manual actions are required in cases where the data is not forwarded automatically by the computer.

2–31b Note.—During Stage A operation, data are exchanged between interfaced automated facilities and both the data and time of transmission are recorded automatically.

c. *EN ROUTE:* Forward proposed tower en route flight plans and any related amendments to the appropriate departure terminal facility.

2–32 FORWARDING VFR DATA

TERMINAL

Forward aircraft departure times to FSS's or military operations offices when they have requested them. Forward other VFR flight plan data only if requested by the pilot.

2–33 MILITARY DVFR DEPARTURES

TERMINAL

Forward departure times on all military DVFR departures from joint-use airports to the military operations office.

2–33 Note 1.—Details for handling air carrier, non-scheduled civil, and military DVFR flight data are contained in 7610.4.

2–33 Note 2.—Military pilots departing DVFR from a joint-use airport will include the phrase "DVFR to (destination)" in their initial call-up to an FAA operated tower.

2–34 IFR TO VFR FLIGHT PLAN CHANGE

Request a pilot to contact the appropriate FSS if he informs you of a desire to change from an IFR to a VFR flight plan.

2–35 IFR FLIGHT PROGRESS DATA

Forward control information from controller to controller within a facility, then to the receiving facility as the aircraft progresses along its route. Where appropriate, use computer equipment in lieu of manual coordination procedures. Do not use the remarks section of flight progress strips in lieu of voice coordination to pass control information. Ensure that flight plan and control information is correct and up-to-date. When covered by a letter of agreement/facility directive, the time requirements of subparagraph 2–35a may be reduced, and the time requirements of subparagraph 2–35b1 and subparagraph 2–40a may be increased up to 15 minutes when facilitated by automated systems or mandatory radar handoffs; or if operationally necessary because of manual data processing or nonradar operations, the time requirements of subparagraph 2–35a may be increased.

2–35 Note 1.—The procedures for preparing flight plan and control information related to altitude reservations (ALTRV's) are contained in Order 7210.3, ALTRV Flight Data Processing, paragraph 10–2. Development of the methods of assuring the accuracy and completeness of ALTRV flight plan and control information is the responsibility of the Military Liaison and Security Officer.

2–35 Note 2.—The term facility in this paragraph is defined as centers and terminal facilities when operating in an en route capacity.

a. Forward the following information at least 15 minutes before the aircraft is estimated to enter the receiving facility's area:

1. Aircraft identification.

2. TCAS/heavy aircraft indicator if appropriate, type of aircraft, and appropriate aircraft equipment suffix. The TCAS indicator is "T/," the heavy aircraft indicator is "H/," and for aircraft that are both TCAS and heavy the indicator is "B/."

3. Assigned altitude and ETA over last reporting point/fix in transferring facility's area or assumed departure time when the departure point is the last point/fix in the transferring facility's area.

4. Altitude at which aircraft will enter the receiving facility's area if other than the assigned altitude.

5. True airspeed.

6. Point of departure.

7. Route of flight remaining.

8. Destination airport and clearance limit if other than destination airport.

9. ETA at destination airport (not required for military or scheduled air carrier aircraft).

10. Altitude requested by the aircraft if assigned altitude differs from requested altitude (within a facility only).

2–35a10 Note.—When an aircraft has crossed one facility's area and assignment at a different altitude is still desired, the pilot will reinitiate his request with the next facility.

2–35a10 Reference.—Anticipated Altitude Changes, paragraph 4–66.

11. When flight plan data must be forwarded manually and an aircraft has been assigned a beacon code by the computer, include the code as part of the flight plan.

12. Longitudinal separation being used between aircraft at the same altitude if it results in these aircraft having less than 10 minutes separation at the facilities' boundary.

13. Any additional non-routine operational information pertinent to flight safety.

2–35a13 Note.—*EN ROUTE:* This includes alerting the receiving controller that the flight is conducting celestial navigation training.

2–35a13 Reference.—*EN ROUTE:* Celestial Navigation Training, paragraph 9–21.

b. Forward position report over last reporting point in the transferring facility's area if any of the following conditions exist:

1. Time differs more than 3 minutes from estimate given.

2. Requested by receiving facility.

3. Agreed to between facilities.

2–36 MANUAL INPUT OF COMPUTER-ASSIGNED BEACON CODES

When a flight plan is manually entered into the computer and a computer-assigned beacon code has been forwarded with the flight plan data, insert the beacon code in the appropriate field as part of the input message.

2–37 ALTRV INFORMATION

EN ROUTE

When an aircraft is a part of an approved ALTRV, forward only those items necessary to properly identify the flight, update flight data contained in the ALTRV APVL, or revise previously given information.

2–38 COMPUTER MESSAGE VERIFICATION

EN ROUTE

Unless your facility is equipped to automatically obtain acknowledgment of receipt of transferred data, when you transfer control information by computer message obtain, via Service F, acknowledgment that the receiving center has received the message and verification of the following:

a. Within the time limits specified by a letter of agreement or when not covered by a letter of agreement, at least 15 minutes before the aircraft is estimated to enter the receiving facility's area or at the time of a radar handoff or coordination for transfer of control:

1. Aircraft identification.

2. Assigned altitude.

3. Departure or coordination fix time.

b. Any cancellation of IFR flight plan.

2–39 TRANSMIT PROPOSED FLIGHT PLAN

EN ROUTE

a. Transmit proposed flight plans which fall within an ARTCC's Proposed Boundary Crossing Time (PBCT) parameter to adjacent ARTCC's via the Computer B network during hours of inter-center computer operation. In addition, when the route of flight of any proposed flight plan exceeds 20 elements external to the originating ARTCC's area, Center B shall be used to forward the data to all affected centers.

b. During nonautomated operation, the proposed flight plans shall be sent via Center B to the other centers involved when any of the following conditions are met:

1. The route of flight external to the originating center's area consists of 10 or more elements and the flight will enter 3 or more other center areas.

2–39b1 Note.—An element is defined as either a fix or route as specified in Order 7110.10, paragraph 6–12.

2. The route of flight beyond the first exit from the originating center's area consists of 10 or more elements, which are primarily fixes described in fix-radial-distance or latitude/longitude format,

regardless of the number of other center areas entered.

3. The flight plan remarks are too lengthy for interphone transmission.

2–40 FORWARDING AMENDED AND UTM DATA

a. Forward any amending data concerning previously forwarded flight plans except that revisions to ETA information in paragraph 2–35a(3) need only be forwarded when the time differs by more than 3 minutes from the estimate given.

Phraseology:

(Identifica REVISED (revised information).

2–40a Exa —

"America wo, revised flight level, three three zero."

"United Eight Ten, revised estimate, Front Royal two zero zero five."

"Douglas Five Zero One Romeo, revised altitude, eight thousand."

"Eastern Four Thirty-six, revised type, heavy DC-Eight.

b. Computer acceptance of an appropriate input message fulfills the requirement for sending amended data. The amendment data are considered acknowledged upon receipt of a CRD update message or a computer-generated flight progress strip containing the amendment data.

2–40b Note 1.—The successful utilization of automation equipment requires timely and accurate insertion of changes and/or new data.

2–40b Note 2.—If a pilot is not issued a computer-generated PDR/PDAR/PAR and amendment data are not entered into the computer, the next controller will have incorrect route information.

c. Forward any amending control information and record the action on the appropriate flight progress strip. Additionally, when a route or altitude in a previously issued clearance is amended within 15 minutes of an aircraft's proposed departure time, the facility that amended the clearance shall coordinate the amendment with the receiving facility via verbal AND automated means to ensure timely passage of the information.

2–40c Note.—The term "receiving" facility means the air traffic control facility that is expected to transmit the clearance amendment to the intended aircraft/pilot.

d. *EN ROUTE:* During Stage A operation, effect manual coordination on an initial interfacility flight plan message and on any subsequent messages related to that flight plan under the following conditions:

1. When a red coordination indicator is printed on the coordination strip.

2. When a black coordination indicator is printed on the coordination strip and an Unsuccessful Transmission Message (UTM) referencing that flight plan is received at the coordination sector. Draw a line through the computer coordination indicator, and indicate when manual coordination has been effected.

3. Then the transmission of the initial flight plan message is successful and a UTM is received containing revised data.

2–41 AIRBORNE MILITARY FLIGHTS

Forward to FSS's the following information received from airborne military aircraft:

a. IFR flight plans and changes from VFR to IFR flight plans.

b. Changes to an IFR flight plan as follows:

1. Change in destination.
   (a) Aircraft identification and type.
   (b) Departure point.
   (c) Original destination.
   (d) Position and time.
   (e) New destination.
   (f) ETA.
   (g) Remarks including change in fuel exhaustion time.
2. Revised ETA.
3. *Change in fuel exhaustion time.*

2–41b Note.—This makes current information available to FSS's for relay to military bases concerned and for use by centers in the event of two-way radio communications failure.

2–42 FORWARDING FLIGHT PLAN DATA BETWEEN U.S. ARTCCs AND CANADIAN ACCs

EN ROUTE

a. *Domestic*—(Continental U.S./Canadian Airspace except Alaska) Proposed departure flight plans and en route estimates will be handled on a 30 minute lead time (or as bilaterally agreed) between any ACC or ARTCC.

b. *International*—Any route changes (except SID's) must be forwarded to the appropriate Oceanic/Pre-oceanic ACC or ARTCC with an optimum lead time of 30 minutes or as soon as this information becomes available.

c. Initially, if a flight goes from U.S. airspace into Canadian airspace and returns to U.S. airspace, the ACC will be responsible for forwarding the flight plan data to the appropriate ARTCC by voice transmission except for flights which traverse mutually agreed on airways/fixes. These airways/fixes will be determined on a case-by-case basis and will be based on time and distance considerations at the regional level.

2–43 TELETYPE FLIGHT DATA FORMAT—U.S. ARTCCs—CANADIAN ACCs

EN ROUTE

The exchange of flight plan data between Canadian ACCs and U.S. ARTCCs shall be made as follows:

a. The U.S. ARTCC will transmit flight data to the Canadian ACCs in one of the following formats:

1. FAA Service B Teletypewriter input format as described in the NAS Management Directives (MDs) for:

(a) Flight Plan Messages:

(1) Active.

(2) Proposed.

(b) Amendment Messages.

(c) Cancellation Messages.

(d) Response Messages to Canadian Input:

(1) Acknowledgment Messages.

(2) Error Messages.

(3) Rejection Messages.

2. Canadian Ministry of Transport ACC Flight Strip Format: Where the data to be printed on the ACC strip form exceeds the strip form field size, the FAA Service B Teletypewriter input format in 1 above will be used. Input sequentially fields 1 through 8 in paragraph 2–35a.

b. The Ministry of Transport ACCs will transmit flight data to the FAA ARTCCs in the following format:

1. FAA Service B Teletypewriter input format as described in NAS MDs for:

(a) Flight Plan Messages:

(1) Active.

(2) Proposed.

(b) Amendment Messages.

(c) Cancellation Messages.

(d) Correction Messages.

2–44 thru 2–49 RESERVED

Section 3. FLIGHT PROGRESS STRIPS

2–50 GENERAL

Use flight progress strips to post current data on air traffic and clearances required for control and other air traffic control services. To prevent misinterpretation when data is hand printed, use standard hand-printed characters.

2–50 Note.—Unused flight progress strips, made available because of the design of strip printers whereby several blank strips are ejected to reach the first printed strip, should be saved and used for *manual strip preparation.*

a. Enter on the appropriate strip without delay the estimated times, clearance information, position reports, and any other IFR flight data received over any communications channel.

b. Maintain only necessary current data and remove the strips from the flight progress boards when no longer required for control purposes. To correct, update, or preplan information:

1. Do not erase or overwrite any item. Use an "X" to delete a climb/descend and maintain arrow, an at or above/below symbol, a cruise symbol, and unwanted altitude information. Write the new altitude information immediately adjacent to it and within the same space. For other items, draw a horizontal line through it, and write the new item immediately adjacent to it and within the same space.

2. Do not draw a horizontal line through an altitude being vacated until after the aircraft has reported or is observed (valid Mode C) leaving the altitude.

3. *EN ROUTE:* Preplanning may be accomplished in red pencil.

c. Enter the time of arrival (at approach control locations, the time over release point) for aircraft landing within your sector jurisdiction as follows:

1. *EN ROUTE:* Within controlled airspace—On the appropriate fix strip.

2. *EN ROUTE:* Outside of controlled airspace but within Within Class G airspace and a flight advisory area—On the strip of the fix nearest the point of landing.

d. Manually prepared strips shall conform to the format of machine-generated strips and manual strip preparation procedures will be modified simultaneously with the operational implementation of changes in the machine-generated format. (See Figure 2–50[1]).

Figure 2–50[1]
Standard Recording of Hand-printed Characters

Typed	Hand Printed	Typed	Hand Printed
A	A	T	T
B	B	U	U
C	C	V	V
D	D	W	W
E	E	X	X
F	F	Y	Y
G	G	Z	Z
H	H		
I	I	1	1
J	J	2	2
K	K	3	3
L	L	4	4
M	M	5	5
N	N	6	6
O	O	7	7
P	P	8	8
Q	Q	9	9
R	R	0	Ø
S	S		

NOTE: A slant line crossing through the numberal zero an underline of the letter "s" on handwritten portions of flight progress strips are required only when there is reason to believe the lack of these markings could lead to a misunderstanding. A slant line crossing through the numeral zero is required on all weather data.

2–51 ARRANGEMENT OF POSTINGS

EN ROUTE

Arrange flight progress strips, as specified by a facility directive, under the appropriate fix designator(s).

2–52 EN ROUTE DATA ENTRIES

a. Enter the information specified below in the correspondingly numbered spaces of the flight progress strips (FAA Form 7230–19):

1. Verification symbol if required.
2. Revision number.
3. Aircraft identification.
4. Number of aircraft if more than one, TCAS/heavy aircraft indicator if appropriate, type of aircraft,

and aircraft equipment suffix. The TCAS indicator is "T/," the heavy aircraft indicator is "H/," and for aircraft that are both TCAS and heavy the indicator is "B/."

5. Filed true airspeed.

6. Sector number.

7. Computer identification number if required.

8. Estimated groundspeed.

9. Revised ground speed or strip request (SR) originator.

10. Strip number.

11. Previous fix.

12. Estimated time over previous fix.

13. Revised estimated time over previous fix.

14. Actual time over previous fix, or actual departure time entered on first fix posting after departure.

14a. Plus time expressed in minutes from the previous fix to the posted fix.

15 Center-estimated time over fix (in hours and minutes), or clearance information for departing aircraft.

16. Arrows to indicate if aircraft is departing (↑) or arriving (↓).

17. Pilot-estimated time over fix.

18. Actual time over fix, time leaving holding fix, arrival time at nonapproach control airport, or symbol indicating cancellation of IFR flight plan for arriving aircraft, or departure time (actual or assumed).

19. Fix. For departing aircraft, add proposed departure time.

20. Altitude (in hundreds of feet) information.

21. Next posted fix or coordination fix.

22. Pilot's estimated time over next fix.

23. Arrows to indicate north (↑), south (↓), east (→), or west (←) direction of flight if required.

24. Requested altitude.

25. Point of origin, route as required for control and data relay, and destination.

26. Pertinent remarks, point out/radar vector/ speed adjustment information or sector/position number (when applicable in accordance with paragraph 2–30c).

27. Mode 3/A beacon code if applicable.

28. Miscellaneous control data (expected further clearance time, time cleared for approach, etc.).

29–30. Transfer of control data and coordination indicators. (See Figure 2–52[1]).

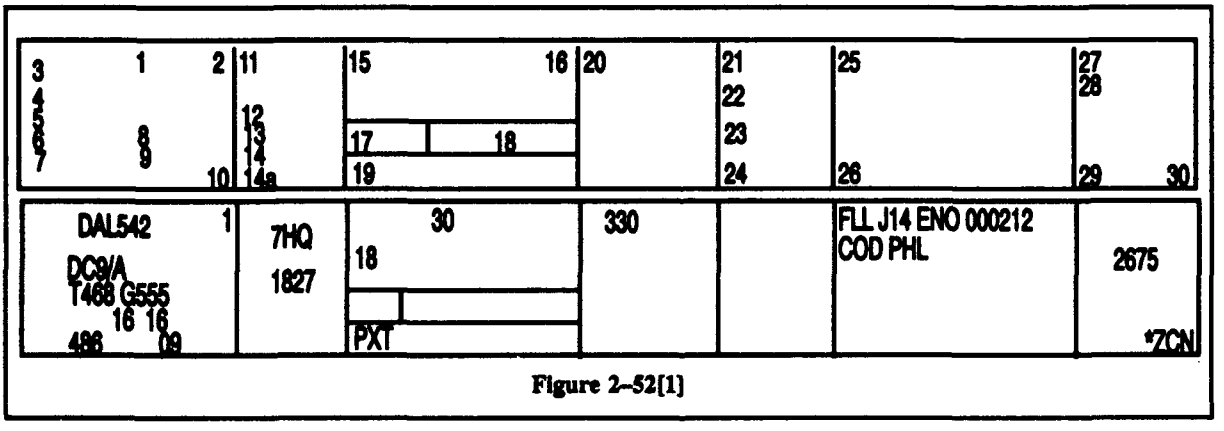


Figure 2–52[1]

b. Latitude/longitude coordinates may be used to define waypoints and may be substituted for nonadapted NAVAID's in space 25 of domestic en route flight progress strips provided it is necessary to accommodate a random RNAV route request.

c. Facility Air Traffic Managers may authorize the optional use of spaces 13, 14, 14a, 22, 23, 24, and 28 for point out information, radar vector information, speed adjustment information, or transfer of control data.

2–53 TERMINAL DATA ENTRIES

Enter the information specified below in the correspondingly numbered spaces of the flight progress strips (FAA Forms 7230–7.1, 7230–7.2, and 7230–8): (See Figure 2–53[1]).

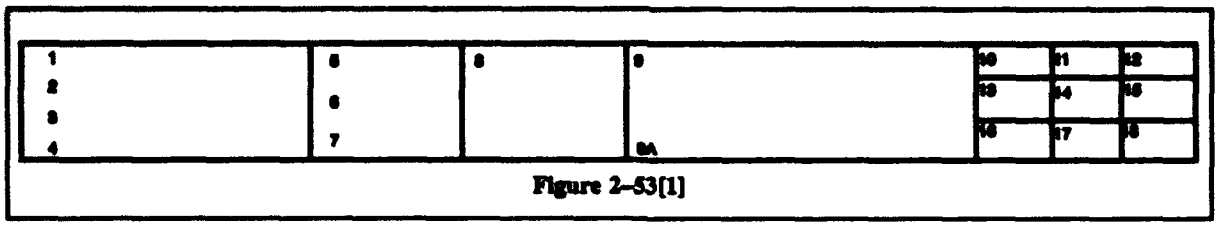


Figure 2–53[1]

2–53 Note 1.—National standardization of items (10 through 18) is not practical because of regional and local variations in operating methods; e.g., single fix, multiple fix, radar, tower en route control, etc.

2–53 Note 2.—Air Traffic managers at FDEP locations may authorize reduced lateral spacing between fields so as to print all FDEP data to the left of the strip perforation when using FAA Form 7230–7.2. All items will retain the same relationship to each other as they do when the full length strip (FAA Form 7230–7.1) is used.

2–53 Note 3.—Air traffic managers at automated terminal radar facilities may waive the requirement to use flight progress strips provided:

a. Backup systems such as multiple radar sites/systems or single site radars with CENRAP are utilized.

b. Local procedures are documented in a facility directive. These procedures should include but not be limited to:

1. Departure areas and/or procedures.

2. Arrival procedures.

3. Overflight handling procedures.

4. Transition from radar to nonradar.

5. Transition from ARTS to non–ARTS.

c. No misunderstanding will occur as a result of no strip usage.

d. Unused flight progress strips, facility developed forms and/or blank notepads shall be provided for controller use.

e. Facilities shall revert to flight progress strip usage if backup systems referred to in paragraph 2–53a are not available.

a. Arrivals:

1. Aircraft identification.

2. Revision number (FDEP locations only).

2A. Strip request originator. (At FDEP locations this indicates the sector or position that requested a strip be printed.)

3. Number of aircraft if more than one, TCAS/heavy aircraft indicator if appropriate, type of aircraft, and aircraft equipment suffix. The TCAS indicator is "T/," the heavy aircraft indicator is "H/," and for aircraft that are both TCAS and heavy the indicator is "B/."

4. Computer identification number if required.

5. Secondary radar (beacon) code assigned.

6. Previous fix (FDEP locations) or inbound airway.

2–53a6 Note.—The previous fix will be printed at FDEP locations. Use of the inbound airway is restricted to facilities where flight data is received via interphone when agreed upon by the center and terminal facilities.

7. Coordination fix.

8. Estimated time of arrival at the coordination fix or destination airport.

9. Altitude (in hundreds of feet) and remarks.

9A. Destination airport/point out/radar vector/speed adjustment information. Air Traffic managers may authorize the omission of any of these items if no misunderstanding will result, and they may authorize the optional use of spaces 2A and 10–18 for point out/radar vector or speed adjustment information.

2–53a9A Note.—Air Traffic managers may permit this information to be omitted if no misunderstanding will result. This shall be specified in the facility directive concerning strip marking procedures.

10 through 18. Enter data as specified by a facility directive. Radar facility personnel need not enter data in these spaces except when nonradar procedures are used or when radio recording equipment is inoperative.

b. Departures:

1. Aircraft identification.

2. Revision number (FDEP locations only).

2A. Strip request originator. (At FDEP locations this indicates the sector or position that requested a strip be printed.)

3. Number of aircraft if more than one, TCAS/heavy aircraft indicator if appropriate, type of aircraft, and aircraft equipment suffix. The TCAS indicator is "T/," the heavy aircraft indicator is "H/," and for aircraft that are both TCAS and heavy the indicator is "B/."

4. Computer identification number if required.

5. Secondary radar (beacon) code assigned.

6. Proposed departure time.

7. Requested altitude.

8. Departure airport.

2–53b6, 7, and 8 Reference.—See subparagraph 2–53a9A Note.

9. Machine-generated—Route, destination, and remarks. Manually enter altitude/altitude restrictions in the order flown if appropriate.

Manually prepared—Clearance limit, route, altitude/altitude restrictions in the order flown, if appropriate, and remarks.

9A. Point out/radar vector/speed adjustment information. Air Traffic managers may authorize the optional use of spaces 2A and 10–18 for this information.

10 through 18. Enter data as specified by a facility directive. Items, such as departure time, runway used for takeoff, check marks to indicate information forwarded or relayed, may be entered in these spaces.

c. Overflights:

1. Aircraft identification.

2. Revision number (FDEP locations only).

2A. Strip request originator. (At FDEP locations this indicates the sector or position that requested a strip be printed.)

3. Number of aircraft if more than one, TCAS/heavy aircraft indicator if appropriate, type of aircraft, and aircraft equipment suffix. The TCAS indicator is "T/," the heavy aircraft indicator is "H/," and for aircraft that are both TCAS and heavy the indicator is "B/."

4. Computer identification number if required.

5. Secondary radar (beacon) code assigned.

6. Coordination fix.

7. Overflight coordination indicator (FDEP locations only).

2–53c7 Note.—The overflight coordination indicator identifies the facility to which flight data has been forwarded.

8. Estimated time of arrival at the coordination fix.

9. Altitude and route of flight through the terminal area.

9A. Point out/radar vector/speed adjustment information. Air Traffic managers may authorize the optional use of spaces 2A and 10–18 for this information.

10 through 18. Enter data as specified by a facility directive.

2–54 AIRCRAFT IDENTITY

Indicate aircraft identity by one of the following using combinations not to exceed seven alphanumeric characters:

a. Civil aircraft, including air carrier—Aircraft letter—digit registration number including the letter "T" prefix for air taxi aircraft, the letter "L" for lifeguard aircraft, 3–letter aircraft company designator specified in the Contractions Handbook followed by the trip or flight number. Use the operating air carrier's company name in identifying equipment interchange flights.

2–54a Examples.—
"N12345." "TN5552Q." "AAL192." "LN751B."

2–54a Note.—The letter "L" is not to be used for air carrier/taxi lifeguard aircraft.

b. Military—

1. Prefixes indicating branch of service and/or type of mission followed by the last 5 digits of the serial number (the last 4 digits for CAF/CAM/CTG). (See Table 2–54[1] and Table 2–54[2]).

Table 2–54[1]
Branch of Service Prefix

Prefix	*Branch*
A	U.S. Air Force
C	U.S. Coast Guard
G	Air or Army National Guard
R	U.S. Army
VM	U.S. Marine Corps
VV	U. S. Navy
CAF	Canadian Armed Force
CAM	Canadian Armed Force (Transport Command)
CTG	Canadian Coast Guard

Table 2–54[2]
Military Mission Prefix

Prefix	*Mission*
E	Medical Air Evacuation
F	Flight Check
L	LOGAIR (USAF Contract)
M	AMC (Air Mobility Command)
S	Special Air Mission

2. Pronounceable words of 3, 4, 5, and 6 letters followed by a 4–, 3–, 2–, or 1–digit number.

2–54b2 Example.—
"SAMP Three One Six."

3. Assigned double-letter 2–digit flight number.

4. Navy or Marine fleet and training command aircraft, one of the following:

(a) The service prefix and 2 letters (use phonetic alphabet equivalent) followed by 2 or 3 digits.

(b) The service prefix and a digit and a letter (use phonetic alphabet equivalent) followed by 2 or 3 digits.

c. Special-use—Approved special-use identifiers.

2–55 AIRCRAFT TYPE

Use the approved codes listed in Appendices A thru D to indicate aircraft type.

2–56 USAF/USN UNDERGRADUATE PILOTS

To identify aircraft piloted by solo USAF/USN undergraduate student pilots (who may occasionally request revised clearances because they normally are restricted to flight in VFR conditions), the aircraft identification in the flight plan shall include the letter "Z" as a suffix. Do not use this suffix, however, in ground-to-air communication.

2–56 Note.—USAF solo students who have passed an instrument certification check may penetrate cloud layers in climb or descent only. Requests for revised clearances to avoid clouds in level flight can still be expected. This does not change the requirement to use the letter "Z" as a suffix to the aircraft identification.

2–56 Reference.—Aircraft Identification, paragraph 2–87; FAA Order 7610.4, Chapter 12, Section 10.

2–57 AIRCRAFT EQUIPMENT SUFFIX

a. Indicate, for both VFR and IFR operations, the aircraft's radar transponder, DME, or RNAV capability by adding the appropriate symbol, preceded by a slant. (See Table 2–57[1]).

Table 2–57[1]
Aircraft Equipment Suffix

	NO DME	DME	TACAN ONLY	RNAV	FMS/EFIS
No transponder.	/X	/D	/M	/W	
Transponder [no altitude capability].	/T	/B	/N	/C	
Transponder [with altitude encoding].	/U	/A	/P	/R	/G

Table 2–57[1] Note.— The /G suffix will only be used by U.S. air carriers operating to and from airports within the United States. Air carriers must obtain approval from the Flight Standards Service prior to filing /G. An aircraft operator must obtain approval from the Flight Standards Service prior to filing "/G" suffix.

b. When forwarding this information, state the aircraft type followed by the word "slant" and the appropriate phonetic letter equivalent of the suffix.

2–57 Examples.—

"D-C Six slant tango."

"D-C Six slant tango."

"F-Four-C slant november."

"F-Eight-E slant papa."

"Seven-Oh-Seven slant romeo."

2–58 CLEARANCE STATUS

Use an appropriate clearance symbol followed by a dash (—) and other pertinent information to clearly show the clearance status of an aircraft. To indicate delay status use:

a. The symbol "H" at the clearance limit when holding instructions have been included in the aircraft's original clearance. Show detailed holding information following the dash when holding differs from the established pattern for the fix; i.e., turns, leg lengths, etc.

b. The symbols "F" or "O" to indicate the clearance limit when a delay is not anticipated.

2–59 CONTROL SYMBOLOGY

Use authorized control and clearance symbols or abbreviations for recording clearances, reports, and instructions. Control status of aircraft must always be current. You may use:

a. Plain language markings when it will aid in understanding information.

b. Locally approved identifiers. Use these only within your facility and not on teletypewriter or interphone circuits.

c. Plain sheets of paper to record information when flight progress strips are not used. (See Table 2–59[1] and Table 2–59[2]).

Table 2–59[1]
Clearance Abbreviations

Abbreviation	*Meaning*
A	Cleared to airport (point of intended landing)
B	Center clearance delivered
C	ATC clears (when clearance relayed through non-ATC facility)

Table 2–59[1]—CONTINUED
Clearance Abbreviations

Abbreviation	*Meaning*
CAF	Cleared as filed
D	Cleared to depart from the fix
F	Cleared to the fix
H	Cleared to hold and instructions issued
L	Cleared to land
N	Clearance not delivered
O	Cleared to the outer marker
PD	Cleared to climb/descend at pilot's discretion
Q	Cleared to fly specified sectors of a NAVAID defined in terms of courses, bearings, radials or quadrants within a designated radius.
T	Cleared through (for landing and takeoff through intermediate point)
V	Cleared over the fix
X	Cleared to cross (airway, route, radial) at (point)
Z	Tower jurisdiction

Table 2–59[2]
Miscellaneous Abbreviations

Abbreviation	*Meaning*
BC	Back course approach

Table 2–59[2]—CONTINUED
Miscellaneous Abbreviations

Abbreviation	*Meaning*
CT	Contact approach
FA	Final approach
I	Initial approach
ILS	ILS approach
MA	Missed approach
MLS	MLS approach
NDB	Nondirectional radio beacon approach
OTP	VFR conditions-on-top
PA	Precision approach
PT	Procedure turn
RH	Runway Heading
RP	Report immediately upon passing (fix/altitude)
RX	Report crossing
SA	Surveillance approach
SI	Straight-in approach
TA	TACAN approach
TL	Turn left
TR	Turn right
VA	Visual approach
VR	VOR approach

2–59 Control Information Symbols (See Figure 2–59[1] and Figure 2–59[2]).

Symbols	Meaning
T →( )	Depart (direction, if specified)
↑	Climb and maintain
↓	Descend and maintain
→	Cruise
@	At
X	Cross
-M→	Maintain
⌝	Join or intercept airway/jet route/track or course
▪	While in controlled airspace
△	While in control area
↘△	Enter control area
△↗	Out of control area
NW ⊖ ⊘ NE ⊖→ E	Cleared to enter, depart or through [redacted] indicated direction of flight by arrow and appropriate compass letter. Maintain Special VFR conditions (altitude if appropriate) while in [redacted]
250 K	Aircraft requested to adjust speed to 250 knots.
-20 K	Aircraft requested to reduce speed to 20 knots.
+30 K	Aircraft requested to increase speed to 30 knots.
W	Local Special VFR operations in the vicinity of (name) airport are authorized until(time). Maintain special VFR conditions (altitude if appropriate).
>	Before
<	After or Past
170 (red)	Inappropriate altitude/flight level for direction of flight. (Underline assigned altitude/flight level in red.)
/	Until
( )	Alternate instructions
Restriction	Restriction
T↓	At or Below
↑T	At or Above
-(Dash)	From-to (route, time, etc.)
(Alt)B(Alt)	Indicates a block altitude assignment. Altitudes are inclusive, and the first altitude shall be lower than the second. Example: 310B370
v<	Clearance void if aircraft not off ground by (time)

NOTE: The absence of an airway route number between two fixes in the route of flight indicates "direct"; no symbol or abbreviation is required.

Figure 2–59[1]

Symbols	Meaning
℄	Pilot cancelled flight plan
✓	EN ROUTE: Aircraft has reported at assigned altitude, Example: 80 ✓
✓	TERMINAL/FSS: Information forwarded (indicated information forwarded as required)
○ (red)	EN ROUTE: Information or revised information forwarded. (Circle, in red, inappropriate altitude/flight level for direction of flight or other control information when coordinated. Also circle, in red, the time (minutes and altitude when a flight plan or estimate is forwarded. Use this method in both inter-center and intra-center coordination.)
(80)	Other than assigned altitude reported (circle reported altitude)
10 / 6	DME holding (use with mileages) (Upper figure indicates distance from station to DME fix, lower figure indicates length of holding pattern. In this example, the DME fix is 10 miles out with a 6 mile pattern indicated.
(mi.)(dir.)	DME arc of VORTAC, TACAN, or MLS.
(freq.)	Contact (facility) or (freq.), (time, fix, or altitude if appropriate). Insert frequency only when it is other than standard.
R	Radar contact.
R	EN ROUTE: Requested altitude (preceding altitude information)
~~R~~	Radar service terminated
~~R~~	Radar contact lost
RV	Radar vector
~~RV~~	Pilot resumed own navigation
(R)	Radar handoff (circle symbol when handoff completed)
E (red)	EMERGENCY
W (red)	WARNING
P	Point out initiated. Indicate the appropriate facility, sector or position. Example: PZFW.

NOTE: The absence of an airway route number between two fixes in the route of flight indicates "direct"; no symbol or abbreviation is required.

Figure 2–59[2]

2–59 Reference.—Exceptions, paragraph 4–61.

2–60 thru 2–69 RESERVED

Section 4. RADIO AND INTERPHONE COMMUNICATIONS

2–70 RADIO COMMUNICATIONS

Use radio frequencies for the special purposes for which they are intended. A single frequency may be used for more than one function except as follows:

TERMINAL: When combining positions in the tower, do not use ground control frequency for airborne communications.

2–70 Note.—Due to the limited number of frequencies assigned to towers for the ground control function, it is very likely that airborne use of a ground control frequency could cause interference to other towers or interference to your aircraft from another tower. When combining these functions, it is recommended combining them on local control. The ATIS may be used to specify the desired frequency.

2–71 MONITORING

Monitor interphones and assigned radio frequencies continuously.

2–71 Note.—Although all FAA facilities, including RAPCON's and RATCF's, are required to monitor all assigned frequencies continuously, USAF facilities may not monitor all unpublished discrete frequencies.

2–72 PILOT ACKNOWLEDGMENT/ READBACK

a. When issuing clearances, instructions, or information, ensure acknowledgment by the pilot.

2–72a Note.—Pilots may acknowledge clearances, instructions, or other information by using "Wilco," "Roger," "Affirmative," or other words or remarks.

2–72a Reference.—Airman's Information Manual, Contact Procedures, paragraph 4–33c.

b. If altitude, heading, or other items are read back by the pilot, ensure the readback is correct. If incorrect or incomplete, make corrections as appropriate.

2–73 AUTHORIZED INTERRUPTIONS

As necessary, authorize a pilot to interrupt his communications guard.

2–73 Note.—Some users have adopted procedures to insure uninterrupted receiving capability with ATC when a pilot with only one operative communications radio must interrupt his communications guard because of a safety related problem requiring airborne communications with his company. In this event, pilots will request approval to abandon guard on the assigned ATC frequency for a mutually agreeable time period. Additionally, they will inform controllers of the NAVAID voice facility and the company frequency they will monitor.

2–74 AUTHORIZED TRANSMISSIONS

Transmit only those messages necessary for air traffic control or otherwise contributing to air safety.

2–74 Reference.—FAA Order 7210.3, Authorized Messages Not Directly Associated With AT Services, paragraph 3–21.

2–75 FALSE OR DECEPTIVE COMMUNICATIONS

Take action to detect, prevent, and report:

a. False, deceptive, or phantom controller communications to an aircraft or controller. The following shall be accomplished when false or deceptive communications occur:

1. Correct false information.
2. Broadcast an alert to aircraft operating on all frequencies within the area where deceptive or phantom transmissions have been received.

2–75a2 Example.—

"Attention all aircraft. False air traffic control instructions have been received in the area of Long Beach Airport. Exercise extreme caution on all frequencies and verify instructions."

3. Collect pertinent information regarding the incident.
4. Notify the Area Supervisor of the false, deceptive, or phantom transmission and report all relevant information pertaining to the incident

2–76 AUTHORIZED RELAYS

a. Relay operational information to aircraft or aircraft operators as necessary. Do not agree to handle such messages on a regular basis. Give the source of any such message you relay.

b. Relay official FAA messages as required.

2–76b Note.—The FAA Administrator and Deputy Administrator will sometimes use code phrases to identify themselves in air-to-ground communications as follows:

a. Administrator—"Safeair One."

b. Deputy Administrator—"Safeair Two."

2–76b Example.—

"Miami Center, Jetstar One, this is Safeair One, (message)".

c. Relay operational information to military aircraft flight planned to or operating on IR's.

2–77 RADIO MESSAGE FORMAT

Communication for both initiation and reply via radio with an aircraft by using the following format and procedures:

a. Sector/position initial radio contact:

1. Identification of aircraft.
2. Identification of ATC unit.
3. Message (if any).
4. The word "over" if required.

b. Subsequent radio transmissions from the same sector/position shall use the same format as subparagraph 2–77a, except the identification of the ATC unit may be omitted.

TERMINAL: You may omit aircraft identification after initial contact when conducting the final portion of a radar approach.

2–77a1 Reference.—Aircraft Identification, paragraph 2–87.

2–78 ABBREVIATED TRANSMISSIONS

Transmissions may be abbreviated as follows:

a. Use the identification prefix and the last 3 digits or letters of the aircraft identification after communications have been established and the type of aircraft is known. Do not abbreviate similar sounding aircraft identifications or the identification of an air carrier or other civil aircraft having an FAA authorized call sign.

2–78a Reference.—Aircraft Identification, paragraph 2–87.

b. Omit the facility identification after communication has been established.

c. Transmit the message immediately after the callup (without waiting for the aircraft's reply) when the message is short and receipt is generally assured.

d. Omit the word "over" if the message obviously requires a reply.

2–79 INTERPHONE TRANSMISSION PRIORITIES

Give priority to interphone transmissions as follows:

a. First priority—Emergency messages including essential information on aircraft accidents or suspected accidents. After an actual emergency has passed, give a lower priority to messages relating to that accident.

b. Second priority—Clearances and control instructions.

c. Third priority—Movement and control messages using the following order of preference when possible:

1. Progress reports.
2. Departure or arrival reports.
3. Flight plans.

d. Fourth priority—Movement messages on VFR aircraft.

2–80 PRIORITY INTERRUPTION

Use the words "emergency" or "control" for interrupting lower priority messages when you have an emergency or control message to transmit.

2–81 INTERPHONE MESSAGE FORMAT

Use the following format for interphone (override/handoff line) intra/interfacility communications:

a. The caller states the identification of the position being called followed by the position identification of the caller.

2–81a Note.—Other means of identifying a position, such as substituting departure or arrival gate/fix names for position identification, may be used. However, it must be operationally beneficial, and the procedure fully covered in a letter of agreement or a facility directive, as appropriate.

b. The receiver states the position identification followed by an acknowledgment of the call.

2–81b Note.—If operationally beneficial, subparagraphs 2–81a and b may be reversed.

c. The caller states the message.

d. The receiver states the response to the caller's message followed by the receiver's operating initials.

e. The caller states his or her operating initials.

2–81 Example 1.—

Caller—"Denver High, R Twenty-five."

Receiver—"Denver High."

Caller—"Request direct Denver for Eastern Three Twenty-eight."

Receiver—"Eastern Three Twenty-eight direct Denver approved. H.F."

Caller—"G.M."

2–81 Example 2.—

Receiver—"Denver High, go ahead override."

Caller—"R Twenty-five, request direct Denver for Eastern Three Twenty-eight."

Receiver—"Eastern Three Twenty-eight direct Denver approved. H.F."

Caller—"G.M."

2–81 Example 3.—

Caller—("Bolos" is a departure gate in Houston ARTCC's Sabine sector)-"Bolos, Houston local."

Receiver—"Bolos."

Caller—"Request Flight Level three five zero for American twenty-five."

Receiver—"American twenty-five Flight Level three five zero approved, A.C."

Caller—"G.M."

f. Identify the interphone voice line on which the call is being made when two or more such lines are collocated at the receiving operating position.

2–81f Examples—

"Washington Center, Washington Approach on the 57 line"

"Chicago Center, O'Hare Tower handoff on the Departure West line."

2–82 INTERPHONE MESSAGE TERMINATION

Terminate interphone messages with your operating initials.

2–83 WORDS AND PHRASES

Use the words or phrases in radiotelephone and interphone communication as contained in the Pilot/Controller Glossary. The word "heavy" shall be used as part of the identification of heavy jet aircraft as follow:

TERMINAL: In all communications with or about heavy jet aircraft.

EN ROUTE: The use of the word heavy may be omitted except as follows:

a. In communications with a terminal facility about heavy jet operations.

b. In communications with or about heavy jet aircraft with regard to an airport where the en route center is providing approach control service.

c. In communications with or about heavy jet aircraft when the separation from a following aircraft may become less than 5 miles by approved procedure.

d. When issuing traffic advisories.

2–83 Example.—
"United Fifty-eight heavy."

2–83 Note 1. Most airlines will use the word "heavy" following the company prefix and trip number when establishing communications or when changing frequencies within a terminal facility's area.

2–83 Note 2. When in radiotelephone communications with "AIR FORCE ONE" or "AIR FORCE TWO", do not add the heavy designator to the call sign. State only the call sign "AIR FORCE ONE/TWO" regardless of the type aircraft.

2–84 EMPHASIS FOR CLARITY

Emphasize appropriate digits, letters, or similar sounding words to aid in distinguishing between similar sounding aircraft identifications. Additionally:

a. Notify each pilot concerned when communicating with aircraft having similar sounding identifications.

2–84a Examples.—
"United Thirty-one United, Miami Center, Eastern Thirty-one is also on this frequency, acknowledge." "Eastern Thirty-one Eastern, Miami Center, United Thirty-one is also on this frequency, acknowledge."

2–84a Reference.—Aircraft Identification, paragraph 2–87. FAA Order 7210.3, Aircraft Identification Problems, paragraph 2–11.

b. Notify the area supervisor-in-charge of any duplicate flight identification numbers or phonetically similar-sounding call signs when the aircraft are operating simultaneously within the same sector.

2–84b Note.—This is especially important when this occures on a repetitive, rather than an isolated, basis.

2–85 ICAO PHONETICS

Use the ICAO pronunciation of numbers and, as necessary to clarify individual letters. (See the ICAO radiotelephony alphabet and pronunciation in Table 2–85[1]).

Table 2–85[1]
ICAO Phonetics

Character	*Word*	*Pronunciation*
0	Zero	ZE—RO
1	One	WUN
2	Two	TOO
3	Three	TREE
4	Four	FOW—ER
5	Five	FIFE
6	Six	SIX
7	Seven	SEV—EN
8	Eight	AIT
9	Nine	NIN—ER
A	Alfa	ALFAH
B	Bravo	BRAHVOH
C	Charlie	CHARLEE
D	Delta	DELLTAH
E	Echo	ECKOH
F	Foxtrot	FOKSTROT
G	Golf	GOLF
H	Hotel	HOHTELL
I	India	INDEE AH
J	Juliett	JEWLEE ETT
K	Kilo	KEYLOH
L	Lima	LEEMAH
M	Mike	MIKE
N	November	NOVEMBER
O	Oscar	OSSCAH
P	Papa	PAHPAH
Q	Quebec	KEHBECK
R	Romeo	ROWME OH
S	Sierra	SEEAIRAH
T	Tango	TANGGO
U	Uniform	YOUNEE FORM
V	Victor	VIKTAH
W	Whiskey	WISSKEY
X	X-ray	ECKSRAY
Y	Yankee	YANGKEY
Z	Zulu	ZOOLOO

Table 2–85[1]—CONTINUED
ICAO Phonetics

Note.—Syllables to be emphasized in pronunciation are in bold face.

2–86 NUMBERS USAGE

State numbers as follows:

a. Serial numbers—The separate digits.

2–86a Examples.—Table 2–86[1]:

Number	*Statement*
11,495	"One one four niner five."
20,069	"Two zero zero six niner."

b. Altitudes or flight levels:

1. Altitudes—Pronounce each digit in the number of hundreds or thousands followed by the word "hundred" or "thousand" as appropriate.

2–86b1 Example 1.—Table 2–86[2]:

Altitude	*Statement*
10,000	"One zero thousand."
11,000	"One one thousand."
17,900	"One seven thousand niner hundred."

2–86b1 Note.—Altitudes may be restated in group form for added clarity if the controller chooses.

2–86b1 Example 2.—Table 2–86[3]

Altitude	*Statement*
10,000	"Ten thousand."
11,000	"Eleven thousand."
17,900	"Seventeen thousand niner hundred."

2. Flight levels—The words "flight level" followed by the separate digits of the flight level.

2–86b2 Examples.—Table 2–86[4]:

Flight level	*Statement*
180	"Flight level one eight zero"
275	"Flight level two seven five"

3. MDA/DH Altitudes—The separate digits of the MDA/DH altitude

2–86b3 Examples.—Table 2–86[5]:

MDA/DH Altitude	*Statement*
1,320	"Minimum descent altitude, one three two zero"
486	"Decision height, four eight six"

c. Time:

1. General time information—The 4 separate digits of the hour and minutes based on the 24–hour clock in terms of Coordinated Universal Time (UTC).

2–86c1 Examples.—Table 2–86[6]:

Time (12 hr.)	*Time (24 hr.)*	*Statement*
1:15 a.m.	0115	"Zero one one five."
1:15 p.m.	1315	"One three one five."

2. Upon request—The 4 separate digits of the hours and minutes in terms of UTC by stating "Zulu" followed by the local standard time equivalent.

2–86c2 Example.—Table 2–86[7]:

Time	*Statement*
1430 PST (2230 UTC)	"Two two three zero Zulu, one four three zero Pacific."

3. Time check—The word "time" followed by the 4 separate digits of the hour and minutes, and nearest quarter minute.

2–86c3 Example.—Table 2–86[8]:

Time	*Statement*
1415 3/4	"Time, one four one five and three-quarters."

4. Abbreviated time—The separate digits of the minutes only.

2–86c4 Examples.—Table 2–86[9]:

Time	*Statement*
1415	"One five."
1420	"Two zero."

d. Field elevation—The words "field elevation" followed by the separate digits of the elevation.

2–86d Examples.—Table 2–86[10]:

Elevation	*Statement*
17 feet	"Field elevation, one seven."
817 feet	"Field elevation, eight one seven."
2,817 feet	"Field elevation, two eight one seven."

e. The number "0" as "zero" except where it is used in approved "group form" for authorized aircraft call signs, and in stating altitudes.

2–86e Example.—Table 2–86[11]:

	Statement
	"Field elevation one six zero."
	"Heading three zero zero."
	"Western five thirty."
	"Eastern Metro four hundred."
	"One zero thousand five hundred."

2–86e Reference.—paragraph 2–86b and paragraph 2–87a1.

f. Altimeter setting—The word "altimeter" followed by the separate digits of the altimeter setting.

2–86f Example.—Table 2–86[12]:

Setting	*Statement*
30.01	"Altimeter, three zero zero one."

g. Surface wind—The word "wind" followed by the separate digits of the indicated wind direction to the nearest 10–degree multiple, the word "at," and the separate digits of the indicated velocity in knots.

2–86g Examples.—

"Wind zero three zero at two five."

"Wind two seven zero at one five gusts three five."

h. Heading—The word "heading" followed by the three separate digits of the number of degrees, omitting the word "degrees." Use heading 360 degrees to indicate a north heading.

2–86h Examples.—Table 2–86[13]:

Heading	*Statement*
5 degrees	"Heading zero zero five."
30 degrees	"Heading zero three zero."
360 degrees	"Heading three six zero."

i. Radar beacon codes—The separate digits of the 4–digit code.

2–86i Examples.—Table 2–86[14]:

Code	*Statement*
1000	"One zero zero zero."
2100	"Two one zero zero."

j. Runways—The word "runway," followed by the separate digits of the runway designation. For a parallel runway, state the word "left," "right," or "center" if the letter "L," "R," or "C" is included in the designation.

2–86j Examples.—Table 2–86[15]:

Designation	*Statement*
3	"Runway Three."
8L	"Runway Eight Left."
27R	"Runway Two Seven Right."

k. Frequencies—

1. The separate digits of the frequency, inserting the word "point" where the decimal point occurs. Omit digits after the second digit to the right of the decimal point. When the frequency is in the L/MF band, include the word "kiloHertz."

2–86k1 Examples.—Table 2–86[16]:

Frequency	*Statement*
126.55 mHz	"One two six point five five."
369.0 mHz	"Three six niner point zero."
121.5 mHz	"One two one point five."
135.275 mHz	"One three five point two seven."
302 kHz	"Three zero two kiloHertz."

2. *USAF/USN:* Local channelization numbers may be used in lieu of frequencies for locally based aircraft when local procedures are established to ensure that local aircraft and ATC facilities use the same channelization.

2–86k2 Example.—Table 2–86[17]:

Frequency	*Statement*
275.8 mHz	"Local channel one six."

3. Issue MLS/TACAN frequencies by stating the assigned two-or three-digit channel number.

2–86k3 Examples.—

"M-L-S channel five three zero."

"TACAN channel nine seven."

l. Speeds—

1. The separate digits of the speed followed by "knots" except as required by Methods (Speed Adjustment) paragraph 5–101.

2–86l1 Examples.—Table 2–86[18]:

Speed	*Statement*
250	"Two five zero knots."
190	"One niner zero knots."

2. The separate digits of the mach number preceded by "mach."

2–86l2 Examples.—Table 2–86[19]:

Mach Number	*Statement*
1.5	"Mach one point five."
0.64	"Mach point six four."
0.7	"Mach point seven."

m. Miles—The separate digits of the mileage followed by the word *mile.*

2–86m Examples.—

"Three zero mile arc east of Nottingham."

"Traffic, one o'clock, two five miles, northbound, D-C Eight, flight level two seven zero."

2–87 FACILITY IDENTIFICATION

Identify facilities as follows:

a. Airport traffic control towers—State the name of the facility followed by the word "tower." Where military and civil airports are located in the same general area and have similar names, state the name of the military service followed by the name of the military facility and the word "tower."

2–87a Examples.—

"Columbus Tower."

"Barksdale Tower."

"Navy Jacksonville Tower."

b. Air route traffic control centers—State the name of the facility followed by the word "center."

c. Approach control facilities, including RAPCON's, RATCF's, and ARAC's—State the name of the facility followed by the word "approach." Where military and civil facilities are located in the same general area and have similar names, state the name of the military service followed by the name of the military facility and the word "approach."

2–87c Examples.—

"Denver Approach."

"Griffiss Approach."

"Navy Jacksonville Approach."

d. Functions within a terminal facility—State the name of the facility followed by the name of the function.

2–87d Examples.—

"Boston Departure."

"La Guardia Clearance Delivery."

"O'Hare Ground."

e. When calling or replying on an interphone line which connects only two facilities, you may omit the facility name.

2–87e Example.—

"Bradford High, handoff."

f. FAA flight service stations—State the name of the station followed by the word "radio."

2–87f Example—

"Pittsburgh Radio."

g. Radar facilities having ASR or PAR but not providing approach control service—State the name of the facility, followed by the letters "G-C-A."

2–87g Examples.—

"Chanute G-C-A."

"Corpus Christi G-C-A."

"Davison G-C-A."

2–88 AIRCRAFT IDENTIFICATION

Identify aircraft as follows: use the full identification in reply to aircraft with similar sounding identifications. For other aircraft, the same identification may be used in reply that the pilot used in his initial callup except use the correct identification after communications have been established.

2–88 Reference.—Radio Message Format, paragraph 2–77. Abbreviated Transmissions, paragraph 2–78. Emphasis for Clarity, paragraph 2–84. Numbers Usage, paragraph 2–86.

a. Civil—State the aircraft type, the model, the manufacturer's name, or the prefix "November" followed by the numbers/letters of the aircraft registration.

2–88a Examples.—

"Jet Commander One Four Two Four."

"Douglas Three Zero Five Romeo."

"Bonanza One Two Three Four Tango."

"November One Two Three Four Golf."

"Bell Two Seven Three Three."

2–88a Note.—The prefix "November" denotes a U.S. aircraft registry.

1. Air carrier and other civil aircraft having FAA authorized call signs—State the call sign followed by the flight number in group form.

2–88a1 Examples.—

"American Fifty-two."

"Delta One Hundred."

"Eastern Metro One Ten."

"General Motors Thirty Fifteen."

"United One Zero One."

"Delta Zero One Zero."

"Eastern Ten Zero Four."

2–88a1 Note.—"Group form" is the pronunciation of a series of numbers as the whole number, or pairs of numbers they represent rather than pronouncing each separate digit. The use of group form may however be negated by four digit identifiers or the placement of zeros in the identifier.

2. If aircraft identification becomes a problem when the procedures specified in 1 are used, the call sign shall be restated after the flight number of the aircraft involved.

2–88a2 Examples—

"American Five Twenty-one American."

"Commuter Six Eleven Commuter."

"General Motors Thirty-seven General Motors."

2–88a2 Reference.—FAA Order 7210.3, Aircraft Identification Problems, paragraph 2–11.

3. Air taxi and commercial operators not having FAA authorized call signs—State the prefix "TANGO" on initial contact, if used by the pilot, followed by the registration number. The prefix may be dropped in subsequent communications.

2–88a3 Examples.—

"Tango Mooney Five Five Five Two Quebec."

"Tango November One Two Three Four."

b. Air carrier/taxi ambulance—State the prefix, "Lifeguard," if used by the pilot, followed by the call sign and flight number in group form.

2–88b Example.—

"LIFEGUARD Delta Fifty-one."

c. Civilian airborne ambulance—State the word "LIFEGUARD" followed by the numbers/letters of the registration number.

2–88c Example.—

"LIFEGUARD Two Six Four Six."

d. U.S. military—State one of the following:

1. The service name, followed by the word "copter," when appropriate, and the last 5 digits of the serial number.

2–88d1 Examples.—
"Navy Five Six Seven One Three."

"Coast Guard Six One Three Two Seven."

"Air Guard One Three Five Eight Six"

"Army Copter Three Two One Seven Six."

2–88d1 Note.—If aircraft identification becomes a problem, procedures in subparagraph 2–88a2 above will apply.

2. Special military operations—State one of the following followed by the last 5 digits of the serial number:

(a) Air evacuation flights—"AIR EVAC," "MARINE AIR EVAC," or "NAVY AIR EVAC."

2–88d2(a) Example.—
"AIR EVAC One Seven Six Five Two."

(b) Rescue flights—(Service name) "RESCUE."

2–88d2(b) Example.—
"Air Force RESCUE Six One Five Seven Niner."

(c) Air Mobility Command (AMC)—"REACH"

2–88d2(c) Example.—
"REACH Seven Eight Five Six Two."

(d) Special Air Mission—"SAM."

2–88d2(d) Example.—
"U.S. SAM Niner One Five Six Two."

(e) USAF Contract Aircraft—"LOGAIR."

2–88d2(e) Example.—
"LOGAIR Seven Five Eight Two Six."

3. Military tactical and training:

(a) U.S. Air Force, Air National Guard, Military District of Washington priority aircraft, and USAF civil disturbance aircraft—Pronounceable words of 3, 4, 5 or 6 letters followed by a 4, 3, 2, or 1–digit number.

2–88d3(a) Examples.—
"Paul Two Zero."

"Pat One Five Seven."

"Gaydog Four."

2–88d3(a) Note.—When the "Z" suffix described in paragraph 2–56 is added to identify aircraft piloted by USAF undergraduate pilots, the call sign will be limited to a combination of six characters.

(b) Navy or Marine fleet and training command aircraft—The service name and 2 letters, or a digit and a letter (use letter phonetic equivalents), followed by 2 or 3 digits.

2–88d3(b) Examples.—
"Navy Golf Alfa Two One "

"Marine Four Charlie Two Three Six."

(c) NORAD interceptors—An assigned double letter 2–digit flight number.

2–88d3(c) Example.—
"Alfa Kilo One Five."

e. Foreign registry—State one of the following:

1. Civil—State the aircraft type or the manufacturer's name followed by the letters/numbers of the aircraft registration, or state the letters or digits of the aircraft registration or call sign.

2–88e1 Examples.—
"Stationair F-L-R-B."

"C-F-L-R-B."

2–88e1 Note.—Letters may be spoken individually or phonetically.

2. Air carrier—The abbreviated name of the operating company, followed by:

(a) The letters or digits of the registration or call sign.

2–88e2(a) Example.—
"Air France F-L-R-L-G."

(b) The flight number in group form, or you may use separate digits if that is the format used by the pilot.

2–88e2(b) Examples.—
"Scandinavian Sixty-eight."

"Scandinavian Six Eight."

3. Military—Except Canada, the name of the country and the military service followed by the separate digits or letters of the registration or call sign. Canadian Armed Force aircraft shall be identified by the word "Canforce" followed by the separate digits of the serial number, except that the Transport Command of the Canadian Armed Force shall be identified by the words "Canadian Military" and the Canadian Coast Guard shall be identified as "Canadian Coast Guard" followed by the separate digits of the serial number.

2–88e3 Examples.—
"CANFORCE Five Six Two Seven."

"Brazilian Air Force Five Three Two Seven Six."

f. Presidential aircraft and Presidential family aircraft:

1. When the President is aboard a military aircraft, state the name of the military service, followed by the word "One."

2–88f1 Examples.—
"Air Force One." 'Army One." 'Marine One."

(2) When the President is aboard a civil aircraft, state the words "Executive One."

(3) When a member of the President's family is aboard any aircraft, if the U.S. Secret Service or the White House Staff determines it is necessary, state the words "Executive One Foxtrot."

2–88f Reference.—Operational Priority, paragraph 2–4d.

g. Vice Presidential aircraft:

1. When the Vice President is aboard a military aircraft, state the name of the military service, followed by the word "Two."

2–88g1 Examples.—
"Air Force Two." "Army Two." "Marine Two."

2. When the Vice President is aboard a civil aircraft, state the words "Executive Two."

3. When a member of the Vice President's family is aboard any aircraft, if the U.S. Secret Service or the White House Staff determines it is necessary, state the words "Executive Two Foxtrot."

2–88g Reference.—Operational Priority, paragraph 2–4d.

h. DOT and FAA flights: The following alphanumeric identifiers and radio/interphone call-signs are established for use in air/ground communications when the Secretary of Transportation, Deputy Secretary of Transportation, FAA Administrator or FAA Deputy Administrator have a requirement to identify themselves. (See Table 2–88[1]).

Table 2–88[1]

	Identifier	Call-sign
Secretary of Transportation	DOT–1	Transport–1
Deputy Secretary of Transportation	DOT–2	Transport–2
Administrator, Federal Aviation Administration	FAA–1	Safeair–1
Deputy Administrator, Federal Aviation Administration	FAA–2	Safeair–2

i. Other Special Flights:

1. Department of Energy flights - State the letters "R-A-C" (use phonetic alphabet equivalents) followed by the last 4 separate digits of the aircraft registration number.

2–88i1 Example.—
"Romeo Alfa Charlie One Six Five Three."

2. Semiautomatic Flight Inspections—State the code name "SAFI" followed by the separate digits of the grid number as filed.

2–88i2 Example.—
"Denver Center, SAFI Five Two Seven."

3. Flight Inspection of Navigational Aids - State the call sign "FLIGHT CHECK" followed by the digits of the registration number.

2–88i3 Example.—
"Flight Check Three Niner Six Five Four."

4. USAF aircraft engaged in aerial sampling missions—State the call sign "SAMP" followed by the last three digits of the serial number.

2–88i4 Example.—
"SAMP Three One Six."

2–88i(4) Reference.— SAMP, paragraph 9–33.

j. Use a pilot's name in identification of an aircraft only in special or emergency situations.

2–89 DESCRIPTION OF AIRCRAFT TYPES

Except as provided in subparagraph 2–89d, describe aircraft as follows when issuing traffic information.

a. Military:

1. Military designator, with numbers spoken in group form, or

2–89a1 Examples.—
"F-Fifteen." "B-One."

"Air Force bomber." "Navy fighter."

"Fighter." "Bomber."

2. Service and type, or

3. Type only if no confusion or misidentification is likely.

b. Air Carrier:

1. Manufacturer's name or model.

2. Add the company name or other identifying features when confusion or misidentification is likely.

2–89b Examples.—
"L-Ten-Eleven." "American MD-Eighty." "United Seven Thirty-seven."

2–89b Note.—*TERMINAL:* Pilots of "interchange" aircraft are expected to inform the tower on the first radio contact the name of the operating company and trip number followed by the company name, as displayed on the aircraft, and the aircraft type.

c. General Aviation and Air Taxi:

1. Manufacturer's model, name, or designator.

2. Add color when considered advantageous.

2–89c Examples.—
"Tri-Pacer." "PA Twenty-two."

"Cessna Four-Oh-One." "Blue and White King Air."

"Airliner."

"Sikorsky S–Seventy–Six."

d. When issuing traffic information to aircraft following a heavy jet, specify the word "heavy" before the manufacturer's name and model.

2–89d Examples.—
"Heavy L-Ten-Eleven."

"Heavy Boeing Seven Forty-seven."

2–89 Reference.—Traffic Advisories, paragraph 2–21a5.

2–90 AIRSPACE CLASSES

Classes A, B, C, D, E and G airspace are pronounced in individual letter form. Only use ICAO phonetic pronunciation of letters to clarify the class of airspace.

2–90 Examples.—
"Cessna 123 Mike Romeo cleared to enter Class B airspace"

"Sikorski 123 Tango Sierra cleared to enter New York Class Bravo airspace"

2–91 thru 2–99 RESERVED

Section 5. ROUTE AND NAVAID DESCRIPTION

2–100 AIRWAYS AND ROUTES.

Describe airways, routes, or jet routes as follows:

a. VOR/VORTAC/TACAN airways or jet routes—State the word "Victor" or the letter "J" followed by the number of the airway or route in group form. For RNAV routes add the word "Romeo."

2–100a Examples.—

"Victor Twelve."

"J Five Thirty-three."

"Victor Seven Ten Romeo."

"J Eight Thirty Romeo."

"Offset one zero miles right of J Eight Thirty Romeo."

b. VOR/VORTAC/TACAN alternate airways—State the word "Victor" followed by the number of the airway in group form and the alternate direction.

2–100b Example.—

"Victor Twelve South."

c. L/MF airways—State the color of the airway followed by the number in group form.

2–100c Example.—

"Blue Eighty-one."

d. Named Routes - State the words "North American Route" or "Bahama Route" followed by the number of the route in group form.

2–100d Examples.—

"North American Route Fifty."

"Bahama Route Fifty-five Victor."

e. Air Traffic Service (ATS) routes - State the letter/s of the route phonetically, followed by the number of the route in group form.

2–100e Example.—

"Romeo Twenty," "Alfa Fifty," "Golf Sixty-one," "Bravo Twenty-six," "Alfa Seven," "Romeo Seventy-seven," "Alfa Seven Hundred."

f. MTR's—State the letters followed by the number of the route in group form.

2–100f Example.—

"I-R Five Thirty-one."

2–101 NAVAID TERMS

Describe radials, arcs, courses, bearings, and quadrants of NAVAID's as follows:

a. VOR/VORTAC/TACAN/MLS NAVAID's—State the name of the NAVAID followed by the separate digits of the radial/azimuth (omitting the word "degrees") and the word "radial/azimuth."

2–101a Examples.—

"Appleton zero five zero radial."

"Lindburg Runway Two Seven M-L-S, two six zero azimuth."

b. Arcs about VOR-DME/VORTAC/TACAN/MLS NAVAID's—State the distance in miles from the NAVAID followed by the words "mile arc," the direction from the NAVAID in terms of the eight principal points of the compass, the word "of," and the name of the NAVAID.

2–101b Example.—

"Two zero mile arc southwest of O'Hare Runway Two Seven Left M-L-S."

c. Quadrant within a radius of NAVAID—State direction from NAVAID in terms of the quadrant; e.g., NE, SE, SW, NW, followed by the distance in miles from the NAVAID.

2–101c Example.—

"Cleared to fly northeast quadrant of Phillipsburg VOR-TAC within four zero mile radius."

2–101c Reference.—Route Use, paragraph 4–50h. Pilot/Controller Glossary term—Quadrant.

d. Nondirectional beacons—State the course to or the bearing from the radio beacon, omitting the word "degree," followed by the words "course to" or "bearing from," the name of the radio beacon, and the words "radio beacon."

2–101d Example.—

"Three four zero bearing from Randolph Radio Beacon."

e. Microwave Landing System—States the azimuth to or azimuth from the Microwave Landing System, omitting the word "degree" followed by the words "azimuth to" or "azimuth from," the name of the Microwave Landing System, and the word MLS.

2–101e Example.—

"Two six zero azimuth to Linburgh Runway two seven MLS."

2–102 NAVAID FIXES

Describe fixes determined by reference to a radial/localizer/azimuth and distance from a VOR-DME/VORTAC/TACAN/ILS-DME or MLS as follows:

a. When a fix is not named, state the name of the NAVAID followed by a specified radial/localizer/azimuth, and state the distance in miles followed by the phrase "mile fix".

2–102a Examples.—

"Appleton zero five zero radial three seven mile fix."

"Reno localizer back course 4 mile fix."

"Hobby Runway One Two M-L-S zero niner zero azimuth one two mile fix."

b. When a fix is charted on a SID, STAR, enroute chart, or approach plate, state the name of the fix.

c. Use specific terms to describe a fix. Do not use expressions such as "passing Victor Twelve" or "passing J Eleven."

2–102c Reference.—Fix Use, paragraph 4–5.

2–103 thru 2–109 RESERVED

Section 6. WEATHER INFORMATION

2–110 FAMILIARIZATION

Become familiar with pertinent weather information when coming on duty, and stay aware of current weather information needed to perform air traffic control duties.

2–111 HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE (HIWAS)

Controllers shall advise pilots of hazardous weather that may impact operations within 150 NM of their sector or area of jurisdiction. Hazardous weather information contained in HIWAS broadcasts include: Airmens Meteorological Information (AIRMET), Significant Meteorological Information (SIGMET), Convective SIGMET (WST), Urgent Pilot Weather Reports (UUA), and Center Weather Advisories (CWA). Facilities shall review alert messages to determine the geographical area and operational impact for hazardous weather information broadcasts. The broadcast is not required if aircraft on your frequency/frequencies will not be affected.

a. Controllers within commissioned HIWAS areas shall:

1. Broadcast a HIWAS alert on all frequencies, except emergency, upon receipt of hazardous weather information. Controllers are required to disseminate data based on the operational impact on the sector or area of control jurisdiction.

2–111a1 Note.— The inclusion of the type and number of the weather advisory responsible for the HIWAS advisory is optional.

Phraseology:

ATTENTION ALL AIRCRAFT. HAZARDOUS WEATHER INFORMATION FOR (geographical area) AVAILABLE ON HIWAS, FLIGHT WATCH OR FLIGHT SERVICE.

b. Controllers outside of commissioned HIWAS areas shall:

1. Advise pilots of the availability of hazardous weather advisories. Pilots requesting additional information should be directed to contact the nearest Flight Watch or Flight Service.

2. Apply the same procedure when HIWAS outlets, or outlets with radio coverage extending into your sector or airspace under your jurisdiction, are out of service.

Phraseology:

ATTENTION ALL AIRCRAFT. HAZARDOUS WEATHER INFORMATION FOR (geographical area) AVAILABLE FROM FLIGHT WATCH OR FLIGHT SERVICE.

c. Terminal facilities have the option to limit hazardous weather information broadcasts as follows: Tower cab and approach control facilities may opt to broadcast hazardous weather information alerts only when any part of the area described is within 50 NM of the airspace under their jurisdiction.

2–111 Reference.—Airman's Information Manual, paragraphs 7–5 through 7–9.

2–112 PIREP INFORMATION

Significant PIREP information includes reports of strong frontal activity, squall lines, thunderstorms, light to severe icing, windshear and turbulence (including clear air turbulence) of moderate or greater intensity, or other conditions pertinent to flight safety.

2–112 References.—Low Level Windshear Advisories, paragraph 3–8. Order 7210.3, Handling of SIGMET's, CWA's, and PIREP's, paragraph 8–30; and Order 7210.3, SIGMET and PIREP Handling, paragraph 12–30.

a. Solicit PIREP's when requested or when one of the following conditions exist or are forecast for your area of jurisdiction:

1. Ceilings at or below 5,000 feet. These PIREP's shall include cloud base/top reports when feasible. *TERMINAL:* Ensure that at least one descent/climb-out PIREP, including cloud base/s, top/s, and other related phenomena, is obtained each hour when there is a ceiling at or below 5,000 feet.

2. Visibility (surface or aloft) at or less than 5 miles.

3. Thunderstorms and related phenomena.

4. Turbulence of moderate degree or greater.

5. Icing of light degree or greater.

6. Windshear.

7. *TERMINAL:* Braking Action Advisories are in effect.

2–112a7 References.—Braking Action Advisories, paragraph 3–34. Pilot/Controller Glossary, Braking Action Advisories.

b. Record with the PIREP's:

1. Time.

2. Aircraft position.

3. Type aircraft.

4. Altitude.

c. Obtain PIREP's directly from the pilot, or if the PIREP has been requested by another facility, you may instruct the pilot to deliver it directly to that facility.

Phraseology:

REQUEST FLIGHT CONDITIONS.

or if appropriate,

REQUEST (specific conditions — ie., ride, ceiling, visibility, etc.) CONDITIONS.

if necessary,

OVER (fix),

or

ALONG PRESENT ROUTE,

or

BETWEEN (fix) and (fix).

d. Handle PIREP's as follows:

1. Relay pertinent PIREP information to concerned aircraft in a timely manner.

2. *EN ROUTE:* Relay all operationally significant PIREP's to the facility weather coordinator.

3. *TERMINAL:* Relay all operationally significant PIREP's to:

(a) The appropriate intrafacility positions.

(b) The FSS serving the area in which the report was obtained.

2–112d3(b) Note.—The FSS is responsible for Service A teletypewriter dissemination.

(c) Other concerned terminal or en route ATC facilities, including non-FAA facilities.

(d) Use the words *gain* and/or *loss* when describing to pilots the effects of windshear on airspeed.

2–112d3(d) Examples.—

"Delta Seven Twenty-one, a Boeing Seven Twenty-seven, previously reported windshear, loss of two five knots at four hundred feet."

"U.S. Air Seventy-six, a D-C Niner, previously reported windshear, gain of twenty-five knots between niner hundred and six hundred feet, followed by a loss of five zero knots between five hundred feet and the surface."

2–112d3(d) Reference.—Airman's Information Manual, Windshear PIREPS, paragraph 7–22a.

2–113 WEATHER AND CHAFF SERVICES

a. Issue pertinent information on observed/reported weather or chaff areas. Provide radar navigational guidance and/or approve deviations around weather or chaff areas when requested by the pilot. Do not use the word "turbulence" in describing radar-derived weather.

1. Issue weather and chaff information by defining the area of coverage in terms of azimuth (by referring to the 12–hour clock) and distance from the aircraft or by indicating the general width of the area and the area of coverage in terms of fixes or distance and direction from fixes.

2. When a deviation cannot be approved as requested and the situation permits, suggest an alternative course of action.

b. In areas of significant weather, plan ahead and be prepared to suggest, upon pilot request, the use of alternative routes/altitudes.

2–113b Note.—Weather significant to the safety of aircraft includes such conditions as tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, windshear, moderate to extreme turbulence (including CAT), and light to severe icing.

c. Inform any tower for which you provide approach control services if you observe any weather echoes on radar which might affect their operations.

Phraseology:

WEATHER/CHAFF AREA BETWEEN (number) O'CLOCK AND (number) O'CLOCK (number) MILES,

or

(number) MILE BAND OF WEATHER/CHAFF FROM (fix or number of miles and direction from fix) TO (fix or number of miles and direction from fix),

or

LEVEL (number) WEATHER ECHO BETWEEN (number) O'CLOCK AND (number) O'CLOCK, (number) MILES. MOVING (direction) AT (number) KNOTS, TOPS (altitude).

or

DEVIATION APPROVED, (restrictions if necessary), ADVISE WHEN ABLE TO:

RETURN TO COURSE,

or

RESUME OWN NAVIGATION

or

FLY HEADING (heading)

or

PROCEED DIRECT TO (name of NAVAID). UNABLE DEVIATION (state possible alternate courses of action).

2–113c Example 1.—

"Level five weather echo between eleven o'clock and one o'clock, one zero miles. Moving east at two zero knots, tops flight level three niner zero."

2–113c Example 2.—

"Level four weather echo between ten o'clock and two o'clock, one five miles. Weather area is two five miles in diameter."

2–113c Note.—Phraseology using level number is only applicable when the radar weather echo intensity information is determined by NWS radar equipment or ASR–9 radar equipment.

2–113c Reference.—Pilot/Controller Glossary, Radar Weather Echo Intensity Levels.

d. The area supervisor/area manager/controller-in-charge shall verify the ASR–9 weather channel information by the best means available (e.g., pilot reports, local tower personnel, etc.) if the weather data display by the ASR–9 is reported as questionable or erroneous. Errors in weather radar presentation shall be reported to the AF technician and the AT supervisor shall determine if the weather channel is to be disabled and a NOTAM distributed.

2–114 CALM WIND CONDITIONS

TERMINAL

Describe the wind as calm when the wind velocity is less than three knots.

2–114 Reference.—Tailwind Components, paragraph 3–62. Intersecting Runway Separation, paragraph 3–123.

2–115 REPORTING WEATHER CONDITIONS

a. *USAF NOT APPLICABLE.* When the prevailing visibility at the usual point of observation, or at the tower level, is less than 4 miles, tower personnel shall take prevailing visibility observations and apply the observations as follows:

1. Use the lower of the two observations (tower or surface) for aircraft operations.

2. Forward tower visibility observations to the weather observer.

3. Notify the weather observer when the tower observes the prevailing visibility to decrease to less than 4 miles or increase to 4 miles or more.

b. Forward current weather changes to the appropriate control facility as follows:

1. When the official weather changes to a condition which is below 1,000–foot ceiling or below the highest circling minimum, whichever is greater, or less than 3 miles visibility, and when it improves to a condition which is better than those above.

2. Changes which are classified as special weather observations during the time that weather conditions are below 1,000–foot ceiling or the highest circling minimum, whichever is greater, or less than 3 miles visibility.

c. Towers at airports where military turbo-jet en route descents are routinely conducted shall also report the conditions to the ARTCC even if it is not the controlling facility.

d. If the receiving facility informs you that weather reports are not required, discontinue the reports. The time period specified should not exceed the duration of your tour of duty.

e. *EN ROUTE:* When you determine that weather reports for an airport will not be required for a specific time period, inform the FSS or tower of this determination. The time period specified should not exceed the duration of your tour of duty.

2–115 Reference.—Forwarding Approach Information by Non-Approach Control Facilities, paragraph 3–121.

2–116 DISSEMINATING WEATHER INFORMATION

TERMINAL

Observed elements of weather information shall be disseminated as follows:

a. General weather information, such as "large breaks in the overcast," "visibility lowering to the south," or similar statements which do not include specific values, and any elements derived directly from instruments, pilots, or radar may be transmitted to pilots or other ATC facilities without consulting the weather reporting station.

b. Specific values, such as ceiling and visibility, may be transmitted if obtained by one of the following means:

1. You are properly certificated and acting as official weather observer for the elements being reported.

2–116b1 Note.—USAF controllers do not serve as official weather observers.

2. You have obtained the information from the official observer for the elements being reported.

3. The weather report was composed or verified by the weather station.

4. The information is obtained from an official Automated Weather Observation System (AWOS) or an Automated Surface Observation System (ASOS).

c. Differences between weather elements observed from the tower and those reported by the weather station shall be reported to the official observer for the element concerned.

2–117 thru 2–119 RESERVED

Section 7. ALTIMETER SETTINGS

2–120 CURRENT SETTINGS

a. Current altimeter settings shall be obtained from direct-reading instruments or directly from weather reporting stations.

2–120a Reference.—FAA Order 7210.3, Chapter 2, Section 8, Wind/Altimeter Information.

b. If a pilot requests the altimeter setting in millibars, ask the nearest weather reporting station for the equivalent millibar setting.

c. *USAF/USA:* Use the term "Estimated Altimeter" for altimeter settings reported or received as estimated.

2–120 Reference.—Departure Information, paragraph 3–100. Landing Information, paragraph 3–120. Approach Information by Approach Control Facilities, paragraph 4–92.

2–121 ALTIMETER SETTING ISSUANCE BELOW LOWEST USABLE FL

a. *TERMINAL:* Identify the source of an altimeter setting when issued for a location other than the aircraft's departure or destination airport.

b. *EN ROUTE:* Identify the source of all altimeter settings when issued.

Phraseology:

THE (facility name) (time of report if more than one hour old) ALTIMETER (setting).

c. Issue the altimeter setting:

1. To en route aircraft at least one time while operating in your area of jurisdiction. Issue the setting for the nearest reporting station along the aircraft's route of flight:

2–121c1 Note.—Part 91.121(1) requires that the pilot set his altimeter to the setting of a station along his route of flight within 100 miles of the aircraft if one is available. However, issuance of the setting of an adjacent station during periods that a steep gradient exists will serve to inform the pilot of the difference between the setting he is using and the pressure in the local area and better enable him to choose a more advantageous setting within the limitations of FAR 91.121.

2. *TERMINAL:* To all departures. Unless specifically requested by the pilot, the altimeter setting need not be issued to local aircraft operators who have requested this omission in writing or to scheduled air carriers.

2–121c2 Reference.—Departure Information, paragraph 3–100.

3. *TERMINAL:* To arriving aircraft on initial contact or as soon as possible thereafter. The tower may omit the altimeter if the aircraft is sequenced or vectored to the airport by the approach control having jurisdiction at that facility.

2–121c3 Reference.—Approach Information by Approach Control Facilities, paragraph 4–92a; Approach Information, paragraph 5–131a.

4. *EN ROUTE:* For the destination airport to arriving aircraft approximately 50 miles from the destination if an approach control facility does not serve the airport.

d. If the altimeter setting must be obtained by the pilot of an arriving aircraft from another source, instruct the pilot to obtain the altimeter setting from that source.

2–121d Note 1.—The destination altimeter setting, whether from a local or remote source, is the setting upon which the instrument approach is predicated.

2–121d Note 2.—Approach charts for many locations specify the source of altimeter settings as non-FAA facilities, such as UNICOM's.

e. When issuing clearance to descend below the lowest usable flight level, advise the pilot of the altimeter setting of the weather reporting station nearest the point the aircraft will descend below that flight level.

f. Department of Defense (DOD) aircraft which will operate on "single altimeter settings" (FAR Exemption 2861A) shall be issued altimeter settings in accord with standard procedures while the aircraft are en route to and from their restricted areas, MOA's, and ATC Assigned Airspace areas.

2–121f Reference.—FAA Order 7210.3, paragraph 6–71.

g. When the barometric pressure is greater than 31.00 inches Hg., issue the altimeter setting and:

1. En Route/Arrivals-Advise pilots to remain set on 31.00 inches until reaching final approach segment.

2. Departures-Advise pilots to set 31.00 inches prior to reaching any mandatory/crossing altitude or 1,500 feet AGL, whichever is lower.

Phraseology:

ALTIMETER, THREE ONE TWO FIVE, SET THREE ONE ZERO ZERO UNTIL REACHING THE FINAL APPROACH FIX.

or

ALTIMETER, THREE ONE ONE ZERO, SET THREE ONE ZERO ZERO PRIOR TO REACHING ONE THOUSAND THREE HUNDRED.

2–121g Note 1.—Aircraft with Mode C altitude reporting will be displayed on the controller's radar scope with a uniform altitude offset above the assigned altitude. With an actual altimeter of 31.28 inches, the Mode C equipped aircraft will show 3,300 feet when assigned 3,000 feet. This will occur unless local directives authorize entering the altimeter setting 31.00 into the computer system regardless of the actual barometric pressure.

2–121g Note 2.—Flight Standards will implement high barometric pressure procedures by NOTAM defining the geographic area affected.

2–121g Note 3.—Airports unable to accurately measure barometric pressures above 31.00 inches Hg. will report the barometric pressure as"missing" or "in excess of 31.00 inches of Hg." Flight operations to or from those airports are restricted to VFR weather conditions.

2–121g2 Reference.—Airman's Information Manual, Procedures, paragraph 7–32.

2–121 Reference.— Landing Information, paragraph 3–120.

2–122 thru 2–129 RESERVED

Section 8. RUNWAY VISIBILITY REPORTING — TERMINAL

2–130 FURNISH RVR/RVV VALUES

Where RVR or RVV equipment is operational, irrespective of subsequent operation or non-operation of navigational or visual aids for the application of RVR/RVV as a takeoff or landing minima, furnish the values for the runway in use in accordance with paragraph 2–132.

2–130 Note.—Readout capability of different type/model RVR equipment varies. For example, older equipment minimum readout value is 600 feet. Newer equipment may have minimum readout capability as low as 100 feet. Readout value increments also may differ. Older equipment have minimum readout increments of 200 feet. New equipment increments below 800 feet are 100 feet.

2–130 Reference.—Order 6560.10, Runway Visual Range (RVR). Order 6750.24, ILS Electronic Requirements.

2–131 ARRIVAL/DEPARTURE RUNWAY VISIBILITY

a. Issue current touchdown RVR/RVV for the runway/s in use:

1. When prevailing visibility is 1 mile or less regardless of the value indicated.

2. When RVR/RVV indicates a reportable value regardless of the prevailing visibility.

2–131a2 Note.—Reportable values are: RVR 6,000 feet or less; RVV 1 1/2 miles or less.

3. When it is determined from a reliable source that the indicated RVR value differs by more than 400 feet from the actual conditions within the area of the transmissometer, the RVR data is not acceptable and shall not be reported.

2–131a3 Note.—A reliable source is considered to be a certified weather observer, air traffic controller, flight service specialist, or pilot.

4. When the observer has reliable reports, or has otherwise determined that the instrument values are not representative of the associated runway, the data shall not be used.

b. Issue mid/rollout RVR when the value of either is less than 2,000 feet and less than the touchdown value.

c. Local control shall issue the current RVR/RVV to each aircraft prior to landing or departure in accordance with paragraph 2–131 a and b.

2–132 TERMINOLOGY

a. Provide RVR/RVV information by stating the runway, the abbreviation RVR/RVV, and the indicated value. When issued along with other weather elements, transmit these values in the normal sequence used for weather reporting.

2–132a Examples.—

"Runway One Four R-V-R two thousand four hundred."

"Runway Three Two R-V-V three quarters."

b. When two or more RVR systems serve the runway in use, report the indicated values for the different systems in terms of touchdown, mid, and rollout as appropriate.

2–132b Examples.—

"Runway Two Two Left R-V-R two thousand, rollout one thousand eight hundred."

"Runway Two Seven Right R-V-R one thousand, mid eight hundred, rollout six hundred."

c. When there is a requirement to issue an RVR or RVV value and a visibility condition greater or less than the reportable values of the equipment is indicated, state the condition as "MORE THAN" or "LESS THAN" the appropriate minimum or maximum readable value.

2–132c Examples.—

"Runway Three Six R-V-R more than six thousand."

"Runway Niner R-V-R one thousand, rollout less than six hundred."

d. When a readout indicates a rapidly varying visibility condition (1,000 feet or more for RVR; one or more reportable values for RVV), report the current value followed by the range of visibility variance.

2–132d Examples.—

"Runway Two Four R-V-R two thousand, variable one thousand six hundred to three thousand."

"Runway Three One R-V-V three-quarters, variable one-quarter to one."

2–132 Reference.—Furnish RVR/RVV Values, paragraph 2–130.

2–133 thru 2–139 RESERVED

Section 9. AUTOMATIC TERMINAL INFORMATION SERVICE PROCEDURES

2–140 APPLICATION

Use the ATIS, where available, to provide noncontrol airport and terminal area operational and meteorological information to aircraft.

a. Identify each message by a phonetic letter code word at both the beginning and the end of the message except where omissions are required because of special programs or equipment.

1. Each alphabet letter phonetic word shall be used sequentially, except as authorized in paragraph 2–140a2, beginning with "Alfa," ending with "Zulu," and repeated without regard to the beginning of a new day. Identify the first resumed broadcast message with "Alfa" or the first assigned alphabet letter word in the event of a broadcast interruption of more than 12 hours.

2. Specific sequential portions of the alphabet may be assigned between facilities or an arrival and departure ATIS when designated by a Letter of Agreement or facility directive.

2–140a2 Reference.—Order 7210.3, Automatic Terminal Information Service (ATIS), paragraph 12–40.

b. The ATIS recording shall be reviewed for completeness, accuracy, speech rate, and proper enunciation before being transmitted.

c. Arrival and departure messages, when broadcast separately, need only contain information appropriate for that operation.

2–141 OPERATING PROCEDURES

a. Make a new recording when any of the following occur:

1. Upon receipt of any new official weather regardless of whether there is or is not a change in values.

2. When runway braking action reports are received that indicate runway braking is worse than that which is included in the current ATIS broadcast.

3. When there is a change in any other pertinent data, such as runway change, instrument approach in use, new or canceled NOTAM's/ PIREP's/HIWAS Update etc.

b. When a pilot acknowledges that he has received the ATIS broadcast, controllers may omit those items contained in the broadcasts if they are current. Rapidly changing conditions will be issued by ATC, and the ATIS will contain the following:

2–141b Example.—

"Latest ceiling/visibility/altimeter/wind/(other conditions) will be issued by approach control/tower."

c. Broadcast on all appropriate frequencies to advise aircraft of a change in the ATIS code/ message.

d. Controllers shall ensure pilots receive all pertinent information contained in the ATIS broadcast. If a pilot does not state receipt of the current ATIS, ask the pilot to confirm receipt of the appropriate ATIS information

2–141d Example.—

"Verify you have information ALPHA."

e. Controllers shall issue current ATIS information unless the pilot volunteers to obtain it.

f. Controllers shall ensure that the appropriate ATIS information for satellite airports under their control, is made available/broadcast to pilots intending to use those satellite airports.

2–142 CONTENT

Include the following in ATIS broadcast as appropriate:

a. Time of weather sequence (UTC). Weather information consisting of ceiling, visibility, obstructions to vision, temperature, dew point, wind direction and velocity, altimeter, a density altitude advisory when appropriate, and other pertinent remarks included in the official weather observation. Wind direction, velocity, and altimeter shall be reported from certified direct reading instruments. Temperature and dew point should be reported from certified direct reading sensors when available. Always include weather observation remarks of lightening, cumulonimbus, and towering cumulus clouds.

b. The ceiling/sky condition, visibility, and obstructions to vision may be omitted if the ceiling is above 5,000 feet and the visibility is more than 5 miles.

2–142b Example.—

A remark may be made, "The weather is better than five thousand and five."

c. Instrument/visual approach/s in use. Specify landing runway/s unless the runway is that to which the instrument approach is made.

d. Departure runway/s (to be given only if different from landing runway/s or in the instance of a "departure only" ATIS).

e. NOTAM's and notification of PIREP's pertinent to operations in the terminal area. Inform pilots of where hazardous weather is occurring and how the information may be obtained.

f. Runway braking action or friction reports when provided. Include the time of the report and a

word describing the cause of the runway friction problem.

Phraseology:

RUNWAY (number) MU (first value, second value, third value) AT (time), (cause).

2–142f Example.—

"RUNWAY TWO SEVEN, MU FORTY-TWO, FORTY-ONE, TWENTY-EIGHT AT ONE ZERO ONE EIGHT ZULU, ICE."

2–142f Reference.—Braking Action Advisories, paragraph 3–34.

g. Other optional information as local conditions dictate in coordination with ATC. This may include such items as VFR arrival frequencies, temporary airport conditions, SOIR operations being conducted, or other perishable items that may appear only for a matter of hours or a few days on the ATIS message.

h. Low level windshear (LLWS) when reported by pilots or is detected on a low level windshear alert system (LLWAS).

2–142h Reference.—Low Level Windshear Advisories, paragraph 3–8.

i. A statement which advises the pilot to readback instructions to hold short of a runway. The air traffic manager may elect to remove this requirement 60 days after implementation provided that removing the statement from the ATIS does not result in increased requests from aircraft for readback of hold short instructions.

j. Instructions for the pilot to acknowledge receipt of the ATIS message by informing the controller on initial contact.

2–142j Example.—

"Boston Tower information Delta. One four zero zero Zulu. Measured ceiling four thousand five hundred broken. Visibility one zero. Temperature three four. Dew point two eight. Wind two five zero at one zero. Altimeter three zero one zero. ILS-DME Seven Approach in use. Departing Runway Right. HAZARDOUS WEATHER INFORMATION FOR (Geographical area) AVAILABLE ON HIWAS, FLIGHT WATCH OR FLIGHT SERVICE. Advise on initial contact you have Delta."

2–143 thru 2–149 RESERVED

Section 10. TEAM POSITION RESPONSIBILITIES

2–150 EN ROUTE SECTOR TEAM POSITION RESPONSIBILITIES

a. En Route Sector Team Concept and Intent:

1. There are no absolute divisions of responsibilities regarding position operations. The tasks to be completed remain the same whether one, two, or three people are working positions within a sector. The team, as a whole, has responsibility for the safe and efficient operation of that sector.

2. The intent of the team concept is not to hold the team accountable for the action of individual members, in the event of an operational accident/incident.

b. Terms: The following terms will be used in en route facilities for the purpose of standardization:

1. Sector: The area of control responsibility (delegated airspace) of the en route sector team, and the team as a whole.

2. Radar Position (R): That position which is in direct communication with the aircraft and which uses radar information as the primary means of separation.

3. Radar Associate (RA): That position sometimes referred to as "D–Side" or "Manual Controller."

4. Radar Coordinator Position (RC): That position sometimes referred to as "Coordinator", "Tracker," or "Handoff Controller" (En Route).

5. Radar Flight Data (FD): That position commonly referred to as "Assistant Controller" or "A–Side" position.

6. Non–Radar Position (NR): That position which is usually in direct communication with the aircraft and which uses non–radar procedures as the primary means of separation.

c. Primary Responsibilities of the En Route Sector Team Positions:

1. Radar Position:

(a) Ensure separation.

(b) Initiate control instructions.

(c) Monitor and operate radios.

(d) Accept and initiate automated handoffs.

(e) Assist the radar associate position with non–automated handoff actions when needed.

(f) Assist the radar associate position in consolidation when needed.

(g) Scan radar display. Correlate with flight progress strip information.

(h) Ensure computer entries are completed on instructions or clearances you issue or receive.

(i) Ensure strip marking is completed on instructions or clearances you issue or receive.

(j) Adjust equipment at radar position to be usable by all members of the team.

2. Radar Associate Position:

(a) Ensure separation.

(b) Initiate control instructions.

(c) Operate interphones.

(d) Accept and initiate non–automated handoffs, and ensure radar position is made aware of the actions.

(e) Assist the radar position by accepting or initiating automated handoffs which are necessary for the continued smooth operation of the sector, and ensure that the radar position is made immediately aware of any action taken.

(f) Coordinate, including pointouts.

(g) Monitor radios when not performing higher priority duties.

(h) Scan flight progress strips. Correlate with radar data.

(i) Manage flight progress strips.

(j) Ensure computer entries are completed on instructions issued or received. Enter instructions issued or received by the radar position when aware of those instructions.

(k) Ensure strip marking is completed on instructions issued or received, and write instructions issued or received by the radar position when aware of them.

(l) Adjust equipment at radar associate position to be usable by all members of the team.

3. Radar Coordinator Position:

(a) Perform interfacility/intrafacility/sector/position coordination of traffic actions.

(b) Advise the radar position and the radar associate position of sector actions required to accomplish overall objectives.

(c) Perform any of the functions of the en route sector team which will assist in meeting situation objectives.

4. Radar Flight Data:

(a) Operate interphone.

(b) Assist Radar Associate Position in managing flight progress strips.

(c) Receive/process and distribute flight progress strips.

(d) Ensure flight data processing equipment is operational.

(e) Request/receive and disseminate weather, NOTAMS, NAS status, traffic management, and Special Use Airspace status messages.

(f) Manually prepare flight progress strips when automation systems are not available.

(g) Enters flight data into computer.

(h) Forwards flight data into computer.

(i) Assist facility/sector in meeting situation objectives.

5. The Radar Position has the responsibility of managing the overall sector operations, including aircraft separation and traffic flows. The Radar Coordinator position assumes responsibility for managing traffic flows and the Radar Position retains responsibility for aircraft separation when the Radar Coordinator Position is staffed.

6. En Route Non–Radar Position:

(a) Ensure separation.

(b) Initiate control instructions.

(c) Monitor and operate radios.

(d) Accept and initiate transfer of control, communications, and flight data.

(e) Ensure computer entries are completed on instructions or clearances issued or received.

(f) Ensure strip marking is completed on instructions or clearances issued or received.

(g) Facilities utilizing non–radar positions may modify the standards contained in the radar associate, radar coordinator, and radar flight data sections to accommodate facility/sector needs, i.e., non–radar coordinator, non–radar data positions.

2–151 TERMINAL RADAR/NON–RADAR TEAM POSITION RESPONSIBILITIES

a. Terminal Radar Team Concept and Intent:

1. There are no absolute divisions of responsibilities regarding position operations. The tasks to be completed remain the same whether one, two, or three people are working positions within a facility/sector. The team, as a whole, has responsibility for the safe and efficient operation of that facility/sector.

2. The intent of the team concept is not to hold the team accountable for the action of individual members in the event of an operational error/deviation.

b. Terms: The following terms will be used in terminal facilities for the purposes of standardization.

1. Facility/Sector: The area of control responsibility (delegated airspace) of the radar team, and the team as a whole.

2. Radar Position (R): That position which is in direct communication with the aircraft and which uses radar information as the primary means of separation.

3. Radar Associate Position (RA): That position commonly referred to as "Handoff Controller" or "Radar Data Controller."

4. Radar Coordinator Position (RC): That position commonly referred to as "Coordinator," "Tracker," "Sequencer," or "Overhead."

5. Radar Flight Data (FD): That position commonly referred to as "Flight Data."

6. Non–Radar Position (NR). That position which is usually in direct communication with the aircraft and which uses non–radar procedures as the primary means of separation.

c. Primary Responsibilities of the Terminal Radar Team Positions:

1. Radar Position:

(a) Ensure separation.

(b) Initiate control instructions.

(c) Monitor and operate radios.

(d) Accept and initiate automated handoffs.

(e) Assist the Radar Associate Position with nonautomated handoff actions when needed.

(f) Assist the Radar Associate Position in coordination when needed.

(g) Scan radar display. Correlate with flight progress strip information.

(h) Ensure computer entries are completed on instructions or clearances you issue or receive.

(i) Ensure strip marking is completed on instructions or clearances you issue or receive.

(j) Adjust equipment at Radar Position to be usable by all members of the team.

2. Radar Associate Position:

(a) Ensure separation.

(b) Initiate control instructions.

(c) Operate interphones.

(d) Maintain awareness of facility/sector activities.

(e) Accept and initiate nonautomated handoffs.

(f) Assist the Radar Position by accepting or initiating automated handoffs which are necessary for the continued smooth operation of the facility/sector and ensure that the Radar Position is made immediately aware of any actions taken.

(g) Coordinate,including point outs.

(h) Scan flight progress strips. Correlate with radar data.

(i) Manage flight progress strips.

(j) Ensure computer entries are completed on instructions issued or received, and enter instruc-

tions issued or received by the Radar Position aware of those instructions.

(k) Ensure strip marking is completed on instructions issued or received, and write instructions issued or received by the Radar Position when aware of them.

(l) Adjust equipment at Radar Associate Position to be usable by all members of the Radar Team.

3. Radar Coordinator Position:

(a) Perform interfacility/sector/position coordination of traffic actions.

(b) Advise the Radar Position and the Radar Associate Position of facility/sector actions required to accomplish overall objectives.

(c) Perform any of the functions of the Radar Team which will assist in meeting situation objectives.

4. Radar Flight Data:

(a) Operate interphones.

(b) Process and forward flight plan information.

(c) Compile statistical data.

(d) Assist facility/sector in meeting situation objectives.

5. The Radar Position has the *responsibility* of managing the overall sector operations, including aircraft separation and traffic flows. The Radar Coordinator Position assumes responsibility for managing traffic flows and the Radar Position retains responsibility for aircraft separation when the Radar Coordinator Position is staffed.

6. Terminal Non–Radar Position:

(a) Ensure Separation.

(b) Initiate control instructions.

(c) Monitor and operate radios.

(d) Accept and initiate transfer of control, communications and flight data.

(e) Ensure computer entries are completed on instructions or clearances issued or received.

(f) Ensure strip marking is completed on instructions or clearances issued or received.

(g) Facilities utilizing non–radar positions may modify the standards contained in the radar associate, radar coordinator, and radar flight data sections to accommodate facility/sector needs, i.e. non–radar coordinator, non–radar data positions.

2–152 TOWER TEAM POSITION RESPONSIBILITIES

a. Tower Team Concept and Intent:

1. There are no absolute divisions of responsibilities regarding position operations. The tasks to be completed remain the same whether one, two, or three people are working positions within a tower cab. The team as a whole has responsibility for the safe and efficient operation of that tower cab.

2. The intent of the team concept is not to hold the team accountable for the action of individual members in the event of an operational error/deviation.

b. Terms: The following terms will be used in terminal facilities for the purpose of standardization.

1. Tower Cab: The area of control responsibility (delegated airspace and/or airport surface areas) of the tower team, and the team as a whole.

2. Tower Position(s) (LC or GC): That position which is in direct communications with the aircraft and ensures separation of aircraft in/on the area of jurisdiction.

3. Tower Associate Position(s): That position commonly referred to as "Local Assist," "Ground Assist," "Local Associate," or "Ground Associate."

4. Tower Cab Coordinator Position (CC): That position commonly referred to as "Coordinator."

5. Flight Data (FD): That position commonly referred to as "Flight Data."

6. *Clearance Delivery (CD)*: That position commonly referred to as "Clearance."

c. Primary Responsibilities of the Tower Team Positions

1. Tower Position(s):

(a) Ensure separation.

(b) Initiate control instructions.

(c) Monitor and operate communications equipment.

(d) Utilize tower radar display(s).

(e) Utilize alphanumerics.

(f) Assist the Tower Associate Position with coordination.

(g) Scan Tower Cab environment.

(h) Ensure computer entries are completed for instructions or clearances issued or received.

(i) Ensure strip marking is completed for instructions or clearances issued or received.

(j) Process and forward flight plan information.

(k) Perform any functions of the Tower Team which will assist in meeting situation objectives.

2. Tower Associate Position(s):

(a) Ensure separation.

(b) Operate interphones.

(c) Maintain awareness of Tower Cab activities.

(d) Utilize alphanumerics.

(e) Utilize tower radar display(s).

(f) Assist Tower Position by accepting/initiating coordination for the continued smooth operation of the Tower Cab and ensure that the Tower Position is made immediately aware of any actions taken.

(g) Manage flight plan information.

(h) Ensure computer entries are completed for instructions issued or received and enter instructions issued or received by a Tower Position.

(i) Ensure strip marking is completed for instructions issued or received and enter instructions issued or received by a Tower Position.

3. Tower Coordinator Position:

(a) Perform interfacility/ position coordination for traffic actions.

(b) Advise the Tower and the Tower Associate Position(s) of tower cab actions required to accomplish overall objectives.

(c) Perform any of the functions of the Tower Team which will assist in meeting situation objectives.

4. Flight Data:

(a) Operate interphones.

(b) Process and forward flight plan information.

(c) Compile statistical data.

(d) Assist tower cab in meeting situation objectives.

(e) Observe and report weather information.

(f) Utilize alphanumerics.

5. Clearance Delivery:

(a) Operate communications equipment.

(b) Process and forward flight plan information.

(c) Issue clearances and ensure accuracy of pilot readback.

(d) Assist tower cab in meeting situation objectives.

(e) Operate tower equipment.

(f) Utilize alphanumerics.

6. The Tower Positions have the responsibility for aircraft separation and traffic flows. The Tower Coordinator Position assumes responsibility for managing traffic flows and the Tower Positions retain responsibility for aircraft separation when the Tower Coordinator Position is staffed.

Chapter 3. AIRPORT TRAFFIC CONTROL — TERMINAL

Section 1. GENERAL

3–1 PROVIDE SERVICE

Provide airport traffic control service based only upon observed or known traffic and airport conditions.

3–1 Note.—When operating in accordance with the FAR's, it is the responsibility of the pilot to avoid collision with other aircraft. However, due to the limited space around terminal locations, traffic information can aid pilots in avoiding collision between aircraft operating within [redacted] Class B, C, or D surface areas and the terminal radar service areas, and transiting aircraft operating in proximity to terminal locations.

3–2 PREVENTIVE CONTROL

Provide preventive control service only to aircraft operating in accordance with a letter of agreement. When providing this service, issue advice or instructions only if a situation develops which requires corrective action.

3–2 Note.—Preventive control differs from other airport traffic control in that repetitious, routine approval of pilot action is eliminated. Controllers intervene only when they observe a traffic conflict developing.

3–3 USE OF ACTIVE RUNWAYS

The local controller has primary responsibility for operations conducted on the active runway and must control the use of those runways. Positive coordination and control is required as follows:

3–3 Note.—Exceptions may be authorized only as provided in paragraph 1–9 and FAA Order 7210.3, paragraph 12–7 where justified by extraordinary circumstances at specific locations.

3–3 Reference.—FAA Order 7210.3, Use of Active Runways, paragraph 12–7b.

a. Ground control must obtain approval from local control before authorizing an aircraft or a vehicle to cross or use any portion of an active runway.

b. When the local controller authorizes another controller to cross an active runway, the local controller shall verbally specify the runway to be crossed preceded by the word "cross."

Phraseology:

CROSS (runway) AT (intersection if necessary).

c. The ground controller shall advise the local controller when the coordinated runway operation is complete. This may be accomplished verbally or through visual aids as specified by a facility directive.

d. *USAF NOT APPLICABLE* Authorization for aircraft/vehicles to taxi/proceed on or along an active runway, for purposes other than crossing, shall be provided via direct communications on the appropriate local control frequency. This authorization may be provided on the ground control frequency after coordination with local control is completed for those operations specifically described in a facility directive.

3–3d Note.– The USAF establish local operating procedures in accordance with USAF directives.

e. The local controller shall coordinate with the ground controller before using a runway not previously designated as active.

3–3 Reference.—Coordination Between Local and Ground Controllers, paragraph 3–4.

3–4 COORDINATION BETWEEN LOCAL AND GROUND CONTROLLERS

Local and ground controllers shall exchange information as necessary for the safe and efficient use of airport runways and movement areas. This may be accomplished via verbal means, flight progress strips, other written information, or automation displays. As a minimum, provide aircraft identification and applicable runway/intersection/taxiway information as follows:

a. Ground control shall notify local control when a departing aircraft has been taxied to a runway other than one previously designated as active.

3–4a Reference.—Use of Active Runways, paragraph 3–3. FAA Order 7210.3, Selecting Active Runways, paragraph 12–6.

b. Ground control shall notify local control of any aircraft taxied to an intersection for takeoff, unless departure from that intersection is specifically designated via prior coordination or facility directive as the standard operating procedure for the runway to be used. When standard procedures require departures to use a specific intersection, ground control shall notify local control when aircraft are taxied to other portions of the runway for departure.

3–4b Reference.—Intersection Departure, paragraph 3–106.

c. When the runways in use for landing/departing aircraft are not visible from the tower or the aircraft using them are not visible on radar, advise the local/ground controller of the aircraft's location before releasing the aircraft to the other controller.

3–5 VEHICLES/EQUIPMENT/PERSONNEL ON RUNWAYS

a. Ensure that the runway to be used is free of all known ground vehicles, equipment, and personnel before a departing aircraft starts takeoff or a landing aircraft crosses the runway threshold.

b. Vehicles, equipment, and personnel in direct communications with the control tower, may be authorized to operate up to the edge of an active runway surface when necessary. Provide advisories as specified in paragraph 3–6, Traffic Information, and paragraph 3–84d, Precision Approach Critical Areas, as appropriate.

Phraseology:
PROCEED AS REQUESTED; and if necessary, (additional instructions or information)

3–5 Note.—Establishing hold lines/signs is the responsibility of the airport manager. Standards for surface measurements, markings, and signs are contained in Advisory Circulars 150/5300–13, 150/5340–1, and 150/5340–18. The operator is responsible to properly position the aircraft, vehicle, or equipment at the appropriate hold line/sign or designated point. The requirements in paragraph 3–12, Visually Scanning Runways, remain valid as appropriate.

3–5 Reference.—Runway Proximity, paragraph 3–83, Touch-and-Go or Stop-and-Go or Low Approach, paragraph 3–91. Altitude Restricted Low Approach, paragraph 3–129. AC 150/5300–13, Airport Design, Part 91.129 Operation at Airports With Operating Control Towers, AIM paragraph 2–22 and Pilot/Controller Glossary.

3–6 TRAFFIC INFORMATION

a. Describe vehicles, equipment, or personnel on or near the movement area in a manner which will assist pilots in recognizing them.

3–6a Examples.—
"Mower left of Runway Two Seven."

"Trucks crossing approach end of Runway Two Five."

"Workman on Taxiway Bravo."

"Aircraft left of Runway One Eight."

b. Describe the relative position of traffic in an easy to understand manner, such as "to your right" or "ahead of you."

3–6b Examples.—
"Traffic, Eastern DC–9 on downwind leg to your left."

"Twin Bonanza inbound from outer marker on straight-in approach to Runway One Seven."

c. When using a certified tower radar display, you may issue traffic advisories using the standard radar phraseology prescribed in paragraph 2–21.

3–6 Reference.— Altitude Restricted Low Approach, paragraph 3–129.

3–7 POSITION DETERMINATION

a. Determine the position of an aircraft before issuing taxi instructions or takeoff clearance.

3–7 Note.—The aircraft's position may be determined visually by the controller, by pilots, or through the use of the ASDE.

b. When a local controller delivers or amends an ATC clearance to an aircraft awaiting departure and that aircraft is holding short of a runway or is holding in position on a runway, an additional clearance shall be issued to prevent the possibility of the aircraft inadvertently taxiing onto the runway and/or beginning takeoff roll. In such cases, append one of the following ATC instructions as appropriate:

1. HOLD SHORT OF RUNWAY, *or*
2. HOLD IN POSITION.

3–8 LOW LEVEL WINDSHEAR ADVISORIES

When low level windshear is reported by pilots or detected on any of the Doppler or Low Level Windshear Alert Systems (LLWAS), a statement shall be included on the ATIS for 20 minutes following the last report or indication of windshear.

3–8 Reference.—PIREP information, paragraph 2–102. Content, paragraph 2–127. Landing Information, paragraph 3–120.

Phraseology:
LOW LEVEL WINDSHEAR ADVISORIES IN EFFECT.

At facilities without ATIS, ensure that windshear information is broadcast to all arriving and departing aircraft for 20 minutes following the last report or indication of windshear.

a. At locations equipped with LLWAS, the local controller shall provide wind information as follows:

3–8a Note.—The LLWAS is designed to detect low level windshear conditions around the periphery of an airport. It does not detect windshear beyond that limitation.

3–8a Reference.—FAA Order 7210.3, Low Level Windshear Alert System (LLWAS), paragraph 12–32.

1. If an alert is received, issue the centerfield wind and the displayed field boundary wind.

Phraseology:
WINDSHEAR ALERT. CENTERFIELD WIND (direction) AT (velocity). (Location of sensor) BOUNDARY WIND (direction) AT (velocity).

2. If multiple alerts are received, issue an advisory that there are windshear alerts in two/several/all quadrants. After issuing the advisory, issue the centerfield wind in accordance with paragraph 3–100b followed by the field boundary wind most appropriate to the aircraft operation.

Phraseology:
WINDSHEAR ALERTS TWO/SEVERAL/ALL QUADRANTS. CENTERFIELD WIND (direction) AT (velocity). (Location of sensor) BOUNDARY WIND (direction) AT (velocity).

3. If requested by the pilot, issue specific field boundary wind information even though the LLWAS may not be in alert status.

3–8a3 Note.—The requirements of subparagraphs 3–8a and 3–8b, paragraph 3–100, and paragraph 3–120 (reference issuance of wind information) remain valid as appropriate.

b. "Improved" LLWAS systems are designed to detect windshear in the vicinity of the centerfield

sensor as well as around the periphery. Locations equipped with "improved" LLWAS systems will issue centerfield wind variance when an alert is received from the centerfield area.

Phraseology:
WINDSHEAR ALERT, CENTERFIELD WIND (direction) AT (velocity) VARYING TO (direction) AT (velocity).

c. LLWAS "Network Expansion" and LLWAS systems that are integrated with Terminal Doppler Weather radars (TDWR) provide the capability of displaying microburst alerts, windshear alerts, and wind information oriented to the threshold or departure end of a runway.

1. If a windshear or microburst alert is received for the runway in use, issue the displayed alert information for that runway to arriving and departing aircraft.

Phraseology:
WINDSHEAR/MICROBURST ALERT, (windspeed) KNOT GAIN/LOSS, (location).

2. If requested by the pilot or deemed appropriate by the controller, issue the displayed wind information oriented to the threshold or departure end of the runway.

Phraseology:
(runway) DEPARTURE/THRESHOLD WIND (direction) AT (velocity).

3. Alerts occurring on the edge of the system, or if the system is unable to distinguish between windshear and microbursts; an alert message will be displayed advising of a possible windshear outside of the system network.

Phraseology:
(appropriate wind or alert information) POSSIBLE WINDSHEAR OUTSIDE THE NETWORK.

4. If unstable conditions produce multiple alerts, issue an advisory of multiple windshear/microburst alerts followed by specific alert or wind information.

Phraseology:
MULTIPLE WINDSHEAR/MICROBURST ALERTS (specific alert or wind information).

5. When a microburst is detected, a statement shall be included on the ATIS broadcast, "MICROBURST ADVISORIES IN EFFECT." This item shall be included on the ATIS for at least 1 hour following the microburst alert.

6. The LLWAS "Network Expansion" is designed to operate with as many as three sensors inoperative. Whenever one to three sensors are inoperative, the system will display this information in the status area. When an LLWAS sensor is inoperative and windshear/microburst activity is likely; (e.g.-frontal activity, convective storms, PIREPS), a statement shall be included on the ATIS, "LLWAS IMPAIRED FOR WINDSHEAR AND MICROBURST DETECTION."

3–9 USE OF TOWER RADAR DISPLAYS

a. Local controllers may use certified tower radar displays for the following purposes:

1. To determine an aircraft's identification, exact location, or spatial relationship to other aircraft.

3–9a1 Note.—This authorization does not alter visual separation procedures. When employing visual separation, the provisions of paragraph 7–10 apply unless otherwise authorized by AAT–1.

3–9a1 Reference.—Primary Radar Identification Methods, paragraph 5–51; Beacon Identification Methods, paragraph 5–52; ARTS/PIDP Identification Methods, paragraph 5–53.

2. To provide aircraft with radar traffic advisories.

3. To provide a direction or suggested headings to VFR aircraft as a method for radar identification or as an advisory aid to navigation.

Phraseology:
(Identification), PROCEED (direction)-BOUND, (other instructions or information as necessary),

or

(identification), SUGGESTED HEADING (degrees), (other instructions as necessary).

3–9a3 Note.—It is important that the pilot be aware of the fact that the directions or headings being provided are suggestions or are advisory in nature. This is to keep the pilot from being inadvertently mislead into assuming that radar vectors (and other associated radar services) are being provided when, in fact, they are not.

4. To provide information and instructions to aircraft operating within the airport traffic area surface area for which the tower has responsibility.

3–9a4 Example.—
"Turn base leg now."

3–9a Note.—Unless otherwise authorized, tower radar displays are intended to be an aid to local controllers in meeting their responsibilities to the aircraft operating on the runways or within the airport traffic area surface area. They are not intended to provide radar benefits to pilots except for those accrued through a more efficient and effective local control position. In addition, local controllers at nonapproach control towers must devote the majority of their time to visually scanning the runways and local area; an assurance of continued positive radar identification could place distracting and operationally inefficient requirements upon the local controller. Therefore, since the requirements of paragraph 5–50 cannot be assured, the radar functions prescribed above are not considered to be radar services and pilots should not be advised of being in "radar contact."

b. Additional functions may be performed provided the procedures have been reviewed and authorized by appropriate management levels.

3–9 Reference.—Minima, paragraph 5–72.

3–10 OBSERVED ABNORMALITIES

When requested by a pilot or when you deem it necessary, inform an aircraft of any observed abnormal aircraft condition.

Phraseology:
(Item) APPEAR/S (observed condition).

3–10 Examples.—

"Landing gear appears down and in place."

"Rear baggage door appears open."

3–11 AIRPORT TRAFFIC AREA SURFACE AREA RESTRICTIONS

a. If traffic conditions permit, approve a pilot's request to cross an airport traffic area Class C or D surface areas or exceed the airport traffic area Class C or D airspace speed limit. Do not, however, approve a speed in excess of 250 knots (288 mph) unless the pilot informs you a higher minimum speed is required.

3–11a Note.—Part 91.117 permits speeds in excess of 250 knots (288 mph) when so required or recommended in the airplane flight manual or required by normal military operating procedures.

3–11a Reference.—Airport Traffic Areas Surface Areas, paragraph 2–16.

b. Do not approve a pilot's request or ask a pilot to conduct unusual maneuvers within an airport traffic area surface areas of Class B, C, or D airspace if they are not essential to the performance of the flight.

3–11b Note.—These unusual maneuvers include unnecessary low passes, unscheduled flybys, practice instrument approaches to altitudes below specified minima (unless a landing or touch-and-go is to be made), or any so-called "buzz jobs" wherein a flight is conducted at a low altitude and/or a high rate of speed for thrill purposes. Such maneuvers increase hazards to persons and property and contribute to noise complaints.

3–12 VISUALLY SCANNING RUNWAYS

a. Local controllers shall visually scan runways to the maximum extent possible.

b. Ground control shall assist local control in visually scanning runways, especially when runways are in close proximity to other movement areas.

3–13 ESTABLISHING TWO-WAY COMMUNICATIONS

Pilots are required to establish two-way radio communications before entering the Class D airspace. If the controller responds to a radio call with, "(a/c callsign) standby," radio communications have been established and the pilot can enter the Class D airspace. If workload or traffic conditions prevent immediate provision of Class D service, inform the pilot to remain outside the Class D airspace until conditions permit the services to be provided.

Phraseology:

(a/c callsign) REMAIN OUTSIDE THE CLASS D AIRSPACE AND STANDBY.

3–13 Reference.—Visual Separation, paragraph 7–10.

3–14 thru 3–19 RESERVED

Section 2. VISUAL SIGNALS

3–20 LIGHT SIGNALS

Use air traffic control light signals from the Table to control aircraft and the movement of vehicles, equipment, and personnel on the movement area when radio communications cannot be employed. (See Table 3–20[1]).

Table 3–20[1]
ATC Light Signals.

	Meaning		
Color and type of signal	*Aircraft on the ground*	*Aircraft in flight*	*Movement of vehicles, equipment, and personnel*
Steady green	Cleared for takeoff	Cleared to land	Cleared to cross; proceed; go
Flashing green	Cleared to taxi	Return for landing (to be followed by steady green at the proper time)	Not applicable
Steady red	Stop	Give way to other aircraft and continue circling	Stop
Flashing red	Taxi clear of landing area or runway in use	Airport unsafe—Do not land	Clear the taxiway/runway
Flashing white	Return to starting point on airport	Not applicable	Return to starting point on airport

Alternating red and green: General Warning Signal—Exercise Extreme Caution

3–20 Reference.—Altitude Restricted Low Approach, paragraph 3–129. Order 7210.3, Letters of Agreement, paragraph 4–30.

3–21 WARNING SIGNAL

Direct a general warning signal to aircraft or vehicle operators, as appropriate, when:

3–21 Note.—The warning signal is not a prohibitive signal and can be followed by any other light signal, as circumstances permit.

a. Aircraft are converging and a collision hazard exists.

b. Mechanical trouble exists of which the pilot might not be aware.

c. Other hazardous conditions are present which call for intensified pilot or operator alertness. These conditions may include obstructions, soft field, ice on the runway, etc.

3–22 RECEIVER-ONLY ACKNOWLEDGMENT

To obtain acknowledgment from an aircraft equipped with receiver only, request the aircraft to do the following:

a. Fixed-wing aircraft—

1. Between sunrise and sunset—

(a) Move ailerons or rudders while on the ground.

(b) Rock wings while in flight.

2. Between sunset and sunrise—Flash navigation or landing lights.

b. Helicopters—

1. Between sunrise and sunset—

(a) While hovering, either turn the helicopter toward the controlling facility and flash the landing light or rock the tip path plane.

(b) While in flight, either flash the landing light or rock the tip path plane.

2. Between sunset and sunrise—Flash landing light or search light.

3–23 thru 3–29 RESERVED

Section 3. AIRPORT CONDITIONS

3–30 LANDING AREA CONDITION

If you observe or are informed of any condition which affects the safe use of a landing area:

3–30 Note 1.—The airport management/military operations office is responsible for observing and reporting the condition of the landing area.

3–30 Note 2.—It is the responsibility of the agency operating the airport to provide the tower with current information regarding airport conditions.

3–30 Note 3.—A disabled aircraft on a runway, after occupants are clear, is normally handled by Flight Standards and airport management/military operations office personnel in the same manner as any obstruction; e.g., construction equipment.

a. Relay the information to the airport manager/military operations office concerned.

b. Copy verbatim any information received and record the name of the person submitting it.

c. Confirm information obtained from other than authorized airport or FAA personnel unless this function is the responsibility of the military operations office.

3–30c Note.—Civil airport managers are required to provide a list of airport employees who are authorized to issue information concerning conditions affecting the safe use of the airport.

d. If you are unable to contact the airport management or operator, issue a Notice to Airmen publicizing an unsafe condition and inform the management or operator as soon as practicable.

3–30d Example.—

"Disabled aircraft on runway."

3–30d Note 1.—Legally, only the airport management/military operations office can close a runway.

3–30d Note 2.—Military controllers are not authorized to issue Notices to Airmen. It is the responsibility of the military operations office.

e. Issue to aircraft only factual information, as reported by the airport management concerning the condition of the runway surface, describing the accumulation of precipitation.

3–30e Example.—

"All runways covered by compacted snow six inches deep."

3–30 Reference.—Airport Conditions, paragraph 4–90.

3–31 CLOSED/UNSAFE RUNWAY INFORMATION

If an aircraft requests to takeoff, land, or touch-and-go on a closed or unsafe runway, inform the pilot the runway is closed or unsafe, and

a. If the pilot persists in his request, quote him the appropriate parts of the Notice to Airmen applying to the runway and inform him that a clearance cannot be issued.

b. Then, if the pilot insists and in your opinion the intended operation would not adversely affect other traffic, inform him that the operation will be at his own risk.

Phraseology:

RUNWAY (runway number) CLOSED/UNSAFE.

If appropriate,

(quote Notice to Airmen information), UNABLE TO ISSUE DEPARTURE/LANDING/TOUCH-AND-GO CLEARANCE.

DEPARTURE/LANDING/TOUCH-AND-GO WILL BE AT YOUR OWN RISK.

c. Except as permitted by paragraph 4–106, where parallel runways are served by separate ILS/MLS systems and one of the runways is closed, the ILS/MLS associated with the closed runway should not be used for approaches unless not using the ILS/MLS would have an adverse impact on the operational efficiency of the airport.

3–31 Reference.—Landing Clearance, paragraph 3–124. Airport Conditions, paragraph 4–90.

3–32 TIMELY INFORMATION

Issue airport condition information necessary for an aircraft's safe operation in time for it to be useful to the pilot. Include the following, as appropriate:

a. Construction work on or immediately adjacent to the movement area.

b. Rough portions of the movement area.

c. Braking conditions caused by ice, snow, slush, or water.

d. Snowdrifts or piles of snow on or along the edges of the area and the extent of any plowed area.

e. Parked aircraft on the movement area.

f. Irregular operation of part or all of the airport lighting system.

g. Other pertinent airport conditions.

3–32 Reference.—Airport Conditions, paragraph 4–90. Reporting Essential Flight Information, paragraph 2–9. Altitude Restricted Low Approach, paragraph 3–129.

3–33 BRAKING ACTION

Furnish quality of braking action, as received from pilots or the airport management, to all aircraft as follows:

a. Describe the quality of braking action using the terms "good," "fair," "poor," "nil," or a combination of these terms. If the pilot or airport management reports braking action in other than the foregoing terms, ask him to categorize braking action in these terms.

3–33a Note.—The term "nil" is used to indicate bad or no braking action.

b. Include type of aircraft or vehicle from which the report is received.

3–33a and b Examples.—

"Braking action fair to poor, reported by a heavy D-C Ten."

"Braking action poor, reported by a Boeing Seven Twenty-seven."

c. If the braking action report affects only a portion of a runway, obtain enough information from the pilot or airport management to describe the braking action in terms easily understood by the pilot.

3–33c Examples.—

"Braking action poor first half of runway, reported by a Lockheed Ten Eleven."

"Braking action poor beyond the intersection of Runway Two Seven, reported by a Boeing Seven Twenty-seven."

3–33c Note.—Descriptive terms, such as the first or the last half of the runway, should normally be used rather than landmark descriptions, such as opposite the fire station, south of a taxiway, etc. Landmarks extraneous to the landing runway are difficult to distinguish during low visibility, at night, or anytime a pilot is busy landing an aircraft.

d. Furnish runway friction measurement readings/values as received from airport management to aircraft as follows:

1. Furnish information as received from the airport management to pilots on the ATIS at locations where friction measuring devices, such as MU–Meter, Saab Friction Tester (SFT), and Skiddometer are in use. Use the runway followed by the MU number for each of the three runway segments, time of report, and a word describing the cause of the runway friction problem.

3–33d1 Example.—

"RUNWAY TWO SEVEN, MU FORTY–TWO, FORTY–ONE, TWENTY–EIGHT AT ONE ZERO ONE EIGHT ZULU, ICE."

2. Issue the runway surface condition and/or the Runway Condition Reading (RCR), if provided, to all USAF and ANG aircraft. Issue the RCR to other aircraft upon pilot request.

3–33d2 Example.—

"Ice on runway, RCR zero five, patchy."

3–33d2 Note 1.—USAF has established RCR procedures for determining the average deceleration readings of runways under conditions of water, slush, ice, or snow. The use of the RCR code is dependent upon the pilot's having a "stopping capability chart" specifically applicable to his aircraft.

3–33d2 Note 2.—USAF offices furnish RCR information at airports serving USAF and ANG aircraft.

3–33d2 Reference.—Airport Conditions, paragraph 4–90.

3–33 Reference.—Braking Action Advisories, paragraph 3–34 .

3–34 BRAKING ACTION ADVISORIES

a. When runway braking action reports are received from pilots or the airport management which include the terms "poor" or "nil" or whenever weather conditions are conducive to deteriorating or rapidly changing runway conditions, include on the ATIS broadcast the statement "Braking Action Advisories are in effect."

3–34a Reference.—Order 7210.3, Automatic Terminal Information Service, paragraph 12–40.

b. During the time Braking Action Advisories are in effect, take the following action:

1. Issue the latest braking action report for the runway in use to each arriving and departing aircraft early enough to be of benefit to the pilot. When possible, include reports from heavy jet aircraft when the arriving or departing aircraft is a heavy jet.

2. If no report has been received for the runway of intended use, issue an advisory to that effect.

Phraseology:

NO BRAKING ACTION REPORTS RECEIVED FOR RUNWAY (runway number).

3. Advise the airport management that runway braking action reports of "poor" or "nil" have been received.

3–34b3 Reference.—Order 7210.3, Letters of Agreement, paragraph 4–30.

4. Solicit PIREP's of runway braking action.

3–34b4 Reference.—PIREP Information, paragraph 2–102.

c. Include runway friction measurement/values received from airport management on the ATIS. Furnish the information when requested by the pilot in accordance with paragraph 3–33.

3–34 Reference.—Content, paragraph 2–127. Departure Information, paragraph 3–100. Landing Information, paragraph 3–120. Airport Conditions, paragraph 4–90.

3–35 ARRESTING SYSTEM OPERATION

a. For normal operations, arresting systems remotely controlled by air traffic control shall remain in the retracted or down position.

3–35a Note 1.—USN Runway Arresting Gear-Barriers are not operated by air traffic control personnel. Readiness/rigging of the equipment is the responsibility of the operations department.

3–35a Note 2.—A request to raise a barrier or hook cable means the barrier or cable on the departure end of the runway. If an approach end engagement is required, the pilot or military authority will specifically request that the approach end cable be raised.

3–35 Reference.—Order 7610.4, paragraphs 9–31 through 9–35.

b. Raise aircraft arresting systems whenever:

1. Requested by a pilot.

3–35b1 Note.—The standard emergency phraseology for a pilot requesting an arresting system to be raised for immediate engagement is "Barrier-Barrier-Barrier" or "Cable-Cable-Cable."

2. Requested by military authority; e.g., airfield manager, supervisor of flying, mobile control officer, etc.

3. A military jet aircraft is landing with known or suspected radio failure or conditions (drag chute/

hydraulic/electrical failure, etc.) that indicate an arresting system may be needed. Exceptions are authorized for military aircraft which cannot engage an arresting system (C–9, C–141, C–5, T–39, etc.) and should be identified in a letter of agreement and/or appropriate military directive.

c. When requested by military authority due to freezing weather conditions or malfunction of the activating mechanism, the barrier/cable may remain in a raised position provided aircraft are advised.

Phraseology:

YOUR DEPARTURE/LANDING WILL BE TOWARD/OVER A RAISED BARRIER/CABLE ON RUNWAY (number), (location, distance, as appropriate).

d. Inform civil and U.S. Army aircraft whenever rubber supported cables are in place at the approach end of the landing runway, and include the distance of the cables from the threshold. This information may be omitted if it is published in the "Notices to Airmen" publication/DOD FLIP.

3–35d Example.—

"Runway One Four arresting cable one thousand feet from threshold."

e. When arresting system operation has been requested, inform the pilot of the indicated barrier/cable position.

Phraseology:

(Identification), BARRIER/CABLE INDICATES UP/DOWN. CLEARED FOR TAKEOFF/TO LAND.

f. Time permitting, advise pilots of the availability of all arresting systems on the runway in question when a pilot requests barrier information.

g. If an aircraft engages a raised barrier/cable, initiate crash alarm procedures immediately.

h. For preplanned practice engagements not associated with emergencies, crash alarm systems need not be activated if—in accordance with local military operating procedures—all required notifications are made before the practice engagement.

3–35 Reference.—Airport Conditions, paragraph 4–90.

3–36 FAR FIELD MONITOR (FFM) REMOTE STATUS UNIT

a. Background.

1. To meet the demand for more facilities capable of operating under CAT III weather, Type II equipment is being upgraded to Integrity Level 3. This integrity level will support operations which place a high degree of reliance on ILS guidance for positioning through touchdown.

2. Installation of the FFM remote status indicating units is necessary to attain the integrity necessary to meet internationally agreed upon reliability values in support of CAT III operations on Type II ILS equipment. The remote status indicating unit used in conjunction with Type II equipment adds a third integrity test; thereby, producing an approach aid which has integrity capable of providing Level 3 service.

3. The remote status sensing unit, when installed in the tower cab, will give immediate indications of localizer out-of-tolerance conditions. The alarm in the FFM remote status sensing unit indicates an inoperative or an out-of-tolerance localizer signal; e.g., the course may have shifted due to equipment malfunction or vehicle/aircraft encroachment into the critical area.

b. Procedures.

1. Operation of the FFM remote sensing unit will be based on the prevailing weather. The FFM remote sensing unit shall be operational when the weather is below CAT I ILS minimums.

2. When the weather is less than that required for CAT I operations, the GRN–27 FFM remote status sensing unit shall be set at:

(a) "CAT II" when the RVR is less than 2,400 feet;

(b) "CAT III" when the RVR is less than 1,200 feet.

3. When the remote status unit indicates that the localizer FFM is in alarm (aural warning following the preset delay) and:

(a) The aircraft is outside the middle marker (MM), check for encroachment those portions of the critical area that can be seen from the tower. It is understood that the entire critical area may not be visible due to low ceilings and poor visibility. The check is strictly to determine possible causal factors for the out-of-tolerance situation. If the alarm has not cleared prior to the aircraft's arriving at the MM, immediately issue an advisory that the FFM remote status sensing unit indicates the localizer is unreliable.

(b) The aircraft is between the MM and the inner marker (IM), immediately issue an advisory that the FFM remote status sensing unit indicates the localizer is unreliable.

Phraseology:

CAUTION, MONITOR INDICATES RUNWAY (number) LOCALIZER UNRELIABLE.

(c) The aircraft has passed the IM, there is no action requirement. Although the FFM has been modified with filters which dampen the effect of false alarms, you may expect alarms when aircraft are located between the FFM and the localizer antenna either on landing or on takeoff.

3–36 Reference.—Airport Conditions,paragraph 4–90.

3–37 thru 3–39 RESERVED

Section 4. AIRPORT LIGHTING

3–40 EMERGENCY LIGHTING

Whenever you become aware that an emergency has or will occur, take action to provide for the operation of all appropriate airport lighting aids as required.

3–40 Reference.—Lighting Requirements, paragraph 10–41.

3–41 RUNWAY END IDENTIFIER LIGHTS

When separate on-off controls are provided, operate runway end identifier lights:

a. When the associated runway lights are lighted. Turn the REIL off after:

1. An arriving aircraft has landed.
2. A departing aircraft has left the traffic pattern area.
3. It is determined that the lights are of no further use to the pilot.

b. As required by facility directives to meet local conditions.

c. As requested by the pilot.

d. Operate intensity setting in accordance with the values in the Table 3–41[1] except as prescribed in subparagraphs 3–41b and c.

Table 3–41[1]
REIL Intensity Setting—Three Step System.

Settings	*Visibility*	
	Day	*Night*
3	Less than 2 miles	Less than 1 mile
2	2 to 5 miles inclusive	1 to but not including 3 miles
1	When requested	3 miles or more

3–42 VISUAL APPROACH SLOPE INDICATORS (VASI)

VASI systems with remote on-off switching shall be operated when they serve the runway in use and where intensities are controlled in accordance with the Table 3–42[1] and Table 3–42[2] except:

a. As required by facility directives to meet local conditions.

b. As required by the pilot.

Table 3–42[1]
VASI Intensity Setting—Two Step System

Step	*Period/Condition*
High	Day—Sunrise to sunset.
Low	Night—Sunset to sunrise.

Table 3–42[2]
VASI Intensity Setting—Three Step System.

Step	*Period/Condition*
High	Day—Sunrise to sunset.
Medium	Twilight—From sunset to 30 minutes after sunset and from 30 minutes before sunrise to sunrise, and during twilight in Alaska.*
Low	Night—From 30 minutes after sunset to 30 minutes before sunrise.

*During a 1 year period, twilight may vary 26 to 43 minutes between 25 and 49N latitude.

3–42 Note.—The basic FAA standard for VASI systems permits independent operation by means of photoelectric device. This system has no on-off control feature and is intended for continuous operation. Other VASI systems in use include those that are operated remotely from the control tower. These systems may consist of either a photoelectric intensity control with only an on-off switch, a two step intensity system, or a three step intensity system.

3–42 Reference.—FAA Order 7210.3, VASI Systems, paragraph 12–64. FAA Order 6850.2, Visual Guidance Lighting Systems.

3–43 APPROACH LIGHTS

Operate approach lights:

a. Between sunset and sunrise when one of the following conditions exists:

1. They serve the landing runway.
2. They serve a runway to which an approach is being made but aircraft will land on another runway.

b. Between sunrise and sunset when the ceiling is less than 1,000 feet or the prevailing visibility is 5 miles or less and approaches are being made to:

1. A landing runway served by the lights.
2. A runway served by the lights but aircraft are landing on another runway.
3. The airport, but landing will be made on a runway served by the lights.

c. As requested by the pilot.

d. As you deem necessary, if not contrary to pilot's request.

3–43 Note.—In the interest of energy conservation, the ALS should be turned off when not needed for aircraft operations.

3–43 Reference.—ALS Intensity Settings, paragraph 3–44.

3–44 ALS INTENSITY SETTINGS

When operating ALS as prescribed in paragraph 3–43, operate intensity controls in accordance with the values in Table 3–44[1] except:

a. When facility directives specify other settings to meet local atmospheric, topographic, and twilight conditions.

b. As requested by the pilot.

c. As you deem necessary, if not contrary to pilot's request.

Table 3–44[1]
ALS Intensity Setting

Step	*Visibility—(Applicable to runway served by lights)*	
	Day	*Night*
5	Less than 1 mile*	When requested
4	1 to but not including 3 miles	When requested
3	3 to but not including 5 miles	Less than 1 mile*
2	5 to but not including 7 miles	1 to 3 miles inclusive
1	When requested	Greater than 3 miles

*and/or 6,000 feet or less of the RVR on the runway served by the ALS and RVR.

3–44 Note.—Daylight Steps 2 and 3 provide recommended settings applicable to conditions in subparagraphs b and c. At night, use step 4 or 5 only when requested by a pilot.

3–45 SEQUENCED FLASHING LIGHTS

Operate Sequenced Flashing Lights:

3–45 Note.—SFL are a component of the ALS and cannot be operated when the ALS is off.

a. When the visibility is less than 3 miles and instrument approaches are being made to the runway served by the associated ALS.

b. As requested by the pilot.

c. As you deem necessary, if not contrary to pilot's request.

3–46 MALSR/ODALS

Operate MALSR/ODALS that have separate on-off and intensity setting controls in accordance with Table 3–46[1] and Table 3–46[2] except:

a. When facility directives specify other settings to meet local atmospheric, topographic, and twilight conditions.

b. As requested by the pilot.

c. As you deem necessary if not contrary to pilot's request.

Table 3–46[1]
Two Step MALS/One Step RAIL/Two Step ODALS

Settings		*Visibility*	
		Day	*Night*
MALS/ODALS RAIL	Hi On	Less than 3 miles	Less than 3 miles*
MALS/ODALS RAIL	Low Off	When requested	3 miles or more

* At locations providing part-time control tower service, if duplicate controls are not provided in the associated FSS, the MALSR/ODALS shall be set to low intensity during the hours of darkness when the tower is unmanned.

Table 3–46[2] Three Step MALS/Three Step RAIL/ Three Step ODALS

Settings	*Visibility*	
	Day	*Night*
3	Less than 2 miles	Less than 1 mile
2	2 to 5 miles inclusive	1 to but not including 3 miles*
1	When requested	3 miles or more

*At locations providing part-time control tower service, if duplicate controls are not provided in the FSS on the airport, the air-to-ground radio link shall be activated during the hours of darkness when the tower is unmanned. If there is no radio air-to-ground control, the MALSR/ODALS shall be set on intensity setting 2 during the hours of darkness when the tower is unmanned. (See FAA Order 7210.3, paragraph 12–53.)

3–47 ALSF–2/SSALR

a. When the prevailing visibility is 3/4 mile or less or the RVR is 4,000 feet or less, operate the ALSF–2 system as follows:

1. As requested by the pilot.

2. As you deem necessary if not contrary to pilot request.

b. Operate the SSALR system when the conditions in subparagraph 3–47a are not a factor.

3–48 RUNWAY EDGE LIGHTS

Operate the runway edge light system/s serving the runway/s in use as follows:

a. Between sunset and sunrise, turn the lights on:

1. For departures—Before an aircraft taxies onto the runway and until it leaves the airport traffic area Class B, C, or D surface area.

2. For arrivals—

(a) IFR aircraft—Before the aircraft begins final approach, or

(b) VFR aircraft—Before the aircraft enters the airport traffic area Class B, C, or D surface area, and

(c) Until the aircraft has taxied off the landing runway.

b. Between sunrise and sunset, turn the lights on as in subpargraphs a1 and 2 above when the surface visibility is less than 2 miles.

c. As required by facility directives to meet local conditions.

d. Different from subparagraphs 3–48a, b, or c when:

1. You consider it necessary, or

2. Requested by a pilot and no other known aircraft will be adversely affected.

3–48d2 Note.—Pilots may request lights to be turned on or off contrary to subparagraphs 3–48a, b, or c. However, Part 135 operators are required to land/takeoff on lighted runways/heliport landing areas at night.

e. Do not turn on the runway edge lights when a NOTAM closing the runway is in effect.

3–48 Note.—Application concerns use for takeoffs/landings/approaches and does not preclude turning lights on for use of unaffected portions of a runway for taxiing aircraft, surface vehicles, maintenance, repair, etc.

3–48 Reference.—Simultaneous Approach and Runway Edge Light Operation, paragraph 3–53. FAA Order 7210.3, paragraph 12–62.

3–49 HIGH INTENSITY RUNWAY, RUNWAY CENTERLINE, AND TOUCHDOWN ZONE LIGHTS

Operate high intensity runway and associated runway centerline and touchdown zone lights in accordance with Table 3–49[1], except:

a. Where a facility directive specifies other settings to meet local conditions.

b. As requested by the pilot.

c. As you deem necessary, if not contrary to pilot request.

Table 3–49[1]
HIRL, RCLS, TDZL Intensity Setting

Step	*Visibility*	
	Day	*Night*
5	Less than 1 mile*	When requested
4	1 to but not including 2 miles*	Less than 1 mile*
3	2 to but not including 3 miles	1 to but not including 3 miles*
2	When requested	3 to 5 miles inclusive
1	When requested	More than 5 miles

*and/or appropriate RVR/RVV equivalent.

3–50 HIRL ASSOCIATED WITH MALSR

Operate HIRL which control the associated MALSR in accordance with Table 3–50[1], except:

a. As requested by the pilot.

b. As you deem necessary, if not contrary to the pilot's request.

Table 3–50[1]
HIRL associated with MALSR

Step	*Visibility*	
	Day	*Night*
5	Less than 1 mile	When requested
4	1 to but not including 2 miles	Less than 1 mile
3	2 to but not including 3 miles	1 to but not including 3 miles
2	When requested	3 to 5 miles inclusive
1	When requested	More than 5 miles

3–50 Note.—When going from a given brightness step setting to a lower setting, rotation of the brightness control to a point below the intended step setting and then back to the appropriate step setting will ensure that the MALSR will operate at the appropriate brightness.

3–50 Reference.—Medium Intensity Runway Lights, paragraph 3–52.

3–51 HIRL CHANGES AFFECTING RVR

Keep the appropriate approach controller or PAR controller informed, in advance if possible, of HIRL changes that affect RVR.

3–52 MEDIUM INTENSITY RUNWAY LIGHTS

Operate MIRL or MIRL which control the associated MALSR in accordance with Table 3–52[1], except:

a. As requested by the pilot.

b. As you deem necessary, if not contrary to the pilot's request.

Table 3–52[1]
MIRL Intensity Setting

Step	*Visibility*	
	Day	*Night*
3	Less than 2 miles	Less than 1 mile
2	2 to 3 miles	1 to 3 miles
1	When requested	More than 3 miles

3–52 Reference.—See HIRL Associated with MALSR, paragraph 3–50 Note.

3–53 SIMULTANEOUS APPROACH AND RUNWAY EDGE LIGHT OPERATION

Turn on the runway edge lights for the runway in use whenever the associated approach lights are on. If multiple runway light selection is not possible, you may leave the approach lights on

and switch the runway lights to another runway to accommodate another aircraft

3–53 Reference.—Runway Edge Lights, paragraph 3–48.

3–54 HIGH SPEED TURNOFF LIGHTS

Operate high speed turnoff lights:

a. Whenever the associated runway lights are used for arriving aircraft. Leave them on until the aircraft has either entered a taxiway or passed the last light.

b. As required by facility directives to meet local conditions.

c. As requested by the pilot.

3–55 TAXIWAY LIGHTS

Operate taxiway lights serving the taxiways, or portions thereof, in use as follows:

a. Between sunset and sunrise—Before an aircraft taxies onto the taxiway (normally at the time taxi information is issued) and until it taxies off it.

b. At other times when you consider it necessary and as required by local instructions.

3–56 OBSTRUCTION LIGHTS

If controls are provided, turn the lights on between sunset and sunrise.

3–57 ROTATING BEACON

If controls are provided, turn the rotating beacon on:

a. Between sunset and sunrise.

b. Between sunrise and sunset when the reported ceiling or visibility is below basic VFR minima.

3–58 thru 3–59 RESERVED

Section 5. RUNWAY SELECTION

3–60 SELECTION

a. Except where a "runway use" program is in effect, use the runway most nearly aligned with the wind when 5 knots or more or the "calm wind" runway when less than 5 knots (set tetrahedrons accordingly) unless use of another runway:

3–60a Note 1.—If a pilot prefers to use a runway different from that specified, he/she is expected to advise ATC.

3–60a Note 2.—At airports where a "runway use" program is established, ATC will assign runways deemed to have the least noise impact. If in the interest of safety a runway different from that specified is preferred, the pilot is expected to advise ATC accordingly. ATC will honor such requests and advise pilots when the requested runway is noise sensitive.

3–60a Reference.—Order 8400.9, National Safety and Operational Criteria for Runway Use Programs.

1. Will be operationally advantageous, or
2. Is requested by the pilot.

b. When conducting aircraft operations on other than the advertised active runway, state the runway in use.

3–61 STOL RUNWAYS

Use STOL runways as follows:

a. A designated STOL runway may be assigned only when requested by the pilot or as specified in a letter of agreement with an aircraft operator.

b. Issue the measured STOL runway length if the pilot requests it.

3–62 TAILWIND COMPONENTS

When authorizing use of runways and a tailwind component exists, always state both wind direction and velocity.

3–62 Note.—The wind may be described as "calm" when appropriate.

3–62 Reference.—Calm Wind Condition, paragraph 2–104.

3–63 thru 3–69 RESERVED

Section 6. AIRPORT SURFACE DETECTION PROCEDURES

3–70 EQUIPMENT USAGE

Use ASDE to augment visual observation of aircraft and/or vehicular movements on runways and taxiways:

a. When visibility is less than the most distant point in the active movement area, and

b. When, in your judgment, its use will assist you in the performance of your duties at any time.

3–71 INFORMATION USAGE

a. Use ASDE derived information to assist with:

1. Formulating clearances and control instructions to aircraft and vehicles on the movement area.

2. Determining when the runway is clear of aircraft and vehicles prior to a landing or departure.

3–71a2 Reference.—Order 7210.3, Radar Use, paragraph 3–81.

3. Positioning aircraft and vehicles using the movement area.

4. Determining the exact location of aircraft and vehicles, or spatial relationship to other aircraft/vehicles on the movement area.

5. Monitoring compliance with control instructions by aircraft and vehicles on taxiways and runways.

6. Confirming pilot reported positions.

7. Providing directional taxi information on pilot request.

Phraseology:

TURN (left/right) ON THE TAXIWAY/RUNWAY YOU ARE APPROACHING.

b. Do not provide specific navigational guidance (exact headings to be followed) unless an emergency exists or by mutual agreement with the pilot.

3–71b Note.—It remains the pilot's responsibility to navigate visually via routes to the clearance limit specified by the controller and to avoid other parked or taxiing aircraft, vehicles, or persons in the movement area.

3–72 IDENTIFICATION

To identify an observed target on the ASDE display, correlate its position with one or more of the following:

a. Pilot's report.

b. Controller's visual observation.

c. An identified target observed on the ASR bright display.

3–73 thru 3–79 RESERVED

Section 7. TAXI AND GROUND MOVEMENT PROCEDURES

3–80 GROUND TRAFFIC MOVEMENT

Issue by radio or directional light signals specific instructions which approve or disapprove the movement of aircraft, vehicles, equipment, or personnel on the movement area.

a. Do not issue *conditional* instructions that are dependent upon the movement of an arrival aircraft on or approaching the runway or a departure aircraft established on a takeoff roll. Do not say, "Taxi into position and hold behind landing traffic," or "Taxi/proceed across Runway Three Six behind departing/landing Jetstar." The above requirements do not preclude issuing instructions to follow an aircraft observed to be operating on the movement area in accordance with an ATC clearance/instruction and in such a manner that the instructions to follow are not ambiguous.

b. Do not use the word "cleared" in conjunction with authorization for aircraft to taxi or equipment/vehicle/personnel operations. Use the prefix "taxi," "proceed," or "hold," as appropriate, for aircraft instructions and "proceed" or "hold" for equipment/vehicles/personnel.

c. Intersection departures may be initiated by a controller or a controller may authorize an intersection departure if a pilot requests. Issue the measured distance from the intersection to the runway end rounded "down" to the nearest 50 feet to any pilot who requests and to all military aircraft, unless use of the intersection is covered in appropriate directives.

3–80c Note.— Exceptions are authorized where specific military aircraft routinely make intersection takeoffs and procedures are defined in appropriate directives. The authority exercising operational control of such aircraft ensures that all pilots are thoroughly familiar with these procedures, including the usable runway length from the applicable intersection.

3–81 TAXI AND GROUND MOVEMENT OPERATION

Issue, as required or requested, the route for the aircraft/vehicle to follow on the movement area in concise and easy to understand terms.

a. When authorizing a vehicle to proceed on the movement area or an aircraft to taxi to any point other than an assigned takeoff runway, absence of holding instructions authorizes an aircraft/vehicle to cross all taxiways and runways that intersect the taxi route. If it is the intent to hold the aircraft/vehicle short of any given point along the taxi route, issue the route if necessary, then state the holding instructions.

3–81a Note.— Movement of aircraft or vehicles on nonmovement areas is the responsibility of the pilot, the aircraft operator, or the airport management.

Phraseology:

HOLD POSITION.

HOLD FOR (reason)

CROSS (runway/taxiway)

or

TAXI/CONTINUE TAXIING/PROCEED:

VIA (route),

or

ON (runway number or taxiways, etc.),

or

TO (location),

or

(direction),

or

ACROSS RUNWAY (number).

or

VIA (route), HOLD SHORT OF (location)

or

FOLLOW (traffic) (restrictions as necessary)

or

BEHIND (traffic)

3–81a Examples.—

"Cross Runway Two Eight Left."

"Taxi/continue taxiing/proceed to the hanger."

"Taxi/continue taxiing/proceed straight ahead then via ramp to the hanger."

"Taxi/continue taxiing/proceed on Taxiway Charlie, hold short of Runway Two Seven."

b. When authorizing an aircraft to taxi to an assigned takeoff runway and hold short instructions are not issued, specify the runway preceded by "taxi to," and issue taxi instructions if necessary. This authorizes the aircraft to "cross" all runways/taxiways which the taxi route intersects except the assigned takeoff runway. This does not authorize the aircraft to "enter" or "cross" the assigned takeoff runway at any point.

Phraseology:

TAXI TO RUNWAY (number) VIA . . .

3–81b Examples.—

"Taxi to Runway One Two."

"Taxi to Runway Three Six via Taxiway Echo."

c. Specify the runway for departure, any necessary taxi instructions, and hold short restrictions when an aircraft will be required to hold short of a runway along the taxi route.

Phraseology:

RUNWAY (number),

TAXI/PROCEED VIA (route if necessary),

HOLD:

SHORT OF (runway number),

or

SHORT OF (location),

or

ON (taxi strip, runup pad, etc.),

and if necessary,

TRAFFIC (traffic information),

or

FOR (reason).

3–81c Example.—

"Runway 36 Left, taxi via Taxiway Charlie, hold short of Runway 27 Right."

d. Request a read back of runway hold short instructions when they are not received from the pilot/vehicle operator.

Phraseology:

READBACK HOLD INSTRUCTIONS.

3–81d Example 1.—

"American Four Ninety Two, Runway 36 Left, taxi via Taxiway Charlie, hold short of Runway 27 Right."

"American Four Ninety Two, Roger."

"American Four Ninety Two, Read Back Hold Instructions."

3–81d Example 2.—

"Cleveland Tower, American Sixty Three is ready for departure."

"American Sixty Three hold short of Runway 23 Left, traffic one mile final."

"American Sixty Three Roger."

"American Sixty Three Read Back Hold Instructions."

3–81d Example 3.—

"OPS Three proceed via Taxiway Charlie hold short of Runway 27."

"OPS Three roger."

"OPS Three, Read Back Hold Instructions."

3–81d Note.— Readback hold instructions phraseology may be initiated for any point on a movement area when the controller believes the readback is necessary.

e. Issue progressive taxi/ground movement instructions when:

1. Pilot/operator requests.

2. The specialist deems it necessary due to traffic or field conditions, e.g., construction or closed taxiways.

f. Progressive ground movement instructions include step-by-step routing directions.

3–81 Reference.— Runway Proximity, paragraph 3–83. Taxi and Ground Movement Operation, paragraph 3–140.

3–82 GROUND OPERATIONS

WAKE TURBULENCE APPLICATION

Avoid clearances which require:

a. Heavy jet aircraft to use greater than normal taxiing power.

b. Small aircraft or helicopters to taxi in close proximity to taxiing or hover-taxi helicopters.

3–82 Reference.— AC 90–23, Wake Turbulence, paragraph 10 and paragraph 11.

3–83 RUNWAY PROXIMITY

Hold a taxiing aircraft or vehicle clear of the runway as follows:

a. Instruct aircraft or vehicle to hold short of a specific runway.

b. Instruct aircraft or vehicle to hold at a specified point.

c. Issue traffic information as necessary.

Phraseology:

HOLD SHORT OF/AT (runway number or specific point), (traffic or other information).

3–83 Note.— Establishing hold lines/signs is the responsibility of the airport manager. The standards for surface measurements, markings, and signs are contained in AC 150/5300–13, AC 150/5340–1 and AC 150/5340–18. The operator is responsible for properly positioning the aircraft, vehicle, or equipment at the appropriate hold line/sign or designated point. The requirements in paragraph 3–12, Visually Scanning Runways, remain valid as appropriate.

3–83 Reference.— Taxi and Ground Movement Operation, paragraph 3–81; Altitude Restricted Low Approach, paragraph 3–129, Vehicles/ Equipment/Personnel on Runways, paragraph 3–5.

3–84 PRECISION APPROACH CRITICAL AREA

a. Instrument Landing System (ILS) critical area dimensions are described in FAA Order 6750.16, Siting Criteria for Instrument Landing Systems. Aircraft and vehicle access to the ILS/MLS critical area must be controlled to ensure the integrity of ILS/MLS course signals whenever conditions are less than reported ceiling 800 feet and/or visibility less than 2 miles. Do not authorize vehicles/aircraft to operate in or over the critical area, except as specified in subparagraph 3–84a1, whenever an arriving aircraft is inside the ILS outer marker (OM) or the fix used in lieu of the OM unless the arriving aircraft has reported the runway in sight or is circling to land on another runway.

Phraseology:

HOLD SHORT OF (Runway) ILS/MLS CRITICAL AREA.

1. LOCALIZER CRITICAL AREA

(a) Do not authorize vehicle or aircraft operations in or over the area when an arriving aircraft is between the ILS OM or the fix used in lieu of the OM when conditions are less than reported ceiling 800 feet and/or visibility less than 2 miles, except:

(1) A preceding arriving aircraft on the same or another runway that passes over or through the area while landing or exiting the runway.

(2) A preceding departing aircraft or missed approach on the same or another runway that passes through or over the area.

(b) In addition to subparagraph 3–84a1(a), do not authorize vehicles or aircraft operations in or over the area when an arriving aircraft is inside the middle marker when conditions are less than reported ceiling 200 feet and/or RVR 2,000 feet.

2. GLIDESLOPE CRITICAL AREA – Do not authorize vehicles or aircraft operations in or over the area when an arriving aircraft is between the ILS OM or the fix used in lieu of the OM unless the arriving aircraft has reported the runway in sight or is circling to land on another runway when conditions are less than reported ceiling 800 feet and/or visibility less than 2 miles.

b. Air carriers commonly conduct "coupled" or "autoland" operations to satisfy maintenance, training, or reliability program requirements. Promptly issue an advisory if the critical area will not be protected when an arriving aircraft advises that a "coupled," "CAT III," "autoland," or similar type approach will be conducted and the weather is a reported ceiling of 800 feet or more, or the visibility is less than 2 miles or more.

Phraseology:

ILS/MLS CRITICAL AREA NOT PROTECTED.

c. The Department of Defense (DOD) is authorized to define criteria for protection of precision approach critical areas at military controlled airports. This protection is provided to all aircraft operating at that military controlled airport. Waiver authority for DOD precision approach critical area criteria rests with the appropriate military authority.

3–84 Note.— Signs and markings are installed by the airport operator to define the ILS/MLS critical area. No point along the longitudinal axis of the aircraft is permitted past the hold line for holding purposes. The operator is responsible to properly position the aircraft, vehicle, or equipment at the appropriate hold line/sign or designated point. The requirements in Paragraph 3–12, Visually Scanning Runways, remain valid as appropriate.

3–84 Reference 1.— Advisory Circular 150/5340–1, Marking Paved Areas on Airports.

3–84 Reference 2.— Airman's Information Manual.

3–85 thru 3–89 RESERVED

Section 8. SPACING AND SEQUENCING

3–90 SEQUENCE/SPACING APPLICATION

Establish the sequence of arriving and departing aircraft by requiring them to adjust flight or ground operation as necessary to achieve proper spacing.

Phraseology:

CLEARED FOR TAKEOFF.

CLEARED FOR TAKEOFF OR HOLD SHORT/HOLD IN POSITION/TAXI OFF THE RUNWAY (traffic).

EXTEND DOWNWIND.

MAKE SHORT APPROACH.

NUMBER (landing sequence number).

FOLLOW (description and location of traffic),

or if traffic is utilizing another runway,

TRAFFIC (description and location) LANDING RUNWAY (number of runway being used).

CIRCLE THE AIRPORT.

MAKE LEFT/RIGHT THREE-SIXTY/TWO SEVENTY.

GO AROUND.

CLEARED TO LAND.

CLEARED:

TOUCH-AND-GO,

or

STOP-AND-GO,

or

LOW APPROACH.

CLEARED FOR THE OPTION,

or

OPTION APPROVED,

or

UNABLE OPTION, (alternate instructions).

or

UNABLE (type of option), OTHER OPTIONS APPROVED.

3–90 Note 1.—The "Cleared for the Option" procedure will permit an instructor pilot/flight examiner/pilot the option to make a touch-and-go, low approach, missed approach, stop-and-go, or full stop landing. This procedure will only be used at those locations with an operational control tower and will be subject to ATC approval.

3–90 Note 2.—For proper helicopter spacing, speed adjustments may be more practical than course changes.

3–90 Note 3.– Read back of hold short instructions apply when hold instructions are issued to a pilot in lieu of a takeoff clearance.

3–90 Reference.—Expeditious Compliance, paragraph 2–5. Taxi and Ground Movement Operation, paragraph 3–81

3–91 TOUCH-AND-GO OR STOP-AND-GO OR LOW APPROACH

Consider an aircraft cleared for touch-and-go, stop-and-go, or low approach as an arriving aircraft until it touches down (for touch-and-go), or makes a complete stop (for stop-and-go), or crosses the landing threshold (for low approach), and thereafter as a departing aircraft.

3–91 Reference.—Vehicles/Equipment/Personnel on Runways, paragraph 3–5. Intersection Departure, paragraph 3–106.

3–92 *SIMULTANEOUS SAME DIRECTION* OPERATION

Authorize simultaneous, same direction operations on parallel runways, on parallel landing strips, or on a runway and a parallel landing strip only when the following conditions are met:

a. Operations are conducted in VFR conditions unless visual separation is applied.

b. Two-way radio communication is maintained with the aircraft involved and pertinent traffic information is issued.

c. The distance between the runways or landing strips is in accordance with the minima in Table 3–92[1] (use the greater minimum if two categories are involved).

Table 3–92[1]
Same Direction Distance Minima

Aircraft category	*Minimum distance (feet) between parallel*	
	Runway centerlines	*Edges of adjacent strips or runway and strip*
Lightweight, single engine, propeller driven	300	200
Twin-engine, propeller driven	500	400
All others	700	600

3–93 SIMULTANEOUS OPPOSITE DIRECTION OPERATION

Authorize simultaneous opposite direction operations on parallel runways, on parallel landing strips, or on a runway and a parallel landing strip only when the following conditions are met:

a. Operations are conducted in VFR conditions.

b. Two-way radio communication is maintained with the aircraft involved and pertinent traffic information is issued.

Phraseology:

TRAFFIC (description) ARRIVING/DEPARTING/LOW APPROACH, OPPOSITE DIRECTION ON PARALLEL RUNWAY/LANDING STRIP.

c. The distance between the runways or landing strips is in accordance with the minima in Table 3–93[1].

Table 3–93[1]
Opposite Direction Distance Minima

Time of Operation	*Minimum distance (feet) between parallel*	
	Runway centerlines	*Edges of adjacent strips or runway and strip*
Between sunrise and sunset	1,400	1,400
Between sunset and sunrise	2,800	Not authorized

3–94 thru 3–99 RESERVED

Section 9. DEPARTURE PROCEDURES AND SEPARATION

3–100 DEPARTURE INFORMATION

Provide current departure information, as appropriate, to departing aircraft. Departure information contained in the ATIS broadcast may be omitted if the pilot states the appropriate ATIS code. Runway, wind, and altimeter may be omitted if a pilot uses the phrase "have numbers." Issue departure information by including the following:

3–100 Note.—Pilot use of "have numbers" does not indicate receipt of the ATIS broadcast.

a. Runway in use.

b. Surface wind from direct readout dials. At LLWAS locations, centerfield wind from the LLWAS display.

c. Altimeter setting.

3–100c Reference.—Chapter 2, Section 7, Altimeter Settings

d. Time, when requested.

e. Issue the official ceiling and visibility, when available, to a departing aircraft before takeoff as follows:

1. To a VFR aircraft when weather is below VFR conditions.

2. To an IFR aircraft when weather is below VFR conditions or highest takeoff minima, whichever is greater.

3–100e2 Note.—Standard takeoff minimums are published in Part 91.175(f). Takeoff minima other than standard are prescribed for specific airports/runways and published in a tabular form supplement to the NOS instrument approach procedures charts and appropriate FAA Forms 8260.

f. Taxi information, as necessary. You need not issue taxi route information unless the pilot specifically requests it.

g. *USAF NOT APPLICABLE.* An advisory to "check density altitude" when appropriate.

3–100g Reference.—FAA Order 7210.3, Broadcast Density Altitude Advisory, paragraph 2–145.

h. Issue braking action for the runway in use as received from pilots or the airport management when Braking Action Advisories are in effect.

3–100h Reference.—Braking Action Advisories, paragraph 3–34. Pilot/Controller Glossary—Braking Action Advisories.

3–100 Reference.—Altimeter Setting Issuance Below Lowest Usable FL, paragraph 2–111. Low Level Wind Shear Advisories, paragraph 3–8.

3–101 DEPARTURE DELAY INFORMATION

USA/USAF/USN NOT APPLICABLE

When gate-hold procedures are in effect, issue the following departure delay information as appropriate:

3–101 Reference.—FAA Order 7210.3, Gate Hold Procedures, paragraph 12–42.

a. Advise departing aircraft the time at which the pilot can expect to receive engine startup advisory.

Phraseology:

GATE HOLD PROCEDURES ARE IN EFFECT. ALL AIRCRAFT CONTACT (position) ON (frequency) FOR ENGINE START TIME. EXPECT ENGINE START/TAXI (time).

b. Advise departing aircraft when to start engines and/or to advise when ready to taxi.

Phraseology:

START ENGINES, ADVISE WHEN READY TO TAXI

or

ADVISE WHEN READY TO TAXI

c. If the pilot requests to hold in a delay absorbing area, the request shall be approved if space and traffic conditions permit.

d. Advise all aircraft on GC/FD frequency upon termination of gate hold procedures.

Phraseology:

GATE HOLD PROCEDURES NO LONGER IN EFFECT.

3–102 DEPARTURE CONTROL INSTRUCTIONS

Inform departing IFR and Stage III TRSA VFR aircraft of the following:

a. Before takeoff—

1. Issue the appropriate departure control frequency and beacon code. The departure control frequency may be omitted if a SID has been or will be assigned and the departure control frequency is published on the SID.

Phraseology:

DEPARTURE FREQUENCY WILL BE (frequency), SQUAWK (code).

2. Inform all departing IFR military turboprop/turbojet aircraft (except transport and cargo types) to change to departure control frequency. If the local controller has departure frequency override, transmit urgent instructions on this frequency. If the override capability does not exist, transmit urgent instructions on the emergency frequency.

Phraseology:

CHANGE TO DEPARTURE.

b. After takeoff—

1. When the aircraft is about ½ mile beyond the runway end, instruct civil aircraft and military transport and cargo types to contact departure control provided further communication with you is not required.

2. Do not request departing military turboprop/turbojet aircraft (except transport and cargo types) to make radio frequency or radar beacon changes before the aircraft reaches 2,500 feet above the surface.

3–102 Reference.—Visual Separation, paragraph 7–10.

3–103 TAKEOFF POSITION HOLD

a. Authorize an aircraft to taxi into position and hold, except as restricted in paragraph 3–103c, when takeoff clearance cannot be issued because of traffic. Issue traffic information to any aircraft so authorized. Traffic information may be omitted when the traffic is another aircraft which has landed on or is taking off the same runway and is clearly visible to the holding aircraft. Do not use conditional phrases such as "behind landing traffic" or "after the departing aircraft."

b. First state the runway number followed by the taxi into position clearance when more than one runway is active.

Phraseology:

RUNWAY (number), TAXI INTO POSITION AND HOLD

or,

when only one runway is active:

TAXI INTO POSITION AND HOLD.

c. Do not authorize an aircraft to taxi into position and hold at an intersection between sunset and sunrise or at anytime when the intersection is not visible from the tower.

d. *USN:* Do not authorize aircraft to taxi into takeoff position to hold simultaneously on intersecting runways.

Phraseology:

CONTINUE HOLDING,

or

TAXI OFF THE RUNWAY.

3–103d Reference.—Altitude Restricted Low Approach, paragraph 3–129.

e. *USAF/USN:* When issuing additional instructions or information to an aircraft holding in takeoff position, include instructions to continue holding or taxi off the runway, unless it is cleared for takeoff.

Phraseology:

CONTINUE HOLDING,

or

TAXI OFF THE RUNWAY.

3–103e Reference.— Altitude Restricted Low Approach, Paragraph 3–129.

3–104 ANTICIPATING SEPARATION

Takeoff clearance need not be withheld until prescribed separation exists if there is a reasonable assurance it will exist when the aircraft starts takeoff roll.

3–105 SAME RUNWAY SEPARATION

Separate a departing aircraft from a preceding departing or arriving aircraft using the same runway by ensuring that it does not begin takeoff roll until:

a. The other aircraft has departed and crossed the runway end or turned to avert any conflict. If you can determine distances by reference to suitable landmarks, the other aircraft need only be airborne if the following minimum distance exists between aircraft:

1. When only Category I aircraft are involved—*3,000 feet.*
2. When a Category I aircraft is preceded by a Category II aircraft—*3,000 feet.*
3. When either the succeeding or both are Category II aircraft—*4,500 feet.*
4. When either is a Category III aircraft—*6,000 feet.*
5. When the succeeding aircraft is a helicopter, visual separation may be applied in lieu of using distance minima. (See Figure 3–105[1] and Figure 3–105[2]).

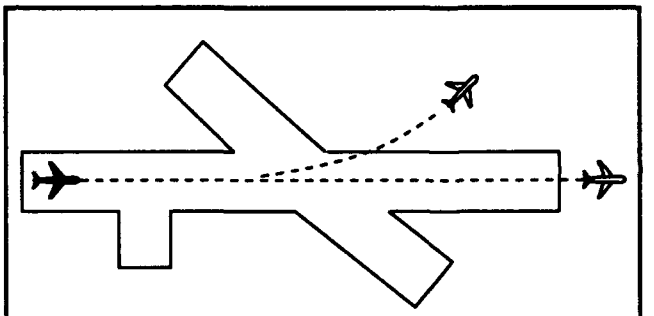


Figure 3–105[1]

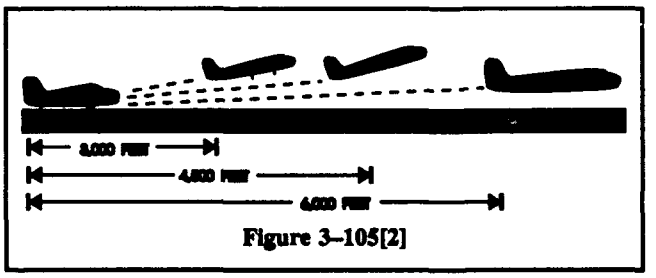


Figure 3–105[2]

3–105a Note.—Aircraft same runway separation (SRS) Categories are specified in Appendix A, B, and C and based upon the following definitions:

Category I— "Small" weight class (12,500 lbs. or less), single-engine, propeller-driven aircraft, and all helicopters.

Category II— "Small" weight class (12,500 lbs. or less), twin-engine, propeller-driven aircraft.

Category III— All other aircraft.

b. A preceding landing aircraft is clear of the runway. (See Figure 3–105[3]).

3–105b Reference.—Pilot/Controller Glossary—Clear of the Runway

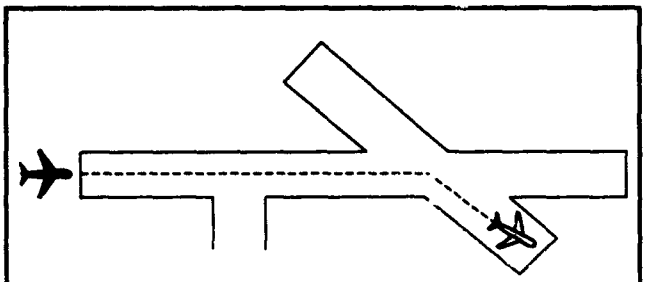


Figure 3–105[3]

WAKE TURBULENCE APPLICATION

c. Do not issue clearances which imply or indicate approval of rolling takeoffs by heavy jet aircraft.

d. Do not issue clearances to a small aircraft to taxi into position and hold on the same runway behind a departing heavy jet aircraft to apply the necessary intervals.

3–105d Reference.—AC 90–23, Wake Turbulence.

e. The minima in paragraph 5–72d may be applied in lieu of the 2–minute requirement in subparagraph 3–105f. When paragraph 5–72d minima are applied, ensure that the appropriate radar separation exists at or prior to the time an aircraft becomes airborne when taking off behind a heavy jet.

3–105e Note.—The pilot may request additional separation; i.e., 2 minutes vs. 4 miles, but should make this request before taxiing on the runway.

f. Separate IFR/VFR aircraft taking off behind a heavy jet departure by *2 minutes,* when departing:

3–105f Note.—Takeoff clearance to the following aircraft should not be issued until *2 minutes* after the heavy jet begins takeoff roll.

1. The same runway. (See Figure 3–105[4]).

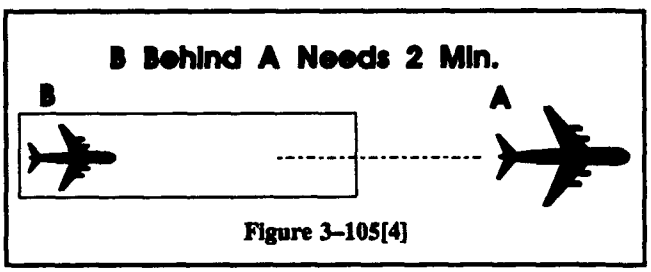


Figure 3–105[4]

2. A parallel runway separated by less than 2,500 feet.

g. Separate an aircraft from a heavy jet when operating on a runway with a displaced landing threshold if projected flight paths will cross—*2 minutes* when:

1. A departure follows a heavy jet arrival.
2. An arrival follows a heavy jet departure.

h. The 2–minute minima need not be applied if the pilot of a departing IFR/VFR aircraft has initiated a request to deviate from the 2–minute interval. In this case, issue a wake turbulence cautionary advisory before clearing the aircraft for takeoff.

i. Separate a small aircraft behind a large aircraft taking off or making a low/missed approach when utilizing opposite direction takeoffs on the same runway by *3 minutes* unless a pilot has initiated a request to deviate from the 3–minute interval. In the latter case, issue a wake turbulence advisory before clearing the aircraft for takeoff.

3–105i Note.—A request for takeoff does not initiate a waiver request; the request for takeoff must be accompanied by a request to deviate from the 3–minute rule.

3–105i Reference.—Aircraft Weight Classes and Groups: Appendix A, Appendix B, and Appendix C.

j. Separate aircraft behind a heavy jet departing or making a low/missed approach when utilizing opposite direction takeoffs or landings on the same or parallel runways separated by less than 2,500 feet - *3 minutes.*

k. Inform an aircraft when it is necessary to hold in order to provide the required *3–minute* interval.

Phraseology:

HOLD FOR WAKE TURBULENCE.

3–105 Reference.—Intersection Departure, paragraph 3–106.

3–106 INTERSECTION DEPARTURES

Handle intersection takeoffs as follows:

3–106 Reference.—Same Runway Separation, paragraph 3–105. Successive or Simultaneous Departures, paragraph 5–113. FAA Order 7210.3, Intersection Takeoffs, paragraph 2–11.

a. You may initiate an intersection takeoff.

b. You may authorize an intersection takeoff if the pilot requests it.

c. Issue the measured distance from the intersection to the runway end rounded "down" to the nearest 50 feet to any pilot who requests it, and to all military aircraft, unless use of the intersection is covered in appropriate directives.

3–106c Note.—Exceptions are authorized where specific military aircraft routinely make intersection takeoffs and procedures are defined in appropriate directives. The authority exercising operational control of such aircraft ensures that all pilots are thoroughly familiar with these procedures, including the usable runway length from the applicable intersection.

Phraseology:

RUNWAY (number) INTERSECTION DEPARTURE.

If requested or required,

RUNWAY (number) INTERSECTION DEPARTURE, (remaining length) FEET AVAILABLE.

d. State the runway intersection when authorizing an aircraft to taxi into position to hold or when clearing an aircraft for takeoff from an intersection.

Phraseology:

RUNWAY (number) AT (taxiway designator) further instructions as needed.

RUNWAY (number) AT (taxiway designator), TAXI INTO POSITION AND HOLD.

if requested or required,

RUNWAY (number) AT (taxiway designator) INTERSECTION DEPARTURE, (remaining length) FEET AVAILABLE.

WAKE TURBULENCE APPLICATION

e. Separate a small aircraft taking off from an intersection on the same runway (same or opposite direction takeoff) behind a preceding departing large aircraft by ensuring that it does not start takeoff roll until at least *3 minutes* after the large aircraft has taken off. Inform an aircraft when it is necessary to hold in order to provide the required 3–minute interval.

Phraseology:

HOLD FOR WAKE TURBULENCE.

3–106e Note.—Aircraft conducting touch-and-go and stop-and-go operations are considered to be departing from an intersection, reference paragraph 3–91.

f. The 3–minute interval is not required when:

1. A pilot has initiated a request to deviate from that interval, or

3–106f1 Note.—A request for takeoff does not initiate a waiver request; the request for takeoff must be accomplished by a request to deviate from the 3–minute interval.

2. *USA NOT APPLICABLE.* The intersection is 500 feet or less from the departure point of the preceding aircraft and both aircraft are taking off in the same direction.

3. Successive touch–and–go and stop–and–go operations are conducted with a small aircraft following a large aircraft in the pattern, or large aircraft departing the same runway, provided the pilot of the small aircraft is maintaining visual separation/spacing behind the preceding large aircraft. Apply the provisions of subparagraph 3–106e if action is initiated to reduce the separation between these successive touch–and–go or stop–and–go operations.

g. When applying the provisions of subparagraph 3–106f:

1. Issue a wake turbulence advisory before clearing the aircraft for takeoff.

2. Do not clear the intersection departure for an immediate takeoff.

3. When applying paragraph 3–106f1 or 2, issue a clearance to permit the trailing aircraft to deviate from course enough to avoid the flight path of the preceding large departure.

4. Separation requirements in accordance with paragraph 3–105a must also apply.

3–106f and g Reference.—Aircraft Categories, paragraph 3–105a Note.

h. Separate an aircraft taking off from an intersection on the same runway (same or opposite direction takeoff) and parallel runways separated by less than 2,500 feet, by ensuring that it does not start takeoff roll until at least *3 minutes* after a heavy jet has taken off.

3–106 Reference.—Coordination Between Local and Ground Controllers, paragraph 3–4.

3–107 INTERSECTING RUNWAY SEPARATION

Separate departing aircraft from an aircraft using an intersecting runway, or nonintersecting runways when the flight paths intersect, by ensuring that the departure does not begin takeoff roll until one of the following exists:

a. The preceding aircraft has departed and passed the intersection, has crossed the departure runway, or is turning to avert any conflict. (See Figure 3–107[1] and Figure 3–107[2]).

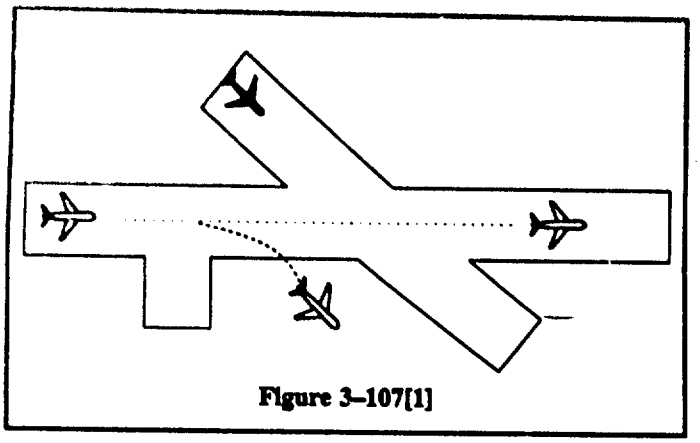


Figure 3–107[1]

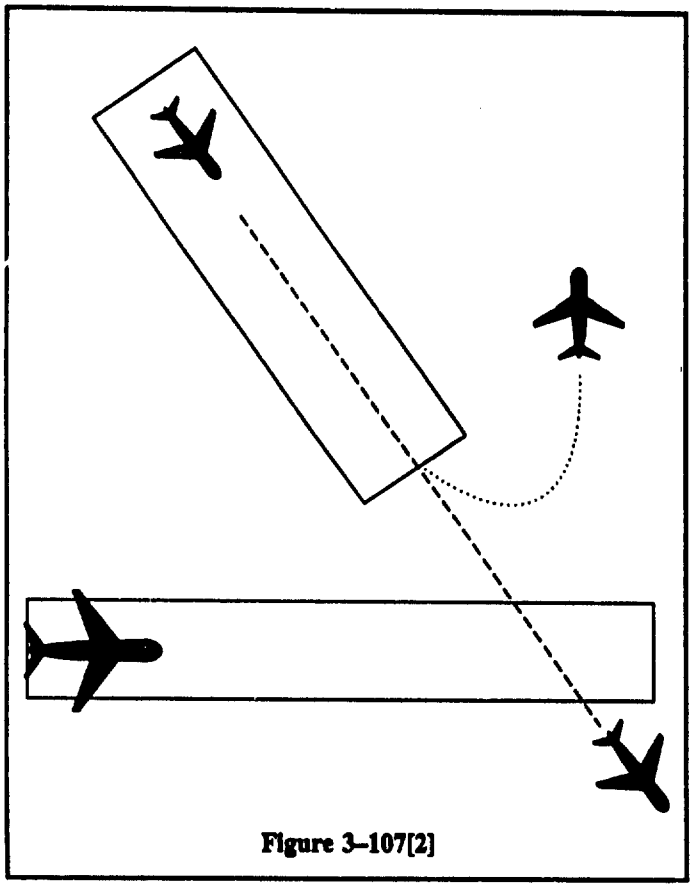


Figure 3–107[2]

b. A preceding arriving aircraft is clear of the landing runway, completed the landing roll and will hold short of the intersection, passed the intersection, or has crossed over the departure runway. (See Figure 3–107[3] and Figure 3–107[4]).

3–107b Reference.— Pilot/Controller Glossary—Clear of the Runway

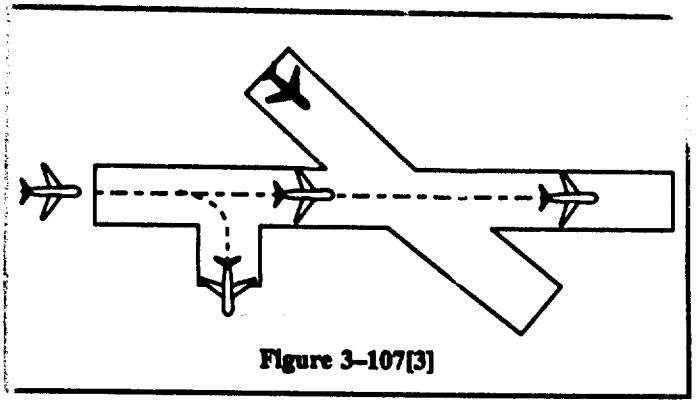


Figure 3–107[3]

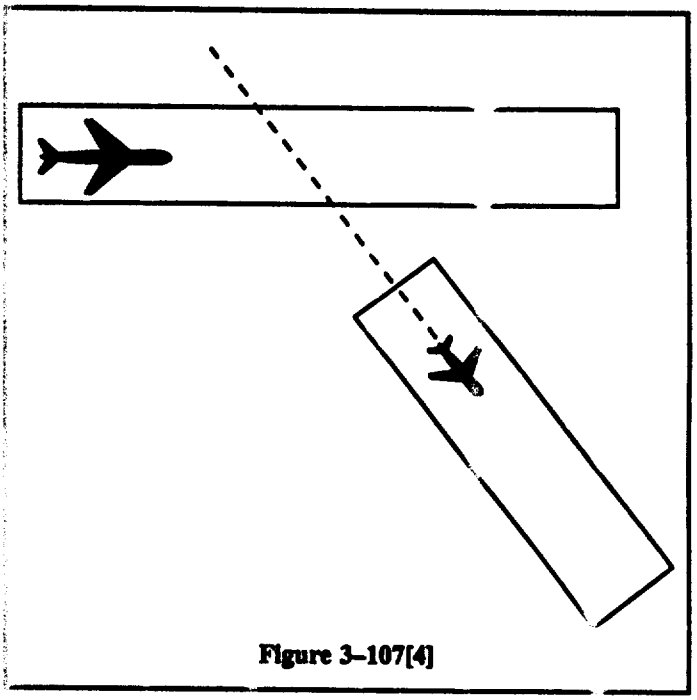


Figure 3–107[4]

WAKE TURBULENCE APPLICATION

c. Separate IFR/VFR aircraft taking off behind a heavy jet departure by 2 *minutes* when departing:

3–107c Note.— Takeoff clearance to the following aircraft should not be issued until 2 minutes after the heavy jet begins takeoff roll.

1. Crossing runways if projected flight paths will cross. (See Figure 3–107[5]).

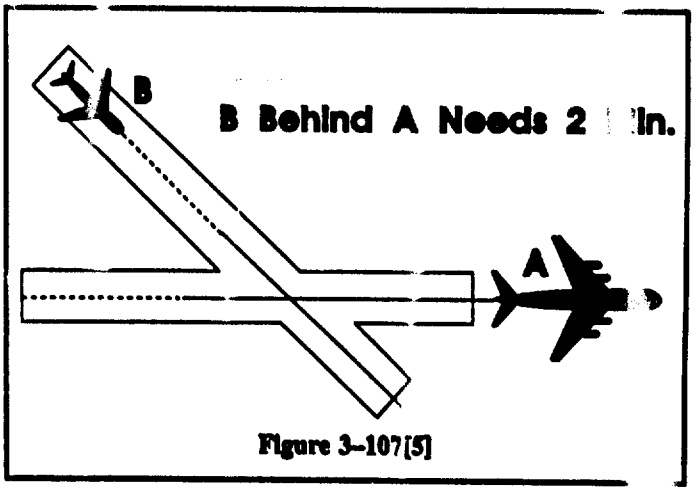


Figure 3–107[5]

2. A parallel runway separated by 2,500 feet or more if projected flight paths will cross. (See Figure 3–107[6]).

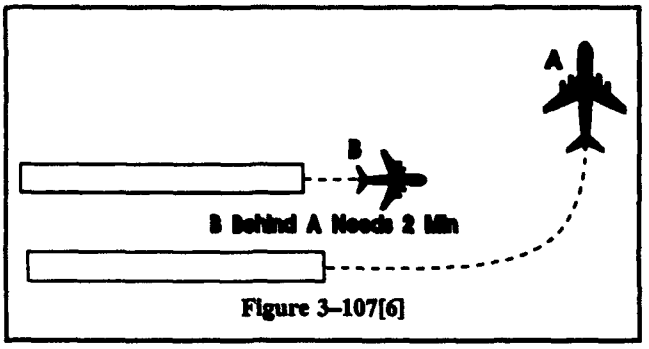


Figure 3–107[6]

d. Separate IFR/VFR aircraft departing behind a landing heavy jet on a crossing runway if the departure will fly through the airborne path of the arrival— *2 minutes.* (See Figure 3–107[7]).

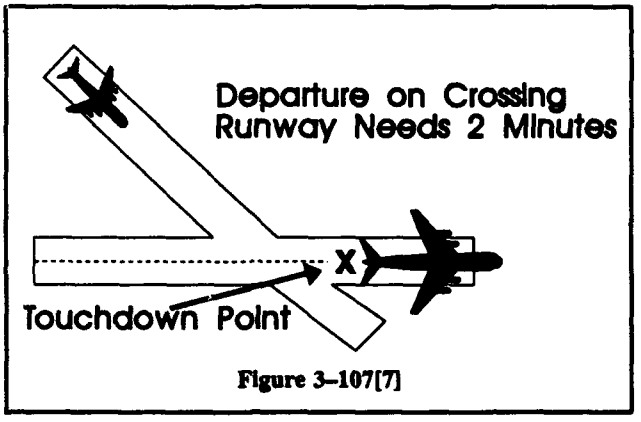


Figure 3–107[7]

e. The *2–minute* minima need not be applied if the pilot of a departing IFR/VFR aircraft has initiated a request to deviate from the *2–minute* interval. In this case, issue a wake turbulence cautionary advisory before clearing the aircraft for takeoff.

3–107 Reference.— Successive or Simultaneous Departures, paragraph 5–113. Departures and Arrivals on Parallel or Non-Intersecting Diverging Runways, paragraph 5–115.

3–108 TAKEOFF CLEARANCE

a. When only one runway is active, issue takeoff clearance.

Phraseology:
CLEARED FOR TAKEOFF.

3–108a Note.—Turbine-powered aircraft may be considered ready for takeoff when they reach the runway unless they advise otherwise.

3–108a Reference.—Departure Terminology, paragraph 4–30.

b. When more than one runway is active, first state the runway number followed by the takeoff clearance.

Phraseology:
RUNWAY (number), CLEARED FOR TAKEOFF.

3–108b Example.—
"Runway Two Seven. Cleared for takeoff."

c. *USA/USN:* Issue surface wind and takeoff clearance to aircraft.

Phraseology:
WIND (surface wind in direction and velocity).

CLEARED FOR TAKEOFF.

3–109 CANCELLATION OF TAKEOFF CLEARANCE

Cancel a previously issued clearance for takeoff and inform the pilot of the reason if circumstances require. Once an aircraft has started takeoff roll, cancel the takeoff clearance only for the purpose of safety.

3–109 Note.—In no case should a takeoff clearance be canceled after an aircraft has started its takeoff roll solely for the purpose of meeting traffic management requirements/EDCT's.

Phraseology:
CANCEL TAKEOFF CLEARANCE (reason).

3–110 thru 3–119 RESERVED

Section 10. ARRIVAL PROCEDURES AND SEPARATION

3–120 LANDING INFORMATION

Provide current landing information, as appropriate, to arriving aircraft. Landing information contained in the ATIS broadcast may be omitted if the pilot states the appropriate ATIS code. Runway, wind, and altimeter may be omitted if a pilot uses the phrase "have numbers." Issue landing information by including the following:

2–120 Note.—Pilot use of "have numbers" does not indicate receipt of the ATIS broadcast.

a. Specific traffic pattern information (may be omitted if the aircraft is to circle the airport to the left).

Phraseology:

ENTER LEFT/RIGHT BASE. STRAIGHT-IN. MAKE STRAIGHT-IN. STRAIGHT-IN APPROVED. RIGHT TRAFFIC. MAKE RIGHT TRAFFIC. RIGHT TRAFFIC APPROVED. CONTINUE.

b. Runway in use.

c. Surface wind

d. Altimeter setting.

3–120d Reference.—Chapter 2, Section 7.

e. Any supplementary information

f. Clearance to land.

g. Requests for additional position reports. Use prominent geographical fixes which can be easily recognized from the air, preferably those depicted on sectional charts. This does not preclude the use of the legs of the traffic pattern as reporting points.

3–120g Note.—At some locations, VFR checkpoints are depicted on Sectional Aeronautical and Terminal Area Charts. In selecting geographical fixes, depicted VFR checkpoints are preferred unless the pilot exhibits a familiarity with the local area.

h. Ceiling and visibility if either is below basic VFR minima.

i. Low level windshear advisories when available.

3–120i Reference.—Low Level Windshear Advisories, paragraph 3–8.

j. Issue braking action for the runway in use as received from pilots or the airport management when Braking Action Advisories are in effect.

3–120j Reference.—Braking Action Advisories, paragraph 3–34. Pilot/Controller Glossary—Braking Action Advisories.

3–121 FORWARDING APPROACH INFORMATION BY NONAPPROACH CONTROL FACILITIES

a. Forward the following, as appropriate, to the control facility having IFR jurisdiction in your area. You may eliminate those items that, because of local conditions or situations, are fully covered in a letter of agreement or a facility directive.

1. When you clear an arriving aircraft for a visual approach.

3–121a1 Reference.—Visual Approach, paragraph 7–30.

2. Aircraft arriving time.

3. Cancellation of IFR flight plan.

4. Information on a missed approach, unreported, or overdue aircraft.

5. Runway in use.

6. Weather as required.

3–121a6 Reference.—Reporting Weather Conditions, paragraph 2–105.

b. When the weather is below 1,000 feet or 3 miles or the highest circling minimums, whichever is greater, issue current weather to aircraft executing an instrument approach if it changes from that on the ATIS or that previously forwarded to the center/approach control.

3–122 SAME RUNWAY SEPARATION

a. Separate an arriving aircraft from another aircraft using the same runway by ensuring that the arriving aircraft does not cross the landing threshold until one of the following conditions exists or unless authorized in paragraph 3–131:

1. The other aircraft has landed and is clear of the runway. Between sunrise and sunset, if you can determine distances by reference to suitable landmarks and the other aircraft has landed, it need not be clear of the runway if the following minimum distance from the landing threshold exists: (See Figure 3–122[1]).

3–122a1 Reference.— Pilot/Controller Glossary—Clear of the Runway.

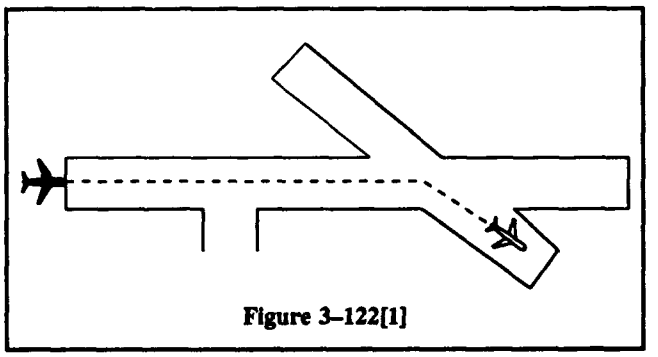


Figure 3–122[1]

(a) When a Category I aircraft is landing behind a Category I or II— *3,000 feet.* (See Figure 3–122[2]).

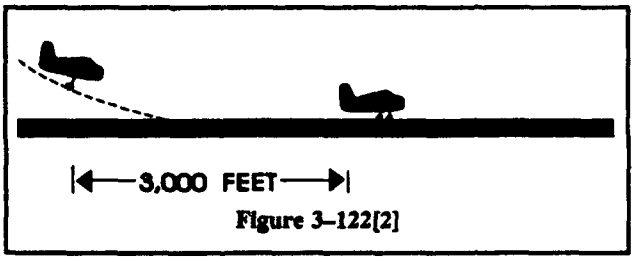


Figure 3–122[2]

(b) When a Category II aircraft is landing behind a Category I or II— *4,500 feet.* (See Figure 3–122[3]).

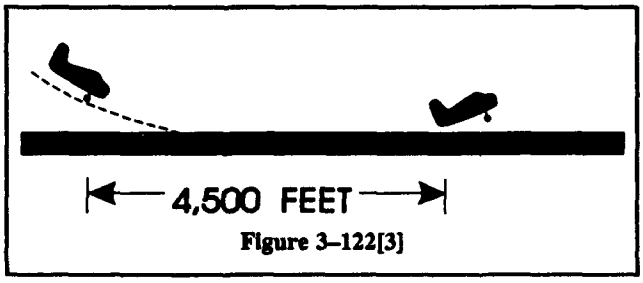


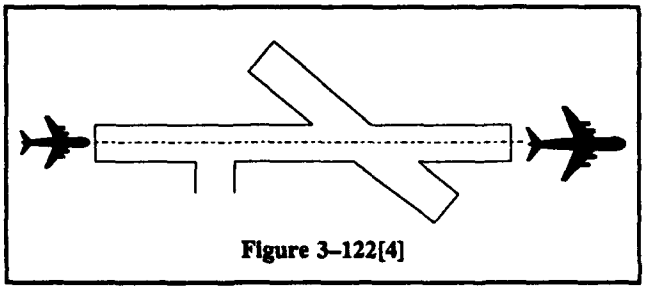
Figure 3–122[3]

2. The other aircraft has departed and crossed the runway end. If you can determine distances by reference to suitable landmarks and the other aircraft is airborne, it need not have crossed the runway end if the following minimum distance from the landing threshold exists:

(a) Category I aircraft landing behind Category I or II— *3,000 feet.*

(b) Category II aircraft landing behind Category I or II— *4,500 feet.*

(c) When either is a category III aircraft— *6,000 feet.* (See Figure 3–122[4] and Figure 3–122[5]).


Figure 3–122[4]

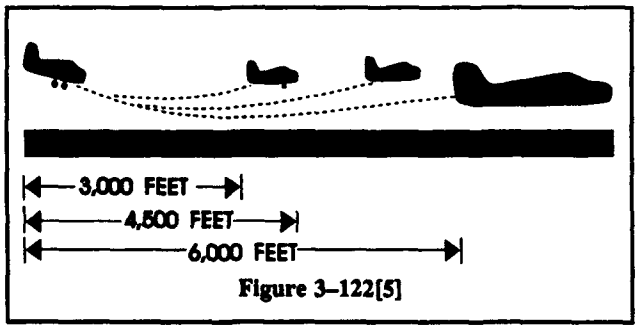


Figure 3–122[5]

3. When the succeeding aircraft is a helicopter, visual separation may be applied in lieu of using distance minima.

WAKE TURBULENCE APPLICATION

b. Issue wake turbulence cautionary advisories and the position, altitude if known, and direction of flight of the heavy jets to aircraft landing behind a departing/arriving heavy jet on the same or parallel runways separated by less than 2,500 feet.

3–122b Reference.—AC 90–23, Pilot Responsibility, paragraph 12.

3–122b Example 1.—

"Runway Two Seven Left cleared to land, caution wake turbulence, heavy Boeing 747 departing Runway Two Seven Right."

3–122b Example 2.—

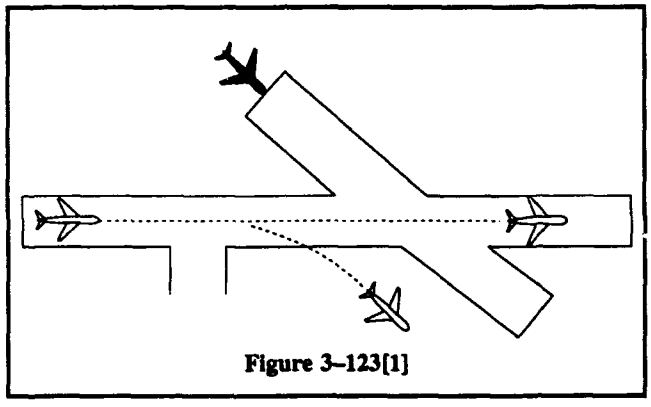
"Number two to land, following a heavy Lockheed C5A on two-mile final. Caution wake turbulence."

3–122 Reference.—Altitude Restricted Low Approach, paragraph 3–129.

3–123 INTERSECTING RUNWAY SEPARATION

a. Separate an arriving aircraft using one runway from another aircraft using an intersecting runway or a nonintersecting runway when the flight paths intersect by ensuring that the arriving aircraft does not cross the landing threshold or flight path of the other aircraft until one of the following conditions exists:

1. The preceding aircraft has departed and passed the intersection/flight path or is airborne and turning to avert any conflict. (See Figure 3–123[1] and Figure 3–123[2]).


Figure 3–123[1]

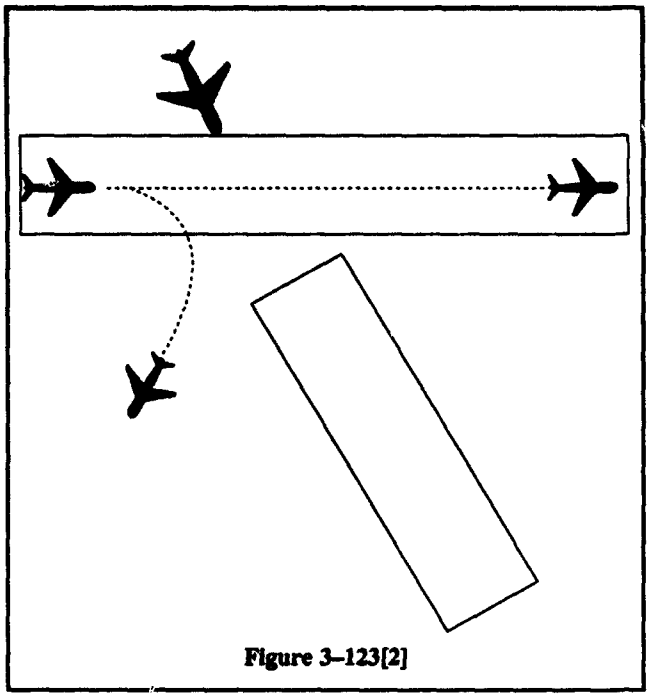


Figure 3–123[2]

2. A preceding arriving aircraft is clear of the landing runway, completed landing roll and will hold short of the intersection/flight path, or has passed the intersection/flight path. (See Figure 3–123[3] and Figure 3–123[4]).

3–123a2 Reference.— Pilot/Controller Glossary—Clear of the Runway.

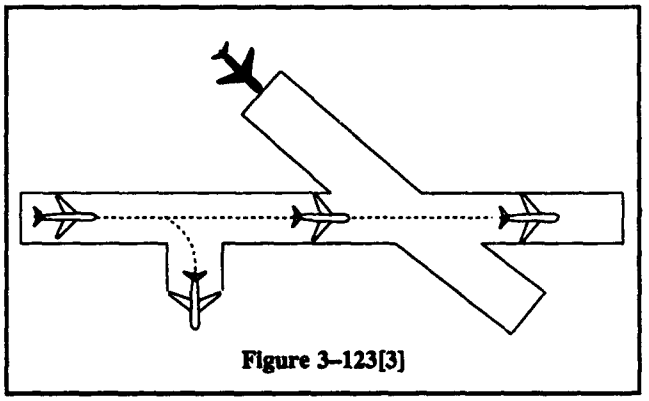


Figure 3–123[3]

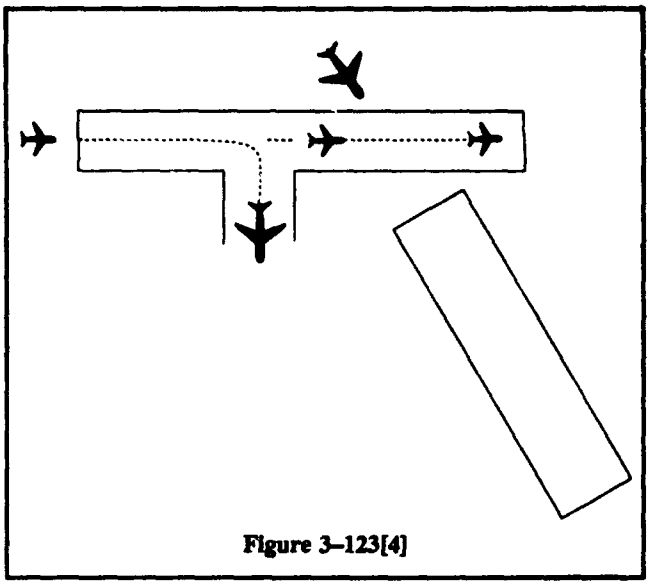


Figure 3–123[4]

b. *USN NOT APPLICABLE. (USAF ONLY:* Major command approval required prior to conducting simultaneous operations on intersecting runways). An aircraft may be authorized to takeoff from one runway while another aircraft lands simultaneously on an intersecting runway or an aircraft lands on one runway while another aircraft lands simultaneously on an intersecting runway. The procedure shall be approved by the Air Traffic Manager and be in accordance with a facility directive. The following conditions apply:

3–123b Note.—Application of these procedures does not relieve controllers from the responsibility of providing other appropriate separation contained in this Order.

3–123b Reference.—FAA Order 7210.3, Simultaneous Operations on Intersecting Runways, paragraph 12–36.

1. A simultaneous takeoff and landing operation shall only be conducted in VFR conditions.

2. Instruct the landing aircraft to hold short of the intersecting runway being used by the aircraft taking off. In the case of simultaneous landings and no operational benefit is lost, restrict the aircraft in the lesser Group.

Phraseology:

HOLD SHORT OF RUNWAY (runway number), (traffic or other information).

3–123b2 Note.—Pilots who prefer to use the full length of the runway or a runway different from that specified are expected to advise ATC prior to landing.

3. Issue traffic information to both aircraft involved and obtain an acknowledgment from each.

3–123b Example 1.—

"Runway One Eight cleared to land, hold short of Runway One Four Left, traffic landing Runway One Four Left."

"Runway One Four Left cleared to land, traffic landing Runway One Eight will hold short of the intersection."

3–123b Example 2.—

"Runway Three Six cleared to land, hold short of Runway Three Three, traffic departing Runway Three Three."

"Traffic landing Runway Three Six will hold short of the intersection, Runway Three Three cleared for takeoff."

4. Issue the measured distance from the landing threshold to the hold short point rounded "down" to the nearest 50–foot increment if requested by either aircraft.

3–123b4 Example.—

"Five thousand fifty feet available."

5. The conditions in subparagraphs 3–123b2, 3, and 4 shall be met in sufficient time for the pilots to take other action, if desired, and no later than the time landing clearance is issued.

6. Both runways must be dry with no reports that braking action is less than good.

7. There is no tailwind for the landing aircraft restricted to hold short of the intersection.The wind may be described as "calm" when appropriate.

3–123b7 Reference.—Calm Wind Conditions, paragraph 2–104.

8. The aircraft restricted to hold short is listed in Appendix A, Appendix B, and Appendix C.

9. STOL aircraft operations are in accordance with a letter of agreement with the aircraft operator/ pilot, the aircraft is listed as a Group 1 in Appendix A, B, and C or the pilot confirms that it is a STOL aircraft.

WAKE TURBULENCE APPLICATION

c. Separate IFR/VFR aircraft landing behind a departing heavy jet on a crossing runway if the arrival will fly through the airborne path of the departure— *2 minutes* or the appropriate radar separation minima. (See Figure 3–123[5]).

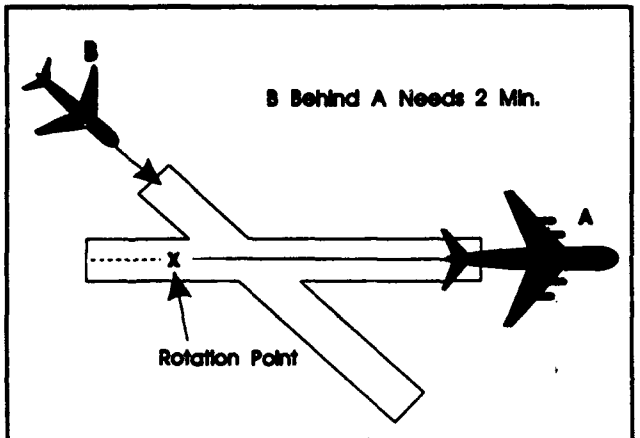


Figure 3–123[5]

d. Issue wake turbulence cautionary advisories and the position, altitude if known, and direction of flight of the heavy jets to:

3–123d Reference.—AC 90–23, Pilot Responsibility, paragraph 12.

1. IFR/VFR aircraft landing on crossing runways behind a departing heavy jet, if the arrival flight path will cross the takeoff path behind the heavy jet and behind the heavy jet rotation point. (See Figure 3–123[6]).

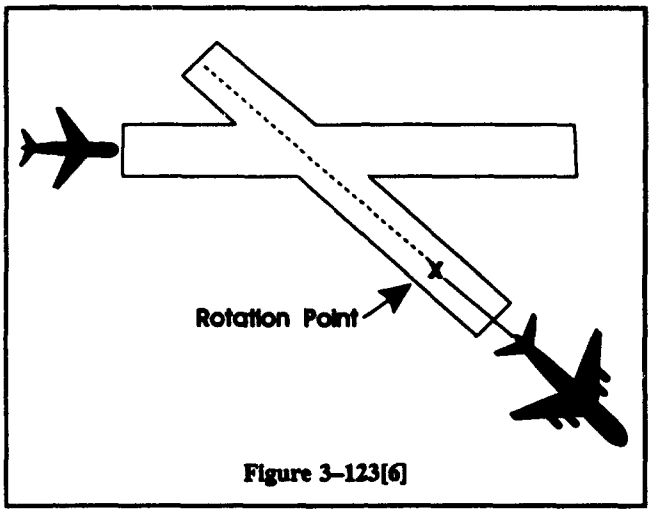


Figure 3–123[6]

3–123d1 Example.—

"Runway Niner cleared to land. Caution wake turbulence, heavy C141 departing Runway One Five."

2. VFR aircraft landing on a crossing runway behind an arriving heavy jet if the arrival flight path will cross. (See Figure 3–123[7]).

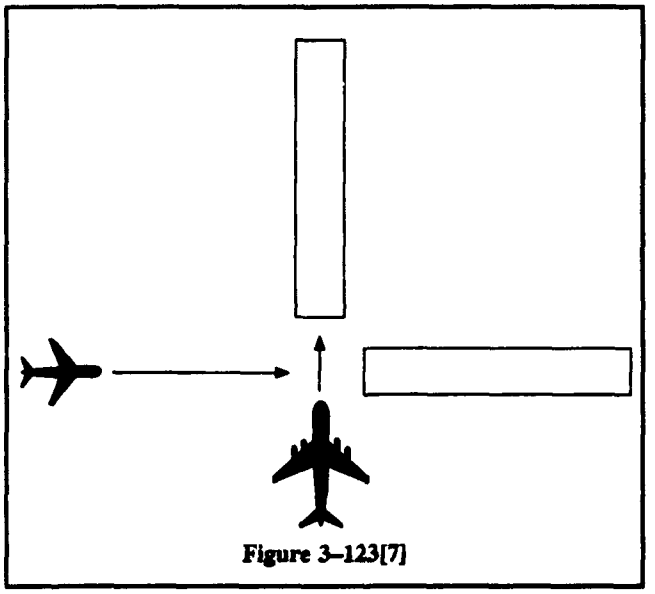


Figure 3–123[7]

3–123d2 Example.—

"Runway Niner cleared to land. Caution wake turbulence, heavy Boeing 747 landing Runway Three Six."

3–123 Reference.—Approaches to Multiple Runways, paragraph 7–33.

3–124 LANDING CLEARANCE

Issue landing clearance. Restate the landing runway whenever there is a possibility of a conflict with another aircraft which is using or planning to

use another runway, or an instrument approach is being conducted to a closed runway.

Phraseology:

CLEARED TO LAND,

or

RUNWAY (designator) CLEARED TO LAND.

USA/USAF/USN Issue surface wind when clearing an aircraft to land, touch-and-go, stop-and-go, low approach, or the option. Restate the landing runway whenever there is a possibility of a conflict with another aircraft which is using or is planning to use another runway.

Phraseology:

WIND (surface wind direction and velocity),

CLEARED TO LAND,

or

WIND (surface wind direction and velocity),

RUNWAY (designator) CLEARED TO LAND.

3–124 Note.—A clearance to land means that appropriate separation on the landing runway will be ensured. A landing clearance does not relieve the pilot from compliance with any previously issued restriction.

3–125 ANTICIPATING SEPARATION

Landing clearance to a succeeding aircraft in a landing sequence need not be withheld if you observe the positions of the aircraft and determine that prescribed runway separation will exist when the aircraft cross the landing threshold. Issue traffic information to the succeeding aircraft.

3–125 Example.—

"Delta Forty-two cleared to land. Traffic is Eastern DC–9 over approach lights."

3–125 Reference.—Closed/Unsafe Runway Information, paragraph 3–31.

3–126 LANDING CLEARANCE WITHOUT VISUAL OBSERVATION

When an arriving aircraft reports at a position where he should be seen but has not been visually observed, advise the aircraft as a part of the landing clearance that it is not in sight and restate the landing runway.

Phraseology:

NOT IN SIGHT, RUNWAY (number) CLEARED TO LAND.

3–126 Note.—Aircraft observance on the BRITE radar display satisfies the visually observed requirement.

3–127 WITHHOLDING LANDING CLEARANCE

Do not withhold a landing clearance indefinitely even though it appears a violation of FAR has been committed. The apparent violation might be the result of an emergency situation. In any event, assist the pilot to the extent possible.

3–128 RUNWAY EXITING

a. Instruct aircraft where to turn–off the runway after landing, when appropriate, and advise the aircraft to hold short of a runway or taxiway if required for traffic.

Phraseology:

TURN LEFT/RIGHT (turning point),

or

IF ABLE, TURN LEFT/RIGHT (turning point)

and if required

HOLD SHORT OF (runway).

3–128a Note— Runway exiting or taxi instructions should not normally be issued to an aircraft prior to, or immediately after, touchdown.

b. Taxi instructions shall be provided to the aircraft by the local controller when:

1. Compliance with air traffic control (ATC) instructions will be required before the aircraft can change to ground control, or

2. The aircraft will be required to enter a taxiway/runway/ramp area, other than the one used to exit the landing runway, in order to taxi clear of the landing runway.

3–128b Example.—U.S. Air Ten Forty Two, turn right next taxiway, cross Taxiway Bravo, hold short of Taxiway Charlie, contact ground point seven.

3–128b Note 1.—An aircraft is expected to taxi clear of the runway unless otherwise directed by ATC. In the absence of ATC instructions, an aircraft should taxi clear of the landing runway even if that requires the aircraft to protrude into or enter another taxiway/runway/ramp area. This does not authorize an aircraft to cross a subsequent taxiway/runway/ramp after clearing the landing runway.

3–128b Note 2.—The pilot is responsible for ascertaining when the aircraft is clear of the runway.

c. Ground control and local control shall protect a taxiway/runway/ramp intersection if an aircraft is required to enter that intersection to clear the landing runway.

3–128c Reference.—FAA Order 7210.3, paragraph 12–7, Use of Active Runways.

d. Request a readback of runway hold short instructions when not received from the pilot.

Phraseology:

"American Four Ninety Two, turn left at taxiway Charlie, hold short of Runway 27 Right."

"American Four Ninety Two, Roger."

"American Four Ninety Two, read back hold instructions."

3–128 Note.— Readback hold instructions phraseology may be initiated for any point on a movement area when the controller believes the readback is necessary.

3–129 ALTITUDE RESTRICTED LOW APPROACH

A low approach with an altitude restriction of not less than 500 feet above the airport may be authorized except over an aircraft in takeoff

position or a departure aircraft. Do not clear aircraft for restricted altitude low approaches over personnel unless airport authorities have advised these personnel that the approaches will be conducted Advise the approaching aircraft of the location of applicable ground traffic, personnel, or equipment.

3–129 Note 1.—The 500 feet restriction is a minimum. Higher altitudes should be used when warranted. For example, 1,000 feet is more appropriate for heavy aircraft operating over unprotected personnel or small aircraft on or near the runway.

3–129 Note 2.—This authorization includes altitude restricted low approaches over preceding landing or taxiing aircraft. Restricted low approaches are not authorized over aircraft in takeoff position or departing aircraft.

Phraseology:

CLEARED LOW APPROACH AT OR ABOVE (altitude). TRAFFIC (description and location).

3–129 Reference.—Vehicles/Equipment/Personnel on Runways, paragraph 3–5; Traffic Information, paragraph 3–6; Light Signals, paragraph 3–20; Timely Information, paragraph 3–32; Takeoff Position Hold, paragraph 3–103; Same Runway Separation, paragraph 3–122.

3–130 CLOSED TRAFFIC

Approve/disapprove pilot requests to remain in closed traffic for successive operations subject to local traffic conditions.

Phraseology:

LEFT/RIGHT (if required) CLOSED TRAFFIC APPROVED. REPORT (position if required),

or

UNABLE CLOSED TRAFFIC, (additional information as required).

3–130 Note.—Segregated traffic patterns for helicopters to runways and other areas may be established by letter of agreement or other local operating procedures.

3–130 Reference.—Runway Proximity, paragraph 3–83. Takeoff Position Hold, paragraph 3–103. Same Runway Separation, paragraph 3–122.

3–131 OVERHEAD MANEUVER

Issue the following to arriving aircraft that will conduct an overhead maneuver:

a. Pattern altitude and direction of traffic. Omit either or both if standard or when you know the pilot is familiar with a nonstandard procedure.

Phraseology:

PATTERN ALTITUDE (altitude). RIGHT TURNS.

b. Request for report on initial approach.

Phraseology:

REPORT INITIAL.

c. "Break" information and request for pilot report. Specify the point of "break" only if nonstandard. Request the pilot to report "break" if required for traffic or other reasons.

Phraseology:

BREAK AT (specified point).

REPORT BREAK.

d. Overhead maneuver patterns are developed at airports where aircraft have an operational need to conduct the maneuver. An aircraft conducting an overhead maneuver is VFR and the instrument flight rules (IFR) flight plan is cancelled when the aircraft crosses the landing threshold on the initial approach portion of the manuever. The existence of a standard overhead maneuver pattern does not eliminate the possible requirement for an aircraft to conform to conventional rectangular patterns if an overhead maneuver cannot be approved.

3–131 Note.— Aircraft operating to an airport without a functioning control tower must initiate cancellation of the IFR flight plan prior to executing the overhead manuever or after landing.

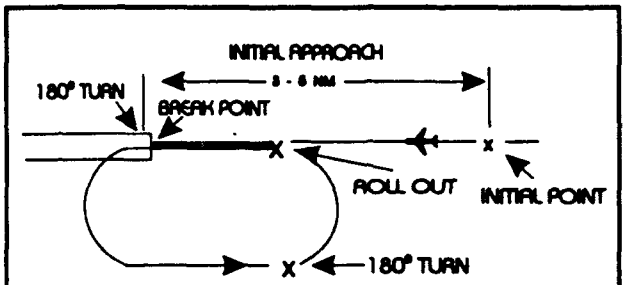


Figure 3–131[1]

3–131 Examples.—

"Air Force Three Six Eight, Runway Six, wind zero seven zero at eight, pattern altitude six thousand, report initial."

"Air Force Three Six Eight, break at midfield, report break"

"Air Force Three Six Eight, cleared to land."

"Alfa Kilo Two Two, Runway Three One, wind three three zero at one four, right turns, report initial."

"Alfa Kilo Two Two, report break."

"Alfa Kilo Two Two, cleared to land."

e. Timely and positive controller action is required to prevent a conflict when an overhead pattern could extend into the path of a departing or a missed approach aircraft. Local procedures and/or coordination requirements should be set forth in an appropriate Letter of Agreement, facility directive, base flying manual etc, when the frequency of occurrence warrants.

3–132 SIMULATED FLAMEOUT OPERATIONS/PRACTICE PRECAUTIONARY APPROACHES

Military aircraft may be authorized to make SFO/practice precautionary approaches if the following conditions are met:

3–132 Note.—Practice precautionary/flameout approaches are authorized only for specific aircraft. Precautionary approaches, however, might be made by any aircraft when engine failure is considered possible. The practice precautionary approach maneuvering area/altitudes may not conform to the standard flameout maneuvering area/altitudes.

3–132 Reference.—Low Approach and Touch-and-Go, paragraph 4–111. FAA Order 7610.4, paragraph 9–37.

a. A letter of agreement for the operation is in effect between the control tower, approach control, and other adjacent facilities as required.

b. Traffic information on aircraft in radio communication with or visible to you within or adjacent to the flameout maneuvering area is exchanged between the SFO and other concerned aircraft.

c. The exchange or issuance of traffic information as agreed to in any interfacility letter of agreement is accomplished.

d. The high-key altitude or practice precautionary approach maneuvering altitudes of the aircraft concerned are obtained prior to approving the approach. (See Figure 3–132[1]).

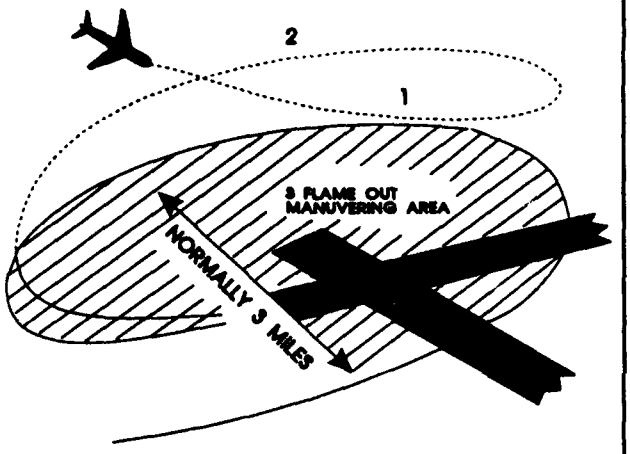


Figure 3–132[1]

This illustration depicts a "flameout" maneuver:

1. High Key: That position over the airport where the pilot begins to maneuver the aircraft to enter a high downwind leg.
2. Low Key: That position on high downwind leg just before turning on base leg.
3. "Flameout" Maneuvering Area: That airspace to be occupied by an aircraft practicing "flameout" procedures, which begin at the high key, includes the low key, and ends at the landing threshold.

3–133 thru 3–139 RESERVED

Section 11. HELICOPTER OPERATIONS

3–140 TAXI AND GROUND MOVEMENT OPERATION

a. When necessary for a wheeled helicopter to taxi on the surface, use the phraseology in paragraph 3–81.

3–140a Note.—Ground taxiing uses less fuel than hover-taxiing and minimizes air turbulence. However, under certain conditions, such as rough, soft, or uneven terrain, it may become necessary to hover/air-taxi for safety considerations. Helicopters with articulating rotors (usually designs with three or more main rotor blades) are subject to "ground resonance" and may, on rare occasions, suddenly lift off the ground to avoid severe damage or destruction.

b. When requested or necessary for a helicopter/VTOL aircraft to proceed at a slow speed above the surface, normally below 20 knots and in ground effect, use the following phraseology, supplemented as is appropriate with the phraseology in paragraph 3–81.

Phraseology:

HOVER-TAXI (supplemented, as appropriate, from paragraph 3–81).

CAUTION (dust, blowing snow, loose debris, taxiing light aircraft, personnel, etc.).

3–140b Note.—Hover-taxiing consumes fuel at a high burn rate, and helicopter downwash turbulence (produced in ground effect) increases significantly with larger and heavier helicopters.

3–140b References.—Pilot/Controller Glossary—Hover Taxi; Airman's Information Manual, VFR Helicopter Operations at Controlled Airports, paragraph 4–67.

c. When requested or necessary for a helicopter to proceed expeditiously from one point to another, normally below 100 feet AGL and at airspeeds above 20 knots, use the following phraseology, supplemented as is appropriate with the phraseology in paragraph 3–81.

Phraseology:

AIR-TAXI:

VIA (direct, as requested, or specified route)

TO (location, heliport, helipad, operating/movement area, active/inactive runway).

AVOID (aircraft/vehicles/personnel).

If required,

REMAIN AT OR BELOW (altitude).

CAUTION (wake turbulence or other reasons above).

LAND AND CONTACT TOWER,

or

HOLD FOR (reason—takeoff clearance, release, landing/taxiing aircraft, etc.)

3–140c Note.—Air-taxi is the preferred method for helicopter movements on airports provided ground operations/conditions permit. Air-taxi authorizes the pilot to proceed above the surface either via hover-taxi or flight at speeds more than 20 knots. Unless otherwise requested or instructed, the pilot is expected to remain below 100 feet AGL. The pilot is solely responsible for selecting a safe airspeed for the altitude/operation being conducted.

3–140c Reference.—Pilot/Controller Glossary—Air Taxi; Airman's Information Manual, VFR Helicopter Operations at Controlled Airports, paragraph 4–67.

WAKE TURBULENCE APPLICATION

d. Avoid clearances which require small aircraft or helicopters to taxi in close proximity to taxiing or hover-taxi helicopters.

3–140 Reference.—AC 90–23, Wake Turbulence, paragraph 10 and paragraph 11.

3–141 HELICOPTER TAKEOFF CLEARANCE

a. Issue takeoff clearance from movement areas other than active runways, or in diverse directions from active runways, with additional instructions, as necessary. Whenever possible, issue takeoff clearance in lieu of extended hover-taxi or air-taxi operations.

Phraseology:

CLEARED FOR TAKEOFF FROM (present position, taxiway, helipad, numbers). MAKE RIGHT/LEFT TURN FOR (direction, points of compass, heading, NAVAID radial) DEPARTURE/DEPARTURE ROUTE (number, name, or code).

AVOID (aircraft/vehicles/personnel),

or

REMAIN (direction) OF (active runways, parking areas, passenger terminals, etc.).

CAUTION (power lines, unlighted obstructions, trees, wake turbulence, etc.).

b. If takeoff is requested from nonmovement areas and, in your judgment, the operation appears to be reasonable, use the following phraseology instead of the takeoff clearance in subparagraph a. above.

Phraseology:

PROCEED AS REQUESTED, USE CAUTION (reason and additional instructions, as appropriate).

c. If takeoff is requested from an area not visible, an area not authorized for helicopter use, an unlighted nonmovement area at night, or an area off the airport, and traffic is not a factor, use the following phraseology.

Phraseology:

DEPARTURE FROM (requested location) WILL BE AT YOUR OWN RISK (reason and additional instructions, as necessary).

TRAFFIC (as applicable),

or

TRAFFIC NOT A FACTOR.

d. Unless requested by the pilot, do not issue downwind takeoffs if the tailwind exceeds 5 knots.

3–141d Note.—A pilot request to takeoff from a given point in a given direction constitutes such a request.

3–142 HELICOPTER DEPARTURE SEPARATION

Separate a departing helicopter from other helicopters by ensuring that it does not takeoff until one of the following conditions exists:

3–142 Note.—Helicopters performing air-taxiing operations within the boundary of the airport are considered to be taxiing aircraft.

a. A preceding, departing helicopter has left the takeoff area. (See Figure 3–142[1]).

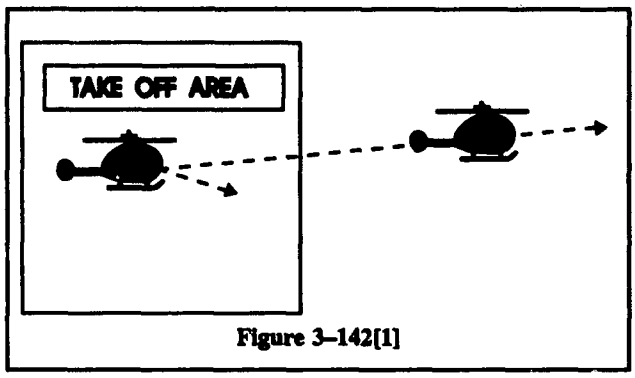


Figure 3–142[1]

b. A preceding, arriving helicopter has taxied off the landing area. (See Figure 3–142[2]).

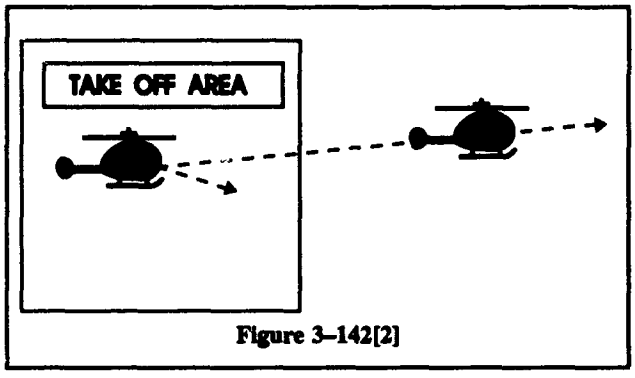


Figure 3–142[2]

3–143 HELICOPTER ARRIVAL SEPARATION

Separate an arriving helicopter from other helicopters by ensuring that it does not land until one of the following conditions exists:

a. A preceding, arriving helicopter has come to a stop or taxied off the landing area. (See Figure 3–143[1] and Figure 3–143[2]).

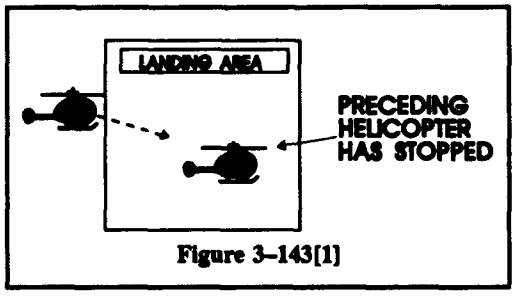


Figure 3–143[1]

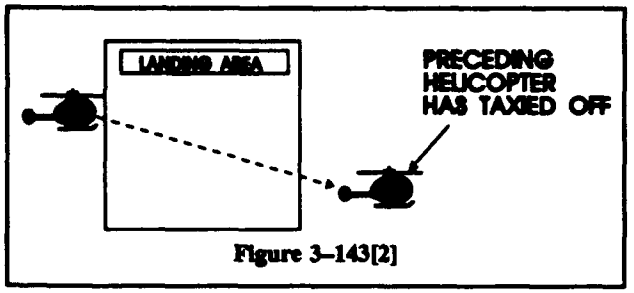


Figure 3–143[2]

b. A preceding, departing helicopter has left the landing area. (See Figure 3–143[3]).

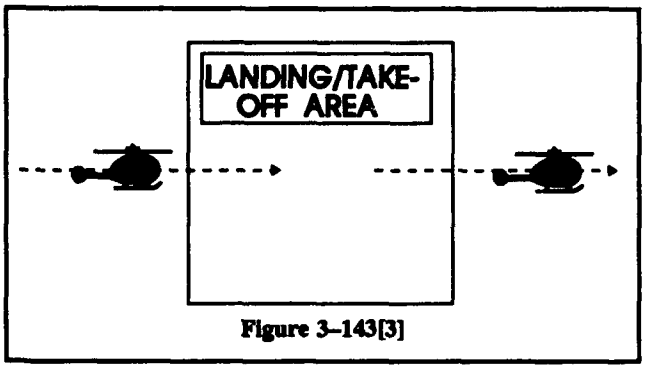


Figure 3–143[3]

3–144 SIMULTANEOUS LANDINGS OR TAKEOFFS

Authorize helicopters to conduct simultaneous landings or takeoffs if the distance between the landing or takeoff points is at least 200 feet and the courses to be flown do not conflict. Refer to surface markings to determine the 200–foot minimum, or instruct a helicopter to remain at least 200 feet from another helicopter. (See Figure 3–144[1]).

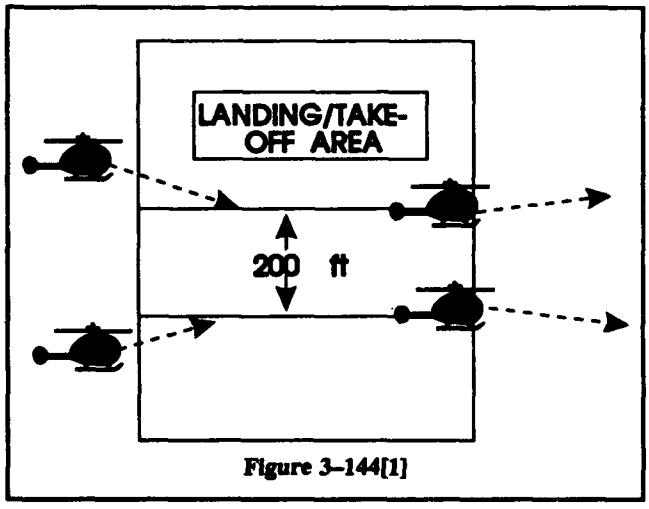


Figure 3–144[1]

3–145 HELICOPTER LANDING CLEARANCE

a. Issue landing clearance for helicopters to movement areas other than active runways, or from diverse directions to points on active runways, with additional instructions, as necessary. Whenever

possible, issue landing clearance in lieu of extended hover-taxi or air-taxi operations.

Phraseology:

MAKE APPROACH STRAIGHT-IN/CIRCLING LEFT/RIGHT TURN TO (location, runway, taxiway, helipad, Maltese cross) ARRIVAL/ARRIVAL ROUTE (number, name, or code).

HOLD SHORT OF (active runway, extended runway centerline, other).

REMAIN (direction/distance; e.g., 700 feet, 1 1/2 miles) FROM (runway, runway centerline, other helicopter/aircraft).

CAUTION (power lines, unlighted obstructions, wake turbulence, etc.).

CLEARED TO LAND.

CONTACT GROUND.

AIR TAXI TO RAMP.

b. If landing is requested to nonmovement areas and, in your judgment, the operation appears to be reasonable, use the following phraseology instead of the landing clearance in subparagraph a. above.

Phraseology:

PROCEED AS REQUESTED, USE CAUTION (reason and additional instructions, as appropriate).

c. If landing is requested to an area not visible, an area not authorized for helicopter use, an unlighted nonmovement area at night, or an area off the airport, and traffic is not a factor, use the following phraseology.

Phraseology:

LANDING AT (requested location) WILL BE AT YOUR OWN RISK (reason and additional instructions, as necessary).

TRAFFIC (as applicable),

or

TRAFFIC NOT A FACTOR.

d. Unless requested by the pilot, do not issue downwind landings if the tailwind exceeds 5 knots.

3–145d Note.—A pilot request to land at a given point from a given direction constitutes such a request.

3–146 thru 3–149 RESERVED

Section 12. SEA LANE OPERATIONS

3–150 APPLICATION

Where Sea Lanes are established and controlled, apply the provisions of this section.

3–151 DEPARTURE SEPARATION

Separate a departing aircraft from a preceding departing or arriving aircraft using the same sea lane by ensuring that it does not commence takeoff until:

a. The other aircraft has departed and crossed the end of the sea lane or turned to avert any conflict. If you can determine distances by reference to suitable landmarks, the other aircraft need only be airborne if the following minimum distance exists between aircraft:

1. When only Category I aircraft are involved— *1,500 feet.*

2. When a Category I aircraft is preceded by a Category II aircraft— *3,000 feet.*

3. When either the succeeding or both are Category II aircraft— *3,000 feet.*

4. When either is a Category III aircraft— *6,000 feet.* (See Figure 3–151[1] and Figure 3–151[2]).

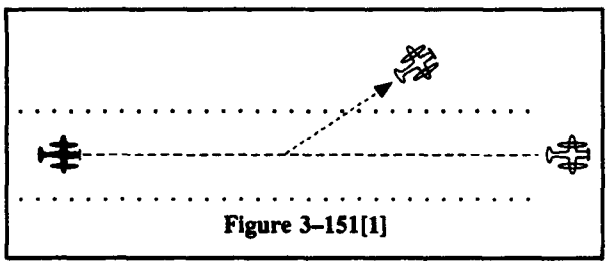


Figure 3–151[1]

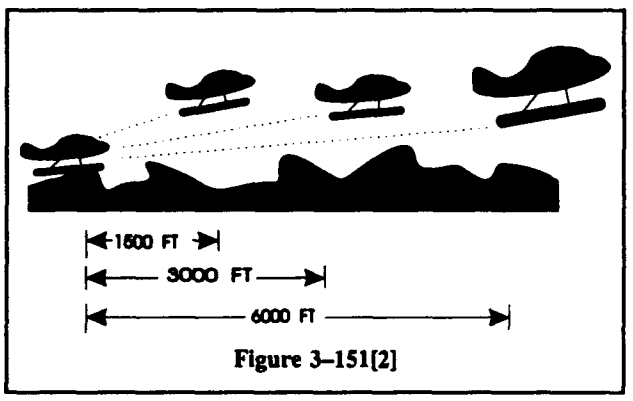


Figure 3–151[2]

b. A preceding landing aircraft has taxied out of the sea lane.

3–151 Note.—Due to the absence of braking capability, caution should be exercised when instructing a float plane to hold a position as the aircraft will continue to move because of prop generated thrust. Clearance to taxi into position and hold should, therefore, be followed by takeoff or other clearance as soon as practicable.

3–152 ARRIVAL SEPARATION

Separate an arriving aircraft from another aircraft using the same sea lane by ensuring that the arriving aircraft does not cross the landing threshold until one of the following conditions exists:

a. The other aircraft has landed and taxied out of the sea lane. Between sunrise and sunset, if you can determine distances by reference to suitable landmarks and the other aircraft has landed, it need not be clear of the sea lane if the following minimum distance from the landing threshold exists:

1. When a Category I aircraft is landing behind a Category I or II— *2,000 feet.* (See Figure 3–152[1]).

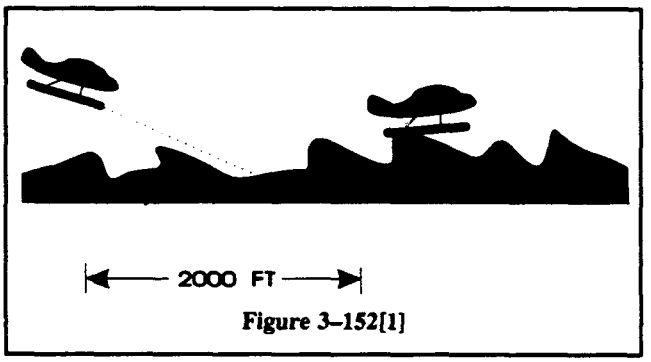


Figure 3–152[1]

2. When a Category II aircraft is landing behind a Category I or II— *2,500 feet.* (See Figure 3–152[2]).

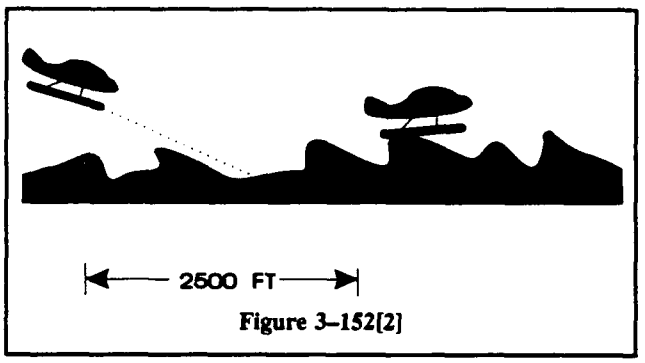


Figure 3–152[2]

b. The other aircraft has departed and crossed the end of the sea lane or turned to avert any conflict. If you can determine distances by reference to suitable landmarks and the other aircraft is airborne, it need not have crossed the end of the sea lane if the following minimum distance from the landing threshold exists:

1. When only Category I aircraft are involved— *1,500 feet.*

2. When either is a Category II aircraft— *3,000 feet.*

3. When either is a Category III aircraft—*6,000 feet.* (See Figure 3–152[3] and Figure 3–152[4]).

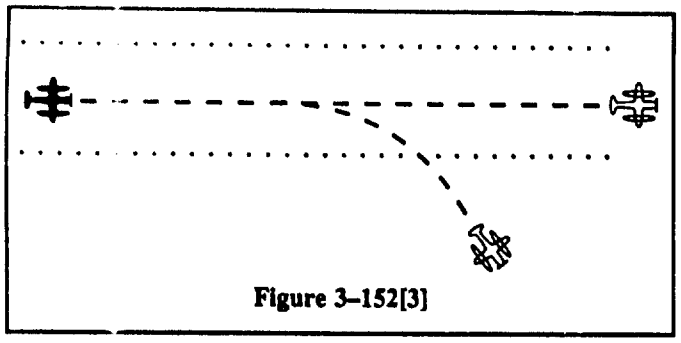


Figure 3–152[3]

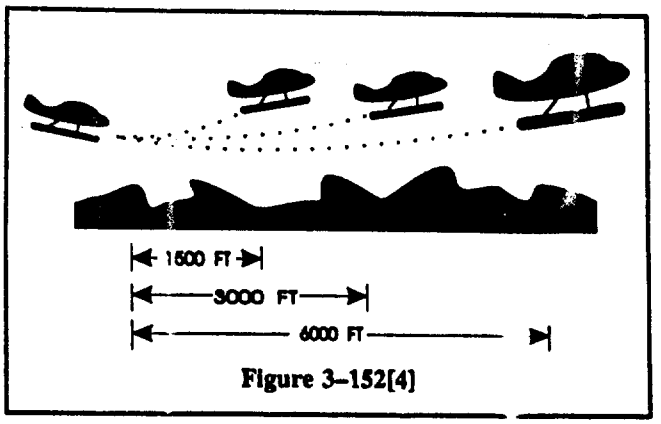


Figure 3–152[4]

Chapter 4. IFR

Section 1. NAVAID USE LIMITATIONS

4–1 ALTITUDE AND DISTANCE LIMITATIONS

When specifying a route other than an established airway or route, do not exceed the limitations in the Table on any portion of the route which lies within controlled airspace. (For Altitude and Distance Limitations, see Table 4–1[1], Table 4–1[2], Table 4–1[3], and Table 4–1[4]). (For correct application of altitude and distance limitations see Figure 4–1[1] and Figure 4–1[2]).

4–1 Reference.—Fix Use, paragraph 4–5. **Methods**, paragraph 5–91.

Table 4–1[1]
VOR/VORTAC/TACAN NAVAID's
Normal Usable Altitudes and Radius Distances

Class	*Altitudes*	*Distance (miles)*
T	12,000 and below	25
L	Below 18,000	40
H	Below 14,500	40
H	14,500—17,999	100
H	18,000—FL 450	130
H	Above FL 450	100

Table 4–1[2]
L/MF Radio Beacon (RBN)
Usable Radius Distances for All Altitudes

Class	*Power (watts)*	*Distance (miles)*
CL	Under 25	15
MH	Under 50	25
H	50—1,999	50
HH	2,000 or more	75

Table 4–1[3]
ILS
Usable Height and Distance*

Height (feet) above transmitter	*Distance (miles) from transmitter*
4,500	10 (for glideslope)
4,500	18 (for localizer)

*Use the current flight check height/altitude limitations if different from the above minima.

Table 4–1[4]
MLS
Usable Height and Distance*

Height (feet) above transmitter	*Distance (miles) from transmitter*
20,000	20 (for glidepath)
20,000	20 (for azimuth)

*Use the current flight check height/altitude limitations if different from the above minima.

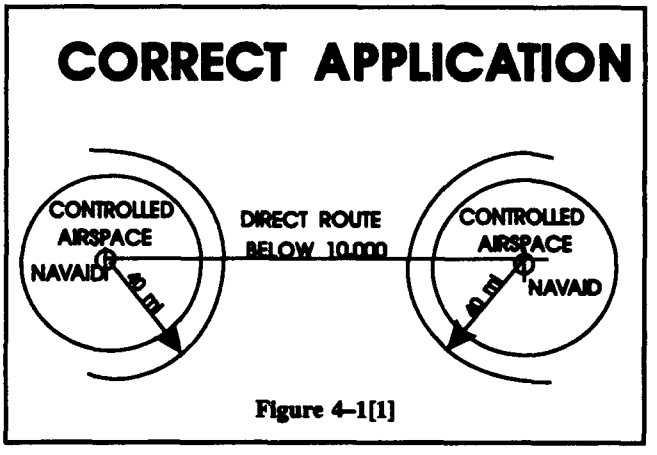


Figure 4–1[1]

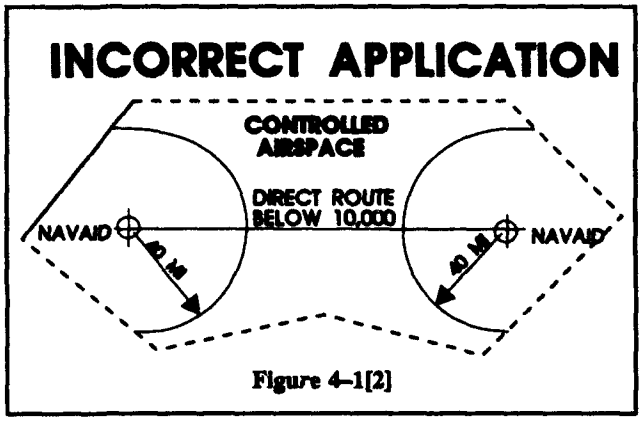


Figure 4–1[2]

4–2 EXCEPTIONS

Altitude and distance limitations need not be applied when any of the following conditions are met:

a. Routing is initiated by ATC or requested by the pilot and the following is provided:

1. Radar monitoring.
2. As necessary, course guidance.

4–2a Note 1.—Paragraph 4–50i requires radar monitoring be provided at FL 450 and below to aircraft on random (impromptu) RNAV routes. Paragraph 5–70a requires radar separation be provided for these routes at FL 450 and below.

4–2a Note 2.—When a clearance is issued beyond the altitude and/or distance limitations of a NAVAID, in addition to being responsible for maintaining separation from other aircraft and airspace, the controller is responsible for providing aircraft with information and advice related to significant deviations from the expected flight path.

4–2 Reference.—Pilot/Controller Glossary, Radar Monitoring.

b. Operational necessity requires and approval has been obtained from the Frequency Management and Flight Inspection Offices to exceed them.

c. Requested routing is via an MTR.

4–2 Reference.—Methods, paragraph 5–91.

4–3 CROSSING ALTITUDE

Use an altitude consistent with the limitations of the aid when clearing an aircraft to cross or hold at a fix.

4–3 Reference.—Methods, paragraph 5–91.

4–4 VFR-ON-TOP

Use a route not meeting service volume limitations only if an aircraft requests to operate "VFR-on-top" on this route.

4–4 Note.—Aircraft equipped with TACAN-only are expected to:

a. Define route of flight between TACAN or VORTAC NAVAID's in the same manner as VOR-equipped aircraft.

b. Except in positive control areas Class A airspace, submit requests for "VFR-on-top" flight where insufficient TACAN or VORTAC NAVAID's exist to define the route.

4–4 Reference.—Methods, paragraph 5–91.

4–5 FIX USE

Request aircraft position reports only over fixes shown on charts used for the altitude being flown, except as follows:

4–5 Note.—Waypoints filed in random RNAV routes automatically become compulsory reporting points for the flight unless otherwise advised by ATC.

a. Unless the pilot requests otherwise, use only those fixes shown on High Altitude En route Charts, High Altitude Instrument Approach Procedures Charts, and SID Charts when clearing military turbojet single-piloted aircraft.

b. Except for military single-piloted turbojet aircraft, unpublished fixes may be used if the name of the NAVAID and, if appropriate, the radial/course/azimuth and frequency/channel are given to the pilot. An unpublished fix is defined as one approved and planned for publication which is not yet depicted on the charts or one which is used in accord with the following:

4–5b Reference.—Order 7130.3, Holding Pattern Criteria.

1. Unpublished fixes are formed by the en route radial and either a DME distance from the same NAVAID or an intersecting radial from an off-route VOR/VORTAC/TACAN. DME shall be used in lieu of off-route radials, whenever possible.

2. Except where known signal coverage restrictions exist, an unpublished fix may be used for ATC purposes if its location does not exceed NAVAID altitude and distance limitation, and when off-route radials are used, the angle of divergence meets the criteria prescribed below.

4–5b2 Note.—Unpublished fixes should not negate the normal use of published intersections. Frequent routine use of an unpublished fix would justify establishing a fix.

4–5b2 Reference.—Altitude and Distance Limitations, paragraph 4–1.

3. Do not hold aircraft at unpublished fixes below the lowest assignable altitude dictated by terrain clearance for the appropriate holding pattern airspace area (template) regardless of the MEA for the route being flown.

4. When the unpublished fix is located on an off-route radial and the radial providing course guidance, it shall be used consistent with the following divergence angles.

(a) When holding operations are involved with respect to subparagraph 4–5b4(b) and (c), the angle of divergence shall be at least 45 degrees.

(b) When both NAVAID's involved are located within 30 NM of the unpublished fix, the minimum divergence angle is 30 degrees.

(c) When the unpublished fix is located over 30 NM from the NAVAID generating the off-course radial, the minimum divergence angle shall increase 1 degree per nautical mile up to 45 NM; e.g., 45 NM would require 45 degrees.

(d) When the unpublished fix is located beyond 45 NM from the NAVAID generating the off-course radial, the minimum diver ce angle shall increase 1/2 degree per nautical mile; e.g., 130 NM would require 88 degrees.

c. Fixes contained in the route description of MTR's are considered filed fixes.

d. TACAN-only aircraft (type suffix M, N, or P) possess TACAN with DME, but no VOR or LF navigation system capability. Assign fixes based on TACAN or VORTAC facilities only.

4–5d Note.—TACAN-only aircraft can never be held overhead the NAVAID, be it TACAN or VORTAC.

e. DME fixes shall not be established within the no-course signal zone of the NAVAID from which inbound holding course information would be derived.

4–5 Reference.—NAVAID Fixes, paragraph 2–92. Methods, paragraph 5–91.

4–6 thru 4–9 RESERVED

Section 2. CLEARANCES

4–10 CLEARANCE ITEMS

Issue the following clearance items, as appropriate, in the order listed below:

a. Aircraft identification.

b. Clearance limit.

c. Departure procedure or SID.

d. Route of flight including PDR/PDAR/PAR when applied.

e. Altitude data in the order flown.

f. MACH Number, if applicable.

g. *USAF:* When issuing a clearance to an airborne aircraft containing an altitude assignment, do not include more than one of the following in the same transmission:

1. Frequency change.
2. Transponder change.
3. Heading.
4. Altimeter setting.
5. Traffic information containing an altitude.

h. Holding instructions.

i. Any special information.

j. Frequency and beacon code information.

4–10 Reference.—IFR-VFR and VFR-IFR Flights, paragraph 4–17. Altitude Information, paragraph 4–45.

4–11 CLEARANCE PREFIX

a. Prefix a clearance, information, or a request for information which will be relayed to an aircraft through a non-ATC facility by stating "A-T-C clears," "A-T-C advises," or "A-T-C requests."

b. Omit the term "ATC" when issuing a clearance, information, or a request for information to an ATC facility, including flight service stations, or to an aircraft by direct ATC communications.

c. Flight service stations shall prefix a clearance with the appropriate phrase: "ATC clears," "ATC advises," etc.

4–12 DELIVERY INSTRUCTIONS

Issue specific clearance delivery instructions, if appropriate.

4–13 CLEARANCE RELAY

Relay clearances verbatim.

4–13 Reference.—Communications Failure, paragraph 10–43.

4–14 ROUTE OR ALTITUDE AMENDMENTS

a. Amend route of flight in a previously issued clearance by one of the following:

1. State which portion of the route is being amended and then state the amendment.

Phraseology:

CHANGE (*portion of route*) TO READ (*amended route*).

2. State the amendment to the route and then state that the rest of the route is unchanged.

Phraseology:

(*Amended route*), REST OF ROUTE UNCHANGED.

3. Issue the entire route by stating the amendment.

4–14a Examples.—

Cessna 21A has been cleared to the Airville airport via V41 Delta VOR V174 Alfa VOR, direct Airville airport, maintain 9000. After takeoff, the aircraft is rerouted via V41 Frank intersection, V71 Delta VOR, V174 Alfa VOR. The controller issues one of the following as an amended clearance:

"Cessna Two One Alfa change Victor Forty-one Delta to read Victor Forty-one Frank, Victor Seventy-one Delta."

"Cessna Two One Alfa cleared via Victor Forty-one Frank, Victor Seventy-one Delta, rest of route unchanged."

"Cessna Two One Alfa cleared via Victor Forty-one Frank, Victor Seventy-one Delta, Victor One Seventy-four Alfa V-O-R, direct Airville airport, maintain niner thousand."

b. When route or altitude in a previously issued clearance is amended, restate all applicable altitude restrictions.

4–14b Example.—

A departing aircraft is cleared to cross Ollis intersection at or above 3,000; Gordonsville VOR at or above 12,000; maintain FL 200. Shortly after departure the altitude to be maintained is changed to FL 240. Because altitude restrictions remain in effect, the controller issues an amended clearance as follows:

"Amend altitude. cross Ollis intersection at or above three thousand; cross Gordonsville V-O-R at or above one two thousand; maintain flight level two four zero."

Shortly after departure, altitude restrictions are no longer applicable, the controller issues an amended clearance as follows:

"Climb and maintain flight level two four zero."

4–14b Note.—Restating previously issued altitude to "maintain" is an amended clearance. If altitude to "maintain" is changed or restated, whether prior to departure or while airborne, and previously issued altitude restrictions are omitted, altitude restrictions are canceled, including SID altitude restrictions if any.

c. Issue an amended clearance if a speed restriction is declined because it cannot be complied with concurrently with a previously issued altitude restriction.

4–14c Example.—

An aircraft is cleared to cross Gordonsville VOR at 11,000. Shortly thereafter he is cleared to reduce his airspeed to 300 knots. The pilot informs the controller he is unable to comply with both clearances simultaneously. The controller issues and amended clearance as follows

"Cross Gordonsville VOR at one one thousand. Then, reduce speed to three zero zero."

4–14c Note.—The phrase "do the best you can" or comparable phrases are not valid substitutes for an amended clearance with altitude or speed restrictions.

4–14c Reference.—Speed Adjustment, Methods, paragraph 5–101b.

4–14 Reference.—Operational Requests, paragraph 2–18. Vectoring, Methods, paragraph 5–91.

4–15 THROUGH CLEARANCES

You may clear an aircraft through intermediate stops.

Phraseology:

CLEARED THROUGH (airport) TO (fix).

4–16 ALTRV CLEARANCE

Use the phrase "via approved altitude reservation flight plan," if the aircraft will operate in an approved ALTRV.

Phraseology:

VIA APPROVED ALTITUDE RESERVATION (mission name) FLIGHT PLAN.

4–16 Note.—An ALTRV normally includes the departure, climb, cruise, and arrival phases of flight up to and including holding pattern or point/time at which ATC provides separation between aircraft.

4–16 Reference.—Abbreviated Departure Clearance, paragraph 4–22.

4–17 IFR-VFR AND VFR-IFR FLIGHTS

a. Clear an aircraft planning IFR operations for the initial part of flight and VFR for the latter part to the fix at which the IFR part ends.

b. Treat an aircraft planning VFR for the initial part of flight and IFR for the latter part as a VFR departure. Issue a clearance to this aircraft when it requests IFR clearance approaching the fix where it proposes to start IFR operations. The phraseology CLEARED TO (destination) AIRPORT AS FILED may be used with abbreviated departure clearance procedures.

4–17b Reference.—Abbreviated Departure Clearance, paragraph 4–22.

c. When an aircraft changes from VFR to IFR, the controller shall assign a beacon code to Mode C equipped aircraft that will allow MSAW alarms.

d. When a VFR aircraft, operating below the minimum altitude for IFR operations, requests an IFR clearance and you are aware that the pilot is unable to climb in VFR conditions to the minimum IFR altitude:

4–17d Note.—Pilots of pop-up aircraft are responsible for terrain and obstacle clearance until reaching minimum instrument altitude (MIA) or minimum en route altitude (MEA). Pilot compliance with an approved FAA procedure or an ATC instruction transfers that responsibility to the FAA; therefore, do not assign (or imply) specific course guidance that will (or could) be in effect below the MIA or MEA.

1. Before issuing a clearance, ask if the pilot is able to maintain terrain and obstruction clearance during a climb to the minimum IFR altitude.

4–17d1 Example.—

"November eight seven six, are you able to provide your own terrain and obstruction clearance between your present altitude and six thousand feet?"

2. If the pilot is able to maintain terrain and obstruction separation, issue the appropriate clearance as prescribed in paragraphs 4–10 and 4–44.

3. If unable to maintain terrain and obstruction separation, instruct the pilot to maintain VFR and to state intentions.

4. If appropriate, apply the provisions of paragraphs 10–16, 10–17, or 10–18, as necessary.

4–18 CLEARANCE ITEMS

The following guidelines shall be utilized to facilitate the processing of airfile aircraft:

a. Ensure the aircraft is within your area of jurisdiction unless otherwise coordinated.

b. Obtain necessary information needed to provide IFR service. Record the information on a flight progress strip and enter the information in the flight plan data base. Record additional information provided by the pilot on the flight progress strip or voice recorder.

c. Issue clearance to destination, short range clearance, or an instruction to the pilot to contact a Flight Service Station (FSS) if the flight plan cannot be processed.

4–18 Note.—These guidelines do not imply that the processing of airfiles has priority over another ATC duty to be performed.

4–19 thru 4–29 RESERVED

Section 3. DEPARTURE PROCEDURES

4–30 DEPARTURE TERMINOLOGY

Avoid using the term "takeoff" except to actually clear an aircraft for takeoff or to cancel a takeoff clearance. Use such terms as "depart," "departure," or "fly" in clearances when necessary.

4–30 Reference.—Takeoff Clearance, paragraph 3–109.

4–31 DEPARTURE CLEARANCES

Include the following items in IFR departure clearances:

4–31 Note.—When considered necessary, controllers or pilots may initiate readbacks of a clearance. Some pilots may be required by company rule to do so.

a. Always include the airport of departure when issuing a departure clearance for relay to an aircraft by an FSS, dispatcher, etc.

b. Clearance Limit—Specify the destination airport when practicable, even though it is outside controlled airspace. Issue short range clearances as provided for in any procedures established for their use.

c. Departure Procedures—

1. Specify direction of takeoff/turn or initial heading/azimuth to be flown after takeoff as follows:

(a) Locations with Airport Traffic Control Service—Specify these items as necessary.

(b) Locations without Airport Traffic Control Service, but within a control zone [redacted]—Specify these items if necessary. Obtain/solicit the pilot's concurrence concerning these items before issuing them in a clearance.

4–31c1(b) Note.—Direction of takeoff and turn after takeoff can be obtained/solicited directly from the pilot, or relayed by an FSS, dispatcher, etc., as obtained/solicited from the pilot.

(c) At all other airports—Do not specify direction of takeoff/turn after takeoff. If necessary to specify an initial heading/azimuth to be flown after takeoff, issue the initial heading/azimuth so as to apply only within controlled airspace.

2. When IFR departure procedures are published for a location and pilot compliance is necessary to insure separation, include the published departure procedure as part of the ATC clearance.

4–31c2 Note.—IFR takeoff minimums and departure procedures are prescribed for specific airports/runways and published in a tabular form supplement to the NOS Instrument Approach Procedure Charts and appropriate FAA Forms 8260. These procedures are identified on Instrument Approach Procedure charts with a symbol "SYM".

3. Compatibility with a procedure issued may be verified by asking the pilot if items obtained/solicited will allow him to comply with local traffic pattern, terrain, or obstruction avoidance.

Phraseology:

FLY RUNWAY HEADING.

DEPART (direction or runway).

TURN LEFT/RIGHT.

WHEN ENTERING CONTROLLED AIRSPACE (instruction), FLY HEADING (degrees) UNTIL REACHING (altitude, point, or fix) BEFORE PROCEEDING ON COURSE.

FLY A (degree) BEARING/AZIMUTH FROM/TO (fix) UNTIL (time),

or

UNTIL REACHING (fix or altitude),

and if required,

BEFORE PROCEEDING ON COURSE.

4–31c3 Examples.—

"Verify right turn after departure will allow compliance with local traffic pattern," or "Verify this clearance will allow compliance with terrain or obstruction avoidance."

4–31c3 Note.—If a published IFR departure procedure is not included in an ATC clearance, compliance with such a procedure is the pilot's prerogative.

4. SID's:

(a) Assign a SID (including transition if necessary). Assign a Preferential Departure Route (PDR) or the route filed by the pilot only when a SID is not established for the departure route to be flown or the pilot has indicated that he does not wish to use a SID.

Phraseology:

(SID name and number) DEPARTURE.

(SID name and number) DEPARTURE, (transition name) TRANSITION.

4–31c4(a) Examples.—

"Stroudsburg One Departure."

"Stroudsburg One Departure, Sparta Transition."

"Stroudsburg One RNAV Departure."

4–31c4(a) Note.—If a pilot does not wish to use a SID issued in an ATC clearance or any other SID published for that location, he is expected to advise ATC.

(b) If it is necessary to assign a crossing altitude which differs from the SID altitude, repeat the changed altitude to the pilot for emphasis.

Phraseology:

(SID name) DEPARTURE, EXCEPT (revised altitude information). I SAY AGAIN (revised altitude information).

4–31c4(b) Examples.—

"Stroudsburg One Departure, except cross Quaker at five thousand. I say again, cross Quaker at five thousand."

"Astoria Two RNAV Departure, except cross Astor waypoint at six thousand. I say again, cross Astor waypoint at six thousand."

(c) Specify altitudes when they are not included in the SID.

Phraseology:

(SID name) DEPARTURE. CROSS (fix) AT (altitude).

4–31c4(c) Examples.—

"Stroudsburg One Departure. Cross Jersey intersection at four thousand. Cross Range intersection at six thousand."

"Engle Two RNAV Departure. Cross Pilim waypoint at or above five thousand. Cross Engle waypoint at or above seven thousand. Cross Gorge waypoint at niner thousand."

d. Route of flight—Specify one or more of the following:

1. Airway, route, course, heading, azimuth, arc, or vector.

2. The routing a pilot can expect if any part of the route beyond a short range clearance limit differs from that filed.

Phraseology:
EXPECT FURTHER CLEARANCE VIA (airways, routes, or fixes.).

e. Altitude—Use one of the following in the order of preference listed:

4–31e2 Note. 1—Turbojet aircraft equipped with afterburner engines may occasionally be expected to use afterburning during their climb to the en route altitude. When so advised by the pilot, the controller may be able to plan his traffic to accommodate the high performance climb and allow the pilot to climb to his planned altitude without restriction.

1. Assign the altitude requested by the pilot.

2. Assign an altitude, as near as possible to the altitude requested by the pilot, and

(a) Inform the pilot when to expect clearance to the requested altitude unless instructions are contained in the specified SID, or

(b) If the requested altitude is not expected to be available, inform the pilot what altitude can be expected and when/where to expect it.

4–31e2 Note. 2—

a. The Code of Federal Regulations (CFR), Part 91.185, says that in the event of a two-way radio communication failure, in VFR conditions or if VFR conditions are encountered after the failure, the pilot shall continue the flight under VFR and land as soon as practicable. That section also says that when the failure occurs in IFR conditions the pilot shall continue flight at the highest of the following altitudes or flight levels for the route segment being flown:

1. The altitude or flight level assigned in the last ATC clearance received.

2. The minimum altitude (converted, if appropriate, to minimum flight level as prescribed in Part 91.121(c)) for IFR operations. (This altitude should be consistent with MEA's, MOCA's, etc.)

3. The altitude or flight level ATC has advised may be expected in a further clearance.

b. If the expected altitude is the highest of the preceding choices, the pilot should begin to climb to that expected altitude at the time or fix specified in the clearance. The choice to climb to the expected altitude is not applicable if the pilot has proceeded beyond the specified fix or if the time designated in the clearance has expired.

Phraseology:
CLIMB AND MAINTAIN (the altitude as near as possible to the pilots requested altitude). EXPECT (the requested altitude or an altitude different from the requested altitude) AT (time or fix), and if applicable, (pilot's requested altitude) IS NOT AVAILABLE.

4–31e2 Examples.—

A pilot has requested flight level 350. Flight level 230 is immediately available and flight level 350 will be available at the Appleton zero five zero radial 35 mile fix. The clearance will read: "Climb and maintain flight level two three zero. Expect flight level three five zero at Appleton zero five zero radial three five mile fix."

A pilot has requested 9,000 feet. An altitude restriction is required because of facility procedures or requirements. Assign the altitude and advise the pilot at what fix/time the pilot may expect the requested altitude. The clearance could read: "Climb and maintain five thousand. Expect niner thousand one zero minutes after departure."

A pilot has requested 17,000 feet which is unavailable. You plan 15,000 feet to be the pilot's highest altitude prior to descent to the pilot's destination but only 13,000 feet is available until San Jose VOR. Advised the pilot of the expected altitude change and at what fix/time to expect clearance to 15,000 feet. The clearance will read: Climb and maintain one three thousand. Expect one five thousand at San Jose. One seven thousand is not available.

4–31 Reference.—Abbreviated Departure Clearance, paragraph 4–32. Initial Heading, paragraph 5–111.

4–32 ABBREVIATED DEPARTURE CLEARANCE

a. Issue an abbreviated departure clearance if its use reduces verbiage and the following conditions are met:

4–32a Reference.—IFR-VFR and VFR-IFR Flights, paragraph 4–17.

1. The route of flight filed with ATC has not been changed by the pilot, company, operations officer, input operator, or in the stored flight plan program prior to departure.

4–32a1 Note.—A pilot will not accept an abbreviated clearance if the route of flight filed with ATC has been changed by him or the company or the operations officer before departure. He is expected to inform the control facility on initial radio contact if he cannot accept the clearance. It is the responsibility of the company or operations officer to inform the pilot when they make a change.

2. All ATC facilities concerned have sufficient route of flight information to exercise their control responsibilities.

4–32a2 Note.—The route of flight information to be provided may be covered in letters of agreement.

3. When the flight will depart IFR, destination airport information is relayed between the facilities concerned prior to departure.

4–32a3 Example 1.—

A tower or flight service station relay of destination airport information to the center when requesting clearance. "Request clearance for United Four Sixty-one to O'Hare."

4–32a3 Example 2.—

A center relay to the tower or flight service station when initiating a clearance, "Clearance for United Four Sixty-one to O'Hare."

4–32a3 Note.—Pilots are expected to furnish the facility concerned with destination airport information on initial radio

call-up. This will provide the information necessary for detecting any destination airport differences on facility relay.

4. The assigned altitude, according to the provisions in paragraph 4–31e, is stated in the clearance.

b. If it is necessary to modify a filed route of flight in order to achieve computer acceptance due, for example, to incorrect fix or airway identification, the contraction "FRC," meaning "Full Route Clearance Necessary," will be added to the remarks. The contraction "FRC" must always be the first item of intra-center remarks. When the contraction "FRC" appears on a flight progress strip, the controller issuing the ATC clearance to the aircraft shall issue a full route clearance.

4–32b Note.—Changes, such as those made to conform with traffic flows and preferred routings, are only permitted to be made by the pilot (or his operations office) or the controller responsible for initiating the clearance to the aircraft.

c. Specify the destination airport in the clearance.

d. When no changes are required in the filed route, state the phrase, "Cleared to (destination) airport, (SID and SID transition, as appropriate); then, as filed." If a SID is not assigned, follow with "As filed." Specify the assigned altitude; and, if required, add any additional instructions or information.

Phraseology:

CLEARED TO (destination) AIRPORT;

and as appropriate,

(SID name and number) DEPARTURE,

(transition name) TRANSITION; THEN,

AS FILED.

MAINTAIN (altitude);

and if required,

(additional instructions or information).

If a SID is not assigned,

CLEARED TO (destination) AIRPORT AS FILED.

MAINTAIN (altitude);

and if required,

(additional instructions or information).

4–32d Examples.—

"Cleared to Reynolds Airport; David Two RNAV Departure, Kingham Transition; then, as filed. Maintain niner thousand. Expect flight level four one zero, one zero minutes after departure."

"Cleared to Reynolds Airport as filed. Maintain niner thousand. Expect flight level four one zero, one zero minutes after departure."

4–32d Note 1.—SID's are excluded from "cleared as filed" procedures.

4–32d Note 2.—If a pilot does not wish to accept an ATC clearance to fly a SID, he is expected to advise ATC or state "No SID" in his flight plan remarks.

e. When a filed route will require revisions, the controller responsible for initiating the clearance to the aircraft shall either:

1. Issue a full route clearance; or

2. If it reduces verbiage, state the phrase, "Cleared to (destination) airport, (SID and SID transition, as appropriate), then as filed, except . . .." Specify the necessary revision; then, the assigned altitude; and if required, add any additional instructions or information. If a SID is not assigned, state, "Cleared to (destination) airport as filed, except . . .." Specify the necessary revision, the assigned altitude; and if required, add any additional instructions or information.

Phraseology:

CLEARED TO (destination) AIRPORT;

and as appropriate,

(SID name and number) DEPARTURE,

(transition name) TRANSITION; THEN,

AS FILED, EXCEPT CHANGE ROUTE

TO READ (amended route portion).

MAINTAIN (altitude);

and if required,

(additional instructions or information).

If a SID is not assigned,

CLEARED TO (destination) AIRPORT AS FILED,

EXCEPT CHANGE ROUTE TO READ (amended route portion).

MAINTAIN (altitude);

and if required,

(additional instructions or information).

4–32e Examples.—

"Cleared to Reynolds Airport; South Boston One Departure; then, as filed, except change route to read, South Boston Victor Twenty Greensboro. Maintain eight thousand, report leaving four thousand."

"Cleared to Reynolds Airport as filed, except change route to read, South Boston Victor Twenty Greensboro. Maintain eight thousand, report leaving four thousand."

f. In a nonradar environment specify one, two, or more fixes, as necessary, to identify the initial route of flight.

4–32f Example.—

The filed route of flight is from Hutchins V10 Emporia, thence V10N and V77 to St. Joseph. The clearance will read:

"Cleared to Watson Airport as filed via Emporia, maintain seven thousand."

g. Do not apply these procedures when a pilot requests a detailed clearance or to military operations conducted within altitude reservations, stereo routes, operations above FL 600, and other military operations requiring special handling.

4–32g Note.—Departure clearance procedures and phraseology for military operations within approved altitude reservations, military operations above FL 600, and other military operations

requiring special handling are contained in separate procedures in this order or in letters of agreement, as appropriate..

4–32g Reference.—ALTRV Clearances, paragraph 4–16; Military Operations Above FL 600, paragraph 9–30.

4–33 DEPARTURE RESTRICTIONS, CLEARANCE VOID TIMES, HOLD FOR RELEASE, AND RELEASE TIMES

Assign departure restrictions, clearance void times, hold for release, or release times when necessary to separate departures from other traffic or to restrict or regulate the departure flow.

4–33 Reference.—Overdue Aircraft, paragraph 10–14; Traffic Restrictions, paragraph 10–40; Traffic Resumption, paragraph 10–42.

a. Clearance Void Times.

1. When issuing clearance void times at airports not served by control towers, provide alternative instructions requiring the pilots to advise ATC of their intentions no later than 30 minutes after the clearance void time if not airborne.

2. The facility delivering a clearance void time to a pilot shall issue a time check.

Phraseology:

CLEARANCE VOID IF NOT OFF BY (clearance void time),

and if required,

IF NOT OFF BY (clearance void time), ADVISE (facility) NOT LATER THAN (time) OF INTENTIONS.

TIME (time in hours, minutes, and the nearest quarter minute).

b. Hold For Release (HFR).

1. "Hold for release" instructions shall be used when necessary to inform a pilot or a controller that a departure clearance is not valid until additional instructions are received.

4–33b1 Reference.—Pilot/Controller Glossary—Hold for Release.

2. When issuing hold for release instructions, include departure delay information.

Phraseology:

(Aircraft identification) CLEARED TO (destination) AIRPORT AS FILED, MAINTAIN (altitude),

and if required,

(additional instructions or information).

HOLD FOR RELEASE, EXPECT (time in hours and/or minutes) DEPARTURE DELAY.

3. When conditions allow, release the aircraft as soon as possible.

Phraseology:

To another controller,

RELEASE (aircraft identification).

To a flight service specialist,

ADVISE (aircraft identification) RELEASED FOR DEPARTURE.

To a pilot at an airport not served by a control tower,

(aircraft identification) RELEASED FOR DEPARTURE.

c. Release Times.

1. Release times shall be issued to pilots when necessary to specify the earliest time an aircraft may depart.

4–33c1 Note.—A release time is a departure restriction issued to a pilot (either directly or through authorized relay) to separate a departing aircraft from other traffic.

2. The facility issuing a release time to a pilot shall include a time check.

Phraseology:

(Aircraft identification) RELEASED FOR DEPARTURE AT (time in hours and/or minutes),

and if required,

IF NOT OFF BY (time), ADVISE (facility) NOT LATER THAN (time) OF INTENTIONS.

TIME (time in hours, minutes, and nearest quarter minute).

d. When controlled departure time (CDT) procedures are in effect, the departure terminal shall, to the extent possible, plan ground movement of aircraft destined to the affected airport(s) so that flights are sequenced to depart as near as possible to the assigned EDCT, but no earlier than 5 minutes prior to the EDCT or 15 minutes after the assigned EDCT. If the aircraft is unable to meet these parameters, contact the overlying TMU for a revised EDCT.

4–34 DELAY SEQUENCING

When aircraft elect to take delay on the ground before departure, issue departure clearances to them in the order in which the requests for clearance were originally made if practicable.

4–35 FORWARD DEPARTURE DELAY INFORMATION

Inform approach control facilities and/or towers of anticipated departure delays.

4–36 COORDINATION WITH RECEIVING FACILITY

a. Coordinate with the receiving facility before the departure of an aircraft if the departure point is less than 15 minutes flying time from the transferring facility's boundary unless an automatic transfer of data between automated systems will occur, in which case, the flying time requirement may be reduced to 5 minutes or replaced with a mileage from the boundary parameter when mutually agreeable to both facilities.

4–36a Note.—Agreements requiring additional time are encouraged between facilities that need earlier coordination. However, when agreements establish mandatory radar handoff procedures, coordination need only be effected in a timely manner prior to transfer of control.

4–36a Reference.—Radar Handoff Application, paragraph 5–60.

b. The actual departure time or a subsequent strip posting time shall be forwarded to the receiving facility unless assumed departure times are agreed upon and that time is within 3 minutes of the actual departure time.

4–37 VFR RELEASE OF IFR DEPARTURE

When an aircraft which has filed an IFR flight plan requests a VFR departure through a terminal facility, FSS, or air/ground communications station:

a. After obtaining, if necessary, approval from the facility/sector responsible for issuing the IFR clearance, you may authorize an IFR flight planned aircraft to depart VFR. Inform the pilot of the proper frequency and, if appropriate, where or when to contact the facility responsible for issuing the clearance.

Phraseology:

VFR DEPARTURE AUTHORIZED. CONTACT (facility) ON (frequency) AT (location or time if required) FOR CLEARANCE.

b. If the facility/sector responsible or issuing the clearance is unable to issue a clearance, inform the pilot, and suggest that the delay be taken on the ground. If the pilot insists upon taking off VFR and obtaining an IFR clearance in the air, inform the facility/sector holding the flight plan of the pilot's intentions and, if possible, the VFR departure time.

4–38 FORWARDING DEPARTURE TIMES

TERMINAL

Unless alternate procedures are prescribed in a letter of agreement or automatic departure messages are being transmitted between automated facilities, forward departure times to the facility from which you received the clearance and also to the terminal departure controller when that position is involved in the departure sequence.

4–38 Note 1.—Letters of agreement prescribing assumed departure times or mandatory radar handoff procedures are alternatives for providing equivalent procedures.

4–38 Note 2.—The letters "DM" flashing in Field 4 of the Full Data Block signify unsuccessful transmission of an automatic departure message.

4–38 Reference.—FAA Order 7210.3, Automatic Acquisition/Termination Areas, paragraph 13–25.

4–39 thru 4–49 RESERVED

Section 4. ROUTE ASSIGNMENT

4–50 ROUTE USE

Clear aircraft via airways, route structures, random RNAV routes, and NAVAID's established for the altitude stratum in which the operation is to be conducted by one or more of the following:

4–50 Note.—Except for certain NAVAID's/routes used by scheduled air carriers or authorized for specific uses in the control of IFR aircraft, airways, routes, and NAVAID's established for use at specified altitudes are shown on U.S. Government charts or DOD FLIP charts.

4–50 Reference.—NAVAID Terms, paragraph 2–91; Exceptions, paragraph 4–2; Minimum En route Altitudes, paragraph 4–44; Application of Vector, paragraph 5–90.

a. Designated airways and routes.

Phraseology:

VIA:

VICTOR (color) (airway number)(the word ROMEO when RNAV),

or

J (route number) (the word ROMEO when RNAV),

or

SUBSTITUTE (airway or jet route) FROM (fix) TO (fix),

or

IR (route number).

CROSS/JOIN VICTOR/(color) (airway number), (number of miles) MILES (direction) OF (fix).

b. Radials, courses, azimuths, or direct to or from NAVAID's.

Phraseology:

DIRECT.

VIA:

(name of NAVAID) (specified) RADIAL/COURSE/AZIMUTH,

or

(fix) AND (fix),

or

RADIALS OF (airway or route) AND (airway or route).

c. DME arcs of VORTAC, MLS, or TACAN aids.

d. Radials, courses, azimuths, and headings of departure or arrival routes.

e. SID's/STAR's.

f. Vectors.

g. Fixes defined in terms of degree-distance from NAVAID's for special military operations.

h. Courses, azimuths, bearings, quadrants, or radials within a radius of a NAVAID.

Phraseology:

CLEARED TO FLY (general direction from NAVAID) OF (NAVAID name and type) BETWEEN (specified) COURSES TO/BEARINGS FROM/RADIALS (NAVAID name when a NDB) WITHIN (number of miles) MILE RADIUS,

or

CLEARED TO FLY (specified) QUADRANT OF (NAVAID name and type) WITHIN (number of miles) MILE RADIUS.

or

CLEARED TO FLY (general direction from MLS) OF (name or MLS) BETWEEN (specified) AZIMUTHS WITHIN/BETWEEN (number of miles) MILE RADIUS.

4–50h Examples.—

"Cleared to fly east of Allentown VOR-TAC between the zero four five and the one three five radials within four zero mile radius."

"Cleared to fly east of Crystal Lake radio beacon between the two two five and the three one five courses to Crystal Lake within three zero mile radius."

"Cleared to fly northeast quadrant of Philipsburg VOR-TAC within four zero mile radius."

"Cleared to fly east of the Montgomery M-L-S Runway Two Eight Left between the two seven zero and the two four zero azimuth within a 5 mile radius."

i. Fixes defined in terms of degree-distance from NAVAID's or offset from published or established routes/airways at a specified distance and direction for random (impromptu) RNAV Routes. Provide radar monitoring at FL 450 and below.

Phraseology:

DIRECT TO THE (facility)(radial)(distance)FIX. OFFSET(distance) RIGHT/LEFT OF (route).

4–50i Examples.—

"Direct to the Appleton three one zero radial two five mile fix."

"Offset eight miles right of Victor Six."

4–50i Reference.—Radar Separation, paragraph 5–70.

j. Waypoints defined in terms of latitude/longitude coordinates for random RNAV routes.

4–51 ROUTE STRUCTURE TRANSITIONS

To effect transition within or between route structure, clear an aircraft by one or more of the following methods, based on VOR, VORTAC, TACAN, or MLS NAVAID's (unless use of other NAVAIDs are essential to aircraft operation or ATC efficiency):

a. Vector aircraft to or from radials, courses, or azimuths of the airway or route assigned.

b. Assign a SID/STAR.

c. Clear departing or arriving aircraft to climb or descend via radials, courses, or azimuths of the airway or jet route assigned.

d. Clear departing or arriving aircraft directly to or between the NAVAIDs forming the airway or route assigned.

e. Clear aircraft to climb or descend via the airway or route on which flight will be conducted.

f. Clear aircraft to climb or descend on specified radials, courses, or azimuths of NAVAIDs.

g. Provide radar monitor when transition to or from a designated or established RNAV route is made along random RNAV routes.

h. Clear RNAV aircraft transitioning to or between designated or established RNAV routes direct to a named waypoint on the new route.

4–52 DEGREE-DISTANCE ROUTE DEFINITION FOR MILITARY OPERATIONS

EN ROUTE

a. Do not accept a military flight plan whose route or route segments do not coincide with designated airways or jet routes or with a direct course between NAVAID's unless it is authorized in subparagraph 4–52b and meets the following degree-distance route definition and procedural requirements:

1. The route or route segments shall be defined in the flight plan by degree-distance fixes composed of:

(a) A location identifier;

(b) Azimuth in degrees magnetic; and

(c) Distance in miles from the NAVAID used.

Example.—
"MKE 030025."

2. The NAVAID's selected to define the degree-distance fixes shall be those authorized for use at the altitude being flown and at a distance within the published service volume area.

3. The distance between the fixes used to define the route shall not exceed:

(a) Below flight level 180—80 miles;

(b) Flight level 180 and above—260 miles; and

(c) For celestial navigation routes, all altitudes—260 miles.

4. Degree-distance fixes used to define a route shall be considered compulsory reporting points except that an aircraft may be authorized by ATC to omit reports when traffic conditions permit.

5. Military aircraft using degree-distance route definition procedures shall conduct operations in accordance with the following:

(a) Unless prior coordination has been effected with the appropriate air traffic control facility, flight plan the departure and the arrival phases to conform with the routine flow of traffic when operating within 75 miles of the departure and the arrival airport. Use defined routes or airways or direct courses between NAVAID's or as otherwise required to conform to the normal flow of traffic.

(b) Flight plans must be filed at least 2 hours before the estimated time of departure.

b. The following special military operations are authorized to define routes, or portions of routes, by degree-distance fixes:

1. Airborne radar navigation, radar bomb scoring (RBS), and airborne missile programming conducted by the USAF, USN, and RAF.

2. Celestial navigation conducted by the USAF, USN, and RAF.

3. Target aircraft operating in conjunction with air defense interceptors, and air defense interceptors while en route to and from assigned airspace.

4. Missions conducted above FL 450.

5. USN fighter and attack aircraft operating in positive control airspace.

6. USN/USMC aircraft, TACAN equipped, operating within the Honolulu FIR/Hawaiian airways area.

7. USAF/USN/USMC aircraft flight planned to operate on MTR's.

8. USAF Air Mobility Command (AMC) aircraft operating on approved station-keeping equipment (SKE) routes in accordance with the conditions and limitations listed in FAA Exemption No. 4371 to FAR 91.177(a)(2) and FAR 91.179(b)(1).

4–53 ALTERNATIVE ROUTES

When any part of an airway or route is unusable because of NAVAID status, clear aircraft via one of the following alternative routes:

a. A route depicted on current U.S. Government charts/publications. Use the word "substitute" immediately preceding the alternative route in issuing the clearance.

b. A route defined by specifying NAVAID radials, courses, or azimuths.

c. A route defined as direct to or between NAVAID's.

d. Vectors.

4–54 UNCONTROLLED AIRSPACE CLASS G AIRSPACE

Include routes through uncontrolled airspace Class G airspace only when requested by the pilot.

4–54 Note 1.—Flight plans filed for random RNAV routes through uncontrolled airspace Class G airspace are considered a request by the pilot.

4–54 Note 2.—Flight plans containing MTR segments in/through uncontrolled airspace Class G airspace are considered a request by the pilot/s.

4–55 thru 4–59 RESERVED

Section 5. ALTITUDE ASSIGNMENT AND VERIFICATION

4–60 FLIGHT DIRECTION

Clear aircraft at altitudes according to the Table 4–60[1].

Table 4–60[1]
Altitude Assignment

Aircraft Operating	*On course degrees magnetic*	*Assign*	*Examples*
Below 3,000 feet above surface	Any course	Any altitude	
Below FL 290	0 through 179	Odd cardinal altitudes or flight levels at intervals of 2,000 feet	3,000, 5,000, FL250, FL270
	180 through 359	Even cardinal altitudes or flight levels at intervals of 2,000 feet	4,000, 6,000, FL240, FL260
At or above FL 290	0 through 179	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 290	FL290, FL330, FL370
	180 through 359	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 310	FL310, FL350, FL390
One way routes (except in composite systems)	Any course	Any cardinal altitude or flight level below FL 290 or any odd cardinal flight level at or above FL 290	FL270, FL280, FL310, FL330
Within an ALTRV	Any course	Any altitude or flight level	
In transition to/ from or within Oceanic airspace where composite separation is authorized	Any course	Any odd or even cardinal flight level including those above FL290	FL280, FL290, FL300, FL310, FL320, FL330, FL340
In aerial refueling tracks and anchors	Any course	Altitude blocks as requested. Any altitude or flight level	050B080, FL180B220, FL280B310

4–60 Note. —Oceanic separation procedures are supplemented in Chapter 8, Sections 7, 8, 9, and 10.

4–60 Reference.—Exceptions, paragraph 4–61. Altitude Assignments, paragraph 7–84. Separation Minima, paragraph 9–51.

4–61 EXCEPTIONS

When traffic, meteorological conditions, or aircraft operational limitations prevent assignment of altitudes prescribed in paragraph 4–60, assign any cardinal altitude or flight level below FL 290 or any odd cardinal flight level at or above FL 290 without regard to direction of flight as follows:

4–61 Note.—See paragraph 2–59 for control abbreviations and symbols to be used in conjunction with this paragraph.

a. For traffic conditions, take this action only if one of the following conditions exists:

1. Aircraft remain within a facility's area and prior approval is obtained from other affected positions or sectors or the operations are covered in a Facility Directive.

2. Aircraft will proceed beyond the facility's area and specific operations and procedures permitting random altitude assignment are covered in a letter of agreement between the appropriate facilities.

3. Military aircraft are operating on random routes and prior approval is obtained from the facility concerned.

b. For meteorological conditions, take this action only if you obtain prior approval from other affected positions or sectors within your facility and, if necessary, from the adjacent facility concerned.

c. For aircraft operational limitations, take this action only if the pilot informs you the available appropriate altitude exceeds the operational limitations of his aircraft and only after you obtain prior approval from other affected positions or sectors within your facility and, if necessary, from the adjacent facility concerned.

d. For mission requirements, take this action only when the aircraft is operating on an MTR.

4–61 Reference.—Altitude Assignments, paragraph 7–84. Separation Minima, paragraph 9–51.

4–62 LOWEST USABLE FLIGHT LEVEL

If a change in atmospheric pressure affects a usable flight level in your area of jurisdiction, use Table 4–62[1] to determine the lowest usable flight level to clear aircraft at or above 18,000 feet msl.

Table 4–62[1]
Lowest Usable FL

Altimeter Setting	*Lowest Usable FL*
29.92" or higher	180
29.91" to 28.92"	190
28.91" to 27.92"	200

4–62 Reference.—Separation Minima, paragraph 9–51.

4–63 ADJUSTED MINIMUM FLIGHT LEVEL

When the prescribed minimum altitude for IFR operations is at or above 18,000 feet MSL and the atmospheric pressure is less than 29.92", add the appropriate adjustment factor from Table 4–63[1] to the flight level equivalent of the minimum altitude in feet to determine the adjusted minimum flight level.

Table 4–63[1]
Minimum FL Adjustment

Altimeter Setting	*Adjustment Factor*
29.92" or higher	None
29.91" to 29.42"	500 feet
29.41" to 28.92"	1,000 feet
28.91" to 28.42"	1,500 feet
28.41" to 27.92"	2,000 feet

4–64 MINIMUM EN ROUTE ALTITUDES

Except as provided in subparagraphs a and b below, assign altitudes at or above the MEA for the route segment being flown. When a lower MEA for subsequent segments of the route is applicable, issue the lower MEA only after the aircraft is over or past the Fix/NAVAID beyond which the lower MEA applies unless a crossing restriction at or above the higher MEA is issued.

a. An aircraft may be cleared below the MEA but not below the MOCA for the route segment being flown if the altitude assigned is at least 300 feet above the floor of controlled airspace and one of the following conditions are met:

4–64a Note.—Controllers must be aware that in the event of radio communications failure, a pilot will climb to the MEA for the route segment being flown.

1. Nonradar procedures are used only within 22 miles of a VOR, VORTAC, or TACAN.

2. Radar procedures are used only when an operational advantage is realized and the following actions are taken:

(a) Radar navigational guidance is provided until the aircraft is within 22 miles of the NAVID, and

(b) Lost communications instructions are issued.

b. An aircraft may be cleared to operate on jet routes below the MEA (but not below the prescribed minimum altitude for IFR operations) or above the maximum authorized altitude if, in either case, radar service is provided.

4–64b Note.—Minimum en route and maximum authorized altitudes for certain jet route segments have been established above the floor of the jet route structure due to limitations on navigational signal coverage.

c. Where a higher altitude is required because of an MEA, the aircraft shall be cleared to begin climb to the higher MEA as follows:

1. If no MCA is specified, prior to or immediately after passing the fix where the higher MEA is designated. (See Figure 4–64[1]).

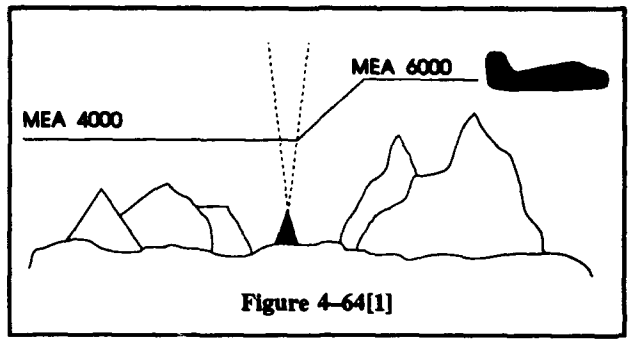


Figure 4–64[1]

2. If a MCA is specified, prior to the fix so as to cross the fix at or above the MCA. (See Figure 4–64[2]).

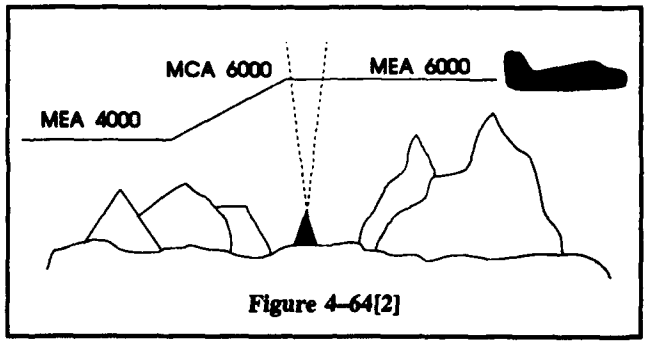


Figure 4–64[2]

d. Where MEA's have not been established, clear an aircraft at or above the minimum altitude for IFR operations prescribed by FAR 91.177.

4–64 Reference.—IFR-VFR and VFR-IFR Flights, paragraph 4–17. Route Use, paragraph 4–30. Application, paragraph 5–90. Altitude Assignments, paragraph 7–84.

4–65 ALTITUDE INFORMATION

When issuing altitude information, include the following items, as appropriate:

4–65 Reference.—Clearance Items, paragraph 4–10.

a. Altitude to maintain or cruise. When issuing cruise in conjunction with an airport clearance limit and an unpublished route will be used, issue

an appropriate crossing altitude to ensure terrain clearance until the aircraft reaches a fix, point, or route where the altitude information is available to the pilot. When issuing a cruise clearance to an airport which does not have a published instrument approach, a cruise clearance without a crossing restriction may be issued.

Phraseology:

MAINTAIN/CRUISE (altitude). MAINTAIN (altitude) UNTIL (time), or PAST (fix), or (number of miles or minutes) MILES/MINUTES PAST (fix).

CROSS (fix, point) or INTERCEPT (route) AT OR ABOVE (altitude), CRUISE (altitude).

4–65a Note 1.—The crossing altitude must assure IFR obstruction clearance to the point where the aircraft is established on a segment of a published route or instrument approach procedure.

4–65a Note 2.—When an aircraft is issued a cruise clearance to an airport which does not have a published instrument approach procedure, it is not possible to satisfy the requirement for a crossing altitude that will ensure terrain clearance until the aircraft reaches a fix, point, or route where altitude information is available to the pilot. Under those conditions, a cruise clearance without a crossing restriction authorizes a pilot to determine the minimum IFR altitude as prescribed in FAR 91.119 and descend to it at pilot discretion if it is lower than the altitude specified in the cruise clearance.

b. Instructions to climb or descend, including restrictions, as required.

4–65b Reference.—Combining speed reduction with decent clearance, paragraph 5–101b.

Phraseology:

CLIMB/DESCEND AND MAINTAIN (altitude).

If required,

AFTER PASSING (fix),

or

AT (time).

CLIMB/DESCEND AND MAINTAIN (altitude) WHEN ESTABLISHED AT LEAST (number of miles or minutes) MILES/MINUTES PAST (fix) ON THE (NAVAID) (specified) RADIAL.

CLIMB/DESCEND TO REACH (altitude) AT (time or fix),

or

A POINT (number of miles) MILES (direction) OF (name of DME NAVAID).

c. Specified altitude over a specified fix.

Phraseology:

CROSS (fix) AT (altitude).

CROSS (fix) AT OR ABOVE/BELOW (altitude).

d. A specified altitude over a specified fix for that portion of a descent clearance where descent at pilot's discretion is permissible. At any other time it is practicable, authorize climb/descent at pilot's discretion.

Phraseology:

CLIMB/DESCEND AT PILOT'S DISCRETION.

4–65d Example 1.—

"United Four Seventeen, descend and maintain six thousand."

The pilot is expected to commence descent upon receipt of the clearance and to descend at the suggested rates specified in the Airman's Information Manual (AIM) Section on ATC Clearances/Separations, Adherence to Clearance paragraph 4–89 until reaching the assigned altitude of 6,000 feet.

4–65d Example 2.—

"United Four Seventeen, descend at pilot's discretion, maintain six thousand."

The pilot is authorized to conduct descent within the context of the term "at pilot's discretion" as described in the AIM.

4–65d Example 3.—

"United Four Seventeen cross Lakeview V-O-R at or above flight level two zero zero, descend and maintain six thousand."

The pilot is authorized to conduct descent "at pilot's discretion" until reaching Lakeview VOR. He/she must comply with the clearance provision to cross the Lakeview VOR at or above FL 200, and after passing Lakeview VOR, he/she is expected to descend at the rates specified in the AIM until reaching the assigned altitude of 6,000 feet.

4–65d Example 4.—

"United Four Seventeen, cross Lakeview V-O-R at and maintain six thousand."

The pilot is authorized to conduct descent "at pilot's discretion," but must comply with the clearance provision to cross Lakeview VOR at 6,000 feet.

4–65d Example 5.—

"United Four Seventeen, descend now to flight level two seven zero, cross Lakeview V-O-R at or below one zero thousand, descend and maintain six thousand."

The pilot is expected to promptly execute and complete descent to FL 270 upon receipt of the clearance. After reaching FL 270, he/she is authorized to descend "at pilot's discretion" until reaching Lakeview VOR. He/she must comply with the clearance provision to cross Lakeview VOR at or below 10,000 feet. After Lakeview VOR, he/she is expected to descend at the rates specified in the AIM until reaching 6,000 feet.

4–65d Note. 1—A descent clearance which specifies a crossing altitude authorizes descent at pilot's discretion for that portion of the flight to which the crossing altitude restriction applies. Any other time that authorization to descend at pilot's discretion is intended, it must be specifically stated by the controller.

4–65d Note. 2—The pilot may need to know of any future restrictions that might affect the descent, including those that may be issued in another sector, in order to properly plan a descent at pilot's discretion.

4–65d Note 3.—Controllers need to be aware that the descent rates in the AIM are only suggested and aircraft will not always descend at those rates.

4–65d Reference.—Pilot/Controller Glossary, Pilot's Discretion.

e. When a portion of a climb/descent may be authorized at the pilot's discretion, specify the altitude the aircraft must climb/descend to followed by the altitude to maintain at the pilot's discretion.

Phraseology:

CLIMB/DESCEND NOW TO (altitude), THEN CLIMB/DESCEND AT PILOT'S DISCRETION MAINTAIN (altitude).

4–65e Example.—
"United three ten, descend now to flight level two eight zero, then descend at the pilot's discretion maintain flight level two four zero."

The pilot is expected to commence descent upon receipt of the clearance and to descend at the suggested rates specified in the Airman's Information Manual (AIM) Section on ATC Clearances/Separations, Adherence to Clearances paragraph 4–89, until reaching flight level 280. At that point, the pilot is authorized to continue descent to flight level 240 within the context of the term "at pilot's discretion" as described in the AIM.

4–65e Note.— Controllers need to be aware that the descent rates in the AIM are only suggested and aircraft will not always descend at those rates.

f. When the "pilot's discretion" portion of a climb/descent clearance is being canceled by assigning a new altitude, inform the pilot that the new altitude is an "amended altitude."

4–65f Example.—
American Eighty Three, at flight level 280, has been cleared to descend at pilot's discretion to flight level 240. Subsequently, the altitude assignment is changed to flight level 260 and pilot's discretion is not authorized. In the above situation, the appropriate clearance would be:

"American Eighty Three, amend altitude, descend and maintain flight level two six zero."

g. Altitude assignments involving more than one altitude.

Phraseology:
MAINTAIN BLOCK (altiude) THROUGH (altitude).

4–66 ANTICIPATED ALTITUDE CHANGES

If practicable, inform an aircraft when to expect climb or descent clearance or to request altitude change from another facility.

Phraseology:
EXPECT HIGHER/LOWER ALTITUDE IN (number of miles or minutes) MILES/MINUTES,

or

AT (fix). REQUEST ALTITUDE CHANGE FROM (name of facility).

If required,

AT (time, fix, or altitude).

4–66 Reference.—IFR Flight Progress Data, paragraph 2–35.

4–67 ALTITUDE CONFIRMATION—NONRADAR

a. Request a pilot to confirm assigned altitude on initial contact and when position reports are received unless:

4–67a Note.—For the purpose of this paragraph, "initial contact" means a pilot's first radio contact with each sector/position.

1. The pilot states the assigned altitude, or

2. You assign a new altitude to a climbing or descending aircraft, or

3. *TERMINAL:* The aircraft was transferred to you from another sector/position within your facility (intrafacility).

Phraseology:
In level flight situations,

VERIFY AT (altitude).

In climbing/descending situations,

VERIFY ASSIGNED ALTITUDE (altitude).

b. *USA:* Reconfirm all pilot altitude readbacks.

Phraseology:
If altitude readback is correct,

AFFIRMATIVE (altitude).

If altitude readback is not correct,

NEGATIVE. CLIMB/DESCEND AND MAINTAIN (Altitude),

or

NEGATIVE. MAINTAIN (altitude).

4–68 thru 4–69 RESERVED

Section 6. HOLDING AIRCRAFT

4–70 CLEARANCE TO HOLDING FIX

Consider operational factors such as length of delay, holding airspace limitations, navigational aids, altitude, meteorological conditions when necessary to clear an aircraft to a fix other than the destination airport. Issue the following:

a. Clearance limit (if any part of the route beyond a clearance limit differs from the last routing cleared, issue the route the pilot can expect beyond the clearance limit).

Phraseology:

EXPECT FURTHER CLEARANCE VIA (routing).

4–70a Example.—

"Expect further clearance via direct Stillwater V-O-R, Victor Two Twenty-six Snapy Intersection, direct Newark,"

b. Holding instructions.

1. Holding instructions may be eliminated when you inform the pilot that no delay is expected.

2. When the pattern is charted, you may omit all holding instructions except the charted holding direction and the statement "as published." Always issue complete holding instructions when the pilot requests them.

4–70b2 Note.—The most generally used holding patterns are depicted on U.S. Government or commercially produced low/high altitude en route, area, and STAR charts.

Phraseology:

CLEARED TO (fix), HOLD (direction), AS PUBLISHED,

or

CLEARED TO (fix), NO DELAY EXPECTED.

c. EFC. Do not specify this item if no delay is expected.

1. When additional holding is expected at any other fix in your facility's area, state the fix and your best estimate of the additional delay. When more than one fix is involved, state the total additional en route delay (omit specific fixes).

4–70c1 Note.—Additional delay information is not used to determine pilot action in the event of two-way communications failure. Pilots are expected to predicate their actions solely on the provisions of FAR 91.185.

Phraseology:

EXPECT FURTHER CLEARANCE (time),

and if required,

ANTICIPATE ADDITIONAL (time in minutes/hours) MINUTE/HOUR DELAY AT (fix),

or

ANTICIPATE ADDITIONAL (time in minutes/hours) MINUTE/HOUR EN ROUTE DELAY.

4–70c1 Examples.—

"Expect further clearance one niner two zero, anticipate additional three zero minute delay at Sweet."

"Expect further clearance one five one zero, anticipate additional three zero minute en route delay."

2. When additional holding is expected in an approach control area, state the total additional terminal delay.

Phraseology:

EXPECT FURTHER CLEARANCE (time),

and if required,

ANTICIPATE ADDITIONAL (time in minutes/hours) MINUTE/HOUR TERMINAL DELAY.

3. *TERMINAL:* When terminal delays exist or are expected, inform the appropriate center or approach control facility so that the information can be forwarded to arrival aircraft.

4. When delay is expected, issue items in subparagraphs 4–70a, b, and c at least 5 minutes before the aircraft is estimated to reach the clearance limit. If the traffic situation requires holding an aircraft that is less than 5 minutes from the holding fix, issue these items immediately.

4–70c4 Note 1.—The AIM indicates that pilots should start speed reduction when 3 minutes or less from the holding fix. The additional 2 minutes contained in the 5–minute requirement are necessary to compensate for different pilot/controller ETAs at the holding fix, minor differences in clock times, and provision for sufficient planning and reaction times.

4–70c4 Note 2.—When holding is necessary, the phrase "delay indefinite" should be used when an accurate estimate of the delay time and the reason for the delay cannot immediately be determined; i.e., disabled aircraft on the runway, terminal or center sector saturation, weather below landing minimums, etc. In any event, every attempt should be made to provide the pilot with the best possible estimate of his delay time and the reason for the delay. Controllers/supervisors should consult, as appropriate, with personnel (other sectors, weather forecasters, the airport management, other facilities, etc.) who can best provide this information.

Phraseology:

DELAY INDEFINITE, (reason if known), EXPECT FURTHER CLEARANCE (time). (After determining the reason for the delay, advise the pilot as soon as possible.)

4–70 Examples.—

"Cleared to Drewe, hold west, as published, expect further clearance via direct Sidney V-O-R one three one five, anticipate additional two zero minute delay at Woody."

"Cleared to Aston, hold west on Victor Two Twenty-five, seven mile leg, left turns, expect further clearance one niner two zero, anticipate additional one five minute terminal delay."

"Cleared to Wayne, no delay expected."

"Cleared to Wally, hold north, as published, delay indefinite, snow removal in progress, expect further clearance one one three zero.

4–71 CLEARANCE BEYOND FIX

a. If no delay is expected, issue a clearance beyond the clearance limit as soon as possible and, whenever possible, at least 5 minutes before the aircraft reaches the fix.

b. Include the following items when issuing clearance beyond a clearance limit:

1. Clearance limit or approach clearance.

2. Route of flight. Specify one of the following:

(a) Complete details of the route (airway, route, course, fix(es), azimuth course, heading, arc, or vector).

(b) The phrase "via last routing cleared." Use this phrase only when the most recently issued routing to the new clearance limit is valid and verbiage will be reduced.

Phraseology:
VIA LAST ROUTING CLEARED.

3. Assigned altitude if different from present altitude.

4–71 Note.—Except in the event of a two-way communications failure, when a clearance beyond a fix has not been received, pilots are expected to hold as depicted on U.S. Government or commercially produced (meeting FAA requirements) low/high altitude en route and area or STAR charts. If no holding pattern is charted and holding instructions have not been issued, pilots should ask ATC for holding instructions prior to reaching the fix. If a pilot is unable to obtain holding instructions prior to reaching the fix, he is expected to hold in a standard pattern on the course on which he approached the fix and request further clearance as soon as possible.

4–72 DELAYS

a. Advise your supervisor or flow controller as soon as possible when you delay or expect to delay aircraft.

b. When arrival delays reach or are anticipated to reach 30 minutes, take the following action:

1. *EN ROUTE:* The center responsible for transferring control to an approach control facility or, for a nonapproach control destination, the center in whose area the aircraft will land shall issue total delay information as soon as possible after the aircraft enters the center's area. Whenever possible, the delay information shall be issued by the first center controller to communicate with the aircraft.

2. *TERMINAL:* When tower en route control service is being provided, the approach control facility whose area contains the destination airport shall issue total delay information as soon as possible after the aircraft enters its approach control area. Whenever possible, the delay information shall be issued by the first terminal controller to communicate with the aircraft.

3. Unless a pilot requests delay information, the actions specified in 1 and 2. above may be omitted when total delay information is available to pilots via ATIS.

Phraseology:
(Airport) ARRIVAL DELAYS (time in minutes/hours).

4–73 HOLDING INSTRUCTIONS

When necessary to issue holding instructions, specify:

a. Direction of holding from the fix.

b. Holding fix.

4–73b Note.—The holding fix may be omitted if included at the beginning of the transmission as the clearance limit.

c. Radial, course, bearing, azimuth, airway, or route on which the aircraft is to hold.

d. Leg length in miles if DME or RNAV is to be used. Specify leg length in minutes if the pilot requests or you consider it necessary.

e. Direction of holding pattern turns only if left turns are to be made, the pilot requests, or you consider it necessary.

Phraseology:
HOLD (direction) OF (fix) ON (specified radial, course, bearing, airway, azimuth(s), or route).

If leg length is specified,

(number of minutes/miles) MINUTE/MILE LEG.

If direction of turn is specified,

LEFT/RIGHT TURNS.

4–73e Note.—It is mandatory for the controller to issue left or right turns every time a holding pattern is issued for MLS.

4–74 VISUAL HOLDING POINTS

You may use as a holding fix a location which the pilot can determine by visual reference to the surface if he is familiar with it.

Phraseology:
HOLD AT (location) UNTIL (time or other condition).

4–74 Reference.—Visual Holding of VFR Aircraft, paragraph 7–4.

4–75 HOLDING FLIGHT PATH DEVIATION

Approve a pilot's request to deviate from the prescribed holding flight path if traffic conditions permit.

4–76 UNMONITORED NAVAIDS

Separate an aircraft holding at an unmonitored NAVAID from any other aircraft occupying the course which the holding aircraft will follow if it does not receive signals from the NAVAID.

4–77 ILS PROTECTION/CRITICAL AREAS

When conditions are less than reported ceiling 800 feet and/or visibility of 2 miles, do not authorize aircraft to hold below 5,000 feet AGL inbound toward the airport on or within 1 statute mile

of the localizer between the ILS OM or the fix used in lieu of the OM and the airport. *USAF:* The holding restriction applies only when an arriving aircraft is between the ILS OM or the fix used in lieu of the OM and the runway.

4–77a Reference.—Order 7130.3, paragraph 54 and Figure 20.

4–78 thru 4–79 RESERVED

Section 7. ARRIVAL PROCEDURES

4–80 CLEARANCE INFORMATION

Clear an arriving aircraft to a clearance limit by specifying the following:

a. Name of fix or airport.

b. Route of flight including a STAR and STAR Transition, if appropriate. Assign a STAR and STAR Transition to any civil aircraft in lieu of other routes; e.g., airways or Preferential Arrival Routes when the routings are the same. The clearance shall include the name, the current number, and the transition, if necessary, of the STAR to be flown. Assign a STAR to military aircraft only when a STAR is filed or requested by the pilot.

Phraseology:

(STAR name and number) ARRIVAL.

(STAR name and number) ARRIVAL, (transition name) TRANSITION.

4–80b Examples.—

"Rosewood One Arrival."

"Rosewood One Arrival, Delta Transition."

4–80b Note.—If a civil pilot does not wish to use a STAR issued in an ATC clearance or any other STAR published for that location, he is expected to advise ATC.

c. Assigned altitude if different from present altitude or when a STAR/STAR Transition is issued.

4–80c Example.—

Bayview Three RNAV Arrival, Helen Transition, maintain flight level three three zero."

d. Issue holding instructions, EFC, and additional delay information as required.

e. Instructions regarding further communications as appropriate.

4–80e Reference.—Radio Communications Transfer, paragraph 2–17.

4–81 ADVANCE DESCENT CLEARANCE

EN ROUTE

Take the following action when exercising control of aircraft landing at an airport located in an adjacent center's control area near the common boundary:

a. Coordinate with the receiving facility for a lower altitude and issue a clearance to the aircraft as appropriate.

b. Initiate this action at a distance sufficient from destination to allow for normal descent and speed reduction.

4–82 SINGLE FREQUENCY APPROACHES (SFA)

TERMINAL

Where SFA procedures for military single-piloted turbojet aircraft on an IFR flight plan are contained in a letter of agreement, do not require a radio frequency change after the aircraft begins approach or after initial contact during an en route descent until a landing or low approach has been completed except under the following conditions:

4–82 Reference.—FAA Order 7610.4, Single Frequency Approach, paragraph 9–36. Pilot/Controller Glossary term—Single-piloted aircraft.

a. During daylight hours while the aircraft is in VFR conditions.

b. On pilot request.

c. When pilot cancels IFR flight plan.

d. In an emergency situation.

e. When aircraft is cleared for visual approach.

4–83 RADIO FREQUENCY AND RADAR BEACON CHANGES FOR MILITARY AIRCRAFT

When military single-piloted turbojet aircraft will conduct an approach wholly or partly in IFR conditions or at night, take the following action:

4–83 Note.—It is known that the mental distraction and the inadvertent movement of aircraft controls resulting from the pilot's turning, reaching, or leaning to change frequencies can induce spatial disorientation (vertigo).

a. Avoid radio frequency and radar beacon changes to the maximum extent that communications capabilities and traffic will permit. However, when changes are required:

1. Give instructions early enough to allow the change before the aircraft reaches the approach fix or handoff point.

2. Keep frequency/radar beacon changes to a minimum below 2,500 feet above the surface.

3. Avoid requiring frequency/radar beacon changes during the time the aircraft is making a turn.

b. When traffic volume requires, a frequency other than the one used by aircraft making approaches may be assigned for use in transferring control to the approach control facility.

TERMINAL

c. If practicable, use a frequency common to both the GCA unit and approach control to minimize frequency changes.

d. When a GCA unit is not able to communicate on a common frequency, a change to a GCA frequency may be authorized.

e. When a nonradar approach will be made, aircraft may be instructed to change to tower frequency when:

1. The reported ceiling is at or above 1,500 feet and visibility is 5 statute miles or more.

2. The aircraft reports able to proceed by visual reference to the surface.

3. The aircraft request and is cleared for a contact approach.

4. The aircraft is cleared for a visual approach.

f. Avoid making frequency/radar beacon changes after an aircraft begins a high altitude approach.

g. In the event of a missed approach, do not require a frequency/radar beacon change before the aircraft reaches the missed approach altitude, the MEA, or the MVA.

4–83 Reference.—Function Code Assignments, paragraph 5–25.

4–84 MILITARY TURBOJET EN ROUTE DESCENT

Provide military turbojet aircraft the same arrival procedures that are provided for nonmilitary turbojet aircraft except:

4–84 Note.—It is the responsibility of the pilot to request a high altitude approach if he does not want normal arrival handling.

a. An en route descent may be used in a nonradar environment; however, radar capability should exist which will permit the aircraft to be vectored to the final approach course of a published high altitude instrument approach procedure or PAR/ASR approach. Do not use this procedure if other than normal vectoring delays are anticipated.

b. Prior to issuance of a descent clearance below the highest initial approach fix altitude established for any high altitude instrument approach procedure for the destination airport inform the aircraft:

1. Type of approach to expect.

4–84b1 Example.—
"Expect V-O-R approach to Runway Three Two."

2. Radar vectors will be provided to the final approach course.

4–84b2 Example.—
"Expect surveillance/precision approach to Runway One Seven; radar vectors to final approach course."

3. Current weather whenever the ceiling is below 1,000 feet *(USAF:* 1,500 feet) or the highest circling minimum whichever is greater, or when the visibility is less than 3 miles.

4–84b3 Example.—
"Expect ILS/MLS approach to Runway Eight; radar vectors to localizer/azimuth course. Weather (reported weather)."

c. If ATIS is provided and the pilot advises he has received the current ATIS broadcast before the descent clearance in subparagraph 4–84b is issued, omit those items in subparagraph 4–84b that are contained in the broadcast.

d. To avoid requiring an aircraft to fly at low altitudes for an excessive distance, descent clearance should be issued at a point determined by adding 10 to the first two digits of the flight level.

4–84d Example.—
For FL 370, 37 plus 10=47 miles.

4–84d Note.—Turbojet en route descents are based on a rate of descent of 4,000 to 6,000 feet per minute.

e. Do not terminate the en route descent of an aircraft without the consent of the pilot except as required by radar outage or an emergency situation.

4–84 Reference.—Altitude Assignment for Military High Altitude Instrument Approaches, paragraph 4–83.

4–85 ADVANCE APPROACH INFORMATION

When an aircraft intends to land at an airport where approach control services are provided and two or more instrument approach procedures are published, the facility controlling the aircraft immediately before entry into the approach control area shall inform the aircraft of the type of approach to expect or that it will be vectored to the airport. Omit this information if ATIS is provided for the airport or if the visibility is 3 miles or better and the ceiling is at or above the highest initial approach altitude established for any low altitude instrument approach procedure for the airport.

Phraseology:
EXPECT (type) APPROACH.

EXPECT VISUAL APPROACH.

4–85 Reference.—Approach Information by Approach Control Facilities, paragraph 4–92.

4–86 ARRIVAL INFORMATION

EN ROUTE

a. Forward the following information to nonapproach control towers soon enough to permit adjustment of the traffic flow or to FSS's soon enough to provide Local Airport Advisory where applicable:

1. Aircraft identification.
2. Type of aircraft.
3. ETA.
4. Type of instrument approach procedure the aircraft will execute; or
5. For SVFR, the direction from which the aircraft will enter the control zone Class B, C, D, or E surface area and any altitude restrictions that were issued; or
6. For aircraft executing a contact approach the position of the aircraft.

4–86a Note— Specific time requirements are usually stated in a letter of agreement.

b. Forward the following information to approach control facilities before transfer of control jurisdiction:

4–86b Note.—Transfer points are usually specified in a letter of agreement.

1. Aircraft identification.
2. Type of aircraft and appropriate aircraft equipment suffix.

3. ETA or actual time, and proposed or actual altitude over clearance limit. The ETA need not be given if the arrival information is being forwarded during a radar handoff.

4. Clearance limit (when other than the destination airport) and EFC issued to the aircraft. Clearance limit may be omitted when provided for in a letter of agreement.

5. Time, fix, or altitude when control responsibility is transferred to the approach control facility. This information may be omitted when provided for in a letter of agreement.

Phraseology:

(Identification), (type of aircraft), ESTIMATED/OVER (clearance limit), (time), (altitude), EFC (time).

If required,

YOUR CONTROL,

or

YOUR CONTROL AT (time, fix or altitude).

4–87 WEATHER INFORMATION

EN ROUTE

When an available official weather report indicates weather conditions are below a 1,000–foot *(USAF:* 1,500–foot) ceiling or below the highest circling minimum, whichever is higher, or less than three-miles visibility for the airport concerned, transmit the weather report and changes classified as special weather observations to an arriving aircraft prior to or as part of the approach clearance when:

a. It is transmitted directly to the pilot via center controller-to-pilot communications.

b. It is relayed through a communications station other than an air carrier company radio or through a nonapproach control facility. You may do this by telling the station or non-approach control facility to issue current weather.

4–88 BELOW MINIMA REPORT BY PILOT

If an arriving aircraft reports weather conditions are below his landing minima:

4–88 Note.—Determination that existing weather/visibility is adequate for approach/landing is the responsibility of the pilot/aircraft operator.

a. Issue appropriate instructions to the aircraft to hold or proceed to another airport.

b. Adjust, as necessary, the position in the landing sequence of any other aircraft desiring to make approaches and issue approach clearances accordingly.

4–89 TRANSFER OF JURISDICTION

Transfer radio communications and control responsibility early enough to allow the receiving facility to clear an aircraft beyond the clearance limit before the aircraft reaches it.

4–90 AIRPORT CONDITIONS

a. *EN ROUTE:* Before issuing an approach clearance or en route descent, and subsequently as changes occur, inform an aircraft of any abnormal operation of approach and landing aids and of destination airport conditions that you know of which might restrict an approach or landing.

b. *TERMINAL:* On first contact or as soon as possible thereafter, and subsequently as changes occur, inform an aircraft of any abnormal operation of approach and landing aids and of destination airport conditions that you know of which might restrict an approach or landing. This information may be omitted if it is contained in the ATIS broadcast and the pilot states the appropriate ATIS code.

4–90b Reference.—Chapter 3. Airport Traffic Control—Terminal, Section 3., Airport Conditions.

c. *TERMINAL:* Where RCR's are provided, transmit this information to USAF and ANG aircraft in accordance with one of the following. Issue the RCR to other aircraft upon pilot request.

1. Before or when an approach clearance is issued.

2. Before an en route descent clearance is issued.

3. Prior to departure.

4. As soon as possible after receipt of any subsequent changes in previously issued RCR information.

4–90c Note 1.—USAF has established RCR procedures for determining the average deceleration readings of runways under conditions of water, slush, ice, or snow. The use of RCR code is dependent upon the pilot having a "stopping capability chart" specifically applicable to his aircraft.

4–90c Note 2.—USAF offices furnish RCR information at airports serving USAF and ANG aircraft.

4–90c Reference.—Landing Area Conditions, paragraph 3–30.

4–91 ARRIVAL INFORMATION BY APPROACH CONTROL FACILITIES

TERMINAL

a. Forward the following information to nonapproach control towers soon enough to permit adjustment of the traffic flow or to FSS's soon enough to provide Local Airport Advisory where applicable:

1. Aircraft identification.

2. Type of aircraft.

3. ETA.

4. Type of instrument approach procedure the aircraft will execute; or

5. For SVFR, the direction from which the aircraft will enter [redacted] and any altitude restrictions that were issued; or

6. For aircraft executing a contact approach the position of the aircraft.

4–91a Note.—Specific time requirements are usually stated in a letter of agreement.

b. Forward the following information to the tower when the tower and TRACON are part of the same facility:

1. Aircraft identification.

2. Type aircraft if required for separation purposes.

3. Type of instrument approach procedure and/or runway if differing from that in use.

4–91b3 Note.—The local controller has the responsibility to determine whether or not conditions are adequate for the use of ARTS data on the BRITE where a facility directive authorizes its use for the transfer of arrival data.

4–91b3 Reference.—FAA Order 7210.3, Use of ARTS Modify and Quick Look Functions, paragraph 13–23 Note.

c. Where the collocated or satellite tower has ARTS data displayed on its BRITE, the ARTS modify or quick look functions may be used to forward arrival data provided that a facility directive at the collocated tower or a letter of agreement with the satellite tower exists which outlines procedures for using ARTS for transferring this data.

d. Forward the following information to centers:

1. Where two or more instrument approach procedures are published for the airport, the particular procedure which an aircraft can expect or that it will be vectored toward the airport for a visual approach.

2. Highest altitude being used by the approach control facility at the holding fix.

3. Average time interval between successive approaches.

4. Arrival time of aircraft over the holding fix or, if control has been transferred to you before an aircraft has reached the fix, a statement or other indication acknowledging receipt of control responsibility.

5. Revised EFC if different by 10 minutes or more from that issued by the center.

6. Missed approaches if they affect center operations.

7. Information relating to an unreported or overdue aircraft.

4–92 APPROACH INFORMATION BY APPROACH CONTROL FACILITIES

a. Provide current approach information to arriving aircraft at airports where your facility/sector provides approach control services on first radio contact or as soon as possible thereafter. Approach information contained in the ATIS broadcast may be omitted if the pilot states the appropriate ATIS code; otherwise, issue approach information by including the following:

1. Approach clearance or type approach to be expected if two or more approaches are published and the clearance limit does not indicate which will be used.

4–92a1 Reference.—Advance Approach Information, paragraph 4–85.

2. Runway if different from that to which the instrument approach is made.

3. Surface wind.

4. Ceiling and visibility if the ceiling at the airport of intended landing is reported below 1,000 feet or below the highest circling minimum, whichever is greater, or the visibility is less than 3 miles.

5. Altimeter setting for the airport of intended landing.

4–92a5 Reference.—Chapter 2, Section 7, Altimeter Settings.

6. Controllers without access to current airport weather data shall inform pilots that the weather is not available and the frequency where automated weather data may be obtained.

Phraseology:

(Airport) AWOS/ASOS WEATHER AVAILABLE ON (frequency).

b. Issue any known changes classified as special weather observations as soon as possible. Special weather observations need not be issued after they are included in the ATIS broadcast and the pilot states the appropriate ATIS code.

c. Advise pilots when the ILS/MLS on the runway in use is not operational if that ILS/MLS is on the same frequency as an operational ILS/MLS serving another runway.

4–92c Example.—

"Expect Visual Approach Runway Two Five Right, Runway Two Five Right I-L-S not operational."

4–92c Reference.—Part 91.129(d)(2).

4–92 Reference.—Altimeter Setting Issuance Below Lowest Usable FL, paragraph 2–121. Approach Information, paragraph 5–131.

4–93 SWITCHING ILS/MLS RUNWAYS

TERMINAL

When a change is made from one instrument landing system (ILS) to another or from one microwave landing system (MLS) to another at airports equipped with multiple systems which are not used simultaneously, coordinate with the facilities which use the fixes formed by reference to these NAVAID's.

4–94 thru 4–99 RESERVED

Section 8. APPROACH CLEARANCE PROCEDURES

4–100 APPROACH CLEARANCE

a. Clear aircraft for "standard" or "special" instrument approach procedures only. To require an aircraft to execute a particular instrument approach procedure, specify in the approach clearance the name of the approach as published on the approach chart. Where more than one procedure is published on a single chart and a specific procedure is to be flown, amend the approach clearance to specify execution of the specific approach to be flown. If only one instrument approach of a particular type is published, the approach need not be identified by the runway reference. An aircraft conducting an ILS/MLS approach when the glideslope/glidepath is reported out of service shall be advised at the time an approach clearance is issued. Where adequate radar coverage exists, radar facilities may vector aircraft to the final approach course in accordance with paragraph 5–120.

Phraseology:

CLEARED (type) APPROACH.

For a straight-in-approach—IFR,

CLEARED STRAIGHT-IN (type) APPROACH.

To authorize a pilot to execute his choice of instrument approach,

CLEARED APPROACH.

Where more than one procedure is published on a single chart and a specific procedure is to be flown,

CLEARED (specific procedure to be flown) APPROACH.

To authorize a pilot to execute an ILS/MLS approach when the glideslope/glidepath is out of service,

CLEARED (type) APPROACH, GLIDESLOPE/GLIDEPATH UNUSABLE.

4–100a Examples.—

"Cleared Approach."

"Cleared V-O-R Approach."

"Cleared V-O-R Runway Three Six Approach."

"Cleared I-L-S Approach."

"Cleared Localizer Back Course Runway One Three Approach."

"Cleared R-NAV Runway Two Two Approach."

"Cleared Branch One R-NAV Arrival and R-NAV Runway One Three Approach."

"Cleared I-L-S Runway Three Six Approach, glideslope unusable."

"Cleared M-L-S Approach."

"Cleared M-L-S Runway Three Six Approach."

"Cleared M-L-S Runway Three Six Approach, glidepath unusable."

4–100a Note 1.—Clearances authorizing instrument approaches are issued on the basis that, if visual contact with the ground is made before the approach is completed, the entire approach procedure will be followed unless the pilot receives approval for a contact approach, is cleared for a visual approach, or cancels his IFR flight plan.

4–100a Note 2.—Approach clearances are issued based on known traffic. The receipt of an approach clearance does not relieve the pilot of his responsibility to comply with applicable FAR's and the notations on instrument approach charts which levy on the pilot the responsibility to comply with or act on an instruction; e.g., "Straight-in minima not authorized at night," "Procedure not authorized when glideslope/glidepath not used," "Use of procedure limited to aircraft authorized to use airport," or "Procedure not authorized at night."

4–100a Note 3.—The name of the approach, as published, is used to identify the approach, even though a component of the approach aid, other than the localizer on an ILS or the azimuth on an MLS is inoperative. Where more than one procedure to the same runway is published on a single chart, each must adhere to all final approach guidance contained on that chart, even though each procedure will be treated as a separate entity when authorized by ATC. For example, Instrument Approach Procedures published on a chart as either *Hi-VOR/DME* or *TACAN 1* would be stated as either "Hi V-O-R/D-M-E 1 Runway Six Left Approach" or "Hi TACAN 1 Runway Six Left Approach." The use of numerical identifiers in the approach name, such as "Hi TACAN 1 Rwy 6L or Hi TACAN 2 Rwy 6L," denotes multiple straight-in approaches to the same runway that use the same approach aid. Alphabetical suffixes denote a procedure that does not meet the criteria for straight-in landing minimums authorization."

4–100a Reference.—Order 8260.3, United States Standards for Terminal Instrument Approach Procedures.

4–100a Note 4.—FAR 91.116 requires a pilot to receive a clearance for a procedure turn when vectored to a final approach fix or position, conducting a timed approach, or when the procedure specifies "No PT."

4–100a Note 5.—An aircraft which has been cleared to a holding fix and prior to reaching that fix is issued a clearance for an approach, but not issued a revised routing; i.e., "proceed direct to. . . ." may be expected to proceed via the last assigned route, a feeder route (if one is published on the approach chart), and then to commence the approach as published. If, by following the route of flight to the holding fix, the aircraft would overfly an IAF or the fix associated with the beginning of a feeder route to be used, the aircraft is expected to commence the approach using the published feeder route to the IAF or from the IAF as appropriate; i.e., the aircraft would not be expected to overfly and return to the IAF or feeder route.

b. For aircraft operating on unpublished routes, issue the approach clearance only after the aircraft is: (See Figure 4–100[1]).

1. Established on a segment of a published route or instrument approach procedure.

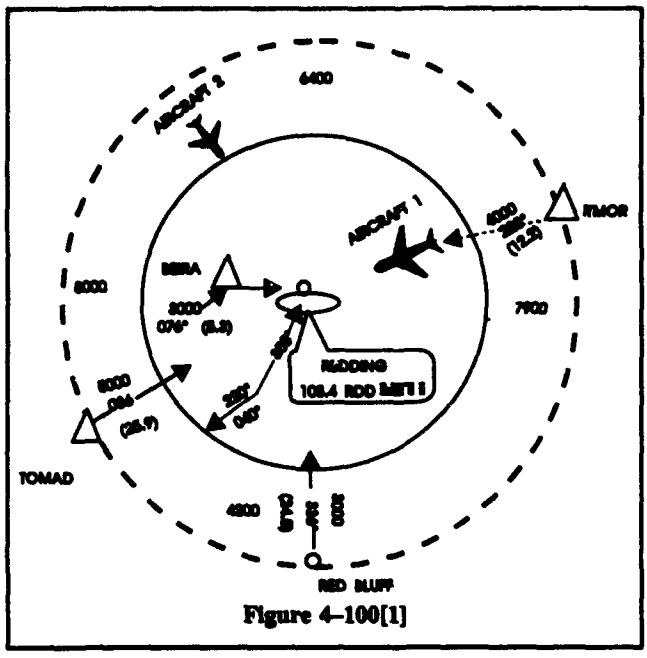


Figure 4–100[1]

4–100b1 Example.—

Aircraft 1: The aircraft is established on a segment of a published route at 5,000 feet. "Cleared V-O-R Runway Three Four Approach."

2. Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure.

4–100b2 Example.—

Aircraft 2: The aircraft is inbound to the VOR on an unpublished direct route at 7,000 feet. The minimum IFR altitude for IFR operations (FAR 91.[illegible]) along this flight path to the VOR is 5,000 feet. "Cross the Redding V-O-R at or above five thousand, cleared V-O-R Runway Three Four Approach."

4–100b2 Note 1.—The altitude assigned must assure IFR obstruction clearance from the point at which the approach clearance is issued until established on a segment of a published route or instrument approach procedure.

4–100b2 Note 2.—If the altitude assignment is VFR-on-top, it is conceivable that the pilot may elect to remain high until arrival over the final approach fix which may require the pilot to circle to descend so as to cross the final approach fix at an altitude that would permit landing.

c. Except when applying radar procedures, timed or visual approaches, clear an aircraft for an approach to an airport when the preceding aircraft has landed or canceled IFR flight plan.

d. Where instrument approaches require radar monitoring and radar services are not available, do not use the phraseology "cleared approach," which allows the pilot his choice of instrument approaches.

4–101 CLEARANCE LIMIT

Issue approach or other clearances, as required, specifying the destination airport as the clearance limit if airport traffic control service is not provided even though this is a repetition of the initial clearance.

4–102 RELAYED APPROACH CLEARANCE

TERMINAL

Include the weather report, when it is required and available, when an approach clearance is relayed through a communication station other than an air carrier company radio. You may do this by telling the station to issue current weather.

4–103 ALTITUDE ASSIGNMENT FOR MILITARY HIGH ALTITUDE INSTRUMENT APPROACHES

Altitudes above those shown on the High Altitude Instrument Approach Procedures chart may be specified when required for separation.

4–103 Note.—To preclude the possibility of aircraft exceeding rate-of-descent or airspeed limitations, the maximum altitudes which may be assigned for any portion of the high altitude instrument approach procedure will be determined through coordination between the ATC facility concerned and the military authority which originated the high altitude instrument approach procedure.

4–103 Reference.—Military Turbojet En route Descent, paragraph 4–84.

4–104 SPECIFYING ALTITUDE

Specify in the approach clearance the altitude shown in the approach procedures when adherence to that altitude is required for separation. When vertical separation will be provided from other aircraft by pilot adherence to the prescribed maximum, minimum, or mandatory altitudes, the controller may omit specifying the altitude in the approach clearance.

4–104 Note.—Use NOS or DMAAC instrument approach procedures charts appropriate for the aircraft executing the approach.

4–105 CIRCLING APPROACH

a. Circling approach instructions may only be given for aircraft landing at airports with operational control towers.

b. Include in the approach clearance instructions to circle to the runway in use if landing will be made on a runway other than that aligned with the direction of instrument approach. When the direction of the circling maneuver in relation to the airport/runway is required, state the direction (eight cardinal compass points) and specify a left or right base/downwind leg as appropriate.

Phraseology:

CIRCLE TO RUNWAY (number),

or

CIRCLE (direction using eight cardinal compass points) OF THE AIRPORT/RUNWAY FOR A LEFT/RIGHT BASE/ DOWNWIND TO RUNWAY (number).

4–105b Note.—Where Standard Instrument Approach Procedures authorize circling approaches, they provide a basic mini-

mum of 300 feet of obstacle clearance at the MDA within the circling area considered. The dimensions of these areas, expressed in distances from the runways, vary for the different approach categories of aircraft. In some cases a SIAP may otherwise restrict circling approach maneuvers.

c. Do not issue clearances, such as "extend downwind leg," which might cause an aircraft to exceed the circling approach area distance from the runways within which required circling approach obstacle clearance is assured.

4–106 SIDE-STEP MANEUVER

TERMINAL

Side-Step Maneuver—When authorized by an instrument approach procedure, you may clear an aircraft for an approach to one runway and inform the aircraft that landing will be made on a parallel runway.

4–106 Example.—

"Cleared I-L-S Runway Seven Left Approach. Side-step to Runway Seven Right."

4–106 Note.—Side-step maneuvers require higher weather minima/MDA. These higher minima/MDA are published on the instrument approach charts.

4–106 Reference.—Closed/Unsafe Runway Information, paragraph 3–31. Pilot/Controller Glossary, Side-Step Maneuver.

4–107 COMMUNICATIONS RELEASE

If an IFR aircraft intends to land at an airport not served by a tower or FSS, approve a change to the advisory service frequency when you no longer require direct communications.

Phraseology:

CHANGE TO ADVISORY FREQUENCY APPROVED.

4–107 Note.—An expeditious frequency change permits the aircraft to receive timely local airport traffic information in accordance with Advisory Circular 90–42.

4–107 Reference.—Arrival Instructions, paragraph 5–123.

4–108 MISSED APPROACH

Except in the case of a VFR aircraft practicing an instrument approach, an approach clearance automatically authorizes the aircraft to execute the missed approach procedure depicted for the instrument approach being flown. An alternate missed approach procedure as published on the appropriate FAA Form 8260 may be assigned when necessary. Once an aircraft commences a missed approach, it may be radar vectored.

4–108 Note 1.—Alternate missed approach procedures are published on the appropriate FAA Form 8260 only and require a detailed clearance when they are issued to the pilot.

4–108 Note 2.—In the event of a missed approach involving a turn, unless otherwise cleared, the pilot will proceed to the missed approach point before starting that turn

4–108 Reference.— Practice Approaches, paragraph 4–110.

4–109 APPROACH INFORMATION

Specify the following in the approach clearance when the pilot says he is unfamiliar with the procedure:

a. Initial approach altitude.

b. Direction and distance from the holding fix within which procedure turn is to be completed.

c. Altitude at which the procedure turn is to be made.

d. Final approach course and altitude.

e. Missed approach procedures if considered necessary.

Phraseology:

INITIAL APPROACH AT (altitude), PROCEDURE TURN AT (altitude) (number) MINUTES/MILES (direction), FINAL APPROACH ON (name of NAVAID) (specified) COURSE/RADIAL/AZIMUTH AT (altitude).

4–110 PRACTICE APPROACHES

Except for military aircraft operating at military airfields, ensure that neither VFR nor IFR practice approaches disrupt the flow of other arriving and departing IFR or VFR aircraft. Authorize, withdraw authorization, or refuse to authorize practice approaches as traffic conditions require. Normally, approaches in progress should not be terminated.

4–110 Note.—The priority afforded other aircraft over practice instrument approaches is not intended to be so rigidly applied that it causes grossly inefficient application of services.

a. Separation.

1. IFR aircraft practicing instrument approaches shall be afforded standard separation in accordance with Chapters 3, 4, 5, 6, and 7 minima until:

(a) The aircraft lands, and the flight is terminated, or

(b) The pilot cancels the flight plan.

2. Where procedures require application of IFR separation to VFR aircraft practicing instrument approaches, standard IFR separation in accordance with Chapters 3, 4, 5, 6, and 7 shall be provided. Controller responsibility for separation begins at the point where the approach clearance becomes effective. Except for heavy aircraft, *500 feet* vertical separation may be applied between VFR aircraft and between a VFR and an IFR aircraft.

4–110a2 References.—Order 7210.3, paragraph 8–43. Order 7210.3, paragraph 12–44.

3. Where separation services are not provided to VFR aircraft practicing instrument approaches, the controller shall;

(a) Instruct the pilot to maintain VFR.

(b) Advise the pilot that separation services are not provided.

(c) Provide traffic information or advise the pilot to contact the appropriate facility.

4–110a3 Example.

"(aircraft identification) maintain VFR, practice approach approved, no separation services provided."

4. If an altitude is assigned, including at-or-above/below altitudes, the altitude specified must meet MVA, minimum safe altitude, or minimum IFR altitude criteria.

4–110a4 Reference.—Altitude Assignments, paragraph 7–84.

5. All VFR aircraft shall be instructed to maintain VFR on initial contact or as soon as possible there

4–1 Note.—This advisory is intended to remind the pilot that ... though ATC is providing IFR-type instructions, the pilot is responsible for compliance with the applicable FARs governing VFR flight.

b. Missed Approaches.

1. Unless alternate instructions have been issued, IFR aircraft are automatically authorized to execute the missed approach depicted for the instrument approach being flown.

4–110b1 Reference.—Missed Approach, paragraph 4–108.

2. VFR aircraft are not automatically authorized to execute the missed approach procedure. This authorization must be specifically requested by the pilot and approved by the controller. When a missed approach has been approved, separation shall be provided throughout the missed approach.

4–110 Reference.—Visual Separation, paragraph 7–10.

4–111 LOW APPROACH AND TOUCH-AND-GO

Consider an aircraft cleared for a touch-and-go, low approach, or practice approach as an arriving aircraft until that aircraft touches down or crosses the landing threshold; thereafter, consider the aircraft as a departing aircraft. Before the aircraft begins its final descent, issue the appropriate departure instructions the pilot is to follow upon completion of the approach (in accordance with paragraph 4–21). Climb-out instructions must include a specific heading or a route of flight and altitude, except when the aircraft will maintain VFR and contact the tower.

4–111 Examples.—

"After completing low approach, climb and maintain six thousand. Turn right, heading three six zero."

"Maintain VFR, contact tower."

(Issue other instructions as appropriate.)

4–111 Note.—Climb-out instructions may be omitted after the first approach if instructions remain the same.

Chapter 5. RADAR
Section 1. GENERAL

5–1 PRESENTATION AND EQUIPMENT PERFORMANCE

Provide radar service only if you are personally satisfied that the radar presentation and equipment performance is adequate for the service being provided.

5–1 Note.—The provision of radar service is not limited to the distance and altitude parameters obtained during the commissioning flight check.

5–2 ALIGNMENT CHECK

As soon as possible after assuming responsibility for a control position, check the operating equipment for alignment accuracy and display acceptability. Recheck periodically throughout the watch.

5–2 Reference.—FAA Order 7210.3, Chapter 3, Chapter 9, Chapter 10, Chapter 12, and Chapter 13; comparable military directives; e.g., USAF's AFR 60–5, etc., FAA Notice 7110.930.

TERMINAL

a. Check the alignment of the radar video display by assuring that the video map or overlay is properly aligned with a permanent target of known range and azimuth on the radar display. Where possible, check one permanent target per quadrant.

5–2a Note.—Map alignment shall be verified for ASR–9 systems by using the moving target indicator (MTI) reflectors, fixed location beacon transponders (parrots), or beacon real-time quality control (RTQC) symbols.

5–2a Reference.—FAA Order 7210.3, paragraph 3–90, Tolerance for Radar Fix Accuracy.

EN ROUTE

b. When operating in the broadband mode, apply the procedures in subparagraph 5–2a.

c. When operating in the narrowband mode (Stage A) with broadband as a backup display source, assure the alignment of the broadband radar according to the procedures in subparagraph 5–2a.

5–2c Note.—During Stage A operation, alignment checking is accomplished by the operational program as part of the certification procedures for system startup and then on a real-time basis during operational hours.

d. When operating in the DARC/NAS mode using DARC functional program update RAJ or later, ensure the PVD center and altitude limits for the DARC system are appropriate for the operating position.

5–2d Reference.—Selected Altitude Limits, paragraph 5–194.

5–3 RADAR USE

Use radar information derived from primary and Mode 3/A secondary radar systems.

5–3 Reference.—Beacon Range Accuracy, paragraph 5–4. Inoperative or Malfunctioning Interrogator, paragraph 5–35.

a. Secondary radar may be used as the sole display source as follows:

1. In [redacted].

5–3a1 Reference.—Failed Transponder in [redacted] Class A airspace, paragraph 5–36. Part 91.135.

2. Outside [redacted], or where mix of [redacted]/non-[redacted] airspace exists, only when:

(a) Additional coverage is provided by secondary radar beyond that of the primary radar.

(b) The primary radar is temporarily unusable or out of service. Advise pilots when these conditions exist.

Phraseology:

PRIMARY RADAR OUT OF SERVICE. RADAR TRAFFIC ADVISORIES AVAILABLE ON TRANSPONDER AIRCRAFT ONLY.

5–3a2(b) Note 1.—Advisory may be omitted when provided on ATIS and pilot indicates having ATIS information.

5–3a2(b) Note 2.—Advisory may be omitted in the en route environment when there is overlapping primary radar coverage from multiple radar sites.

(c) *EN ROUTE:* A secondary radar system is the only source of radar data for the area of service. When the system is used for separation, beacon range accuracy is assured, as provided in paragraph 5–4.

5–3a2(c) Note.—This provision is to authorize secondary radar only operations where there is no primary radar available and the condition is not temporary.

b. *TERMINAL:* Do not use only secondary radar to conduct surveillance (ASR) final approaches unless an emergency exists and the pilot concurs.

5–4 BEACON RANGE ACCURACY

a. Your may use beacon targets for separation purposes if beacon range accuracy is verified by one of the following methods:

5–4a Note 1.—The check for verification of beacon range accuracy accomplished by correlation of beacon and primary radar targets of the same aircraft is not a check of display accuracy. Therefore, it is not necessary that it be done using the same display with which separation is being provided, nor the same targets being separated.

5–4a Note 2.—Narrowband: Beacon range accuracy for automated narrowband display equipment is verified by AF personnel. Consequently, further verification by the controller is unnecessary.

1. Correlate beacon and primary targets of the same aircraft (not necessarily the one being provided separation) to assure that they coincide.

2. When beacon and primary targets of the same aircraft do not coincide, correlate them to assure that any beacon displacement agrees with the specified distance and direction for that particular radar system.

3. Refer to beacon range monitoring equipment where so installed.

b. If beacon range accuracy cannot be verified, you may use beacon targets only for traffic information.

5–4 Reference.—Radar Use, paragraph 5–3.

5–5 ECM/ECCM ACTIVITY

a. Refer all ECM/ECCM activity requests to the appropriate center supervisor.

5–5a Reference.—Snow Time, paragraph 9–34. FAA ORDER 7610.4, Chapter 2, Section 7, ECM Missions/Exercises.

5–5a Note.—ECM activity can subsequently result in a request to apply ECCM videos to the radar system which may necessitate the decertification of the narrowband search radar. The facility SE should be consulted concerning the effect of ECM/ECCM on the operational use of the radar (narrowband/broadband) prior to approving/disapproving requests to conduct ECM/ECCM activity.

b. When ECM activity interferes with the operational use of radar:

1. *EN ROUTE:* Request the responsible military unit or aircraft, if initial request was received directly from pilot, to suspend the activity.

2. *TERMINAL:* Request suspension of the activity through the ARTCC. If immediate cessation of the activity is required, broadcast the request directly to the ECM aircraft on the emergency frequency. Notify the ARTCC of direct broadcast as soon as possible.

c. When previously suspended activity will no longer interfere:

1. *EN ROUTE:* Inform the NORAD unit or aircraft that it may be resumed.

2. *TERMINAL:* Inform the ARTCC or aircraft that it may be resumed. Obtain approval from the ARTCC prior to broadcasting a resume clearance directly to the aircraft.

d. In each stop request, include your facility name, type of ECM activity (chaff dispensing—"stream"/"burst"—or electronic jamming—"buzzer"), radar band affected and, when feasible, expected duration of suspension.

Phraseology:

BIG PHOTO (identification, if known) (name) CENTER/TOWER/APPROACH CONTROL,

to stop ECM activity

STOP STREAM/BURST IN AREA (area name) (degree and distance from facility),

or

STOP BUZZER ON (frequency band or channel). To resume ECM activity RESUME STREAM/BURST,

or

RESUME BUZZER ON (frequency band or channel).

5–6 SERVICE LIMITATIONS

a. When radar mapping is not available, limit radar services to:

1. Separating identified aircraft targets.

2. Vectoring aircraft to intercept a PAR final approach course.

3. Providing radar service in areas that ensure no confliction with traffic on airways, other ATC areas of jurisdiction, restricted or prohibited areas, terrain, control zones, etc.

b. *EN ROUTE:* Stage A and DARC—When the position symbol associated with the full data block falls more than one history behind the actual aircraft target or there is no target symbol displayed, the Mode C information in the full data block shall not be used for the purpose of determining separation.

c. Report radar malfunctions immediately for corrective action and for dispatch of a Notice to Airmen. Advise adjacent ATC facilities when appropriate.

5–6c Reference.—Responsibility for Reporting Essential Flight Information, paragraph 2–9. FAA Order 7210.3, Chapter 3, Chapter 9, Chapter 12, Section 4, and Chapter 13, Section 2.

5–7 ELECTRONIC CURSOR

TERMINAL

a. An electronic cursor may be used to aid in identifying and vectoring an aircraft and to give finer delineation to a video map. Do not use it as a substitute for a video map or map overlay; e.g., to form intersections, airway boundaries, final approach courses, etc.

b. Fixed electronic cursors may be used to form the final approach course for surveillance approaches conducted by military operated mobile radar facilities.

5–8 MERGING TARGET PROCEDURES

a. Except while they are established in a holding pattern, apply merging target procedures to all radar identified:

1. Aircraft at 10,000 feet and above.

2. Turbojet aircraft regardless of altitude.

5–8a2 Reference.—Pilot/Controller Glossary term—Turbojet Aircraft.

3. Presidential aircraft regardless of altitude.

b. Issue traffic information to those aircraft listed in subparagraph a. whose targets appear likely to merge unless the aircraft are separated by more than the appropriate vertical separation minima.

5–8b Example.—

"Traffic twelve o'clock, seven miles, eastbound, DC–8, at one seven thousand."

"United sixteen and American twenty–five, traffic twelve o'clock, one zero miles, opposite direction, eastbound seven twenty seven at flight level three three zero, westbound DC–9 at flight level three one zero."

c. If the pilot requests, vector his aircraft to avoid merging with the target of previously issued traffic.

5–8c Note.—Aircraft closure rates are so rapid that when applying merging target procedures, controller issuance of traffic must be commenced in ample time for the pilot to decide if a vector is necessary.

d. If unable to provide vector service, inform the pilot.

5–9 HOLDING PATTERN SURVEILLANCE

Provide radar surveillance of outer fix holding pattern airspace areas, or any portions thereof, shown on your radar scope (displayed on the video map or scribed on the map overlay) whenever aircraft are holding there. Attempt to detect any that stray outside the area. If you detect an aircraft straying outside the area, assist it to return to the assigned airspace.

5–10 DEVIATION ADVISORIES

Inform an aircraft when it is observed in a position and on a track which will obviously cause the aircraft to deviate from its protected airspace area. If necessary, assist the aircraft to return to the assigned protected airspace.

5–10 Reference.—Route or Altitude Amendments, paragraph 4–14. Methods, paragraph 7–112.

5–11 RADAR FIX POSTING

EN ROUTE

Except during full NAS Stage A operations, at least once in each sector record on the flight progress strip the time of observed position of each aircraft in "radar contact" with respect to a fix shown on the radar display.

5–12 POSITION REPORTING

a. If necessary, you may request an aircraft to provide an estimate or report over a specific fix.

5–12a Note.—After an aircraft receives the statement "radar contact" from ATC, it discontinues reporting over compulsory reporting points. It resumes normal position reporting when ATC informs it "radar contact lost" or "radar service terminated."

5–12a Reference.—Pilot/Controller Glossary term—Radar Contact.

b. When required, inform an aircraft of its position with respect to a fix or airway.

Phraseology:

OVER/PASSING (fix)

(Number of miles) MILES FROM (fix).

(Number of miles) MILES (direction) OF (fix, airway, or location).

CROSSING/JOINING/DEPARTING (airway or route).

INTERCEPTING/CROSSING (name of NAVAID) (specified) RADIAL.

5–13 RADAR SERVICE TERMINATION

a. Inform aircraft when radar service is terminated.

Phraseology:

RADAR SERVICE TERMINATED (nonradar routing if required).

b. Radar service is automatically terminated and the aircraft need not be advised of termination when:

5–13b Note.—Termination of radar monitoring when conducting simultaneous ILS/MLS approaches is prescribed in paragraph 5–126h3. Termination of radar monitoring where PAR equipment is used to monitor approaches is prescribed in paragraph 5–182e.

1. An aircraft cancels its IFR flight plan, except within a TCA, ARSA, TRSA or where Stage II Class B airspace, Class C airspace, TRSA or where basic radar service is provided.

2. An aircraft conducting an instrument, visual, or contact approach has landed or has been instructed to change to advisory frequency.

5–13b2 Note.—At tower-controlled airports where radar coverage does not exist to within 1/2 mile of the end of the runway, arriving aircraft shall be informed when radar service is terminated.

5–13b2 Reference.—FAA Order 7210.3, paragraph 12–55a.

3. *TERMINAL:* An arriving VFR aircraft receiving radar service to a tower-controlled airport within a TCA, TRSA, ARSA or where Stage II Class B airspace, Class C airspace, TRSA or where basic radar service is provided has landed, or to all other airports, is instructed to change to tower or advisory frequency.

4. *TERMINAL:* An aircraft completes a radar approach.

5–13 Reference.—Service Provided When Tower is Inoperative, paragraph 7–71.

5–14 thru 5–19 RESERVED

Section 2. BEACON SYSTEMS

5–20 ASSIGNMENT CRITERIA

a. General

1. Mode 3/A is designated as the common military/civil mode for air traffic control use.

2. Make radar beacon code assignments to only Mode 3/A transponder-equipped aircraft.

b. Unless otherwise specified in a directive or a letter of agreement, make code assignments to departing, en route, and arrival aircraft in accordance with the procedures specified in this section for the radar beacon code environment in which you are providing ATC service. Give first preference to the use of discrete beacon codes.

Phraseology:

SQUAWK THREE/ALFA (code),

or

SQUAWK (code).

5–20b Note.—A code environment is determined by an operating position's/sector's equipment capability to decode radar beacon targets using either the first and second or all four digits of a beacon code.

5–20 Reference.—Beacon Identification Methods, paragraph 5–52.

5–21 DISCRETE ENVIRONMENT

a. Issue discrete beacon codes assigned by the computer. Computer-assigned codes may be modified as required.

1. *TERMINAL:* Aircraft that will remain within the terminal facility's delegated airspace shall be assigned a code from the code subset allocated to the terminal facility.

2. *TERMINAL:* Aircraft that will enter an adjacent ARTS facility's delegated airspace shall be assigned a beacon code assigned by the ARTCC computer.

5–21a2 Note.—This will provide the adjacent facility advance information on the aircraft and will cause auto-acquisition of the aircraft prior to handoff.

b. Make handoffs to other positions/sectors on the computer-assigned code.

c. Coastal facilities accepting "over" traffic that will subsequently be handed-off to an oceanic ARTCC shall reassign a new discrete beacon code to an aircraft when it first enters the receiving facility's airspace. The code reassignment shall be accomplished by inputting an appropriate message into the computer and issued to the pilot while operating in the first sector/position in the receiving facility's airspace.

5–21c Note.—Per an agreement between FAA and the Department of Defense, 17 code subsets in the NBCAP have been reserved for exclusive military use outside NBCAP airspace. To maximize the use of these subsets, they have been allocated to ARTCC's underlying NBCAP airspace that do not abut an oceanic ARTCC's area. To preclude a potential situation where two aircraft might be in the same airspace at the same time on the same discrete code, it is necessary to reassign an aircraft another code as specified in paragraph 5–21c.

5–21 Reference.—Mixed Environment, paragraph 5–23. VFR Code Assignments, paragraph 5–29. Beacon Identification Methods, paragraph 5–52.

5–22 NONDISCRETE ENVIRONMENT

a. Assign appropriate nondiscrete beacon codes from the function codes specified in paragraph 5–25.

b. Unless otherwise coordinated at the time of handoff, make handoffs to other positions/sectors on an appropriate nondiscrete function code.

5–22 Reference.—Mixed Environment, paragraph 5–23.

5–22 Reference.—VFR Code Assignments, paragraph 5–29. Beacon Identification Methods, paragraph 5–52.

5–23 MIXED ENVIRONMENT

a. When discrete beacon code capability does not exist in your area of responsibility, comply with the procedures specified in paragraph 5–22.

5–23 Note.—In a mixed code environment, a situation may exist where a discrete-equipped position/sector exchanges control of aircraft with nondiscrete-equipped facilities or vice versa.

b. When discrete beacon code capability exists in your area of responsibility:

1. Comply with the procedures specified in paragraph 5–21, and

2. Unless otherwise coordinated at the time of handoff, assign aircraft that will enter the area of responsibility of a nondiscrete-equipped position/sector an appropriate nondiscrete function code from the codes specified in paragraph 5–25 prior to initiating a handoff.

5–23 Reference.—IFR-VFR and VFR-IFR Flights, paragraph 4–17. VFR Code Assignments, paragraph 5–29. Beacon Identification Methods, paragraph 5–52.

5–24 RADAR BEACON CODE CHANGES

Unless otherwise specified in a directive or a letter of agreement or coordinated at the time of handoff, do not request an aircraft to change from the code it was squawking in the transferring facility's area until the aircraft is within your area of responsibility.

5–24 Reference.—IFR-VFR and VFR-IFR Flights, paragraph 4–17. Beacon Identification Methods, paragraph 5–52.

5–25 FUNCTION CODE ASSIGNMENTS

Unless otherwise specified by a directive or a letter of agreement, make nondiscrete code assignments from the following categories:

a. Assign codes to departing IFR aircraft as follows:

1. Code 2000 to an aircraft which will climb to FL 240 or above or to an aircraft which will climb to FL 180 or above where the base of [redacted] Class A airspace and the base of the operating sector are at FL 180, and for inter-facility handoff the receiving sector is also stratified at FL 180. The en route code shall not be assigned until the aircraft is established in the high altitude sector.

2. Code 1100 to an aircraft which will remain below FL 240 or below FL 180 as in subparagraph 5–25a1.

3. For handoffs from terminal facilities when so specified in a letter of agreement as follows:

(a) Within NBCAP airspace—Code 0100 to Code 0400 inclusive or any other code authorized by the regional Air Traffic Division.

(b) Outside NBCAP airspace—Code 1000 or one of the codes from 0100 to 0700 inclusive or any other code authorized by the regional Air Traffic Division.

b. Assign codes to en route IFR aircraft as follows:

5–25b Note.—FL 180 may be used in lieu of FL 240 where the base of [redacted] Class A airspace and the base of the operating sector are at FL 180, and for inter-facility handoff the receiving sector is also stratified at FL 180. The provisions of subparagraphs 5–25b2(b) and (c) may be modified by facility directive or letter of agreement when operational complexities or simplified sectorization indicate. Letters of agreement are mandatory when the operating sectors of two facilities are not stratified at identical levels. The general concept of utilizing Codes 2100 through 2500 within [redacted] Class A airspace should be adhered to.

1. Aircraft operating below FL 240 or when control is transferred to a controller whose area includes the stratum involved.

(a) Code 1000 may be assigned to aircraft changing altitudes.

(b) Code 1100 to an aircraft operating at an assigned altitude below FL 240. Should an additional code be operationally desirable, Code 1300 shall be assigned.

2. Aircraft operating at or above FL 240 or when control is transferred to a controller whose area includes the stratum involved.

(a) Code 2300 may be assigned to aircraft changing altitudes.

(b) Code 2100 to an aircraft operating at an assigned altitude from FL 240 to FL 330 inclusive. Should an additional code be operationally desirable, Code 2200 shall be assigned.

(c) Code 2400 to an aircraft operating at an assigned altitude from FL 350 to FL 600 inclusive. Should an additional code be operationally desirable, Code 2500 shall be assigned.

3. Code 4000—When aircraft are operating on a flight plan specifying frequent or rapid changes in assigned altitude in more than one stratum or other conditions of flight not compatible with a stratified code assignment.

5–25b3 Note 1.—Categories of flight that can be assigned code 4000 include certain flight test aircraft, MTR missions, aerial refueling operation requiring descent involving more than one stratum, ALTRV's where continuous monitoring of ATC communications facilities is not required and frequent altitude changes are approved, and other aircraft operating on flight plans requiring special handling by ATC.

5–25b3 Note 2.—Military aircraft operating VFR or IFR in restricted/warning areas or VFR on VR routes will adjust their transponders to reply on Code 4000 unless another code has been assigned by ATC or coordinated, if possible, with ATC.

c. Assign the following codes to arriving IFR aircraft, except military turbojet aircraft as specified in paragraph 4–83:

5–25c Note.—FL 180 may be used in lieu of FL 240 where the base of [redacted] Class A airspace and the base of the operating sector are at FL 180, and for inter-facility handoff the receiving sector is also stratified at FL 180.

1. Code 2300 may be assigned for descents while above FL 240.

2. Code 1500 may be assigned for descents into and while within the strata below FL 240, or with prior coordination the specific code utilized by the destination controller, or the code currently assigned when descent clearance is issued.

3. The applicable en route code for the holding altitude if holding is necessary before entering the terminal area and the appropriate code in subparagraphs 5–25c1 or 2.

5–25 Reference.—IFR-VFR and VFR-IFR Flights, paragraph 4–17. Nondiscrete Environment, paragraph 5–22. Mixed Environment, paragraph 5–23. VFR Code Assignments, paragraph 5–29. Beacon Identification Methods, paragraph 5–52.

5–26 REVERTING TO BROADBAND

When the narrowband system is no longer available/usable for ATC purposes, aircraft operating on computer-assigned codes shall be instructed to squawk the Function Code appropriate for your area of responsibility.

5–26 Note.—During the transition to the broadband mode, targets can be maintained by selecting on the broadband decoder equipment the codes in use by aircraft in your area or activating the "all" beacon feature.

Phraseology:

ALL AIRCRAFT SQUAWK (appropriate code).

5–26 Reference.—Beacon Identification Methods, paragraph 5–52.

5–27 EMERGENCY CODE ASSIGNMENT

Assign codes to emergency aircraft as follows:

a. Code 7700 when the pilot declares an emergency and the aircraft is not radar identified.

Phraseology:
SQUAWK MAYDAY ON 7700.

b. After radio and radar contact have been established, you may request other than single-piloted helicopters and single-piloted turbojet aircraft to change from Code 7700 to another code appropriate for your radar beacon code environment.

5–27b Note 1.—The code change, based on pilot concurrence, the nature of the emergency, and current flight conditions will signify to other radar facilities that the aircraft in distress is identified and under ATC control.

5–27b Note 2.—Pilots of single-piloted helicopters and single-piloted turbojet aircraft may be unable to reposition transponder controls during the emergency.

Phraseology:
RADAR CONTACT (position). IF FEASIBLE, SQUAWK (code).

5–27 Reference.—Beacon Identification Methods, paragraph 5–52.

c. The following shall be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of code 7700:

1. TERMINAL: Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

2. EN ROUTE: An appropriate keyboard entry shall be made to ensure en route MSAW (EMSAW) alarm processing.

5–28 RADIO FAILURE

When you observe a Code 7600 display, apply the procedures in paragraph 10–43.

5–28 Note.—Should a transponder-equipped aircraft experience a loss of two-way radio communications capability, the pilot can be expected to adjust his transponder to Code 7600.

5–28 Reference.—Beacon Identification Methods, paragraph 5–52.

5–29 VFR CODE ASSIGNMENTS

a. Provided the aircraft is within your area of responsibility or prior coordination has been affected with the facility/sector in whose area an aircraft is operating and an operational benefit will be gained, assign aircraft operating with a clearance specifying "VFR-on-top," "VFR conditions," or VFR aircraft receiving radar advisories an appropriate Function Code or computer-assigned code for the code environment in which you are providing service.

5–29a Note 1.—Paragraphs 5–21, 5–22, and 5–23 specify code assignments procedures to follow for the three code environments.

5–29a Note 2.—Paragraph 5–25 a, b, and c specify the Function Code allocation from which an appropriate code for the aircraft indicated in subparagraph 5–29a should be selected. In the terminal environment, additional Function Codes may be authorized by the regional Air Traffic division.

b. Instruct IFR aircraft which cancel an IFR flight plan and are not requesting radar advisory service and VFR aircraft for which radar advisory service is being terminated to squawk the VFR code.

Phraseology:
SQUAWK VFR.

or

SQUAWK 1200.

5–29b Note.—VFR aircraft which fly authorized SAR missions for the USAF or USCG may be advised to squawk 1277 in lieu of 1200 while en route to/from or within the designated search area.

5–29b Reference.—Order 7110.66A, National Beacon Code Allocation Plan.

c. When an aircraft changes from VFR to IFR, the controller shall assign a beacon code to Mode C equipped aircraft that will allow MSAW alarms.

5–29 Reference.—Beacon Identification Methods, paragraph 5–52.

5–30 BEACON CODE FOR PRESSURE SUIT FLIGHTS AND FLIGHTS ABOVE FL 600

a. Mode 3/A, Code 4400, and discrete codes 4401 through 4477 are reserved for use by R–71, F–12, U–2, B–57, pressure suit flights, and aircraft operations above FL 600.

5–30a Note.—The specific allocation of the special use codes in subset 4400 is in the NBCAP, Order 7110.66.

b. Ensure that aircraft remain on Code 4400 or one of the special use discrete codes in the 4400 subset if filed as part of the flight plan. Except when unforeseen events, such as weather deviations, equipment failure, etc., cause more than one aircraft with same Mode 3/A discrete beacon codes to be in the same or adjacent ARTCC's airspace at the same time, a controller may request the pilot to make a code change, squawk standby, or to stop squawk as appropriate.

5–30b Note.—Due to the inaccessibility of certain equipment to the flight crews, Code 4400 or a discrete code from the 4400 subset is preset on the ground and will be used throughout the flight profile including operations below FL 600. Controllers should be cognizant that not all aircraft may be able to accept the transponder changes identified in the Exception. Emergency code 7700, however, can be activated.

5–30 Reference.—Beacon Identification Methods, paragraph 5–52.

5–31 AIR DEFENSE EXERCISE BEACON CODE ASSIGNMENT

EN ROUTE

Ensure exercise faker aircraft remain on the exercise flight plan filed discrete beacon code.

5–31 Note 1.—NORAD will ensure exercise faker aircraft flight plans are filed containing discrete beacon codes from the Department of Defense code allocation specified in Order 7610.4 Appendix 5.

5–31 Note 2.—NORAD will ensure that those faker aircraft assigned the same discrete beacon code are not flight planned in the same or any adjacent ARTCC's airspace at the same time. (Simultaneous assignment of codes will only occur when operational requirements necessitate.)

5–31 Reference.—Beacon Identification Methods, paragraph 5–52.

5–32 STANDBY OR LOW SENSITIVITY OPERATION

You may instruct an aircraft operating on an assigned code to change transponder to "standby" or "low sensitivity" position:

5–32 Note.—National standards no longer require improved transponder to be equipped with the low sensitivity feature. Therefore, aircraft with late model transponders will be unable to respond to a request to "squawk low."

a. When approximately 15 miles from its destination and you no longer desire operation of the transponder.

b. When necessary to reduce clutter in a multi-target area, or to reduce "ring-around" or other phenomena, provided you instruct the aircraft to return to "normal sensitivity" position as soon as possible thereafter.

Phraseology:

SQUAWK STANDBY,

or

SQUAWK LOW/NORMAL.

5–32 Reference.—Beacon Identification Methods, paragraph 5–52.

5–33 CODE MONITOR

Continuously monitor the Mode 3/A radar beacon codes assigned for use by aircraft operating within your area of responsibility when nonautomated beacon decoding equipment (e.g., 10–channel decoder) is used to display the target symbol.

5–33 Note 1.—When you are notified by pilots of VFR aircraft that they are unable to comply with VFR code changes because of high performance maneuvering requiring rapid transition through the altitudes where transponder changes should be made, you may assign (and monitor) whichever one of the VFR codes is most applicable to the situation. If appropriate, assign Code 4000.

5–33 Note 2.—In addition to alphanumeric and control symbology processing enhancements, the ARTS and the TPX–42 systems are equipped with automatic beacon decoders. Therefore, in facilities where the automatic beacon decoders are providing the control slash video, there is no requirement to have the nonautomated decoding equipment simultaneously operating.

5–33 Reference.—Order 7210.3, monitoring of Mode 3/A Radar Beacon Codes, paragraph 3–83.

a. This includes the appropriate IFR code actually assigned and, additionally, Code 1200 and Code 1277 unless your area of responsibility includes only positive control airspace. During periods when ring-around or excessive VFR target presentations derogate the separation of IFR traffic, the monitoring of VFR code 1200 and Code 1277 may be temporarily discontinued.

b. Positions of operation which contain a restricted or warning area or VR route within or immediately adjacent to their area of jurisdiction shall monitor Code 4000 and any other code used in lieu of 4000 within the warning/restricted area or VR route. If by local coordination with the restricted/warning area or VR route user a code other than 4000 is to be exclusively used, then this code shall be monitored.

c. If a normally assigned beacon code disappears, check for a response on the following codes in the order listed and take appropriate action:

5–33c Note.—When codes 7500 and/or 7600 have been preselected, it will be necessary for the ID-SEL-OFF switches for these codes to be left in the OFF position so that beacon target for an aircraft changing to one of these codes will disappear, thereby alerting the controller to make the check. This check will not be required if automatic alerting capability exists.

1. Code 7500 (hijack code).

5–33c1 Reference.—Hijack Aircraft, paragraph 10–22.

2. Code 7600 (loss of radio communications code).

5–34 FAILURE TO DISPLAY ASSIGNED BEACON CODE OR INOPERATIVE/ MALFUNCTIONING TRANSPONDER

a. Inform an aircraft with an operable transponder that the assigned beacon code is not being displayed.

Phraseology:

(Identification) RESET TRANSPONDER, SQUAWK (appropriate code).

b. Inform an aircraft when its transponder appears to be inoperative or malfunctioning.

Phraseology:

(Identification) YOUR TRANSPONDER APPEARS INOPERATIVE/MALFUNCTIONING, RESET, SQUAWK (appropriate code).

c. Ensure that the subsequent control position in the facility or the next facility, as applicable, is notified when an aircraft transponder is malfunctioning/inoperative.

5–34 Reference.—Beacon Identification Methods, paragraph 5–52.

5–35 INOPERATIVE OR MALFUNCTIONING INTERROGATOR

Inform aircraft concerned when the ground interrogator appears to be inoperative or malfunctioning.

Phraseology:

(Name of facility or control function) BEACON INTERROGATOR INOPERATIVE / MALFUNCTIONING.

5–35 Reference.—Radar Use, paragraph 5–3. Beacon Identification Methods, paragraph 5–52.

5–36 FAILED TRANSPONDER IN POSITIVE CONTROL AREA CLASS A AIRSPACE

Disapprove a request or withdraw previously issued approval to operate in positive control area Class A airspace with a failed transponder solely on the basis of traffic conditions or other operational factors.

5–36 Reference.—Radar Use, paragraph 5–3. Beacon Identification Methods, paragraph 5–52.

5–37 VALIDATION OF MODE C READOUT

Ensure that Mode C altitude readouts are valid after accepting an interfacility handoff, initial track start, track start from coast/suspend tabular list, missing, or unreasonable Mode C readouts. For TPX–42 and equivalent systems ensure that altitude readout is valid immediately after identification. (TCDD-/BANS-equipped tower cabs are not required to validate Mode C readouts after receiving interfacility handoffs from TRACON's according to the procedures in paragraph 5–62a4.)

a. Consider an altitude readout valid when:

1. It varies less than 300 feet from the pilot reported altitude, or

Phraseology:

SAY ALTITUDE.

2. You receive a continuous readout from an aircraft on the airport and the readout varies by less than 300 feet from the field elevation, or

5–37a2 Note.—A continuous readout exists only when the altitude filter limits are set to include the field elevation.

5–37 Reference.—Order 7210.3, Display Data, paragraph, 13–22.

3. You have correlated the altitude information in your data block with the validated information in a data block generated in another facility (by verbally coordinating with the other controller) and your readout is exactly the same as the readout in the other data block.

b. When unable to validate the readout, do not use the Mode C altitude information for separation.

c. Whenever you observe an invalid Mode C readout below FL 180:

1. Issue the correct altimeter setting and confirm the pilot has accurately reported the altitude.

Phraseology:

(location) ALTIMETER (appropriate altimeter), VERIFY ALTITUDE.

2. If the altitude readout continues to be invalid:

(a) Instruct the pilot to turn off the altitude–reporting part of his/her transponder and include the reason; and,

(b) Notify the area supervisor–in–charge of the aircraft call sign.

Phraseology:

STOP ALTITUDE SQUAWK. ALTITUDE DIFFERS BY (number of feet) FEET.

d. Whenever you observe an invalid Mode C readout at or above FL 180, unless the aircraft is descending below the PCA Class A airspace:

1. Confirm that the pilot is using 29.92 inches of mercury as the altimeter setting and has accurately reported the altitude.

Phraseology:

CONFIRM USING TWO NINER NINER TWO AS YOUR ALTIMETER SETTING, VERIFY ALTITUDE.

2. If the Mode C readout continues to be invalid:

(a) Instruct the pilot to turn off the altitude–reporting part of his/her transponder and include the reason; and,

(b) Notify the area supervisor–in–charge of the aircraft call sign.

Phraseology:

STOP ALTITUDE SQUAWK. ALTITUDE DIFFERS BY (number of feet) FEET.

e. Whenever possible, inhibit altitude readouts on all consoles when a malfunction of the ground equipment causes repeated invalid readouts.

5–38 ALTITUDE CONFIRMATION—MODE C

Request a pilot to confirm assigned altitude on initial contact unless:

5–38 Note.—For the purpose of this paragraph, "initial contact" means a pilot's first radio contact with each sector/position.

a. The pilot states the assigned altitude, or

b. You assign a new altitude to a climbing or a descending aircraft, or

c. The Mode C readout is valid and indicates that the aircraft is established at the assigned altitude, or

d. *TERMINAL:* The aircraft was transferred to you from another sector/position within your facility (intrafacility).

Phraseology:

In level flight situations,

VERIFY AT (altitude).

In climbing/descending situations,

VERIFY ASSIGNED ALTITUDE (altitude).

5–38 Reference.—Beacon Identification Methods, paragraph 5–52.

5–39 ALTITUDE CONFIRMATION—NONMODE C

a. Request a pilot to confirm assigned altitude on initial contact unless:

5–39a Note.—For the purpose of this paragraph, "initial contact" means a pilot's first radio contact with each sector/position.

1. The pilot states the assigned altitude, or

2. You assign a new altitude to a climbing or a descending aircraft, or

3. *TERMINAL:* The aircraft was transferred to you from another sector/position within your facility (intrafacility).

Phraseology:

In level flight situations,

VERIFY AT (altitude).

In climbing/descending situations,

VERIFY ASSIGNED ALTITUDE (altitude).

b. *USA:* Reconfirm all pilot altitude readbacks.

Phraseology:

If the altitude readback is correct,

AFFIRMATIVE (altitude).

If the altitude readback is not correct,

NEGATIVE. CLIMB/DESCEND AND MAINTAIN (altitude),

or

NEGATIVE. MAINTAIN (altitude).

5–39 Reference.—Beacon Identification Methods, paragraph 5–52.

5–40 AUTOMATIC ALTITUDE REPORTING

Inform an aircraft when you want it to turn on/off the automatic altitude reporting feature of its transponder.

Phraseology:

SQUAWK ALTITUDE,

or

STOP ALTITUDE SQUAWK.

5–40 Note.—Controllers should be aware that not all aircraft have a capability to disengage the altitude squawk independently from the beacon code squawk. On some aircraft both functions are controlled by the same switch.

5–40 Reference.—Validation of Mode C Readout, paragraph 5–37. Beacon Identification Methods, paragraph 5–52. Pilot/Controller Glossary, Automatic Altitude Report.

5–41 IN—FLIGHT DEVIATIONS FROM TRANSPONDER/MODE C REQUIREMENTS BETWEEN 10,000 FEET AND 18,000 FEET.

Apply the following procedures to requests to deviate from the Mode C transponder requirement by aircraft operating in the airspace of the 48 contiguous states and the District of Columbia at and above 10,000 feet MSL and below 18,000 feet MSL, excluding the airspace at and below 2,500 feet AGL.

5–41 Note.—FAR 91.215(b)(5) provides, in part, that all U.S. registered civil aircraft, except balloons, gliders, and aircraft without engine-driven electrical systems, must be equipped with an operable, coded radar beacon transponder when operating in the altitude stratum listed above. Such transponders shall have a Mode 3/A 4096 code capability, replying to Mode 3/A interrogation with the code specified by ATC, or a Mode S capability, replying to Mode 3/A interrogations with the code specified by ATC. The aircraft must also be equipped with automatic pressure altitude reporting equipment having a Mode C capability that automatically replies to Mode C interrogations by transmitting pressure altitude information in 100-foot increments.

5–41 Reference.—Order 7210.3, paragraph 6–70.

a. Except in an emergency, do not approve inflight requests for authorization to deviate from FAR 91.215b(5)(i) requirements originated by aircraft without transponder equipment installed.

b. Approve or disapprove other in-flight deviation requests, or withdraw approval previously issued to such flights, solely on the basis of traffic conditions and other operational factors.

c. Adhere to the following sequence of action when an in-flight VFR deviation request is received from an aircraft with an inoperative transponder or Mode C, or is not Mode C equipped:

1. Suggest that the aircraft conduct its flight in airspace unaffected by the FAR.

2. Suggest that the aircraft file an IFR flight plan.

3. Suggest that the aircraft provide a VFR route of flight and maintain radio contact with ATC.

d. Do not approve an in-flight deviation unless the aircraft has filed an IFR flight plan or a VFR route of flight is provided and radio contact with ATC is maintained.

e. You may approve an in-flight deviation request which includes airspace outside your jurisdiction without the prior approval of the adjacent ATC sector/facility providing a transponder/Mode C status report is forwarded prior to control transfer.

f. Approve or disapprove in-flight deviation requests within a reasonable period of time or advise when approval/disapproval can be expected.

5–41 Reference.—Beacon Identification Methods, paragraph 5–52.

5–42 BEACON TERMINATION

Inform an aircraft when you want it to turn off its transponder.

Phraseology:

STOP SQUAWK.

For a military aircraft when you do not know if the military service requires that it continue operating on another mode,

STOP SQUAWK (mode in use).

5–42 Reference.—Beacon Identification Methods, paragraph 5–52.

5–43 thru 5–49 RESERVED

Section 3. RADAR IDENTIFICATION

5–50 APPLICATION

Before you provide radar service, establish and maintain radar identification of the aircraft involved, except as provided in 5–70b2 and b3.

5–50 Reference.—Use of Tower Radar Displays, paragraph 3–9.

5–51 PRIMARY RADAR IDENTIFICATION METHODS

Identify a primary or radar beacon target by using one of the following methods:

a. Observing a departing aircraft target within 1 mile of the takeoff runway end.

b. Observing a target whose position with respect to a fix (displayed on the video map, scribed on the map overlay, or displayed as a permanent echo) or a visual reporting point (whose range and azimuth from the radar antenna has been accurately determined and made available to the controller) corresponds with a direct position report received from an aircraft, and the observed track is consistent with the reported heading or route of flight. If a TACAN/VORTAC is located within 6,000 feet of the radar antenna, the TACAN/VORTAC may be used as a reference fix for radar identification without being displayed on the video map or map overlay.

5–51b Note 1.—Establishment of radar identification through use of DME position information can be complicated by the fact that some military TACANs are not collocated with frequency-paired VORs and might be separated from them by as much as 31 miles.

5–51b Note 2.—Visual reporting points used for radar identification are limited to those most used by pilots and whose range and azimuth have been determined by supervisory personnel.

c. Observing a target make an identifying turn or turns of 30 degrees or more, provided the following conditions are met:

5–51c NOTE—Use of identifying turns or headings which would cause the aircraft to follow normal IFR routes or known VFR flight paths might result in misidentification. When these circumstances cannot be avoided, additional methods of identification may be necessary.

1. Except in the case of a lost aircraft, a pilot position report is received which assures you that the aircraft is within radar coverage and within the area being displayed.

2. Only one aircraft is observed making these turns.

3. For aircraft operating in accordance with an IFR clearance, you either issue a heading away from an area which will require an increased minimum IFR altitude or have the aircraft climb to the highest minimum altitude in your area of jurisdiction before you issue a heading.

5–51 Reference.—Use of Tower Radar Displays, paragraph 3–9. Surveillance Unusable, paragraph 5–169.

5–52 BEACON IDENTIFICATION METHODS

When using only Mode 3/A radar beacon to identify a target, use one of the following methods:

a. Request the aircraft to activate the "IDENT" feature of the transponder and then observe the identification display.

5–52a Note 1.—At facilities where the single-slash "IDENT" modification is installed or other decoder modifications have been made which increase the number of 'blooming' target displays, it will be necessary to exercise additional care to preclude the possibility of misidentification.

5–52a Note 2.—*TERMINAL:* When automated displays are operated in the analog mode, the "IDENT" return is displayed as a double slash and the emergency return as a single bloomer whenever the beacon control head is in the "FAIL" position.

Phraseology:

IDENT.

SQUAWK (code) AND IDENT.

b. Request the aircraft to change to a specific discrete or non-discrete code, as appropriate, and then observe the target or code display change. If a code change is required in accordance with *Section 2 of this Chapter*, use the codes specified therein.

c. Request the aircraft to change transponder to "standby." After you observe the target disappear for sufficient scans to assure that loss of target resulted from placing the transponder in "standby" position, request the aircraft to return transponder to normal operation and then observe the reappearance of the target.

Phraseology:

SQUAWK STANDBY,

then,

SQUAWK NORMAL.

d. *EN ROUTE:* During narrowband operations, an aircraft may be considered identified when the full data block is automatically associated with the beacon target symbol of an aircraft that is squawking a discrete code assigned by the computer.

Phraseology:

SQUAWK (4 digit discrete code), *and if aircraft has Mode C automatic altitude reporting and the equipment has been deactivated,* AND ALTITUDE.

5–52d Note.—The AIM informs pilots to adjust Mode C transponders with altitude reporting capability activated unless deactivation is requested by ATC. SQUAWK ALTITUDE is included to provide applicable phraseology.

5–52 Reference.—Use of Tower Radar Displays, paragraph 3–9 Position Information, paragraph 5–55.

5–53 ARTS/PIDP IDENTIFICATION METHODS

TERMINAL

a. Consider an auto-acquired aircraft as identified when the data block is displayed and is visible to you, and one of the following conditions exist:

1. The radar or beacon identification procedures have been used to confirm the identity of the tagged target.

2. The aircraft is being handed off through use of NAS Stage A/ARTS, NAS Stage A/EARTS, NAS Stage A/PIDP, ARTS/ARTS, EARTS/ARTS, or EARTS/PIDP automated handoff and one of the following does not appear in the data block: "CST," "NAT," "NT," "AMB," "OLD," "NB," "TU," "AM," or "OL."

b. Use the ARTS/PIDP data block to maintain target identity unless it is in a coast status or displaced from the appropriate target.

c. Displaced data block shall be updated at all times.

5–53 Reference.—Use of Tower Radar Displays, paragraph 3–9.

5–54 QUESTIONABLE IDENTIFICATION

a. Use more than one method of identification when proximity of targets, duplication of observed action, or any other circumstances cause doubt as to target identification.

b. If identification is questionable for any reason, take immediate action to reidentify the aircraft or terminate radar service.

5–54 Reference.—Methods, paragraph 5–62.

5–55 POSITION INFORMATION

Inform an aircraft of its position whenever radar identification is established by means of identifying turns or by any of the beacon identification methods outlined in paragraph 5–52. Position information need not be given when identification is established by position correlation or when a departing aircraft is identified within 1 mile of the takeoff runway end.

5–56 IDENTIFICATION STATUS

a. Inform an aircraft of radar contact when:

1. Initial radar identification in the ATC system is established.

2. Subsequent to loss of radar contact or terminating radar service, radar identification is reestablished.

Phraseology:

RADAR CONTACT (position if required).

b. Inform an aircraft when radar contact is lost.

Phraseology:

RADAR CONTACT LOST (alternative instructions when required).

5–57 TARGET MARKERS

EN ROUTE

a. Use radar target markers (shrimp boats) on horizontal scopes to provide continuous target identity. Post flight identification and altitude when constant, on markers. Post miscellaneous items (abbreviated route, vector headings, arrows to indicate climb and descent, etc.) at your discretion. To prevent misinterpretation, use standard hand printed characters.

b. Automated Systems—Use data blocks that are associated with the appropriate target symbol to provide continuous identity. Display flight identification, interim altitude or assigned altitude if interim altitude is not being used, and reported altitude as minimum display. Interim/assigned altitude, reported altitude, or flight identification, or all may be temporarily inhibited in NAS En route Stage A to eliminate an existing data block overlap condition.

5–58 thru 5–59 RESERVED

Section 4. TRANSFER OF RADAR IDENTIFICATION

5–60 APPLICATION

To provide continuous radar service to an aircraft and facilitate a safe, orderly, and expeditious flow of traffic, it is often necessary to transfer radar identification of an aircraft from one controller to another. This section describes the terms, methods, and responsibilities associated with this task. Interfacility and intrafacility transfers of radar identification shall be accomplished in all areas of radar surveillance except where it is not operationally feasible. Where such constraints exist, they shall be:

a. Covered in letters of agreement which clearly state that control will not be based upon a radar handoff, or

b. Coordinated by the transferring and receiving controllers for a specified period of time.

5–60 Reference.—Coordination with Receiving Facility, paragraph 4–36.

5–61 TERMS

a. *Handoff*—An action taken to transfer the radar identification of an aircraft from one controller to another controller if the aircraft will enter the receiving controller's airspace and radio communications with the aircraft will be transferred.

b. *Radar Contact*—The term used to inform the controller initiating a handoff that the aircraft is identified and approval is granted for the aircraft to enter the receiving controller's airspace.

c. *Point Out*—An action taken by a controller to transfer the radar identification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred.

d. *Point Out Approved*—The term used to inform the controller initiating a point out that the aircraft is identified and that approval is granted for the aircraft to enter the receiving controller's airspace, as coordinated, without a communications transfer.

e. *Traffic*—A term used to transfer radar identification of an aircraft to another controller for the purpose of coordinating separation action. Traffic is normally issued (a) in response to a handoff or point out, (b) in anticipation of a handoff or point out, or (c) in conjunction with a request for control of an aircraft.

f. *Traffic Observed*—The term used to inform the controller issuing the traffic restrictions that the traffic is identified and that the restrictions issued are understood and will be complied with.

5–62 METHODS

a. *Transfer the radar identification* of an aircraft by at least one of the following methods:

1. Physically point to the target on the receiving controller's display.

2. Use landline voice communications.

3. Use automation capabilities.

4. *TERMINAL:* Use the "Modify" or "Quick Look" functions for data transfer between the TRACON and tower cab only if specific procedures are established in a facility directive. The local controller has the responsibility to determine whether or not conditions are adequate for the use of ARTS data on the BRITE.

5–62a4 Reference.—Order 7210.3, Use of ARTS Modify and Quick Look Functions, paragraph 13–23.

5. *EN ROUTE:* DARC/HOST has interfacility handoff capabilities that can be manually initiated and accepted through the Quick Action Keys (QAK), or used in automatic handoff mode as in HOST Stage A. DARC does not have capabilities for interfacility handoffs. Therefore, handoffs between facilities must be made via landline voice communications when operating in DARC.

b. When making a handoff, point-out, or issuing traffic restrictions, relay information to the receiving controller in the following order:

1. The position of the target relative to a fix, map symbol, or radar target known and displayed by both the receiving and transferring controller.

2. The aircraft identification, as follows:

(a) The aircraft call sign, or

(b) The discrete beacon code of the aircraft during interfacility point-outs only, if both the receiving and the transferring controllers agree.

5–62b2(b) Note.—Acceptance of a point-out using the discrete beacon code as the aircraft's identification constitutes agreement.

3. The assigned altitude, appropriate restrictions, and information that the aircraft is climbing or descending, if applicable, except when inter/intrafacility directives ensure that the altitude information will be known by the receiving controller.

Phraseology:

HANDOFF/POINT-OUT/TRAFFIC (aircraft position) (aircraft ID) or (discrete beacon code point-out only) (altitude, restrictions, and other appropriate information, if applicable).

c. When receiving a handoff, point-out, or traffic restrictions, respond to the transferring controller as follows:

Phraseology:

(Aircraft ID) (restrictions, if applicable) RADAR CONTACT,

or

(Aircraft ID or discrete beacon code) (restrictions, if applicable) POINT-OUT APPROVED,

or

TRAFFIC OBSERVED,

or

UNABLE (appropriate information, as required).

d. If any doubt as to target identification exists after attempting confirmation in accordance with this section, apply the provisions of paragraph 5–54.

5–62 Reference.—Validation of Mode C Readout, paragraph 5–37.

5–63 TRAFFIC

a. When using the term "traffic" for coordinating separation, the controller issuing traffic shall issue appropriate restrictions.

b. The controller accepting the restrictions shall be responsible to ensure that approved separation is maintained between the involved aircraft.

5–64 TRANSFERRING CONTROLLER HANDOFF

The transferring controller shall:

a. Complete a radar handoff prior to an aircraft's entering the airspace delegated to the receiving controller.

5–64 Reference.—Coordinate Use of Airspace, paragraph 2–14. Control Transfer, paragraph 2–15. Receiving Controller Handoff, paragraph 5–65.

b. Verbally obtain the receiving controller's approval prior to making any changes to an aircraft's flight path, altitude, or data block information while the handoff is being initiated or after acceptance, unless otherwise specified by a Letter of Agreement or a facility directive.

c. Ensure that, prior to transferring communications:

1. Potential violations of adjacent airspace and potential conflicts between aircraft in their own area of jurisdiction are resolved.

2. Necessary coordination has been accomplished with all controllers through whose area of jurisdiction the aircraft will pass prior to entering the receiving controller's area of jurisdiction, except when such coordination is the receiving controller's responsibility as stated in paragraph 5–65 and unless otherwise specified by a letter of agreement or a facility directive.

3. Restrictions issued to ensure separation are passed to the receiving controller.

d. After transferring communications, continue to comply with the requirements of subparagraphs 5–64c1 and 5–64c2.

e. Comply with restrictions issued by the receiving controller unless otherwise coordinated.

f. Comply with the provisions of paragraph 2–17a and to the extent possible, transfer communications when the transfer of radar identification has been accepted.

5–64f Note.—Before the ARTS "Modify/Quick Look" function is used to transfer radar identification, a facility directive which specifies communication transfer points is required.

g. Advise the receiving controller of pertinent information not contained in the data block or flight progress strip unless covered in a letter of agreement or facility directive. Pertinent information includes:

1. Assigned heading.
2. Air speed restrictions.
3. Altitude information issued.
4. Observed track or deviation from the last route clearance.
5. The beacon code if different from that normally used or previously coordinated.
6. Any other pertinent information.

h. Ensure that the data block is associated with the appropriate target.

i. Initiate verbal coordination to verify the position of primary or nondiscrete targets when using the automated handoff functions except for intrafacility handoffs using single-sensor systems or multisensor systems operating in a mosaic RDP mode.

j. Initiate verbal coordination before transferring control of a track when "CST," "FAIL," "NONE," "NB," "NX," "IF," or "NT" is displayed in the data block.

k. Advise the receiving controller that radar monitoring is required when the aircraft is on a direct route initiated by ATC that exceeds usable navaid distances.

l. Issue restrictions to the receiving controller which are necessary to maintain separation from other aircraft within your area of jurisdiction before releasing control of the aircraft.

m. Consider the target being transferred as identified on the receiving controller's display when the receiving controller acknowledges receipt verbally or has accepted an automated handoff.

n. Accomplish the necessary coordination with any intervening controllers whose area of jurisdiction is affected by the receiving controller's delay in the climb or the descent of an aircraft through the vertical limits of your area of jurisdiction when the receiving controller advises you of that delay before accepting the transfer of radar identification unless otherwise specified by a letter of agreement or a facility directive.

5–65 RECEIVING CONTROLLER HANDOFF

The receiving controller shall:

a. Ensure that the target position corresponds with the position given by the transferring controller or that there is an appropriate association between an automated data block and the target being transferred before accepting an handoff.

5–65 Reference.—Coordinate Use of Airspace, paragraph 2–14. Control Transfer, paragraph 2–15. Transferring Controller Handoff, paragraph 5–64.

b. Issue restrictions that are needed for the aircraft to enter your sector safely before accepting the handoff.

c. Comply with restrictions issued by the initiating controller unless otherwise coordinated.

d. Before you issue control instructions directly to an aircraft that is within another controller's area of jurisdiction that will change that aircraft's heading, route, speed, altitude, or beacon code, ensure that coordination has been accomplished with each of the controllers listed below whose area of jurisdiction is affected by those instructions unless otherwise specified by a letter of agreement or a facility directive:

1. The controller within whose area of jurisdiction the control instructions will be issued.

2. Any intervening controller(s) through whose area of jurisdiction the aircraft will pass.

e. After accepting a handoff from another controller, confirm the identity of primary target by advising the aircraft of its position, and of a beacon target by observing a code change, an "Ident" reply, or a "standby" squawk unless one of these was used during handoff. These provisions do not apply at those towers and GCAs which have been delegated the responsibility for providing radar separation within designated areas by the parent approach control facility and the aircraft identification is assured by sequencing or positioning prior to the handoff.

5–65e Reference.—Approach Separation Responsibility, paragraph 5–124.

f. When using appropriate equipment, consider a discrete beacon target's identity to be confirmed when:

1. The data block associated with the target being handed off indicates the computer assigned discrete beacon code is being received, or

2. You observe the deletion of a discrete code that was displayed in the data block, or

5–65f2 Note.—When the aircraft generated discrete beacon code does not match the computer assigned beacon code, the code generated will be displayed in the data block. When the aircraft changes to the assigned discrete code, the code disappears from the data block. In this instance, the observance of code removal from the data block satisfies confirmation requirements.

3. You observe the numeric display of a discrete code that an aircraft has been instructed to squawk or reports squawking.

g. Initiate verbal coordination prior to accepting control of a track when "CST," "NAT," "NT," "NONE," "NB," "NX," "OLD," "OL," "AMB," "AM," or "TU" is displayed in the data block.

1. When an automated interfacility handoff action is initiated and "AMB" or "AM" is displayed in the full data block, advise the other facility that a disparity exists between the position declared by their computer and that declared by your ARTS/PIDP.

2. When an automated interfacility handoff action is initiated and "NAT," "NT," or "TU" is displayed in the full data block, advise the other facility if a disparity exists between the position declared by their computer and the actual target position.

h. Advise the transferring controller, prior to accepting the transfer of radar identification, that you will delay the climb or the descent of an aircraft through the vertical limits of the transferring controller's area of jurisdiction, unless otherwise specified in a letter of agreement or a facility directive.

i. If you decide, *after* accepting the transfer of radar identification, to delay the aircraft's climb or descent through the vertical limits of the transferring controller's area of jurisdiction, advise the transferring controller of that decision as soon as possible. *You* now have the responsibility to ensure that the necessary coordination is accomplished with any intervening controller(s) whose area of jurisdiction is affected by that delay, unless otherwise specified in a letter of agreement or a facility directive.

5–66 POINT OUT

a. The transferring controller shall:

1. Obtain verbal approval before permitting an aircraft to enter the receiving controller's delegated airspace.

2. Obtain the receiving controller's approval before making any changes to an aircraft's flight path, altitude, or data block information after the point out has been approved.

3. Comply with restrictions issued by the receiving controller unless otherwise coordinated.

4. Be responsible for subsequent radar handoffs and communications transfer, including flight data revisions and coordination, unless otherwise agreed

to by the receiving controller or as specified in a letter of agreement.

b. The receiving controller shall:

1. Ensure that the target position corresponds with the position given by the transferring controller or that there is an association between a computer data block and the target being transferred prior to approving a point out.

2. Be responsible for separation between point out aircraft and other aircraft for which he/she has separation responsibility.

3. Issue restrictions necessary to provide separation from other aircraft within his/her area of jurisdiction.

5–67 AUTOMATED INFORMATION TRANSFER (AIT)

Transfer radar identification and/or altitude control without verbal coordination under the following conditions:

a. During radar handoff, and;

b. Via information displayed in full data blocks, and;

c. Within the same facility, and;

d. When following procedures specified in your facility AIT directive.

5–68 thru 5–69 RESERVED

Section 5. RADAR SEPARATION

5–70 APPLICATION

a. Radar separation shall be applied to all RNAV aircraft operating on a random (impromptu) route at or below FL 450.

b. Radar separation may be applied between:

1. Radar identified aircraft.

2. An aircraft taking off and another radar-identified aircraft when the aircraft taking off will be radar-identified within 1 mile of the runway end.

3. A radar-identified aircraft and one not radar-identified when either is cleared to climb/descend through the altitude of the other provided:

(a) The performance of the radar system is adequate and, as a minimum, primary radar targets or ASR–9/Full Digital Radar Primary Symbol targets are being displayed on the display being used within the airspace within which radar separation is being applied, and

(b) Flight data on the aircraft not radar–identified indicate it is a type which can be expected to give adequate primary/ASR–9/Full Digital Radar Primary Symbol return in the area where separation is applied, and

(c) The airspace within which radar separation is applied is not less than the following number of miles from the edge of the radar display:

(1) When less than 40 miles from the antenna— *6 miles;*

(2) When 40 miles or more from the antenna— *10 miles;*

(3) Narrowband radar operations— *10 miles,* and

(d) Radar separation is maintained between the radar–identified aircraft and all observed primary, ASR–9/ Full Digital Radar Primary Symbol, and secondary radar targets until nonradar separation is established from the aircraft not radar identified, and

(e) When the aircraft involved are on the same relative heading, the radar-identified aircraft is vectored a sufficient distance from the route of the aircraft not radar identified to assure the targets are not superimposed prior to issuing the clearance to climb/descend.

5–70 Reference.—Exceptions, paragraph 4–2. Route Use, paragraph 4–50. Application, paragraph 5–50. Additional Separation for Formation Flights, paragraph 5–74. Approach Separation Responsibility, paragraph 5–124.

5–71 TARGET SEPARATION

Apply radar separation:

a. Between the centers of primary radar targets; however, do not allow a primary target to touch another primary target or a beacon control slash.

b. Between the ends of beacon control slashes.

5–71b Note.— At TPX–42 sites, the bracket video feature must be activated to display the beacon control slash.

c. Between the end of a beacon control slash and the center of a primary target.

d. All-Digital Displays: Between the centers of digitized targets. Do not allow targets to touch.

5–71 Reference.—Simultaneous ILS/MLS Approaches, paragraph 5–126.

5–72 MINIMA

Separate aircraft by the following minima:

5–72 Note.—Wake Turbulence procedures specify increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence.

a. Broadband Radar System or ASR–9/Full Digital Terminal Radar System:

1. When less than 40 miles from the antenna— *3 miles.*

2. When 40 miles or more from the antenna— *5 miles.*

EN ROUTE

b. Stage A/DARC and EARTS Mosaic:

5–72b Note.—EARTS Mosaic combines radar input from 3 to 15 sites into a single picture utilizing a mosaic grid composed of radar sort boxes.

1. Below FL 600–*5 miles.*

2. At or above FL 600–*10 miles.*

3. Within 40 miles of the antenna and below FL 180–Facility directives may specify 3 miles.

5–72b3 Note.—Where a significant operational advantage is obtained by modifying a radar site adaptation to single site coverage, facility directives are required to define the areas where 3–mile separation applies.

5–72b3 Reference.—FAA Order 7210.3, Single Site Coverage Stage A Operations, paragraph 10–20.

4. When transitioning from terminal to en route control, 3 miles increasing to 5 miles or greater, provided:

(a) The aircraft are on diverging routes/courses, and/or,

(b) The leading aircraft is and will remain faster than the following aircraft, and,

(c) Separation constantly increasing and the first center controller will establish 5 NM or other appropriate form of separation prior to the aircraft departing the first center sector, and,

(d) The proceedure is covered by a letter of agreement between the facilities involved and limited to specified routes and/or sectors/positions.

c. EARTS Sensor Mode:

5–72c Note 1.—EARTS Sensor mode displays information from the radar input of a single site.

5–72c Note 2.—Procedures to convert EARTS mosaic to EARTS sensor mode at each PVD will be established by facility directive.

1. When less than 40 miles from the antenna *3 miles.*

2. When 40 miles or more from the antenna *5 miles.*

WAKE TURBULENCE APPLICATION

d. Separate aircraft operating directly behind, or directly behind and less than 1,000 feet below, or following an aircraft conducting an instrument approach by:

5–72d Note.—Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.

1. Heavy behind heavy-*4 miles.*

2. Small/large behind heavy-*5 miles.*

(See Figure 5–72[1] and Figure 5–72[2]).

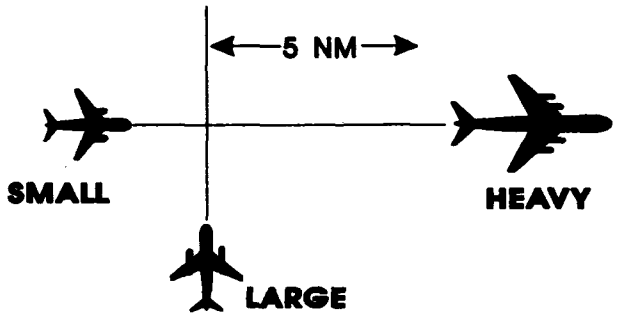


Figure 5–72[1]

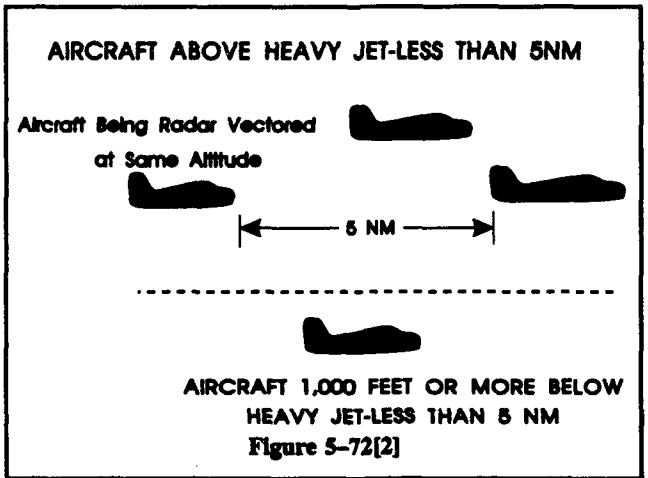


Figure 5–72[2]

WAKE TURBULENCE APPLICATION

e. *TERMINAL:* In addition to subparagraph 5–72d, separate an aircraft landing behind another aircraft on the same runway, or one making a touch-and-go, stop-and-go, or low approach by ensuring the following minima will exist at the time the preceding aircraft is over the landing threshold:

5–72e Note.—Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.

1. Small behind large-*4 miles.*

2. Small behind heavy-*6 miles.*

f. *TERMINAL:* 2.5 nautical miles (NMs) separation is authorized between aircraft established on the final approach course within 10 NMs of the landing runway when:

1. The leading aircraft's Weight Class is the same or less than the trailing aircraft;

2. Heavy aircraft and the Boeing 757 are permitted to participate in the separation reduction as the trailing aircraft only;

3. A runway occupancy time of 50 seconds or less is documented;

4. BRITE/TCDD displays are operational and used for quick glance references;

5–72f4 Reference.—Use of Tower Radar Displays, paragraph 3–9a Note.

5. Turnoff points are visible from the control tower; and

6. Runways are clear.

5–72 Reference.—Wake Turbulence, paragraph 2–19. Same Runway Separation, paragraph 3–106. Passing or Diverging, paragraph 5–73. Separation from Obstructions, paragraph 5–75. Successive or Simultaneous Departures, paragraph 5–113. Approach Separation Responsibility, paragraph 5–124. Sequencing, paragraph 7–66. Separation, paragraph 7–82. Separation, paragraph 7–92. FAA Order 7210.3, Reduced Separation on Final, paragraph 12–46.

5–73 PASSING OR DIVERGING

a. *TERMINAL:* Vertical separation between aircraft may be discontinued when the following conditions are met:

1. You observe that they have passed each other or that one has crossed the projected course of the other.

2. The tracks are monitored to ensure that the primary targets, beacon control slashes, or ASR–9/full digital terminal system type target symbols will not touch.

3. Their courses diverge at least 15 degrees.

b. *EN ROUTE:* Vertical separation between aircraft may be discontinued when they are on opposite courses as defined in paragraph 1–21; and

1. You are in communications with both aircraft involved; and

2. You tell the pilot of one aircraft about the other aircraft, including position, direction, type; and

3. One pilot reports having seen the other aircraft and that the aircraft have passed each other; and

4. You have observed that the radar targets have passed each other; and

5. You have advised the pilots if either aircraft is classified as a heavy aircraft.

5–73b5 Note.—Although vertical separation may be discontinued, the requirements of paragraph 5–72d and e must be applied when operating behind a heavy jet.

5–73b Examples.—

"Traffic, twelve o'clock, Boeing seven twenty seven, opposite direction. Do you have it in sight?"

If the answer is in the affirmative:

"Report passing the traffic."

When pilot reports passing the traffic and the radar targets confirm that the traffic has passed, issue apporpriate control instructions.

5–74 ADDITIONAL SEPARATION FOR FORMATION FLIGHTS

Because of the distance allowed between formation aircraft and lead aircraft, additional separation is necessary to ensure the periphery of the formation is adequately separated from other aircraft, adjacent airspace, or obstructions. Provide supplemental separation for formation flights as follows:

a. Separate a standard formation flight by adding 1 mile to the appropriate radar separation minima.

5–74a Reference.—Formation Flights, paragraph 2–13; Application, paragraph 5–70; Separation, paragraph 7–82. Pilot/Controller Glossary term—Formation Flight.

b. Separate two standard formation flights from each other by adding 2 miles to the appropriate separation minima.

c. Separate a nonstandard formation flight by applying the appropriate separation minima to the perimeter of the airspace encompassing the nonstandard formation or from the outermost aircraft of the nonstandard formation whichever applies.

d. If necessary for separation between a nonstandard formation and other aircraft, assign an appropriate beacon code to each aircraft in the formation or to the first and last aircraft in-trail.

5–74 Note.—The additional separation provided in paragraph 5–74 is not normally added to wake turbulence separation when a formation is following a heavier aircraft since none of the formation aircraft are likely to be closer to the heavier aircraft than the lead aircraft (to which the prescribed wake turbulence separation has been applied).

5–74 Reference.—Military Aerial Refueling, paragraph 9–29.

5–75 SEPARATION FROM OBSTRUCTIONS

a. Except in En route Stage A/DARC, separate aircraft from prominent obstructions depicted on the radar scope (displayed on the video/geo map, scribed on the map overlay, or displayed as a permanent echo) by the following minima:

1. When less than 40 miles from the antenna— *3 miles.*

2. When 40 miles or more from the antenna— *5 miles.*

b. Except in En route Stage A/DARC, vertical separation of aircraft above a prominent obstruction displayed as a permanent echo may be discontinued after the aircraft is passed it.

c. En route Stage A/DARC: Apply the radar separation minima specified in paragraph 5–72b1.

5–75a, b, and c Note.—The determination of what constitutes a prominent obstruction is made locally after coordination with appropriate Flight Standards representatives. Prominent obstructions shall be displayed as permanent echoes on the radar display using parrots, MTI reflectors, or RTQC symbols. Digital map marks (DMM) may be used to mark obstructions. DMM's are not to be used alone for map alignment but in conjunction with one or more of the permanent echo marking devices. When RTQC alone is used for obstruction marking, it shall be certified by Airway Facilities per the appropriate certification manual.

5–76 ADJACENT AIRSPACE

a. If coordination between the controller concerned has not been effected, separate radar-controlled aircraft from the boundary of adjacent airspace in which radar separation is also being used by the following minima:

5–76a Reference.—Coordinate Use of Airspace, paragraph 2–14.

1. When less than 40 miles from the antenna— *1 1/2 miles.*

2. When 40 miles or more from the antenna— *2 1/2 miles.*

3. En route Stage A/DARC:

(a) Below Flight Level 600— *2 1/2 miles.*

(b) Flight Level 600 and above— *5 miles.*

b. Separate radar-controlled aircraft from the boundary of airspace in which nonradar separation is being used by the following minima:

1. When less than 40 miles from the antenna— *3 miles.*

2. When 40 miles or more from the antenna— *5 miles.*

3. En route Stage A/DARC:

(a) Below Flight Level 600— *5 miles.*

(b) Flight Level 600 and above— *10 miles.*

c. The provisions of subparagraphs 5–76a and b do not apply to VFR aircraft being provided [redacted] services. Insure that targets of

these aircraft do not touch the boundary of adjacent airspace.

5–77 EDGE OF SCOPE

Separate a radar-controlled aircraft climbing or descending through the altitude of an aircraft that has been tracked to the edge of the scope/display by the following minima until nonradar separation has been established:

a. When less than 40 miles from the antenna— *3 miles* from edge of scope.

b. When 40 miles or more from the antenna— *5 miles* from edge of scope.

c. En route Stage A/DARC:

1. Below Flight Level 600— *5 miles.*
2. Flight Level 600 and above— *10 miles.*

5–78 BEACON TARGET DISPLACEMENT

When using a radar target display with a previously specified beacon target displacement to separate a beacon target from a primary target, adjacent airspace, obstructions, or terrain, add a 1–mile correction factor to the applicable minima.

5–78 Note.—The maximum allowable beacon target displacement which may be specified by the facility Air Traffic manager is ½ mile.

5–78 Reference.—FAA Order 7210.3, Monitoring of Mode 3/A Radar Beacon Codes, paragraph 3–83.

5–79 GPA 102/103 CORRECTION FACTOR

When using a radar display whose primary radar video is processed by the GPA 102/103 modification to a joint-use radar system, apply the following correction factors to the applicable minima:

a. If less than 40 miles from the antenna - add *1 mile.*

b. If 40 miles or more but not over 200 miles from the antenna - add *3 miles.*

5–80 thru 5–89 RESERVED

Section 6. VECTORING

5–90 APPLICATION

Vector aircraft:

a. In controlled airspace for separation, safety, noise abatement, operational advantage, or when a pilot requests. Allow aircraft operating on an RNAV route to remain on their own navigation to the extent possible.

b. In [redacted] Class C airspace only upon pilot request and as an additional service.

c. At or above MVA or the minimum IFR altitude except as authorized for missed approaches, radar approaches, departures, Special VFR and VFR operations.

5–90c Note.—VFR aircraft not at an altitude assigned by ATC may be vectored at any altitude. It is the responsibility of the pilot to comply with the applicable FAR's.

5–90c References.—Minimum En route Altitudes, paragraph 4–64; Priority, paragraph 7–41; Altitude Assignment, paragraph 7–43, Altitude Assignments, paragraph 7–84. Minimum Safe Altitudes, Part 91.119.

d. In airspace for which you have control jurisdiction, unless otherwise coordinated.

e. So as to permit it to resume its own navigation within radar coverage.

f. Operating Special VFR only within control zones [redacted] surface areas.

g. Operating VFR at those locations where a special program is established, or when a pilot requests, or you suggest and the pilot concurs.

5–90g Reference.—FAA Order 7210.3, Chapter 13, Section 1, National Terminal Radar Program.

5–90 Reference.—Route Use, paragraph 4–50. Visual Separation, paragraph 7–10. Separation, paragraph 7–42. Application, paragraph 7–60. Separation Minima, paragraph 9–63.

5–91 METHODS

a. Vector aircraft by specifying:

1. Direction of turn, if appropriate, and magnetic heading to be flown, or

Phraseology:

TURN LEFT/RIGHT HEADING (degrees).

FLY HEADING (degrees).

FLY PRESENT HEADING.

DEPART (fix) HEADING (degrees).

2. The number of degrees, in group form, to turn and the direction of turn, or

Phraseology:

TURN (number of degrees) DEGREES LEFT/RIGHT.

3. For NO-GYRO procedures, the type of vector, direction of turn, and when to stop turn.

Phraseology:

THIS WILL BE A NO-GYRO VECTOR,

TURN LEFT/RIGHT.

STOP TURN.

b. When initiating a vector, advise the pilot of the purpose.

Phraseology:

VECTOR TO (fix or airway).

VECTOR TO INTERCEPT (name of NAVAID) (specified) RADIAL.

VECTOR FOR SPACING.

VECTOR TO FINAL APPROACH COURSE,

or if the pilot does not have knowledge of the type of approach,

VECTOR TO (approach name) FINAL APPROACH COURSE.

5–91b Note.—Determine optimum routing based on factors such as wind, weather, traffic, pilot requests, noise abatement, adjacent sector requirement, and Letters of Agreement.

c. Issue with the vector an altitude to maintain and all appropriate altitude restrictions when:

1. The vector will take the aircraft off an assigned procedure which contains altitude instructions, i.e., instrument approach, non-radar SID, etc.

2. The previously issued clearance included crossing restrictions.

5–91c Reference.—Route or Altitude Amendments, paragraph 4–14.

d. If appropriate, advise the pilot what to expect when the vector is completed.

Phraseology:

EXPECT TO RESUME (route, SID, STAR, etc.).

5–91d Note.—You must ensure that the pilot is made aware if he is expected to resume a previously issued route/procedure.

e. Provide radar navigational guidance until the aircraft is:

1. Established within the airspace to be protected for the nonradar route to be flown, or

2. On a heading that will, within a reasonable distance, intercept the nonradar route to be flown, and

3. Informed of its position unless the aircraft is RNAV or DME equipped and being vectored toward a VORTAC/TACAN or Waypoint and within the service volume of the NAVAID.

Phraseology:

(Position with respect to course/fix along route),

RESUME OWN NAVIGATION,

or

FLY HEADING (degrees). WHEN ABLE, PROCEED DIRECT (name of fix),

or

RESUME (name-number SID/Transition/STAR/procedure).

5–91e3 Reference.—Chapter 4, Section 1, NAVAID Use Limitations.

f. Aircraft instructed to resume a procedure which contains restrictions (SID/STAR, etc.) shall be issued/reissued all applicable restrictions or shall be advised to comply with those restrictions.

Phraseology:

RESUME (name-number SID/Transition/STAR), COMPLY WITH RESTRICTIONS.

g. Aircraft vectored off an RNAV route shall be recleared to the next waypoint or as requested by the pilot.

h. During Stage A operation, update the route of flight in the computer unless an operational advantage is gained and coordination is accomplished.

i. Inform the pilot when a vector will take the aircraft across a previously assigned nonradar route.

Phraseology:

EXPECT VECTOR ACROSS (NAVAID radial)(airway/route/course) FOR (purpose).

5–91 Reference.—Application, paragraph 7–60.

5–92 thru 5–99 RESERVED

Section 7. SPEED ADJUSTMENT

5–100 APPLICATION

a. Keep speed adjustments to the minimum necessary to achieve or maintain required or desired spacing. Avoid adjustments requiring alternate decreases and increases. Permit pilots to resume normal speed when previously specified adjustments are no longer needed.

5–100a Note 1—It is the pilot's responsibility and prerogative to refuse speed adjustment that he considers excessive or contrary to the aircraft's operating specifications.

5–100a Note 2—Consider the following when applying speed control:

a. Determine the interval required and the point at which the interval is to be accomplished.

b. Implement speed adjustment based on the following principles:

1. Priority of speed adjustment instructions is determined by the relative speed and position of the aircraft involved and the spacing requirement.

2. Speed adjustments are not achieved instantaneously. Aircraft configuration, altitudes, and speed determine the time and distance required to accomplish the adjustment.

c. Use the following techniques in speed control situations:

1. Compensate for compression when assigning air speed adjustment in an in–trail situation by using one of the following techniques:

(a) Reduce the trailing aircraft first.

(b) Increase the leading aircraft first.

2. Assign a specific airspeed if required to maintain spacing.

3. Allow increased time and distance to achieve speed adjustments in the following situations:

(a) Higher altitudes.

(b) Greater speed.

(c) Clean configurations.

4. Ensure that aircraft are allowed to operate in a clean configuration as long as circumstances permit.

5. Keep the number of speed adjustments per aircraft to the minimum required to achieve and maintain spacing.

b. Do not assign speed adjustment to aircraft:

1. At or above FL 290 without pilot consent.

2. Executing a published high altitude instrument approach procedure.

3. In a holding pattern.

4. Inside the final approach fix on final or a point 5 miles from the runway, whichever is closer to the runway.

c. At the time approach clearance is issued, previously issued speed adjustments shall be restated if required.

5–100c Note.—Approach clearances cancel any previously assigned speed adjustment. Pilots are expected to make their own speed adjustments to complete the approach unless the adjustment are restated.

d. Express speed adjustments in terms of knots based on indicated airspeed (IAS) in 10–knot increments. At or above FL 240, speeds may be expressed in terms of mach numbers in 0.01 increments for turbojet aircraft with mach meters (i.e., mach 0.69, 0.70, 0.71, etc).

5–100d Note 1.—Pilots complying with speed adjustment instructions should maintain a speed within plus or minus 10 knots or 0.02 mach number of the specified speed.

5–100d Note 2.—When assigning speeds to achieve spacing between aircraft at different altitudes, consider that ground speed may vary with altitude. Further speed adjustment may be necessary to attain the desired spacing.

5–100 Reference.—Methods, paragraph 5–101.

5–101 METHODS

a. Instruct aircraft to:

1. Maintain present/specific speed.
2. Maintain specified speed or greater/less.
3. Maintain the highest/lowest practical speed.
4. Increase or reduce to a specified speed or by a specified number of knots.

Phraseology:

SAY AIRSPEED.

SAY MACH NUMBER.

MAINTAIN PRESENT SPEED.

MAINTAIN (specific speed) KNOTS.

MAINTAIN (specific speed) KNOTS OR GREATER.

DO NOT EXCEED (speed) KNOTS.

MAINTAIN MAXIMUM FORWARD SPEED.

MAINTAIN SLOWEST PRACTICAL SPEED.

INCREASE/REDUCE SPEED:

TO (specified speed in knots),

or

TO MACH (mach number),

or

(number of knots) KNOTS.

DO NOT EXCEED (speed) KNOTS,

5–101a Examples.—

"Increase speed to mach point seven two."

"Reduce speed to two five zero."

"Reduce speed twenty knots."

"Maintain two eight zero knots."

"Maintain maximum forward speed."

5–101a Note 1.—A pilot operating at or above 10,000 feet MSL on an assigned speed adjustment greater than 250 knots is expected to comply with FAR 91.117(a) when cleared below 10,000 feet MSL without notifying ATC. Pilots are expected to comply with the other provisions of FAR 91.117 without notification unless otherwise authorized by ATC.

5–101a Note 2.—The phrases "maintain maximum forward speed" and "maintain slowest practical speed" are primarily intended for use when sequencing a group of aircraft. As the sequencing plan develops, it may be necessary to determine the specific speed and/or make specific speed assignments.

b. To obtain pilot concurrence for a speed adjustment at or above FL 290, as required by paragraph 5–100b, or an adjustment less than the minima required in paragraph 5–102, use the following phraseology:

Phraseology:
(Speed adjustment), IF UNABLE ADVISE.

5–101b Example.—
"Reduce speed to one niner zero, if unable advise."

c. Specify which action is expected first when combining speed reduction with a descent clearance.

1. Speed reductions prior to descent.

Phraseology:
REDUCE SPEED:

TO (specified speed),

or

(number of knots) KNOTS.

THEN, DESCEND AND MAINTAIN (altitude).

2. Speed reduction following descent.

Phraseology:
DESCEND AND MAINTAIN (altitude).

THEN, REDUCE SPEED:

TO (specified speed in knots),

or

TO MACH (mach number),

or

(number of knots) KNOTS.

5–101c Note 1.—Simultaneous speed reduction and descent can be extremely difficult, particularly for turbojet aircraft. Specifying which action is to be accomplished first removes any doubt the pilot may have as to controller intent or priority.

5–101c Note 2.—When specifying descent prior to speed reduction, consider the maximum speed requirements specified in FAR 91.117. It may be necessary for the pilot to level off temporarily and reduce speed prior to descending below 10,000 feet MSL.

d. Specify combined speed/altitude fix crossing restrictions.

Phraseology:
CROSS (fix) AT AND MAINTAIN (altitude) AT (specified speed) KNOTS.

5–101d Example.—
"Cross Robinsville at and maintain six thousand at two three zero knots."

5–101 Reference.—Numbers Usage, paragraph 2–85 Altitude Information, paragraph 4–65.

5–102 MINIMA

Unless a pilot concurs in the use of a lower speed, use the following minima:

a. To aircraft operating between FL 280 and 10,000 feet, a speed not less than 250 knots or the equivalent mach number.

5–102a Note.—On a standard day the mach numbers equivalent to 250 knots CAS (subject to minor variations) are: FL 240—0.6; FL 250—0.61; FL 260—0.62; FL 270—0.64; FL 280—0.65; FL 290—0.66.

b. To arrival aircraft operating below 10,000 feet:

1. Turbojet aircraft—A speed not less than 210 knots; except when the aircraft is within 20 flying miles of the runway threshold of the airport of intended landing, a speed not less than 170 knots.

2. Reciprocating engine and turboprop aircraft—A speed not less than 200 knots; except when the aircraft is within 20 flying miles of the runway threshold of the airport of intended landing, a speed not less than 150 knots.

c. Departures:

1. Turbojet aircraft—A speed not less than 230 knots.

2. Reciprocating engine and turboprop aircraft—A speed not less than 150 knots.

d. Helicopters—A speed not less than 60 knots.

5–102 Reference.—Methods, paragraph 5–101.

5–103 TERMINATION

Advise aircraft when speed adjustment is not longer needed.

Phraseology:
RESUME NORMAL SPEED.

5–104 thru 5–109 RESERVED

Section 8. RADAR DEPARTURES

5–110 PROCEDURES

Use standard departure routes and channelized altitudes whenever practical to reduce coordination. Do not, however, assign these routes solely to provide for possible radar or communication failure.

5–111 INITIAL HEADING

Before departure, assign the initial heading to be flown if a departing aircraft is to be vectored immediately after takeoff.

Phraseology:

FLY RUNWAY HEADING.

TURN LEFT/RIGHT, HEADING (degrees).

5–111 Note.—*TERMINAL:* A purpose for the heading is not necessary, since pilots operating in a radar environment associate assigned headings with vectors to their planned route of flight.

5–111 Reference.—Departure Clearances, paragraph 4–31.

5–112 VECTORS BELOW MINIMUM ALTITUDE

Except in en route automated environments in areas where more than 3 miles separation minima is required, you may vector a departing IFR aircraft, or one executing a missed approach, within 40 miles of the antenna and before it reaches the minimum altitude for IFR operations if separation from prominent obstructions shown on the radar scope is applied in accordance with the following:

a. If the flight path is 3 miles or more from the obstruction and the aircraft is climbing to an altitude at least 1,000 feet above the obstruction, vector the aircraft to maintain at least 3 miles separation from the obstruction until the aircraft reports leaving an altitude above the obstruction.

b. If the flight path is less than 3 miles from the obstruction, and the aircraft is climbing to an altitude at least 1,000 feet above the obstruction, vector the aircraft to increase lateral separation from the obstruction until the 3–mile minimum is achieved or until the aircraft reports leaving an altitude above the obstruction.

c. At those locations where diverse vector areas (DVA) have been established, terminal radar facilities may vector aircraft below the MVA/MIA within those areas and along those routes described in facility directives.

5–112c Reference.—FAA Order 7210.3, Establishing Diverse Vector Area/s (DVA), paragraph 3–104.

5–113 SUCCESSIVE OR SIMULTANEOUS DEPARTURES

TERMINAL

Separate aircraft departing from the same airport/heliport or adjacent airports/heliports in accordance with the following minima provided radar identification with the aircraft will be established within 1 mile of the takeoff runway end/helipad and courses will diverge by 15 degrees or more.

5–113 Note 1.—Flight Procedures and Airspace FAA Order 8260.19, establishes guidelines for IFR departure turning procedures which assumes a climb to 400 feet above the airport elevation before a turn is commenced. FAA Order 8260.3, TERPS, the ILS missed approach criteria, requires a straight climb of 400 feet be specified where turns greater than 15 degrees are required.

5–113 Note 2.—Consider known aircraft performance characteristics when applying initial separation to successive departing aircraft.

5–113 Note 3.—When one or both of the departure surfaces is a helipad, use the takeoff course of the helicopter as a reference, comparable to the centerline of a runway and the helipad center as the threshold.

a. Between aircraft departing the same runway/helipad or parallel runways/helicopter takeoff courses separated by less than 2,500 feet—*1 mile* if courses diverge immediately after departure. (See Figure 5–113[1], Figure 5–113[2], and Figure 5–113[3]).

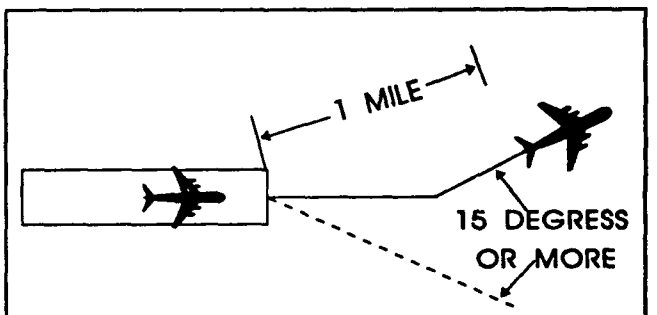


Figure 5–113[1]

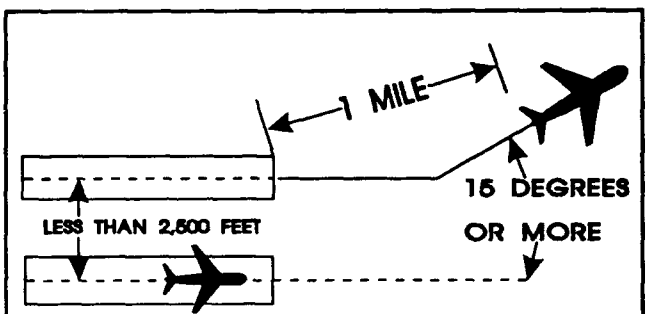


Figure 5–113[2]

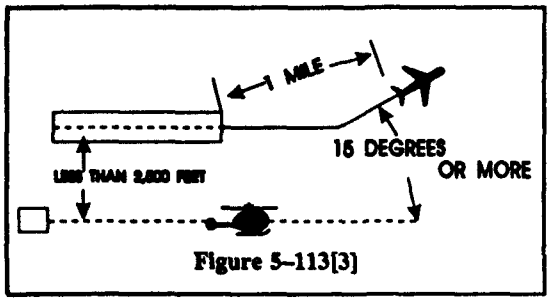


Figure 5–113[3]

5–113a Note.—This procedure does not apply when small aircraft are taking off from an intersection on the same r behind a large aircraft or when aircraft are departing behi heavy jet.

5–113a Reference.—Intersecting Runway Separation, paragraph 3–108; Intersection Departure, paragraph 3–106; Minima, paragraph 5–72.

b. Between aircraft departing from diverging runways:

1. Nonintersecting runways—Authorize simultaneous takeoffs if runways diverge by 15 degrees or more. (See Figure 5–113[4]).

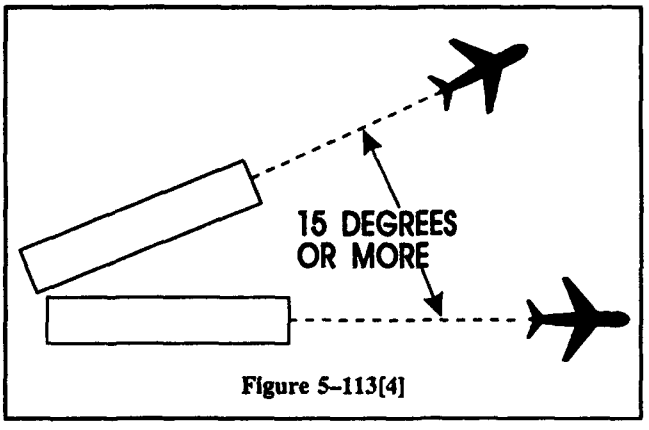


Figure 5–113[4]

2. Intersecting runways and/or helicopter takeoff courses which diverge by 15 degrees or more—Authorize takeoff of a succeeding aircraft when the preceding aircraft has passed the point of runway and/or takeoff course intersection. When applicable, apply the procedure in paragraph 3–104. (See Figure 5–113[5] and Figure 5–113[6]).

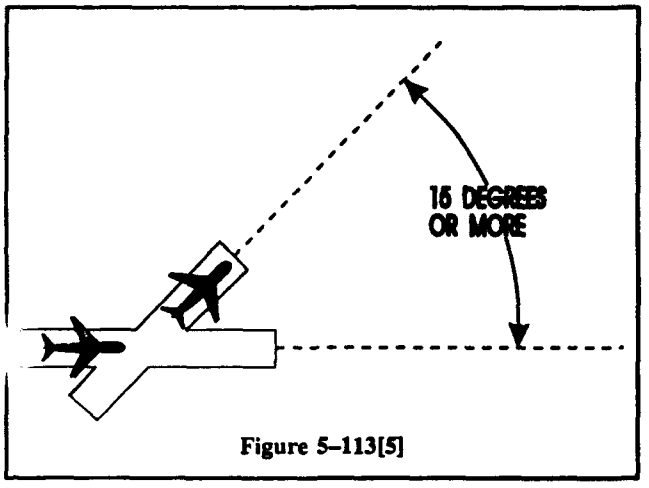


Figure 5–113[5]

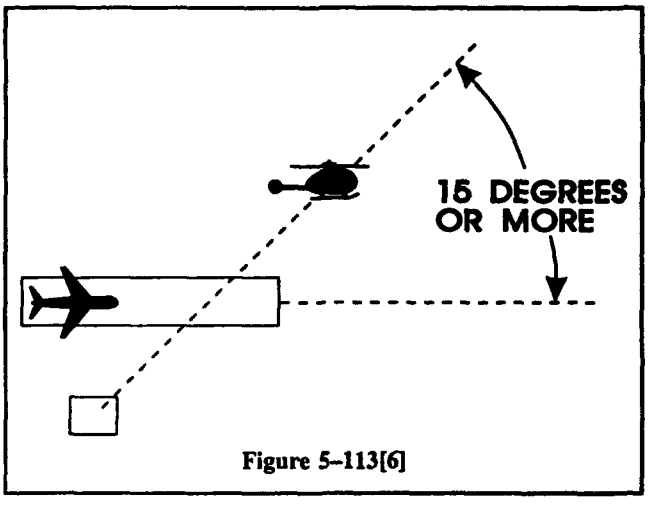


Figure 5–113[6]

5–113b2 Note.—This procedure does not apply when aircraft are departing behind a heavy jet.

c. Between aircraft departing in the same direction from parallel runways/helicopter takeoff courses—Authorize simultaneous takeoffs if the centerlines/takeoff courses are separated by at least 2,500 feet and courses diverge by 15 degrees or more immediately after departure. (See Figure 5–113[7] and Figure 5–113[8]).

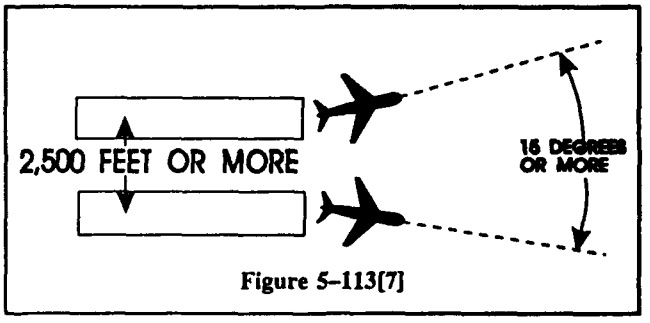


Figure 5–113[7]

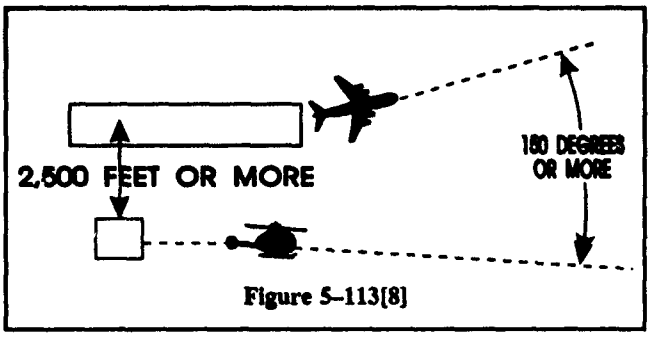


Figure 5–113[8]

5–114 DEPARTURE AND ARRIVAL

TERMINAL

Except as provided in paragraph 5–115, separate a departing aircraft from an arriving aircraft on final approach by a minimum of *2 miles* if separation will increase to a minimum of 3 miles (5 miles when 40 miles or more from the antenna) within 1 minute after takeoff.

5–114 Note 1.—This procedure permits a departing aircraft to be released so long as an arriving aircraft is no closer than 2 miles from the runway at the time. This separation is determined at the time the departing aircraft commences takeoff roll.

5–114 Note 2.—Consider the effect surface conditions, such as ice, snow, and other precipitation may have on known aircraft performance characteristics, and the influence these conditions may have on the pilot's ability to commence takeoff roll in a timely manner.

5–115 DEPARTURES AND ARRIVALS ON PARALLEL OR NONINTERSECTING DIVERGING RUNWAYS

TERMINAL

Authorize simultaneous operations between an aircraft departing on a runway and an aircraft on final approach to another parallel or nonintersecting diverging runway if the departure course diverges immediately by at least 30 degrees from the missed approach course until separation is applied and provided one of the following conditions are met:

5–115 Note.—When one or both of the takeoff/landing surfaces is a helipad, consider the helicopter takeoff course as the runway centerline and the helipad center as the threshold.

a. When parallel runway thresholds are even, the runway centerlines are at least 2,500 feet apart. (See Figure 5–115[1] and Figure 5–115[2]).

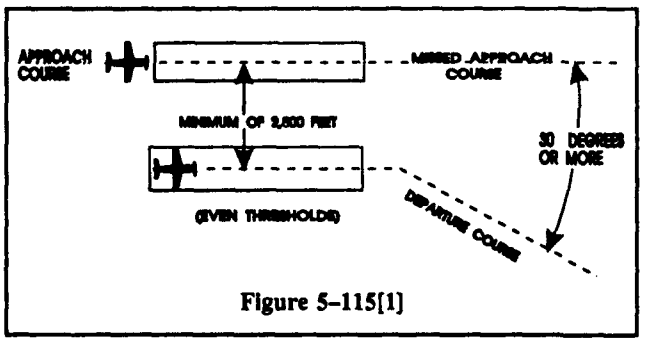


Figure 5–115[1]

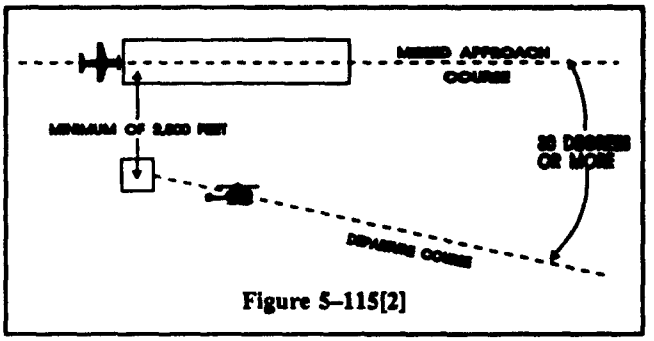


Figure 5–115[2]

b. When parallel runway thresholds are staggered and:

1. The arriving aircraft is approaching the nearer runway—The centerlines are at least 1,000 feet apart and the landing thresholds are staggered at least 500 feet for each 100 feet less than 2,500 the centerlines are separated. (See Figure 5–115[3] and Figure 5–115[4]).

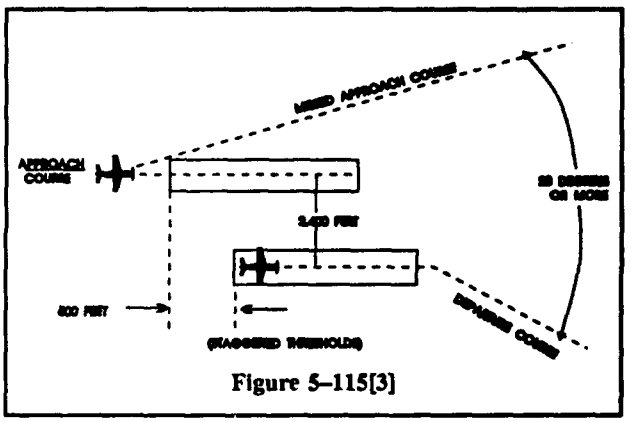


Figure 5–115[3]

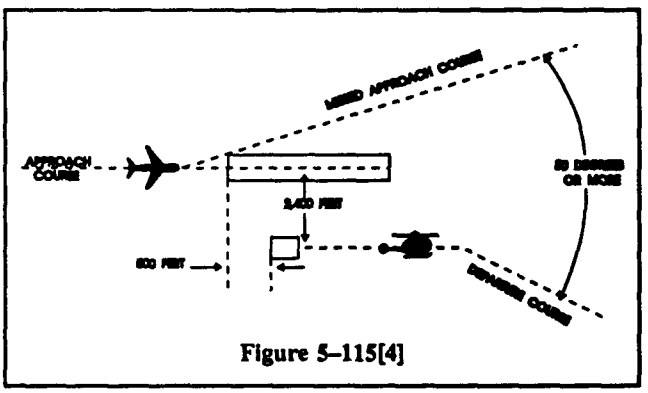


Figure 5–115[4]

5–115b1 Note.—In the event of a missed approach by a heavy jet, apply the procedures in paragraph 3–108 or ensure that the heavy jet does not overtake an aircraft departing from the adjacent parallel runway.

2. The arriving aircraft is approaching the farther runway—The runway centerlines separation exceeds 2,500 feet by at least 100 feet for each 500 feet the landing thresholds are staggered. (See Figure 5–115[5]).

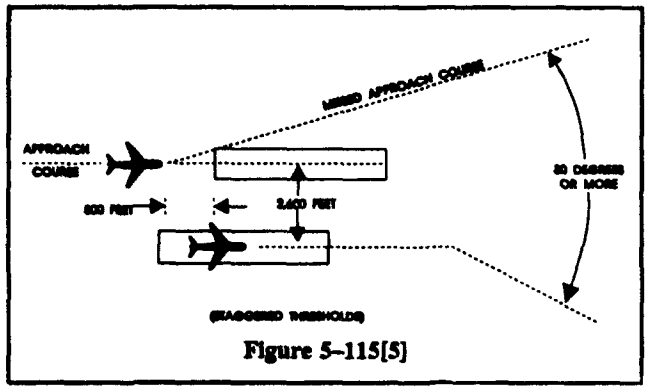


Figure 5–115[5]

c. When nonintersecting runways diverge by 15 degrees or more and runway edges do not touch. (See Figure 5–115[6]).

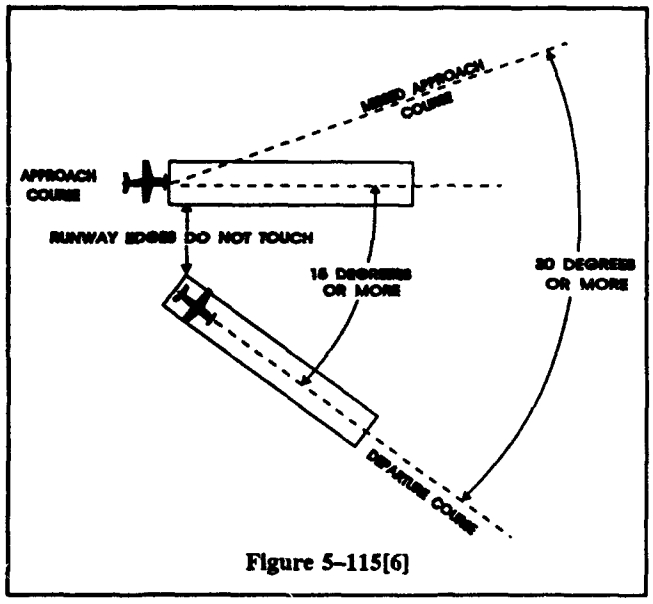


Figure 5–115[6]

d. When the aircraft on takeoff is a helicopter, hold the helicopter until visual separation is possible or apply the separation criteria in subparagraphs 5–115a, b, or c.

5–115 Reference.—Departure and Arrival, paragraph 5–114.

5–116 thru 5–119 RESERVED

Section 9. RADAR ARRIVALS

5–120 VECTORS TO FINAL APPROACH COURSE

Except as provided in paragraph 7–31, vector arriving aircraft to intercept the final approach course:

a. At least 2 miles outside the approach gate unless one of the following exists:

1. When the reported ceiling is at least 500 feet above the MVA/MIA and the visibility is at least 3 miles (report may be a PIREP if no weather is reported for the airport), aircraft may be vectored to intercept the final approach course closer than 2 miles outside the approach gate but no closer than the approach gate.

2. If specifically requested by the pilot, aircraft may be vectored to intercept the final approach course inside the approach gate but no closer than the final approach fix.

b. For a precision approach, at an altitude not above the glideslope/glidepath or below the minimum glideslope intercept altitude specified on the approach procedure chart.

c. For a nonprecision approach, at an altitude which will allow descent in accordance with the published procedure.

5–120c Note.—A pilot request for an "evaluation approach," or a "coupled approach," or use of a similar term, indicates he desires the application of subparagraphs 5–120a and b.

d. EN ROUTE: At airports where controllers are required to provide vectors to the final approach course, it is required that:

1. The approach gate and, in addition, a line (solid or broken), at least 5 miles in length, depicting the final approach course--starting at or passing through the approach gate and extending away from the airport, be displayed on the radar scope, and;

2. The maximum range selected on the PVD is 125 NM, or;

3. An adjacent PVD is set at 125 NM or less, configured for the approach in use, and is utilized for the vector to the final approach course.

4. If unable to comply with 5–120d1, 5–120d2, or 5–120d3 above, issue the clearance in accordance with paragraph 4–90 of this order.

5–120 Reference.—Approach Clearance, paragraph 4–90. Final Approach Course Intersection, paragraph 5–121.

5–121 FINAL APPROACH COURSE INTERCEPTION

a. Assign headings that will permit final approach course interception on a track that does not exceed the interception angles specified in the Table 5–121[1].

Table 5–121[1]
Approach Course Interception Angle.

Distance from interception point to approach gate	*Maximum interception angle*
Less than 2 miles or Triple Simultaneous ILS/MLS Approaches in use..	20 degrees
2 miles or more	30 degrees (45 degrees for helicopters)

b. If deviations from the final approach course are observed after initial course interception, apply the following:

1. Outside the approach gate: Apply procedures in accordance with subparagraph 5–121a, if necessary, vector the aircraft for another approach.

2. Inside the approach gate: Inform the pilot of the aircraft's position and ask intentions.

Phraseology:
(Ident) (distance) MILE(S) FROM THE AIRPORT, (distance) MILE(S) RIGHT/LEFT OF COURSE, SAY INTENTIONS.

5–121 Note.—The intent is to provide for a trackcourse intercept angle judged by the controller to be no greater than specified by this procedure.

5–121 Reference.—Chapter 5, Sections 9 and 10.

5–122 VECTORS ACROSS FINAL APPROACH COURSE

Inform the aircraft whenever a vector will take it across the final approach course and state the reason for such action.

5–122 Note.—In the event you are unable to so inform the aircraft, the pilot is not expected to turn inbound on the final approach course unless approach clearance has been issued.

Phraseology:
EXPECT VECTORS ACROSS FINAL FOR (purpose).

5–122 Example.—
"Expect vectors across final for spacing."

5–122 Reference.—Final Approach Course Interception, paragraph 5–121.

5–123 ARRIVAL INSTRUCTIONS

Issue all of the following to an aircraft before it reaches the approach gate:

a. Position relative to a fix on the final approach course. If none is portrayed on the radar display or if none is prescribed in the procedure, issue position information relative to the navigation aid which provides final approach guidance or relative to the airport.

Vector to intercept the final approach course as required.

c. Approach clearance except when conducting a radar approach. Issue approach clearance only after the aircraft is:

1. Established on a segment of a published route or instrument approach procedure, or

5–123c1 Example.—

Aircraft 1 was vectored to the final approach course but clearance was withheld. It is now at 4,000 feet and established on a segment of the instrument approach procedure. "Seven miles from X-ray. Cleared I-L-S Runway Three Six Approach." (See Figure 5–123[1]).

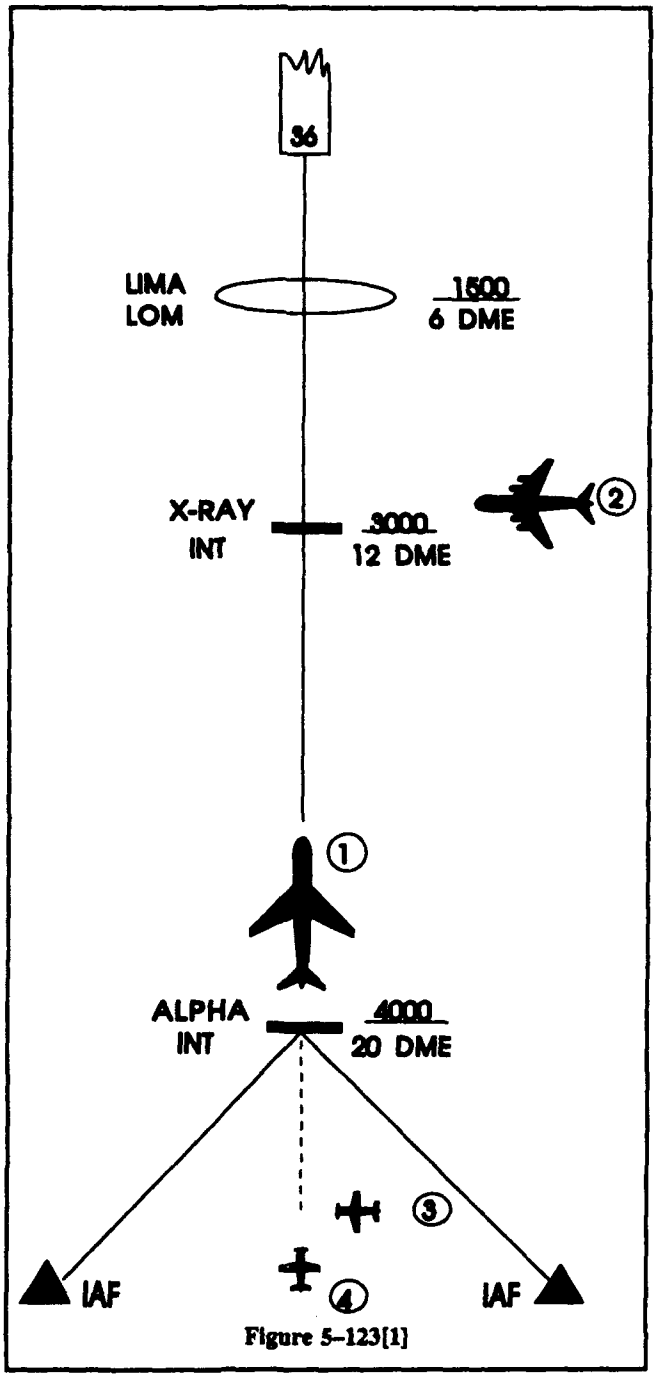


Figure 5–123[1]

2. Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure.

5–123c2 Example 1.—

Aircraft 2 is being vectored to a published segment of the final approach course, 4 miles from Lima at 2,000 feet. The MVA for this area is 2,000 feet. "Four miles from Lima. Turn right heading three four zero. Maintain two thousand until established on the localizer. Cleared I-L-S Runway Three Six Approach." (See Figure 5–123[1]).

5–123c2 Example 2.—

Aircraft 3 is being vectored to intercept the final approach course beyond the approach segments, 5 miles from Alpha at 5,000 feet. The MVA for this area is 4,000 feet. "Five miles from Alpha. Turn right heading three three zero. Cross Alpha at or above four thousand. Cleared I-L-S Runway Three Six Approach." (See Figure 5–123[1]).

5–123c2 Example 3.—

Aircraft 4 is established on the final approach course beyond the approach segments, 8 miles from Alpha at 6,000 feet. The MVA for this area is 4,000 feet. "Eight miles from Alpha. Cross Alpha at or above four thousand. Cleared I-L-S Runway Three Six Approach." (See Figure 5–123[1]).

5–123c2 Example 4.—

The aircraft is being vectored to a published segment of the MLS final approach course, 3 miles from Alpha at 4,000 feet. The MVA for this area is 4,000 feet. "Three miles from Alpha. Turn left heading two one zero. Maintain four thousand until established on the azimuth course. Cleared M-L-S Runway One Eight Approach." (See Figure 5–123[2].

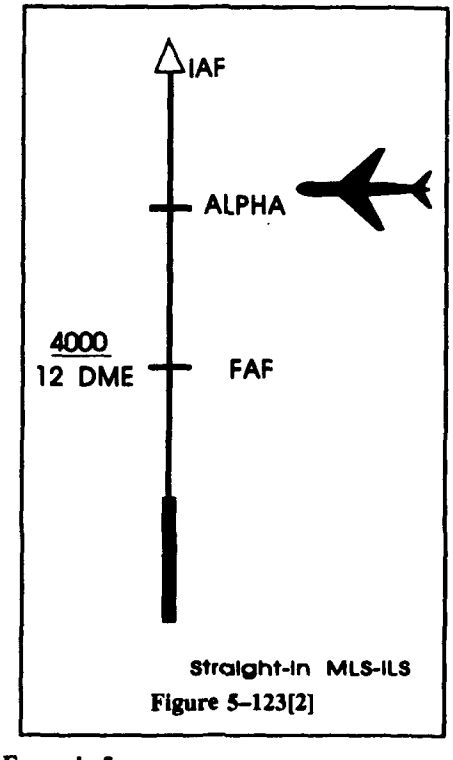


Figure 5–123[2]

5–123c2 Example 5.—

The aircraft is en route to Delta Waypoint at 6,000 feet. The MVA for this area is 4,000 feet. "Cross Delta at or above four thousand. Cleared M-L-S Runway One Eight Approach." (See Figure 5–123[3]).

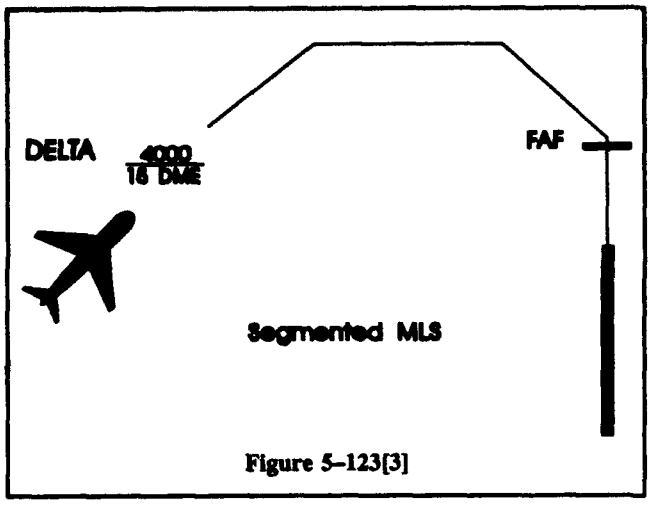


Figure 5–123[3]

5–123c2 Example 6.—

The aircraft is being vectored to an MLS curved approach, 3 miles from X-ray at 3,000 feet. "Three miles from X-ray. Turn right heading three three zero. Maintain three thousand until established on the azimuth course. Cleared M-L-S Runway One Eight Approach." (See Figure 5–123[4]).

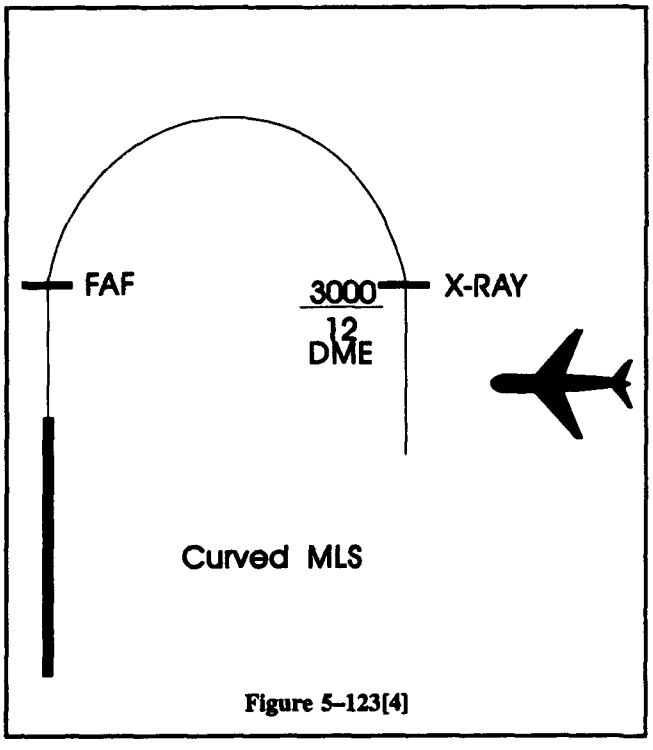


Figure 5–123[4]

5–123c2 Note 1.—The altitude assigned must assure IFR obstruction clearance from the point at which the approach clearance is issued until established on a segment of a published route or instrument approach procedure.

5–123c2 Note 2.—If the altitude assignment is VFR-on-top, it is conceivable that the pilot may elect to remain high until arrival over the final approach fix which may require the pilot to circle to descend so as to cross the final approach fix at an altitude that would permit landing.

d. Instructions to do one of the following:

5–123d Note.—The principal purpose of this paragraph is to ensure that frequency changes are made prior to passing the final approach fix. However, at times it will be desirable to retain an aircraft on the approach control frequency to provide a single-frequency approach or other radar services. When this occurs, it will be necessary to relay tower clearances or instructions to preclude changing frequencies prior to landing or approach termination.Monitor local control frequency, reporting to the tower when over the approach fix.

2. Contact the tower on local control frequency.

5–123d2 Reference.—Communications Release, paragraph 4–107.

3. Contact the final controller on the appropriate frequency if radar service will be provided on final on a different frequency.

5–123d3 Reference.—Final Controller Changeover, paragraph 5–137.

4. When radar is used to establish the final approach fix, inform the pilot that after being advised that he is over the fix he is to contact the tower on local control frequency.

5–123d4 Example.—

"Three miles from final approach fix. Turn left heading zero one zero. Maintain two thousand until established on the localizer. Cleared I-L-S Runway Three Six Approach. I will advise when over the fix."

"Over final approach fix. Contact tower one one eight point one."

5–123d4 Note.—ARSR may be used for establishment of initial approach and intermediate approach fixes only. ASR must be used to establish the final approach fix.

5–123 Reference.—Final Approach Course Intersection, paragraph 5–121. Simultaneous ILS/MLS Approaches, paragraph 5–126.

5–124 APPROACH SEPARATION RESPONSIBILITY

a. The radar controller performing the approach control function is responsible for separation of radar arrivals unless visual separation is provided by the tower, or a letter of agreement/facility directive authorizes otherwise. Radar final controllers ensure that established separation is maintained between aircraft under their control and other aircraft established on the same final approach course.

5–124a Note.—The radar controller may be a controller in an ARTCC, a terminal facility, or a tower controller when authorized to perform the approach control function in a terminal area.

5–124a Reference.—Visual Separation, paragraph 7–10; Radar Separation, paragraph 5–70; Wake Turbulence, paragraph 2–19, Minima, paragraph 5–72. Order 7210.3, Authorization for Separation Services by Towers, paragraph 2–14.

b. When timed approaches are being conducted, the radar controller shall maintain the radar separation specified in paragraph 6–64 until the aircraft is observed to have passed the final approach fix inbound (nonprecision approaches) or the OM or the fix used in lieu of the outer marker (precision approaches) and is within 5 miles of the runway on the final approach course or until visual separation can be provided by the tower.

5–124 Reference.—Receiving Controller Handoff, paragraph 5–65. Final Approach Course Intersection, paragraph 5–121. Parallel ILS/MLS Approaches, paragraph 5–125. Approach Sequence, paragraph 6–61.

5–125 PARALLEL ILS/MLS APPROACHES

TERMINAL

When conducting parallel ILS, MLS, or ILS and MLS approaches:

a. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft during turn on.

b. Provide a minimum of 2.5 miles radar separation between aircraft within 10 miles of the runway end on the same localizer course and/or MLS azimuth course and comply with paragraph 5–72f.

c. Provide a minimum of 1.5 miles radar separation diagonally between successive aircraft on adjacent localizer/azimuth courses when runway centerlines are at least 2,500 feet but no more than 4,300 feet apart.

5–125c Note.—Applying this procedure does not replace the prescribed minima in 5–125b.

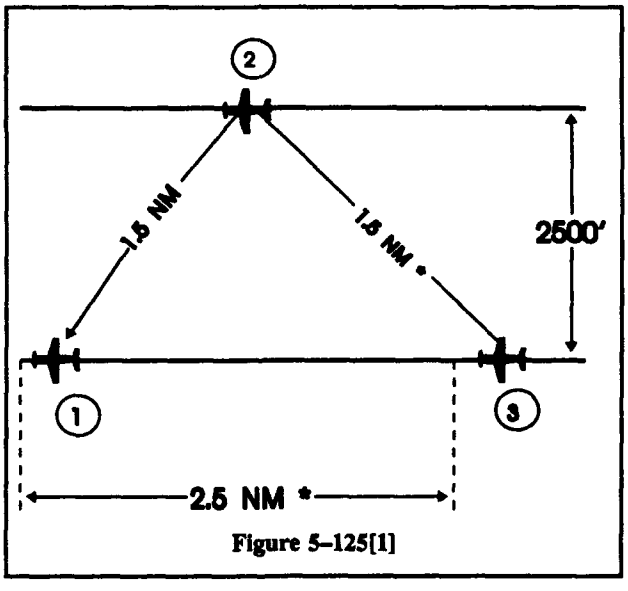


Figure 5–125[1]

In Figure 5–125[1], aircraft 2 is 1.5 miles from aircraft 1, and aircraft 3 is 1.5 miles or more from aircraft 2. *The resultant separation between aircraft 1 and 3 is at least 2.5 miles.

d. Provide a minimum of 2 miles radar separation diagonally between successive aircraft on adjacent localizer/azimuth courses where runway centerlines are more than 4,300 feet but no more than 9,000 feet apart.

5–125d Note.—Applying this procedure does not replace the prescribed minima in 5–125b.

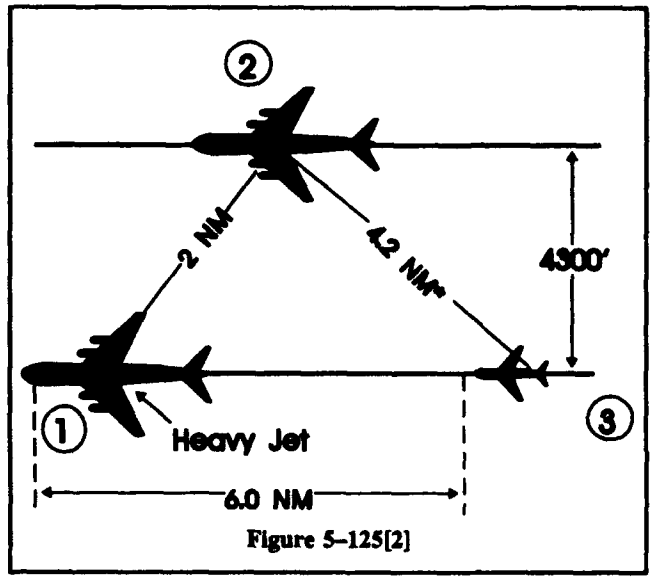


Figure 5–125[2]

In Figure 5–125[2], aircraft 2 is 2 miles from heavy aircraft 1. Aircraft 3 is a small aircraft and is 6 miles from aircraft 1. *The resultant separation between aircraft 2 and 3 is 4.2 miles.

e. The following conditions are required when applying the minimum radar separation on adjacent localizer/azimuth courses allowed in 5–125c or 5–125d:

1. Apply this separation standard only after aircraft are established on the parallel final approach course.
2. Straight-in landings will be made.
3. Missed approach procedures do not conflict.
4. Aircraft are informed that approaches to both runways are in use. This information may be provided through the ATIS.
5. Approach control shall have the interphone capability of communicating directly with the local controller at locations where separation responsibility has not been delegated to the tower.

5–125e5 Note.—The interphone capability is an integral part of this procedure when approach control has the sole separation responsibility.

5–125e5 Reference.—Approach Separation Responsibility, paragraph 5–124; Order 7210.3, Authorization for Separation Services by Towers, paragraph 2–14.

f. Consideration should be given to known factors that may in any way affect the safety of the instrument approach phase of flight, such as surface wind direction and velocity, windshear alerts/reports, severe weather activity, etc. Closely monitor weather activity that could impact the final approach course. Weather conditions in the vicinity of the final approach course may dictate a change of approach in use.

5–125 Reference.—Final Approach Course Intersection, paragraph 5–121.

5–126 SIMULTANEOUS ILS/MLS APPROACHES

TERMINAL

a. When parallel runways are at least 4,300 feet apart, authorize simultaneous ILS, MLS, or ILS and MLS approaches to parallel runways if:

1. Straight-in landings will be made.

2. ILS, MLS, radar, and appropriate frequencies are operating normally.

b. Prior to aircraft departing an outer fix, inform aircraft that simultaneous ILS/MLS approaches are in use. This information may be provided through the ATIS.

c. On the initial vector, inform the aircraft of the ILS/MLS runway number.

Phraseology:

I-L-S RUNWAY (runway number) (left/right).

M-L-S RUNWAY (runway number) (left/right).

d. Clear the aircraft to descend to the appropriate glideslope/glidepath intercept altitude soon enough to provide a period of level flight to dissipate excess speed. Provide at least 1 mile of straight flight prior to the final approach course intercept.

5–126d Note.—Not applicable to curved and segmented MLS approaches.

e. Vector the aircraft to intercept the final approach course at an angle not greater than 30 degrees.

f. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft during turn-on to parallel final approach. Provide the minimum applicable radar separation between aircraft on the same final approach course.

5–126f Note.—Aircraft established on a final approach course are separated from aircraft established on an adjacent parallel final approach course provided neither aircraft penetrates the depicted NTZ.

g. When assigning the final heading to intercept the final approach course, issue the following to the aircraft:

1. Position from a fix on the localizer course or the MLS azimuth course.

2. An altitude to maintain until established on the localizer course or the MLS azimuth course.

5–126g2 Reference.—Arrival Instructions, paragraph 5–123.

3. Clearance for the appropriate ILS/MLS runway number approach.

Phraseology:

POSITION (number) MILES FROM (fix). TURN (left/right) HEADING (degrees). MAINTAIN (altitude) UNTIL ESTABLISHED ON THE LOCALIZER. CLEARED I-L-S RUNWAY (number) (left/right) APPROACH.

POSITION (number) MILES FROM (fix). TURN (left/right) HEADING (degrees). MAINTAIN (altitude) UNTIL ESTABLISHED ON THE FINAL APPROACH COURSE. CLEARED M-L-S RUNWAY (number) (left/right) APPROACH.

h. Monitor all approaches regardless of weather. Monitor local control frequency to receive any aircraft transmission. Issue control instructions as necessary to ensure aircraft do not enter the NTZ.

5–126h Note 1.—Separate monitor controllers, each with transmit/receive and override capability on the local control frequency, shall ensure aircraft do not penetrate the depicted NTZ. Facility directives shall delineate responsibility for providing the minimum applicable longitudinal separation between aircraft on the same final approach course.

5–126h Note 2.—An NTZ at least 2,000 feet wide is established equidistant between runway centerlines extended and is depicted on the monitor display. The primary responsibility for navigation on the final approach course rests with the pilot. Therefore, control instructions and information are issued only to ensure separation between aircraft and that aircraft do not penetrate the NTZ. Pilots are not expected to acknowledge those transmissions unless specifically requested to do so.

5–126h Note 3.—For the purposes of ensuring an aircraft does not penetrate the NTZ, the "aircraft" is considered the center of the primary radar return for that aircraft. The provisions of paragraph 5–71 apply also.

1. When aircraft are observed to overshoot the turn-on or to continue on a track which will penetrate the NTZ, instruct the aircraft to return to the correct final approach course immediately.

Phraseology:

YOU HAVE CROSSED THE FINAL APPROACH COURSE. TURN (left/right) IMMEDIATELY AND RETURN TO LOCALIZER/AZIMUTH COURSE,

or

TURN (left/right) IMMEDIATELY HEADING (degrees), CLIMB AND MAINTAIN (altitude).

2. Instruct aircraft on the adjacent final approach course to alter course to avoid the deviating aircraft when an aircraft is observed penetrating the NTZ.

Phraseology:

TURN (right/left) IMMEDIATELY HEADING (degrees), CLIMB AND MAINTAIN (altitude).

3. Terminate radar monitoring when one of the following occurs:

(a) Visual separation is applied.

(b) The aircraft reports the approach lights or runway in sight.

(c) The aircraft is 1 mile or less from the runway threshold, if procedurally required and contained in facility directives.

4. Do not inform the aircraft when radar monitoring is terminated.

5. Do not apply the provisions of paragraph 5–180 for simultaneous ILS, MLS, or ILS and MLS approaches.

i. When simultaneous ILS, MLS, or ILS and MLS approaches are being conducted to parallel runways, consideration should be given to known factors that may in any way affect the safety of the instrument approach phase of flight, such

as surface wind direction and velocity, windshear alerts/reports, severe weather activity, etc. Closely monitor weather activity that could impact the final approach course. Weather conditions in the vicinity of the final approach course may dictate a change of approach in use.

5–126 Reference.—Radar Service Termination, paragraph 5–13. Final Approach Course Intersection, paragraph 5–121.

5–127 SIMULTANEOUS ILS/MLS APPROACHES - HIGH UPDATE RADAR

TERMINAL

a. Authorize simultaneous independent ILS, MLS, or ILS and MLS approaches to parallel runways with centerlines separated by 3,400 to 4,300 feet when precision runway monitors are utilized with a radar update rate of 2.4 seconds or less, and:

1. Straight-in landings will be made.

2. ILS, MLS, radar, and appropriate frequencies are operating normally.

b. Inform aircraft that simultaneous ILS/MLS approaches are in use prior to aircraft departing an outer fix. This information may be provided through the ATIS.

c. Inform the aircraft of the ILS/MLS runway number on the initial vector.

Phraseology:

I-L-S RUNWAY (runway number) (left/right).

M-L-S RUNWAY (runway number) (left/right).

d. Clear the aircraft to descend to the appropriate glideslope/glidepath intercept altitude soon enough to provide a period of level flight to dissipate excess speed. Provide at least 1 mile of straight flight prior to the final approach course intercept.

5–127d Note.— Not applicable to curved and segmented MLS approaches.

e. Vector the aircraft to intercept the final approach course at an angle not greater than 30 degrees.

f. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft during turn onto parallel final approach. Provide the minimum applicable radar separation between aircraft on the same final approach course

5–127f Note— Aircraft established on a final approach course are separated from aircraft established on an adjacent parallel final approach course provided neither aircraft penetrates the depicted no transgression zone (NTZ).

g. Issue the following to an aircraft when assigning a final heading to intercept the final approach course:

1. Position from a fix on the localizer course or the MLS azimuth course.

2. An altitude to maintain until established on the localizer course or the MLS azimuth course.

5–127g2 Reference.— Arrival Instructions, paragraph 5–123.

3. Clearance for the appropriate ILS/MLS runway number approach.

Phraseology:

POSITION (number) MILES FROM (fix). TURN (left/right) HEADING (degrees). MAINTAIN (altitude) UNTIL ESTABLISHED ON THE LOCALIZER. CLEARED I-L-S RUNWAY (number) (left/right) APPROACH.

or

POSITION (number) MILES FROM (fix). TURN (left/right) HEADING (degrees). MAINTAIN (altitude) UNTIL ESTABLISHED ON THE FINAL APPROACH COURSE. CLEARED M-L-S RUNWAY (number) (left/right) APPROACH.

h. Monitor all approaches regardless of weather. Monitor local control frequency to receive any aircraft transmission. Issue control instructions as necessary to ensure aircraft do not enter the NTZ.

5–127h Note 1.— Separate monitor controllers, each with transmit/receive and override capability on the local control frequency, shall ensure aircraft do not penetrate the depicted NTZ. Facility directives shall define the responsibility for providing the minimum applicable longitudinal separation between aircraft on the same final approach course.

5–127h Note 2.— An NTZ at least 2,000 feet wide is established equidistant between extended runway final approach course centerlines and shall be depicted on the monitor display. The primary responsibility for navigation on the final approach course rests with the pilot. Control instructions and information are issued only to ensure that aircraft do not penetrate the NTZ. Pilots are not expected to acknowledge those transmissions unless specifically requested to do so.

5–127h Note 3.— The aircraft is considered the center of the digitized target for that aircraft for the purposes of ensuring an aircraft does not penetrate the NTZ.

1. Instruct the aircraft to return immediately to the correct final approach course when aircraft are observed to overshoot the turn-on or continue on a track which will penetrate the NTZ.

Phraseology:

YOU HAVE CROSSED THE FINAL APPROACH COURSE. TURN (left/right) IMMEDIATELY AND RETURN TO LOCALIZER/AZIMUTH COURSE.

or

TURN (left/right) AND RETURN TO THE LOCALIZER/AZIMUTH COURSE.

2. Instruct aircraft on the adjacent final approach course to alter course to avoid the deviating aircraft when an aircraft is observed penetrating the NTZ.

Phraseology:

TURN (left/right) IMMEDIATELY HEADING (degrees), CLIMB AND MAINTAIN (altitude).

3. Terminate radar monitoring when one of the following occurs:

(a) Visual separation is applied.

(b) The aircraft reports the approach lights or runway in sight.

(c) The aircraft has landed or, in the event of a missed approach, is one-half mile beyond the departure end of the runway.

4. Do not inform the aircraft when radar monitoring is terminated.

5. Do not apply the provisions of paragraph 5–180 for simultaneous ILS, MLS, or ILS and MLS approaches.

i. Consideration should be given to known factors that may in any way affect the safety of the instrument approach phase of flight when simultaneous ILS, MLS, or ILS and MLS approaches are being conducted to parallel runways. Factors include but are not limited to wind direction/velocity, wind-shear alerts/reports, severe weather activity. Closely monitor weather activity that could impact the final approach course. Weather conditions in the vicinity of the final approach course may dictate a change of the approach in use.

5–128 thru 5–129 RESERVED

Section 10. RADAR APPROACHES —TERMINAL

5–130 APPLICATION

a. Provide radar approaches in accordance with standard or special instrument approach procedures.

b. A radar approach may be given to any aircraft upon request and may be offered to aircraft in distress regardless of weather conditions or to expedite traffic.

5–130b Note.—Acceptance of a radar approach by a pilot does not waive the prescribed weather minima for the airport or for the particular aircraft operator concerned. The pilot is responsible for determining if the approach and landing are authorized under the existing weather minima.

5–130 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–131 APPROACH INFORMATION

a. Issue the following information to an aircraft that will conduct a radar approach. Current approach information contained in the ATIS broadcast may be omitted if the pilot states the appropriate ATIS broadcast code. All items listed below, except for subparagraph 5–131a3, may be omitted after the first approach if repeated approaches are made and no change has occurred. Transmissions with aircraft in this phase of the approach should occur approximately every minute.

5–131a Reference.—Approach Information by Approach Control Facilities, paragraph 4–92.

1. Altimeter setting.

2. If available, ceiling and visibility if the ceiling at the airport of intended landing is reported below 1,000 feet or below the highest circling minimum, whichever is greater, or if the visibility is less than 3 miles. Advise pilots when weather information is available via the Automated Weather Observation System (AWOS)/Automated Surface Observation System (ASOS) and issue the appropriate frequency.

3. Issue any known changes classified as special weather observations as soon as possible. Special weather observations need not be issued after they are included in the ATIS broadcast and the pilot states the appropriate ATIS broadcast code.

4. Pertinent information on known airport conditions if they are considered necessary to the safe operation of the aircraft concerned.

5. Lost communication procedures as specified in paragraph 5–133.

b. Before starting final approach:

5–131b Note 1.—ASR approach procedures may be prescribed for specific runways, for an airport/heliport, and for helicopters only to a "point-in-space," i.e., a MAP from which a helicopter must be able to proceed to the landing area by visual reference to a prescribed surface route.

5–131b Note 2.—Occasionally, copter PAR approaches are available to runways where conventional PAR approaches have been established. In those instances where the two PAR approaches serve the same runway, the copter approach will have a steeper glide slope and a lower decision height. By the controller's designating the approach to be flown, the helicopter pilot understands which of the two approaches he has been vectored for and which set of minima apply.

1. Inform the aircraft of the type of approach, runway, airport, heliport, or other point, as appropriate, to which the approach will be made. Specify the airport name when the approach is to a secondary airport.

Phraseology:

THIS WILL BE A P-A-R/SURVEILLANCE APPROACH TO:

RUNWAY (runway number),

or

(airport name) AIRPORT, RUNWAY (runway number),

or

(airport name) AIRPORT/HELIPORT.

THIS WILL BE A COPTER P-A-R APPROACH TO:

RUNWAY (runway number),

or

(airport name) AIRPORT, RUNWAY (runway number),

or

(airport name) AIRPORT/HELIPORT.

2. For surveillance approaches, specify the location of the MAP in relation to the runway/airport/heliport.

Phraseology:

MISSED APPROACH POINT IS (distance) MILE/S FROM RUNWAY/AIRPORT/HELIPORT,

or for a Point-In-Space Approach,

A MISSED APPROACH POINT (distance) MILE/S (direction from landing area) OF (airport name) AIRPORT/HELIPORT.

5–131b1 and 2 Example.—

Helicopter Point-in-Space Approach:

"Army Copter Zulu Two, this will be a surveillance approach to a missed approach point, three point five miles south of Creedon Heliport."

5–131b Reference.—Elevation failure, paragraph 5–168.

c. Inform an aircraft making an approach to an airport not served by a tower that no traffic or landing runway information is available for that airport.

Phraseology:

NO TRAFFIC OR LANDING RUNWAY INFORMATION AVAILABLE FOR THE AIRPORT.

5–131 Reference.—Altimeter Setting Issuance Below Lowest Usable FL, paragraph 2–111. Final Approach Course Intersection, paragraph 5–121.

5–132 NO-GYRO APPROACH

When an aircraft will make a no-gyro surveillance or a PAR approach:

a. Before issuing a vector, inform the aircraft of the type of approach.

Phraseology:

THIS WILL BE A NO-GYRO SURVEILLANCE/P-A-R APPROACH.

b. Instruct the aircraft when to start and stop turn.

Phraseology:

TURN LEFT/RIGHT.

STOP TURN.

c. After turn on to final approach has been made and prior to the aircraft reaching the approach gate, instruct the aircraft to make half-standard rate turns.

Phraseology:

MAKE HALF-STANDARD RATE TURNS.

5–132 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–133 LOST COMMUNICATIONS

When weather reports indicate that an aircraft will likely encounter IFR weather conditions during the approach, take the following action as soon as possible after establishing radar identification and radio communications (may be omitted after the first approach when successive approaches are made and the instructions remain the same):

5–133 Note.—Air traffic control facilities at U.S. Army and U.S. Air Force Installations are not required to transmit lost communications instructions to military aircraft. All military facilities will issue specific lost communications instructions to civil aircraft when required.

a. If lost communications instructions will require the aircraft to fly on an unpublished route, issue an appropriate altitude to the pilot. If the lost communications instructions are the same for both pattern and final, the pattern/vector controller shall issue both. Advise the pilot that if radio communications are lost for a specified time interval (not more than 1 minute) on vector to final approach, 15 seconds on a surveillance final approach, or 5 seconds on a PAR final approach to:

1. Attempt contact on a secondary or a tower frequency.

2. Proceed in accordance with visual flight rules if possible.

3. Proceed with an approved nonradar approach, or execute the specific lost communications procedure for the radar approach being used.

5–133a3 Note.—The approved procedures are those published on the FAA Forms 8260 or applicable military document.

Phraseology:

IF NO TRANSMISSIONS ARE RECEIVED FOR (time interval) IN THE PATTERN OR FIVE TEEN SECONDS ON FINAL APPROACH, ATTEMPT CONTACT ON (frequency), AND

if the possibility exists,

PROCEED VFR. IF UNABLE:

if approved,

PROCEED WITH (nonradar approach), MAINTAIN (altitude) UNTIL ESTABLISHED ON/OVER/FIX/NAVAID/ APPROACH PROCEDURE,

or

(alternative instructions).

USN

Phraseology:

For ACLS operations using Mode I, IA, and II,

IF NO TRANSMISSIONS ARE RECEIVED FOR FIVE SECONDS AFTER LOSS OF DATA LINK, ATTEMPT CONTACT ON (frequency), AND

if the possibility exists,

PROCEED VFR. IF UNABLE:

if approved,

PROCEED WITH (nonradar approach), MAINTAIN (altitude) UNTIL ESTABLISHED ON/OVER FIX/NAVAID/ APPROACH PROCEDURE,

or

(alternative instructions).

b. If the final approach lost communications instructions are changed, differ from those for the pattern, or are not issued by the pattern controller, they shall be issued by the final controller.

c. If the pilot states that he cannot accept a lost communications procedure due to weather conditions or other reasons, request the pilot's intention.

5–133c Note.—The pilot is responsible for determining the adequacy of lost communications procedures with respect to aircraft performance, equipment capability, or reported weather.

5–133 Reference.—Final Approach Course Intersection, paragraph 5–121. Approach Information, paragraph 5–131. Elevation Failure, paragraph 5–168.

5–134 RADAR CONTACT LOST

If radar contact is lost during an approach and the aircraft has not started final approach, clear the aircraft to an appropriate NAVAID/fix for an instrument approach.

5–134 Reference.—Final Approach Course Intersection, paragraph 5–121. Final Approach Abnormalities, paragraph 5–143. Elevation Failure, paragraph 5–168.

5–135 LANDING CHECK

USA/USN

Advise the pilot to perform landing check while the aircraft is on downwind leg and in time to complete it before turning base leg. If an incomplete pattern is used, issue this before handoff to the final controller for a PAR approach, or before

starting descent on final approach for surveillance approach.

Phraseology:
PERFORM LANDING CHECK

5–135 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–136 POSITION INFORMATION

Inform the aircraft of its position at least once before starting final approach.

Phraseology:
(Number) MILES (direction) OF (airport name) AIRPORT,

or

(Number) MILES (direction) OF (airport name) AIRPORT ON DOWNWIND/BASE LEG.

5–136 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–137 FINAL CONTROLLER CHANGEOVER

When instructing the aircraft to change frequency for final approach guidance, include the name of the facility.

Phraseology:
CONTACT (name of facility) FINAL CONTROLLER ON (frequency).

5–137 Reference.—Radio Communications Transfer, paragraph 2–17. Final Approach Course Intersection, paragraph 5–121. Arrival Instructions, paragraph 5–123. Elevation Failure, paragraph 5–168.

5–138 COMMUNICATIONS CHECK

On initial contact with the final controller, ask the aircraft for a communication check.

Phraseology:
(Aircraft call sign), (name of facility) FINAL CONTROLLER.

HOW DO YOU HEAR ME?

5–138 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–139 TRANSMISSION ACKNOWLEDGMENT

After contact has been established with the final controller and while on the final approach course, instruct the aircraft not to acknowledge further transmissions.

Phraseology:
DO NOT ACKNOWLEDGE FURTHER TRANSMISSIONS.

5–139 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–140 MISSED APPROACH

Before an aircraft starts final descent for a full stop landing and weather reports indicate that any portion of the final approach will be conducted in IFR conditions, issue a specific missed approach procedure approved for the radar approach being conducted.

Phraseology:
YOUR MISSED APPROACH PROCEDURE IS (missed approach procedure).

5–140 Note. 1—The specific missed approach procedure is published on FAA Form 8260–4 or applicable military document.

5–140 Note. 2—*USAF:* At locations where missed approach instructions are published in base flying regulations, controllers need not issue missed approach instructions to locally assigned/attached aircraft.

5–140 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–141 LOW APPROACH AND TOUCH-AND-GO

Before an aircraft which plans to execute a low approach or touch-and-go begins final descent, issue appropriate departure instructions to be followed upon completion of the approach. Climb-out instructions must include a specific heading and altitude except when the aircraft will maintain VFR and contact the tower.

Phraseology:
AFTER COMPLETING LOW APPROACH/

TOUCH AND GO:

CLIMB AND MAINTAIN (altitude).

TURN (right or left) HEADING (degrees)/FLY RUNWAY HEADING,

or

MAINTAIN VFR, CONTACT TOWER,

or

(other instructions as appropriate).

5–141 Note.—This may be omitted after the first approach if instructions remain the same.

5–141 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–142 TOWER CLEARANCE

a. When an aircraft is on final approach to an airport served by a tower, obtain a clearance to land, touch-and-go, or make low approach. Issue the clearance and the surface wind to the aircraft.

b. If the clearance is not obtained or is canceled, inform the aircraft and issue alternative instructions.

Phraseology:
TOWER CLEARANCE CANCELED/NOT RECEIVED (alternative instructions).

5–142 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–143 FINAL APPROACH ABNORMALITIES

Instruct the aircraft if runway environment not in sight, execute a missed approach if previously given; or climb to or maintain a specified altitude and fly a specified course whenever the completion of a safe approach is questionable because one or more of the following conditions exists. The conditions in subparagraphs 5–143a. b, and c do not apply after the aircraft passes decision height on a PAR approach.

5–143 Examples—

Examples of reasons for issuing missed approach instructions:

"Radar contact lost."

"Too high/low for safe approach."

"Too far right/left for safe approach."

5–143 Reference.—Position Advisories, paragraph 5–166.

a. Safety limits are exceeded or radical target deviations are observed.

b. Position or identification of the aircraft is in doubt.

c. Radar contact is lost or a malfunctioning radar is suspected.

Phraseology:

(Reason) IF RUNWAY/APPROACH LIGHTS/RUNWAY LIGHTS NOT IN SIGHT, EXECUTE MISSED APPROACH/(alternative instructions).

5–143c Note.—If the pilot requests, approval may be granted to proceed with the approach via ILS or another navigational aid/approach aid.

5–143c Reference.—Radar Contact Lost, paragraph 5–134.

d. Airport conditions or traffic preclude approach completion.

Phraseology:

EXECUTE MISSED APPROACH/(alternative instructions). (Reason).

5–143 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–144 MILITARY SINGLE FREQUENCY APPROACHES

a. Utilize single frequency approach procedures as contained in a Letter of Agreement.

b. Do not require a frequency change from aircraft on a single frequency approach after the approach has begun unless:

1. Landing or low approach has been completed.
2. The aircraft is in visual flight rules (VFR) conditions during daylight hours.
3. The pilot requests the frequency change.
4. An emergency situation exists.
5. The aircraft is cleared for a visual approach.
6. The pilot cancels instrument instrument flight rules (IFR).

c. Accomplish the following steps to complete communications transfer on single frequency approaches after completion of a handoff:

1. Transferring controller: Position transmitter selectors to preclude further transmissions on the special use frequencies.
2. Receiving controller: Position transmitter and receiver selectors to enable communications on the special use frequencies.
3. Do not require or expect the flight to check on frequency unless an actual frequency change is transmitted to the pilot.

5–145 thru 5–149 RESERVED

Section 11. SURVEILLANCE APPROACHES —TERMINAL

5–150 ALTITUDE INFORMATION

Provide recommended altitudes on final approach if the pilot requests. If recommended altitudes are requested, inform the pilot that recommended altitudes which are at or above the published MDA will be given for each mile on final.

5–150 Reference.—Order 7210.3, Facility managers refer to Recommended Altitudes for Surveillance Approaches, paragraph 12–56.

Phraseology:

RECOMMENDED ALTITUDES WILL BE PROVIDED FOR EACH MILE ON FINAL TO MINIMUM DESCENT ALTITUDE/CIRCLING MINIMUM DESCENT ALTITUDE.

5–150 Reference.—Final Approach Guidance, paragraph 5–154.

5–151 VISUAL REFERENCE REPORT

Aircraft may be requested to report the runway, approach/runway lights, or airport in sight. Helicopters making a "point-in-space" approach may be requested to report when able to proceed to the landing area by visual reference to a prescribed surface route.

Phraseology:

REPORT (runway, approach/runway lights or airport) IN SIGHT.

REPORT WHEN ABLE TO PROCEED VISUALLY TO AIRPORT/HELIPORT.

5–152 DESCENT NOTIFICATION

a. Issue advance notice of where descent will begin and issue the straight-in MDA prior to issuing final descent for the approaches.

5–152a Note.—The point at which descent to the minimum descent altitude is authorized is the final approach fix unless an altitude limiting stepdown-fix is prescribed.

b. When it is determined that the surveillance approach will terminate in a circle to land maneuver, request the aircraft approach category from the pilot. After receiving the aircraft approach category, provide him with the applicable circling MDA prior to issuing final descent for the approach.

5–152b Note.—Pilots are normally expected to furnish the aircraft approach category to the controller when it is determined that the surveillance approach will terminate in a circle to land maneuver. If this information is not voluntarily given, solicit the aircraft approach category from the pilot, and then issue him the applicable circling MDA.

Phraseology:

PREPARE TO DESCEND IN (number) MILE/S.

For straight-in approaches,

MINIMUM DESCENT ALTITUDE (altitude).

For circling approaches,

REQUEST YOUR AIRCRAFT APPROACH CATEGORY. (Upon receipt of aircraft approach category) PUBLISHED CIRCLING MINIMUM DESCENT ALTITUDE (altitude).

5–153 DESCENT INSTRUCTIONS

When an aircraft reaches the descent point, issue one of the following as appropriate:

5–153 Reference.—Elevation Failure, paragraph 5–168.

a. Unless a descent restriction exists, advise the aircraft to descend to the MDA.

Phraseology:

(Number) MILES FROM RUNWAY/AIRPORT/HELIPORT. DESCEND TO YOUR MINIMUM DESCENT ALTITUDE.

b. When a descent restriction exists, specify the prescribed restriction altitude. When the aircraft has passed the altitude limiting point, advise to continue descent to MDA.

Phraseology:

(Number) MILES FROM RUNWAY/AIRPORT/HELIPORT. DESCEND AND MAINTAIN (restriction altitude).

DESCEND TO YOUR MINIMUM DESCENT ALTITUDE.

5–154 FINAL APPROACH GUIDANCE

a. Issue course guidance, inform the aircraft when it is on course, and frequently inform the aircraft of any deviation from course. Transmissions with aircraft on surveillance final approach should occur approximately every 15 seconds.

Phraseology:

HEADING (heading),

ON COURSE,

or

SLIGHTLY/WELL LEFT/RIGHT OF COURSE.

5–154a Note.—Controllers should not key the radio transmitter continuously during radar approaches to preclude a lengthy communications block. The decision on how often transmitters are unkeyed is the controller's prerogative.

b. Issue trend information, as required, to indicate target position with respect to the extended runway centerline and to describe the target movement as appropriate corrections are issued. Trend information may be modified by the terms "RAPIDLY" and "SLOWLY" as appropriate.

5–154b Examples.—

"Going left/right of course." "Left/right of course and holding/correcting."

c. Inform the aircraft of its distance from the runway, airport/heliport, or MAP, as appropriate, each mile on final.

Phraseology:

(Number) MILE/S FROM RUNWAY/AIRPORT/HELIPORT OR MISSED APPROACH POINT.

d. Recommended altitudes shall be furnished, if requested, in accordance with paragraph 5–150.

Phraseology:

If requested,

ALTITUDE SHOULD BE (altitude).

5–155 APPROACH GUIDANCE TERMINATION

a. Discontinue surveillance approach guidance when:

1. Requested by the pilot.
2. In your opinion, continuation of a safe approach to the MAP is questionable.
3. The aircraft is over the MAP.

b. Surveillance approach guidance may be discontinued when the pilot reports the runway or approach/runway lights in sight or if a "point-in-space" approach, he reports able to proceed to the landing area by visual reference to a prescribed surface route.

c. When approach guidance is discontinued in accordance with subparagraph 5–155a and the aircraft has reported the runway or approach/runway lights in sight, advise the aircraft of its position and to proceed visually.

Phraseology:

(Distance) MILE/S FROM RUNWAY/AIRPORT/HELIPORT,

or

OVER MISSED APPROACH POINT.

PROCEED VISUALLY (additional instructions/clearance as required).

d. When approach guidance is discontinued in accordance with subparagraph 5–155a above and the aircraft has not reported the runway or approach/runway lights in sight, advise the aircraft of its position and to execute a missed approach unless the runway or approach/runway lights are in sight or, if a "point-in-space" approach, unless able to proceed visually.

Phraseology:

(Distance) MILE/S FROM RUNWAY,

or

OVER MISSED APPROACH POINT.

IF RUNWAY,

or

APPROACH/RUNWAY LIGHTS NOT IN SIGHT, EXECUTE MISSED APPROACH/(missed approach instructions). (Additional instructions/clearance, as required).

(Distance and direction) FROM AIRPORT/HELIPORT/MISSED APPROACH POINT.

IF UNABLE TO PROCEED VISUALLY, EXECUTE MISSED APPROACH. (Additional instructions/clearance, if required).

5–155d Note.—Terminal Instrument Approach Procedures and Flight Inspection criteria require establishment of a MAP for each procedure including the point to which satisfactory radar guidance can be provided.

5–156 thru 5–159 RESERVED

Section 12. PAR APPROACHES —TERMINAL

5–160 GLIDEPATH NOTIFICATION

Inform the aircraft when it is approaching glidepath (approximately 10 to 30 seconds before final descent).

Phraseology:
APPROACHING GLIDEPATH.

5–161 DECISION HEIGHT (DH) NOTIFICATION

Provide the DH to any pilot who requests it.

Phraseology:
DECISION HEIGHT (number of feet).

5–162 DESCENT INSTRUCTION

When an aircraft reaches the point where final descent is to start, instruct it to begin descent.

Phraseology:
BEGIN DESCENT.

5–163 GLIDEPATH AND COURSE INFORMATION

a. Issue course guidance and inform the aircraft when it is on glidepath and on course, and frequently inform the aircraft of any deviation from glidepath or course. Transmissions with aircraft on precision final approach should occur approximately every 5 seconds.

Phraseology:
HEADING (heading).

ON GLIDEPATH.

ON COURSE,

or

SLIGHTLY/WELL ABOVE/BELOW GLIDEPATH.

SLIGHTLY/WELL LEFT/RIGHT OF COURSE.

5–163a Note.—Controllers should not key the radio transmitter continuously during radar approaches to preclude a lengthy communications block. The decision on how often transmitters are unkeyed is the controller's prerogative.

b. Issue trend information as required, to indicate target position with respect to the azimuth and elevation cursors and to describe target movement as appropriate corrections are issued. Trend information may be modified by the terms "RAPIDLY or "SLOWLY", as appropriate.

5–163b Examples.—
"Going above/below glidepath."

"Going right/left of course."

"Above/below glidepath and coming down/up."

"Above/below glidepath and holding."

"Left/right of course and holding/correcting."

5–163 Reference.—Position Advisories, paragraph 5–166. Monitor Information, paragraph 5–182.

5–164 DISTANCE FROM TOUCHDOWN

Inform the aircraft of its distance from touchdown at least once each mile on final approach.

Phraseology:
(Number of miles) MILES FROM TOUCHDOWN.

5–165 DECISION HEIGHT

Inform the aircraft when it reaches the published decision height.

Phraseology:
AT DECISION HEIGHT.

5–166 POSITION ADVISORIES

a. Continue to provide glidepath and course information prescribed in paragraph 5–163a and b until the aircraft passes over threshold.

5–166 Note.—Glidepath and course information provided below decision height is advisory only. FAR 91.116 outlines pilot responsibilities for descent below decision height.

b. Inform the aircraft when it is passing over the approach lights.

Phraseology:
OVER APPROACH LIGHTS.

c. Inform the aircraft when it is passing over the landing threshold and inform it of its position with respect to the final approach course.

Phraseology:
OVER LANDING THRESHOLD, (position with respect to course).

5–166 Reference.—Final Approach Abnormalities, paragraph 5–143.

5–167 COMMUNICATION TRANSFER

Issue communications transfer instructions.

Phraseology:
CONTACT (terminal control function) (frequency, if required) AFTER LANDING.

5–167 Note.—Communications transfer instructions should be delayed slightly until the aircraft is on the landing roll-out to preclude diversion of the pilot's attention during transition and touchdown.

5–167 Reference.—Radio Communications Transfer, paragraph 2–17.

5–168 ELEVATION FAILURE

a. If the elevation portion of PAR equipment fails during a precision approach:

1. Discontinue PAR instructions and tell the aircraft to take over visually or if unable, to execute a missed approach. If the aircraft executes a missed approach, apply subparagraph 5–168a2.

Phraseology:
NO GLIDEPATH INFORMATION AVAILABLE. IF RUNWAY, APPROACH/RUNWAY LIGHTS, NOT IN SIGHT, EXECUTE MISSED APPROACH/(alternative instructions).

2. If a surveillance approach, ASR or PAR without glide slope, is established for the same runway, inform the aircraft that a surveillance approach can be given. Use ASR or the azimuth portion of the PAR to conduct the approach and

apply section 11 of this chapter. When the PAR azimuth is used, inform the pilot that mileage information will be from touchdown, and at those runways where specific minima have been established for PAR without glideslope, inform the pilot that the PAR azimuth will be used for the approach.

5–168a2 Examples.—

a. Approach information when PAR azimuth used:

"This will be a surveillance approach to Runway Three Six. Mileages will be from touchdown," or

"This will be a surveillance approach to Runway Three Six using P-A-R azimuth. Mileages will be from touchdown."

b. Descent instructions:

"Five miles from touchdown, descend to your minimum descent altitude/minimum altitude."

5–168a2 Reference.—Approach Information, paragraph 5–131; Descent Instructions, paragraph 5–153.

b. If the elevation portion of the PAR equipment is inoperative before starting a precision approach, apply subparagraph 5–168a2.

5–169 SURVEILLANCE UNUSABLE

PAR approaches may be conducted when the ASR is unusable provided a nonradar instrument approach will position the aircraft over a navigational aid or DME fix within the precision radar coverage, or an adjacent radar facility can provide a direct radar handoff to the PAR controller.

5–169 Note.—The display of the NAVAID or DME fix in accordance with paragraph 5–51b is not required provided the NAVAID or DME fix can be correlated on a PAR scope.

5–170 thru 5–179 RESERVED

Section 13. USE OF PAR FOR APPROACH MONITORING —TERMINAL

5–180 MONITOR ON PAR EQUIPMENT

Aircraft conducting precision or nonprecision approaches shall be monitored by PAR equipment if the PAR final approach course coincides with the NAVAID final approach course from the final approach fix to the runway and one of the following conditions exists:

5–180 Note 1.—The provisions of this section do not apply to monitoring simultaneous ILS, MLS, or ILS and MLS approaches.

5–180 Note 2.—This procedure is used in PAR facilities operated by the FAA and the military services at joint-use civil/military locations and military installations during the operational hours of the PAR.

a. The reported weather is below basic VFR minima.

b. *USA NOT APPLICABLE:* At night.

c. Upon request of the pilot.

5–180 Reference.—Simultaneous ILS/MLS Approaches, paragraph 5–126.

5–181 MONITOR AVAILABILITY

a. Inform the aircraft of the frequency on which monitoring information will be transmitted if it will not be the same as the communication frequency used for the approach.

Phraseology:

RADAR MONITORING ON LOCALIZER VOICE (frequency),

and if applicable,

CONTACT (terminal control function) (frequency, if required) AFTER LANDING.

b. If the approach is not monitored, inform the aircraft that radar monitoring is not available.

Phraseology:

RADAR MONITORING NOT AVAILABLE.

c. If conditions prevent continued monitor after the aircraft is on final approach, advise the pilot. State the reason, and issue alternate procedures as appropriate.

Phraseology:

(Reason), RADAR MONITORING NOT AVAILABLE, (alternative instructions).

5–181c Note.—Approach monitoring is a vital service, but during the approach, the controller acts primarily as a safety observer and does not actually guide the aircraft. Loss of the radar monitoring capability (and thus availability) is no reason to terminate an otherwise good instrument approach. Advise the pilot that radar contact has been lost (or other reason as appropriate), that radar monitoring is not available, and of actions for the pilot to take in either proceeding with or breaking off the approach; i.e., contact tower, remain on P-A-R frequency, etc.

5–182 MONITOR INFORMATION

When approaches are monitored, take the following action:

a. Advise the pilot executing a nonprecision approach that glidepath advisories are not provided. Do this prior to the pilot beginning his final descent.

Phraseology:

GLIDEPATH ADVISORIES WILL NOT BE PROVIDED.

b. Inform the aircraft when passing the final approach fix (nonprecision approaches) or when passing the outer marker or the fix used in lieu of the outer marker (precision approaches).

Phraseology:

PASSING (fix).

c. Advise the pilot of glidepath trend information (precision approaches) and course trend information to indicate target position and movement with respect to the elevation or azimuth cursor when the aircraft target corresponds to a position of well above/below the glidepath or well left/right of course and whenever the aircraft exceeds the radar safety limits. Repeat if no correction is observed.

5–182c Examples.—

Course trend information: "(Ident), well right/left of P-A-R course, drifting further right/left."

Glidepath trend information: "(Ident), well above/below P-A-R glidepath."

5–182c Reference.—Glidepath and Course Information, paragraph 5–163b.

d. If, after repeated advisories, the aircraft is observed proceeding outside the safety limits or a radical target deviation is observed, advise the aircraft if unable to proceed visually, execute a missed approach. Issue a specific altitude and heading if a procedure other than the published missed approach is to be executed.

Phraseology:

(Position with respect to course or glidepath). IF NOT VISUAL, ADVISE YOU EXECUTE MISSED APPROACH (alternative instructions).

e. Provide monitor information until the aircraft is over the landing threshold or commences a circling approach.

f. Provide azimuth monitoring only at locations where the MLS glidepath and the PAR glidepath are not coincidental.

5–182 Reference.—Radar Service Termination, paragraph 5–13.

5–183 thru 5–189 RESERVED

Section 14. AUTOMATION —EN ROUTE

5–190 CONFLICT MODE C INTRUDER ALERT1

a. When a conflict alert or Mode C Intruder (MCI) Alert is displayed, evaluate the reason for the alert without delay and take appropriate action.

5–190a Note.—DARC does not have conflict/MCI alert capability.

5–190a Reference.—Safety Alert, paragraph 2–6.

b. If another controller is involved in the alert, initiate coordination to ensure an effective course of action. Coordination is not required when immediate action is dictated.

c. Suppressing/Inhibiting Conflict/MCI Alert.

1. The controller may suppress the display of a Conflict/MCI Alert from a control position with the application of one of the following suppress/inhibit computer functions:

(a) The Conflict Suppress (CO) function may be used to suppress the CA/MCI display between specific aircraft for a specific alert.

5–190c1(a) Note.—See NAS-MD–678 for the EARTS Conflict Suppress message.

(b) The Group Suppression (SG) function shall be applied exclusively to inhibit the displaying of alerts among military aircraft engaged in special military operations where standard en route separation criteria do not apply.

5–190c1(b) Note.—Special military operations where the SG function would typically apply involve those activities where military aircraft routinely operate in proximities to each other that are less than standard en route separation criteria; i.e., air refueling operations, ADC practice intercept operations, etc.

2. The computer entry of a message suppressing a Conflict/MCI Alert constitutes acknowledgment for the alert and signifies that appropriate action has or will be taken.

3. The Conflict/MCI Alert may not be suppressed or inhibited at or for another control position without being coordinated.

5–191 EN ROUTE MINIMUM SAFE ALTITUDE WARNING (E-MSAW)

a. When an E-MSAW alert is displayed, immediately analyze the situation and, if necessary, take the appropriate action to resolve the alert.

5–191a Note 1.—Caution should be exercised when issuing a clearance to an aircraft in reaction to an E-MSAW alert to ensure that adjacent MIA areas are not a factor.

5–191a Note 2.—DARC does not have E-MSAW capability.

5–191a Reference.—Safety Alert, paragraph 2–6.

b. The controller may suppress the display of an E-MSAW alert from his control position with the application of one of the following suppress/inhibit computer functions:

1. The Specific Alert Suppression message may be used to inhibit the E-MSAW alerting display on a single flight for a specific alert.

2. The Indefinite Alert Suppression message shall be used exclusively to inhibit the display of E-MSAW alerts on aircraft known to be flying at an altitude that will activate the alert feature of one or more MIA areas within an ARTCC.

5–191b2 Note 1.—The Indefinite Suppression message will remain in effect for the duration of the referenced flight's active status within the ARTCC unless modified by controller action.

5–191b2 Note 2.—The Indefinite Suppression message would typically apply to military flights with clearance to fly low-level type routes that routinely require altitudes below established minimum IFR altitudes.

c. The computer entry of a message suppressing or inhibiting E-MSAW alerts constitutes acknowledgment for the alert and indicates that appropriate action has or will be taken to resolve the situation.

5–192 COMPUTER ENTRY OF ASSIGNED ALTITUDE

The data block shall always reflect the current status of the aircraft unless otherwise specified in a facility directive. Whenever an aircraft is cleared to maintain an altitude different from that in the flight plan data base, enter into the computer one of the following:

5–192 Note.—A facility directive may be published deleting the interim altitude computer entry requirements of subparagraph 5–192b. The directive would apply to those conditions where heavy traffic or sector complexity preclude meeting these entry requirements.

5–192 Reference.—Order 7210.3, Waiver of Interim Altitude Requirements, paragraph 10–25.

a. The new assigned altitude if the aircraft will (climb or descend to and) maintain the new altitude, or

b. An interim altitude if the aircraft will (climb or descend to and) maintain the new altitude for a short period of time and subsequently be recleared to the altitude in the flight plan data base or a new altitude or a new interim altitude.

5–192b Note 1.—Use of the interim altitude function will ensure that the data block reflects the actual status of the aircraft and eliminate superfluous altitude updates.

5–192b Note 2.—EARTS does not have interim altitude capability

5–193 ENTRY OF REPORTED ALTITUDE

Whenever Mode C altitude information is either not available or is unreliable, enter reported altitudes into the computer as follows:

5–193 Note.—Altitude updates are required to assure maximum accuracy in applying slant range correction formulas.

a. When an aircraft reaches the assigned altitude.

b. When an aircraft at an assigned altitude is issued a clearance to climb or descend.

c. A minimum of each 10,000 feet during climb to or descent from FL 180 and above.

5–194 SELECTED ALTITUDE LIMITS

To ensure the display of Mode C targets and data blocks, take the following actions:

5–194 Note.—Exception to these requirements may be authorized for specific altitudes in certain center sectors if defined in appropriate facility directives and approved by the regional AT Division manager.

a. National Airspace System (NAS) en route Stage A/direct access radar channel (DARC): Display altitude limits in the "R" CRD when operating on NAS en route Stage A or on the plan view display (PVD) when operating on DARC and select the display filter keys on the PVD to include, as a minimum, the altitude stratum of the sector, plus:

1. 1,200 feet above the highest and below the lowest altitude or flight level of the sector where 1,000 feet vertical separation is applicable, and

2. 2,200 feet above the highest and below the lowest flight level of the sector where 2,000 feet vertical separation is applicable.

b. En Route Automated Radar Tracking System (EARTS): Display the EARTS altitude filter limits to include, as a minimum, the altitude stratum of the sector, and:

1. 1,200 feet above the highest and below the lowest altitude or flight level of the sector where 1,000 feet vertical separation is applicable, and

2. 2,200 feet above the highest and below the lowest flight level of the sector where 2,000 feet vertical separation is applicable.

5–194 Reference.—Alignment Check, paragraph 5–2.

5–195 SECTOR ELIGIBILITY

The use of the OK function is allowed to override sector eligibility only when one of the following conditions is met:

a. Prior coordination is effected.

b. The flight is within the control jurisdiction of the sector.

5–196 COAST TRACKS

Do not use coast tracks in the application of either radar or nonradar separation criteria.

5–197 CONTROLLER INITIATED COAST TRACKS

a. Initiate coast tracks only in Flight Plan Aided Tracking (FLAT) mode, except "free" coast tracking may be used as a reminder that aircraft without corresponding computer-stored flight plan information are under your control.

5–197a Note 1.—To ensure tracks are started in FLAT mode, perform a start track function at the aircraft's most current reported position, then immediately "force" the track into coast tracking by performing another start function with "CT" option in field 64. Making amendments to the stored route with trackball entry when the aircraft is rerouted, and repositioning the data block to coincide with the aircraft's position reports are methods of maintaining a coast track in FLAT mode.

5–197a Note 2.—DARC does not have the capability to initiate coast tracks.

b. Prior to initiating a coast track, ensure the following:

1. A departure message or progress report corresponding with the aircraft's current position is entered into the computer.

2. The track being started is within the Posted Time Update Interval (PTUI) of the aircraft's computer-estimated position and the Flight Plan Track Position Difference (FTPD) distance of the aircraft's flight plan route.

5–197b2 Note.—FTPD is an automation parameter, normally set to 15 miles, that is compared with the tracked target's perpendicular distance from the stored flight plan route. If the track is within the parameter miles, it is eligible for "FLAT Tracking." PTUI is an automation parameter, normally set to 3 minutes, that is compared against the difference between the calculated time of arrival and the actual time of arrival over a fix. If the difference is greater than PTUI, the flight plan's stored data will be revised and fix-time update messages will be generated.

c. As soon as practicable after the aircraft is in radar surveillance, initiate action to cause radar tracking to begin on the aircraft.

5–198 thru 5–209 RESERVED

Section 15. AUTOMATED RADAR TERMINAL SYSTEMS (ARTS) — TERMINAL

5–210 APPLICATION

ARTS may be used for identifying aircraft assigned a discrete beacon code, maintaining identity of targets, and performing handoffs of these targets between controllers.

5–210 Note.—*USAF/USN:* Where PIDP/DAIR equipment is capable of performing the functions described in this section, it may be used accordingly.

5–211 RESPONSIBILITY

This equipment does not relieve the controller of the responsibility to ensure proper identification, maintenance of identity, handoff of the correct target associated with the alphanumeric data, and separation of aircraft.

5–212 FUNCTIONAL USE

In addition to other uses specified herein, terminal automation may be used for the following functions:

a. Tracking (ARTS III and IIIA).

b. Tagging (ARTS II).

c. Handoff (ARTS II, III, and IIIA).

d. Altitude information (ARTS II, III, and IIIA).

e. Coordination (ARTS II, III, and IIIA).

f. Ground speed (ARTS III and IIIA).

g. Identification.

5–213 SYSTEM REQUIREMENTS

Use the ARTS as follows:

5–213 Note.— Locally developed procedures, operating instructions, and training material are required because of differences in equipment capability. Such locally developed procedures shall be supplemental to those contained in this section and shall be designed to make maximum use of the ARTS equipment.

a. Inform all appropriate positions before terminating or reinstating use of the ARTS at a control position. When terminating the use of ARTS, all pertinent flight data of that position shall be transferred or terminated.

b. Inform other interfaced facilities of scheduled and unscheduled shutdowns.

c. Initiate a track/tag on all aircraft to the maximum extent possible. As a minimum, aircraft identification should be entered, and automated handoff functions should be used.

d. Assigned altitude, if displayed, shall be kept current at all times. Climb and descent arrows, where available, shall be used to indicate other than level flight.

e. Do not use the automatic altitude readout of an aircraft under another controller's jurisdiction for vertical separation purposes without verbal coordination.

5–214 INFORMATION DISPLAYED

a. Two-letter ICAO designators or three-letter designators, as appropriate, shall be used unless program limitations dictate the use of a single letter alpha prefix.

b. Use of the inhibit select switches to remove displayed information no longer required shall be in accordance with local directives, which should ensure maximum required use of the equipment.

c. Information displayed in the ATIS, General Information, and Scratch Pad areas shall be in accordance with local directives.

5–215 CONFLICT ALERT

a. When a Conflict Alert is displayed, evaluate the reason for the Alert without delay and take appropriate action.

5–215a Reference.—Safety Alert, paragraph 2–6.

b. If another controller is involved in the Alert, initiate coordination to ensure an effective course of action. Coordination is not required when immediate action is dictated.

c. Suppressing/Inhibiting Conflict Alert.

1. The suppress function may be used to suppress the display of a specific Conflict Alert.

2. The inhibit function shall only be used to inhibit the display of Conflict Alert for aircraft routinely engaged in operations where standard separation criteria do not apply.

5–215c2 Note.— Examples of operations where standard separation criteria do not apply are ADC practice intercept operations and air shows.

3. Computer entry of a message suppressing a Conflict Alert constitutes acknowledgment for the Alert and signifies that appropriate action has or will be taken.

4. Conflict Alert may not be suppressed or inhibited at or for another control position without being coordinated.

5–216 INHIBITING MINIMUM SAFE ALTITUDE WARNING (MSAW)

a. Assign a beacon code to VFR aircraft to inhibit MSAW processing unless the aircraft has specifically requested MSAW. Inhibit MSAW processing for an aircraft which has canceled its IFR flight plan but has not requested MSAW processing.

b. A low altitude alert may be suppressed from the control position. Computer entry of the suppress message constitutes an acknowledgment for the

alert and indicates that appropriate action has or will be taken.

5–217 TRACK SUSPEND FUNCTION

Use the track suspend function only when data block overlap in holding patterns or in proximity of the final approach create an unworkable situation. If necessary to suspend tracks, those which are not displaying automatic altitude readouts shall be suspended. If the condition still exists, those displaying automatic altitude readouts may then be suspended.

5–218 thru 5–219 RESERVED

Section 16. TPX–42 — TERMINAL

5–220 APPLICATION

Each TPX–42 facility shall utilize the equipment to the maximum extent possible consistent with local operating conditions.

5–221 RESPONSIBILITY

This equipment does not relieve the controller of the responsibility to ensure proper identification, maintenance of identity, handoff of the correct radar beacon target associated with numeric data, and the separation of aircraft.

5–222 FUNCTIONAL USE

TPX–42 may be used for the following functions:

a. Tagging.

b. Altitude information.

c. Coordination.

d. Target identity confirmation.

5–223 SYSTEM REQUIREMENTS

Use the TPX–42 system as follows:

a. TPX–42 facilities shall inform adjacent facilities of scheduled and unscheduled shutdowns.

b. To the maximum extent practicable, tags should be utilized for all controlled aircraft.

5–224 INFORMATION DISPLAYED

a. Inhibiting portions of the tag shall be in accordance with facility directives, which shall ensure maximum required use of the equipment.

b. Mode C altitude information shall not be inhibited unless a ground malfunction causes repeated discrepancies of 300 feet or more between the automatic altitude readouts and pilot reported altitudes.

5–225 ALTITUDE FILTERS

Set the altitude filters to display Mode C within each controller's area of responsibility by setting the altitude limits to encompass all altitudes under the controller's jurisdiction. Set the upper limits no lower than 1,000 feet above the highest altitude for which the controller is responsible. Normally, the lower limits should encompass the field elevation so that provisions of paragraphs 2–6 and 5–37b3 may be applied. Air Traffic managers may authorize temporary suspension of this requirement when clutter is excessive.

5–226 INHIBITING LOW ALTITUDE ALERT SYSTEM (LAAS)

Assign a beacon code to a VFR aircraft or to an aircraft that has canceled its IFR flight plan to inhibit LAAS processing unless the aircraft has specifically requested LAAS.

Chapter 6. NON-RADAR

Section 1. GENERAL

6–1 DME

Use DME procedures and minima only when direct pilot-controller communications are maintained.

6–2 NONRECEIPT OF POSITION REPORT

When a position report affecting separation is not received, take action to obtain the report no later than 5 minutes after the aircraft was estimated over the fix.

6–2 Reference.—IFR Military Training Routes, paragraph 9–26.

6–3 DUPLICATE POSITION REPORTS

Do not require an aircraft to make the same position report to more than one facility.

6–4 ADJACENT AIRPORT OPERATION

TERMINAL

WAKE TURBULENCE APPLICATION

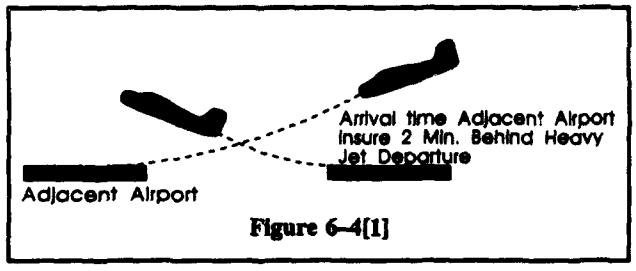


Figure 6–4[1]

The ATC facility providing service to heavy jets and having control jurisdiction at adjacent airports shall separate arriving or departing IFR aircraft on a course that will cross behind the flight path of a heavy jet— *2 minutes. (See Figure 6–4[1] and Figure 6–4[2]).*

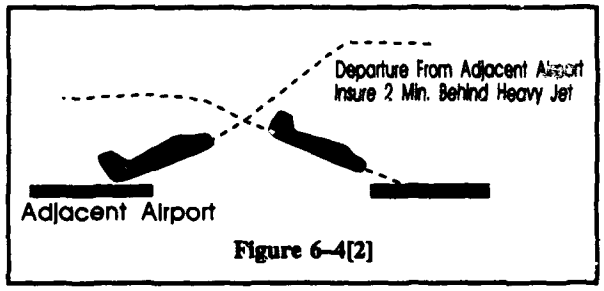


Figure 6–4[2]

6–5 ARRIVAL MINIMA

TERMINAL

WAKE TURBULENCE APPLICATION

Separate IFR aircraft landing behind an arriving heavy jet by *2 minutes* when arriving:

a. The same runway (use *3 minutes* for a small aircraft behind a heavy jet).

b. A parallel runway separated by less than 2,500 feet.

c. A crossing runway if projected flight paths will cross. (See Figure 6–5[1]).

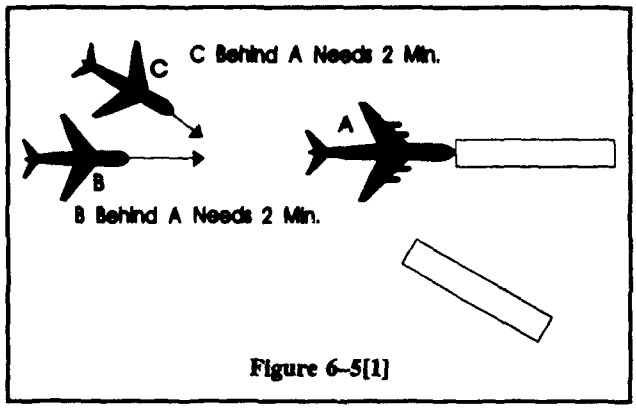


Figure 6–5[1]

6–6 thru 6–9 RESERVED

Section 2. INITIAL SEPARATION OF SUCCESSIVE DEPARTING AIRCRAFT

6–10 MINIMA ON DIVERGING COURSES

Separate aircraft that will fly courses diverging by 45 degrees or more after departing the same or adjacent airports by use of one of the following minima:

6–10 Note 1.—Consider known aircraft performance characteristics when applying initial separation to successive departing aircraft.

6–10 Note 2.—When one or both of the departure surfaces is a helipad, use the takeoff course of the helicopter as a reference, comparable to the centerline of a runway and the helipad center as the threshold.

a. When aircraft will fly diverging courses:

1. Immediately after takeoff— *1 minute* until courses diverge. (See Figure 6–10[1]).

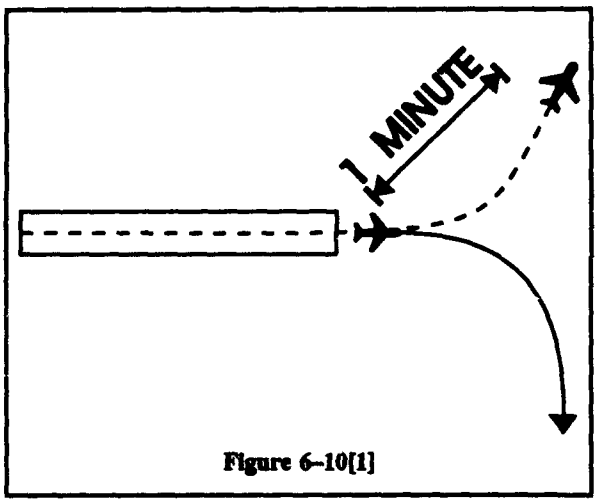


Figure 6–10[1]

2. Within 5 minutes after takeoff— *2 minutes* until courses diverge. (See Figure 6–10[2]).

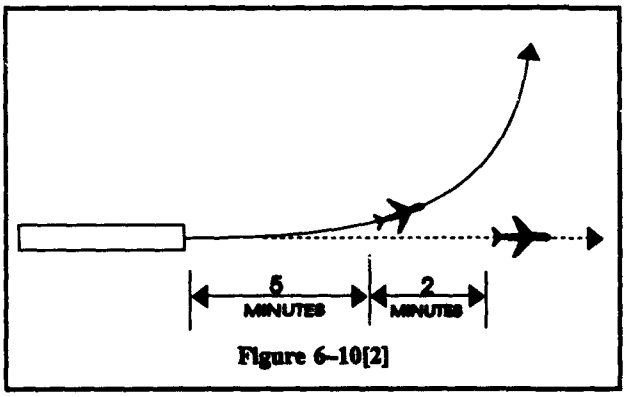


Figure 6–10[2]

3. Within 13 miles DME after takeoff— *3 miles* until courses diverge. (See Figure 6–10[3]).

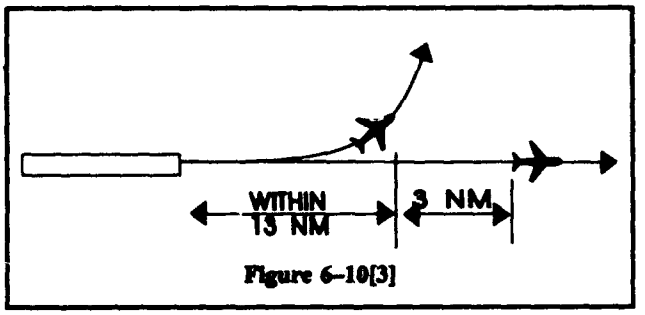


Figure 6–10[3]

b. *TERMINAL:* Between aircraft departing in the same direction from different runways whose centerlines are parallel and separated by at least 3,500 feet—Authorize simultaneous takeoffs when the aircraft will fly diverging courses immediately after takeoff. (See Figure 6–10[4]).

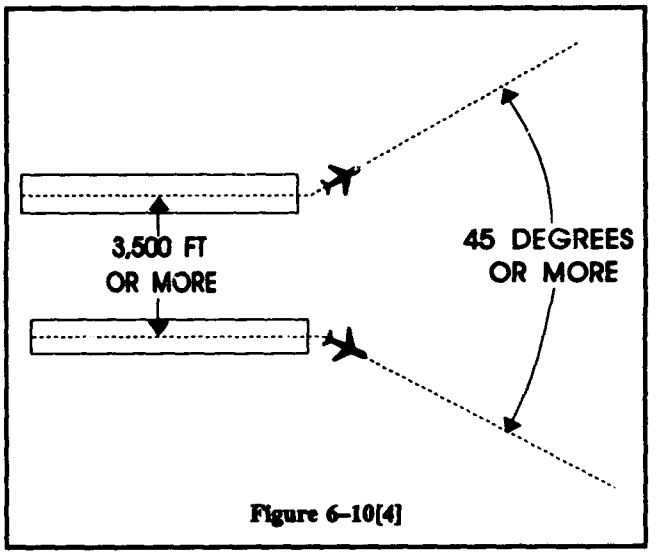


Figure 6–10[4]

c. *TERMINAL:* Between aircraft that will fly diverging courses immediately after takeoff from diverging runways: (See Figure 6–10[5]).

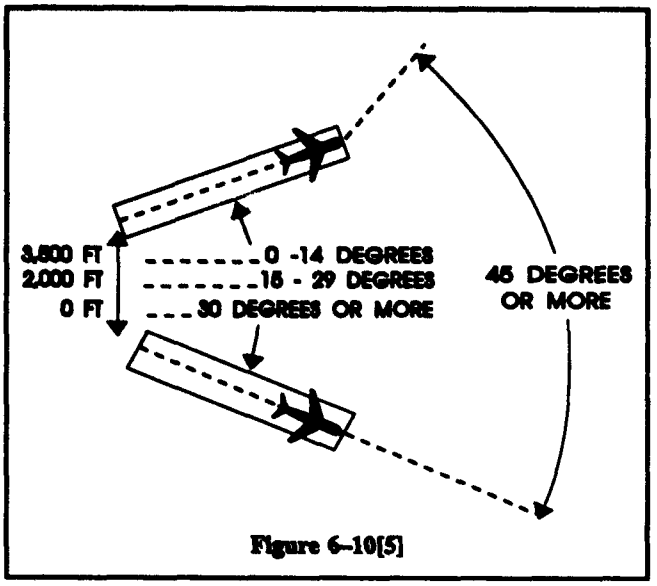


Figure 6–10[5]

1. Nonintersecting runways—Authorize simultaneous takeoffs when either of the following conditions exist:

(a) The runways diverge by 30 degrees or more.

(b) The distance between runway centerlines at and beyond the points where takeoffs begin is at least:

(1) 2,000 feet and the runways diverge by 15 to 29 degrees inclusive.

(2) 3,500 feet and the runways diverge by less than 15 degrees.

2. Intersecting runways—Authorize takeoff of a succeeding aircraft when the preceding aircraft has passed the point of runway intersection, and

(a) The runways diverge by 30 degrees or more. (See Figure 6–10[6]).

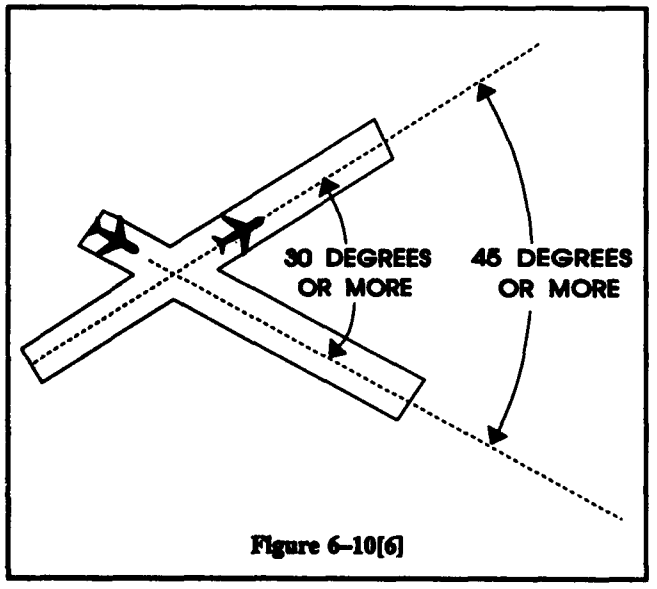


Figure 6–10[6]

(b) The runways diverge by 15 to 29 degrees inclusive and the preceding aircraft has commenced a turn. (See Figure 6–10[7]).

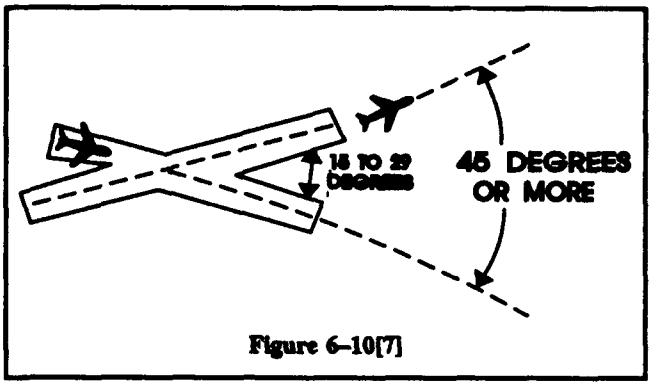


Figure 6–10[7]

6–11 MINIMA ON SAME COURSE

Separate aircraft that will fly the same course when the following aircraft will climb through the altitude assigned to the leading aircraft by using a minimum of *3 minutes* until the following aircraft passes through the assigned altitude of the leading aircraft; or *5 miles* if both aircraft are using DME. (See Figure 6–11[1] and Figure 6–11[2]).

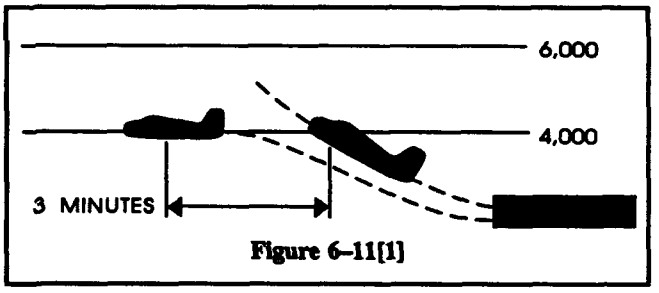


Figure 6–11[1]

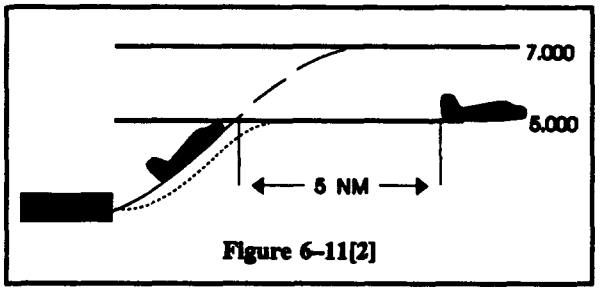


Figure 6–11[2]

6–12 thru 6–19 RESERVED

Section 3. INITIAL SEPARATION OF DEPARTING AND ARRIVING AIRCRAFT

6–20 SEPARATION MINIMA

Separate a departing aircraft from an arriving aircraft making an instrument approach to the same airport by using one of the following minima until vertical or lateral separation is achieved:

a. *TERMINAL:* When takeoff direction differs by at least 45 degrees from the reciprocal of the final approach course—The departing aircraft takes off before the arriving aircraft leaves a fix inbound not less than *4 miles* from the airport.

b. *TERMINAL:* When takeoff direction is other than in subparagraph 6–20a—The departing aircraft takes off so that it is established on a course diverging by at least 45 degrees from the reciprocal of the final approach course before the arriving aircraft leaves a fix inbound not less than *4 miles* from the airport.

c. *TERMINAL:* When the absence of an appropriate fix precludes the application of subparagraphs 6–20a or b, and at airports where approach control service is not provided—The separation in subparagraphs 6–20d or e shall be applied.

d. When takeoff direction differs by at least 45 degrees from the reciprocal of the final approach course—The departing aircraft takes off *3 minutes* before the arriving aircraft is estimated at the airport. (See Figure 6–20[1]).

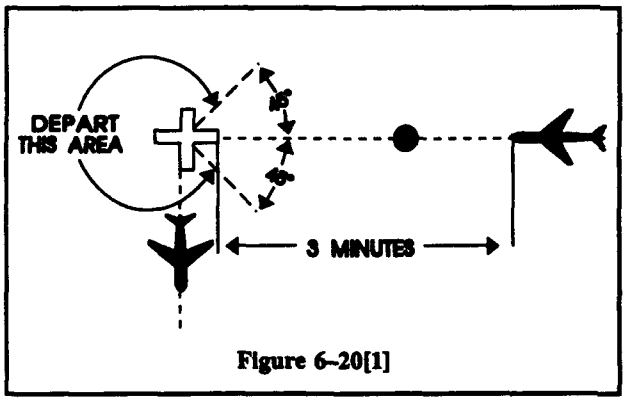


Figure 6–20[1]

e. When takeoff direction is other than in subparagraph 6–20d—The departing aircraft takes off so that it is established on a course diverging by at least 45 degrees from the reciprocal of the final approach course *5 minutes* before the arriving aircraft is estimated at the airport or before it starts procedure turn. (See Figure 6–20[2] and Figure 6–20[3]).

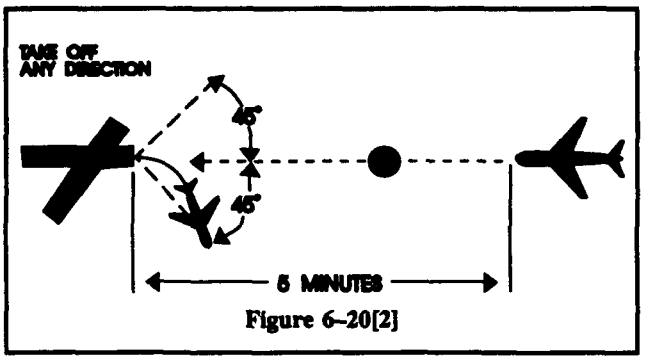


Figure 6–20[2]

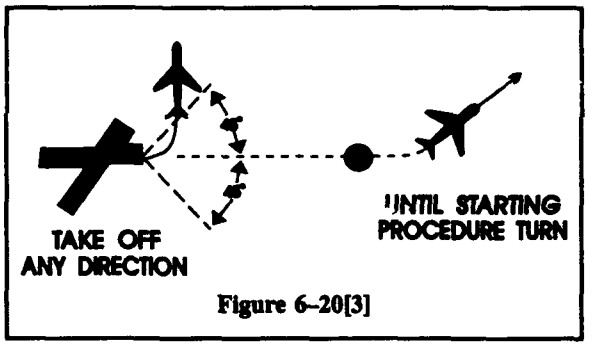


Figure 6–20[3]

6–21 thru 6–29 RESERVED

Section 4. LONGITUDINAL SEPARATION

6–30 APPLICATION

Separate aircraft longitudinally by requiring them to do one of the following, as appropriate:

a. Depart at a specified time.

b. Arrive at a fix at a specified time.

Phraseology:

CROSS (fix) AT OR BEFORE (time).

CROSS (fix) AT OR AFTER (time).

c. Hold at a fix until a specified time.

d. Change altitude at a specified time or fix.

6–31 MINIMA ON SAME, CONVERGING, OR CROSSING COURSES

Separate aircraft on the same, converging, or crossing courses by an interval expressed in time or distance, using the following minima:

a. When the leading aircraft maintains a speed at least 44 knots faster than the following aircraft—*5 miles* between aircraft using DME and/or RNAV; or *3 minutes* between other aircraft if, in either case, one of the following conditions is met:

1. A departing aircraft follows a preceding aircraft which has taken off from the same or adjacent airport. (See Figure 6–31[1]).

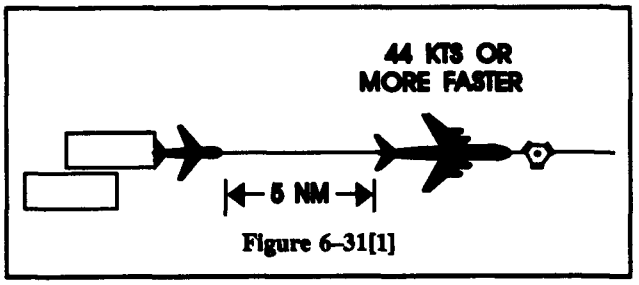


Figure 6–31[1]

2. A departing aircraft follows a preceding en route aircraft which has reported over a fix serving the departure airport. (See Figure 6–31[2]).

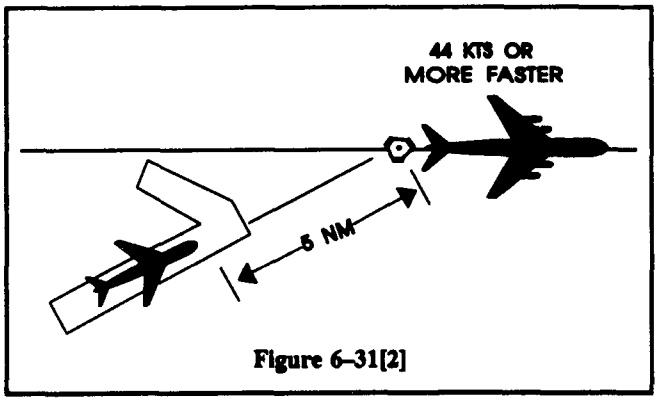


Figure 6–31[2]

3. An en route aircraft follows a preceding en route aircraft which has reported over the same fix. (See Figure 6–31[3]).

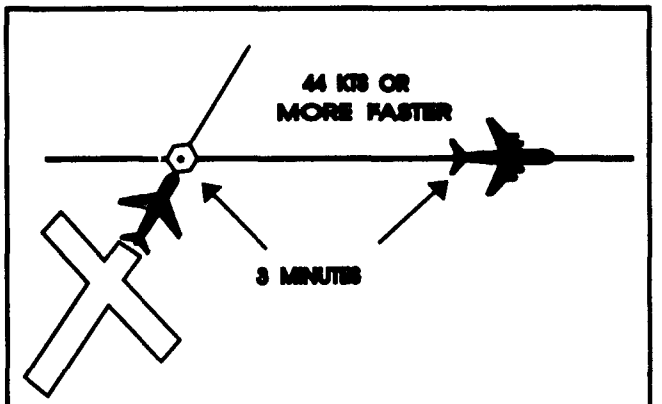


Figure 6–31[3]

b. When the leading aircraft maintains a speed at least 22 knots faster than the following aircraft—*10 miles* between aircraft using DME and/or RNAV; or *5 minutes* between other aircraft if, in either case, one of the following conditions exists:

1. A departing aircraft follows a preceding aircraft which has taken off from the same or an adjacent airport. (See Figure 6–31[4]).

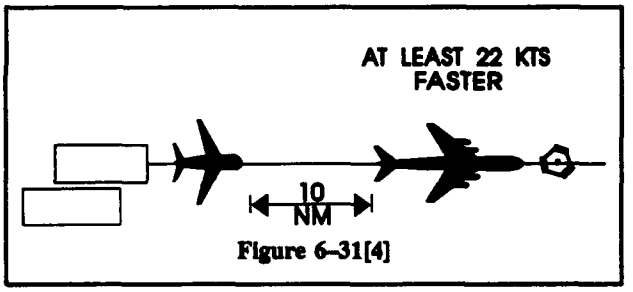


Figure 6–31[4]

2. A departing aircraft follows a preceding en route aircraft which has reported over a fix serving the departure airport. (See Figure 6–31[5]).

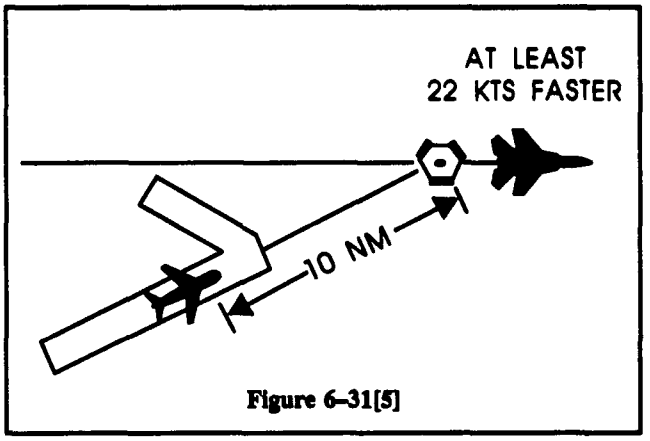


Figure 6–31[5]

3. An en route aircraft follows a preceding en route aircraft which has reported over the same fix. (See Figure 6–31[6]).

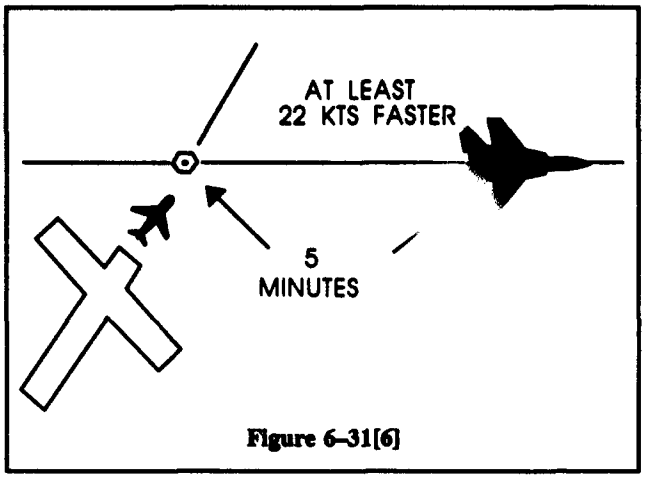


Figure 6–31[6]

c. When an aircraft is climbing or descending through the altitude of another aircraft:

1. Between aircraft using DME— *10 miles,* if the descending aircraft is leading or the climbing aircraft is following. (See Figure 6–31[7] and Figure 6–31[8]).

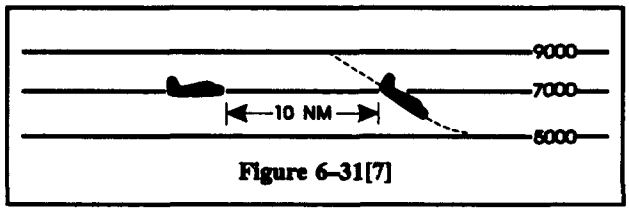


Figure 6–31[7]

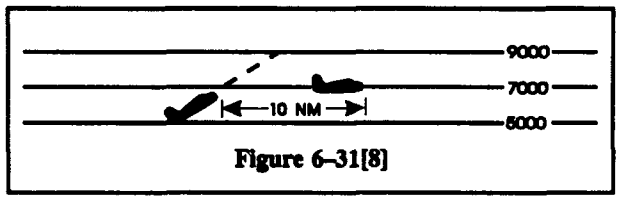


Figure 6–31[8]

2. Between other aircraft— *5 minutes,* if all of the following conditions are met: (See Figure 6–31[9] and Figure 6–31[10]).

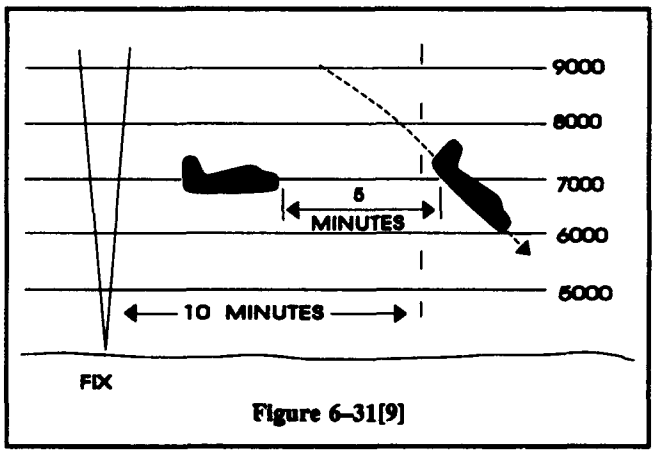


Figure 6–31[9]

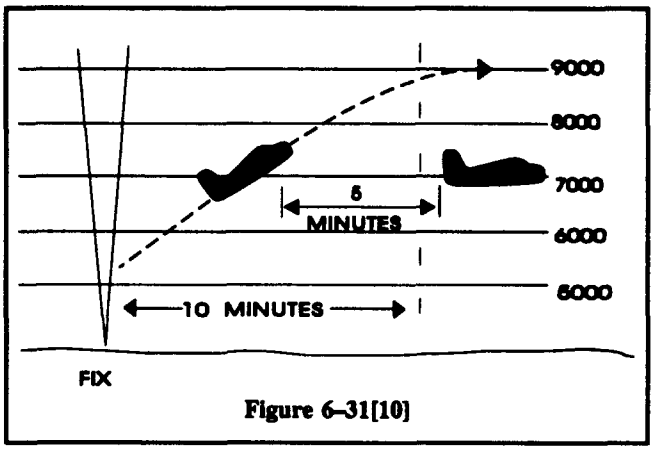


Figure 6–31[10]

(a) The descending aircraft is leading or climbing aircraft is following.

(b) The aircraft were separated by not more than 4,000 feet when the altitude change started.

(c) The change is started within 10 minutes after a following aircraft reports over a fix reported over by the leading aircraft or has acknowledged a clearance specifying the time to cross the same fix.

3. Between RNAV aircraft that are operating along an RNAV route that is eight miles or less in width—*10 miles* provided the following conditions are met:

(a) The descending aircraft is leading or the climbing aircraft is following.

(b) The aircraft were separated by not more than 4,000 feet when the altitude change started.

d. When the conditions of paragraph 6–31a, b, or c cannot be met— *20 miles* between aircraft using DME and/or RNAV; or *10 minutes* between other aircraft. (See Figure 6–31[11], Figure 6–31[12], Figure 6–31[13], Figure 6–31[14], Figure 6–31[15], and Figure 6–31[16]).

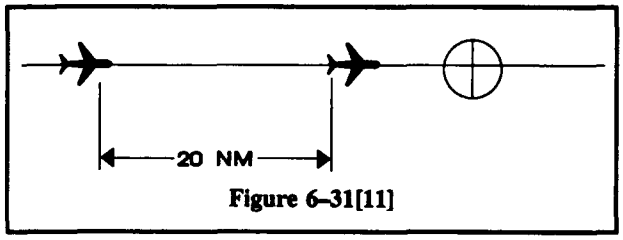


Figure 6–31[11]

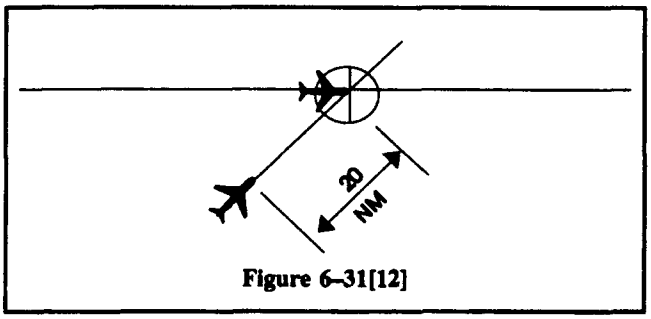


Figure 6–31[12]

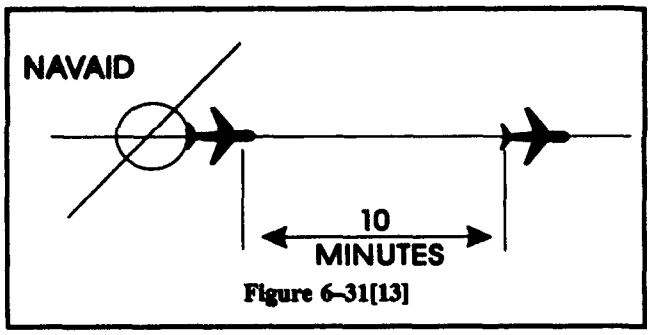


Figure 6-31[13]

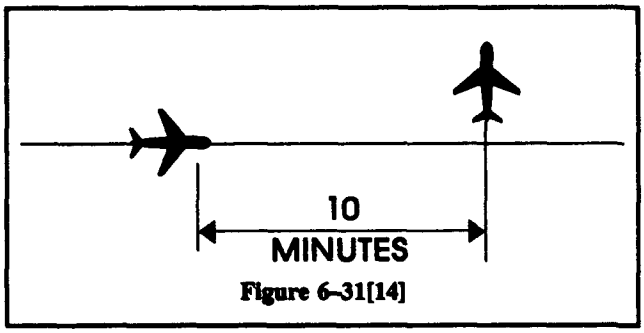


Figure 6-31[14]

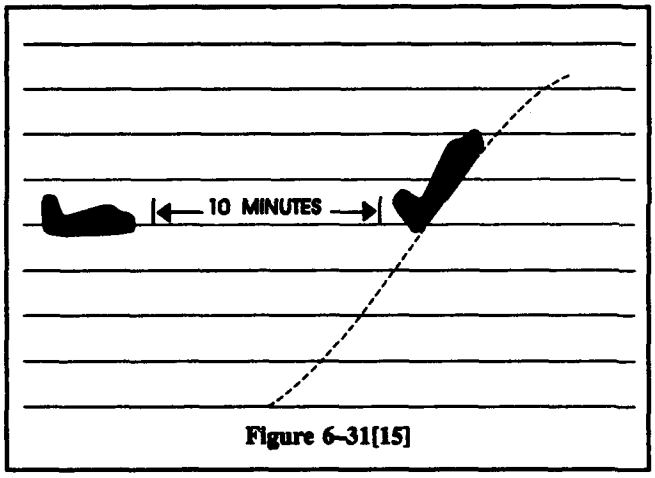


Figure 6-31[15]

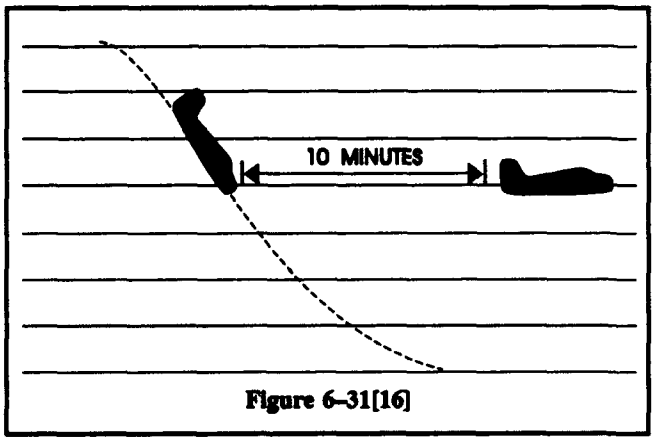


Figure 6-31[16]

e. Between aircraft, when one aircraft is using DME and the other is not—*30 miles* if both the following conditions are met: (See Figure 6-31[17] and Figure 6-31[18]).

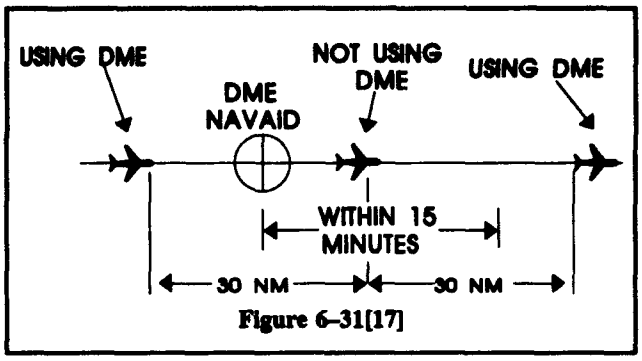


Figure 6-31[17]

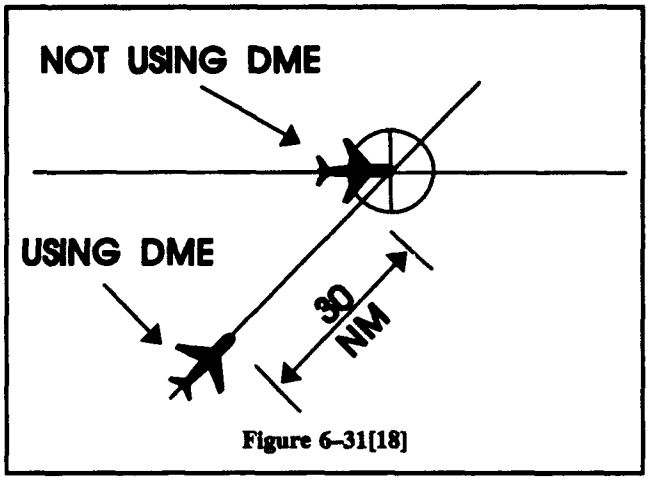


Figure 6-31[18]

1. The aircraft using DME derives distance information by reference to the same NAVAID over which the aircraft not using DME has reported.

2. The aircraft not using DME is within 15 minutes of the NAVAID.

f. Between aircraft when one aircraft is using RNAV and the other is using neither DME nor RNAV—*30 miles.*

6-32 MINIMA ON OPPOSITE COURSES

Separate aircraft traveling opposite courses by assigning different altitudes consistent with the approved vertical separation from *10 minutes* before, until *10 minutes* after they are estimated to pass. Vertical separation may be discontinued after one of the following conditions is met: (See Figure 6-32[1]).

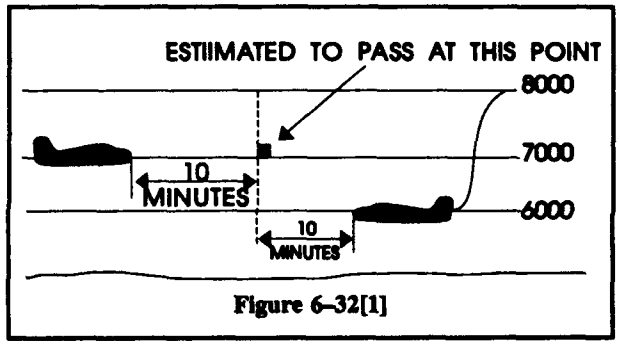


Figure 6-32[1]

6–32 Note.—RNAV route segments that have been expanded in the proximity to reference facilities for slant-range effect are not to be considered "expanded" for purposes of applying separation criteria in this paragraph.

a. Both aircraft have reported passing NAVAID's or DME fixes indicating they have passed each other. (See Figure 6–32[2]).

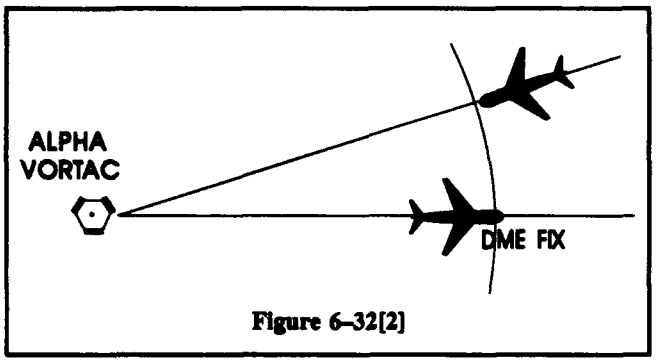


Figure 6–32[2]

6–32a Note.—It is not intended to limit application of this procedure only to aircraft operating in opposite directions along the same airway or radial. This procedure may also be applied to aircraft established on diverging airways or radials of the same NAVAID.

b. Both aircraft have reported passing the same intersection and they are at least *3 minutes* apart.

c. Two RNAV aircraft have reported passing the same position and are at least *8 miles* apart if operating along a route that is 8 miles or less in width; or *18 miles* apart if operating along an expanded route; except that *30 miles* shall be applied if operating along that portion of any route segment defined by a navigation station requiring extended usable distance limitations beyond 130 miles.

d. An aircraft utilizing RNAV and an aircraft utilizing VOR have reported passing the same position and the RNAV aircraft is at least *4 miles* beyond the reported position when operating along a route that is 8 miles or less in width; *9 miles* beyond the point when operating along an expanded route; except that *15 miles* shall be applied if operating along that portion of any route segment defined by a navigation station requiring extended usable distance limitation beyond 130 miles; or *3 minutes* apart whichever is greater.

6–33 SEPARATION BY PILOTS

When pilots of aircraft on the same course in direct radio communication with each other concur, you may authorize the following aircraft to maintain longitudinal separation of *10 minutes;* or *20 miles* if they are using DME.

Phraseology:

MAINTAIN AT LEAST ONE ZERO MINUTES/TWO ZERO MILES SEPARATION FROM (ident).

6–34 RNAV AIRCRAFT ALONG VOR AIRWAYS/ROUTES

Advise the pilot to use DME distances when applying DME separation to an RNAV aircraft operating along VOR airways/routes.

Phraseology:

USE DME DISTANCES.

6–34 Note.—*Along track distance* derived from area navigation devices having slant-range correction will not coincide with the direct DME readout.

6–35 thru 6–39 RESERVED

Section 5. LATERAL SEPARATION

6–40 SEPARATION METHODS

Separate aircraft by one of the following methods:

a. Clear aircraft on different airways or routes whose widths or protected airspace do not overlap.

b. Clear aircraft below 18,000 to proceed to and report over or hold at different geographical locations determined visually or by reference to NAVAIDs.

c. Clear aircraft to hold over different fixes whose holding pattern airspace areas do not overlap each other or other airspace to be protected.

d. Clear departing aircraft to fly specified headings which diverge by at least 45 degrees.

6–41 MINIMA ON DIVERGING RADIALS.

a. Consider separation to exist between aircraft established on radials of the same NAVAID that diverge by at least 15 degrees when either aircraft is clear of the airspace to be protected for the other aircraft.

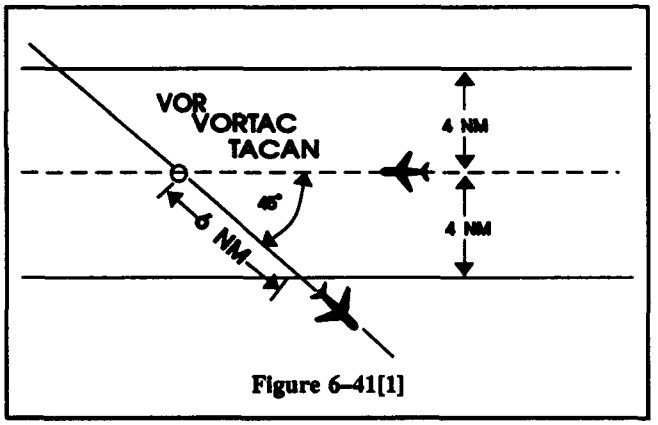


Figure 6–41[1]

6–41a Note.—The procedure may be applied to converging as well as diverging aircraft. (See Figure 6–41[1]). The aircraft depicted 6 miles from the NAVAID in subparagraph 6–41a Illustration would require vertical separation until reaching the 6–mile point. Reversing direction, the same aircraft would require vertical separation before passing the 6–mile point.

b. Use the Table 6–41[1] and Table 6–41[2] to determine the distance required for various divergence angles to clear the airspace to be protected. For divergence that falls between two values, use the lesser divergence value to obtain the distance.

Table 6–41[1]
Non-DME Divergence-Distance Minima

Divergence (Degrees)	*Distance (NM)*
15	16
20	12
25	10
30	8
35	7
45	6
55	5
90	4

Note.—This Table is for non-DME application only.

Table 6–41[2]
Divergence-Distance Minima

Divergence (degrees)	*Distance (NM)*	
	Below FL 180	*FL 180 through FL 450*
15	17	18
20	13	15
25	11	13
30	9	11
35	8	11
45	7	11
55	6	11
90	5	11

This Table is for DME application and compensates for DME slant-range error.

6–41b Note.—For altitudes of 3,000 feet or less above the elevation of the NAVAID, DME slant-range error is negligible and the values in 6–41b Table 1 may be used.

6–42 DME ARC MINIMA

Apply lateral DME separation by requiring aircraft using DME to fly an arc about a NAVAID at a specified distance using the following minima: (See Figure 6–42[1]).

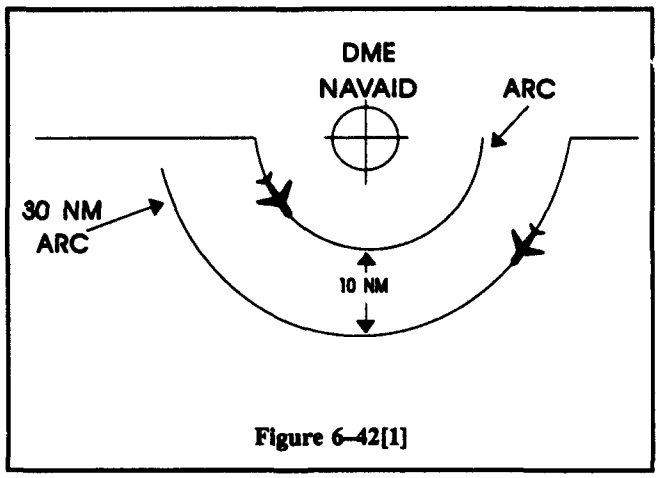


Figure 6–42[1]

6–42 Reference.—NAVAID Terms, paragraph 2–91.

a. Between different arcs about a NAVAID regardless of direction of flight:

1. At 35 miles or less from the NAVAID— *10 miles.*

2. More than 35 miles from the NAVAID— *20 miles.*

b. Between an arc about a NAVAID and other airspace to be protected: (See Figure 6–42[2]).

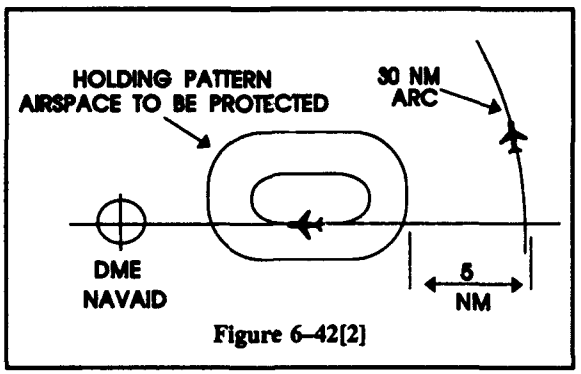


Figure 6–42[2]

6–42b Note.—The other airspace to be protected may be an MOA, a holding pattern, airway or route, ATCAA, warning area, restricted area, prohibited area, etc.

1. At 35 miles or less from the NAVAID— *5 miles.*

2. More than 35 miles from the NAVAID— *10 miles.*

Phraseology:

VIA (number of miles) MILE ARC (direction) OF (name of DME NAVAID).

6–43 MINIMA ALONG OTHER THAN ESTABLISHED AIRWAYS OR ROUTES

Protect airspace along other than established airways or routes as follows: (See Figure 6–43[1]).

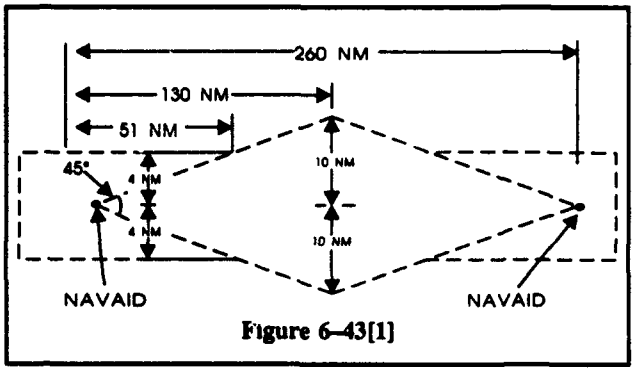


Figure 6–43[1]

6–43 Reference.—Pilot/Controller Glossary terms—Airway, Route.

a. Direct courses and course changes of 15 degrees or less:

1. Via NAVAID's or radials FL 600 and below— *4 miles* on each side of the route to a point 51 miles from the NAVAID, then increasing in width on a 4 1/2 degree angle to a width of *10 miles* on each side of the route at a distance of 130 miles from the NAVAID.

2. Via degree-distance fixes for aircraft authorized under paragraph 4–52.

(a) Below FL 180— *4 miles* on each side of the route.

(b) FL 180 to FL 600 inclusive— *10 miles* on each side of the route.

3. Via degree-distance fixes for RNAV flights above FL 450— *10 miles* on each side of the route.

6–43a3 Note.—Degree-distance RNAV flight (random routes) at FL 450 and below are provided radar separation.

b. When course change is 16 degrees through 90 degrees, protect the airspace on the overflown side beginning at the point where the course changes as follows: (See Figure 6–43[2]).

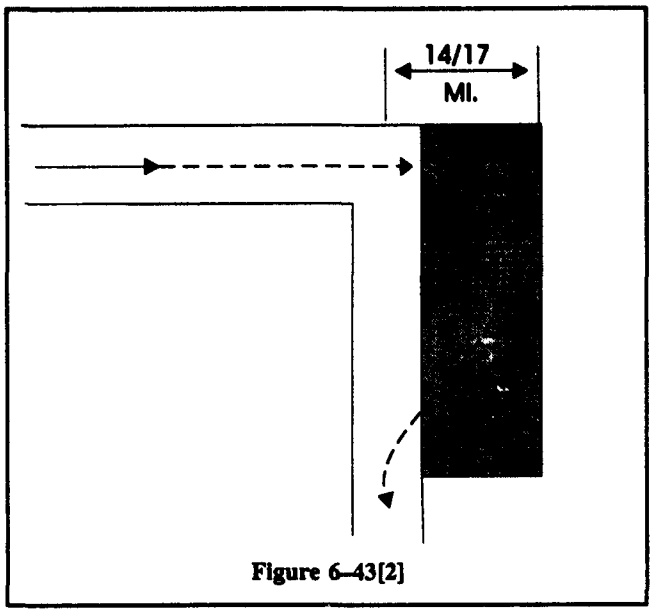


Figure 6–43[2]

1. Below FL 180—same as paragraph 6–43a1 or 2.

2. FL 180 to FL 230 inclusive—*14 miles.*

3. Above FL 230 to FL 600 inclusive—*17 miles.*

c. When course change is 91 degrees through 180 degrees, protect the airspace on the overflown side beginning at the point where the course changes as follows: (See Figure 6–43[3]).

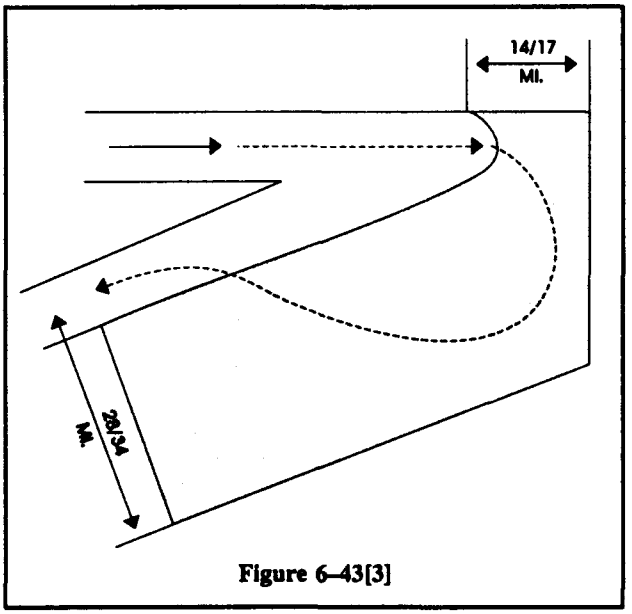


Figure 6–43[3]

1. Below FL 180—same as paragraph 6–43a1 or 2.

2. FL 180 to FL 230 inclusive—*28 miles.*

3. Above FL 230 to FL 600 inclusive—*34 miles.*

d. After the course changes specified in **b** or **c** have been completed and the aircraft is back on course, the appropriate minima in **a** may be used.

6–43 Reference.—Military Operations above FL 600, paragraph 9–30.

6–44 RNAV MINIMA—DIVERGING/ CROSSING COURSES

Consider lateral separation to exist when an RNAV aircraft is beyond the point where the lateral protected airspace of that aircraft has ceased to overlap the lateral protected airspace of another by at least: (See Figure 6–44[1] and Figure 6–44[2]).

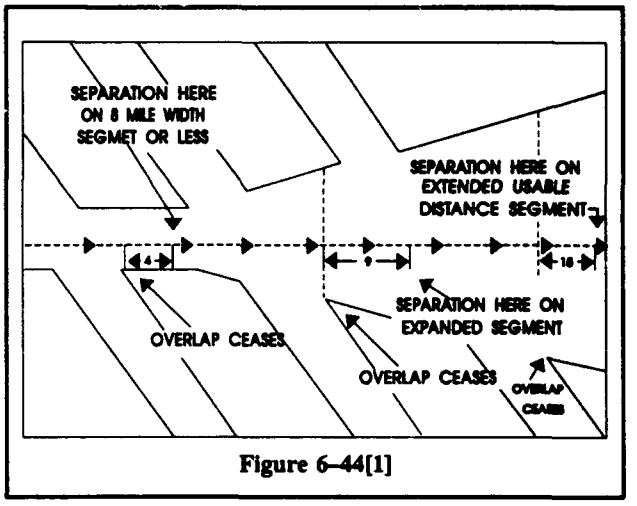


Figure 6–44[1]

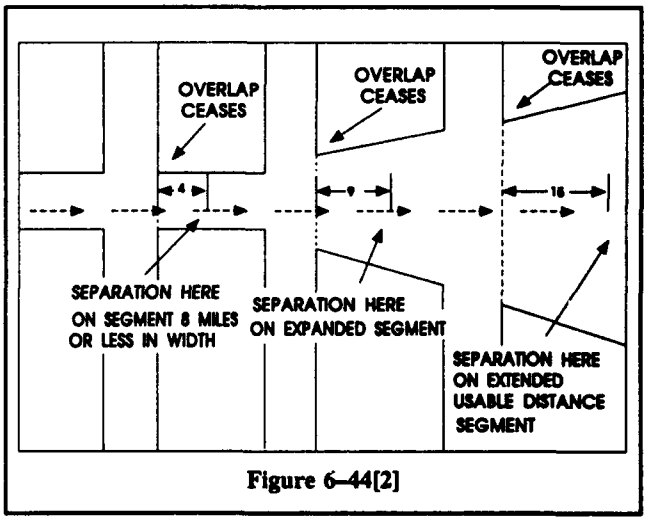


Figure 6–44[2]

a. When operating along a route that is 8 miles or less in width—*4 miles.*

b. When operating along an expanded route—*9 miles,* except that *15 miles* shall be applied along that portion of any route segment requiring extended usable distance limitation beyond 130 miles of the reference facility.

6–45 thru 6–49 RESERVED

Section 6. VERTICAL SEPARATION

6–50 APPLICATION

Assign an altitude to an aircraft only after the aircraft previously at that altitude has reported or is observed (valid Mode C) leaving the altitude.

Phraseology:

REPORT LEAVING/REACHING (altitude).

REPORT LEAVING ODD/EVEN ALTITUDES/FLIGHT LEVELS.

SAY ALTITUDE.

6–50 Note.—Consider known aircraft performance characteristics, pilot furnished and/or Mode C detected information which indicate that climb/descent will not be consistent with the rates recommended in AIM.

6–50 Reference.—Altitude Verification-Automatic Readout, paragraph 5–37.

6–51 MINIMA BETWEEN ALTITUDES

Separate instrument flight rules (IFR) aircraft using the following minima between altitudes:

a. Up to and including FL 290—*1,000 feet.*

b. Above FL 290—*2,000 feet,* except

1. In oceanic airspace, above FL 450 between a supersonic and any other aircraft - 4,000 feet.

2. Above FL 600 between military aircraft - 5,000 feet.

6–51a and b. Note - Oceanic separation procedures are supplemented in Chapter 8, Sections 7, 8, 9, and 10.

6–51 Reference.—Military Operations above FL 600, paragraph 9–30.

6–52 EXCEPTIONS

Assign an altitude to an aircraft only after the aircraft previously at that altitude has reported or is observed (valid Mode C) at or passing through another altitude separated from the first by the appropriate minimum when:

a. Severe turbulence is reported.

b. Aircraft are conducting military aerial refueling.

6–52b Reference.—Military Aerial Refueling, paragraph 9–29.

c. The aircraft previously at the altitude has been:

1. Issued a clearance permitting climb/descent at pilot's discretion.

2. Cleared to CRUISE (altitude). However, do not use Mode C to effect separation with an aircraft on a cruise clearance.

6–52c2 Note.—An aircraft assigned a Cruise clearance is assigned a block of airspace from the minimum IFR altitude up to and including the assigned cruising altitude, and climb/descent within the block is at pilot's discretion. When the pilot verbally reports leaving an altitude in descent, he may not return to that altitude.

6–52c2 Reference.—Pilot/Controller Glossary, Cruise.

6–53 SEPARATION BY PILOTS

When pilots of aircraft in direct radio communication with each other during climb and descent concur, you may authorize the lower aircraft, if climbing, or the upper aircraft, if descending, to maintain vertical separation.

Phraseology:

MAINTAIN AT LEAST ONE/TWO THOUSAND FEET ABOVE/BELOW (identification).

6–54 thru 6–59 RESERVED

Section 7. TIMED APPROACHES

6–60 APPLICATION

Timed approaches using either nonradar procedures or radar vectors to the final approach course may be used at airports served by a tower if the following conditions are met:

6–60 Note.—These procedures require NAVAIDs and standard/special instrument approach procedures or adequate radar coverage which permit an aircraft to:

a. Hold at a fix located on the approach course or to be radar vectored to the final approach course for a straight-in approach in accordance with the minima specified in paragraph 6–64.

b. Proceed in the direction of the airport along the approach course crossing the holding/approach fix at a specified altitude if required.

c. Continue descent for an approach to destination airport.

a. Direct communication is maintained with the aircraft until the pilot is instructed to contact the tower.

b. If more than one missed approach procedure is available, none require course reversal.

c. If only one missed approach procedure is available, the following conditions are met:

1. Course reversal is not required.

2. Reported ceiling and visibility are equal to or greater than the highest prescribed circling minimums for the instrument approach procedure in use.

6–60c2 Note.—Determination of whether or not an existing ceiling meets minima is accomplished by comparing MDA (MSL) with ceiling (AGL) plus the airport elevation.

6–60 Reference.—Approach Sequence, paragraph 6–61.

6–61 APPROACH SEQUENCE

When an aircraft passes the final approach fix inbound (nonprecision approach) or the outer marker or the fix used in lieu of the outer marker inbound (precision approach), issue clearances for a succeeding timed approach in accordance with the following:

6–61 Reference.—Approach Separation Responsibility, paragraph 5–124. Level Flight Restriction, paragraph 6–63. Missed Approaches, paragraph 6–66.

a. Clear the succeeding aircraft for approach, to descend to the altitude vacated by the preceding aircraft, and to leave the final approach fix inbound (nonprecision approach) or the outer marker or the fix used in lieu of the outer marker inbound (precision approach) at a specified time; or when using radar to sequence and position aircraft on the final approach course, vector aircraft to cross the final approach fix/outer marker or the fix used in lieu of the outer marker in compliance with paragraph 6–64, or

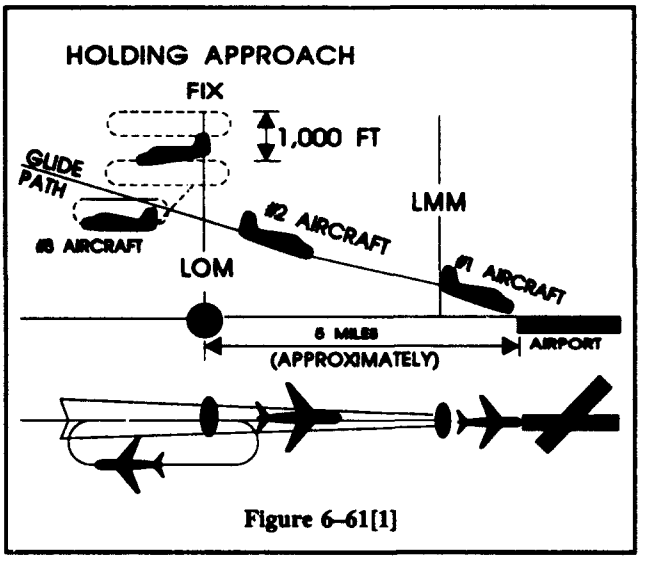


Figure 6–61[1]

Figure 6–61[1] depicts the application of timed approach procedures using an ILS and applying longitudinal separation only. Using an interval of 2 minutes between successive approaches, the #1 and #2 aircraft have already passed the outer locator (LOM) on final approach, and the #3 aircraft has been cleared for approach and to depart the LOM 2 minutes after the #2 aircraft reported leaving the LOM inbound on final approach. After aircraft in the approach sequence depart the holding/approach fix (LOM) inbound, vertical separation is no longer provided and longitudinal separation is utilized.

6–61a Reference.—Final Approach Course Interception, paragraph 5–121.

b. If an alternative missed approach procedure is not available and weather conditions are less than required by paragraph 6–60c, clear the succeeding aircraft for an approach when the preceding aircraft has landed or canceled its IFR flight plan.

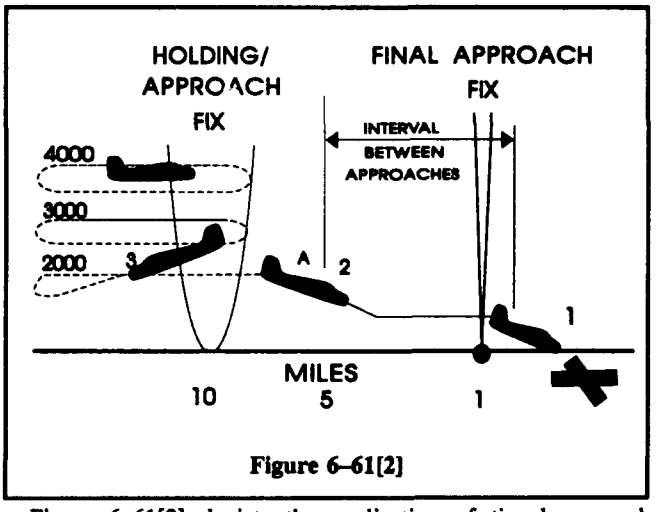


Figure 6–61[2]

Figure 6–61[2] depicts the application of timed approach procedures using a holding/approach fix on a bearing of an NDB and applying a combination of longitudinal and vertical

separation. The #3 aircraft has been instructed to descend to 2,000 after the #2 aircraft has reported departing the holding/approach fix inbound and leaving 2,000 at Point A. The #2 aircraft has departed the holding/approach fix inbound at the designated time, maintaining 2,000 until cleared for approach at Point A. The #1 aircraft has been sighted, enabling the controller to issue approach clearance to the #2 aircraft at Point A.

c. Release the aircraft to the tower before it reaches the final approach fix.

6–62 SEQUENCE INTERRUPTION

Interrupt the established timed approach sequence if necessary to allow an aircraft to execute a different type of approach.

6–63 LEVEL FLIGHT RESTRICTION

If the weather report indicates an aircraft will be in IFR conditions over the final approach fix (nonprecision approach) or the outer marker or the fix used in lieu of the outer marker (precision approach) when paragraph 6–61b is applied, clear the second aircraft for an approach early enough to allow at least 1 minute of level flight before crossing the final approach fix/outer marker or the fix used in lieu of the outer marker.

6–64 INTERVAL MINIMA

Use a *2–minute* or a *5–mile* radar interval (except for a small aircraft behind a heavy aircraft—use a *3–minute* or a *6–mile* radar interval) as the minimum between successive approaches and increase the interval, as necessary, taking into account the:

6–64 Note.—Increased separation is required for small aircraft behind heavy aircraft because of the possible effects of wake turbulence.

6–64 Reference.—Approach Separation Responsibility, paragraph 5–124. Application, paragraph 6–60. Approach Sequence, paragraph 6–61.

a. Relative speeds of the aircraft concerned.

b. Existing weather conditions.

c. Distance between the approach fix and the airport.

d. Type of approach being made.

6–65 TIME CHECK

Issue a time check to an aircraft before specifying a time to leave the approach fix inbound unless the aircraft is vectored to the final approach course.

6–66 MISSED APPROACHES

a. If weather conditions are such that an aircraft will likely miss an approach, issue an alternative missed approach procedure to the next aircraft.

b. If an aircraft misses an approach, allow the next aircraft to continue the approach if it has been assigned an alternative missed approach procedure. Retain radar control or hold any remaining aircraft at assigned altitudes until traffic conditions permit the issuance of approach clearances.

c. When paragraph 6–61b is applied and the first aircraft misses an approach, retain radar control or clear the second aircraft to maintain the last assigned altitude (minimum holding altitude) and return to the holding/approach fix to hold until traffic conditions permit the issuance of approach clearances.

Chapter 7. VISUAL

Section 1. GENERAL

7–1 POSITIVE CONTROL AREA CLASS A AIRSPACE RESTRICTIONS

Do not apply visual separation or issue VFR or "VFR-on-top" clearances in positive control areas Class A airspace.

7–2 VFR CONDITIONS

a. You may clear aircraft to maintain "VFR conditions" if one of the following conditions exists:

1. The pilot of an aircraft on an IFR flight plan requests a VFR climb/descent.

2. *TERMINAL:* The clearance will result in noise abatement benefits where part of the IFR departure route does not conform to an FAA-approved noise abatement route or altitude.

Phraseology:

MAINTAIN VFR CONDITIONS.

MAINTAIN VFR CONDITIONS UNTIL (time or fix).

MAINTAIN VFR CONDITIONS ABOVE/BELOW (altitude).

CLIMB/DESCEND VFR,

and if required,

BETWEEN (altitude) AND (altitude),

or

ABOVE/BELOW (altitude).

b. When, in your judgment, there is reason to believe that flight in VFR conditions may become impractical, issue an alternative clearance which will ensure separation from all other aircraft for which you have separation responsibility.

Phraseology:

IF UNABLE, (alternative procedure), AND ADVISE.

7–3 APPROACH CONTROL SERVICE FOR VFR ARRIVING AIRCRAFT

TERMINAL

Where procedures have been established for arriving VFR aircraft to contact approach control for landing information, during [illegible] Issue the following [illegible] have been established for arriving VFR aircraft to contact approach control for landing information:

a. Wind, runway, and altimeter setting at the airport of intended landing. This information may be omitted if contained in the ATIS broadcast and the pilot states the appropriate ATIS code or if the pilot uses the phrase, "have numbers."

7–3a Note.—Pilot use of "have numbers" does not indicate receipt of the ATIS broadcast.

b. Traffic information on a workload permitting basis.

c. Time or place at which the aircraft is to contact the tower on local control frequency for further landing information.

d. When an aircraft makes initial contact with the tower, you may suggest that it contact approach control for landing and traffic information. An aircraft may be instructed to contact approach control for landing and traffic information upon initial contact with the tower.

7–3 Reference.—Application, paragraph 7–60. Service Availability, paragraph 7–61.

7–4 VISUAL HOLDING OF VFR AIRCRAFT

TERMINAL

When it becomes necessary to hold VFR aircraft at visual holding fixes, take the following actions:

a. Clear aircraft to hold at selected, prominent geographical fixes which can be easily recognized from the air, preferably those depicted on sectional charts.

7–4a Note.—At some locations, VFR checkpoints are depicted on Sectional Aeronautical and Terminal Area Charts. In selecting geographical fixes, depicted VFR checkpoints are preferred unless the pilot exhibits a familiarity with the local area.

7–4a Reference.—Visual Holding Point, paragraph 4–74.

b. Issue traffic information to aircraft cleared to hold at the same fix.

Phraseology:

HOLD AT (location) UNTIL (time or other condition),

TRAFFIC (description) HOLDING AT (fix, altitude if known),

or

PROCEEDING TO (fix) FROM (direction or fix).

7–4 Reference.—Holding, paragraph 7–64.

7–5 thru 7–9 RESERVED

Section 2. VISUAL SEPARATION

7–10 VISUAL SEPARATION

Aircraft may be separated by visual means, as provided in this paragraph, when other approved separation is assured before and after the application of visual separation. To ensure that other separation will exist, consider aircraft performance, routes of flight, and known weather conditions. Reported weather conditions must allow the aircraft to remain within sight until other separation exists. Do not apply visual separation between successive departures when departure routes and/or aircraft performance preclude maintaining separation.

7–10 Reference.—Wake Turbulence Cautionary Advisories, paragraph 2–20. Traffic Advisories, paragraph 2–21. Use of Tower Radar Displays, paragraph 3–9. Approach Separation Responsibility, paragraph 5–124. Visual Approach, paragraph 7–30. Visual Approaches—Radar, paragraph 7–31. Approaches to Multiple Runways, paragraph 7–33. *Pilot/Controller Glossary* terms—Visual Approach, Visual Separation.

a. *TERMINAL:* You may apply visual separation between aircraft under your facility's control within the terminal area, provided: Visual separation may be applied between aircraft under the control of the same facility within the terminal area, provided:

1. You are in communication with at least one of the aircraft involved or have the capability to communicate instantaneously as prescribed in paragraph 3–102a2, and Communication is maintained with at least one of the aircraft involved or the capability to communicate immediately as prescribed in 3–102a2 is available, and:

2. You see the aircraft and maintain visual separation between them. Air traffic controllers are not authorized to provide visual separation between aircraft when wake turbulence separation is required. Additionally, the air traffic controller is not permitted to provide visual separation behind the B–757 because of the wake vortex created by that aircraft. The aircraft are visually observed by the tower and visual separation is maintained between the aircraft by the tower. The tower shall not provide visual separation between aircraft when the lead aircraft is a heavy or B–757.

3. A pilot sees another aircraft and you instruct him to maintain visual separation from it as follows: is instructed to maintain visual separation from the aircraft as follows:

(a) Tell the pilot about the other aircraft including position, direction and, unless it is obvious, the other aircraft's intention.

(b) Obtain acknowledgment from the pilot that the other aircraft is in sight.

(c) Instruct the pilot to maintain visual separation from that aircraft.

(d) Advise the pilot if the radar targets appear likely to converge.

7–10a3(d) Note.—Issue this advisory in conjunction with the instruction to maintain visual separation, or thereafter if the controller subsequently becomes aware that the targets are merging.

(e) If the aircraft are on converging courses, inform the other aircraft of the traffic and that visual separation is being applied.

Phraseology:

TRAFFIC, (clock position and distance), (direction)-BOUND, (type of aircraft), (intentions and other relevant information).

If applicable,

ON CONVERGING COURSE.

DO YOU HAVE IT IN SIGHT?

If the answer is in the affirmative,

MAINTAIN VISUAL SEPARATION FROM THAT TRAFFIC.

If aircraft are on converging courses, advise the other aircraft:

TRAFFIC, (clock position and distance), (direction)-BOUND, (type of aircraft). HAS YOU IN SIGHT AND WILL MAINTAIN VISUAL SEPARATION.

b. *EN ROUTE:* You may use visual separation in conjunction with visual approach procedures.

7–10b Reference.—Visual Approach, paragraph 7–30. Visual Approach-Radar, paragraph 7–31.

c. Nonapproach control towers may be authorized to provide visual separation between aircraft within a control zone surface areas provided other separation is assured before and after the application of visual separation. This may be applied by a controller the nonapproach control tower providing the separation or by a pilot seeing another aircraft and agreeing to maintain visual separation from it visually observing another aircraft and being instructed to maintain visual separation with that aircraft.

Phraseology:

VISUAL SEPARATION APPROVED BETWEEN (identification) AND (identification),

and for departing aircraft,

(departing/ succeeding aircraft) RELEASED YOUR DISCRETION.

7–10c Note.—Separation of IFR aircraft before and after application of visual separation is an IFR control function (approach/departure/en route). A nonapproach control tower controller by accepting authorization for visual separation becomes responsible for ensuring that separation. Separation requirements also apply to VFR aircraft when IFR, TCA or ARSA Stage III Class B CLEARANCE/TRSA separation is prescribed.

7–10c Reference,—Practice Approaches, 4–110. Application, 5–90. Vectors for Visual Approach, 7–31. [redacted] Issuance of EFC, [redacted] Separation, [redacted] Helicopter Traffic, [redacted] Altitude Assignments, [redacted] Approach Interval, [redacted] TRSA Departure Information, [redacted] Separation, 7–92. Establishing Two-Way Communications, 7–93. Altitude Assignments, [redacted] Application, 7–110. Methods, 7–112. [redacted]

7–11 thru 7–19 RESERVED

Section 3. VFR-ON-TOP

7–20 VFR-ON-TOP

a. You may clear an aircraft to maintain "VFR-on-top" if the pilot of an aircraft on an IFR flight plan requests the clearance.

Phraseology:

MAINTAIN VFR-ON-TOP.

7–20a Note 1.—When an aircraft has been cleared to maintain "VFR-on-top," the pilot is responsible to fly at an appropriate VFR altitude, comply with VFR visibility and distance from cloud criteria, and to be vigilant so as to see and avoid other aircraft.

7–20a Note 2.—Although standard IFR separation is not applied, controllers shall continue to provide traffic advisories and safety alerts, and apply merging target procedures to aircraft operating VFR-on-top.

b. You may clear an aircraft to climb through clouds, smoke, haze, or other meteorological formations and then to maintain "VFR-on-top" if the following conditions are met:

1. The pilot requests the clearance.
2. You inform the pilot of the reported height of the tops of the meteorological formation, or
3. You inform the pilot that no top report is available.
4. When necessary, you ensure separation from all other traffic for which you have separation responsibility by issuing an alternative clearance.
5. When an aircraft is climbing to and reports reaching "VFR-on-top," reclear the aircraft to maintain "VFR-on-top."

Phraseology:

CLIMB TO AND REPORT REACHING VFR-ON-TOP,

and

TOPS REPORTED (altitude),

or

NO TOPS REPORTS.

IF NOT ON TOP AT (altitude), MAINTAIN (altitude), AND ADVISE.

MAINTAIN VFR-ON-TOP.

c. Do not clear an aircraft to maintain "VFR-on-top" between sunset and sunrise to separate holding aircraft from each other or from en route aircraft unless restrictions are applied to ensure the appropriate IFR vertical separation.

Phraseology:

MAINTAIN VFR-ON-TOP AT OR ABOVE/BELOW/BETWEEN (altitudes).

7–20c Examples.—

"Maintain VFR-on-top at or above one three thousand five hundred."

"Maintain VFR-on-top at or below one two thousand five hundred."

"Maintain VFR-on-top at or between six thousand and one zero thousand."

d. When, in your judgment, there is reason to believe that flight in VFR conditions may become impractical, issue an alternative clearance which will ensure separation from all other aircraft for which you have separation responsibility.

Phraseology:

IF UNABLE, (alternative procedure), AND ADVISE.

7–20 Reference.—VFR-on-Top, paragraph 9–52.

7–21 ALTITUDE FOR DIRECTION OF FLIGHT

Inform an aircraft maintaining "VFR-on-top" when a report indicates the pilot is not complying with FAR 91.159.

7–21 Note.—As required by FAR 91.159, the appropriate VFR altitudes for aircraft (not in a holding pattern of 2 minutes or less, or turning) operating *more than 3,000 feet above the surface to and including FL 290:*

Magnetic courses 0–179—Odd cardinal altitudes plus 500 feet; e.g., 3,500, 5,500, FL 195, 275.

Magnetic courses 180–359—Even cardinal altitudes plus 500 feet; e.g., 4,500, 8,500, FL 205, 285.

Above FL 290:

Magnetic courses 0–179—4,000 foot intervals beginning with FL 300; e.g., FL 300, 340, 380.

Magnetic courses 180–359—4,000 foot intervals beginning with FL 320; e.g., FL 320, 360, 400.

Phraseology:

VFR-ON-TOP CRUISING LEVELS FOR YOUR DIRECTION OF FLIGHT ARE:

More than 3,000 feet above the surface to FL 290:

ODD/EVEN ALTITUDES/FLIGHT LEVELS

PLUS FIVE HUNDRED FEET.

Above FL 290:

FOUR THOUSAND FOOT INTERVALS BEGINNING AT FLIGHT LEVEL THREE ZERO ZERO/THREE TWO ZERO.

7–22 thru 7–29 RESERVED

Section 4. APPROACHES

7–30 VISUAL APPROACH

A visual approach is an ATC authorization for an aircraft on an IFR flight plan to proceed visually to the airport of intended landing; it is not an instrument approach procedure. Also, there is no missed approach segment. An aircraft unable to complete a visual approach shall be handled as any go-around and appropriate separation must be provided.

7–30 Reference.—Wake Turbulence Cautionary Advisories, paragraph 2–20. Forwarding Approach Information by NonApproach Control Facilities, paragraph 3–121. Visual Separation, paragraph 7–10. Approaches to Multiple Runways, paragraph 7–33.

7–31 VECTORS FOR VISUAL APPROACH

A vector for a visual approach may be initiated if the reported ceiling at the airport of intended landing is at least 500 feet above the MVA/MIA and the visibility is 3 miles or more. At airports without weather reporting service there must be reasonable assurance that descent and flight to the airport can be made in VFR conditions, and the pilot must be informed that weather information is not available.

Phraseology:

(Acft ident) FLY HEADING or TURN RIGHT/LEFT HEADING (degrees) VECTOR FOR VISUAL APPROACH TO (airport name); (if appropriate) WEATHER NOT AVAILABLE.

7–31 Note.—At airports where weather information is not available, a pilot request for a visual approach indicates that descent and flight to the airport can be made in VFR conditions.

7–31 Reference.—Vectors to Final Approach Course, paragraph 5–120. Visual Separation, paragraph 7–10. Clearance for Visual Approach-Radar, paragraph 7–32. Approaches to Multiple Runways, paragraph 7–33. Sequencing, paragraph 7–76. Separation, paragraph 7–92.

7–32 CLEARANCE FOR VISUAL APPROACH

ARTCC's and approach controls may clear aircraft for visual approaches using the following procedures:

7–32 Note.— Towers may exercise this authority when authorized by a letter of agreement with the facility that provides the IFR service, or by a facility directive at collocated facilities.

a. Controllers may initiate, or pilots may request, a visual approach if an aircraft is being vectored for an instrument approach and subsequently reports:

1. The airport or the runway in sight at airports with operating control towers.

2. The airport in sight at airports without a control tower.

b. Resolve potential conflicts with all other aircraft, and ensure that weather conditions at the airport are VFR or that the pilot has been informed that weather is not available for the destination airport. Advise the pilot of the frequency to receive weather information where AWOS/ASOS is available.

c. Clear an aircraft for a visual approach when:

1. The aircraft is number one in the approach sequence, or

2. The aircraft is to follow a preceding aircraft and the pilot reports the preceding aircraft in sight and is instructed to follow it, or

7–32c2 Note.— The pilot need not report the airport/runway in sight.

3. The pilot reports the airport or runway in sight but not the preceding aircraft. Radar separation must be maintained until visual separation is provided.

d. Inform the tower of the aircraft's position prior to communications transfer at controlled airports. ARTS functions may be used provided a facility directive or a letter of agreement sp[illegible] control and communications transfer points.

Phraseology:

(Acft ident) (instructions) CLEARED VISUAL APPROACH RUNWAY (number);

or

(Acft ident) (instructions) CLEARED VISUAL APPROACH TO (airport name); (and if appropriate), WEATHER NOT AVAILABLE or AWOS/ASOS WEATHER AVAILABLE ON FREQUENCY (freq) mHz.

7–32 Reference.— 7–33 Approaches to Multiple Runways.

7–33 APPROACHES TO MULTIPLE RUNWAYS

a. All aircraft must be informed that approaches are being conducted to parallel/ intersecting/converging runways. This may be accomplished through use of the ATIS.

b. When conducting visual approaches to multiple runways, DO NOT PERMIT THE RESPECTIVE AIRCRAFTS' PRIMARY RADAR RETURNS TO MERGE UNLESS VISUAL SEPARATION IS BEING APPLIED.

c. In addition to the requirements in, paragraph 7–10, paragraph 7–30, paragraph 7–31 and, paragraph 7–32, the following conditions apply to visual approaches being conducted simultaneously to parallel, intersecting, and converging runways, as appropriate:

1. Parallel runways separated by less than 2,500 feet. Unless standard separation is provided by ATC, an aircraft must report sighting a preceding aircraft making an approach (instrument or visual) to the adjacent parallel runway. When an aircraft reports another aircraft in sight on the adjacent final approach course and visual separation is applied,

controllers must advise the succeeding aircraft to maintain visual separation. DO NOT PERMIT A HEAVY AIRCRAFT TO OVERTAKE ANOTHER AIRCRAFT. DO NOT PERMIT A LARGE AIRCRAFT TO OVERTAKE A SMALL AIRCRAFT.

2. Parallel runways separated by at least 2,500 feet, but less than 4,300 feet.

(a) Standard separation is provided until the aircraft are established on a heading which will intercept the extended centerline of the runway at an angle not greater than 30 degrees, and each aircraft has been issued and the pilot has acknowledged receipt of the visual approach clearance.

7–33c2(a) Note.—The intent of the 30 degree intercept angle is to reduce the potential for overshoots of the final, and preclude side-by-side operations with one or both aircraft in a "belly-up" configuration during the turn. Aircraft performance, speed, and the number of degrees of the turn to the final are factors to be considered by the controller when vectoring aircraft to parallel runways.

(b) Visual approaches may be conducted to one runway while visual or instrument approaches are conducted simultaneously to the other runway, provided the conditions of subparagraph 7–33c2(a) are met.

(c) When the provisions of subparagraphs 7–33c2(a) and (b) are met, it is not necessary to apply any other type of separation with aircraft on the adjacent final approach course.

3. Parallel runways separated by 4,300 feet or more.

(a) Visual approaches may be conducted simultaneously, provided standard separation is maintained until aircraft has been issued and the pilot acknowledges receipt of the visual approach clearance.

(b) Visual approaches may be conducted to one runway while instrument approaches are conducted simultaneously to the other runway, provided separation is maintained until the aircraft conducting the visual approach has been issued and the pilot acknowledges the visual approach clearance.

(c) When the provisions of subparagraphs 7–33c3(a) and (b) are met it is not necessary to apply any other type of separation with aircraft on the adjacent final approach course.

4. Intersecting and converging runways. Visual approaches may be conducted simultaneously with visual or instrument approaches to another runway, provided standard separation is maintained until the aircraft conducting the visual approach have been issued and the pilot has acknowledged receipt of the visual approach clearance.

7–33c4 Note.—Although simultaneous approaches may be conducted to intersecting runways, staggered approaches may be necessary to meet the airport separation requirements specified in, paragraph 3–123.

7–33 Reference.—Charted Visual Flight Procedures (CVFP). USA/USAF/USN Not Applicable, paragraph 7–34. Separation, paragraph 7–92.

7–34 CHARTED VISUAL FLIGHT PROCEDURES (CVFP). *USA/USN NOT APPLICABLE.*

a. Clear an aircraft for a CVFP only when the following conditions are met:

1. The approach is conducted in a radar environment;

2. There is an operating control tower;

3. The published name of the CVFP and the landing runway are specified in the approach clearance, the reported ceiling at the airport of intended landing is at least 500 feet above the MVA/MIA, and the visibility is 3 miles or more, unless higher minimums are published for the particular CVFP;

4. When using parallel or intersecting/converging runways, the criteria specified in, paragraph 7–33 are applied.

5. An aircraft not following another aircraft on the approach reports sighting a charted visual landmark, or reports sighting a preceding aircraft landing on the same runway and has been instructed to follow that aircraft.

Phraseology:
(Acft ident) CLEARED (name of CVFP) APPROACH.

7–35 CONTACT APPROACH

Clear an aircraft for a contact approach only if the following conditions are met:

a. The pilot has requested it.

7–35a Note.—When executing a contact approach, the pilot is responsible for maintaining the required flight visibility, cloud clearance, and terrain/obstruction clearance. Unless otherwise restricted, the pilot may find it necessary to descend, climb, and/or fly a circuitous route to the airport to maintain cloud clearance and/or terrain/obstruction clearance. It is not in any way intended that controllers will initiate or suggest a contact approach to a pilot.

b. The reported ground visibility is at least 1 statute mile.

c. A standard or special instrument approach procedure has been published and is functioning for the airport of intended landing.

d. Approved separation is applied between aircraft so cleared and other IFR or Special VFR aircraft. When applying vertical separation, do not assign a fixed altitude but clear the aircraft at or below an altitude which is at least 1,000 feet below any IFR traffic but not below the minimum safe altitude prescribed in FAR 91.119.

7–35d Note.—FAR 91.119 specifies the minimum safe altitude to be flown 1 over congested areas, 2 other than congested areas, and 3 anywhere to provide for an emergency landing in the event of power failure and without undue hazard to persons or property on the surface.

e. An alternative clearance is issued when weather conditions are such that a contact approach may be impracticable.

Phraseology:

CLEARED CONTACT APPROACH,

and if required,

AT OR BELOW (altitude) (routing).

IF NOT POSSIBLE, (alternative procedures), AND ADVISE.

7–36 thru 7–39 RESERVED

Section 5. SPECIAL VFR

7–40 AUTHORIZATION

a. Special VFR (SVFR) operations in weather conditions less than basic VFR minima are authorized:

7–40a Reference.—Operational Priority, paragraph 2–4i.

1. For fixed wing aircraft, at any location not prohibited by Part 93.113 or when an exemption to FAR 93.113 has been granted and an associated Letter of Agreement established. At any location not prohibited by Part 93, Appendix D or when an exemption to FAR 93 has been granted and an associated Letter of Agreement established. FAR 91.105(c) prohibits SVFR helicopter operations.

2. Only within control zones Class B, C, D, or E surface areas.

3. Only when requested by the pilot.

4. On the basis of weather conditions reported at the airport of intended landing/departure.

7–40a4 Reference.—Climb to VFR, paragraph 7–45; Ground Visibility Below One Mile, paragraph 7–46.

5. When weather conditions are not reported at the airport of intended landing/departure and the pilot advises he is unable to maintain VFR and requests Special VFR that VFR cannot be maintained and requests Special VFR.

Phraseology:

CLEARED TO ENTER/OUT OF/THROUGH CONTROL ZONE, CLASS B, C, D, or E SURFACE AREA

and if required,

(direction) OF (name) AIRPORT (specified routing),

and

MAINTAIN SPECIAL V-F-R CONDITIONS WHILE IN CONTROL ZONE,

or as applicable for operations under an exemption from Part 93.113 applicable under an exemption from Part 91,

CLEARED FOR (coded arrival or departure procedure) ARRIVAL/DEPARTURE, (additional instructions as required).

7–40a5 Reference—Airspace Classes, 2–90.

b. When the primary airport is reporting VFR, special VFR operations may be authorized for aircraft transiting the control zone, when the pilot advises that he is unable to maintain basic VFR. SVFR operations may be authorized for aircraft transiting Class B, C, D, or E surface area when the primary airport is reporting VFR but the pilot advises that basic VFR cannot be maintained.

7–40b *Note.*—The basic requirements for issuance of a SVFR clearance in subparagraph 7–40a apply with the obvious exception that weather conditions at the controlling airport are not required to be less than basic VFR minima.

7–41 PRIORITY

a. IFW SVFR SVFR flights may be approved only if arriving and departing IFR aircraft are not delayed.

7–41a Example 1.—

A IFW SVFR SVFR aircraft has been cleared to enter a control zone, Class B, C, D, or E surface area and subsequently an IFR aircraft is ready to depart or is in position to begin an approach. Less overall delay might accrue to the IFR aircraft if the IFW SVFR SVFR aircraft is allowed to proceed to the airport and land, rather than leave the control zone, Class B, C, D, or E surface area or be repositioned to provide IFR priority.

7–41a Example 2.—

A IFW SVFR SVFR aircraft is number one for takeoff and located in such a position that the number two aircraft, an IFR flight, cannot taxi past to gain access to the runway. Less overall delay might accrue to the IFR aircraft by releasing the IFW SVFR SVFR departure rather than by having the aircraft taxi down the runway to a turnoff point so the the IFR aircraft could be released first.

7–41a Note.—The priority afforded IFR aircraft over IFW SVFR SVFR aircraft is not intended to be so rigidly applied that it causes grossly inefficient use of airspace. If better overall efficiency will be gained thereby, the controller has the prerogative of allowing completion of the IFW SVFR operation already in progress when an IFR aircraft becomes a factor that inefficient use of airspace results. The controller has the prerogative of permitting completion of a SVFR operation already in progress when an IFR aircraft becomes a factor if better overall efficiency will result.

b. When clearance cannot be granted for a IFW SVFR flight because of IFR traffic, inform the aircraft of the anticipated delay. Inform an aircraft of the anticipated delay when a SVFR clearance cannot be granted because of IFR traffic. Do not issue an EFC or expected departure time.

Phraseology:

EXPECT (number) MINUTES DELAY, (additional instructions as necessary).

7–41 Reference.—Application, paragraph 5–90. Operational Priority, paragraph 2–4. Special VFR Helicopter Separation, paragraph 7–42.

7–42 SEPARATION

Apply approved separation between:

a. Special VFR aircraft. Apply approved separation between:

1. SVFR aircraft.
2. SVFR aircraft and IFR aircraft.

b. Special VFR aircraft and IFR aircraft. Alternate SVFR helicopter separation minima may be established when warranted by the volume and/or complexity of local helicopter operations. Alternate SVFR helicopter separation minima shall be established with Letters of Agreement with the helicopter operator which shall specify, as a minimum, that SVFR

[redacted]

[redacted]

[redacted]

as traffic conditions permit. VFR/SVFR within a control zone. Issue clearance only after ground visibility is reported as 1 mile and request the pilot's intentions.

FAA ORDER 7110.65

[redacted] ADVISORY

7-47 [redacted] airport with an operating control tower, traffic permitting, if the pilot reports the airport in sight. The pilot is responsible to continue to the airport or exit the surface area. FAR Section 91.157 prohibits VFR aircraft (other than helicopters) from landing at any airport within a surface area when flight visibility is less than 1 mile. A pilot could inadvertently encounter conditions that are below SVFR minimums after entering a surface area due to rapidly changing weather. The pilot is best suited to determine the action to be taken since pilots operating under SVFR are not required to be instrument rated, and the possibility exists that flight visibility may not be the same as ground visibility. FAR Section 91.3 authorizes a pilot encountering an in-flight emergency requiring immediate action to deviate from any rule of Part 91 to the extent required to meet that emergency. Flight into adverse weather conditions may require the pilot to execute the emergency authority granted in FAR Section 91.3 and continue inbound to land.

d. Authorize scheduled air carrier aircraft in the United States to conduct operations if ground visibility is not less than 1/2 statute mile.

7-46d Note.—Part 121 permits landing or takeoff by domestic scheduled air carriers where a local surface restriction to visibility is not less than 1/2 statute mile, provided all turns after takeoff or before landing and all flights beyond 1 statute mile from the airport boundary can be accomplished above or outside the area so restricted. The pilot is solely responsible for determining if the nature of the visibility restriction will permit compliance with the provisions of FAR 121.

e. Clear an aircraft to fly through the control zone, if he reports flight visibility is at least 1 statute mile. Class B, C, D, or E surface area if the aircraft reports flight visibility is at least 1 statute mile.

7-46 Reference.—Operational Priority, paragraph 2-4. Authorization, paragraph 7-40. Special VFR Helicopter Separation, paragraph 7-48.

7-47 FLIGHT VISIBILITY BELOW ONE MILE

When weather conditions are not officially reported at an airport and the pilot advises the flight visibility is less than 1 statute mile, treat requests for Special VFR operations at that airport by other than helicopters as follows: Treat requests for SVFR mixed with operations as follows: When weather conditions are not reported at an airport and the pilot advises the flight visibility is less than 1 mile:

7-47 Note.—Part 91 prescribes [redacted] flight visibility, which is not as the governing ground visibility for basic and Special VFR operations. Responsibility for basic VFR and SVFR operations is the official reported ground visibility. Airport operators provide and maintain the official reported ground visibility. Where there is no official reported ground visibility, the pilot is responsible to determine if flight visibility is sufficient for takeoff, landing, and operation in the area.

a. Inform departing aircraft that a clearance cannot be issued.

b. Inform arriving aircraft operating outside of the control zone of a Class B, C, D or E surface area that a clearance cannot be issued unless an emergency exists.

c. Ask an arriving aircraft operating within a control zone, if he can depart the control zone with a flight visibility of at least 1 statute mile. If the aircraft cannot depart the control zone accordingly, or an emergency exists, issue a clearance as soon as traffic conditions permit. Request the intentions of an arriving aircraft operating within a Class B, C, D or E surface area.

7-47c Note.—Clear an aircraft to land at an airport with an operating control tower, traffic permitting, if the pilot reports the airport in sight. The pilot is responsible to continue to the airport or exit the surface area. FAR Section 91.157 prohibits VFR aircraft (other than helicopters) from landing at any airport within a surface area when flight visibility is less than 1 mile. A pilot could inadvertently encounter conditions that are below SVFR minimums after entering a surface area due to rapidly changing weather. The pilot is best suited to determine the action to be taken since pilots operating under SVFR are not required to be instrument rated, and the possibility exists that flight visibility may not be the same as ground visibility. FAR Section 91.3 authorizes a pilot encountering an in-flight emergency requiring immediate action to deviate from any rule of Part 91 to the extent required to meet that emergency. Flight into adverse weather conditions may require the pilot to execute the emergency authority granted in FAR Section 91.3 and continue inbound to land.

7-47 Reference.—Operational Priority, paragraph 2-4. Special VFR Helicopter Separation, paragraph 7-48.

7-48 thru 7-59 RESERVED

Section 6. BASIC RADAR SERVICE TO VFR AIRCRAFT — TERMINAL

7–60 APPLICATION

In addition to the radar services prescribed elsewhere in Chapter 5, apply the procedures contained in paragraph 7–3 when arriving VFR aircraft are handled by approach control and provide vectoring service in accordance with Chapter 5, Section 7, Application, paragraph 5–90, Methods, paragraph 5–91.

a. Basic radar services for VFR aircraft shall include:

1. Safety alerts.
2. Traffic advisories.
3. Limited radar vectoring when requested by the pilot.
4. Sequencing at locations where procedures have been established for this purpose and/or when covered by a letter of agreement.

b. Apply the procedures contained in paragraph 7–3 when arriving VFR aircraft are handled by approach control and provide vectoring service in accordance with Chapter 5, Section 7, in addition to the radar services prescribed elsewhere in Chapter 5. Application paragraph 5–90. Methods, paragraph 5–91.

7–60 Reference.—Airport Traffic Area **Class D Airspace,** paragraph 2–16. Application, paragraph 7–60. FAA Order 7210.3, Chapter 13, Section 1. National Terminal Radar Program **Section 1 , Terminal VFR Radar Services.** Airman's Information Manual, Terminal Radar Programs **Terminal Radar Services** for VFR Aircraft, paragraph 4–17.

7–61 SERVICE AVAILABILITY

a. Inform aircraft on initial contact whenever this service cannot be provided because of radar outage and apply paragraph 7–3.

b. Provide the service, to the extent possible using an available frequency, if an aircraft desires the service but cannot communicate on the appropriate frequencies. Aircraft which do not desire radar service may be fitted into the landing sequence by the tower. Coordination of these aircraft shall be accomplished with the approach control unless a facility directive/letter of agreement prescribes otherwise. Nonparticipating aircraft shall, to the extent possible, be given the same landing sequence they would have received had they been sequenced by radar vectors.

c. Radar sequencing to the primary airport, when local procedures have been developed, shall be provided unless the pilot states that the service is not requested. Arriving aircraft are assumed to want radar service unless the pilot states "Negative radar service", or makes a similar comment.

7–62 INITIAL CONTACT

An aircraft sighted by the local controller at the time of first radio contact may be positioned in the landing sequence after coordination with approach control.

7–63 IDENTIFICATION

Identify the aircraft before taking action to position it in the approach sequence.

7–64 HOLDING

Hold VFR aircraft over the initial reporting fix or a fix near the airport when holding is required to establish an approach sequence.

7–64 Reference.—Visual holding of VFR aircraft, paragraph 7–4.

7–65 APPROACH SEQUENCE

Do not assign landing sequence numbers, when establishing aircraft in the approach sequence, unless this responsibility has been delegated in a letter of agreement or facility directive.

7–65 Note.—The landing sequence is ordinarily established by the tower.

7–66 SEQUENCING

a. Establish radar contact before instructing a VFR aircraft to enter the traffic pattern at a specified point or vectoring the aircraft to a position in the approach sequence. Inform the pilot of the aircraft to follow when the integrity of the approach sequence is dependent on following a preceding aircraft. Ensure visual contact is established with the aircraft to follow and provide instruction to follow that aircraft.

Phraseology:

FOLLOW (description) (position, if necessary).

b. Direct a VFR aircraft to a point near the airport to hold when a position is not available in the approach sequence for the runway in use. The aircraft may be vectored to another runway after coordination with the tower.

c. Apply the provisions of paragraph 5–72 when radar sequencing behind a heavy jet.

7–67 CONTROL TRANSFER

a. Inform the tower of the aircraft's position and then instruct the pilot to contact the tower.

b. The aircraft may be instructed to contact the tower prior to the tower being advised of the aircraft's position provided:

1. The [illegible] the aircraft to [illegible] and;

2. Spell [illegible] on the landing sequence.

c. Instruct [illegible] to contact [illegible] the appropriate [illegible] the approach control ARTS [illegible] displayed on the tower BRITE display [illegible] by ARTS and effective [illegible] of communications and control transfer points.

7-67 Note.—The [illegible] aircraft is instructed to contact the tower [illegible] to verify coordination between the tower and approach control will vary depending on the runway in use, [illegible] number of communications ordinarily occur [illegible] the runway. The point for the transfer of communications should be a sufficient distance from the airport to permit the tower to properly sequence the aircraft, but not at a distance that could degrade the provision of radar traffic information service.

7-68 ABANDONED APPROACH

Instruct the aircraft to change to approach control for sequencing when an aircraft, under tower control, abandons the approach and coordination with approach control reveals no immediate space in the approach sequence.

7-69 VFR DEPARTURE INFORMATION

Inform departing VFR aircraft who request radar traffic advisories when to contact departure control and the frequency to use. Provide traffic advisories in accordance with paragraph 2-21 after the departure is radar identified.

7-69 Note.—Departing aircraft desiring traffic information are expected to request the service and to state their proposed direction of flight upon initial contact with ground control.

7-70 TERMINATION OF SERVICE

Basic radar services should be provided to the extent possible, workload permitting, until 20 miles from the radar site or the airspace boundary, which-[illegible] Terminate radar service to aircraft [illegible] airport other than those where sequencing [illegible] provided at a sufficient distance from the airport to permit the pilot to change to the appropriate frequency for traffic and airport information.

Phraseology:

RADAR SERVICE TERMINATED, SQUAWK ONE TWO ZERO ZERO.

or

SQUAWK VFR.

then

CHANGE TO ADVISORY FREQUENCY APPROVED,

or

CONTACT (frequency identification)

or

FREQUENCY CHANGE APPROVED

7-71 SERVICE PROVIDED WHEN TOWER IS INOPERATIVE

a. Provide the following services during hours when the tower is not in operation:

1. Wind direction and velocity.

7-71a1 Note.—Issue information provided from the FSS or WSO. Otherwise, inform the pilot that wind information is not available.

2. Traffic information.

3. Inform aircraft when radar service is terminated.

7-71a3 Reference.—Radar Service Termination," paragraph 5-13.

b. Do not assign landing sequence.

7-72 thru 7-79 RESERVED

Section 7. STAGE III SERVICE — TERMINAL

APPLICATION

Apply Stage III procedures within the designated Terminal Radar Service Area (TRSA) in addition to the basic services described in paragraph 7–60 and Stage II services.

7–80

7–80 Reference.—Visual Separation, paragraph 7–10.

7–81 ISSUANCE OF EFC

Inform the pilot when to expect further clearance when VFR aircraft are held either inside or outside the TRSA.

7–81 Reference.—Visual Separation, paragraph 7–10.

7–82 SEPARATION

Any of the following may be applied within a TRSA.

7–82 Note 1.—Assignment of radar headings, routes, or altitudes is based on the provision that a pilot operating in accordance with VFR is expected to advise ATC if compliance will cause him to violate any FAR's.

7–82 Note 2.—Stage III TRSA separation and sequencing for VFR aircraft is dependent upon radar. When a radar outage occurs, efforts should be made to segregate VFR traffic from the IFR traffic flow.

a. Visual separation, as specified in paragraph 7–10, paragraph 7–31, and paragraph 7–66.

7–82a Note.—The provisions of paragraph 7–33 b & c are applicable to Stage III TRSA operations.

7–82a Reference.—Pilot/Controller Glossary term—Visual Separation.

b. *500 feet* vertical separation between VFR aircraft and between a VFR and an IFR aircraft.

7–82b Note.—500 feet vertical separation shall not be applied below a heavy jet.

7–82b Reference.—Minima (Radar Separation), paragraph 5–72.

c. Within 15 miles of the radar antenna, separate helicopters and Category I and II VFR aircraft from:

7–82c Note.—This procedure does not apply between IFR aircraft.

7–82c Reference.—Aircraft Categories, paragraph 3–106a. Note.

1. Other Category I or II VFR/IFR aircraft by a minimum of *1 1/2 miles.*

2. Category III VFR/IFR aircraft by *1 1/2 miles* only when both aircraft are on parallel courses. (See Figures 7–82[1] and 7–82[2].)

d. Within 1 mile of the runway end, *1/2 mile* lateral separation between a helicopter and a fixed-wing aircraft/IFR helicopter on a straight-in approach or a straight-out departure.

d Note.—This procedure applies when either of the two aircraft being separated is within 1 mile of the runway end.

d Reference.—Pilot/Controller Glossary term—Lateral Separation.

Reference.—Additional Separation for Formation Flights, paragraph 5–74.

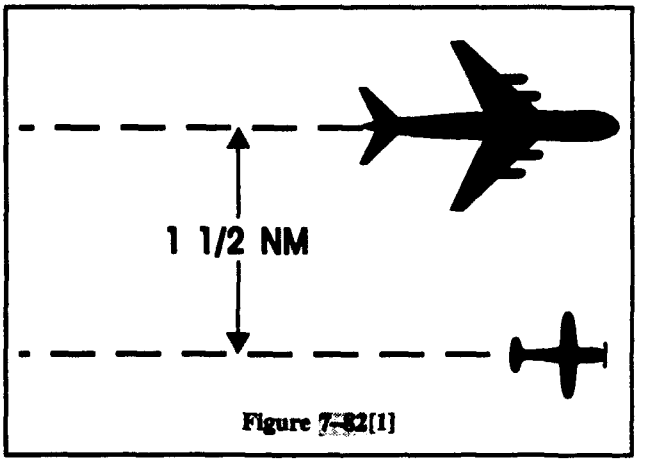


Figure 7–82[1]

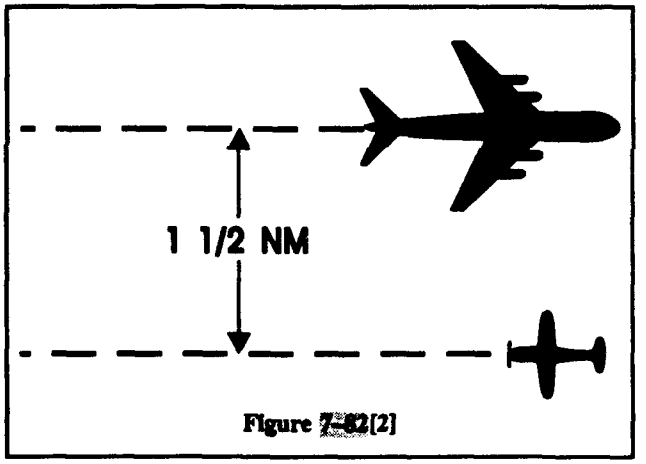


Figure 7–82[2]

HELICOPTER TRAFFIC

Helicopters need not be separated from other helicopters. Traffic information shall be exchanged, as necessary.

Reference.—Visual Separation, paragraph 7–10.

ALTITUDE ASSIGNMENTS

a. Altitude information contained in a clearance, instruction, or advisory to VFR aircraft shall meet MVA, minimum safe altitude, or minimum IFR altitude criteria.

a Reference.—Flight Direction, paragraph 4–60; Exceptions, paragraph 4–61; Minimum En route Altitudes, paragraph 4–64.

b. If required, issue altitude assignments, consistent with the provisions of Part 91.119.

b Note.—The minimum safe altitudes are: (1) over congested areas, an altitude at least 1,000 feet above the highest

bstacle; and (2) over other than congested areas, an altitude at ast 500 feet above the surface.

c. When necessary to assign an altitude for separaon purposes to VFR aircraft contrary to FAR 1.159, advise the aircraft to resume altitudes appropriate for the direction of flight when the altitude ssignment is no longer needed for separation or hen leaving the TRSA.

hraseology:
RESUME APPROPRIATE VFR ALTITUDES.

Reference.—Practice Approaches, paragraph 4–110. pplication, paragraph 5–90. Visual Separation, paragraph 7–10.

APPROACH INTERVAL

he tower shall specify the approach interval.

Reference.—Visual Separation, paragraph 7–10.

TRSA DEPARTURE INFORMATION

a. At controlled airports within the TRSA, inform departing aircraft proposing to operate within ie TRSA when to contact departure control and ie frequency to use. If the aircraft is properly quipped, ground control or clearance delivery shall ssue the appropriate beacon code.

Note.—Departing aircraft are assumed to want service unless the pilot states, "Negative ," or makes a similar comment. Pilots are expected to inform the controller of intended destination and/or route of flight and altitude.

b. Provide separation until the aircraft leaves the TRSA.

c. Inform VFR participating aircraft when leaving the TRSA.

Phraseology:
LEAVING THE (name) TRSA,

and as appropriate,

RESUME OWN NAVIGATION, REMAIN THIS FREQUENCY FOR TRAFFIC ADVISORIES, RADAR SERVICE TERMINATED, SQUAWK ONE TWO ZERO ZERO, *etc.*

d. Aircraft departing satellite controlled airports that will penetrate the TRSA should be provided the same service as those aircraft departing the primary airport. Procedures for handling this situation shall be covered in a letter of agreement or facility directives, as appropriate.

e. Procedures for handling aircraft departing uncontrolled satellite airports must be advertised in a facility bulletin and service provided accordingly.

Reference.—Visual Separation, paragraph 7–10.

RESERVED

Section 9. AIRPORT RADAR SERVICE AREA (ARSA) SERVICE [redacted] — TERMINAL

7-90 APPLICATION

Apply ARSA [redacted] procedures within the designated [redacted] and the associated outer area. [redacted] designed to keep ATC informed of all aircraft within [redacted] not to exclude operations. Two way radio communications are normally required for operations within ARSA [redacted], but operations without radio communications can be conducted by letter of agreement, facility directive, or special arrangement with the ARSA CLASS C airspace controlling facility

7-90 Reference.—Visual Separation, paragraph 7-10.

7-91 ARSA CLASS C SERVICES

a. ARSA Class C services include the following:

1. Sequencing of all aircraft to the primary airport.

2. Standard IFR services to IFR aircraft.

3. Separation, traffic advisories, and safety alerts between IFR and VFR aircraft.

4. Mandatory traffic advisories and safety alerts between VFR aircraft.

b. Provide ARSA Class C services to all aircraft operating within the ARSA Class C airspace.

c. Provide ARSA Class C services to all participating aircraft in the outer area.

d. Aircraft should not normally be held. However, if holding is necessary, inform the pilot of the expected length of delay.

e. When a radar outage occurs, advise aircraft that ARSA Class C services are not available and, if appropriate, when to contact the tower.

7-91 Reference.—Visual Separation, paragraph 7-10.

7-92 SEPARATION

Separate VFR aircraft from IFR aircraft by any one of the following:

a. Visual separation.

b. 500 feet vertical separation; except when operating below heavy jets, apply the provisions of paragraph 5-72d and e.

c. Target resolution when using broadband radar systems; except when operating behind heavy jets, apply the provisions of paragraph 5-72d and e. The application of target resolution at locations not using broadband radar will be individually approved by the Air Traffic Rules and Procedures Service, ATP-1.

7-92 Reference.—Visual Separation, paragraph 7-10.

7-93 ESTABLISHING TWO-WAY COMMUNICATIONS

The ARSA program Class C service requires pilots to establish two-way radio communications before entering the ARSA Class C airspace. If the controller responds to a radio call with, "(a/c callsign) standby," radio communications have been established and the pilot can enter the ARSA Class C airspace. If workload or traffic conditions prevent immediate provision of ARSA Class C services, inform the pilot to remain outside the ARSA Class C airspace until conditions permit the services to be provided.

Phraseology:

(a/c callsign) REMAIN OUTSIDE THE ARSA CLASS C AIRSPACE AND STANDBY.

7-93 Reference.—Visual Separation, paragraph 7-10.

7-94 ALTITUDE ASSIGNMENTS

a. When necessary to assign altitudes to VFR aircraft, assign altitudes that meet the MVA, minimum safe altitude, or minimum IFR altitude criteria.

b. Aircraft assigned altitudes which are contrary to Part 91.159 shall be advised to resume altitudes appropriate for the direction of flight when the *altitude is no longer needed for separation, when* leaving the outer area, or when terminating ARSA Class C service.

Phraseology:

RESUME APPROPRIATE VFR ALTITUDES.

7-94 Reference.—Visual Separation, paragraph 7-10.

7-95 EXCEPTIONS

a. VFR helicopters need not be separated from IFR helicopters. Traffic information and safety alerts shall be issued as appropriate.

b. Hot air balloons need not be separated from IFR aircraft. Traffic information and safety alerts shall be issued as appropriate.

7-96 ADJACENT AIRPORT OPERATIONS

a. Aircraft that will penetrate the ARSA Class C airspace after departing controlled airports within or adjacent to the ARSA Class C airspace shall be provided the same airspaces as those aircraft departing the primary airport. Procedures for handling this situation shall be covered in a letter of agreement or a facility directive as appropriate.

b. Aircraft departing uncontrolled airports within the ARSA Class C airspace shall be handled using procedures advertised in a letter to airmen.

7-97 TERMINATION OF SERVICE

Unless aircraft are landing at secondary airports or have requested termination of service while

in the outer area, provide services until the aircraft departs the associated outer area. Terminate [redacted] to aircraft landing at other than the primary airport at a sufficient distance from the airport to allow the pilot to change to the appropriate frequency for traffic and airport information.

Phraseology:

CHANGE TO ADVISORY FREQUENCY APPROVED,

or

CONTACT (facility identification)

[redacted]

Section [redacted]-TERMINAL

7–110 APPLICATION

Apply [redacted] and procedures within the designated [redacted].

a. No person may operate an aircraft within [redacted] unless:

1. The aircraft has an operable two-way radio capable of communications with ATC on appropriate frequencies for that [redacted].

2. The aircraft is equipped with the applicable operating transponder and automatic altitude reporting equipment specified in paragraph (a) of Part 91.215, except as provided in paragraph (d) of that section.

7–111 VFR AIRCRAFT IN [redacted]

a. VFR aircraft must obtain an ATC clearance to operate in [redacted].

7–111a Reference.—Operational Requests, paragraph 2–18. [redacted]

Phraseology:

[redacted]

or

[redacted]

and as appropriate,

[redacted]

CLEARED TO CLIMB INTO/THROUGH [redacted].

APPROVED AS REQUESTED. (Additional instructions, as necessary.)

REMAIN OUTSIDE [redacted]. (When necessary, reason and/or additional instructions.)

7–111a Note 1.—Assignment of radar headings, routes, or altitudes is based on the provision that a pilot operating in accordance with VFR is expected to advise ATC if compliance will cause violation of any FAR's.

7–111a Note 2.—Separation and sequencing for VFR aircraft is dependent upon radar. Efforts should be made to segregate VFR traffic from IFR traffic flows when a radar outage occurs.

b. Approve/deny requests from VFR aircraft to operate in [redacted] based on workload, operational limitations and traffic conditions.

c. Inform the pilot when to expect further clearance when VFR aircraft are held either inside or outside [redacted].

d. Inform VFR aircraft when leaving [redacted].

Phraseology:

LEAVING (name) [redacted], and as appropriate, RESUME OWN NAVIGATION, REMAIN THIS FREQUENCY FOR TRAFFIC ADVISORIES, RADAR SERVICE TERMINATED, SQUAWK ONE TWO ZERO ZERO, etc.

7–112 METHODS

a. To the extent practical, clear large turbine engine-powered airplanes to/from the primary airport using altitudes and routes that avoid VFR corridors and airspace below the [redacted] floor where VFR aircraft are operating.

7–112a Note.—Pilots operating in accordance with VFR are expected to advise ATC if compliance with assigned altitudes, headings, or routes will cause violation of any FAR.

b. Vector aircraft to remain in [redacted] after entry. Inform the aircraft when leaving and reentering [redacted] if it becomes necessary to extend the flight path outside [redacted] for spacing.

7–112b Note.—Part 91.131 states that "unless otherwise authorized by ATC, each person operating a large turbine engine-powered airplane to or from a primary airport shall operate at or above the designated floor while within the lateral limits of the [redacted] Such authorization should be the exception rather than the rule.

7–112a Reference.—Deviation Advisories, paragraph 5–10.

c. Aircraft departing controlled airports within [redacted] will be provided the same services as those aircraft departing the primary airport.

7–113 SEPARATION

a. Standard IFR services to IFR aircraft.

b. VFR aircraft shall be separated from VFR/IFR aircraft that weigh more than 19,000 pounds and turbojets by no less than:

7–113b Note.—Aircraft weighing 19,000 pounds or less include all of the small category aircraft plus the B31, B32, BE02, BEST, DO82, and SW3.

1. 1 1/2 miles lateral separation, or
2. 500 feet vertical separation, or

7–113b2 Note.—Apply the provisions of Minima, paragraph 5–72d and e, when using vertical separation below/behind heavy jets.

3. Visual separation, as specified in paragraph 7–10, paragraph 7–31, and paragraph 7–66.

c. VFR aircraft shall be separated from all VFR/IFR aircraft which weigh 19,000 pounds or less by a minimum of:

7–113c Note.—Aircraft weighing 19,000 pounds or less include all of the small category aircraft plus the B31, B32, BE02, BEST, DO82, and SW3.

1. Target resolution, or
2. 500 feet vertical separation, or

7–113c2 Note.—Apply the provisions of Minima, paragraph 5–72d and e, when using vertical separation below/behind heavy jets.

3. Visual separation, as specified in paragraph 7–10, paragraph 7–31, and paragraph 7–66.

7–113 Reference.—Pilot/Controller Glossary terms—Lateral Separation, Radar Separation, Target Resolution, Visual Separation.

7–114 TRAFFIC ADVISORIES

a. Provide mandatory traffic advisories and safety alert, between all aircraft.

b. Apply merging target procedures in accordance with paragraph 5–8.

7–115 HELICOPTER TRAFFIC

VFR helicopters need not be separated from VFR or IFR helicopters. Traffic advisories and safety alerts shall be issued as appropriate.

7–116 ALTITUDE ASSIGNMENTS

a. Altitude information contained in a clearance, instruction, or advisory to VFR aircraft shall meet MVA, minimum safe altitude, or minimum IFR altitude criteria.

b. Issue altitude assignments, if required, consistent with the provisions of Part 91.119.

7–116b Note.—The minimum safe altitudes are 1 over congested areas, an altitude at least 1,000 feet above the highest obstacle, 2 over other than congested areas, an altitude at least 500 feet above the surface.

7–116b Reference.—Flight Direction, paragraph 4–60. Exceptions, paragraph 4–61. Minimum En route Altitudes, paragraph 4–64.

c. Aircraft assigned altitudes which are contrary to Part 91.159 shall be advised to resume altitudes appropriate for the direction of flight when the altitude assignment is no longer required or when leaving the ICA Class B airspace.

Phraseology:

RESUME APPROPRIATE VFR ALTITUDES.

7–117 APPROACH INTERVAL

The tower shall specify the approach interval.

Chapter 8. OFFSHORE/OCEANIC PROCEDURES

Section 1. GENERAL

8–1 ATC SERVICE

Provide air traffic control service in oceanic controlled airspace in accordance with the procedures in this chapter except when other procedures/minima are prescribed in a directive or a letter of agreement.

8–1 Reference.— Procedural Letters of Agreement, paragraph 1–8.

8–2 OPERATIONS IN OFFSHORE CONTROL AREAS OFFSHORE AIRSPACE AREAS

Provide air traffic control service in offshore control areas offshore airspace areas in accordance with procedures and minima in this chapter. For those situations not covered by this chapter, the provisions in this Order shall apply.

8–3 VFR FLIGHT PLANS

VFR flights in Oceanic FIR's may be conducted in meteorological conditions equal to or greater than those specified in the following table FAR Part 91 Basic VFR weather minimums. Operations on a VFR flight plan are permitted only between sunrise and sunset and only within:

a. Miami, Houston, and San Juan Oceanic Control Areas (CTA)'s at or below FL 180.

b. Within the Oakland FIR when operating less than 100 NM seaward from the shoreline within controlled airspace.

c. All Oceanic FIR airspace below the Oceanic CTA's.

8–4 TYPES OF SEPARATION

Separation shall consist of at least one of the following:

a. Vertical separation;

b. Horizontal separation, either;

1. Longitudinal; or
2. Lateral;

c. Composite separation;

d. Radar separation, as specified in Chapter 5, where radar coverage is adequate.

8–5 ALTIMETER SETTING

Within oceanic control areas, unless directed and/or charted otherwise, altitude assignment shall be based on flight levels and a standard altimeter setting of 29.92 inches Hg. (QNE).

8–6 RECEIPT OF POSITION REPORTS

When direct pilot controller communication is not available and a position report affecting separation is not received, take action to obtain the report no later than *10 minutes* after the control estimate.

8–7 OCEANIC NAVIGATIONAL ERROR REPORTING (ONER) PROCEDURES

FAA Order 7110.82 contains procedures for reporting and processing navigational errors observed by ATC radar for aircraft exiting oceanic airspace.

8–8 thru 8–19 RESERVED

Section 2. COORDINATION

8–20 GENERAL

ACC's shall:

a. Forward to appropriate ATS facilities, as a flight progresses, current flight plan (CPL) and control information.

b. Coordinate flight plan and control information in sufficient time to permit the receiving facility to analyze the data and to effect any necessary additional coordination. This may be specified in a letter of agreement.

c. Coordinate with adjacent ATS facilities when airspace to be protected will overlap the common boundary.

d. Forward revisions of estimates of *3 minutes* or more to the appropriate ATS facility.

e. Coordinate with adjacent facilities on IFR and VFR flights to ensure the continuation of appropriate air traffic services.

8–21 TRANSFER OF CONTROL AND COMMUNICATIONS

a. Only one air traffic control unit shall control an aircraft at any given time.

b. The control of an aircraft shall be transferred from one control unit to another at the time the aircraft is estimated to cross the control boundary or at such other point or time agreed upon by the two units.

c. The transferring unit shall forward to the accepting unit any changed flight plan or control data which are pertinent to the transfer.

d. The accepting unit shall notify the transferring unit if it is unable to accept control under the terms specified, or it shall specify the changes or conditions required so that the aircraft can be accepted.

e. The accepting unit shall not alter the clearance of an aircraft that has not yet reached the transfer of control point without the prior approval of the transferring unit.

f. Where nonradar separation minima are being applied, the transfer of air–ground communications with an aircraft shall be made *5 minutes* before the time at which the aircraft is estimated to reach the boundary unless otherwise agreed to by the control and/or communication units concerned.

8–22 thru 8–29 RESERVED

Section 3. LONGITUDINAL SEPARATION

8–30 APPLICATION

Separate aircraft by providing a time or distance interval between aircraft consistent with the required minima. Longitudinal separation expressed in distance may be applied as prescribed in Chapter 6.

8–30 Note.— Longitudinal separation minima is contained in:

Section 7, North Atlantic ICAO Region.

Section 8, Caribbean ICAO Region.

Section 9, Pacific ICAO Region.

Section 10, North American ICAO Region.

8–31 SEPARATION METHODS

Separate aircraft longitudinally in accordance with the following:

a. Same courses: Ensure that the spacing between aircraft is not less than the applicable minimum required. (See Figure 8–31[1]).

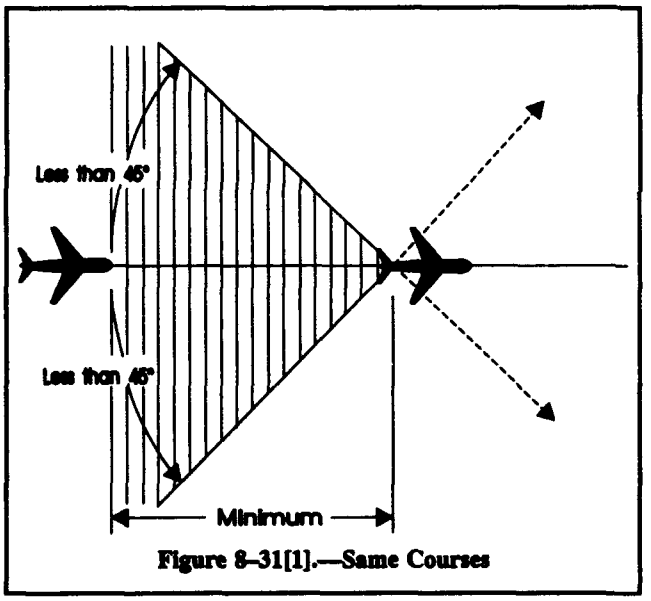


Figure 8–31[1].—Same Courses

b. Crossing courses: Ensure that the spacing at the point of intersection is not less than the applicable minimum required. (See Figure 8–31[2]).

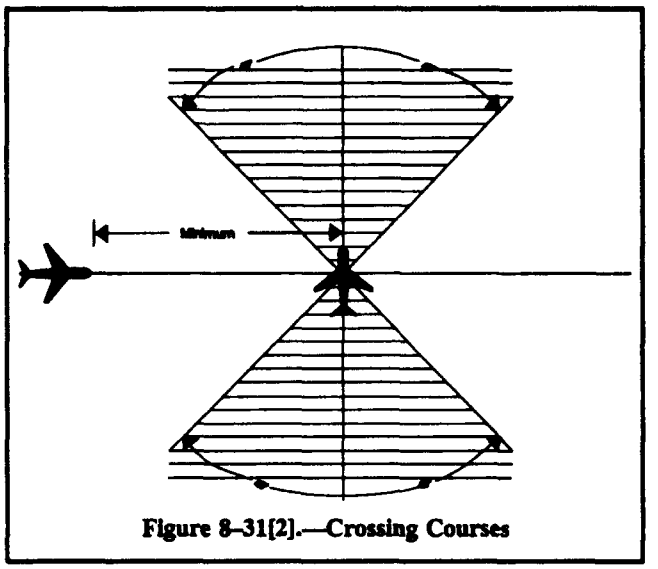


Figure 8–31[2].—Crossing Courses

c. Reciprocal courses:

1. Ensure that aircraft are vertically separated for a time interval equal to the applicable minimum required before and after the aircraft are estimated to pass. (See Figure 8–31[3]).

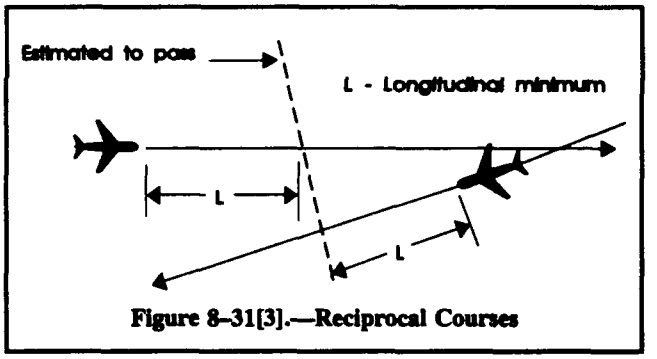


Figure 8–31[3].—Reciprocal Courses

2. Vertical separation may be discontinued after one of the following conditions are met:

(a) Both aircraft have reported passing a significant point and the aircraft are separated by at least the applicable minimum required for the same direction longitudinal spacing; (See Figure 8–31[4]) or

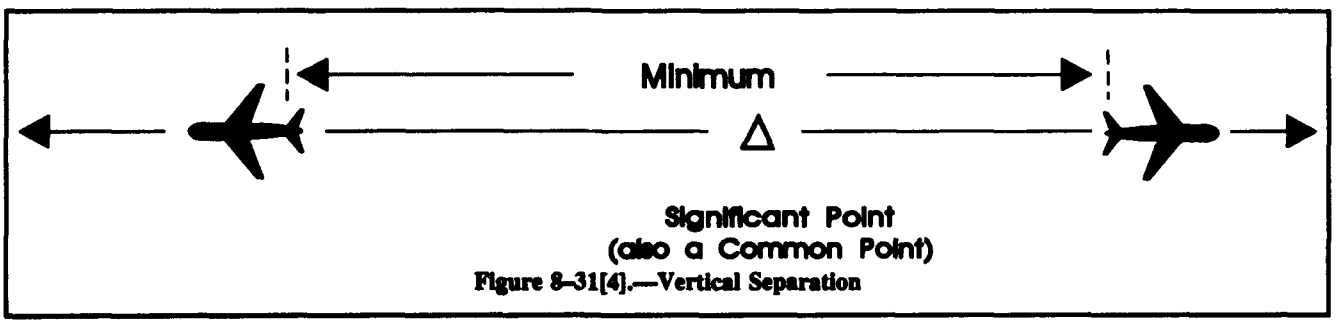


Figure 8–31[4].—Vertical Separation

(b) Both aircraft have reported passing ground-based NAVAID's or DME fixes indicating that they have passed each other.

8–32 MACH NUMBER TECHNIQUE

The following conditions shall be met when the Mach number technique is being applied:

a. Aircraft Types: Turbojet aircraft only.

b. Routes:

1. The aircraft follow the same track or continuously diverging tracks, and

2. The aircraft concerned have reported over a common point; or

3. If the aircraft have *not* reported over a common point, either radar or other approved means are used to ensure that the appropriate time interval will exist at the common point; or

4. If a common point does not exist, either radar or other approved means are used to verify that the appropriate time interval will exist at a significant point on each track from which the tracks continuously diverge.

c. Altitudes:

1. Assign only a single cardinal altitude to each aircraft.

2. The aircraft concerned are in level, climbing or descending flight.

d. Mach Number Assignment:

1. A Mach number (or, when appropriate, a range of Mach numbers) shall be issued to each aircraft.

8–32d1 Note 1.– ICAO DOC 7030/4 requires pilots to strictly adhere to the last assigned Mach number (or range of Mach numbers), even during climbs and descents, unless revised by ATC.

8–32d1 Reference.— ICAO DOC 9426–AN/924, Part II, section 2, paragraph 2.3.4, 2.4.7, and 2.5.3.

8–32d1 Note 2.– When it is necessary to issue crossing restrictions to ensure the appropriate time interval, it may be impossible for an aircraft to comply with both the clearance to meet the crossing restrictions and the clearance to maintain a single, specific Mach number.

8–32d1 Examples.–

"Maintain Mach point eight four or greater."

"Maintain Mach point eight three or less."

"Maintain Mach point eight two or greater; do not exceed Mach point eight four."

e. Separation Criteria:

1. The use of Mach number technique allows for the application of reduced longitudinal separation minima. However, the prescribed longitudinal separation between successive aircraft flying at the same level shall be provided over the entry point *and* on a particular track or tracks, or exist when climb or descent to the level of another aircraft is accomplished into the area concerned.

2. The applicable longitudinal separation minima is maintained by:

(a) Ensuring that the spacing between the estimated positions of the aircraft is not less than the prescribed minimum.

(b) Continuously monitoring aircraft position reports and updating control estimates along the aircraft's track(s). If after establishing the Mach number technique between aircraft, control information indicates that less than the applicable minima between aircraft may exist, immediately:

(1) Issue crossing restrictions to ensure the appropriate longitudinal minima at the next significant point, or

(2) Assign revised Mach numbers appropriate for the estimated interval, or

(3) Establish vertical separation.

8–32e Note.– Control estimates are calculated by the controller using known wind patterns, previous aircraft transit times, pilot progress reports, and pilot estimates.

f. Relative Speeds:

1. The lead aircraft maintains the same or a greater Mach number than the following aircraft; or

2. If the following aircraft is faster than the lead aircraft, ensure that the appropriate time interval will exist until another form of separation is achieved.

8–32f Note.– A "rule–of–thumb" may be applied which allows clearances to be issued in a timely manner, provided the expected minimum longitudinal separation over the exit point is subsequently confirmed when the calculated flight progress strip data becomes available. This rule–of–thumb can be stated as follows: for each 600 NM in distance between the entry and exit points of the area where the Mach number technique is used, add 1 minute for each 0.01 difference in Mach number for the two aircraft concerned to compensate for the fact that the second aircraft is overtaking the first aircraft. (See Table 8–32[1]).

Table 8–32[1]—Application of the Mach number technique when the following aircraft is faster.

Difference in MACH	Distance to Fly and Separation (in Minutes) Required at Entry Point)				
	001–600 NM	601–1200 NM	1201–1800 NM	1801–2400 NM	2401–3000 NM
0.01	11	12	13	14	15
0.02	12	14	16	18	20
0.03	13	16	19	22	25
0.04	14	18	22	26	30
0.05	15	20	25	30	35
0.06	16	22	28	34	40
0.07	17	24	31	38	45
0.08	18	26	34	42	50
0.09	19	28	37	46	55
0.10	20	30	40	50	60

8–33 thru 8–39 RESERVED

Section 4. LATERAL SEPARATION

8–40 APPLICATION

Separate aircraft by assigning different flight paths whose widths or protected airspace do not overlap.

8–40 Note.— Lateral separation minima is contained in:

Section 7, North Atlantic ICAO Region.

Section 8, Caribbean ICAO Region.

Section 9, Pacific ICAO Region.

Section 10, North American ICAO Region.

8–41 SEPARATION METHODS

Lateral separation exists for:

a. Nonintersecting flight paths:

1. When the required distance is maintained between the flight paths; or (See Figure 8–41[1]).

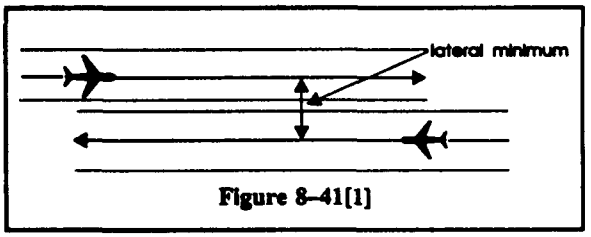


Figure 8–41[1]

2. When reduced route protected airspace is applicable, and the protected airspace of the flight paths do not overlap; or (See Figure 8–41[2]).

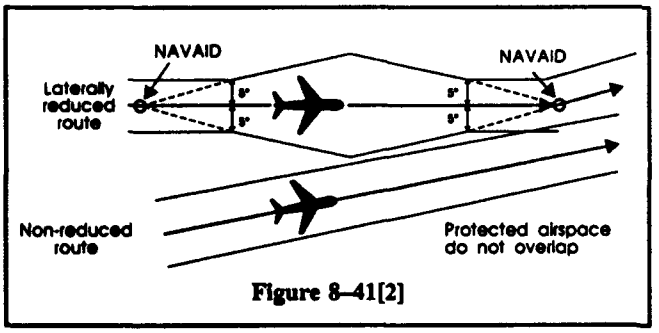


Figure 8–41[2]

3. When aircraft are crossing an oceanic boundary and are entering an airspace with a larger lateral minimum than the airspace being exited; and

(a) The smaller separation exists at the boundary; and

(b) Flight paths diverge by 15° or more until the larger minimum is established. (See Figure 8–41[3]).

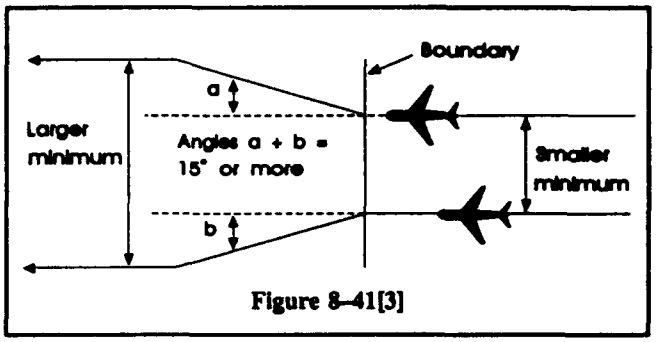


Figure 8–41[3]

b. Intersecting flight paths with constant and same width protected airspace when either aircraft is at or beyond a distance equal to the applicable lateral separation minimum measured perpendicular to the flight path of the other aircraft. (See Figure 8–41[4]).

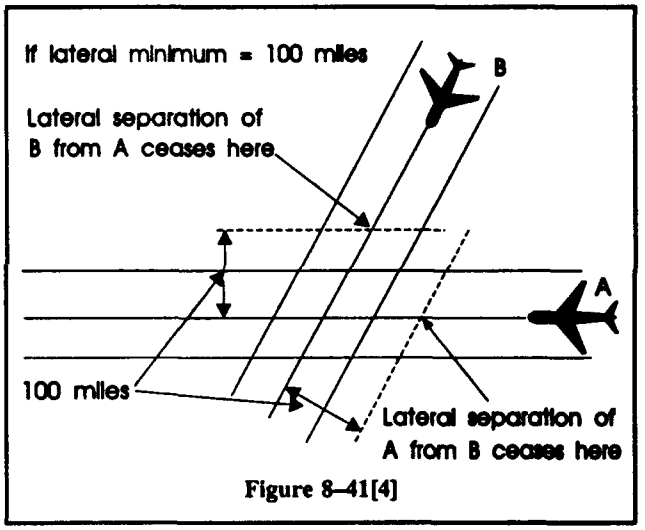


Figure 8–41[4]

c. Intersecting flight paths with constant but different width protected airspace when either aircraft is at or beyond a distance equal to the sum of the protected airspace of both flight paths measured perpendicular to the flight path of the other aircraft. (See Figure 8–41[5]).

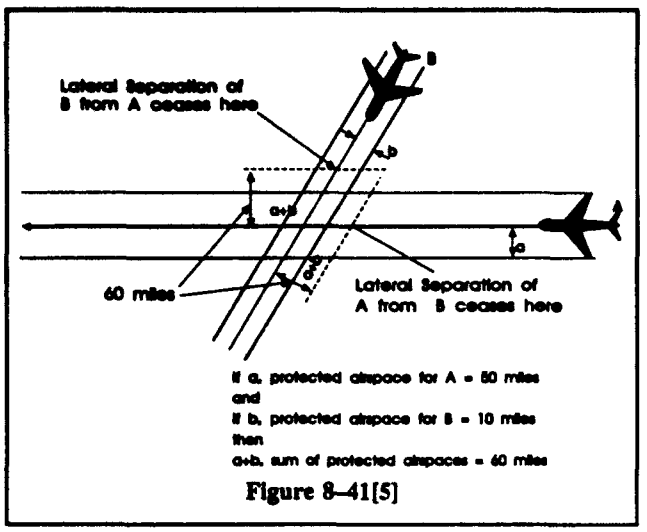


Figure 8–41[5]

8–41[5] Note.— In the example in the illustration, the protected airspace for Westbound flight A is distance "a" (50 miles), and for Southwestbound flight B, distance "b" (10 miles). Therefore, the sum of distances "a" and "b"; i.e., the protected airspace of A and B, establishes the lateral separation minimum (60 miles) applicable for either flight relevant to the other.

d. Intersecting flight paths with variable width protected airspace when either aircraft is at or beyond a distance equal to the sum of the protected airspace of both flight paths measured perpendicular to the flight path of the other aircraft. Measure protected airspace for each aircraft perpendicular to its flight path at the first point or the last point, as applicable, of protected airspace overlap.(See Figure 8–41[6]).

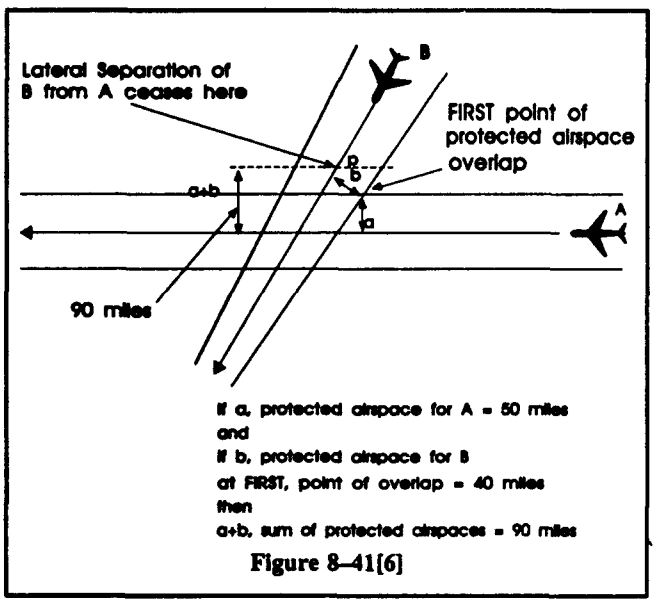


Figure 8–41[6]

8–41[6] Note 1.— At the first point of protected airspace overlap, the protected airspace for Westbound flight A is distance "a" (50 miles), and for Southbound flight B, distance "b" (40 miles). The sum of distances "a" and "b" (90 miles) establishes the lateral separation minimum applicable in this example for either flight as it approaches the intersection. Thus, for example, B should be vertically separated from A by the time it reaches point "p."

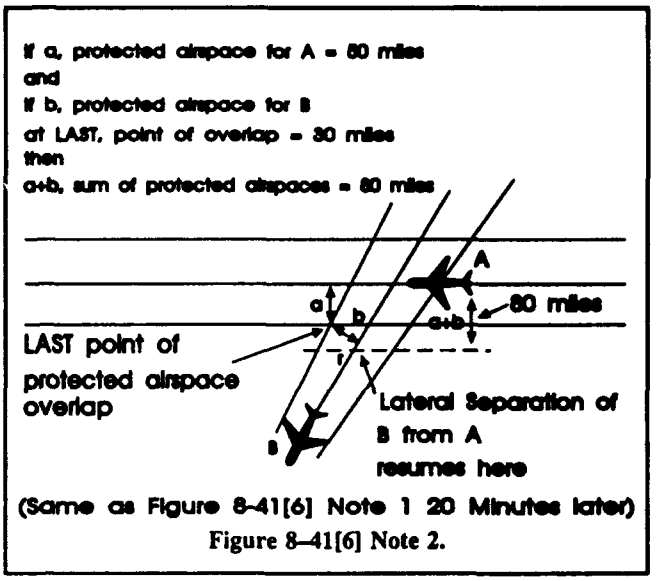


Figure 8–41[6] Note 2.

8–41[6] Note 2.— Distance "a" (50 miles) and "b" (30 miles) are determined at the last point of protected airspace overlap. The sum of the distances "a" and "b" (80 miles) establishes the lateral separation minima applicable for either flight after it passes beyond the intersection. Thus, for example, B could be cleared to, or through, A's altitude after passing point "r."

8–42 REDUCTION OF ROUTE PROTECTED AIRSPACE

When routes have been satisfactorily flight checked and notice has been given to users, reduction in route protected airspace may be made as follows:

a. Below FL 240, reduce the width of the protected airspace to 5 miles on each side of the route centerline to a distance of 57.14 miles from the NAVAID, then increasing in width on a 5° angle from the route centerline, measured at the NAVAID, to the maximum width allowable within the lateral minima; for example, 50 miles of protected airspace on each side of centerline; i.e., a lateral minimum of 100 miles.(See Figure 8–42[1]).

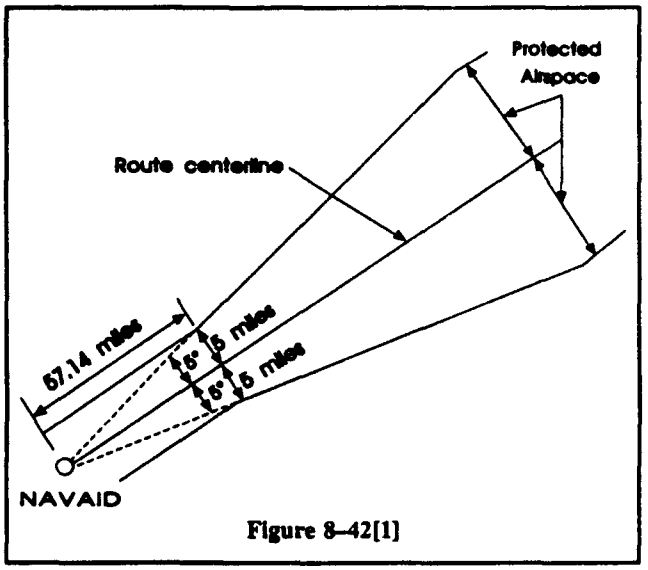


Figure 8–42[1]

b. At and above FL 240, reduce the width of the protected airspace to 10 miles on each side of the route centerline to a distance of 114.29 miles from the NAVAID, then increasing in width on a 5° angle from the route centerline, as measured at the NAVAID, to the maximum width allowable within the lateral minima; for example, 60 miles of protected airspace on each side of the centerline; i.e., a lateral separation minimum of 120 miles. (See Figure 8–42[2]).

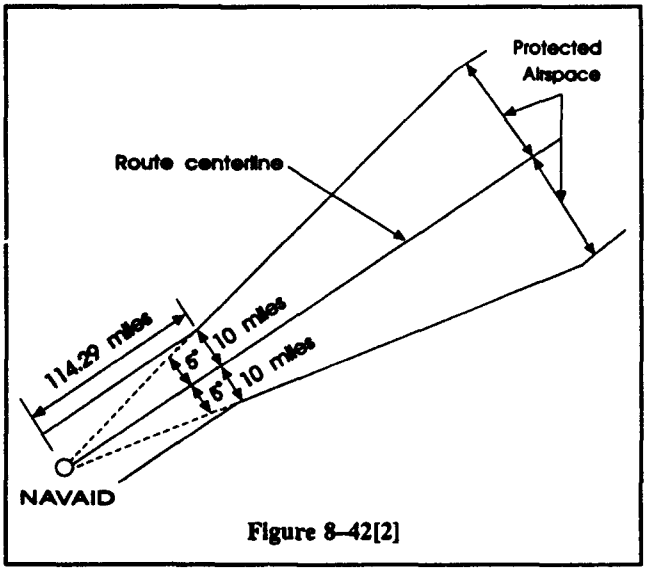


Figure 8–42[2]

8–43 TRACK SEPARATION

Apply track separation between aircraft by requiring aircraft to fly specified tracks or radials and with specified spacings as follows:

a. Same NAVAID:

1. VOR/VORTAC/TACAN. Consider separation to exist between aircraft established on radials of the same NAVAID that diverge by at least 15 degrees when either aircraft is clear of the airspace to be protected for the other aircraft. Use the table to determine the flight distance required for various divergence angles and altitudes to clear the airspace to be protected. (See Figure 8–43[1]).

Table 8–43[1].— Divergence –Distance Minima (VOR/ VORTAC/TACAN)

Table 8–43[1]

Divergence (degrees)	Distance (miles)	
	FL 230 and below	FL 240 through FL 450
15–25	17	18
26–35	11	13
36–90	8	11

Note: This table compensates for DME slant range error.

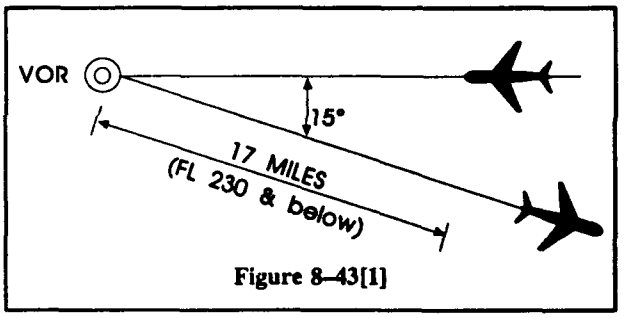


Figure 8–43[1]

2. NDB:

(a) Consider separation to exist between aircraft established on tracks of the same NAVAID that diverge by at least 30 degrees and one aircraft is at least 15 miles from the NAVAID. This separation shall not be used when one or both aircraft are inbound to the aid unless the distance of the aircraft from the facility can be readily determined by reference to the NAVAID. Use the table to determine the flight distance required for various divergence angles to clear the airspace to be protected. For divergence that falls between two values, use the lesser value to obtain the distance. (See Figure 8–43[2]).

Table 8–43[2] Divergence–Distance Minima (NDB)

Table 8–43[2]		
Distance (miles)		
Divergence (degrees)	FL 230 and below	FL 240 through FL 450
30	16	17
45	13	14
60	9	10
75	7	8
90	6	7

Note.—This table compensates for DME slant range error.

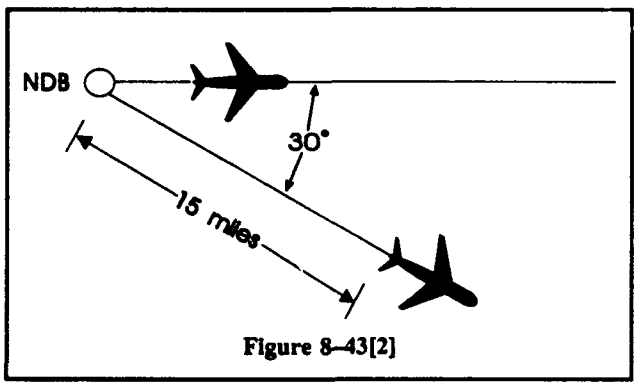


Figure 8–43[2]

(b) Clear aircraft navigating on NDB facilities in accordance with paragraph 2–91d.

b. Different NAVAID's: Separate aircraft using different navigation aids by assigning tracks so that their protected airspace does not overlap. (See Figure 8–43[3]).

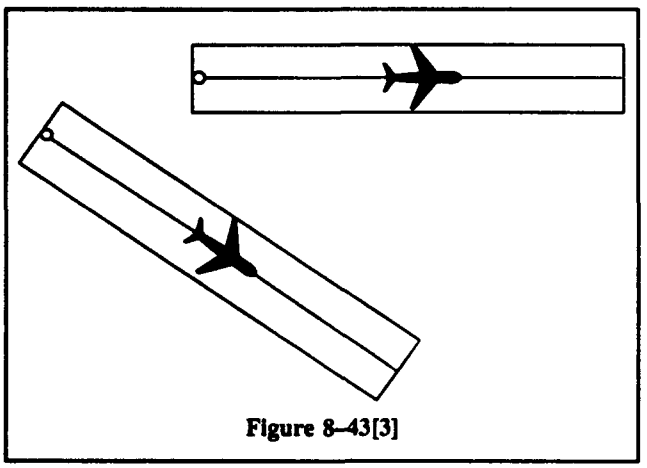


Figure 8–43[3]

c. Dead Reckoning (DR):

1. Consider separation to exist between aircraft established on tracks that diverge by at least 45 degrees when one aircraft is at least 15 miles from the point of intersection of the tracks. This point may be determined either visually or by reference to a navigation aid. (See Figure 8–43[4]).

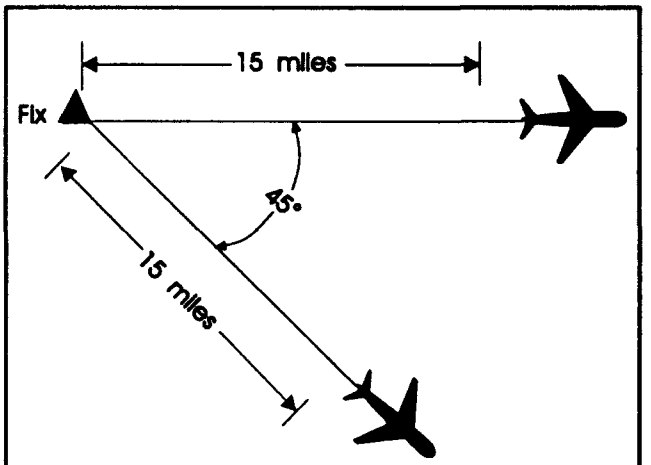


Figure 8–43[4]

8–44 thru 8–49 RESERVED

Section 5. OFFSHORE/OCEANIC TRANSITION PROCEDURES

8–50 ALTITUDE/FLIGHT LEVEL TRANSITION

When vertical separation is applied between aircraft crossing the offshore/oceanic airspace boundary below FL 180, control action shall be taken to ensure that differences between the standard altimeter setting (QNE) and local altimeter setting (QNH) do not compromise separation. (See Figure 8–50[1]).

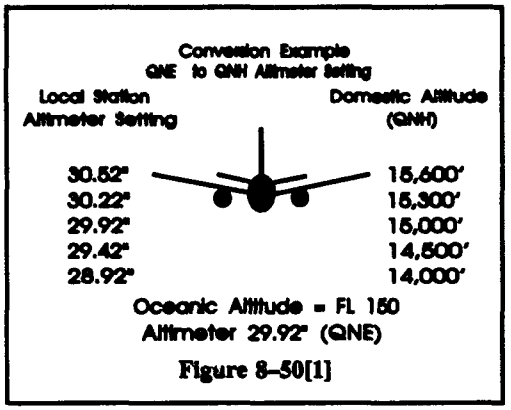


Figure 8–50[1]

8–51 COURSE DIVERGENCE

When aircraft are entering oceanic airspace, separation will exist in oceanic airspace when:

a. Domestic lateral separation exists at the oceanic control boundary;

b. Courses diverge by a least 15° until the oceanic lateral separation is established.

8–52 OPPOSITE DIRECTION

When transitioning from an offshore control area offshore airspace area to oceanic airspace, an aircraft may climb through opposite direction oceanic traffic provided vertical separation above that traffic is established:

a. Before the outbound crosses the offshore/oceanic boundary; and

b. 15 minutes before the aircraft are estimated to pass. (See Figure 8–52[1]).

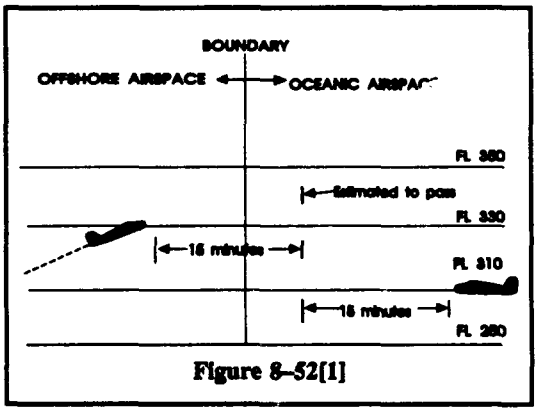


Figure 8–52[1]

8–53 SAME DIRECTION

When transitioning from an offshore control area offshore airspace area to oceanic airspace or while within oceanic airspace, apply 5 minutes minimum separation when a following aircraft on the same course is climbing through the altitude of the preceding aircraft if the following conditions are met:

a. The preceding aircraft is level at the assigned altitude and is maintaining a speed equal to or greater than the following aircraft; and

b. The minimum of *5 minutes* is maintained between the preceding and following aircraft; and

c. The following aircraft is separated by not more than 4,000 feet from the preceding aircraft when the climb clearance is issued; and

d. The following aircraft commences climb within *10 minutes* after passing:

1. An exact reporting point (DME fix or intersection formed from NAVAID's) which the preceding aircraft has reported; or

2. A radar observed position over which the preceding aircraft has been observed; and

e. The following aircraft is in direct communication with air traffic control until vertical separation is established. (See Figure 8–53[1]).

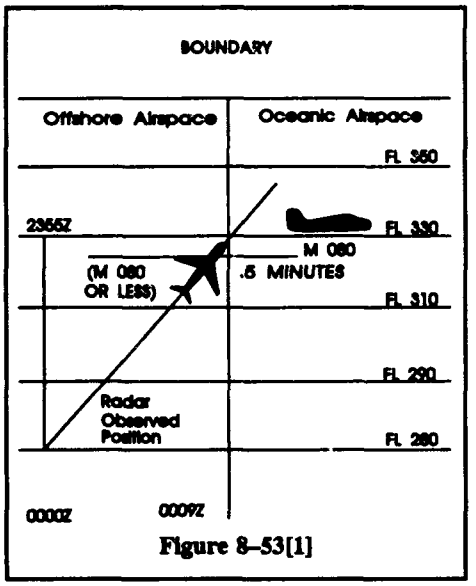


Figure 8–53[1]

8–54 thru 8–59 RESERVED

Section 6. SEPARATION FROM AIRSPACE RESERVATIONS

8–60 TEMPORARY STATIONARY AIRSPACE RESERVATIONS

Separate aircraft from a temporary stationary reservation by one of two methods:

a. Laterally: Clear aircraft so that the protected airspace along the route of flight does not overlap the geographical area of the stationary reservation. (See Figure 8–60[1]).

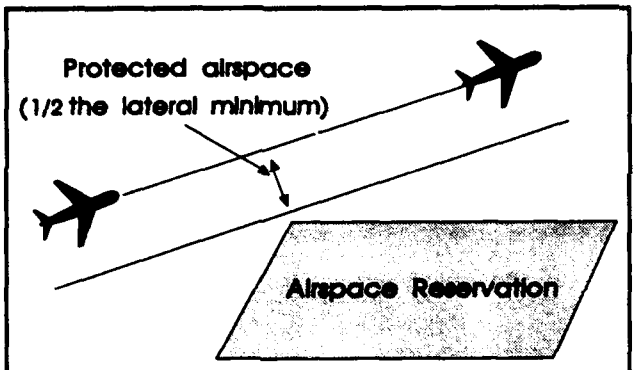


Figure 8–60[1]

b. Vertically: Clear aircraft so that vertical separation exists while the aircraft is within a geographical area defined as the stationary reservation plus a buffer around the perimeter equivalent to one–half the lateral separation minimum. (See Figure 8–60[2]).

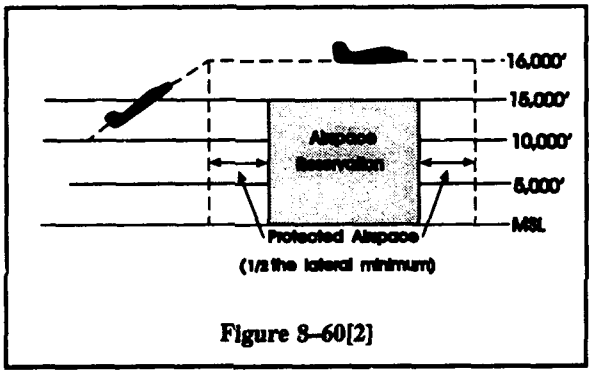


Figure 8–60[2]

8–61 REFUSAL OF AVOIDANCE CLEARANCE

If a pilot refuses to accept a clearance to avoid a reservation, inform him/her of the potential hazard, advise him/her that services will not be provided while the flight is within the reservation and, if possible, inform the appropriate using agency.

8–62 TEMPORARY MOVING AIRSPACE RESERVATIONS

Separate aircraft from a temporary moving airspace reservation by one of the following methods:

a. Laterally: Clear aircraft so that the protected airspace along the route of flight does not overlap the (time–dependent) geographical area of the moving airspace reservation.

b. Longitudinally: Clear aircraft so that the appropriate longitudinal minimum exists ahead of the first or behind the last aircraft operating within the reservation.

c. Vertically: Clear aircraft so that vertical separation exists while the aircraft is within a (time–dependent) geographical area defined as the moving airspace reservation plus a buffer around the perimeter equivalent to one–half the lateral separation minimum.

8–63 WARNING AREAS

Separate aircraft from a Warning Area by one of two methods:

a. Laterally: Clear aircraft on airways or routes whose widths or protected airspace do not overlap the peripheral boundary of the Warning Area.

b. Vertically: Assign an altitude consistent with paragraph 4–60 so that vertical separation exists, which is at least 500 feet (above FL 290 — 1,000 feet) above/below the Warning Area's upper/lower limit, while the aircraft is within a geographical area defined as the Warning Area plus a buffer around its perimeter equivalent to one–half the appropriate lateral separation minimum.

8–64 thru 8–69 RESERVED

Section 7. NORTH ATLANTIC ICAO REGION

8–70 APPLICATION

Provide air traffic control services in the North Atlantic ICAO Region with the procedures and minima contained in this section except when noted otherwise.

8–71 VERTICAL SEPARATION

Provide vertical separation in accordance with Chapter 4, Section 5.

8–72 LONGITUDINAL SEPARATION

Provide longitudinal separation between aircraft as follows:

a. *Supersonic flight:*

1. Provided the Mach number technique is applied in accordance with paragraph 8–32:

(a) *10 Minutes; or*

(b) *10 minutes* when one or both aircraft has been cleared to commence the deceleration/descent phase of supersonic flight and the preceding aircraft is maintaining a Mach number which is the same as or greater than that of the following aircraft.

2. *15 Minutes* between all other aircraft.

b. Operations Wholly or Partly in Minimum Navigation Performance Specification (MNPS) Airspace *(subsonic flight):*

1. *10 minutes*, provided the Mach number technique is applied in accordance with paragraph 8–32; and

(a) Where tracks diverge from the common point:

(1) At least *10 minutes* longitudinal separation exists at the point where the tracks diverge; and

(2) At least *5 minutes* longitudinal separation will exist where 60 NM lateral separation is achieved; and

8–72b1(a)(2) Note.— When the preceding aircraft is maintaining a greater Mach number than the following aircraft in accordance with this subparagraph, and the aircraft will follow continuously diverging tracks so that 60 NM lateral separation will be achieved by the next significant point, the requirement to have at least 5 minutes longitudinal separation where 60 NM lateral separation is achieved, may be disregarded.

(3) At least 60 NM lateral separation will be achieved at or before the next significant point (normally within ten degrees of longitude along track(s)) or, if not, within 90 minutes of the time the second aircraft passes the common point or is within 600 NM of the common point, whichever is estimated to occur first.

2. Between *9 and 5 minutes*, provided the Mach number technique is applied in accordance with paragraph 8–32: and

(a) It is possible to ensure, by radar or other approved means, that the required time interval exists and will exist at the common point from which they either follow the same track or continuously diverging tracks; and

(b) The preceding aircraft is maintaining a greater Mach number than the following aircraft in accordance with the following:

(1) *9 minutes*, if the preceding aircraft is Mach 0.02 faster than the following aircraft;

(2) *8 minutes*, if the preceding aircraft is Mach 0.03 faster than the following aircraft;

(3) *7 minutes*, if the preceding aircraft is Mach 0.04 faster than the following aircraft;

(4) *6 minutes, if the preceding aircraft* is Mach 0.05 faster than the following aircraft;

(5) *5 minutes*, if the preceding aircraft is Mach 0.06 faster than the following aircraft.

3. *15 minutes* between turbojet aircraft not covered by paragraph 8–72b1 and 2.

c. Operations in the West Atlantic Route System *(WATRS) (subsonic flight):*

8–72c Note.–The *WATRS* area is defined as beginning at a point 27°00'N/77°00'W direct to 20°00'N/67°00'W direct to 18°00'N/62°00'W direct to 18°00'N/60°00'W direct to 38°30'N/60°00'W direct to 38°30'N/69°15'W, thence counter–clockwise along the New York Oceanic CTA/FIR boundary to the Miami Oceanic CTA/FIR boundary, thence southbound along the Miami Oceanic CTA/FIR boundary to the point of beginning.

1. Between all aircraft *15 minutes*, or

2. Aircraft operating at or above FL 280 within the *WATRS* area or west of 60° West when in transit to or from *WATRS*;

(a) *10 minutes* provided the Mach number technique is applied in accordance with paragraph 8–32; and

(1) Where tracks diverge from the common point:

[a] At least *10 minutes* longitudinal separation exists at the point where the tracks diverge; and

[b] At least *5 minutes* longitudinal separation will exist where the minimum lateral separation is achieved; and

[c] At least the minimum lateral separation will be achieved at or before the next significant point or, if not, within *90 minutes* of the time the second aircraft passes the common point or is within 600 NM of the common point, whichever is estimated to occur first;

(2) If the aircraft have not reported over a common point, it is possible to ensure, by radar or other approved means, that the appropriate time interval will exist at the common point from which they either follow the same track or continuously diverging tracks;

(b) *Between 9 and 5 minutes,* provided the Mach number technique is applied in accordance with paragraph 8–32; and

(1) It is possible to ensure by radar or other approved means, that the required time interval exists and will exist at the common point from which they either follow the same track or continuously diverging tracks; and

(2) The preceeding aircraft is maintaining a greater Mach number than the following aircraft in accordance with the following:

[a] *9 minutes,* if the preceding aircraft is Mach 0.02 faster than the following aircraft;

[b] *8 minutes,* if the preceding aircraft is Mach 0.03 faster than the following aircraft;

[c] *7 minutes,* if the preceding aircraft is Mach 0.04 faster than the following aircraft;

[d] *6 minutes,* if the preceding aircraft is Mach 0.05 faster than the following aircraft;

[e] *5 minutes,* if the preceding aircraft is Mach 0.06 faster than the following aircraft.

8–72c2(a)(1)[b] Note.– When the preceding aircraft is maintaining a greater Mach number than the following aircraft, in accordance with the above table, and the aircraft will follow continuously diverging tracks so that the minimum lateral separation will be achieved by the next significant point, the requirement stated in 8–72c2(a)(1)[b], to have at least *5 minutes* longitudinal separation where the minimum lateral separation is achieved, may be disregarded.

d. Operations outside of MNPS airspace *(subsonic flight):* Apply the following minimum longitudinal separation:

1. *15 minutes* between turbojet aircraft, provided the Mach number technique is applied in accordance with paragraph 8–32.

2. Between turbojet aircraft, provided the Mach number technique is applied in accordance with paragraph 8–32, and *only* when it is possible to ensure by radar or other approved means that the required time interval exists and will exist at the common point:

(a) *10 minutes* when the preceding aircraft is at least Mach 0.03 faster than the following aircraft; or

(b) *5 minutes* when the preceding aircraft is at least Mach 0.06 faster than the following aircraft.

3. *20 minutes:*

(a) Between turbojet aircraft not covered by paragraphs 8–72d1 or 2; and

(b) Between other than turbojet aircraft operating along routes extending between the United States, Canada or Bermuda and points in the Caribbean Region, or between the United States or Canada and Bermuda; and

4. *30 minutes* between other than turbojet aircraft except those covered in paragraph 8–72d3(b).

8–73 LATERAL SEPARATION

Provide lateral separation by assigning different flight paths whose widths or protected airspace do not overlap. Apply the following:

a. *60 NM or 1 degree* latitude between:

1. Supersonic aircraft operating above FL 275.

2. Aircraft which meet the MNPS and which:

8–73a2 Note.– This reduced lateral separation shall not be used if track keeping capability of the aircraft has been reduced for any reason.

(a) Operate within MNPS airspace; or

(b) Are in transit to or from MNPS airspace; or

(c) Operate for part of their flight within MNPS airspace but are cleared to operate immediately above or below such airspace for a portion of their flight.

b. *90 NM or 1 and 1/2 degrees* latitude between aircraft operating:

1. Within *WATRS;*

2. Between the United States, Canada, and Bermuda;

3. West of 55° West between the United States, Canada, or Bermuda and points in the Caribbean ICAO Region.

c. *120 NM or 2 degrees latitude* between aircraft not covered by paragraphs 8–73a or b.

8–73 Note.– Tracks may be spaced with reference to their difference in latitude, provided that in any interval of 10 degrees of longitude the change in latitude of at least one of the tracks does not exceed 3 degrees when operating south of 58° North.

8–74 thru 8–79 RESERVED

Section 8. CARIBBEAN ICAO REGION

8–80 APPLICATION

Provide air traffic control services in the Caribbean ICAO Region with the procedures and minima contained in this section except when noted otherwise.

8–81 VERTICAL SEPARATION

Provide vertical separation in accordance with Chapter 4, Section 5.

8–82 LONGITUDINAL SEPARATION

Provide longitudinal separation between aircraft as follows:

a. *Supersonic flight:*

1. Provided the Mach number technique is applied in accordance with paragraph 8–32;

(a) *10 minutes;* or,

(b) *10 minutes* when one or both aircraft has been cleared to commence the deceleration/descent phase of supersonic flight and the preceding aircraft is maintaining a Mach number which is the same or greater than that of the following aircraft.

2. *15 minutes* between all other aircraft.

b. Operations in the West Atlantic Route System *(WATRS) (subsonic flight):*

8–82b Note.–The WATRS area is defined as beginning at a point 27°00'N/77°00'W direct to 20°00'N/67°00'W direct to 18°00'N/62°00'W direct to 18°00'N/60°00'W direct to 38°30'N/60°00'W direct to 38°30'N/69°15'W, thence counterclockwise along the New York Oceanic CTA/FIR boundary to the Miami Oceanic CTA/FIR boundary, thence southbound along the Miami Oceanic CTA/FIR boundary to the point of beginning.

1. Between all aircraft within the San Juan CTA/FIR *15 minutes,* or

2. Aircraft operating at or above FL 280 within the WATRS area or west of 60° West when in transit to or from WATRS;

(a) *10 minutes* provided the Mach number technique is applied in accordance with paragraph 8–32; and

(1) Where tracks diverge from the common point:

[a] At least *10 minutes* longitudinal separation exists at the point where the tracks diverge; and

[b] At least *5 minutes* longitudinal separation will exist where the minimum lateral separation is achieved; and

[c] At least the minimum lateral separation will be achieved at or before the next significant point; or, if not, within *90 minutes* of the time the second aircraft passes the common point or is within 600 NM of the common point, whichever is estimated to occur first;

(2) If the aircraft have not reported over a common point, it is possible to ensure, by radar or other approved means, that the appropriate time interval will exist at the common point from which they either follow the same track or continuously diverging tracks;

(b) *Between 9 and 5 minutes,* provided the Mach number technique is applied in accordance with paragraph 8–32; and

(1) It is possible to ensure by radar or other approved means, that the required time interval exists and will exist at the common point from which they either follow the same track or continuously diverging tracks; and

(2) The preceding aircraft is maintaining a greater Mach number than the following aircraft in accordance with the following:

[a] *9 minutes,* if the preceding aircraft is Mach 0.02 faster than the following aircraft;

[b] *8 minutes,* if the preceding aircraft is Mach 0.03 faster than the following aircraft;

[c] *7 minutes,* if the preceding aircraft is Mach 0.04 faster than the following aircraft;

[d] *6 minutes,* if the preceding aircraft is Mach 0.05 faster than the following aircraft;

[e] *5 minutes,* if the preceding aircraft is Mach 0.06 faster than the following aircraft.

8–82b2(a)(1)[b] Note.– When the preceding aircraft is maintaining a greater Mach number than the following aircraft, in accordance with the table above, and the aircraft will follow continuously diverging tracks so that the minimum lateral separation will be achieved by the next significant point, the requirement stated in 8–82b2(a)(1)[b] above, to have at least 5 minutes longitudinal separation where the minimum lateral separation is achieved, may be disregarded.

c. Between turbojet aircraft meeting the Minimum Navigation Performance Specifications (MNPS) and operating in the New York Oceanic CTA/FIR wholly or partly in MNPS airspace *(subsonic flight):*

1. *10 minutes* provided the Mach number technique is applied in accordance with paragraph 8–32; and

(a) Where tracks diverge from the common point:

(1) At least *10 minutes* longitudinal separation exists at the point where the tracks diverge; and

(2) At least *5 minutes* longitudinal separation will exists where 60 NM lateral separation is achieved; and

8–82c1(a)(2) Note.–When the preceding aircraft is maintaining a greater Mach number than the following aircraft in accordance with this subparagraph, and the aircraft will follow continuously diverging tracks so that 60 NM lateral separation will be achieved by the next significant point, the requirement to have at least 5 minutes longitudinal separation where 60 NM lateral separation is achieved, may be disregarded.

(3) At least 60 NM lateral separation will be achieved at or before the next significant point (normally within ten degrees of longitude along track(s)) or, if not, within 90 minutes of the time the second aircraft passes the common point or is within 600 NM of the common point, whichever is estimated to occur first.

2. Between *9 and 5 minutes*, provided the Mach number technique is applied in accordance with paragraph 8–32; and

(a) It is possible to ensure, by radar or other approved means, that the required time interval exists and will exist at the common point from which they either follow the same track or continuously diverging tracks; and

(b) The preceding aircraft is maintaining a greater Mach number than the following aircraft in accordance with the following:

(1) *9 minutes*, if the preceding aircraft is Mach 0.02 faster than the following aircraft;

(2) *8 minutes*, if the preceding aircraft is Mach 0.03 faster than the following aircraft;

(3) *7 minutes*, if the preceding aircraft is Mach 0.04 faster than the following aircraft;

(4) *6 minutes*, if the preceding aircraft is Mach 0.05 faster than the following aircraft;

(5) *5 minutes*, if the preceding aircraft is Mach 0.06 faster than the following aircraft.

3. *15 minutes* between turbojet aircraft not covered in paragraphs 8–82c1 and 2.

d. Operations between aircraft not covered in paragraphs 8–82b or c *(subsonic flight):*

1. Operations at or above FL 200.

(a) *15 minutes* between turbojet aircraft, provided the Mach number technique is applied, in accordance with paragraph 8–32.

(b) Between turbojet aircraft, provided the Mach number technique is applied in accordance with paragraph 8–32, and *only* when it is possible to ensure by radar or other approved means that the required time interval exists and will exist at the common point:

(1) *10 minutes* when the preceding aircraft is at least Mach 0.03 greater than the following aircraft; and

(2) *5 minutes* when the preceding aircraft is at least Mach 0.06 greater than the following aircraft;

2. *20 Minutes:*

(a) Between aircraft operating below FL 200 west of 55° West;

(b) Between aircraft operating at all levels east of 55° West;

(c) Within the New York CTA/FIR;

(1) Between turbojet aircraft not covered by 8–82d1(a) and (b) above;

(2) Between other than turbojet aircraft operating along routes extending between the United States, Canada, or Bermuda and the Caribbean ICAO Region.

8–83 LATERAL SEPARATION

Provide lateral separation by assigning different flight paths whose widths or protected airspace do not overlap. Apply the following:

a. *60 NM:*

1. Supersonic aircraft operating above FL 275 within the New York oceanic CTA/FIR.

2. Supersonic aircraft operating at or above FL 450 not covered in paragraph 8–83a1.

8–83a2 Note.–This reduced lateral separation shall not be used if track keeping capability of the aircraft has been reduced for any reason.

3. Aircraft which meet the MNPS and while operating in the New York oceanic CTA/FIR which are in transit to or from NAT MNPS airspace.

b. *90 NM* between aircraft operating:

1. Within *WATRS;*

2. West of 55° West between the United States, Canada, or Bermuda and points in the Caribbean ICAO Region.

c. *100 NM* between aircraft operating west of 55° West not covered by paragraphs 8–83a or b above.

d. *120 NM* between aircraft operating east of 55° West.

8–84 VFR CLIMB AND DESCENT

a. In the Houston, Miami, and San Juan CTA's, IFR flights may be cleared to climb and descend in VFR conditions only:

1. When requested by the pilot; and

2. Between sunrise and sunset.

b. Apply the following when the flight is cleared:

1. If there is a possibility that VFR conditions may become impractical, issue alternative instructions.

2. Issue traffic information to aircraft that are not separated in accordance with the minima in this section.

8–85 thru 8–89 RESERVED

Section 9. PACIFIC ICAO REGION

8–90 APPLICATION

Provide air traffic control services in the Pacific ICAO Region with the procedures and minima contained in this section except when noted otherwise.

8–91 VERTICAL SEPARATION

Provide vertical separation in accordance with Chapter 4, Section 5, except when aircraft operate within airspace where composite separation and procedures are authorized, apply the minima specified in paragraph 8–94, Composite Separation Minima.

8–92 LONGITUDINAL SEPARATION

Provide longitudinal separation between aircraft as follows:

a. Between all aircraft, *15 minutes*; or

b. Between turbojet aircraft provided the Mach number technique is applied in accordance with paragraph 8–32:

1. *10 minutes;* or
2. Between *9 and 5 minutes* provided:

(a) It is possible to ensure by radar or other approved means that the required time interval will exist at the common point from which the aircraft either follow the same track or continuously diverging tracks; and

(b) The preceding aircraft is maintaining a greater Mach number than the following aircraft in accordance with the following table:

(1) *9 minutes* if the preceding aircraft is Mach 0.02 faster than the following aircraft.

(2) *8 minutes* if the preceding aircraft is Mach 0.03 faster than the following aircraft.

(3) *7 minutes* if the preceding aircraft is Mach 0.04 faster than the following aircraft.

(4) *6 minutes* if the preceding aircraft is Mach 0.05 faster than the following aircraft.

(5) *5 minutes* if the preceding aircraft is Mach 0.06 faster than the following aircraft.

8–93 LATERAL SEPARATION

Provide lateral separation by one of the following:

a. Clear aircraft on different flight paths whose route widths or protected airspace do not overlap.

b. When aircraft operate within airspace where composite separation and procedures are authorized, apply the minimum specified in paragraph 8–94, Composite Separation Minima.

c. When subparagraphs 8–93a or b are not applicable, *apply 100 NM* between aircraft.

8–94 COMPOSITE SEPARATION MINIMA

Provide composite separation within the Central East Pacific (CEP) and North Pacific (NOPAC) composite route systems and where designated by facility directive in the Pacific Organized Track System (PACOTS) at and above FL 290 as follows:

a. *1,000 feet* vertical separation; and

b. *50 NM* lateral separation.

8–95 COMPOSITE SEPARATION ALTITUDE ASSIGNMENT

a. Aircraft operating at or above FL 300 in a composite route system may be cleared at even flight levels. Additionally, aircraft may be cleared at even flight levels while joining, crossing, or leaving a composite route system provided such aircraft leaving the system are cleared to an appropriate odd cardinal flight level when non–composite vertical or lateral separation is achieved.

b. Aircraft (operating at or above FL 300) leaving a composite route system at an even cardinal flight level do not have to be assigned an odd cardinal flight level provided:

1. The aircraft is being provided radar service; and
2. The aircraft will be cleared for descent and approach to an airport within the facility's domestic FIR; and
3. There is an operational advantage.

c. Aircraft operating on unidirectional routes or traffic flows may be assigned altitudes other than the appropriate altitude for direction of flight provided that 2,000 feet vertical separation is maintained between aircraft operating on the same route.

8–96 COMPOSITE SEPARATION APPLICATION

Provide composite separation in the Central East Pacific (CEP) and the North Pacific (NOPAC) composite route systems and where designated by facility directive in the Pacific Organized Track System (PACOTS) as follows:

a. Clear an aircraft to join an outer route of the composite route system at other than the normal entry point provided:

1. Longitudinal or non–composite vertical separation exists between that aircraft and any other aircraft on that route; and
2. Composite separation exists between that aircraft and any other aircraft on the next adjacent route.

b. Clear an aircraft to leave an outer route of the composite route system at other than the

normal exit point provided its course diverges so that lateral spacing from the route system increases until non–composite separation exists between that aircraft and any other aircraft in the composite route system.

c. Clear an aircraft to change from one route to an adjacent route within the composite route system provided:

1. Longitudinal or non–composite vertical separation is maintained between that aircraft and any other aircraft on the route being vacated until that aircraft is established on the route to which it is proceeding; and

2. Longitudinal or non–composite vertical separation exists between that aircraft and any other aircraft on the route to which that aircraft is proceeding; and

3. Composite separation exists between that aircraft and any other aircraft on the next adjacent route.

d. Clear an aircraft to cross the composite route system provided longitudinal or non–composite vertical or lateral separation exists between that aircraft and any other aircraft in the composite route system.

e. Clear aircraft to transition to or from the composite route system from an Oceanic Transition Route (OTR) provided:

1. The OTR is charted on aeronautical charts; and

2. Composite separation is maintained between that aircraft and any other aircraft within the composite route system; and

8–96e2 Note.— An aircraft is within the confines of a composite route system when the aircraft joins or crosses the outer route of the composite route system or passes a composite route entry point.

3. Composite separation is maintained between that aircraft and any other aircraft on adjacent OTR's.

f. Clear an aircraft to change altitude on a route if non–composite separation exists between that aircraft and others operating on that route regardless of other aircraft operating on adjacent routes in the system. Pilot's discretion climbs and descents are not authorized when applying composite separation.

8–96f Note.— Although composite separation is not applied between aircraft on different tracks at FL 280 and FL 290, this paragraph applies to climbs and descents between FL 280 and altitudes within the composite altitude stratum (FL 300 and above).

8–97 thru 8–99 RESERVED

Section 10. NORTH AMERICAN ICAO REGION–ARCTIC CTA

8–100 APPLICATION

Provide air traffic control services in the North American ICAO Region–Arctic CTA with the procedures and minima contained in this section.

8–101 VERTICAL SEPARATION

Provide vertical separation in accordance with Chapter 4, Section 5.

8–102 LONGITUDINAL SEPARATION

Apply the following minimum longitudinal separation:

a. *15 minutes* between aircraft; or

b. Provided the Mach number technique is applied in accordance with paragraph 8–32;

1. *10 minutes* when the preceding aircraft is at least Mach 0.03 faster than the following aircraft; or

2. *5 minutes* when the preceding aircraft is at least Mach 0.06 faster than the following aircraft.

8–103 LATERAL SEPARATION

Provide *90 NM* lateral separation between aircraft, except that lower minima in 7.2 of Part 3 of the Procedures for Air Navigation – Rules of the Air (PANS–RAC), (Doc 4444–RAC/501) may be applied or further reduced in accordance with paragraph 9 of the same part where the conditions specified in the relevant PANS–RAC are met.

Chapter 9. SPECIAL FLIGHTS

Section 1. GENERAL

9–1 GENERAL

Provide aircraft engaged in the flight inspection of NAVAID's with maximum assistance. Unless otherwise agreed to, maintain direct contact with the pilot and exchange information regarding known traffic in the area and his intentions.

9–1 Note 1.—Many flight inspections are accomplished using automatic recording equipment, and an uninterrupted flight is necessary for successful completion of the mission. The workload for the limited number of aircraft engaged in these activities requires strict adherence to a schedule.

9–1 Note 2.—Flight inspection operations which require special participation of ground personnel, specific communications, or radar operation capabilities are considered to require special handling. These flights are coordinated with appropriate facilities before departure.

9–1 Reference.—Order 8200.1, U.S. Standard Flight Inspection Manual and Order 8240.41, Flight Inspection/Air Traffic Coordination.

9–2 SPECIAL HANDLING

a. Clear the aircraft according to pilot request as soon as practicable. Do not ask the pilot to deviate from his planned action except to preclude an emergency situation.

9–2a Reference.—Order 8240.41, Flight Inspection/Air Traffic Coordination Appendix 1 (Flight Inspection Binder), describes certain flight inspection maneuvers in detail.

b. Issue radar advisories to the flight inspection aircraft where adequate coverage exists and to the extent permitted by workload.

c. Suggest flight path adjustments, as required, for any aircraft which will enter or penetrate an area in which a flight inspection function is being performed.

d. Provide special handling, as required, to FAA aircraft conducting flight inspections using the call sign "Flight Check." The call sign "Flight Check (Nr) recorded" indicates automated flight inspections are in progress in terminal areas.

9–2d Note.—FAA flight inspection aircraft will file flight plans using the call sign "Flight Check" during flight inspections or when inbound to conduct flight inspections. Flight plan remarks may indicate type NAVAID inspection to be accomplished; e.g. "FC OKC P."

9–3 FLIGHT CHECK AND SAFI AIRCRAFT

a. Provide special handling, as required, to expedite flight inspection of NAVAID's by Flight Check and SAFI aircraft equipped with airborne computers.

9–3a Note.—Preplanned automatic flight places the following limitations on the capability of the pilot to adhere to normal ATC clearances:

a. Route of flight—Normally requires 40 to 80 nautical miles square, and the route is planned along the grid lines irrespective of any airway structures.

b. Altitude assignment—Normally flights will be accomplished at 10,000, 15,000, or FL200. The crew can compensate for altitude changes not in excess of 2,000 feet, if necessary. For example, the pilot files 15,000; he can accept any altitude from 13,000 to 17,000.

c. En route holding—Holding is required at each turning point in the flight plan before the flight can continue on the next grid line track. The direction and duration of holding will be included in the flight plan and in the position report made on arrival over the holding point.

d. Position reporting—Standard position reporting format will be used, except that the fix code name will be used in lieu of the facility radial and distance during grid positions of flight.

9–3a Reference.—Operational Priority, paragraph 2–4c.

b. Avoid changes in the route or altitude from that filed by the pilot in the initial flight plan.

c. Do not impose air traffic control delays in excess of holding times specified in the flight plan except to preclude emergency situations.

d. Do not change the previously assigned discrete beacon code of special radar accuracy flight check aircraft.

9–3d Reference.—Order 7210.3, Special Radar Accuracy Checks, paragraph 9–3; ASR Performance Checks, paragraph 12–43.

9–4 thru 9–9 RESERVED

Section 2. SPECIAL INTEREST FLIGHTS

9–10 GENERAL

EN ROUTE

a. All flight movement data on the aircraft listed in subparagraph 9–10a1 and 2 shall be immediately brought to the attention of the area manager and forwarded by the most expeditious means (voice, if possible) to the Senior Director at the concerned NORAD Region Operations Control Center/Sector Operations Control Center and to the Air Traffic Control System Command Center (ATCSCC ATM–200). Voice messages will be followed up with a data communication message when directed. All flight plans on aircraft listed in subparagraph 9–10a1 and 2, including flights within the Continental U.S., shall be retransmitted by data communication to ATM–200 and the Office of International Aviation, Attention: AIA–101.

9–10a Note 1.—All flight movement data includes flight plans and changes thereto such as changes from IFR to VFR, reroutes or route deviations authorized or directed by the facility, departure messages, arrival messages, unauthorized route deviations or any other unusual operations, etc.

9–10a Note 2.—These procedures are in addition to the AMIS procedures contained in Order 7610.4, Chapter 5.

9–10a Note 3.—Communist-controlled countries include Albania, Bulgaria, Cambodia, Peoples Republic of China, Cuba, Czechoslovakia, Hungary, North Korea, Outer Mongolia, Poland, Romania, The Union of Soviet Socialist Republics, and Socialist Republic of Vietnam.

9–10a Note 4.—The concerned NORAD Region/Sector is the one to whom SCATANA reports are forwarded consistent with local ARTCC/NORAD Region SCATANA reporting procedures.

9–10a Note 5.—All Continental U.S. facilities have either direct flow control interphone circuits or can reach ATM–200 by DSN, 851–1971, or telephone number (202) 267–3636.

1. All known aircraft of Cuban registry and all known civil aircraft of other communist-controlled countries that will enter, overfly, or operate within the Continental United States, the Atlantic, Gulf of Mexico or Pacific Coastal ADIZ's, or the Southern Border Domestic ADIZ.

9–10a1 Reference.—Pilot/Controller Glossary, Continental United States.

2. All known civil aircraft of foreign registry, other than the aircraft in subparagraph 9–10a1, that will enter or overfly the Continental United States en route to or from Cuba.

b. Advance route information which has been cleared by NORAD and coordinated by AIA–101 with the State Department, as necessary, will be passed to the concerned ARTCC's by AIA–101 via ATM–200. Inform ATM–200 of your concurrence or problems with the route, as the case may be. ATM–200 will relay any problems to AIA–101 for resolution with NORAD. Advance route information does not constitute the forwarding of flight movement data to NORAD as specified in subparagraph 9–10a.

9–10 Reference.—Application, paragraph 9–11.

9–11 APPLICATION

EN ROUTE

a. Comply with any operational request that may be received directly from NORAD or through ATM–200 unless the change will affect flight safety. When safety is a factor, acquaint NORAD with the situation and attempt to work out an alternate solution if time and circumstances permit. If unable, take the course of action dictated by flight safety considerations and inform NORAD and ATM–200 as quickly as possible thereafter. Comply with requests for information or assistance from NORAD or the State Department which may include relay of messages to facilities or an aircraft in flight.

9–11a Note.—State Department communications will be relayed through ATM–200.

b. Request the aircraft to return to its approved route/reroute of flight whenever any deviation is noted.

c. Immediately alert the area manager and notify the Senior Director at the concerned NORAD Region Operations Control Center/Sector Operations Control Center and ATM–200 via the most expeditious means when the following conditions occur:

1. The aircraft refuses to comply with a NORAD or State Department message.

2. Communication with the aircraft is established but the aircraft's identification cannot be immediately correlated with a known flight plan. Attempt flight plan correlation when time permits.

3. The aircraft deviates from its approved route of flight and refuses to return to it when so requested.

4. The aircraft refuses a reroute when so cleared or deviates from its reroute and refuses to return to it when requested.

5. A departure message on a flight plan of an aircraft in paragraph 9–10a1 originating in Canada, Mexico, or Cuba is not received within 5 minutes after the proposed time and you are unable to ascertain if the aircraft has departed either IFR or VFR.

d. If NORAD dispatches aircraft to intercept and escort the flight, the control procedures in Escort of Hijacked Aircraft, 7610.4 Chapter 7, shall apply.

9–12 EMERGENCY OR UNSCHEDULED LANDINGS

a. If an aircraft of a communist-controlled country makes an emergency or unscheduled landing in the United States, immediately alert the AM/ controller-in-charge of the shift and notify:

1. *EN ROUTE:* In the Continental United States—

(a) The Senior Director at the concerned NORAD Region Operations Control/Sector Operations Control Center.

(b) ATM–200.

9–12a Note.—ATM–200 will relay or voice-patch the information to all FAA Washington Headquarters organizations concerned.

(c) U.S. Customs Service Office for the airport where the aircraft will land.

2. *EN ROUTE:* In the Pacific Region, Puerto Rico, and the Virgin Islands—The Air Defense Control Center and the offices specified in subparagraphs 9–12a1(b) and a1(c).

9–12a2 Note.—Guam CERAP forwards the information through the Honolulu ARTCC.

3. *EN ROUTE:* In the Alaskan Region—The Alaskan NORAD Region Operations Control Center and the offices specified in subparagraphs 9–12a1(b) and a1(c).

4. *TERMINAL:* The nearest U.S. Customs Service Office and the appropriate ARTCC.

b. Provide the following information to the organizations specified in subparagraphs 9–12a1, 2, 3, and 4 if available:

1. Type of aircraft.
2. Country of aircraft registry.
3. Destination airport.
4. Nature of emergency or reason for landing, as appropriate.

c. Advise the pilot that passengers must remain aboard the aircraft after landing until cleared by the U.S. Customs Service Office.

d. *TERMINAL:* In cases where communication is established with the aircraft but the aircraft identification cannot be immediately correlated with a known flight plan, notify the appropriate ARTCC and nearest U.S. Customs Service Office.

9–13 thru 9–19 RESERVED

Section 3. SPECIAL OPERATIONS

9–20 AIRCRAFT CARRYING DANGEROUS MATERIALS

a. Provide the following special handling to military aircraft or military contracted aircraft carrying dangerous materials when:

1. The words "Dangerous Cargo," or "Inert Devices," or both are contained in the remarks section of the filed flight plan, or

9–20a1 Note 1.—Certain types of military flights carrying dangerous materials require strict adherence to military regulations and flight planning along carefully selected routes. These flights must avoid heavily populated areas.

9–20a1 Note 2.—"Inert Devices" are devices containing no dangerous materials but closely resembling nuclear or explosive items that are classified as dangerous and could be easily mistaken for their dangerous counterparts.

2. The pilot uses these words in radio communication.

b. If it becomes necessary to issue a clearance to amend the route/altitude, advise the pilot:

1. Of the proposed change, and

2. The amount of delay to expect if it is necessary to maintain the present route/altitude.

c. When it becomes necessary for the pilot to refuse a clearance amending his route/altitude, he will advise if the traffic delay is acceptable or if an alternate route/altitude is desired. In such cases, offer all possible assistance.

d. When the aircraft is provided an en route descent, do not vector the aircraft from the planned route unless the pilot concurs.

e. Use special patterns and routings in areas where they have been developed for these flights. If special patterns and routings have not been developed, employ normal procedures.

9–21 CELESTIAL NAVIGATION TRAINING

EN ROUTE

a. Approve flight plans specifying celestial navigation only when it is requested for USAF or USN aircraft.

9–21a Note.—An ATC clearance must be obtained by the pilot before discontinuing conventional navigation to begin celestial navigation training. The pilot will advise when discontinuing celestial navigation and resuming conventional navigation. Celestial navigation training will be conducted within 30 NM of the route centerline specified in the en route clearance unless otherwise authorized by ATC. During celestial navigation training, the pilot will advise ATC before initiating any heading changes which exceed 20 degrees.

b. Within Conterminous U.S. airspace, limit celestial navigation training to transponder-equipped aircraft within areas of ARTCC radar coverage.

c. Prior to control transfer, insure that the receiving controller is informed of the nature of the celestial navigation training leg.

9–21 Reference.—*IFR Flight Progress Data, paragraph 2–35.*

9–22 DEPARTMENT OF ENERGY (DOE) SPECIAL FLIGHTS

a. Provide notification of possible route or altitude changes as far in advance as possible for "RAC" flights. The pilot will indicate if the proposed change is acceptable or if alternate routing or altitude will be requested.

9–22a Note.—DOE contracts for civil pilots to operate public aircraft to transport radioactive or high explosive materials within the Conterminous U.S. These flights operate on an IFR flight plan but principally during daylight hours and VFR conditions. These flights require flight along carefully selected routes and, in some instances, pilots will refuse clearances that require reroute or altitude changes that would derogate their objective.

b. *EN ROUTE:* Approve pilot requests to leave center frequency for operational purposes as traffic conditions permit.

c. Notify a supervisor in the event any of the following occurs with "RAC" aircraft:

1. Loss of radio contact.

2. Loss of radar contact.

3. The flight is overdue at the destination.

d. If you receive information that a "RAC" aircraft is involved in an accident, secure as much information as possible, particularly with respect to location, and immediately notify the ARTCC AM.

9–22d Note.—There is a possibility of an explosive or radiation hazard of an "RAC" aircraft involved in an accident.

9–23 EXPERIMENTAL AIRCRAFT OPERATIONS

a. When notified that an experimental aircraft requires special handling:

9–23a Note.—Part 91.319(d)(3) requires that each person operating an aircraft with an experimental certificate shall notify the control tower of the experimental nature of the aircraft when operating into or out of airports with operating control towers.Clear the aircraft according to pilot requests as traffic permits and if not contrary to ATC procedures.

2. Once approved, do not ask the pilot to deviate from a planned action except to preclude an emergency situation.

b. At locations where volume or complexity of experimental aircraft operations warrant, a letter of agreement may be consummated between the facility and operator.

9–24 FAA RESEARCH AND DEVELOPMENT FLIGHTS

When coordinated in advance and traffic permits, approve requests for special flight procedures from aircraft participating in FAA research and development test activities. These special procedures shall be applied to participating aircraft/vehicles.

9–24 Note.—Special flight procedures for FAA research and development test activities must be approved by the facility air traffic manager prior to their use.

9–24 Reference.—FAA Order 7210.3, Research and Development Flights, paragraph 6–24.

9–25 FLYNET

Provide expeditious handling for civil or military aircraft using the code name "Flynet." Relay the code name as an element in the remarks position of the flight plan.

9–25 Note.—The code name "Flynet" indicates that an aircraft is transporting a Nuclear Emergency Team or a Disaster Control Team to the location of a nuclear accident or a major accident involving chemical agents or biological research materials. It is in the public interest that they reach their destination as rapidly as possible.

9–25 Reference.—Operational Priority, paragraph 2–4f. FAA Order 7610.4, "Flynet" Flights, Nuclear Emergency Teams, paragraph 12–41.

9–26 IFR MILITARY TRAINING ROUTES

a. Except for aircraft operating in the same altitude reservation, clear aircraft into an MTR provided separation will be applied between successive aircraft unless otherwise covered in a letter of agreement between the military scheduling activity and the concerned ATC facility.

Phraseology:

CLEARED INTO IR (designator).

MAINTAIN (altitude),

or

MAINTAIN IR (designator) ALTITUDE/S,

or

MAINTAIN AT OR BELOW (altitude),

or

CRUISE (altitude),

and if required,

CROSS (fix) AT OR LATER THAN (time).

b. Unless otherwise covered in a letter of agreement between the military scheduling activity and the concerned FAA facility, clear aircraft to exit an MTR.

Phraseology:

CLEARED TO (destination/clearance limit) FROM IR (designator/exit fix) VIA (route). MAINTAIN (altitude).

c. If the provisions of subparagraph 9–26a cannot be accomplished, MTR's may be designated for MARSA operations. To preclude an inadvertent compromise of MARSA standards by ATC, appropriate MARSA application for such routes shall be covered in a letter of agreement with the military scheduling activity. Establish separation between aircraft as soon as practicable after operation on the designated MARSA route is ended.

9–26c Note.—For designated MARSA routes, the military assumes responsibility for separation for MTR aircraft that have passed the primary/alternate entry fix until separation is established by ATC after operations on the MARSA route are completed.

d. The lateral airspace to be protected along an MTR is the designated width of the route.

e. Prior to an aircraft entering an MTR, request the pilot's estimate for the route's exit/alternate exit fix, his requested altitude after exiting, and, if applicable, the number of reentries on a Strategic Training Range (STR).

Phraseology:

(Call sign) CONFIRM YOUR EXIT FIX ESTIMATE AND REQUESTED ALTITUDE AFTER EXIT,

and if applicable,

THE NUMBER OF REENTRIES.

f. Forward estimates for exit/alternate exit fixes, requested altitude after exit, and, if applicable, the number of reentries on the STR.

g. Apply the procedures of paragraph 6–2, based upon the pilot's estimate for the route exit fix.

h. Clearance may be issued to amend or restrict operations on a route for ATC considerations. Where a route has been designated MARSA in accordance with subparagraph 9–26c, ATC shall not amend or restrict operations in such a manner as to compromise MARSA provisions.

9–26h Note.—When MARSA is provided through route scheduling and circumstances prevent the pilot from entering the route within established time limits, it shall be the responsibility of the pilot to inform the ATC facility and advise his intentions.

i. If an aircraft on an IR experiences a two-way radio communications failure and you are unable to determine the aircraft is proceeding VFR in accordance with Part 91.185(b)or the aircraft has not been positively radar identified:

1. Provide separation to the destination airport based on the aircraft complying with the following:

(a) Maintain to the exit/alternate exit fix the higher of the following altitudes:

(1) The minimum IFR altitude for each of the remaining route segment/s remaining on the route.

(2) The highest altitude assigned in the last ATC clearance.

(b) Depart the exit/alternate exit fix at the appropriate altitude specified in subparagraph 9–26i1(a), then climb/descend to the altitude filed

in the flight plan for the remainder of the flight, or

9–26l1(b) Note.—In the event of a two-way communications failure, ATC will be based on the following anticipated pilot action at the exit fix. Unless otherwise covered in a letter of agreement, and if the pilot is unable to comply with the VFR provisions of Part 91.185/FLIP IFR Supplement, the pilot will exercise his emergency authority, squawk transponder Code 7700, depart the exit/alternate exit fix and climb/descend (continuing to squawk 7700) to the altitude filed in the flight plan. Subsequent transponder operations will be in accordance with paragraph 9–43. Air traffic controller action from the exit fix is as prescribed in paragraph 9–1.

(c) Proceed in accordance with the lost communication procedure contained in Letters of Agreement.

2. Continue to monitor the last ATC assigned discrete code.

9–26l2 Note.—Pilots who experience a two-way radio failure will adjust their transponder to Code 7700 during climb/descent to altitude filed for the next leg of the flight plan; then change to Code 7600 for a period of 15 minutes. At the end of each 15–minute period, he will squawk 7700 for a period of 1 minute; all other times he will squawk 7600.

j. Impose delays, if needed, to eliminate conflict with nonparticipating IFR aircraft when necessary to preclude denial of IR usage. Advise the pilot of the expected length and reason for delay.

9–27 INTERCEPTOR OPERATIONS

Provide maximum assistance to expedite the movement of interceptor aircraft on active air defense (scrambles) missions until the unknown aircraft is identified in accordance with the policies and procedures published in FAA Order 7610.4.

9–27 Note.—The FAA and the military have mutually agreed to the implementation of policies and procedures for control of air defense interceptor operations. Effective coordination and cooperation between FAA and the military at all levels are essential if policy objectives are to be met.

a. The ADCF initiating the SCRAMBLE shall identify the mission as an active air defense mission.

b. ATC services shall be used for active air defense missions insofar as the circumstances and situation permits.

c. Upon request, the ATC facility shall expedite transfer of the control jurisdiction of the interceptors to the requesting ADCF.

9–28 LAW ENFORCEMENT OPERATIONS BY CIVIL AND MILITARY ORGANIZATIONS

a. Law enforcement alerts.

1. Aircraft lookouts shall not be distributed outside the FAA.

9–28a1 Reference.—FAA Order 1600.29, Law Enforcement Alert Message System. FAA Order 7210.3, Cooperation with Law Enforcement Agencies, paragraph 2–86.

2. Stolen aircraft alerts, including stolen aircraft summaries, may be distributed outside the FAA to: airport offices, air carriers, fixed base operators, and law enforcement agencies.

3. Upon receipt of knowledge concerning an aircraft for which a current law enforcement alert message is held, do the following:

(a) Forward any information on the aircraft to El Paso Intelligence Center (EPIC) and the requester when specified in the message.

(b) Immediately notify the cognizant Air Transportation Security division/staff by the most rapid means.

(c) DO NOT TAKE ANY OTHER ACTION AFFECTING THE AIRCRAFT, CARGO, CREW, OR PASSENGERS NOT NORMALLY RELATED TO JOB RESPONSIBILITIES.

b. Special law enforcement operations.

1. Special law enforcement operations include in-flight identification, surveillance, interdiction and pursuit activities performed in accordance with official civil and/or military mission responsibilities.

2. To facilitate accomplishment of these special missions, exemptions from specified sections of the FAR have been granted to designated Departments and Agencies. However, it is each organization's responsibility to apprise ATC of their intent to operate under an authorized exemption before initiating actual operations.

9–28b2 Reference.—FAA Order 7210.3, Exemptions from Federal Aviation Regulations, paragraph 6–34.

3. Additionally, some Departments and Agencies that perform special missions have been assigned coded identifiers to permit them to apprise ATC of ongoing mission activities and solicit special air traffic assistance.

9–28b3 Reference.—FAA Order 7110.67, Special Aircraft Operations by Law Enforcement/Military Organizations.

9–28b3 Note.—As specified in paragraph 2–4, Operational Priority, priority of handling for aircraft operating with coded identifiers will be the same as that afforded to SAR aircraft performing a SAR mission.

c. Assistance to law enforcement aircraft operations.

1. Provide the maximum assistance possible to law enforcement aircraft, when requested, in helping them locate suspect aircraft.

2. Communicate with law enforcement aircraft, when possible and if requested, on a frequency not paired with your normal communications frequencies.

3. Do not allow assistance to law enforcement aircraft to violate any required separation minima.

4. Do not assist VFR law enforcement aircraft in any way that will create a situation which,

in your judgement, places the aircraft in unsafe proximity to terrain or other aircraft.

9–29 MILITARY AERIAL REFUELING

Authorize aircraft to conduct aerial refueling along published or special tracks at their flight plan altitude, unless otherwise requested.

Phraseology:

CLEARED TO CONDUCT REFUELING:

ALONG (number) TRACK,

or

FROM (fix) TO (fix),

and

MAINTAIN REFUELING LEVEL (altitude),

or

MAINTAIN (altitude),

or

COMMENCING AT (altitude), DESCENDING TO (altitude).

9–29 Note 1.—During aerial refueling, tanker aircraft are responsible for receiver aircraft communication with ATC and for their navigation along the track.

9–29 Note 2.—Aerial refueling airspace is not sterilized airspace and other aircraft may transit this airspace provided vertical or lateral separation is provided from refueling aircraft.

9–29 Note 3.—MARSA begins between the tanker and receiver when the tanker and receiver/s have entered the air refueling airspace and the tanker advises ATC that he is accepting MARSA.

9–29 Note 4.—MARSA ends between the tanker and receiver when the tanker advises ATC that the tanker and receiver aircraft are vertically positioned within the air refueling airspace and ATC advises MARSA is terminated.

9–29 Reference.—Use of MARSA, paragraph 2–11; Formation Flight Aircraft and Other Aircraft, paragraph 5–74. FAA Order 7610.4 Chapter 10, Aerial Refueling.

a. Provide radar assistance to the rendezvous for participating aircraft:

1. When requested, and

2. By providing vertical separation prior to MARSA declaration.

b. Do not request receiver aircraft that have been cleared to conduct air refueling and have departed the ARIP to:

1. Make code changes when less than 5 miles from the tanker.

2. Squawk Standby when less than 1 mile or more than 3 miles from the tanker.

9–29b Note.—Requests for receiver aircraft to make code changes during air refueling diverts the receiver pilot's attention during a critical phase of flight.

c. When issuing an initial air refueling clearance, you may request a receiver to squawk standby when the receiver reaches a point 3 miles from the tanker.

9–29c Note 1.—Receiver aircraft will squawk normal when separation from the tanker is greater than 3 miles.

9–29c Note 2.—Once rendezvous is completed, heading and altitude assignments may be made with the tanker concurrence with MARSA remaining in effect.

9–29c Note 3.—Upon rendezvous completion, the tanker shall keep receiver aircraft within 3 miles of the tanker until MARSA is terminated.

d. After MARSA has been declared, you should avoid issuing course or altitude changes prior to rendezvous.

9–29d Note.—Altitude or course changes issued will automatically void MARSA.

e. Do not use the altitude vacated during the refueling operation until the refueling aircraft has reported reaching the next IFR altitude.

9–29e Reference.—Exceptions, paragraph 6–52.

f. Approve requests by the tanker pilot for vectors or alternative routes or altitudes as follows:

1. Furnish vectors or alternative altitudes at any time.

2. Furnish nonradar routes only after the refueling aircraft have passed the ARCP.

9–29f Note 1.—To meet a training requirement that aerial refueling be accomplished in a nonradar environment, the military has requested that vectors be furnished only upon request.

9–29f Note 2.—The tanker commander is responsible for coordinating all in-flight requests with other aircraft in the refueling mission before submission of such requests to the center.

9–29f Note 3.—Normally, aircraft conducting aerial refueling operations will utilize at least three consecutive altitudes.

g. Unless a vector or alternative route has been furnished, clear the aircraft to depart the refueling track at a navigational reference point or egress fix.

h. Request an aircraft to report the ARIP, ARCP, or egress fix as necessary.

Phraseology:

REPORT:

A-R-I-P,

or

A-R-C-P

or

EGRESS FIX.

i. Expect the following procedures in addition to those required by the FARs in the event of two–way communications failure:

1. The tanker will depart the track from the highest altitude in the block.

2. The receiver will depart the track from the lowest altitude in the block.

3. Aircraft will squawk 7600 for at least 2 minutes prior to departing the track.

9–29 Reference.—Military Operations above FL 600, paragraph 9–30.

9–30 MILITARY OPERATIONS ABOVE FL 600

EN ROUTE

Control aircraft operating above FL 600 using the following procedures:

a. Flight plans involving supersonic flight are required 16 hours in advance of proposed departure times for processing and approval by the ARTCC's concerned. The originating ARTCC, where the flight plan is first filed, may waive the 16 hour advance filing requirement.

b. The route of flight shall be defined by at least one high altitude fix within each ARTCC area without regard to the distance between fixes. Additionally, the entry and exit points of turns of 90 degrees or more will be designated.

c. Elapsed times from takeoff to the first fix in each ARTCC area shall be included in the route of flight.

d. The ARTCC which originates the flight plan shall forward departure times to all ARTCC's responsible for processing the flight plan.

e. Approval of the flight plan indicates approval of both route and FL's (if stated) including operations below FL 600 (aerial refueling).

Phraseology:

CLEARED AS FILED VIA ROUTE AND FLIGHT LEVELS.

9–30e Reference.—Military Aerial Refueling, paragraph 9–29.

f. Separation. Use the following as minima in lieu of the corresponding type of separation prescribed in:

9–30f Note.—The primary method described to provide separation between two supersonic aircraft is to descend the aircraft at the lower FL and provide vertical separation since the aircraft at the higher FL may not be able to climb rapidly enough to establish the required separation. Another aspect which should be considered is that supersonic aircraft during turns, either programmed or as the result of vectors, will lose a few thousand feet. Vectoring supersonic aircraft seriously affects the range and mission objectives. Radar separation is the preferred method of separating a subsonic aircraft both from another subsonic aircraft or from a supersonic aircraft.

1. Paragraph 6–51, Minima Between Altitudes—*5,000 feet.*

9–30f1 Note 1.—The security requirements of the military services preclude the transmission of actual altitude information on the air/ground or landline circuits. A classified document detailing the plan for ascertaining altitude codes for the day should be readily available to the controllers at their positions of operation.

9–30f1 Note 2.—Pilots will report their altitude, using the coded plan, and intended flight profile on initial contact with each ARTCC.

2. Paragraph 6–43, Minima Along Other Than Established Airways or Routes—Protect the airspace 25 miles either side of the route centerline. For turns by supersonic aircraft, protect the airspace 75 miles on the overflown side and 25 miles on the other side. For turns by subsonic aircraft, protect the airspace 34 miles on the overflown side and 25 miles on the other side.

9–30 Reference.—Abbreviated Departure Clearance, paragraph 4–32.

9–31 MILITARY SPECIAL USE FREQUENCIES

EN ROUTE

a. Assign special use frequency to:

9–31a Note.—Special use frequencies are assigned to ARTCC's in such a manner that adjacent ARTCC's will not have the same frequency. They are to be used within the ARTCC area jurisdiction from the established FL base of the high altitude sectors and above. Each high altitude sector should have the capability to use the special use frequency on a shared basis.

1. USAF Tactical Air Command (TAC), U.S. Navy, and Air National Guard (ANG) single-pilot jet aircraft formations operating at night or in instrument weather conditions. Formations of five or more USAF TAC aircraft deploying either to a Continental U.S. staging base or nonstop to an overseas location are authorized to use special use frequencies at any time. Normally these deployments will be conducted within an altitude reservation.

2. U–2 and B–57 (pressure suit flights) aircraft at all altitudes/FL's except where terminal operations require the assignment of other frequencies.

9–31a2 Note.—Aerial refueling operations may require that aircraft leave the special use frequency for communications with the tanker. This will occur when the receiver is approximately 200 miles from the ARCP. The tanker aircraft will remain on the ARTCC assigned frequency and will relay clearances to the receiver as required. An alternate means of communications between the tanker and receiver is HF radio.

3. All aircraft during supersonic flight.

9–31a2 and 3 Note.—Pilots are expected to request assignment of the special use frequency in the remarks section of the flight plan or before entering supersonic flight. B–57 aircraft engaged in pressure suit operations will use the static call sign KITE and flights will normally be conducted from Dover, Eielson, Ellington, Hickman, Howard, Kirtland, and McClellan Air Force Bases.

4. E–3A AWACS mission crews when operations are being conducted as an MRU in accordance with appropriate letters of agreement.

b. The special use frequency may be assigned as "backup" for the high-altitude sector when direct communications are essential because of a potential emergency control situation.

c. Do not assign the special use frequency to the aircraft in subparagraph 9–31a1 when they will operate in airspace assigned for special military operations.

9–32 AVOIDANCE OF AREAS OF NUCLEAR RADIATION

a. Advise pilots whenever their proposed flight path will traverse a reported or forecasted area of hazardous radiation and reroute the aircraft when requested by the pilot.

9–32a Reference.—FAA Order 7610.4, Avoidance of Hazardous Radiation Areas, paragraph 4–44.

b. Inform pilots when an airfield of intended landing lies within a reported or forecasted area of hazardous radiation and request the pilot to advise his intentions.

9–33 SAMP

Provide special handling to USAF aircraft engaged in aerial sampling missions (atmosphere sampling for nuclear contamination). Honor in-flight clearance requests for altitude and route changes to the maximum extent possible. Other IFR aircraft may be recleared so that requests by SAMPLER aircraft are honored. Separation standards as outlined in this order shall be applied in all cases.

9–33 Reference.—Operational Priority, paragraph 2–4; Aircraft Identification, paragraph 2–87. FAA Order 7210.3, Atmosphere Sampling for Nuclear Contamination, paragraph 6–33.

9–34 SNOW TIME

Whenever a SNOW TIME ECM exercise causes the primary radar display to become unusable, take the following actions, as appropriate:

9–34 Note.—SNOW TIME exercises are large-scale electronic countermeasures (ECM) missions designed to satisfy training requirements of the U.S. military forces. The "Faker Force" aircraft are operated on an ALTRV basis along tracks established for the purpose.

9–34 Reference.—ECM/ECCM Activity, paragraph 5–5.

a. Provide radar service to the extent possible.

b. Use only secondary radar, if required, and apply radar separation only between positively identified aircraft.

c. Apply nonradar separation between all aircraft not positively identified on radar.

d. Implement "Stop Buzzer" only when aircraft safety will be compromised.

e. Curtail radar services if necessary to permit the SNOW TIME ECM exercise to continue.

9–35 AWACS/NORAD SPECIAL FLIGHTS

Do not delay E–3 AWACS aircraft identified as "AWACS/NORAD Special" flights. The following control actions are acceptable while expediting these aircraft to the destination orbit.

a. En route altitude changes +/–2,000 feet from the requested flight level.

b. Radar vectors or minor route changes that do not impede progress towards the destination orbit.

9–35 Note.—NORAD has a requirement to position E–3 AWACS aircraft at selected locations on a time-critical basis. To the extent possible these flights will utilize routes to the destination orbit that have been precoordinated with the impacted ATC facilities. To identify these flights, the words "AWACS/NORAD Special" will be included as the first item in the remarks section of the flight plan.

9–36 thru 9–39 RESERVED

Section 4. SAC OPERATIONS

9–40 SAC EVASIVE ACTION MANEUVER

EN ROUTE

Approve a pilot request to conduct a SAC Evasive Action maneuver only on the basis of a permissible traffic situation. Specify the following items, as necessary, when issuing approval:

9–40 Note.—The SAC "Evasive Action" maneuver is performed by SAC bomber/fighter bomber aircraft at or above FL 250 along a 60 NM long segment of the flight plan route overlying a RBS or other site and includes:

a. Flying a zigzag pattern on both the left and right side of the flight plan route centerline. Altitude deviations are made in conjunction with the lateral maneuvering.

b. Lateral deviations from the route centerline will not normally exceed 12 miles. Altitude variations shall not exceed plus or minus 1,000 feet of the assigned flight level; i.e., confined within a 2,000 foot block.

a. Specific route segment on which the maneuver will take place.

b. Distance of maximum route deviation from the centerline in miles.

c. Altitude.

Phraseology:

CLEARED TO CONDUCT EVASIVE ACTION MANEUVER FROM (fix) TO (fix),

and

(number of miles) EITHER SIDE OF CENTERLINE,

and

MAINTAIN (altitude) THROUGH (altitude),

and

COMPLETE MANEUVER AT (fix) AT (altitude).

9–41 SAC GIANT LANCE OPERATIONS

EN ROUTE

Provide the following to Giant Lance flights at all times when aircraft are within radar coverage:

9–41 Note.—SAC has a continuing requirement to conduct Giant Lance flights under peacetime conditions. These flights shall be identified by CARF notification to activate prepositioned Giant Lance ALTRV's. Since the number and status of Giant Lance flights may vary with emergency readiness conditions, CARF will inform all concerned ARTCC's of the current Giant Lance ALTRV in effect and any changes thereto.

a. Radar flight following.

b. Traffic information, except when operating in positive controlled airspace Class A airspace.

c. Advisory information whenever two or more Giant Lance aircraft are observed with less than 15 miles separation except when a rendezvous or cell formation flight is in progress.

d. Close adherence to preplanned routes except for routine changes requested by the pilot.

9–42 SAC MITO OPERATIONS

a. Control MITO operations on the basis that MARSA is applicable between MITO aircraft until approved separation is established by the aircraft and acknowledged for by ATC.

9–42a Note 1.—ATC is not responsible for providing separation during any portion of a MITO operation for which VFR flight has been requested and approved.

9–42a Note 2.—A MITO operation begins at the takeoff roll and ends at a designated fix or cruising altitude. Use of these procedures does not authorize priority handling of these aircraft.

b. *TERMINAL:* Provide aircraft with at least the requested takeoff interval between departures as specified in a letter of agreement covering the MITO operation.

c. *TERMINAL:* Issue takeoff clearance on the departure frequency established in accordance with one of the following in the order listed:

1. Discrete frequency common to both tower and departure control.

2. Departure control frequency if the tower has "override" capability.

3. If neither of the preceding exists, tower frequency until airborne and changed to departure control.

d. Clear aircraft which will use MITO procedures, then fly in formation en route, to the breakup fix as the clearance limit.

e. Forward data pertaining to altitude or route beyond the breakup point to the center concerned as a part of the routine flight plan information.

f. *EN ROUTE:* If the breakup occurs in your area, issue an appropriate clearance to authorize transition from formation to individual route or altitude or to continue flight as a formation by the route filed by the lead aircraft until such time as breakup may be approved.

9–43 SAC NONSTANDARD FORMATION/ CELL OPERATIONS

Strategic Air Command aircraft normally operate in a nonstandard cell formation and controllers should be knowledgeable of the various tactics employed and the procedures used.

9–43 Reference.—FAA Order 7610.4, Chapter 12, Section 13, Formation Flight.

a. Formation leaders are responsible for obtaining ATC approval to conduct nonstandard formation/ cell operations.

b. When nonstandard formation/cell operations have been approved, controllers shall assign sufficient altitudes to allow intra-cell vertical spacing of 500 feet between each aircraft in the formation.

c. Control nonstandard formation/cell operations on the basis that MARSA is applicable between the participating aircraft until they establish approved separation which is acknowledged by ATC.

d. Apply standard separation criteria between the approved nonstandard formation/cell envelope and nonparticipating aircraft.

e. Clear aircraft operating in a nonstandard formation/cell to the breakup fix as the clearance limit. Forward data pertaining to route or altitude beyond the breakup point to the center concerned as a part of the routine flight plan information.

f. *EN ROUTE:* If the breakup occurs in your area, issue appropriate clearances to authorize transition from formation to individual routes or altitudes. If a breakup cannot be approved, issue an appropriate clearance for the flight to continue as a formation.

9–44 thru 9–49 RESERVED

Section 5. SPECIAL USE AND ATC ASSIGNED AIRSPACE

9–50 APPLICATION

Apply the procedures in this section to aircraft operating in proximity to special use or ATC assigned airspace (ATCAA) unless the airspace is designated an Alert Area/Controlled Firing Area or one of the following conditions exist:

9–50 Note.—These procedures are not applicable to Alert Areas or Controlled Firing Areas. See Pilot/Controller Glossary, Special Use Airspace.

a. The pilot informs you that permission has been obtained from the using agency to operate in the airspace.

b. The using agency informs you they have given permission for the aircraft to operate in the airspace.

9–50b Note.—Using agency permission may be relayed to the pilot.

c. The Restricted/Warning Area, MOA, or ATCAA has been released to the controlling agency.

d. The aircraft is on an approved ALTRV, unless the airspace area in question is an ATCAA.

9–50d Note.—Mission project officers are responsible for obtaining approval for ALTRV operations within Prohibited/Restricted/Warning Areas and MOA's.

9–50– Reference.—Avoidance, paragraph 9–53.

e. Operations in special use airspace located in offshore/oceanic airspace will be conducted in accordance with the procedures in Chapter 8.

9–51 SEPARATION MINIMA

Separate nonparticipating aircraft from active special use airspace and ATCAA by the following minima:

a. Prohibited/Restricted/Warning Area, MOA, or ATCAA—Assign an altitude consistent with paragraph 4–60, paragraph 4–61, and paragraph 4–62, which is at least 500 feet (above FL 290—1,000 feet) above/below the upper/lower limit, unless subparagraph 9–51b. below applies.

b. Some Prohibited/Restricted Areas are established for security reasons or to contain hazardous activities not involving aircraft operations. Nonparticipating aircraft may be assigned any appropriate altitude above or below these Prohibited/Restricted Areas, provided the areas have been identified by facility management.

9–51b Reference.—Order 7210.3, Prohibited/Restricted Areas, paragraph 2–16.

c. Prohibited Area—Clear aircraft on airways or routes whose widths or protected airspace do not overlap the peripheral boundary.

d. Restricted/Warning Area/MOA/ATCAA—Clear aircraft in accordance with subparagraph 9–51c. above, unless clearance of nonparticipating aircraft in/through the area is provided for in a letter of agreement.

e. Prohibited/Restricted/Warning Area, MOA, or ATCAA— *3 miles* (En route Stage A/DARC, FL 600 and above— *6 miles),* unless clearances of nonparticipating aircraft in/through/adjacent the area is provided for in a letter of agreement/facility directive.

f. Exception. Some Prohibited/Restricted Areas are established for security reasons or to contain hazardous activities not involving aircraft operations. The above minima for these Prohibited/Restricted Areas is not required if the areas have been identified by facility management. When separation minima is not required, vector aircraft to avoid the airspace.

9–51c Reference.—Order 7210.3, Prohibited/Restricted Areas, paragraph 2–16.

9–52 VFR-ON-TOP

If the aircraft's route, track, or altitude may cause it to enter an active Prohibited/Restricted/Warning Area, MOA, or ATCAA:

a. Inform the pilot to conduct flight "VFR-on-top" *at least* 500 feet (FL 290 and above—1,000 feet) above the upper limit or below the lower limit of the airspace (subject to paragraph 7–20); or

Phraseology:

MAINTAIN VFR-ON-TOP AT LEAST 500 FEET (FL 290 and above—1,000 FEET) ABOVE/BELOW (upper/lower limit of airspace) ACROSS (name or number of airspace) BETWEEN (fix) AND (fix);

and if the airspace is an ATCAA,

(name of ATCAA) IS ATC ASSIGNED AIRSPACE.

b. Clear the aircraft via a routing which provides approved separation from the airspace.

c. *Exception:* Some Prohibited/Restricted Areas are established for security reasons or to contain hazardous activities not involving aircraft operations. The addition of 500 (or 1,000) feet to the upper/lower limit of these Prohibited/Restricted Areas is not required if the areas have been identified by facility management.

9–52 Reference.—Order 7210.3, Prohibited/Restricted Areas, paragraph 2–16.

9–53 AVOIDANCE

Take the following action of a nonparticipating aircraft's route or track will cause it to enter special use or ATC assigned airspace and paragraph 9–50a, b, c, or d do not apply:

9–53 Note.—Nonparticipating aircraft refers to those aircraft for which you have separation responsibility and which have not

been authorized by the using agency to operate in/through the special use airspace or ATCAA in question.

a. For Prohibited/Restricted/Warning Areas—Clear nonparticipating aircraft via routing which will provide approved separation from the airspace, unless clearance of nonparticipating aircraft in/through the area is provided for in a memorandum/letter of agreement.

9–53a Note.—The FAA has no jurisdictional authority over the use of prohibited or nonjoint use restricted/warning airspace; therefore, clearance cannot be issued for flight therein.

b. For MOA's and ATCAA's—

1. Clear nonparticipating aircraft in/through a MOA/ATCAA provided prior coordination has been accomplished as covered in a letter of agreement between the controlling and using (scheduling) agencies and approved separation will be applied between MOA/ATCAA operations and nonparticipating aircraft.

9–53b1 Reference.—Order 7610.4, Chapter 9, Section 2.

2. If unable to clear nonparticipating aircraft in/through a MOA/ATCAA in accordance with subparagraph 9–53b1, clear aircraft via routing which will provide approved separation from the MOA/ATCAA airspace.

9–54 thru 9–59 RESERVED

Section 6. FUEL DUMPING

9–60 INFORMATION REQUIREMENTS

When information is received that an aircraft plans to dump fuel, determine the route and altitude it will fly and the weather conditions in which the operation will be conducted.

9–61 ROUTING

Except when it is dumping fuel for emergency reasons, an aircraft in either VFR or IFR conditions may be requested to fly a different route.

9–62 ALTITUDE ASSIGNMENT

If an aircraft is dumping fuel in IFR conditions, assign an altitude at least 2,000 feet above the highest obstacle within 5 miles of the route or pattern being flown.

9–63 SEPARATION MINIMA

Separate known aircraft from the aircraft dumping fuel as follows:

a. IFR aircraft by one of the following:

1. *1,000 feet (2,000 feet* above FL 290) above it.
2. *2,000 feet* below it.
3. *5 miles* radar.
4. *5 miles* laterally.

b. VFR radar-identified aircraft by *5 miles* and in accordance with paragraph 5–90c.

9–64 INFORMATION DISSEMINATION

a. If you are in contact with an aircraft when it starts dumping fuel, inform other controllers and facilities which might be concerned. Facilities concerned shall broadcast an advisory on appropriate radio frequencies at 3–minute intervals until the dumping stops.

Phraseology:

ATTENTION ALL AIRCRAFT.

FUEL DUMPING IN PROGRESS OVER (location) AT (altitude) BY (type aircraft)(flight direction).

b. Broadcast a terminating advisory when the fuel dumping operation is completed.

Phraseology:

ATTENTION ALL AIRCRAFT.

FUEL DUMPING BY (type aircraft) TERMINATED.

9–65 thru 9–69 RESERVED

Section 7. JETTISONING OF EXTERNAL STORES

9–70 JETTISONING OF EXTERNAL STORES

At locations where a drop area has been established for radar assistance in jettisoning of external stores, provide vectoring service upon request to:

9–70 Note 1.—Where required, a mutually satisfactory drop area for the jettisoning of external stores will be determined by radar-equipped towers and centers in cooperation with the local USAF units, Air Division, or civil operators and civil aircraft companies concerned.

9–70 Note 2.—FAA and Headquarters, USAF, have agreed to allow FAA facilities to vector USAF, Air Force Reserve, and Air National Guard aircraft for jettisoning of all external stores; i.e., tip tanks, JATO racks, special weapons, etc. Any similar vectoring service given to civil operators and civil aircraft companies operating Air Force type aircraft requires written agreement between the FAA and the user to relieve the FAA of possible liability. The regional counsel's office acts for FAA in executing this agreement.

a. USAF, ANG, and Air Force Reserve aircraft at any time.

b. Civil operators and civil aircraft when a written agreement is in effect for your location.

9–71 thru 9–79 RESERVED

Section 8. UNMANNED FREE BALLOONS

9–80 APPLICATION

Apply the following procedures, as appropriate, when unmanned free balloons are within airspace for which you have control jurisdiction:

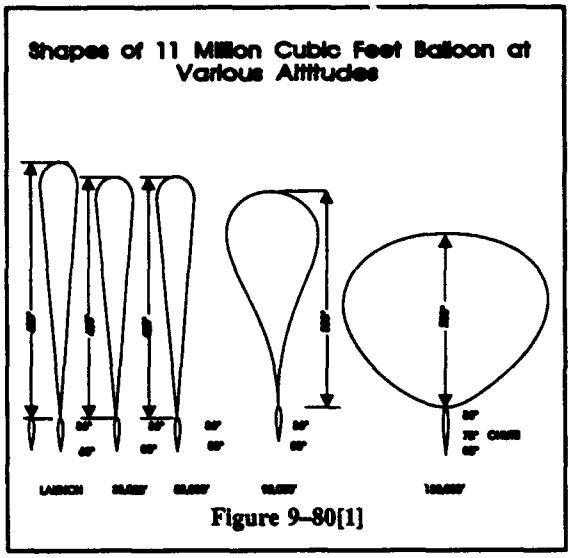


Figure 9–80[1]

9–80 Note.—These procedures apply to unmanned free balloons that carry payloads as described in Part 101.1(a)(4). Payloads may weigh several hundred pounds and the physical shape of the balloons change at various altitudes/flight levels. (See Figure 9–80[1]). Balloon and payload ascend at an average rate of 400 feet a minute. Over the descent area, the payload is normally released from the balloon and descends by parachute at a minimum rate of 1,000 feet a minute. The balloon is normally deflated automatically when the payload is released. The operator is required to advise ATC 1 hour in advance of descent in accordance with Part 101.39.

a. Post the balloon flight on flight progress strips along the planned trajectory and revise routing as tracking/position reports require.

9–80a Note.—The prelaunch notice information should be posted on flight progress strips for planning and operational purposes.

b. Radar flight follow balloons to the extent that equipment capabilities permit. If radar flight following is not possible, tracking should be attempted by communication with the "chase plane," telephone contact with the operator, pilot, or ground observation reports.

9–80b Note.—Some operators have equipped their balloons with transponder beacons in addition to a radar reflection device or material required by Part 101.35. But at cruise altitude, the balloon's communications equipment and transponder, if so equipped, are operated intermittently to conserve battery energy.

c. With pilot concurrence, provide separation between aircraft and balloons when you are satisfied that the balloon information is sufficiently reliable to provide the service. Do not attempt to separate aircraft from the balloon by using vertical separation unless you have accurate balloon altitude information.

d. Provide traffic advisories to all affected aircraft during initial contact specifying the balloon's known or estimated position, direction of movement, and altitude as "unknown" or "reported," as appropriate.

9–80d Note.—Unless ATC requires otherwise, operators of unmanned free balloons are required to monitor the course of the balloon and record its position at least e· ry two hours. Except as required in Part 101.39(h), balloon position reports are not forwarded by the operator unless requested by the ATC.

Phraseology:

UNMANNED FREE BALLOON OVER (name of location),

or

ESTIMATED OVER (name of location), MOVING (direction of movement).

LAST REPORTED ALTITUDE AT (altitude as reported by the operator or determined from pilot report),

or

ALTITUDE UNKNOWN.

e. Transfer flight following responsibility between facilities or between controllers by forwarding the following information when available:

9–80e Reference.—Notice Requirements, Part 101.37. Balloon Position Report, Part 101.39.

1. Identification and type; e.g., Flight 804 Balloon.
2. Last known position and altitude of balloon.
3. General direction of movement and speed.
4. ETA over facility boundary, sector boundary, or other point if believed to be reasonably accurate.
5. Other pertinent information.
6. If in radar contact, physically point out the target to the receiving controller.
7. The name and the telephone number of the location where tracking is being accomplished.

9–80 Reference.—Derelict Balloons, paragraph 9–81.

9–81 DERELICT BALLOONS

Balloons become derelict when a moored balloon slips its mooring and becomes a hazard to air navigation or when an unmanned free balloon flight cannot be terminated as planned. When this occurs:

a. In the case of a moored balloon which has slipped its moorings, issue traffic advisories.

b. In the case of an unmanned free balloon, flight follow the balloon and, to the extent possible, provide aircraft under your control separation from the balloon.

c. Forward balloon position information received from pilot reports or derived from radar returns to your supervisor for further dissemination.

d. If radar contact of the balloon is lost, broadcast an advisory to all aircraft operating in the airspace affected by the derelict balloon at 10–minute intervals continuing until the derelict balloon is no longer a factor.

Phraseology:

ADVISORY TO ALL AIRCRAFT.

DERELICT BALLOON REPORTED IN THE VICINITY OF (location),

or

ESTIMATED IN VICINITY OF (location),

or

REPORTED OVER (location),

or

RADAR REPORTED OVER (location).

LAST REPORTED ALTITUDE AT (altitude as reported by operator or pilot report),

or

ALTITUDE UNKNOWN.

e. Transfer flight following responsibility as outlined in paragraph 9–80e.

9–81 Reference.—FAA Order 7210.3, Derelict Balloons, paragraph 6–62.

9–82 thru 9–89 RESERVED

Section 9. PARACHUTE JUMPING

9–90 COORDINATION

Coordinate any pertinent information prior to and at the end of each parachute jump or series of jumps which begins or ends in your area of jurisdiction with other affected ATC facilities/sectors.

9–90 Note.—Part 105.25 prescribes the information required from each person requesting authorization or submitting notification for nonemergency parachute jumping activity.

9–90 Reference.—Order 7210.3, Nonemergency Parachute Jumping, paragraph 6–60. Parachute Jumping, Part 105.

9–91 POSITIVE CONTROL AREAS, TCA's and ARSA's, CLASS A, CLASS B, and CLASS C AIRSPACE

a. Authorize parachute jumping only within airspace designated for the jumping activity.

b. Separate aircraft, other than those participating in the jump operation, from the airspace authorized for the jumping activity.

c. Impose, as necessary, any conditions and restrictions which in your judgment would promote the safety of the operation.

9–91c Reference —Part 105.19, Jumps in or into Class A, B, C, and D airspace.

9–92 CONTROL ZONES, CLASS D AIRSPACE *TERMINAL*

Handle requests to conduct jump operations in or into a control zone, Class D airspace in which there is a functioning control tower operated by the United States as follows:

a. Authorize parachute jumping with respect to known or observed traffic.

b. Issue advisory information to the jump aircraft and to nonparticipating aircraft as necessary for the safe conduct of the jump operation.

9–93 OTHER CONTROL AIRSPACE

Handle notifications to conduct jump operations in other controlled airspace, Class E, as follows:

a. Issue a traffic advisory to the jump aircraft before the jump. Include aircraft type, altitude, and direction of flight of all known traffic which will transit the airspace within which the jump will be conducted.

9–93a Note.—Part 105.14 prescribes that, except when otherwise authorized by ATC, parachute jumping is not allowed in or into controlled airspace, Class E airspace, unless radio communications have been established between the aircraft and the nearest FAA ATC facility or FSS at least 5 minutes before the jumping activity is to begin for the purpose of receiving information in the aircraft about known air traffic in the vicinity of the jump aircraft.

b. Issue advisories to all known aircraft which will transit the airspace within which the jump operations will be conducted. Advisories shall consist of the location, time, duration, and altitude from which the jump will be made.

c. When time or numbers of aircraft make individual transmissions impractical, advisories to nonparticipating aircraft may be broadcast on appropriate control frequencies, or when available, the ATIS broadcast.

d. When requested by the pilot and to the extent possible, assist nonparticipating aircraft to avoid the airspace within which the jump will be conducted.

Chapter 10. EMERGENCIES

Section 1. GENERAL

10–1 EMERGENCY DETERMINATIONS

a. An emergency can be either a *Distress* or an *Urgency* condition as defined in the "Pilot/Controller Glossary."

b. A pilot who encounters a *Distress* condition should declare an emergency by beginning the initial communication with the word "Mayday," preferably repeated three times. For an *Urgency* condition, the word "Pan-Pan" should be used in the same manner.

c. If the words "Mayday" or "Pan-Pan" are not used and you are in doubt that a situation constitutes an emergency or potential emergency, handle it as though it were an emergency.

d. Because of the infinite variety of possible emergency situations, specific procedures cannot be prescribed. However, when you believe an emergency exists or is imminent, select and pursue a course of action which appears to be most appropriate under the circumstances and which most nearly conforms to the instructions in this manual.

10–1 Reference.—IFR Military Training Routes, paragraph 9–26.

10–2 OBTAINING INFORMATION

Obtain enough information to handle the emergency intelligently. Base your decision as to what type of assistance is needed on information and requests received from the pilot because he is authorized by FAR 91 to determine a course of action.

10–3 PROVIDING ASSISTANCE

Provide maximum assistance to aircraft in distress. Enlist the services of available radar facilities and DF facilities operated by the FAA, the military services, and the Federal Communications Commission, as well as their emergency services and facilities, when the pilot requests or when you deem necessary.

10–3 Note 1.—The National SAR Plan assigns search and rescue responsibilities as follows:

a. To the military agencies—Conducting physical search and rescue operations.

b. To the FAA—

1. Providing emergency service to aircraft in distress.

2. Assuring that SAR procedures will be initiated if an aircraft becomes overdue or unreported. This is accomplished through the ATC system for IFR aircraft and the flight plan system for VFR aircraft.

3. Attempting to locate overdue or unreported aircraft by INREQ and ALNOT communications search.

4. Making all possible facilities available for use by the searching agencies.

10–3b4 Reference.—Operational Priority, paragraph 2–4b.

10–3 Note 2.—FSS's serve as the central points for collecting and disseminating information on an overdue or missing aircraft which is not on an IFR flight plan.

10–3 Note 3.—Centers serve as the central points for collecting information, for coordinating with SAR, and for conducting a communications search by distributing any necessary ALNOT's concerning:

a. Overdue or missing IFR aircraft.

b. IFR aircraft in an emergency situation occurring in their respective areas.

c. Aircraft on a combination VFR/IFR or an airfiled IFR flight plan and 30 minutes have passed since the pilot requested IFR clearance and neither communication nor radar contact can be established with it. For SAR purposes, these aircraft are treated the same as IFR aircraft.

d. Overdue or missing aircraft which have been authorized to operate in accordance with Special VFR clearance.

10–3 Note 4.—The ARTCC serves as the central point for collecting information and coordinating with the RCC on ELT signals.

10–4 RESPONSIBILITY

a. If you are in communication with an aircraft in distress, handle the emergency and coordinate and direct the activities of assisting facilities. Transfer this responsibility to another facility only when you feel better handling of the emergency will result.

b. When you receive information about an aircraft in distress, forward detailed data to the center in whose area the emergency exists.

10–4b Note.—Notifying the center about a VFR aircraft emergency allows provision of IFR separation if considered necessary.

c. If the aircraft involved is operated by a foreign air carrier, notify the center serving the departure or destination point, when either point is within the United States, for relay to the operator of the aircraft.

d. The ARTCC shall be responsible for receiving and relaying all pertinent ELT signal information to the appropriate authorities.

10–4d Reference.—Emergency Locator Transmitter Signals, paragraph 10–19.

10–5 COORDINATION

Coordinate efforts to the extent possible to assist any aircraft believed overdue, lost, or in emergency status.

10–6 AIRPORT GROUND EMERGENCY *TERMINAL*

When an emergency occurs on the airport proper, control other air and ground traffic to avoid conflicts in the area where the emergency is being handled. This also applies when routes within the airport proper are required for movement of local emergency equipment going to or from an emergency which occurs outside the airport proper.

10–6 Note.—Aircraft operated in proximity to accident or other emergency or disaster locations may cause hindrances to airborne and surface rescue or relief operations. Congestion, distraction or other effects, such as wake turbulence from nearby airplanes and helicopters, could prevent or delay proper execution of these operations.

10–6 Reference.—Order 7210.3, Temporary Flight Restrictions, paragraph 6–40. Temporary Flight Restrictions, FAR 91.137.

10–7 IN—FLIGHT EMERGENCIES INVOLVING MILITARY FIGHTER—TYPE AIRCRAFT

The design and complexity of military fighter—type aircraft places an extremely high workload on the pilot during an in—flight emergency. The pilot's full attention is required to maintain control of the aircraft. Therefore, radio frequency and transponder code changes should be avoided and radio transmissions held to a minimum, especially when the aircraft experiencing the emergency is at low altitude.

10–8 thru 10–9 RESERVED

Section 2. EMERGENCY ASSISTANCE

10–10 INFORMATION REQUIREMENTS

a. Start assistance as soon as enough information has been obtained upon which to act. Information requirements will vary, depending on the existing situation. Minimum required information for in-flight emergencies is:

10–10a Note.—In the event of an ELT signal see paragraph 10–19.

1. Aircraft identification and type.
2. Nature of the emergency.
3. Pilot's desires.

b. After initiating action, obtain the following items or any other pertinent information from the pilot or aircraft operator, as necessary:

10–10b Note.—Normally, do not request this information from military fighter—type aircraft that are at low altitudes (i.e. on approach, immediately after departure, on a low level route, etc.). However, request the position of an aircraft that is not visually sighted or displayed on radar if the pilot has not given his location.

1. Aircraft altitude.
2. Fuel remaining in time.
3. Pilot reported weather.
4. Pilot capability for IFR flight.
5. Time and place of last known position.
6. Heading since last known position.
7. Airspeed.
8. Navigation equipment capability.
9. NAVAID signals received.
10. Visible landmarks.
11. Aircraft color.
12. Number of people on board.
13. Point of departure and destination.
14. Emergency equipment on board.

10–11 FREQUENCY CHANGES

Although 121.5 mHz and 243.0 mHz are emergency frequencies, it might be best to keep the aircraft on the initial contact frequency. Change frequencies only when there is a valid reason.

10–12 AIRCRAFT ORIENTATION

Orientate an aircraft by the means most appropriate to the circumstances. Recognized methods include:

a. Radar.

b. DF.

c. NAVAID's.

d. Pilotage.

e. Sighting by other aircraft.

10–13 ALTITUDE CHANGE FOR IMPROVED RECEPTION

When you consider it necessary and if weather and circumstances permit, recommend that the aircraft maintain or increase altitude to improve communications, radar, or DF reception.

10–14 EMERGENCY SITUATIONS

Consider that an aircraft emergency exists and inform the RCC or ARTCC and alert the DF Net when:

10–14 Note 1.—USAF facilities are only required to notify the ARTCC.

10–14 Note 2.—Each ARTCC shall be the DF Net Control for its flight advisory area except Washington ARTCC. The Norfolk RCC is the DF Net Control for the Washington flight advisory area.

a. An emergency is declared by either:

1. The pilot.
2. *Facility personnel.*

10–14a2 Note.—An example of an emergency which should be declared by facility personnel is unexpected loss of radar contact and radio communications with an aircraft.

3. Officials responsible for the operation of the aircraft.

b. Reports indicate it has made a forced landing, is about to do so, or its operating efficiency is so impaired that a forced landing will be necessary.

c. Reports indicate the crew has abandoned the aircraft or is about to do so.

d. An emergency radar beacon response is received.

10–14d Note.— *EN ROUTE:* During Stage A operation, Code 7700 causes EMRG to blink in field E of the data block.

e. Intercept or escort aircraft services are required.

f. The need for ground rescue appears likely.

g. An Emergency Locator Transmitter (ELT) signal is heard or reported.

10–14g Reference.—Providing Assistance, paragraph 10–3. Emergency Locator Transmitter (ELT) Signals, paragraph 10–19.

10–15 HIJACKED AIRCRAFT

When you observe a Mode 3/A Code 7500, do the following:

10–15 Note 1.—Military facilities will notify the appropriate FAA ARTCC, or the host nation agency responsible for en route control, of any indication that an aircraft is being hijacked. They

will also provide full cooperation with the civil agencies in the control of such aircraft.

10–15 Note 2.— *EN ROUTE:* During narrowband radar operations, Code 7500 causes HIJK to blink in the data block.

10–15 Note 3.—Only nondiscrete Code 7500 will be decoded as the hijack code.

a. Acknowledge and confirm receipt of Code 7500 by asking the pilot to verify it. If the aircraft is not being subjected to unlawful interference, the pilot should respond to the query by broadcasting in the clear that he is not being subjected to unlawful interference. If the reply is in the affirmative or if no reply is received, do not question the pilot further but be responsive to the aircraft requests.

Phraseology:

(Identification) (name of facility) VERIFY SQUAWKING 7500.

10–15a Note.—*Code 7500 is only assigned upon notification from the pilot that his aircraft is being subjected to unlawful interference. Therefore, pilots have been requested to refuse the assignment of Code 7500 in any other situation and to inform the controller accordingly.*

b. Notify supervisory personnel of the situation.

c. Flight follow aircraft and use normal handoff procedures without requiring transmissions or responses by aircraft unless communications have been established by the aircraft.

d. If aircraft are dispatched to escort the hijacked aircraft, provide all possible assistance to the escort aircraft to aid in placing them in a position behind the hijacked aircraft.

10–15d Reference.—Escort procedures are contained in Order 7610.4, Chapter 7.

e. To the extent possible, afford the same control service to the aircraft operating VFR observed on the hijack code.

10–15 Reference.—Code Monitor, paragraph 5–33.

10–16 VFR AIRCRAFT IN WEATHER DIFFICULTY

a. If VFR aircraft requests assistance when it encounters or is about to encounter IFR weather conditions, request the aircraft to contact the appropriate control facility. Inform that facility of the situation. If the aircraft is unable to communicate with the control facility, relay information and clearances.

b. The following shall be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of code 7700:

1. TERMINAL: Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

2. EN ROUTE: An appropriate keyboard entry shall be made to ensure en route MSAW (EMSAW) alarm processing.

10–17 RADAR ASSISTANCE TO VFR AIRCRAFT IN WEATHER DIFFICULTY

a. If a VFR aircraft requests radar assistance when it encounters or is about to encounter IFR weather conditions, ask the pilot if he is qualified for and capable of conducting IFR flight.

b. If the pilot states he is qualified for and capable of IFR flight, request him to file an IFR flight plan and then issue clearance to destination airport, as appropriate.

c. If the pilot states he is not qualified for or not capable of conducting IFR flight, or if he refuses to file an IFR flight plan, take whichever of the following actions is appropriate:

1. Inform the pilot of airports where VFR conditions are reported, provide other available pertinent weather information, and ask if he will elect to conduct VFR flight to such an airport.

2. If the action in subparagraph 10–17c1 is not feasible or the pilot declines to conduct VFR flight to another airport, provide radar assistance if the pilot:

(a) Declares an emergency.

(b) Refuses to declare an emergency and you have determined the exact nature of the radar services the pilot desires.

3. If the aircraft has already encountered IFR conditions, inform the pilot of the appropriate terrain/obstacle clearance minimum altitude. If the aircraft is below appropriate terrain/obstacle clearance minimum altitude and sufficiently accurate position information has been received or radar identification is established, furnish a heading or radial on which to climb to reach appropriate terrain/obstacle clearance minimum altitude.

d. The following shall be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of code 7700:

1. TERMINAL: Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

2. EN ROUTE: An appropriate keyboard entry shall be made to ensure en route MSAW (EMSAW) alarm processing.

10–18 RADAR ASSISTANCE TECHNIQUES

Use the following techniques to the extent possible when you provide radar assistance to a pilot not qualified to operate in IFR conditions:

a. Avoid radio frequency changes except when necessary to provide a clear communications channel.

b. Make turns while the aircraft is in VFR conditions so it will be in a position to fly a straight course while in IFR conditions.

c. Have pilot lower gear and slow aircraft to approach speed while in VFR conditions.

d. Avoid requiring a climb or descent while in a turn if in IFR conditions.

e. Avoid abrupt maneuvers.

f. Vector aircraft to VFR conditions.

g. The following shall be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of code 7700:

1. TERMINAL: Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

2. EN ROUTE: An appropriate keyboard entry shall be made to ensure en route MSAW (EMSAW) alarm processing.

10–19 EMERGENCY LOCATOR TRANSMITTER (ELT) SIGNALS

When an ELT signal is heard or reported:

a. *EN ROUTE:* Notify the Rescue Coordination Center (RCC).

10–19a Note.—FAA Form 7210–8. ELT Incident, contains standardized format for coordination with the RCC.

10–19a Reference.—Order 7210.3, paragraph 11–30.

b. *TERMINAL:* Notify the ARTCC which will coordinate with the Rescue Coordination Center (RCC).

10–19a. and b Note 1.—Operational ground testing of Emergency Locator Transmitters (ELT's) has been authorized during the first 5 minutes of each hour. To avoid confusing the tests with an actual alarm, the testing is restricted to no more than three audio sweeps.

10–19a. and b Note 2.—Controllers can expect pilots to report aircraft position and time the signal was first heard, aircraft position and time the signal was last heard, aircraft position at maximum signal strength, flight altitude, and frequency of the emergency signal (121.5/243.0). (See Airman's Information Manual, Emergency Locator Transmitters, paragraph 6–15.)

c. *EN ROUTE:* Request DF Net attempt to obtain fixes or bearings on signal. Forward bearings or fixes obtained plus any other pertinent information to the RCC.

d. *TERMINAL:* Attempt to obtain fixes or bearings on the signal.

e. Solicit the assistance of other aircraft known to be operating in the signal area.

f. *TERMINAL:* Forward fixes or bearings and any other pertinent information to the ARTCC.

10–19f Note.—Fix information in relation to a VOR or VORTAC (radial-distance) facilitates accurate ELT plotting by RCC and should be provided when possible.

g. *EN ROUTE:* When the ELT signal strength indicates the signal may be emanating from somewhere on an airport or vicinity thereof, notify the on-site Airway Facilities personnel and the Regional Operations Center (ROC) for their actions. This action is in addition to the above.

h. *TERMINAL:* When the ELT signal strength indicates the signal may be emanating from somewhere on the airport or vicinity therof, notify the on-site Airway Facilities personnel and the ARTCC for their action. This action is in addition to the above.

i. Air Traffic personnel shall not leave their required duty stations to locate an ELT signal source.

10–19h and i Note.—Portable handcarried receivers assigned to facilities (where no Airway Facilities personnel are available) may be loaned to responsible airport personnel or local authorities to assist in locating the ELT signal source.

j. *EN ROUTE:* Notify the RCC, the ROC, and deactivate the DF net if signal source is located/terminated.

k. *TERMINAL:* Notify the ARTCC if signal source is located/terminated.

10–19 Reference.—Responsibility, paragraph 10–4. Information Requirements, paragraph 10–10.

10–20 AIRCRAFT BOMB THREATS

a. When information is received from any source that a bomb has been placed on, in, or near an aircraft for the purpose of damaging or destroying such aircraft, notify your supervisor or the facility air traffic manager. If the threat is general in nature, handle it as a "Suspicious Activity." When the threat is targeted against a specific aircraft and you are in contact with the suspect aircraft, take the following actions as appropriate:

10–20a Note 1.—Facility supervisors are expected to notify the appropriate offices, agencies, operators/air carriers according to applicable plans, directives, and Order 7210.3, paragraph 2–8 or applicable military directives.

10–20a Note 2.—"Suspicious Activity" is covered in Order 7210.3, paragraph 2–85. Military facilities would report a "general" threat through the chain of command or according to service directives.

1. Advise the pilot of the threat.

2. Inform the pilot that technical assistance can be obtained from an FAA Aviation Explosives Expert.

10–20a2 Note.—An FAA Aviation Explosive Expert is on call at all times and may be contacted by calling the FAA Operations Center, Washington, DC, area code 202–863–5100, FTS 989–5100, ETN 521–0111, or DSN 667–5592. Technical advice can be relayed to assist civil or military air crews in their search

for a bomb and in determining what precautionary action to take if one is found.

3. Ask the pilot if he desires to climb or descend to an altitude that would equalize or reduce the outside air pressure/existing cabin air pressure differential. Issue or relay an appropriate clearance considering MEA, MOCA, MRA, and weather.

10–20a3 Note.—Equalizing existing cabin air pressure with outside air pressure is a key step which the pilot may wish to take to minimize the damage potential of a bomb.

4. Handle the aircraft as an emergency and/or provide the most expeditious handling possible with respect to the safety of other aircraft, ground facilities, and personnel.

10–20a4 Note.—Emergency handling is discretionary and should be based on the situation. With certain types of threats, plans may call for a low-key action or response.

5. Issue or relay clearances to a new destination if requested.

6. When a pilot requests technical assistance or if it is apparent that a pilot may need such assistance, do NOT suggest what actions the pilot should take concerning a bomb, but obtain the following information and notify your supervisor who will contact the FAA Aviation Explosives Expert:

10–20a6 Note.—This information is needed by the FAA Aviation Explosives Expert so that he can assess the situation and make immediate recommendations to the pilot. The Aviation Explosives Expert may not be familiar with all military aircraft configurations but he can offer technical assistance which would be beneficial to the pilot.

(a) Type, series, and model of the aircraft.

(b) Precise location/description of the bomb device if known.

(c) Other details which may be pertinent.

10–20a6(c) Note.—The following details may be of significance if known, but it is not intended that the pilot should disturb a suspected bomb/bomb container to ascertain the information: the altitude or time set for the bomb to explode, type of detonating action (barometric, time, anti-handling, remote radio transmitter), power source (battery, electrical, mechanical), type of initiator (blasting cap, flash bulb, chemical), and the type of explosive/incendiary charge (dynamite, black powder, chemical).

b. When a bomb threat involves an aircraft on the ground and you are in contact with the suspect aircraft, take the following actions in addition to those discussed in the preceding paragraph which may be appropriate:

1. If the aircraft is at an airport where tower control or FSS advisory service is not available, or if the pilot ignores the threat at any airport, recommend that takeoff be delayed until the pilot or aircraft operator establishes that a bomb is not aboard in accordance with FAR 121. If the pilot insists on taking off and in your opinion the operation will not adversely affect other traffic, issue or relay an ATC clearance.

10–20b1 Reference.—Aircraft Security, FAR 121.538.

2. Advise the aircraft to remain as far away from other aircraft and facilities as possible, to clear the runway, if appropriate, and to taxi to an isolated or designated search area. When it is impractical or if the pilot takes an alternative action; e.g., parking and off-loading immediately, advise other aircraft to remain clear of the suspect aircraft by at least 100 yards if able.

10–20b2 Note.—Passenger deplaning may be of paramount importance and must be considered before the aircraft is parked or moved away from service areas. The decision to use ramp facilities rests with the pilot, aircraft operator/airport manager.

c. If you are unable to inform the suspect aircraft of a bomb threat or if you lose contact with the aircraft, advise your supervisor and relay pertinent details to other sectors or facilities as deemed necessary.

d. When a pilot reports the discovery of a bomb or suspected bomb on an aircraft which is airborne or on the ground, determine the pilot's intentions and comply with his requests in so far as possible. Take all of the actions discussed in the preceding paragraphs which may be appropriate under the existing circumstances.

e. The handling of aircraft when a hijacker has or is suspected of having a bomb requires special considerations. Be responsive to the pilot's requests and notify supervisory personnel. Apply hijacking procedures and offer assistance to the pilot according to the preceding paragraphs, if needed.

10–21 EXPLOSIVE DETECTION K–9 TEAMS

Take the following actions should you receive an aircraft request for the location of the nearest explosive detection K–9 team.

10–21 Reference.—Order 7210.3, Explosives Detection K–9 Teams, paragraph 2–10.

a. Obtain the aircraft identification and position and advise your supervisor of the pilot request.

b. When you receive the nearest location of the explosive detection K–9 team, relay the information to the pilot.

c. If the aircraft wishes to divert to the airport location provided, obtain an estimated arrival time from the pilot and advise your supervisor.

10–22 EMERGENCY AIRPORT RECOMMENDATION

Consider the following factors when recommending an emergency airport:

a. Remaining fuel in relation to airport distances.

b. Weather conditions.

c. Airport conditions.

d. NAVAID status.

e. Aircraft type.

f. Pilot's qualifications.

g. Vectoring or homing capability to the emergency airport.

10–23 GUIDANCE TO EMERGENCY AIRPORT

When necessary, use any of the following for guidance to the airport:

a. Radar.

b. DF.

c. Following another aircraft.

d. NAVAID's.

e. Pilotage by landmarks.

f. Compass headings.

10–24 EMERGENCY OBSTRUCTION VIDEO MAP (EOVM)

a. The EOVM is intended to facilitate advisory service to an aircraft in an emergency situation wherein an appropriate terrain/obstacle clearance minimum altitude cannot be maintained. It shall only be used and the service provided under the following conditions:

1. The pilot has declared an emergency, or

2. The controller has determined that an emergency condition exists or is imminent because of the pilot's inability to maintain an appropriate terrain/obstacle clearance minimum altitude.

10–24a2 Note.—Appropriate terrain/obstacle clearance minimum altitudes may be defined as Minimum IFR Altitude (MIA), Minimum En route Altitude (MEA), Minimum Obstruction Clearance Altitude (MOCA), or Minimum Vectoring Altitude (MVA).

b. When providing emergency vectoring service, the controller shall advise the pilot that any headings issued are emergency advisories intended only to direct the aircraft toward and over an area of lower terrain/obstacle elevation.

10–24b Reference.—Order 7210.3, Emergency Obstruction Video Map Order, paragraph 3–103.

10–25 thru 10–29 RESERVED

Section 3. OVERDUE AIRCRAFT

10–30 OVERDUE AIRCRAFT

Consider an aircraft to be overdue when neither communications nor radar contact can be established with it and 30 minutes have passed since:

10–30 Note.—If you have reason to believe that an aircraft is overdue prior to 30 minutes, take appropriate action immediately.

a. Its ETA over a specified or compulsory reporting point or at a clearance limit in your area.

10–30a Note.—The center in whose area the aircraft is first unreported or overdue make this determination and takes any subsequent action required.

b. Its clearance void time.

10–30b Reference.—Departure Restrictions and Clearance Void/Release Time, paragraph 4–33.

10–31 INFORMATION TO BE FORWARDED TO ARTCC

TERMINAL

When an aircraft is considered to be overdue or in emergency status, the terminal facility shall alert the ARTCC and forward the following information as available:

a. Flight plan, including color of aircraft, if known.

b. Time of last transmission received, by whom, and frequency used.

c. Last position report and how determined.

d. Action taken by reporting facility and proposed action.

e. Number of persons on board.

f. Fuel status.

g. Facility working aircraft and frequency.

h. Last known position, estimated present position, and maximum range of flight of the aircraft based on remaining fuel and airspeed.

i. Position of other aircraft near aircraft's route of flight, when requested.

j. Whether or not an ELT signal has been heard or reported in the vicinity of the last known position.

k. Other pertinent information.

10–32 INFORMATION TO BE FORWARDED TO RCC

EN ROUTE

When an aircraft is considered to be overdue or in emergency status, the ARTCC shall alert the RCC and forward the following information as available:

a. Facility and person calling.

b. Flight plan, including color of aircraft, if known.

c. Time of last transmission received, by whom, and frequency used.

d. Last position report and how determined.

e. Action taken by reporting facility and proposed action.

f. Number of persons on board.

g. Fuel status.

h. Facility working aircraft and frequency.

i. Last known position, estimated present position, and maximum range of flight of the aircraft based on remaining fuel and airspeed.

j. Position of other aircraft near aircraft's route of flight, when requested.

k. Whether or not an ELT signal has been heard or reported in the vicinity of the last known position.

l. Other pertinent information.

10–33 ALNOT

EN ROUTE

a. In addition to routing to your regional office operations center, issue an ALNOT to all centers and Area B circuits, generally 50 miles on either side of the route of flight from the last reported position to destination. Include the original or amended flight plan, as appropriate, and the last known position of the aircraft. At the recommendation of the RCC or at your discretion, the ALNOT may be issued to cover the maximum range of the aircraft.

10–33a Note 1.— An ALNOT must be issued before the RCC can begin Search and Rescue procedures.

10–33a Note 2.— Flight plan information on military aircraft is available at the FSS serving as a tie–in station for the departure or destination airport. FAA tie–in stations for airports in the continental United States are listed in the Location Identifiers Handbook. In the Western–Pacific Region, tie–in stations are listed in regional publications entitled, "Flight Plan Routing and Airport Search Directory." For flights with over–seas departure points, the information is available through the destination FSS or the appropriate IFSS.

b. Upon receipt of an INREQ or ALNOT, check the position records to determine whether the aircraft has contacted your facility. Notify the originator of the results or status of this check within one hour of the time the alert was received. Retain the alert in an active status, and immediately notify the originator of subsequent contact, until cancellation is received.

10–34 RESPONSIBILITY TRANSFER TO RCC

EN ROUTE

Transfer responsibility for further search to the RCC when one of the following occurs:

a. Thirty minutes have elapsed after the estimated aircraft fuel exhaustion time.

b. The aircraft has not been located within one hour after ALNOT issuance.

c. The ALNOT search has been completed with negative results.

10–35 AIRCRAFT POSITION PLOTS

Plot the flight path of the aircraft on a chart, including position reports, predicted positions, possible range of flight, and any other pertinent information. Solicit the assistance of other aircraft known to be operating near the aircraft in distress. Forward this information to the RCC or the ARTCC as appropriate.

10–36 ALNOT CANCELLATION

EN ROUTE

Cancel the ALNOT when the aircraft is located or the search is abandoned.

10–37 thru 10–39 RESERVED

Section 4. CONTROL ACTIONS

10–40 TRAFFIC RESTRICTIONS

IFR traffic which could be affected by an overdue or unreported aircraft shall be restricted or suspended unless radar separation is used. The facility responsible shall restrict or suspend IFR traffic for a period of 30 minutes following the applicable time listed in paragraphs a thru e.

a. The time at which approach clearance was delivered to the pilot.

b. The EFC time delivered to the pilot.

c. The arrival time over the NAVAID serving the destination airport.

d. The current estimate, either the control facility's or the pilot's, whichever is later, at:

1. The appropriate en route NAVAID or fix, and

2. The NAVAID serving the destination airport.

e. The release time and, if issued, the clearance void time.

10–40 Reference.—Departure Restrictions, Clearance Void Times, Hold for Release, and Release Times paragraph 4–33.

10–41 LIGHTING REQUIREMENTS

a. *EN ROUTE:* At non-tower or non-FSS locations, request the airport management to *light all runway* lights, approach lights, and all other required airport lighting systems for at least 30 minutes before the ETA of the unreported aircraft until the aircraft has been located or for 30 minutes after its fuel supply is estimated to be exhausted.

b. *TERMINAL:* Operate runway lights, approach lights, and all other required airport lighting systems for at least 30 minutes before the ETA of the unreported aircraft until the aircraft has been located or for 30 minutes after is fuel supply is estimated to be exhausted.

10–41 Reference.—Emergency Lighting, paragraph 3–40.

10–42 TRAFFIC RESUMPTION

After the 30–minute traffic suspension period has expired, resume normal air traffic control if the operators or pilots of other aircraft concur. This concurrence must be maintained for a period of 30 minutes after the suspension period has expired.

10–42 Reference.—Departure Restrictions, Clearance Void Times, Hold for Release, and Release Times, paragraph 4–33.

10–43 COMMUNICATIONS FAILURE

Take the following actions, as appropriate, if two-way radio communications is lost with an aircraft:

10–43 Note 1.—When an IFR aircraft experiences two-way radio communications failure, air traffic control is based on anticipated pilot actions. Pilot procedures and recommended practices are set forth in the AIM, FAR's, and pertinent military regulations.

10–43 Note 2.—Should the pilot of an aircraft equipped with a coded radar beacon transponder experience a loss of two-way radio capability, the pilot can be expected to adjust the transponder to reply on Mode 3/A Code 7600.

a. In the event of lost communications with an aircraft under your control jurisdiction use all appropriate means available to reestablish communications with the aircraft. These may include, but not be limited to, emergency frequencies, navaids that are equipped with voice capability, FSS, Aeronautical Radio Incorporated (ARINC), etc.

10–43a Note 1.— ARINC is a commercial communications corporation which designs, constructs, operates, leases or otherwise engages in radio activities serving the aviation community. ARINC has the capability of relaying information to/from subscribing aircraft throughout the country.

10–43a Note 2.—Aircraft communications addressing and reporting system (ACARS) or selective calling (SELCAL) may be utilized to reestablish radio communications with suitably equipped aircraft. ACARS can be accessed by contacting the San Francisco ARINC communications center, watch supervisor, at 415–312–7930/7931/7932. Provide ARINC the aircraft call sign, approximate location, and contact instructions. In order to utilize the SELCAL system, the SELCAL code for the subject *aircraft must be known. If the* SELCAL code is not contained in the remarks section of the flight plan, contact the pertinent air carrier dispatch office to determine the code. Then contact the San Francisco ARINC communications center, watch supervisor, at 415–312–7930/7931/7932. Provide ARINC the aircraft call sign, SELCAL code, approximate location, and contact instructions.

b. Broadcast clearances through any available means of communications including the voice feature of NAVAID's.

10–43b Note 1.—Some UHF equipped aircraft have VHF navigation equipment and can receive 121.5 mHz.

10–43b Note 2.—"Any available means" includes the use of FSS and ARINC.

10–43b Reference.—Clearance Prefix, paragraph 4–13.

c. Attempt to re-establish communication by having the aircraft use its transponder or make turns to acknowledge clearances and answer questions. Request any of the following in using the transponder:

1. Request the aircraft to reply Mode 3/A "IDENT."

2. Request the aircraft to reply on Code 7600 or if already on Code 7600, the appropriate stratum code.

3. Request the aircraft to change to "stand-by" for sufficient time for you to be sure that the lack of a target is the result of the requested action.

Phraseology:

REPLY NOT RECEIVED, (appropriate instructions).

(Action) OBSERVED, (additional instructions/information if necessary).

d. Broadcast a clearance for the aircraft to proceed to its filed alternate airport at the MEA if the aircraft operator concurs.

10–43 Reference.—Radio Failure, paragraph 5–28. IFR Military Training Routes, paragraph 9–26.

10–44 thru 10–49 RESERVED

Section 5. DIRECTION FINDER SERVICE

10–50 ACTIONS REQUIRED

When providing DF services to an aircraft in emergency status:

a. Determine if aircraft is in VFR or IFR weather conditions, fuel remaining, altitude, and heading.

b. If the aircraft is operating in IFR weather conditions, inform the pilot of the minimum safe altitude.

c. Determine if aircraft is on a flight plan. If the aircraft is not on an IFR flight plan and is in VFR weather conditions, advise the pilot to remain VFR.

d. Alert the DF Net whenever one of the following conditions exists:

1. The pilot is lost.
2. An emergency is declared.

10–50d2 Note.—Alert the Net even if the aircraft is radar identified. It need not be alerted if a terminal controller has the aircraft in sight.

3. An ELT is heard or reported.

10–51 DF FIXING BY NET

When a DF Net is in operation, determine aircraft position as follows:

a. *TERMINAL:* Tell the aircraft to transmit for 10 seconds.

b. *TERMINAL:* Plot the bearings obtained from two or more stations. Inform the aircraft of its position.

10–51b Note.—The center, or the DF station designated as Net Control, is responsible for evaluating and plotting bearings received from individual stations.

10–51b Reference.—Order 7210.3, DF Net Control Position Operation, paragraph 8–32.

c. *EN ROUTE:* Plot cross bearing or other position data obtained from DF stations.

10–52 DF FIXING BY ONE FACILITY

TERMINAL

One DF facility can determine an aircraft's position by:

10–52 Note.—One station DF fixing is based on zero winds.

a. Plotting bearings from a reported VOR radial and an observed DF bearing.

b. Time method:

1. Determine the aircraft's heading and DF bearing.
2. Tell the aircraft to turn left or right, whichever requires the lesser amount of turn, to a heading perpendicular to the DF bearing.
3. After turn is completed, tell the aircraft to transmit (normally 10 seconds). Observe DF bearing.
4. One minute later, request another transmission. Determine bearing and turn aircraft toward DF site.
5. Divide the difference in bearings (steps 3 and 4) into 60. The result is the number of minutes the aircraft is from the DF site.

10–52b Example.—

Original bearing of 360 and aircraft heading of 200, the aircraft should be advised to turn right to a heading of 270. Observe bearing, wait 1 minute, and observe bearing. If the bearing (after completion of turn) was 337 and the second bearing was 325, a difference of 12, the aircraft is 5 minutes from the DF site.

c. Distance method:

1. Use the procedures specified in steps 1 through 4 in subparagraph 10–52b. Request the aircraft's true airspeed.
2. Compute the distance by dividing the bearing change (for 1 minute) into the TAS figure.

10–52c Example.—

140 (TAS) / (bearing change for 1 minute) = 14 miles from DF site.

10–53 VFR DF SERVICE

TERMINAL

a. Provide DF service to VFR aircraft when either of the following conditions exist:

1. The pilot requests the service.
2. You suggest the service and the pilot concurs.

b. After determining an aircraft's bearing, provide DF service by specifying direction of turn and magnetic heading to be flown after completion of turn.

c. Issue the following information to the aircraft:

1. Altimeter setting.
2. Pertinent information on known field conditions and the latest weather information at the destination airport.

d. Request the aircraft's heading and altitude.

Phraseology:

SAY HEADING AND ALTITUDE.

e. While receiving the reply, determine the bearing; then, inform the aircraft of the following:

1. Direction of turn.
2. Heading, spoken in three digits. (Do not state the word "degrees").
3. Nature of service.
4. Necessity to remain VFR.
5. Microphone technique.

6. Request for report when airport is in sight.

Phraseology:

TURN LEFT/RIGHT HEADING (degrees) FOR DF GUIDANCE TO (name of airport, fix, or location). MAINTAIN VFR AT ALL TIMES. WHEN A REQUEST FOR TRANSMISSION IS RECEIVED, PRESS YOUR MICROPHONE BUTTON FOR THE SPECIFIED NUMBER OF SECONDS,

and if appropriate,

REPORT (name) AIRPORT IN SIGHT.

f. Request the aircraft to transmit for specified periods, as required. The frequency of these requests will vary depending on such factors as wind, frequency congestion, and distance, but should be made at least once each minute until aircraft reports airport in sight or service is terminated.

Phraseology:

TRANSMIT (number—normally 10) SECONDS. TURN LEFT/RIGHT, HEADING (degrees),

or

CONTINUE HEADING (degrees).

g. Inform aircraft when DF service is terminated.

Phraseology:

DF SERVICE TERMINATED.

10–53g Note.—Service may be terminated when airport is in sight, the desired fix or location reached, practice steers or approaches are discontinued, etc.

10–53 Reference.—Emergency DF Approach Procedures, paragraph 10–54.

10–54 EMERGENCY DF APPROACH PROCEDURES

TERMINAL

a. Under emergency conditions where a standard instrument approach cannot be executed, provide DF guidance and instrument approach service as follows:

1. Obtain and relay ATC clearance including radio failure procedures.

2. Issue destination airport weather.

3. Provide guidance as specified in paragraph 10–53e, except delete the VFR requirement. To avoid large turns over the DF site, aircraft should be guided to pass over the DF site established on the course that it will maintain on the outbound leg of the approach.

Phraseology:

TURN LEFT/RIGHT HEADING (degrees) FOR DF GUIDANCE AND APPROACH TO THE (name) AIRPORT. MAINTAIN (altitude specified by ATC). WHEN A REQUEST FOR TRANSMISSION IS RECEIVED, PRESS YOUR MICROPHONE BUTTON FOR THE SPECIFIED NUMBER OF SECONDS. REPORT AIRPORT IN SIGHT. IF NO TRANSMISSIONS ARE RECEIVED FOR (time interval) PROCEED VFR. IF UNABLE, PROCEED (routing, fix and altitude as specified by ATC). CONTACT (facility) ON (frequency).

b. Inform the pilot when he is over the DF site, advise him to perform landing check, and provide guidance for outbound track.

Phraseology:

OVER DF SITE, PERFORM LANDING CHECK, CONTINUE HEADING (degrees),

or

TURN LEFT/RIGHT, HEADING (degrees).

c. Provide DF approach guidance in accordance with approved procedures.

10–54c Note 1.—Depending on the terrain factor, it may be necessary to include climb instructions in radio failure procedures.

10–54c Note 2.—Approved procedures are specified on Form 8260 or in specified military documents.

1. Triangle Approach Pattern.

(a) Time the outbound leg and issue descent information. Normally, the outbound track should be maintained for 3 minutes but this may be adjusted, depending on airspeed and nature of the emergency. Time intervals between bearing observations should not exceed 15 seconds.

Phraseology:

ON OUTBOUND LEG. DESCEND AND MAINTAIN (altitude specified).

(b) When outbound leg is completed, issue turn instructions so that the aircraft's course is perpendicular to the final approach course. Issue further descent information if so specified. Issue missed approach procedures as specified on FAA Form 8260–6.

Phraseology:

ON BASE LEG. IN CASE OF MISSED APPROACH, CLIMB TO (altitude) ON COURSE (degrees) WITHIN (number) MILES.

(c) At least two turns should be made onto final approach.

(d) When aircraft is on final approach, advise it to start descent and provide minimum descent altitude and field elevation information. Take bearings more frequently. Time intervals between bearing observations should not exceed 5 seconds during the estimated last 30 seconds of the approach.

Phraseology:

ON FINAL APPROACH, BEGIN DESCENT. MINIMUM DESCENT ALTITUDE (number of feet). FIELD ELEVATION (number of feet).

(e) If the aircraft misses approach, inform the appropriate control facility.

2. Teardrop Approach Pattern.

(a) Provide guidance to establish the aircraft on the outbound course. Issue descent information, if appropriate. Time intervals between bearing observations should not exceed 15 seconds.

(b) Issue direction of turn and inbound heading information. Issue missed approach procedures as specified.

(c) When procedure turn is complete, provide directional guidance and issue descent information.

Time intervals between bearing observations should not exceed 5 seconds during the estimated last 30 seconds of the approach.

(d) If aircraft misses approach, inform the appropriate control facility.

10–55 ACTION AFTER POSITION DETERMINATION

EN ROUTE

When the position of the aircraft has been determined, inform the pilot and provide any requested information, such as direction and distance to the nearest airport. If aircraft is operating in IFR weather conditions, clear the aircraft (if appropriate, authorize a DF facility to provide guidance) to an area where one of the following conditions exist:

a. VFR weather conditions are reported.

b. The aircraft can continue flight using NAVAID's or radar guidance.

c. Transition to an approach aid can be made and an instrument approach executed.

10–56 EMERGENCY DF APPROACH

EN ROUTE

Under emergency conditions where a standard instrument approach cannot be executed, clear an aircraft for DF guidance and instrument approach.

10–57 thru 10–59 RESERVED

Section 6. MISCELLANEOUS OPERATIONS

10–60 NAVY FLEET SUPPORT MISSIONS

When you receive information concerning an emergency to a U.S. Navy "Special Flight Number" aircraft, do the following:

a. Handle Navy Fleet Support Mission aircraft as follows:

1. *EN ROUTE:* Relay immediately, via collect telephone call, all pertinent information to Fleet Operations Control at Norfolk, Virginia, telephone 804–444–6602.

2. *TERMINAL:* Inform the nearest center of all the pertinent information.

b. Relay the words "Special Flight Number" followed by the number given as part of the routine IFR flight information.

c. Honor pilot requests for changes to route, altitude, and destination whenever possible.

10–61 EXPLOSIVE CARGO

TERMINAL

When you receive information that an emergency landing will be made with explosive cargo aboard, inform the pilot of the safest or least congested airport areas. Relay the explosive cargo information to:

a. The emergency equipment crew.

b. The airport management.

c. The appropriate military agencies when requested by the pilot.

10–62 thru 10–69 RESERVED

Section 7. OCEANIC EMERGENCY PROCEDURES

10–70 APPLICATION

The procedures in this section are to be used solely in oceanic airspace.

10–71 PHASES OF EMERGENCY

Emergency phases are described as follows:

a. Uncertainty Phase (INCERFA). When there is concern about the safety of an aircraft or its occupants, an INCERFA exists:

1. When communication from an aircraft has not been received within 30 minutes after the time a communication should have been received or after the time an unsuccessful attempt to establish communication with such aircraft was first made, whichever is earlier; or

2. When an aircraft fails to arrive within 30 minutes after the time of arrival last estimated by the pilot or by the ATC units, whichever is later.

b. Alert Phase (ALERFA). When there is apprehension about the safety of an aircraft and its occupants, an ALERFA exists:

1. Following the uncertainty phase when subsequent attempts to establish communications with the aircraft, or inquiries to other relevant sources, have failed to reveal any information about the aircraft; or

2. When information has been received which indicates that the operating efficiency of the aircraft has been impaired but not to the extent that a forced landing is likely; or

3. When communication from an aircraft has not been received within *60 minutes* after the time a communication should have been received or after the time an unsuccessful attempt to establish communication with such aircraft was first made, whichever is earlier.

c. Distress Phase (DETRESFA). When there is reasonable certainty that the aircraft and its occupants are threatened by grave and imminent danger, a DETRESFA exists:

1. Following the alert phase when further attempts to establish communications with the aircraft and more widespread inquiries are unsuccessful; or

2. When the fuel on board is considered to be exhausted or to be insufficient for the aircraft to reach safety; or

3. When information is received which indicates that the operating efficiency of the aircraft has been impaired to the extent that a forced landing is likely; or

4. When information is received or it is reasonably certain that the aircraft is about to make or has made a forced landing.

10–72 ALERTING SERVICE AND SPECIAL ASSISTANCE

a. Provide Alerting Service to:

1. All aircraft receiving ATC service;

2. All other aircraft which have filed a flight plan or which are otherwise known to the ATC unit; and

3. Any aircraft known or believed to be the subject of unlawful interference.

b. When Alerting Service is required, the responsibility for coordinating such service shall, unless otherwise established by letter of agreement, rest with the facility serving the flight information region (FIR) or control area (CTA):

1. Within which the aircraft was flying at the time of last air-ground radio contact; or

2. Which the aircraft was about to enter if the last air-ground contact was established at or close to the boundary; or

3. Within which the point of destination is located if the aircraft:

(a) Was not equipped with suitable two-way radio communications equipment; or

(b) Was not under obligation to transmit position reports.

10–72b3(b) Reference. - Chapter 8, Section 2.

c. The responsible Area Control Center (ACC) shall serve as the control point for:

1. Collecting all information relevant to a state of emergency of an aircraft;

2. Forwarding that information to the appropriate Rescue Coordination Center (RCC); and

3. Coordinating with other facilities concerned.

d. The responsibility of the ACC to provide Alerting Service for military aircraft may be waived upon a written or recorded request from a military agency. In this case, the military request must state that the military agency assumes full responsibility for their aircraft while the aircraft are operating in the oceanic airspace.

e. Responsibility to provide alerting service for flight operations conducted under the "due regard" or "operational" prerogative of military aircraft is assumed by the military. When "due regard" operations are scheduled to end with aircraft filed under ICAO procedures, the ACC may, if specified in a letter of agreement, assume responsibility for alerting service at proposed time filed.

f. In the event of INCERFA, ALERFA, or DETRESFA, notify the following:

1. When practicable, the aircraft operator.
2. The appropriate RCC.
3. Aeronautical stations having en route communications guard responsibilities at the point of departure, along or adjacent to the route of flight, and at the destination.
4. ACC's having jurisdiction over the proposed route of flight from the last reported position to the destination airport.

g. INCERFA, ALERFA, and DETRESFA messages shall include the following information, if available, in the order listed:

1. INCERFA, ALERFA, or DETRESFA according to the phase of the emergency.
2. Agency and person originating the message.
3. Nature of the emergency.
4. Significant flight plan information.
5. The air traffic unit which made the last radio contact, the time, and the frequency used.
6. The aircraft's last position report, how it was received, and what facility received it.
7. Color and distinctive marks of aircraft.
8. Any action taken by reporting office.
9. Other pertinent remarks.

h. An INCERFA phase ends with the receipt of any information or position report on the aircraft. Cancel the INCERFA by a message addressed to the same stations as the INCERFA message.

1. An ALERFA ends when:

(a) Evidence exists that would ease apprehension about the safety of the aircraft and its occupants; or

(b) The concerned aircraft lands. Cancel the ALERFA message by a message addressed to the same stations as the ALERFA message.

2. A DETRESFA ends when the:

(a) Aircraft successfully lands; or

(b) RCC advises of a successful rescue; or

(c) RCC advises of termination of Search and Rescue (SAR) activities. Cancel the DETRESFA by a message addressed to the same stations as the DETRESFA message.

i. A separate chronological record should be kept on each ALERFA and DETRESFA together with a chart which displays the projected route of the aircraft, position reports received, route of interceptor aircraft, and other pertinent information.

10–73 IN-FLIGHT CONTINGENCIES

a. If an aircraft over water requests weather, sea conditions, ditching information, and/or assistance from surface vessels, or if the controller feels that this information may be necessary for aircraft safety, it should be requested from the RCC. Also, an appropriate AMVER SURPIC should be asked for if requested by the aircraft or deemed beneficial by control personnel.

10–73a Note. —The Automated Mutual-Assistance Vessel Rescue System (AMVER) center can deliver, in a manner of minutes, a Surface Picture (SURPIC) of vessels in the area of a SAR incident, including their predicted positions and their characteristics.

10–73a Reference. — Emergency Descent, 10–73c.

b. In all cases of aircraft ditching, the airspace required for SAR operations shall be determined by the RCC. The ACC shall block that airspace until the RCC advises the airspace is no longer required. An International Notice to Airmen (NOTAM) shall be issued describing the airspace affected.

c. The following actions will be taken in the event an aircraft must make an emergency descent:

1. In the event an aircraft requests an emergency descent:

(a) Issue a clearance to the requested altitude if approved separation can be provided.

(b)Advise the aircraft of the traffic, and request its intentions if traffic prevents an unrestricted descent.

Phraseology:
ATC ADVISES (aircraft identification) UNABLE TO APPROVE UNRESTRICTED DESCENT. TRAFFIC (traffic information). REQUEST INTENTIONS.

2. In the event an aircraft is making or will make an emergency descent without a clearance:

(a) Advise other aircraft of the emergency descent.

Phraseology:
ATC ADVISES (aircraft identification/ALL AIRCRAFT) BE ALERT FOR EMERGENCY DESCENT IN THE VICINITY OF (latitude/longitude) FROM (altitude/FL) TO (altitude/FL).

(b) Advise other aircraft when the emergency descent is complete.

Phraseology:
(Aircraft identification/ALL AIRCRAFT) EMERGENCY DESCENT AT (location) COMPLETED.

3. Upon notification that an aircraft is making an emergency descent through other traffic, take action immediately to safeguard all aircraft concerned.

4. When appropriate, broadcast by ATC communications, by radio navigation aids, and/or through aeronautical communication stations/services an emergency message to all aircraft in the vicinity of the descending aircraft. Include the following information:

(a) Location of emergency descent.

(b) Direction of flight.

(c) Type aircraft.

(d) Route if appropriate.

(e) Altitude vacated.

(f) Other information.

10–73c4 Example.—

"ATTENTION ALL AIRCRAFT IN THE VICINITY OF TROUT, A NORTHBOUND D-C TEN ON A-T-S ROUTE ALFA SEVEN HUNDRED IS MAKING AN EMERGENCY DESCENT FROM FLIGHT LEVEL THREE THREE ZERO." **(Repeat as you deem appropriate.)**

5. If traffic conditions permit, provide traffic information to the affected aircraft.

6. Immediately after an emergency broadcast or traffic information has been made, issue appropriate clearances or instructions, as necessary, to all aircraft involved.

10–74 SERVICES TO RESCUE AIRCRAFT

a. Provide standard IFR separation between the search and rescue aircraft and the aircraft in distress, except that when visual or radar contact has been established by the search and rescue aircraft and the pilots of both aircraft concur, IFR separation may be discontinued.

b. Clear the search and rescue aircraft to a fixed clearance limit rather than to the aircraft in distress, which is a moving fix. Issue route clearances that are consistent with that of the distressed aircraft.

c. Advise the rescue aircraft, as soon as practicable, of any factors that could adversely affect its mission; e.g., unfavorable weather conditions, anticipated problems, the possibility of not being able to approve an IFR descent through en route traffic, etc.

d. Advise the appropriate rescue agency of all pertinent information as it develops.

e. Forward immediately any information about the action being taken by the RCC, other organizations, or aircraft to the aircraft concerned.

f. Advise the aircraft operator of the current status of the search and rescue operation as soon as practicable.

g. Since prompt, correct, and complete information is the key to successful rescue operations, ensure that this information is swiftly and smoothly supplied to those organizations actively engaged in rescue operations.

10–75 thru 10–79 RESERVED

Section 8. GROUND MISSILE EMERGENCIES

10–80 INFORMATION RELAY

When you receive information concerning a ground missile emergency, notify other concerned facilities and take action to have alerting advisories issued by:

a. *EN ROUTE:* Air carrier company radio stations for each VFR company aircraft which is or will be operating in the vicinity of the emergency.

b. *EN ROUTE:* FSS's adjacent to the emergency location.

c. *TERMINAL:* Relay all information concerning a ground missile emergency to the center within whose area the emergency exists and disseminate as an NOTAM.

10–80c Reference.—Pilot/Controller Glossary, Notice to Airmen.

10–81 IFR AND SPECIAL VFR MINIMA

Reroute IFR and Special VFR aircraft as necessary to avoid the emergency location by one of the following minima or by greater minima when suggested by the notifying official:

a. Lateral separation—*1 mile* between the emergency location and either of the following:

1. An aircraft under radar control and the emergency location which can be accurately determined by reference to the radar scope.

2. The airspace to be protected for the route being flown.

b. Vertical separation—*6,000 feet* above the surface over the emergency location.

10–82 VFR MINIMA

Advise all known VFR aircraft which are, or will be, operating in the vicinity of a ground missile emergency to avoid the emergency location by 1 mile laterally or 6,000 feet vertically, or by a greater distance or altitude when suggested by the notifying official.

10–83 SMOKE COLUMN AVOIDANCE

Advise all aircraft to avoid any observed smoke columns in the vicinity of a ground missile emergency.

10–84 EXTENDED NOTIFICATION

EN ROUTE

When reports indicate that an emergency will exist for an extended period of time, a Notice to Airmen may be issued.

Chapter 11. TRAFFIC MANAGEMENT PROCEDURES

Section 1. GENERAL

11–1 DUTY RESPONSIBILITY

ATCS's shall:

a. Ensure that traffic management initiatives are complied with and enforced within his/her area of responsibility.

b. Advise the area supervisor when restrictions appear to be ineffective, overly restrictive, or no longer valid.

c. Not approve or authorize route changes, change proposal times (P-times) for aircraft that are participants in a traffic management program (e.g., EDCT times) predicated on a specific arrival time which would be distorted by a route change unless prior coordination with the TMC has been accomplished and approved.

11–1c Note.— A traffic management restriction does not have priority over control actions. A control action is defined as a response by a controller to ensure separation or the procedural integrity of the sector.

11–2 thru 11–9 RESERVED

Section 2. PREFERRED ROUTES

11–10 OPERATIONAL PROCEDURES

a. General

1. The use of preferred routes is voluntary. There is no regulation requiring the use of the preferred route system. However, if a pilot/operator files for or requests a route other than a preferred route, the route requested should be assigned whenever possible, consistent with traffic flows. It should be recognized that portions of preferred routes will likely be requested.

2. Comments concerning operational problems or recommendations to improve the preferred IFR route program are encouraged and should be forwarded to the ATCSCC.

b. Reroutes.

1. Aircraft reroutes are used primarily to avoid areas of constraint within the NAS and/or to refine traffic flows as operational needs dictate. Constraints are generally caused by severe weather, facility outages, and/or sector workloads.

2. Upon receipt of information that traffic flows have been or are expected to be impacted by a system constraint and that significant delays will result, the ATCSCC shall:

(a) Conference the affected facility(s) to:

(1) Determine the degree of system impact and the time the system is expected to return to normal.

(2) Formulate an operational plan and coordinate alternate routes and restrictions.

(b) Transmit an ATCSCC advisory describing condition, operational plan, alternate routes, and, if appropriate, the time normal routes will be resumed.

(c) Obtain the identifications of two or more deviating flights on weather related route closures when an alternate route will result in a significantly longer flight time.

(d) Conduct telephone conferences, as appropriate, with facilities and users to notify them of the operational plan's status and to seek pathfinders to reopen weather-closed routes.

(e) Continue an ongoing coordination with the affected facility(s) to determine the need to modify or cancel the operational plan until the condition no longer impacts the NAS.

3. When the condition no longer impacts the NAS, the ATCSCC shall transmit an ATCSCC advisory stating that the condition is no longer impacting the system and that normal traffic flows may resume.

11–11 thru 11–19 RESERVED

Section 3. SECTOR TRAFFIC MANAGEMENT PROGRAM (STMP)

11–20 PURPOSE

a. The Sector Traffic Management Program (STMP) provides a dynamic and real-time assessment process for identifying and subsequently managing operational acceptable levels of traffic (OALT).

b. The overall effectiveness of the STMP is dependent upon:

1. Ongoing vigilance of sectors for any potential of exceeding the OALT.
2. Analysis of historical data to obtain reliable predictions of traffic demand.
3. Monitoring of real-time sector loading.
4. Timely implementation of traffic management programs to ensure OALT.
5. Constant updating of system demands to revise traffic management programs as warranted.

11–21 IMPLEMENTATION PROCEDURES

a. When a determination has been made that a sector has exceeded or it is anticipated that a sector will exceed the OALT, the ATCSCC shall:

1. Conference the affected facilities and develop an operational plan, giving consideration to the impact on other facilities and users.
2. Transmit an ATCSCC advisory indicating the type of restriction (e.g., reroute, expanded in-trail, ground delay, or ground stop), the reason for the restriction, the time the restriction is in effect, and the length of delay expected.
3. Continue ongoing coordination with affected facilities to determine the need for increasing/decreasing the restrictions or for extending/canceling the program.
4. Utilize the ASD to monitor activity levels within the sector(s) involved.

b. As the demand decreases below the OALT, the ATCSCC should:

1. Conference the affected facilities and coordinate a plan for returning to normal traffic flows.
2. Transmit an ATCSCC advisory canceling restrictions.

11–22 thru 11–29 RESERVED

Section 4. WEATHER

11–30 SEVERE WEATHER MANAGEMENT

a. The air traffic system is susceptible to thunderstorm activity between April and October on a national basis. Thunderstorms create a major disruption to the normal and organized movement of air traffic and significantly increase the workload in an impacted facility. To meet this challenge, ATM has charged the ATCSCC to set aside a cadre of traffic management coordinators to deal directly and independently with severe weather problem areas.

b. Facility TMU's, when coordinating with the ATCSCC, should ask for the "severe weather coordinator" for matters pertaining to severe weather internally or in adjacent airspace. All other matters shall be coordinated with the TMC assigned to that specific area.

b. The ATCSCC shall be the final approving authority for alternate routes and restrictions that transcend center or terminal boundaries.

11–31 SEVERE WEATHER AVOIDANCE PLAN (SWAP)

a. The ARTCC STMC/TMCIC shall:

1. Coordinate with the ATCSCC when implementing SWAP procedures that affect other ARTCC's. If possible, this coordination should be completed at least 2 hours prior to implementation. This will permit the ATCSCC to notify adjacent facilities and users as to when the SWAP will be implemented.

2. Notify affected facilities within the ARTCC area of responsibility when the SWAP will be implemented. Include restrictions, reroutes, and affected times.

3. Coordinate with the area supervisor and the terminal facility to terminate the use of silent clearances for specific aircraft, informing the terminal facility of the sector to call for clearance.

4. Furnish the sector issuing the revised clearance a route of flight to a point where the new route connects with the filed route.

b. Air traffic facilities may be called upon to favor and accept traffic flows that are not normally routed through their area. In the interest of a balanced flow of traffic and to provide the highest level of service, air traffic facilities shall accept this alternate flow. At times, the alternate flow must be favored over internally generated traffic. The ATCSCC severe weather management position will make those system decisions. ATCSCC coordinators assigned to the severe weather management position shall:

1. Obtain a severe weather analysis from the CFWSU and discuss the findings with the appropriate TMU.

2. Conference all affected facilities and apprise them of forecasted severe weather conditions and the routes or areas that will be impacted.

3. Formulate a dynamic severe weather operational plan. Coordinate traffic flow restrictions and alternate routes with all affected facilities.

4. Use, to the extent possible, the following options in the following sequence when developing an operational plan:

(a) Expanded miles-in-trail restrictions.

(b) Reroutes.

(c) Ground delay programs.

5. Be the final approving authority for traffic flows and reroutes.

6. Obtain two or more aircraft identifications of deviating flights when closure of that route will result in a significantly longer reroute.

7. Transmit advisories with the heading "Special Weather Advisory" that describe the existing or forecasted weather conditions, the operational plan, and the alternate routes.

8. Conduct telephone conferences, as appropriate, with facilities and users to apprise them of the operational plan's status and to seek pathfinders to reopen routes.

9. Continue ongoing coordination with affected facilities until the severe weather no longer impacts the air traffic system.

c. The ATCSCC STMC shall be the approving authority for ground delay programs in support of the severe weather management operational plan.

d. When traffic management programs are implemented for a sector(s) within the ARTCC, periodic evaluations shall be conducted to ensure program effectiveness. This should be accomplished through monitoring of the sector(s) via direct observation ("See All" function or ASD). Adjustments to the program should be made when warranted.

e. The STMC/TMCIC shall notify the ATCSCC and affected facilities within the ARTCC's area of responsibility when normal routings can be resumed. ATCSCC will send advisories reopening weather impacted routes.

11–32 thru 11–39 RESERVED

Section 5. ARRIVAL SEQUENCING PROGRAM (ASP)

11–40 CONCEPT

The objective of the arrival sequencing program (ASP) concept is to allow aircraft to absorb arrival delays based upon the current airport acceptance rate (AAR) during the en route phase of flight under more fuel-efficient conditions and then feed them into the airport in a preplanned sequence. To apply this concept efficiently and accurately, the arrival traffic must be consistently routed into the terminal area via designated metering routes (normalized flight paths) consisting of an outer fix, meter fix, and a predetermined route to the active runway.

11–41 OPERATIONAL PROCEDURES

a. En Route.

1. Procedures shall be provided for continuous monitoring of the arrival demand for a metered airport. Additional criteria shall be developed to measure the arrival demand and determine the point at which metering will be initiated. It is suggested that criteria be developed based on a specific percentage of the current AAR with projects indicating that demand will be sustained or increased over a specified length of time.

2. When the metering criteria has been met, the TMC shall:

(a) Inform the terminal flow position when metering will go into operation.

(b) Inform the appropriate en route arrival sectors that metering is in progress and local metering procedures are in effect until further notice.

3. The center TMC's shall accommodate terminal requests for manual slot times as much as possible.

4. The en route arrival controller shall make every effort to apply the slot times per aircraft as provided by the TMC or displayed via his/her PVD advisory list.

11–41a4 Note.— The facility is encouraged to establish a "plus or minus" parameter to be applied by the controller in meeting slot times. It is recommended that the parameter not exceed 1 minute, effectively providing a 2–minute window based upon the meter fix slot time.

5. To ensure consistently accurate vertex times, procedures should be developed to encourage controllers to maintain FLAT tracking status on all metered flights beginning as soon as track control is acquired by the host center.

11–41a5 Note.— Times for tracks in the FLAT tracking mode are continually updated by the ASP processor to provide the most accurate times possible for metering processing. The ASP processor is not currently capable of similarly refining the times of FREE tracks and, therefore, must resort to flight plan times.

b. Terminal.

1. Procedures shall be developed to allow the traffic management position to dynamically construct an accurate AAR.

2. Coordination between the terminal and the center shall be effected to determine the guidelines on the conditions and the sizes of AAR changes that would be considered significant to the ASP program and necessitate the updating of the AAR with the center. Coordination of the AAR with the center shall be consistent with those guidelines.

3. When metering is in progress, controllers shall conform to the optimum flight paths within the limits of good operating practices. If controllers are periodically unable to conform to these routes, it usually indicates that the AAR may need to be changed. If this occurs routinely, a formal change to that particular flight path is indicated.

Chapter 12. CANADIAN AIRSPACE PROCEDURES

Section 1. GENERAL CONTROL

12–1 APPLICATION

Where control responsibility within Canadian airspace has been formally delegated to the FAA by the Transport Canada Aviation Group, apply basic FAA procedures except for the Canadian procedures contained in this Chapter.

12–1 Note.—In 1985, the United States and Canada established an agreement recognizing the inherent safety of the air traffic control procedures exercised by the other country. This agreement permits the use of air traffic control procedures of one country when that country is exercising air traffic control in the airspace over the territory of the other country insofar as they are not inconsistent with, or repugnant to, the laws and regulations or unique operational requirements of the country over whose territory such airspace is located. Accordingly, this Chapter was revised to include only those Canadian procedures that must be used because of a Canadian regulatory requirement. Additionally, this Chapter contains procedures which have no regulatory impact, but which must be adopted because FAA procedures do not accommodate unique Canadian operational requirements.

12–2 AIRSPACE CLASSIFICATION

a. *Class A Airspace*—Controlled airspace within which only IFR flights are permitted. All controlled high level airspace at and below FL 600.

b. *Class B Airspace*—Controlled airspace within which only IFR and Controlled VFR (CVFR) flights are permitted. Includes all controlled low level airspace above 12,500 feet ASL or the minimum en route IFR altitude, whichever is higher. ATC procedures pertinent to IFR flights shall be applied to CVFR aircraft. Do not apply visual separation or VFR-on-Top/1,000-on-top clearance.

12–2b Note.—The CVFR pilot is responsible to maintain VFR flight and visual reference to the ground at all times.

c. *Class C Airspace*—Controlled airspace within which both IFR and VFR flights are permitted, but VFR flights require a clearance from ATC to enter.

d. *Class D Airspace*—Controlled airspace within which both IFR and VFR flights are permitted, but VFR flights do not require a clearance from ATC to enter.

e. *Class E Airspace*—Airspace within which IFR and VFR flights are not subject to control.

f. *Class F Airspace*—Airspace of defined dimensions within which activities must be confined because of their nature, or within which limitations are imposed upon aircraft operations that are not a part of those activities, or both.

12–3 ONE THOUSAND-ON-TOP

Clear an aircraft to maintain "at least 1,000 feet-on-top" in lieu of "VFR-on-top," provided:

a. The pilot requests it.

12–3a Note.—It is the pilot's responsibility to ensure that the requested operation can be conducted above all cloud, haze, smoke, or other formation, with a flight visibility of 3 miles or more. A pilot's request can be considered as confirmation that conditions are adequate.

b. The pilot will not operate within Class A or Class B airspace.

12–4 SEPARATION

Apply a lateral, longitudinal, or vertical separation minimum between aircraft operating in accordance with an IFR or CVFR clearance regardless of the weather conditions.

12–5 DEPARTURE CLEARANCE/ COMMUNICATION FAILURE

a. Base controller action regarding radio failures in Canadian Airspace on the requirement for pilots to comply with Canadian Airspace Regulations, which are similar to FAR 91.185; however, the following major difference shall be considered when planning control actions. Except when issued alternate radio failure instructions by ATC, pilots will adhere to the following: if flying a turbine-powered (turboprop or turbojet) aircraft and cleared on departure to a point other than the destination, proceed to the destination airport in accordance with the flight plan, maintaining the last assigned altitude or flight level or the minimum en route IFR altitude, whichever is higher, until 10 minutes beyond the point specified in the clearance (clearance limit), and then proceed at altitude/s or flight level/s filed in the flight plan. When the aircraft will enter United States' airspace within 10 minutes after passing the clearance limit, the climb to the flight planned border crossing altitude is to be commenced at the estimated time of crossing the Canadian/United States boundary.

12–6 PARACHUTE JUMPING

Do not authorize parachute jumping without prior permission from the appropriate Canadian authority.

12–6 Note.—Canadian regulations require written authority from the Ministry of Transport.

12–7 SPECIAL VFR (SVFR)

12–7 Note.—Canadian pilots do not have to be instrument rated to fly SVFR at night, nor do the aircraft have to be equipped for IFR flight.

a. Within a control zone where there is an airport controller on duty, approve or refuse a tower's request for SVFR on the basis of current or anticipated IFR traffic only. If approved, specify the period of time during which SVFR flight is permitted.

b. Within a control zone where there is no airport controller on duty, authorize or refuse an aircraft's request for SVFR on the basis of:

1. Current or anticipated IFR traffic, and
2. Official ceiling and visibility reports.

c. Canadian Special VFR weather minimums for:

1. Aircraft other than helicopters—

(a) Ceiling 500 feet and 3 miles visibility, or

(b) Ceiling 600 feet and 2 miles visibility, or

(c) Ceiling 700 feet and 1 mile visibility.

2. Helicopters—Ceiling 300 feet and 1 mile visibility.

PILOT/CONTROLLER GLOSSARY

This Glossary was compiled to promote a common understanding of the terms used in the Air Traffic Control system. It includes those terms which are intended for pilot/controller communications. Those terms most frequently used in pilot/controller communications are printed in ***bold italics***. The definitions are primarily defined in an operational sense applicable to both users and operators of the National Airspace System. Use of the Glossary will preclude any misunderstandings concerning the system's design, function, and purpose.

Because of the international nature of flying, terms used in the *Lexicon,* published by the International Civil Aviation Organization (ICAO), are included when they differ from FAA definitions. These terms are followed by "[ICAO]". For the reader's convenience, there are also cross references to related terms in other parts of the Glossary and to other documents, such as the Federal Aviation Regulations (FAR's) and the Airman's Information Manual (AIM).

This Glossary will be revised, as necessary, to maintain a common understanding of the system.

A

AAI—(See ARRIVAL AIRCRAFT INTERVAL).

AAR—(See AIRPORT ACCEPTANCE RATE).

ABBREVIATED IFR FLIGHT PLANS—An authorization by ATC requiring pilots to submit only that information needed for the purpose of ATC. It includes only a small portion of the usual IFR flight plan information. In certain instances, this may be only aircraft identification, location, and pilot request. Other information may be requested if needed by ATC for separation/control purposes. It is frequently used by aircraft which are airborne and desire an instrument approach or by aircraft which are on the ground and desire a climb to VFR-on-top.

(See VFR-ON-TOP). (Refer to AIM).

ABEAM—An aircraft is "abeam" a fix, point, or object when that fix, point, or object is approximately 90 degrees to the right or left of the aircraft track. Abeam indicates a general position rather than a precise point.

ABORT—To terminate a preplanned aircraft maneuver; e.g., an aborted takeoff.

ACC [ICAO]—(See AREA CONTROL CENTER).

ACCELERATE–STOP DISTANCE AVAILABLE—The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff

ACCELERATE–STOP DISTANCE AVAILABLE [ICAO]—The length of the take–off run available plus the length of the stopway if provided.

ACDO—(See AIR CARRIER DISTRICT OFFICE).

ACKNOWLEDGE—Let me know that you have received my message.

(See ICAO term ACKNOWLEDGE).

ACKNOWLEDGE [ICAO]—Let me know that you have received and understood this message.

ACLS—(See AUTOMATIC CARRIER LANDING SYSTEM).

ACLT—(See ACTUAL CALCULATED LANDING TIME).

ACROBATIC FLIGHT—An intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration not necessary for normal flight.

(Refer to Part 91). (See ICAO term ACROBATIC FLIGHT).

ACROBATIC FLIGHT [ICAO]—Manoeuvres intentionally performed by an aircraft involving an abrupt change in its attitude, an abnormal attitude, or an abnormal variation in speed.

ACTIVE RUNWAY—(See RUNWAY IN USE/ACTIVE RUNWAY/DUTY RUNWAY).

ACTUAL CALCULATED LANDING TIME—ACLT is a flight's frozen calculated landing time. An actual time determined at freeze calculated landing time (FCLT) or meter list display interval (MLDI) for the adapted vertex for each arrival aircraft based upon runway configuration, airport acceptance rate, airport arrival delay period, and other metered arrival aircraft. This time is either the vertex time of arrival (VTA) of the aircraft or the tentative calculated landing time (TCLT)/ACLT of the previous aircraft plus the arrival aircraft interval (AAI), whichever is later. This time will not be updated in response to the aircraft's progress.

ADDITIONAL SERVICES—Advisory information provided by ATC which includes but is not limited to the following:

1. Traffic advisories.
2. Vectors, when requested by the pilot, to assist aircraft receiving traffic advisories to avoid observed traffic.
3. Altitude deviation information of 300 feet or more from an assigned altitude as observed on a verified (reading correctly) automatic altitude readout (Mode C).
4. Advisories that traffic is no longer a factor.
5. Weather and chaff information.
6. Weather assistance.
7. Bird activity information.
8. Holding pattern surveillance. Additional services are provided to the extent possible contingent only upon the controller's capability to fit them into the performance of higher priority duties and on the basis of limitations of the radar, volume of traffic, frequency congestion, and controller workload. The controller has complete discretion for determining if he is able to provide or continue to provide a service in a particular case. The controller's reason not to provide or continue to provide a service in a particular case is not subject to question by the pilot and need not be made known to him.

(See TRAFFIC ADVISORIES). (Refer to AIM).

ADF—(See AUTOMATIC DIRECTION FINDER).

ADIZ—(See AIR DEFENSE IDENTIFICATION ZONE).

ADLY—(See ARRIVAL DELAY).

ADMINISTRATOR—The Federal Aviation Administrator or any person to whom he has delegated his authority in the matter concerned.

ADVISE INTENTIONS—Tell me what you plan to do.

ADVISORY—Advice and information provided to assist pilots in the safe conduct of flight and aircraft movement.
(See ADVISORY SERVICE).

ADVISORY FREQUENCY—The appropriate frequency to be used for Airport Advisory Service.
(See LOCAL AIRPORT ADVISORY). (See UNICOM). (Refer to ADVISORY CIRCULAR NO. 90-42). (Refer to AIM).

ADVISORY SERVICE—Advice and information provided by a facility to assist pilots in the safe conduct of flight and aircraft movement.
(See LOCAL AIRPORT ADVISORY). (See TRAFFIC ADVISORIES). (See SAFETY ALERT). (See ADDITIONAL SERVICES). (See RADAR ADVISORY). (See EN ROUTE FLIGHT ADVISORY SERVICE). (Refer to AIM).

AERIAL REFUELING—A procedure used by the military to transfer fuel from one aircraft to another during flight.
(Refer to VFR/IFR Wall Planning Charts).

AERODROME—A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure, and movement of aircraft.

AERODROME BEACON [ICAO]—Aeronautical beacon used to indicate the location of an aerodrome from the air.

AERODROME CONTROL SERVICE [ICAO]—Air traffic control service for aerodrome traffic.

AERODROME CONTROL TOWER [ICAO]—A unit established to provide air traffic control service to aerodrome traffic.

AERODROME ELEVATION [ICAO]—The elevation of the highest point of the landing area.

AERODROME TRAFFIC CIRCUIT [ICAO]—The specified path to be flown by aircraft operating in the vicinity of an aerodrome.

AERONAUTICAL BEACON—A visual NAVAID displaying flashes of white and/or colored light to indicate the location of an airport, a heliport, a landmark, a certain point of a Federal airway in mountainous terrain, or an obstruction.
(See AIRPORT ROTATING BEACON). (Refer to AIM).

AERONAUTICAL CHART—A map used in air navigation containing all or part of the following: Topographic features, hazards and obstructions, navigation aids, navigation routes, designated airspace, and airports. Commonly used aeronautical charts are:

1. Sectional Aeronautical Charts (1:500,000). Designed for visual navigation of slow or medium speed aircraft. Topographic information on these charts features the portrayal of relief and a judicious selection of visual check points for VFR flight. Aeronautical information includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data.
2. VFR Terminal Area Charts (1:250,000). Depict [redacted] which provides for the control or segregation of all the aircraft within [redacted]. The chart depicts topographic information and aeronautical information which includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data.
3. World Aeronautical Charts (WAC) (1:1,000,000). Provide a standard series of aeronautical charts covering land areas of the world at a size and scale convenient for navigation by moderate speed aircraft. Topographic information includes cities and towns, principal roads, railroads, distinctive landmarks, drainage, and relief. Aeronautical information includes visual and radio aids to navigation, airports, airways, restricted areas, obstructions, and other pertinent data.
4. En Route Low Altitude Charts. Provide aeronautical information for en route instrument navigation (IFR) in the low altitude stratum. Information includes the portrayal of airways, limits of controlled airspace, position identification and frequencies of radio aids, selected airports, minimum en route and minimum obstruction clearance altitudes, airway distances, reporting points, restricted areas, and related data. Area charts, which are a part of this series, furnish terminal data at a larger scale in congested areas.
5. En Route High Altitude Charts. Provide aeronautical information for en route instrument navigation (IFR) in the high altitude stratum. Information includes the portrayal of jet routes, identification and frequencies of radio aids, selected airports, distances, time zones, special use airspace, and related information.
6. Instrument Approach Procedures (IAP) Charts. Portray the aeronautical data which is required to execute an instrument approach to an airport. These charts depict the procedures, including all related data, and the airport diagram. Each procedure is designated for use with a specific type of electronic navigation system including NDB, TACAN, VOR, ILS/MLS, and RNAV. These charts are identified by the type of navigational aid(s) which provide final approach guidance.
7. Standard Instrument Departure (SID) Charts. Designed to expedite clearance delivery and to facilitate transition between takeoff and en route operations. Each SID procedure is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.
8. Standard Terminal Arrival (STAR) Charts. Designed to expedite air traffic control arrival procedures and to facilitate transition between en route and instrument approach operations. Each STAR procedure is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.

9. Airport Taxi Charts. Designed to expedite the efficient and safe flow of ground traffic at an airport. These charts are identified by the official airport name; e.g., Washington National Airport.

(See ICAO term AERONAUTICAL CHART).

AERONAUTICAL CHART [ICAO]—A representation of a portion of the earth, its culture and relief, specifically designated to meet the requirements of air navigation.

AERONAUTICAL INFORMATION PUBLICATION [AIP] [ICAO]—A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

A/FD—(See AIRPORT/FACILITY DIRECTORY).

AFFIRMATIVE—Yes.

AIM—(See AIRMAN'S INFORMATION MANUAL).

AIP [ICAO]—(See AERONAUTICAL INFORMATION PUBLICATION).

AIRBORNE DELAY—Amount of delay to be encountered in airborne holding.

AIR CARRIER DISTRICT OFFICE—An FAA field office serving an assigned geographical area, staffed with Flight Standards personnel serving the aviation industry and the general public on matters related to the certification and operation of scheduled air carriers and other large aircraft operations.

AIRCRAFT—Device(s) that are used or intended to be used for flight in the air, and when used in air traffic control terminology, may include the flight crew.

(See ICAO term AIRCRAFT).

AIRCRAFT [ICAO]—Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

AIRCRAFT APPROACH CATEGORY—A grouping of aircraft based on a speed of 1.3 times the stall speed in the landing configuration at maximum gross landing weight. An aircraft shall fit in only one category. If it is necessary to maneuver at speeds in excess of the upper limit of a speed range for a category, the minimums for the next higher category should be used. For example, an aircraft which falls in Category A, but is circling to land at a speed in excess of 91 knots, should use the approach Category B minimums when circling to land. The categories are as follows:

1. Category A. Speed less than 91 knots.
2. Category B. Speed 91 knots or more but less than 121 knots.
3. Category C. Speed 121 knots or more but less than 141 knots.
4. Category D. Speed 141 knots or more but less than 166 knots.
5. Category E. Speed 166 knots or more.

(Refer to Part 1). (Refer to Part 97).

AIRCRAFT CLASSES—For the purposes of Wake Turbulence Separation Minima, ATC classifies aircraft as Heavy, Large, and Small as follows:

1. Heavy. Aircraft capable of takeoff weights of 300,000 pounds or more whether or not they are operating at this weight during a particular phase of flight.
2. Large. Aircraft of more than 12,500 pounds, maximum certificated takeoff weight, up to 300,000 pounds.
3. Small. Aircraft of 12,500 pounds or less maximum certificated takeoff weight.

(Refer to AIM).

AIRCRAFT SITUATION DISPLAY—ASD is a computer system that receives radar track data from all 20 CONUS ARTCC's, organizes this data into a mosaic display, and presents it on a computer screen. The display allows the traffic management coordinator multiple methods of selection and high-lighting of individual aircraft or groups of aircraft. The user has the option of superimposing these aircraft positions over any number of background displays. These background options include ARTCC boundaries, any stratum of en route sector boundaries, fixes, airways, military and other special use airspace, airports, and geopolitical boundaries. By using the ASD, a coordinator can monitor any number of traffic situations or the entire systemwide traffic flows.

AIRCRAFT SURGE LAUNCH AND RECOVERY—Procedures used at USAF bases to provide increased launch and recovery rates in instrument flight rules conditions. ASLAR is based on:

a. Reduced separation between aircraft which is based on time or distance. Standard arrival separation applies between participants including multiple flights until the DRAG point. The DRAG point is a published location on an ASLAR approach where aircraft landing second in a formation slows to a predetermined airspeed. The DRAG point is the reference point at which MARSA applies as expanding elements effect separation within a flight or between subsequent participating flights.

b. ASLAR procedures shall be covered in a Letter of Agreement between the responsible USAF military ATC facility and the concerned Federal Aviation Administration facility. Initial Approach Fix spacing requirements are normally addressed as a minimum.

AIR DEFENSE EMERGENCY—A military emergency condition declared by a designated authority. This condition exists when an attack upon the continental U.S., Alaska, Canada, or U.S. installations in Greenland by hostile aircraft or missiles is considered probable, is imminent, or is taking place.

(Refer to AIM).

AIR DEFENSE IDENTIFICATION ZONE—The area of airspace over land or water, extending upward from the surface, within which the ready identification, the location, and the control of aircraft are required in the interest of national security.

1. Domestic Air Defense Identification Zone. An ADIZ within the United States along an international boundary of the United States.
2. Coastal Air Defense Identification Zone. An ADIZ over the coastal waters of the United States.
3. Distant Early Warning Identification Zone (DEWIZ). An ADIZ over the coastal waters of the State of Alaska.

ADIZ locations and operating and flight plan requirements for civil aircraft operations are specified in Part 99.

(Refer to AIM).

AIRMAN'S INFORMATION MANUAL—A primary FAA publication whose purpose is to instruct airmen about operating in the National Airspace System of the U.S. It provides basic flight information, ATC Procedures and general instructional information concerning health, medical facts, factors affecting flight safety, accident and hazard reporting, and types of aeronautical charts and their use.

AIRMAN'S METEOROLOGICAL INFORMATION—(See AIRMET).

AIRMET—In-flight weather advisories issued only to amend the area forecast concerning weather phenomena which are of operational interest to all aircraft and potentially hazardous to aircraft having limited capability because of lack of equipment, instrumentation, or pilot qualifications. AIRMET's concern weather of less severity than that covered by SIGMET's or Convective SIGMET's. AIRMET's cover moderate icing, moderate turbulence, sustained winds of 30 knots or more at the surface, widespread areas of ceilings less than 1,000 feet and/or visibility less than 3 miles, and extensive mountain obscurement.

(See AWW). (See SIGMET). (See CONVECTIVE SIGMET). (See CWA). (Refer to AIM).

AIR NAVIGATION FACILITY—Any facility used in, available for use in, or designed for use in, aid of air navigation, including landing areas, lights, any apparatus or equipment for disseminating weather information, for signaling, for radio-directional finding, or for radio or other electrical communication, and any other structure or mechanism having a similar purpose for guiding or controlling flight in the air or the landing and take-off of aircraft.

(See NAVIGATIONAL AID).

AIRPORT—An area on land or water that is used or intended to be used for the landing and takeoff of aircraft and includes its buildings and facilities, if any.

AIRPORT ACCEPTANCE RATE—A dynamic input parameter specifying the number of arriving aircraft which an airport or airspace can accept from the ARTCC per hour. The AAR is used to calculate the desired interval between successive arrival aircraft.

AIRPORT ADVISORY AREA—The area within ten miles of an airport without a control tower or where the tower is not in operation, and on which a Flight Service Station is located.

(See LOCAL AIRPORT ADVISORY). (Refer to AIM).

AIRPORT ELEVATION—The highest point of an airport's usable runways measured in feet from mean sea level.

(See TOUCHDOWN ZONE ELEVATION). (See ICAO term AERODROME ELEVATION).

AIRPORT/FACILITY DIRECTORY—A publication designed primarily as a pilot's operational manual containing all airports, seaplane bases, and heliports open to the public including communications data, navigational facilities, and certain special notices and procedures. This publication is issued in seven volumes according to geographical area.

AIRPORT INFORMATION AID—(See AIRPORT INFORMATION DESK).

AIRPORT INFORMATION DESK—An airport unmanned facility designed for pilot self-service briefing, flight planning, and filing of flight plans.

(Refer to AIM).

AIRPORT LIGHTING—Various lighting aids that may be installed on an airport. Types of airport lighting include:

1. Approach Light System (ALS). An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams in a directional pattern by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach for landing. Condenser-Discharge Sequential Flashing Lights/Sequenced Flashing Lights may be installed in conjunction with the ALS at some airports. Types of Approach Light Systems are:
   a. ALSF–1.—Approach Light System with Sequenced Flashing Lights in ILS Cat-I configuration.
   b. ALSF–2.—Approach Light System with Sequenced Flashing Lights in ILS Cat-II configuration. The ALSF–2 may operate as an SSALR when weather conditions permit.
   c. SSALF.—Simplified Short Approach Light System with Sequenced Flashing Lights.
   d. SSALR.—Simplified Short Approach Light System with Runway Alignment Indicator Lights.
   e. MALSF.—Medium Intensity Approach Light System with Sequenced Flashing Lights.
   f. MALSR.—Medium Intensity Approach Light System with Runway Alignment Indicator Lights.

g. LDIN.—Lead-in-light system: Consists of one or more series of flashing lights installed at or near ground level that provides positive visual guidance along an approach path, either curving or straight, where special problems exist with hazardous terrain, obstructions, or noise abatement procedures.

h. RAIL.—Runway Alignment Indicator Lights (Sequenced Flashing Lights which are installed only in combination with other light systems).

i. ODALS.—Omnidirectional Approach Lighting System consists of seven omnidirectional flashing lights located in the approach area of a nonprecision runway. Five lights are located on the runway centerline extended with the first light located 300 feet from the threshold and extending at equal intervals up to 1,500 feet from the threshold. The other two lights are located, one on each side of the runway threshold, at a lateral distance of 40 feet from the runway edge, or 75 feet from the runway edge when installed on a runway equipped with a VASI.

(Refer to Order 6850.2).

2. Runway Lights/Runway Edge Lights. Lights having a prescribed angle of emission used to define the lateral limits of a runway. Runway lights are uniformly spaced at intervals of approximately 200 feet, and the intensity may be controlled or preset.

3. Touchdown Zone Lighting. Two rows of tranverse light bars located symmetrically about the runway centerline normally at 100 foot intervals. The basic system extends 3,000 feet along the runway.

4. Runway Centerline Lighting. Flush centerline lights spaced at 50–foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway.

5. Threshold Lights. Fixed green lights arranged symmetrically left and right of the runway centerline, identifying the runway threshold.

6. Runway End Identifier Lights (REIL). Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

7. Visual Approach Slope Indicator (VASI). An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is "on path" if he sees red/white, "above path' if white/white, and "below path" if red/red. Some airports serving large aircraft have three-bar VASIs which provide two visual glide paths to the same runway.

8. Boundary Lights. Lights defining the perimeter of an airport or landing area.

(Refer to AIM).

AIRPORT MARKING AIDS—Markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, etc. A runway should be marked in accordance with its present usage such as:

1. Visual.
2. Nonprecision instrument.
3. Precision instrument.

(Refer to AIM).

AIRPORT RADAR SERVICE AREA—(See CONTROLLED AIRSPACE).

AIRPORT RESERVATION OFFICE—Office responsible for monitoring the operation of the high density rule. Receives and processes requests for IFR operations at high density traffic airports.

AIRPORT ROTATING BEACON—A visual NAVAID operated at many airports. At civil airports, alternating white and green flashes indicate the location of the airport. At military airports, the beacons flash alternately white and green, but are differentiated from civil beacons by dualpeaked (two quick) white flashes between the green flashes.

(See SPECIAL VFR OPERATIONS). (See INSTRUMENT FLIGHT RULES). (Refer to AIM). (See ICAO term AERODROME BEACON).

AIRPORT SURFACE DETECTION EQUIPMENT—Radar equipment specifically designed to detect all principal features on the surface of an airport, including aircraft and vehicular traffic, and to present the entire image on a radar indicator console in the control tower. Used to augment visual observation by tower personnel of aircraft and/or vehicular movements on runways and taxiways.

AIRPORT SURVEILLANCE RADAR—Approach control radar used to detect and display an aircraft's position in the terminal area. ASR provides range and azimuth information but does not provide elevation data. Coverage of the ASR can extend up to 60 miles.

AIRPORT TAXI CHARTS—(See AERONAUTICAL CHART).

AIRPORT TRAFFIC AREA—Unless otherwise specifically designated in Part 93, that airspace within a horizontal radius of 5 statute miles from the geographical center of any airport at which a control tower is operating, extending from the surface up to, but not including, an altitude of 3,000 feet above the elevation of an airport. Unless otherwise authorized or required by ATC, no person may operate an aircraft within an airport traffic area except for the purpose of landing at or taking off from an airport within that area. ATC authorizations may be given as individual approval of specific operations or may be contained in written agreements between airport users and the tower concerned.

Refer to Part 1 and Part 91.

AIRPORT TRAFFIC CONTROL SERVICE—A service provided by a control tower for aircraft operating on the movement area and in the vicinity of an airport. *(See MOVEMENT AREA). (See TOWER). (See ICAO term AERODROME CONTROL SERVICE).*

AIRPORT TRAFFIC CONTROL TOWER—(See TOWER).

AIR ROUTE SURVEILLANCE RADAR—Air route traffic control center (ARTCC) radar used primarily to detect and display an aircraft's position while en route between terminal areas. The ARSR enables controllers to provide radar air traffic control service when aircraft are within the ARSR coverage. In some instances, ARSR may enable an ARTCC to provide terminal radar services similar to but usually more limited than those provided by a radar approach control.

AIR ROUTE TRAFFIC CONTROL CENTER—A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft.

(See NAS STAGE A). (See EN ROUTE AIR TRAFFIC CONTROL SERVICES). (Refer to AIM).

AIRSPACE HIERARCHY—Within the airspace classes, there is a heirarchy and, in the event of an overlap of airspace: Class A preempts Class B, Class B preempts Class C, Class C preempts Class D, Class D preempts Class E, and Class E preempts Class G.

AIRSPEED—The speed of an aircraft relative to its surrounding air mass. The unqualified term "airspeed' means one of the following:

1. Indicated Airspeed. The speed shown on the aircraft airspeed indicator. This is the speed used in pilot/controller communications under the general term "airspeed."

(Refer to Part 1).

2. True Airspeed. The airspeed of an aircraft relative to undisturbed air. Used primarily in flight planning and en route portion of flight. When used in pilot/controller communications, it is referred to as "true airspeed" and not shortened to "airspeed."

AIRSTART—The starting of an aircraft engine while the aircraft is airborne, preceded by engine shutdown during training flights or by actual engine failure.

AIR TAXI—Used to describe a helicopter/VTOL aircraft movement conducted above the surface but normally not above 100 feet AGL. The aircraft may proceed either via hover taxi or flight at speeds more than 20 knots. The pilot is solely responsible for selecting a safe airspeed/altitude for the operation being conducted.

(See HOVER TAXI). (Refer to AIM).

AIR TRAFFIC—Aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.

(See ICAO term AIR TRAFFIC).

AIR TRAFFIC [ICAO]—All aircraft in flight or operating on the manoeuvring area of an aerodrome.

AIR TRAFFIC CLEARANCE—An authorization by air traffic control, for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace. The pilot–in–command of an aircraft may not deviate from the provisions of a visual flight rules (VFR) or instrument flight rules (IFR) air traffic clearance unless an amended clearance has been obtained. Additionally, the pilot may request a different clearance from that which has been issued by air traffic control (ATC) if information available to the pilot makes another course of action more practicable or if aircraft equipment limitations or company procedures forbid compliance with the clearance issued. Pilots may also request clarification or amendment, as appropriate, any time a clearance is not fully understood, or considered unacceptable because of safety of flight. Controllers should, in such instances and to the extent of operational practicality and safety, honor the pilot's request. FAR 91.3(a) states: "The pilot–in–command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft." THE PILOT IS RESPONSIBLE TO REQUEST AN AMENDED CLEARANCE if ATC issues a clearance that would cause a pilot to deviate from a rule or regulation, or in the pilot's opinion, would place the aircraft in jeopardy.

(See ATC INSTRUCTIONS). (See ICAO term AIR TRAFFIC CONTROL CLEARANCE).

AIR TRAFFIC CONTROL—A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.

(See ICAO term AIR TRAFFIC CONTROL SERVICE).

AIR TRAFFIC CONTROL CLEARANCE [ICAO]—Authorization for an aircraft to proceed under conditions specified by an air traffic control unit.

Note 1: For convenience, the term air traffic control clearance is frequently abbreviated to clearance when used in appropriate contexts.

Note 2: The abbreviated term clearance may be prefixed by the words taxi, takeoff, departure, en route, approach or landing to indicate the particular portion of flight to which the air traffic control clearance relates.

AIR TRAFFIC CONTROL SERVICE—(See AIR TRAFFIC CONTROL).

AIR TRAFFIC CONTROL SERVICE [ICAO]—A service provided for the purpose of:

1. Preventing collisions:
   a. Between aircraft; and
   b. On the maneuvering area between aircraft and obstructions; and
2. Expediting and maintaining an orderly flow of air traffic.

AIR TRAFFIC CONTROL SPECIALIST—A person authorized to provide air traffic control service.

(See AIR TRAFFIC CONTROL). (See FLIGHT SERVICE STATION). (See ICAO term CONTROLLER).

AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER—An Air Traffic Operations Service facility consisting of four operational units.

1. Central Flow Control Function (CFCF). Responsible for coordination and approval of all major intercenter flow control restrictions on a system basis in order to obtain maximum utilization of the airspace.

(See QUOTA FLOW CONTROL).

2. Central Altitude Reservation Function (CARF). Responsible for coordinating, planning, and approving special user requirements under the Altitude Reservation (ALTRV) concept.

(See ALTITUDE RESERVATION).

3. Airport Reservation Office (ARO). Responsible for approving IFR flights at designated high density traffic airports (John F. Kennedy, LaGuardia, O'Hare, and Washington National) during specified hours.

(Refer to Part 93 and AIRPORT/FACILITY DIRECTORY).

4. ATC Contingency Command Post. A facility which enables the FAA to manage the ATC system when significant portions of the system's capabilities have been lost or are threatened.

AIR TRAFFIC SERVICE—A generic term meaning:

1. Flight Information Service:
2. Alerting Service:
3. Air Traffic Advisory Service:
4. Air Traffic Control Service:
   a. Area Control Service,
   b. Approach Control Service, or
   c. Airport Control Service.

AIRWAY—A control area or portion thereof. A Class E airspace area established in the form of a corridor, the centerline of which is defined by radio navigational aids.

(See FEDERAL AIRWAYS). (Refer to Part 71). (Refer to AIM). (See ICAO term AIRWAY).

AIRWAY [ICAO]—A control area or portion thereof established in the form of corridor equipped with radio navigational aids.

AIRWAY BEACON—Used to mark airway segments in remote mountain areas. The light flashes Morse Code to identify the beacon site.

(Refer to AIM).

AIT—(See AUTOMATED INFORMATION TRANSFER).

ALERFA (Alert Phase) [ICAO]—A situation wherein apprehension exists as to the safety of an aircraft and its occupants.

ALERT AREA—(See SPECIAL USE AIRSPACE).

ALERT NOTICE—A request originated by a flight service station (FSS) or an air route traffic control center (ARTCC) for an extensive communication search for overdue, unreported, or missing aircraft.

ALERTING SERVICE—A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid and assist such organizations as required.

ALNOT—(See ALERT NOTICE).

ALPHANUMERIC DISPLAY—Letters and numerals used to show identification, altitude, beacon code, and other information concerning a target on a radar display.

(See AUTOMATED RADAR TERMINAL SYSTEMS). (See NAS STAGE A).

ALTERNATE AERODROME [ICAO]—An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing.

Note: The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for the flight.

ALTERNATE AIRPORT—An airport at which an aircraft may land if a landing at the intended airport becomes inadvisable.

(See FAA term ICAO term ALTERNATE AERODROME).

ALTIMETER SETTING—The barometric pressure reading used to adjust a pressure altimeter for variations in existing atmospheric pressure or to the standard altimeter setting (29.92).

(Refer to Part 91). (Refer to AIM).

ALTITUDE—The height of a level, point, or object measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL).

(See FLIGHT LEVEL).

1. MSL Altitude. Altitude expressed in feet measured from mean sea level.
2. AGL Altitude. Altitude expressed in feet measured above ground level.
3. Indicated Altitude. The altitude as shown by an altimeter. On a pressure or barometric altimeter it is altitude as shown uncorrected for instrument error and uncompensated for variation from standard atmospheric conditions.

(See ICAO term ALTITUDE).

ALTITUDE [ICAO]—The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).

ALTITUDE READOUT—An aircraft's altitude, transmitted via the Mode C transponder feature, that is visually displayed in 100-foot increments on a radar scope having readout capability.

(See AUTOMATED RADAR TERMINAL SYSTEMS). (See NAS STAGE A). (See ALPHANUMERIC DISPLAY). (Refer to AIM).

ALTITUDE RESERVATION—Airspace utilization under prescribed conditions normally employed for the mass movement of aircraft or other special user requirements which cannot otherwise be accomplished. ALTRVs are approved by the appropriate FAA facility.

(See AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER).

ALTITUDE RESTRICTION—An altitude or altitudes, stated in the order flown, which are to be maintained until reaching a specific point or time. Altitude restrictions may be issued by ATC due to traffic, terrain, or other airspace considerations.

ALTITUDE RESTRICTIONS ARE CANCELED—Adherence to previously imposed altitude restrictions is no longer required during a climb or descent.

ALTRV—(See ALTITUDE RESERVATION).

AMVER—(See AUTOMATED MUTUAL-ASSISTANCE VESSEL RESCUE SYSTEM

APPROACH CLEARANCE—Authorization by ATC for a pilot to conduct an instrument approach. The type of instrument approach for which a clearance and other pertinent information is provided in the approach clearance when required.

(See INSTRUMENT APPROACH PROCEDURE). (See CLEARED APPROACH). (Refer to AIM and Part 91).

APPROACH CONTROL FACILITY—A terminal ATC facility that provides approach control service in a terminal area.

(See APPROACH CONTROL SERVICE). (See RADAR APPROACH CONTROL FACILITY).

APPROACH CONTROL SERVICE—Air traffic control service provided by an approach control facility for arriving and departing VFR/IFR aircraft and, on occasion, en route aircraft. At some airports not served by an approach control facility, the ARTCC provides limited approach control service.

(Refer to AIM). (See ICAO term APPROACH CONTROL SERVICE).

APPROACH CONTROL SERVICE [ICAO]—Air traffic control service for arriving or departing controlled flights.

APPROACH GATE—An imaginary point used within ATC as a basis for vectoring aircraft to the final approach course. The gate will be established along the final approach course 1 mile from the outer marker (or the fix used in lieu of the outer marker) on the side away from the airport for precision approaches and 1 mile from the final approach fix on the side away from the airport for nonprecision approaches. In either case when measured along the final approach course, the gate will be no closer than 5 miles from the landing threshold.

APPROACH LIGHT SYSTEM—(See AIRPORT LIGHTING).

APPROACH SEQUENCE—The order in which aircraft are positioned while on approach or awaiting approach clearance.

(See LANDING SEQUENCE). (See ICAO term APPROACH SEQUENCE).

APPROACH SEQUENCE [ICAO]—The order in which two or more aircraft are cleared to approach to land at the aerodrome.

APPROACH SPEED—The recommended speed contained in aircraft manuals used by pilots when making an approach to landing. This speed will vary for different segments of an approach as well as for aircraft weight and configuration.

APPROPRIATE ATS AUTHORITY [ICAO]—The relevant authority designated by the State responsible for providing air traffic services in the airspace concerned. In the United States, the "appropriate ATS authority" is the Director, Office of Air Traffic System Management, ATM-1.

APPROPRIATE AUTHORITY—

1. Regarding flight over the high seas: the relevant authority is the State of Registry.
2. Regarding flight over other than the high seas: the relevant authority is the State having sovereignty over the territory being overflown.

APPROPRIATE OBSTACLE CLEARANCE MINIMUM ALTITUDE—Any of the following:

(See Minimum IFR Altitude MIA). (See Minimum En Route Altitude MEA). (See Minimum Obstruction Clearance Altitude MOCA). (See Minimum Vectoring Altitude MVA).

APPROPRIATE TERRAIN CLEARANCE MINIMUM ALTITUDE—Any of the following:

(See Minimum IFR Altitude MIA). (See Minimum En Route Altitude MEA). (See Minimum Obstruction Clearance Altitude MOCA). (See Minimum Vectoring Altitude MVA).

APRON—A defined area on an airport or heliport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance. With regard to seaplanes, a ramp is used for access to the apron from the water.

(See ICAO term APRON).

APRON [ICAO]—A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, refuelling, parking or maintenance.

ARC—The track over the ground of an aircraft flying at a constant distance from a navigational aid by reference to distance measuring equipment (DME).

AREA CONTROL CENTER [ICAO]—An ICAO term for an air traffic control facility primarily responsible for ATC services being provided IFR aircraft during the en route phase of flight. The U.S. equivalent facility is an air route traffic control center (ARTCC).

AREA NAVIGATION—A method of navigation that permits aircraft operation on any desired course within the coverage of station-referenced navigation signals or within the limits of a self-contained system capability. Random area navigation routes are direct routes, based on area navigation capability, between waypoints defined in terms of latitude/longitude coordinates, degree/distance fixes, or offsets from published or established routes/airways at a specified distance and direction. The major types of equipment are:

1. VORTAC referenced or Course Line Computer (CLC) systems, which account for the greatest number of RNAV units in use. To function, the CLC must be within the service range of a VORTAC.
2. OMEGA/VLF, although two separate systems, can be considered as one operationally. A long-range navigation system based upon Very Low Frequency radio signals transmitted from a total of 17 stations worldwide.
3. Inertial (INS) systems, which are totally self-contained and require no information from external references. They provide aircraft position and navigation information in response to signals resulting from inertial effects on components within the system.
4. MLS Area Navigation (MLS/RNAV), which provides area navigation with reference to an MLS ground facility.
5. LORAN-C is a long-range radio navigation system that uses ground waves transmitted at low frequency to provide user position information at ranges of up to 600 to 1,200 nautical miles at both en route and approach altitudes. The usable signal coverage areas are determined by the signal-to-noise ratio, the envelope-to-cycle difference, and the geometric relationship between the positions of the user and the transmitting stations.

(See ICAO term AREA NAVIGATION).

AREA NAVIGATION [ICAO]—A method of navigation which permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

ARINC—An acronym for Aeronautical Radio, Inc., a corporation largely owned by a group of airlines. ARINC is licensed by the FCC as an aeronautical station and contracted by the FAA to provide communications support for air traffic control and meteorological services in portions of international airspace.

ARMY AVIATION FLIGHT INFORMATION BULLETIN—A bulletin that provides air operation data covering Army, National Guard, and Army Reserve aviation activities.

ARO—(See AIRPORT RESERVATION OFFICE).

ARRESTING SYSTEM—A safety device consisting of two major components, namely, engaging or catching devices and energy absorption devices for the purpose of arresting both tailhook and/or nontailhook-equipped aircraft. It is used to prevent aircraft from overrunning runways when the aircraft cannot be stopped after landing or during aborted takeoff. Arresting systems have various names; e.g., arresting gear, hook device, wire barrier cable.

(See ABORT). (Refer to AIM).

ARRIVAL AIRCRAFT INTERVAL—An internally generated program in hundredths of minutes based upon the AAR. AAI is the desired optimum interval between successive arrival aircraft over the vertex.

ARRIVAL CENTER—The ARTCC having jurisdiction for the impacted airport.

ARRIVAL DELAY—A parameter which specifies a period of time in which no aircraft will be metered for arrival at the specified airport.

ARRIVAL SECTOR—An operational control sector containing one or more meter fixes.

ARRIVAL SECTOR ADVISORY LIST—An ordered list of data on arrivals displayed at the PVD of the sector which controls the meter fix.

ARRIVAL SEQUENCING PROGRAM—The automated program designed to assist in sequencing aircraft destined for the same airport.

ARRIVAL TIME—The time an aircraft touches down on arrival.

ARSA—(See AIRPORT RADAR SERVICE AREA).

ARSR—(See AIR ROUTE SURVEILLANCE RADAR).

ARTCC—(See AIR ROUTE TRAFFIC CONTROL CENTER).

ARTS—(See AUTOMATED RADAR TERMINAL SYSTEMS).

ASD—(See AIRCRAFT SITUATION DISPLAY).

ASDA—(See ACCELERATE–STOP DISTANCE AVAILABLE).

ASDA [ICAO]—(See ICAO Term ACCELERATE–STOP DISTANCE AVAILABLE).

ASDE—(See AIRPORT SURFACE DETECTION EQUIPMENT).

ASLAR—(See AIRCRAFT SURGE LAUNCH AND RECOVERY).

ASP—(See ARRIVAL SEQUENCING PROGRAM).

ASR—(See AIRPORT SURVEILLANCE RADAR).

ASR APPROACH—(See SURVEILLANCE APPROACH).

ATC—(See AIR TRAFFIC CONTROL).

ATCAA—(See ATC ASSIGNED AIRSPACE).

ATC ADVISES—Used to prefix a message of noncontrol information when it is relayed to an aircraft by other than an air traffic controller.

(See ADVISORY).

ATC ASSIGNED AIRSPACE—Airspace of defined vertical/lateral limits, assigned by ATC, for the purpose of providing air traffic segregation between the specified activities being conducted within the assigned airspace and other IFR air traffic.

(See SPECIAL USE AIRSPACE).

ATC CLEARANCE—(See AIR TRAFFIC CLEARANCE).

ATC CLEARS—Used to prefix an ATC clearance when it is relayed to an aircraft by other than an air traffic controller.

ATC INSTRUCTIONS—Directives issued by air traffic control for the purpose of requiring a pilot to take specific actions; e.g., "Turn left heading two five zero," "Go around," "Clear the runway."

(Refer to Part 91).

ATCRBS—(See RADAR).

ATC REQUESTS—Used to prefix an ATC request when it is relayed to an aircraft by other than an air traffic controller.

ATCSCC—(See AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER).

ATCSCC DELAY FACTOR—The amount of delay calculated to be assigned prior to departure.

ATCT—(See TOWER).

ATIS—(See AUTOMATIC TERMINAL INFORMATION SERVICE).

ATIS [ICAO]—(See ICAO Term AUTOMATIC TERMINAL INFORMATION SERVICE).

ATS Route [ICAO]—A specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services.

Note: The term "ATS Route" is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure, etc.

AUTOLAND APPROACH—An autoland approach is a precision instrument approach to touchdown and, in some cases, through the landing rollout. An autoland approach is performed by the aircraft autopilot which is receiving position information and/or steering commands from onboard navigation equipment(See COUPLED APPROACH).

Note: Autoland and coupled approaches are flown in VFR and IFR. It is common for carriers to require their crews to fly coupled approaches and autoland approaches (if certified) when the weather conditions are less than approximately 4,000 RVR.

AUTOMATED INFORMATION TRANSFER—A precoordinated process, specifically defined in facility directives, during which a transfer of altitude control and/or radar identification is accomplished without verbal coordination between controllers using information communicated in a full data block.

AUTOMATED MUTUAL-ASSISTANCE VESSEL RESCUE SYSTEM—A facility which can deliver, in a matter of minutes, a surface picture (SURPIC) of vessels in the area of a potential or actual search and rescue incident, including their predicted positions and their characteristics.

(See Order 7110.65, paragraph 10-73, In-Flight Contingencies).

AUTOMATED RADAR TERMINAL SYSTEMS—The generic term for the ultimate in functional capability afforded by several automation systems. Each differs in functional capabilities and equipment. ARTS plus a suffix roman numeral denotes a specific system. A following letter indicates a major modification to that system. In general, an ARTS displays for the terminal controller aircraft identification, flight plan data, other flight associated information; e.g., altitude, speed, and aircraft position symbols in conjunction with his radar presentation. Normal radar co-exists with the alphanumeric display. In addition to enhancing visualization of the air traffic situation, ARTS facilitate intra/inter-facility transfer and coordination of flight information. These capabilities are enabled by specially designed computers and subsystems tailored to the radar and communications equipments and operational requirements of each automated facility. Modular design permits adoption of improvements in computer software and electronic technologies as they become available while retaining the characteristics unique to each system.

1. ARTS II. A programmable nontracking, computer-aided display subsystem capable of modular expansion. ARTS II systems provide a level of automated air traffic control capability at terminals having low to medium activity. Flight identification and altitude may be associated with the display of secondary radar targets. The system has the capability of communicating with ARTCC's and other ATRS II, IIA, III, and IIIA facilities.
2. ARTS IIA. A programmable radar-tracking computer subsystem capable of modular expansion. The ARTS IIA detects, tracks, and predicts secondary radar targets. The targets are displayed by means of computer-generated symbols, ground speed, and flight plan data. Although it does not track primary radar targets, they are displayed coincident with the secondary radar as well as the symbols and alphanumerics. The system has the capability of communicating with ARTCC's and other ARTS II, IIA, III, and IIIA facilities.

3. ARTS III. The Beacon Tracking Level of the modular programmable automated radar terminal system in use at medium to high activity terminals. ARTS III detects, tracks, and predicts secondary radar-derived aircraft targets. These are displayed by means of computer-generated symbols and alphanumeric characters depicting flight identification, aircraft altitude, ground speed, and flight plan data. Although it does not track primary targets, they are displayed coincident with the secondary radar as well as the symbols and alphanumerics. The system has the capability of communicating with ARTCC's and other ARTS III facilities.
4. ARTS IIIA. The Radar Tracking and Beacon Tracking Level (RT&BTL) of the modular, programmable automated radar terminal system. ARTS IIIA detects, tracks, and predicts primary as well as secondary radar-derived aircraft targets. This more sophisticated computer-driven system upgrades the existing ARTS III system by providing improved tracking, continuous data recording, and fail-soft capabilities.

AUTOMATIC ALTITUDE REPORT—(See ALTITUDE READOUT).

AUTOMATIC ALTITUDE REPORTING—That function of a transponder which responds to Mode C interrogations by transmitting the aircraft's altitude in 100–foot increments.

AUTOMATIC CARRIER LANDING SYSTEM—U.S. Navy final approach equipment consisting of precision tracking radar coupled to a computer data link to provide continuous information to the aircraft, monitoring capability to the pilot, and a backup approach system.

AUTOMATIC DIRECTION FINDER—An aircraft radio navigation system which senses and indicates the direction to a L/MF nondirectional radio beacon (NDB) ground transmitter. Direction is indicated to the pilot as a magnetic bearing or as a relative bearing to the longitudinal axis of the aircraft depending on the type of indicator installed in the aircraft. In certain applications, such as military, ADF operations may be based on airborne and ground transmitters in the VHF/UHF frequency spectrum.

(See BEARING). (See NONDIRECTIONAL BEACON).

AUTOMATIC TERMINAL INFORMATION SERVICE—The continuous broadcast of recorded noncontrol information in selected terminal areas. Its purpose is to improve controller effectiveness and to relieve frequency congestion by automating the repetitive transmission of essential but routine information; e.g., "Los Angeles information Alfa. One three zero zero Coordinated Universal Time. Weather, measured ceiling two thousand overcast, visibility three, haze, smoke, temperature seven one, dew point five seven, wind two five zero at five, altimeter two niner niner six. I-L-S Runway Two Five Left approach in use, Runway Two Five Right closed, advise you have Alfa."

(Refer to AIM). (See ICAO term AUTOMATIC TERMINAL INFORMATION SERVICE).

AUTOMATIC TERMINAL INFORMATION SERVICE [ICAO]—The provision of current, routine information to arriving and departing aircraft by means of continuous and repetitive broadcasts throughout the day or a specified portion of the day.

AUTOROTATION—A rotorcraft flight condition in which the lifting rotor is driven entirely by action of the air when the rotorcraft is in motion.

1. Autorotative Landing/Touchdown Autorotation. Used by a pilot to indicate that he will be landing without applying power to the rotor.
2. Low Level Autorotation. Commences at an altitude well below the traffic pattern, usually below 100 feet AGL and is used primarily for tactical military training.
3. 180 degrees Autorotation. Initiated from a downwind heading and is commenced well inside the normal traffic pattern. "Go around" may not be possible during the latter part of this maneuver.

AVIATION WEATHER SERVICE—A service provided by the National Weather Service (NWS) and FAA which collects and disseminates pertinent weather information for pilots, aircraft operators, and ATC. Available aviation weather reports and forecasts are displayed at each NWS office and FAA FSS.

(See EN ROUTE FLIGHT ADVISORY SERVICE). (See TRANSCRIBED WEATHER BROADCAST). (See WEATHER ADVISORY). (See PILOTS AUTOMATIC TELEPHONE WEATHER ANSWERING SERVICE). (Refer to AIM).

AWW—(See SEVERE WEATHER FORECAST ALERTS).

AZIMUTH (MLS)—A magnetic bearing extending from an MLS navigation facility.

Note: azimuth bearings are described as magnetic and are referred to as "azimuth" in radio telephone communications.

B

BASE LEG—(See TRAFFIC PATTERN).

BEACON—(See RADAR).

(See NONDIRECTIONAL BEACON). (See MARKER BEACON). (See AIRPORT ROTATING BEACON). (See AERONAUTICAL BEACON). (See AIRWAY BEACON).

BEARING—The horizontal direction to or from any point, usually measured clockwise from true north, magnetic north, or some other reference point through 360 degrees.

(See NONDIRECTIONAL BEACON).

BELOW MINIMUMS—Weather conditions below the minimums prescribed by regulation for the particular action involved; e.g., landing minimums, takeoff minimums.

BLAST FENCE—A barrier that is used to divert or dissipate jet or propeller blast.

BLIND SPEED—The rate of departure or closing of a target relative to the radar antenna at which cancellation of the primary radar target by moving target indicator (MTI) circuits in the radar equipment causes a reduction or complete loss of signal.

(See ICAO term BLIND VELOCITY).

BLIND SPOT—An area from which radio transmissions and/or radar echoes cannot be received. The term is also used to describe portions of the airport not visible from the control tower.

BLIND TRANSMISSION—(See TRANSMITTING IN THE BLIND).

BLIND VELOCITY [ICAO]—The radial velocity of a moving target such that the target is not seen on primary radars fitted with certain forms of fixed echo suppression.

BLIND ZONE—(See BLIND SPOT).

BLOCKED—Phraseology used to indicate that a radio transmission has been distorted or interrupted due to multiple simultaneous radio transmissions.

BOUNDARY LIGHTS—(See AIRPORT LIGHTING).

BRAKING ACTION (GOOD, FAIR, POOR, OR NIL)—A report of conditions on the airport movement area providing a pilot with a degree/quality of braking that he might expect. Braking action is reported in terms of good, fair, poor, or nil.

(See RUNWAY CONDITION READING).

BRAKING ACTION ADVISORIES—When tower controllers have received runway braking action reports which include the terms "poor" or "nil," or whenever weather conditions are conducive to deteriorating or rapidly changing runway braking conditions, the tower will include on the ATIS broadcast the statement, "BRAKING ACTION ADVISORIES ARE IN EFFECT." During the time Braking Action Advisories are in effect, ATC will issue the latest braking action report for the runway in use to each arriving and departing aircraft. Pilots should be prepared for deteriorating braking conditions and should request current runway condition information if not volunteered by controllers. Pilots should also be prepared to provide a descriptive runway condition report to controllers after landing.

BROADCAST—Transmission of information for which an acknowledgement is not expected.

(See ICAO term BROADCAST).

BROADCAST [ICAO]—A transmission of information relating to air navigation that is not addressed to a specific station or stations.

C

CALCULATED LANDING TIME—A term that may be used in place of tentative or actual calculated landing time, whichever applies.

CALL UP—Initial voice contact between a facility and an aircraft, using the identification of the unit being called and the unit initiating the call.

(Refer to AIM).

CALL FOR RELEASE—Wherein the overlying ARTCC requires a terminal facility to initiate verbal coordination to secure ARTCC approval for release of a departure into the en route environment.

CANADIAN MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE—That portion of Canadian domestic airspace within which MNPS separation may be applied.

CARDINAL ALTITUDES—"Odd" or "Even" thousand-foot altitudes or flight levels; e.g., 5,000, 6,000, 7,000, FL 250, FL 260, FL 270.

(See ALTITUDE). (See FLIGHT LEVEL).

CARDINAL FLIGHT LEVELS—(See CARDINAL ALTITUDES).

CAT—(See CLEAR-AIR TURBULENCE).

CDT PROGRAMS—(See CONTROLLED DEPARTURE TIME PROGRAMS).

CEILING—The heights above the earth's surface of the lowest layer of clouds or obscuring phenomena that is reported as "broken," "overcast," or "obscuration," and not classified as "thin" or "partial".

(See ICAO term CEILING).

CEILING [ICAO]—The height above the ground or water of the base of the lowest layer of cloud below 6,000 metres (20,000 feet) covering more than half the sky.

CENRAP—(See CENTER RADAR ARTS PRESENTATION/PROCESSING).

CENRAP-PLUS—(See CENTER RADAR ARTS PRESENTATION/PROCESSING-PLUS).

CENTER—(See AIR ROUTE TRAFFIC CONTROL CENTER).

CENTER'S AREA—The specified airspace within which an air route traffic control center (ARTCC) provides air traffic control and advisory service.

(See AIR ROUTE TRAFFIC CONTROL CENTER). (Refer to AIM).

CENTER RADAR ARTS PRESENTATION/PROCESSING—A computer program developed to provide a back-up system for airport surveillance radar in the event of a failure or malfunction. The program uses air route traffic control center radar for the processing and presentation of data on the ARTS IIA or IIIA displays.

CENTER RADAR ARTS PRESENTATION/PROCESSING-PLUS—A computer program developed to provide a back-up system for airport surveillance radar in the event of a terminal secondary radar system failure. The program uses a combination of Air Route Traffic Control Center Radar and terminal airport surveillance radar primary targets displayed simultaneously for the processing and presentation of data on the ARTS IIA or IIIA displays.

CENTER WEATHER ADVISORY—An unscheduled weather advisory issued by Center Weather Service Unit meteorologists for ATC use to alert pilots of existing or anticipated adverse weather conditions within the next 2 hours. A CWA may modify or redefine a SIGMET.

(See AWW). (See SIGMET). (See CONVECTIVE SIGMET). (See AIRMET). (Refer to AIM).

CENTRAL EAST PACIFIC—An organized route system between the U.S. West Coast and Hawaii.

CEP—(See CENTRAL EAST PACIFIC).

CERAP—(See COMBINED CENTER-RAPCON).

CFR—(See CALL FOR RELEASE).

CHAFF—Thin, narrow metallic reflectors of various lengths and frequency responses, used to reflect radar energy. These reflectors when dropped from aircraft and allowed to drift downward result in large targets on the radar display.

CHARTED VFR FLYWAYS—Charted VFR Flyways are flight paths recommended for use to bypass areas heavily traversed by large turbine-powered aircraft. Pilot compliance with recommended flyways and associated altitudes is strictly voluntary. VFR Flyway Planning charts are published on the back of existing VFR Terminal Area charts.

CHARTED VISUAL FLIGHT PROCEDURE APPROACH—An approach wherein a radar-controlled aircraft on an IFR flight plan, operating in VFR conditions and having an ATC authorization, may proceed to the airport of intended landing via visual landmarks and altitudes depicted on a charted visual flight procedure.

CHASE—An aircraft flown in proximity to another aircraft normally to observe its performance during training or testing.

CHASE AIRCRAFT—(See CHASE).

CIRCLE-TO-LAND MANEUVER—A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or is not desirable. This maneuver is made only after ATC authorization has been obtained and the pilot has established required visual reference to the airport

(See CIRCLE TO RUNWAY). (See LANDING MINIMUMS). (Refer to AIM).

CIRCLE TO RUNWAY (RUNWAY NUMBER)—Used by ATC to inform the pilot that he must circle to land because the runway in use is other than the runway aligned with the instrument approach procedure. When the direction of the circling maneuver in relation to the airport/runway is required, the controller will state the direction (eight cardinal compass points) and specify a left or right downwind or base leg as appropriate; e.g., "Cleared VOR Runway Three Six Approach circle to Runway Two Two," or "Circle northwest of the airport for a right downwind to Runway Two Two."

(See CIRCLE-TO-LAND MANEUVER). (See LANDING MINIMUMS). (Refer to AIM).

CIRCLING APPROACH—(See CIRCLE-TO-LAND MANEUVER).

CIRCLING MANEUVER—(See CIRCLE-TO-LAND MANEUVER).

CIRCLING MINIMA—(See LANDING MINIMUMS).

CLASS A AIRSPACE—(See Controlled Airspace)

CLASS B AIRSPACE—(See Controlled Airspace)

CLASS C AIRSPACE—(See Controlled Airspace)

CLASS D AIRSPACE—(See Controlled Airspace)

CLASS E AIRSPACE—(See Controlled Airspace)

CLASS G AIRSPACE—That airspace not designated as Class A, B, C, D or E.

CLEAR-AIR TURBULENCE—Turbulence encountered in air where no clouds are present. This term is commonly applied to high-level turbulence associated with wind shear. CAT is often encountered in the vicinity of the jet stream.

(See WIND SHEAR). (See JET STREAM).

CLEAR OF THE RUNWAY—

1. A taxiing aircraft, which is approaching a runway, is clear of the runway when all parts of the aircraft are held short of the applicable holding position marking.
2. A pilot or controller may consider an aircraft, which is exiting or crossing a runway, to be clear of the runway when all parts of the aircraft are beyond the runway edge and there is no ATC restriction to its continued movement beyond the applicable holding position marking.
3. Pilots and controllers shall exercise good judgement to ensure that adequate separation exists between all aircraft on runways and taxiways at airports with inadequate runway edge lines or holding position markings.

CLEARANCE—(See AIR TRAFFIC CLEARANCE).

CLEARANCE LIMIT—The fix, point, or location to which an aircraft is cleared when issued an air traffic clearance.

(See ICAO term CLEARANCE LIMIT).

CLEARANCE LIMIT [ICAO]—The point of which an aircraft is granted an air traffic control clearance.

CLEARANCE VOID IF NOT OFF BY (TIME)—Used by ATC to advise an aircraft that the departure clearance is automatically canceled if takeoff is not made prior to a specified time. The pilot must obtain a new clearance or cancel his IFR flight plan if not off by the specified time.

(See ICAO term CLEARANCE VOID TIME).

CLEARANCE VOID TIME [ICAO]—A time specified by an air traffic control unit at which a clearance ceases to be valid unless the aircraft concerned has already taken action to comply therewith.

CLEARED AS FILED—Means the aircraft is cleared to proceed in accordance with the route of flight filed in the flight plan. This clearance does not include the altitude, SID, or SID Transition.

(See REQUEST FULL ROUTE CLEARANCE). (Refer to AIM).

CLEARED (Type Of) APPROACH—ATC authorization for an aircraft to execute a specific instrument approach procedure to an airport; e.g., "Cleared ILS Runway Three Six Approach."

(See INSTRUMENT APPROACH PROCEDURE). (See APPROACH CLEARANCE). (Refer to AIM). (Refer to Part 91).

CLEARED APPROACH—ATC authorization for an aircraft to execute any standard or special instrument approach procedure for that airport. Normally, an aircraft will be cleared for a specific instrument approach procedure.

(See INSTRUMENT APPROACH PROCEDURE). (See CLEARED (TYPE OF) APPROACH). (Refer to AIM). (Refer to Part 91).

CLEARED FOR TAKEOFF—ATC authorization for an aircraft to depart. It is predicated on known traffic and known physical airport conditions.

CLEARED FOR THE OPTION—ATC authorization for an aircraft to make a touch-and-go, low approach, missed approach, stop and go, or full stop landing at the discretion of the pilot. It is normally used in training so that an instructor can evaluate a student's performance under changing situations.

(See OPTION APPROACH). (Refer to AIM).

CLEARED THROUGH—ATC authorization for an aircraft to make intermediate stops at specified airports without refiling a flight plan while en route to the clearance limit.

CLEARED TO LAND—ATC authorization for an aircraft to land. It is predicated on known traffic and known physical airport conditions.

CLEARWAY—An area beyond the takeoff runway under the control of airport authorities within which terrain or fixed obstacles may not extend above specified limits. These areas may be required for certain turbine-powered operations and the size and upward slope of the clearway will differ depending on when the aircraft was certificated.

(Refer to Part 1).

CLIMBOUT—That portion of flight operation between takeoff and the initial cruising altitude.

CLIMB TO VFR—ATC authorization for an aircraft to climb to VFR conditions within a control zone Class B, C, D, and E surface areas when the only weather limitation is restricted visibility. The aircraft must remain clear of clouds while climbing to VFR.

(See Special VFR). (Refer to AIM).

CLOSED RUNWAY—A runway that is unusable for aircraft operations. Only the airport management/military operations office can close a runway.

CLOSED TRAFFIC—Successive operations involving takeoffs and landings or low approaches where the aircraft does not exit the traffic pattern.

CLT—(See CALCULATED LANDING TIME).

CLUTTER—In radar operations, clutter refers to the reception and visual display of radar returns caused by precipitation, chaff, terrain, numerous aircraft targets, or other phenomena. Such returns may limit or preclude ATC from providing services based on radar.

(See GROUND CLUTTER). (See CHAFF). (See PRECIPITATION). (See TARGET). (See ICAO term Radar Clutter).

CMNPS—(See CANADIAN MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE).

COASTAL FIX—A navigation aid or intersection where an aircraft transitions between the domestic route structure and the oceanic route structure.

CODES—The number assigned to a particular multiple pulse reply signal transmitted by a transponder.

(See DISCRETE CODE).

COMBINED CENTER-RAPCON—An air traffic facility which combines the functions of an ARTCC and a radar approach control facility.

(See AIR ROUTE TRAFFIC CONTROL CENTER). (See RADAR APPROACH CONTROL FACILITY).

COMMON POINT—A *significant point* over which two or more aircraft will report passing or have reported passing before proceeding on the same or diverging tracks. To establish/maintain longitudinal separation, a controller may determine a common point not originally in the aircraft's flight plan and then clear the aircraft to fly over the point. See significant point.

COMMON PORTION—(See COMMON ROUTE).

COMMON ROUTE—That segment of a North American Route between the inland navigation facility and the coastal fix.

COMMON TRAFFIC ADVISORY FREQUENCY—A frequency designed for the purpose of carrying out airport advisory practices while operating to or from an uncontrolled airport. The CTAF may be a UNICOM, Multicom, FSS, or tower frequency and is identified in appropriate aeronautical publications.

(Refer to AC90-42).

COMPASS LOCATOR—A low power, low or medium frequency (L/MF) radio beacon installed at the site of the outer or middle marker of an instrument landing system (ILS). It can be used for navigation at distances of approximately 15 miles or as authorized in the approach procedure.

1. Outer Compass Locator (LOM). A compass locator installed at the site of the outer marker of an instrument landing system.

(See OUTER MARKER).

2. Middle Compass Locator (LMM). A compass locator installed at the site of the middle marker of an instrument landing system.

(See MIDDLE MARKER). (See ICAO term LOCATOR).

COMPASS ROSE—A circle, graduated in degrees, printed on some charts or marked on the ground at an airport. It is used as a reference to either true or magnetic direction.

COMPOSITE FLIGHT PLAN—A flight plan which specifies VFR operation for one portion of flight and IFR for another portion. It is used primarily in military operations.

(Refer to AIM).

COMPOSITE ROUTE SYSTEM—An organized oceanic route structure, incorporating reduced lateral spacing between routes, in which composite separation is authorized.

COMPOSITE SEPARATION—A method of separating aircraft in a composite route system where, by management of route and altitude assignments, a combination of half the lateral minimum specified for the area concerned and half the vertical minimum is applied.

COMPULSORY REPORTING POINTS—Reporting points which must be reported to ATC. They are designated on aeronautical charts by solid triangles or filed in a flight plan as fixes selected to define direct routes. These points are geographical locations which are defined by navigation aids/fixes. Pilots should discontinue position reporting over compulsory reporting points when informed by ATC that their aircraft is in "radar contact."

CONFLICT ALERT—A function of certain air traffic control automated systems designed to alert radar controllers to existing or pending situations between tracked targets (known IFR or VFR aircraft) that require his immediate attention/action.

(See MODE C INTRUDER ALERT).

CONFLICT RESOLUTION—The resolution of potential conflictions between aircraft that are radar identified and in communication with ATC by ensuring that radar targets do not touch. Pertinent traffic advisories shall be issued when this procedure is applied.

***Note:* This procedure shall not be provided utilizing mosaic radar systems.**

(See CONTROLLED AIRSPACE). (See AIRPORT RADAR SERVICE AREA). (See OUTER AREA).

CONSOLAN—A low frequency, long-distance NAVAID used principally for transoceanic navigations.

CONTACT

1. **Establish communication with (followed by the name of the facility and, if appropriate, the frequency to be used).**
2. **A flight condition wherein the pilot ascertains the attitude of his aircraft and navigates by visual reference to the surface.**

(See CONTACT APPROACH). (See RADAR CONTACT).

***CONTACT APPROACH*—An approach wherein an aircraft on an IFR flight plan, having an air traffic control authorization, operating clear of clouds with at least 1 mile flight visibility and a reasonable expectation of continuing to the destination airport in those conditions, may deviate from the instrument approach procedure and proceed to the destination airport by visual reference to the surface. This approach will only be authorized when requested by the pilot and the reported ground visibility at the destination airport is at least 1 statute mile.**

(Refer to AIM).

CONTERMINOUS U.S.—The 48 adjoining States and the District of Columbia.

CONTINENTAL CONTROL AREA—(See CONTROLLED AIRSPACE).

CONTINENTAL UNITED STATES—The 49 States located on the continent of North America and the District of Columbia.

CONTROL AREA [ICAO]—A controlled airspace extending upwards from a specified limit above the earth.

CONTROL AREA—(See CONTROLLED AIRSPACE).

CONTROLLED AIRSPACE—Airspace designated as a control zone, airport radar service area, terminal control area, transition area, control area, continental control area, and positive control area within which some or all aircraft may be subject to air traffic control.

(Refer to AIM). (Refer to Part 71).—Types of U.S. Controlled Airspace:

1. Control Zone. Controlled airspace which extends upward from the surface of the earth and terminates at the base of the continental control area. Control zones that do not underlie the continental control area have no upper limit. A control zone may include one or more airports and is normally a circular area with a radius of 5 statute miles and any extensions necessary to include instrument approach and departure paths.

2. Airport Radar Service Area (ARSA). Regulatory airspace surrounding designated airports wherein ATC provides radar vectoring and sequencing on a full-time basis for all IFR and VFR aircraft. The service provided in an ARSA is called ARSA service which includes: IFR IFR-standard IFR separation; IFR VFR-traffic advisories and conflict resolution; and, VFR VFR-traffic advisories and, as appropriate, safety alerts. The AIM contains an explanation of ARSA. The ARSA's are depicted on VFR aeronautical charts.

(See CONFLICT RESOLUTION). (See OUTER AREA). (Refer to AIM). (Refer to A/FD). (Refer to Part 91).

3. Terminal Control Area (TCA). Controlled airspace extending upward from the surface or higher to specified altitudes, within which all aircraft are subject to operating rules and pilot and equipment requirements specified in Part 91. TCA's are depicted on Sectional, World Aeronautical, En Route Low Altitude, DOD FLIP, and TCA charts.

Refer to Part 91). (Refer to AIM).

4. Transition Area. Controlled airspace extending upward from 700 feet or more above the surface of the earth when designated in conjunction with an airport for which an approved instrument approach procedure has been prescribed; or from 1,200 feet or more above the surface of the earth when designated in conjunction with airway route structures or segments. Unless otherwise specified, transition areas terminate at the base of the overlying controlled airspace. Transition areas are designed to contain IFR operations in controlled airspace during portions of the terminal operation and while transiting between the terminal and en route environment.

5. Control Area. Airspace designated as Colored Federal airways, VOR Federal airways, control areas associated with jet routes outside the continental control area (Part 71.161), additional control areas (Part 71.163), control area extensions (Part 71.165), and area low routes. Control areas do not include

the continental control area, but unless otherwise designated, they do include the airspace between a segment of a main VOR Federal airway and its associated alternate segments with the vertical extent of the area corresponding to the vertical extent of the related segment of the main airway. The vertical extent of the various categories of airspace contained in control areas is defined in Part 71.

6. Continental Control Area. The airspace of the 48 contiguous States, the District of Columbia and Alaska, excluding the Alaska peninsula west of Long. 160° 00' 00"W, at and above 14,500 feet MSL, but does not include:

a. The airspace less than 1,500 feet above the surface of the earth; or

b. Prohibited and restricted areas, other than the restricted areas listed in Part 71.

7. Positive Control Area (PCA). Airspace designated in Part 71 within which there is positive control of aircraft. Flight in PCA is normally conducted under instrument flight rules. PCA is designated throughout most of the conterminous United States and its vertical extent is from 18,000 feet MSL to and including flight level 600. In Alaska PCA does not include the airspace less than 1,500 feet above the surface of the earth nor the airspace over the Alaska Peninsula west of longitude 160 degrees West. Rules for operating in PCA are found in Part 91.135 and Part 91.215.

(See ICAO term CONTROLLED AIRSPACE).

CONTROLLED AIRSPACE—An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.

Note 1 – Controlled airspace is a generic term that covers Class A, Class B, Class C, Class D, and Class E airspace.

Note 2 – Controlled airspace is also that airspace within which all aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements in FAR Part 91 (for specific operating requirements, please refer to FAR Part 91). For IFR operations in any class of controlled airspace, a pilot must file an IFR flight plan and receive an appropriate ATC clearance. Each Class B, Class C, and Class D airspace area designated for an airport contains at least one primary airport around which the airspace is designated (for specific designations and descriptions of the airspace classes, please refer to FAR Part 71).

Controlled airspace in the United States is designated as follows:

1. CLASS A: Generally, that airspace from 18,000 feet MSL up to and including FL600, including the airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska. Unless otherwise authorized, all persons must operate their aircraft under IFR.

2. CLASS B: Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspaces areas resemble upside-down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace. An ATC clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace. The cloud clearance requirement for VFR operations is "clear of clouds."

3. CLASS C: Generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Although the configuration of each Class C airspace area is individually tailored, the airspace usually consists of a surface area with a 5 nm radius, and an outer area with a 10 nm radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace. VFR aircraft are only separated from IFR aircraft within the airspace.

4. CLASS D: Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures. Arrival extensions for instrument approach procedures may be Class D or Class E airspace. Unless otherwise authorized, each person must establish two-way radio communications with the ATC facility providing air traffic services prior entering the airspace and thereafter maintain those communications while in the airspace. No separation services are provided to VFR aircraft.

5. CLASS E: Generally, if the airspace is not Class A, Class B, Class C, or Class D, and it is controlled airspace, it is Class E airspace. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Also in this class are Federal airways, airspace beginning at either 700 or 1,200 feet AGL used to transition to/from the terminal or enroute environment, enroute domestic, and offshore airspace areas designated below 18,000 feet MSL. Unless designated at a lower altitude, Class E airspace begins at 14,500 MSL over the United States, including that airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous

States and Alaska. Class E airspace does not include the airspace 18,000 MSL or above.

CONTROLLED AIRSPACE [ICAO]—Airspace of defined dimensions within which air traffic control service is provided to controlled flights.

Control Zone—A controlled airspace extending upwards from the surface of the earth to a specified upper limit.

Terminal Control Area—A control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes.

Control Area—A controlled airspace extending upward from a specified limit above the earth.

CONTROLLED AIRSPACE [ICAO]—An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification. *Note*–Controlled airspace is a generic term which covers ATS airspace Classes A, B, C, D, and E.

CONTROLLED DEPARTURE TIME PROGRAMS—These programs are the flow control process whereby aircraft are held on the ground at the departure airport when delays are projected to occur in either the en route system or the terminal of intended landing. The purpose of these programs is to reduce congestion in the air traffic system or to limit the duration of airborne holding in the arrival center or terminal area. A CDT is a specific departure slot shown on the flight plan as an expected departure clearance time (EDCT).

CONTROLLED TIME OF ARRIVAL—The original estimated time of arrival adjusted by the ATCSCC ground delay factor.

CONTROLLER—(See AIR TRAFFIC CONTROL SPECIALIST).

CONTROLLER [ICAO]—A person authorized to provide air traffic control services.

CONTROL SECTOR—An airspace area of defined horizontal and vertical dimensions for which a controller or group of controllers has air traffic control responsibility, normally within an air route traffic control center or an approach control facility. Sectors are established based on predominant traffic flows, altitude strata, and controller workload. Pilot-communications during operations within a sector are normally maintained on discrete frequencies assigned to the sector.

(See DISCRETE FREQUENCY).

CONTROL SLASH—A radar beacon slash representing the actual position of the associated aircraft. Normally, the control slash is the one closest to the interrogating radar beacon site. When ARTCC radar is operating in narrowband (digitized) mode, the control slash is converted to a target symbol.

CONTROL ZONE—(See CONTROLLED AIRSPACE).

CONVECTIVE SIGMET—A weather advisory concerning convective weather significant to the safety of all aircraft. Convective SIGMET's are issued for tornadoes, lines of thunderstorms, embedded thunderstorms of any intensity level, areas of thunderstorms greater than or equal to VIP level 4 with an area coverage of 4/10 (40%) or more, and hail 3/4 inch or greater.

(See AWW). (See SIGMET). (See CWA). (See AIRMET). (Refer to AIM).

CONVECTIVE SIGNIFICANT METEOROLOGICAL INFORMATION—(See CONVECTIVE SIGMET).

COORDINATES—The intersection of lines of reference, usually expressed in degrees/minutes/seconds of latitude and longitude, used to determine position or location.

COORDINATION FIX—The fix in relation to which facilities will handoff, transfer control of an aircraft, or coordinate flight progress data. For terminal facilities, it may also serve as a clearance for arriving aircraft.

COPTER—(See HELICOPTER).

CORRECTION—An error has been made in the transmission and the correct version follows.

COUPLED APPROACH—A coupled approach is an instrument approach performed by the aircraft autopilot which is receiving position information and/or steering commands from onboard navigation equipment. In general, coupled nonprecision approaches must be discontinued and flown manually at altitudes lower than 50 feet below the minimum descent altitude, and coupled precision approaches must be flown manually below 50 feet ALG

(See AUTOLAND APPROACH).

Note: Coupled and autoland approaches are flown in VFR and IFR. It is common for carriers to require their crews to fly coupled approaches and autoland approaches (if certified) when the weather conditions are less than approximately 4,000 RVR.

COURSE—

1. The intended direction of flight in the horizontal plane measured in degrees from north.
2. The ILS localizer signal pattern usually specified as the front course or the back course.
3. The intended track along a straight, curved, or segmented MLS path.

(See BEARING). (See RADIAL). (See INSTRUMENT LANDING SYSTEM). (See MICROWAVE LANDING SYSTEM).

CPL [ICAO]—(See CURRENT FLIGHT PLAN)

CRITICAL ENGINE—The engine which, upon failure, would most adversely affect the performance or handling qualities of an aircraft.

CROSS (FIX) AT (ALTITUDE)—Used by ATC when a specific altitude restriction at a specified fix is required.

CROSS (FIX) AT OR ABOVE (ALTITUDE)—Used by ATC when an altitude restriction at a specified fix is required. It does not prohibit the aircraft from crossing the fix at a higher altitude than specified; however, the higher altitude may not be one that will violate a succeeding altitude restriction or altitude assignment.

(See ALTITUDE RESTRICTION). (Refer to AIM).

CROSS (FIX) AT OR BELOW (ALTITUDE)—Used by ATC when a maximum crossing altitude at a specific fix is required. It does not prohibit the aircraft from crossing the fix at a lower altitude; however, it must be at or above the minimum IFR altitude.

(See MINIMUM IFR ALTITUDES). (See ALTITUDE RESTRICTION). (Refer to Part 91).

CROSSWIND—

1. When used concerning the traffic pattern, the word means "crosswind leg."

(See TRAFFIC PATTERN).

2. When used concerning wind conditions, the word means a wind not parallel to the runway or the path of an aircraft.

(See CROSSWIND COMPONENT).

CROSSWIND COMPONENT—The wind component measured in knots at 90 degrees to the longitudinal axis of the runway.

CRUISE—Used in an ATC clearance to authorize a pilot to conduct flight at any altitude from the minimum IFR altitude up to and including the altitude specified in the clearance. The pilot may level off at any intermediate altitude within this block of airspace. Climb/descent within the block is to be made at the discretion of the pilot. However, once the pilot starts descent and verbally reports leaving an altitude in the block, he may not return to that altitude without additional ATC clearance. Further, it is approval for the pilot to proceed to and make an approach at destination airport and can be used in conjunction with:

1. An airport clearance limit at locations with a standard/special instrument approach procedure. The FAR's require that if an instrument letdown to an airport is necessary, the pilot shall make the letdown in accordance with a standard/special instrument approach procedure for that airport, or
2. An airport clearance limit at locations that are within/below/outside controlled airspace and without a standard/special instrument approach procedure. Such a clearance is NOT AUTHORIZATION for the pilot to descend under IFR conditions below the applicable minimum IFR altitude nor does it imply that ATC is exercising control over aircraft in uncontrolled airspace (Class G airspace); however, it provides a means for the aircraft to proceed to destination airport, descend, and land in accordance with applicable FAR's governing VFR flight operations. Also, this provides search and rescue protection until such time as the IFR flight plan is closed.

(See INSTRUMENT APPROACH PROCEDURE).

CRUISING ALTITUDE—An altitude or flight level maintained during en route level flight. This is a constant altitude and should not be confused with a cruise clearance.

(See ALTITUDE). (See ICAO term CRUISING LEVEL).

CRUISING LEVEL [ICAO]—A level maintained during a significant portion of a flight.

CRUISE CLIMB—A climb technique employed by aircraft, usually at a constant power setting, resulting in an increase of altitude as the aircraft weight decreases.

CRUISING LEVEL—(See CRUISING ALTITUDE).

CT MESSAGE—An EDCT time generated by the ATCSCC to regulate traffic at arrival airports. Normally, a CT message is automatically transferred from the Traffic Management System computer to the NAS en route computer and appears as an EDCT. In the event of a communication failure between the TMS and the NAS, the CT message can be manually entered by the TMC at the en route facility.

CTA—(See CONTROLLED TIME OF ARRIVAL).

CTA—(See CONTROL AREA [ICAO]).

CTAF—(See COMMON TRAFFIC ADVISORY FREQUENCY).

CURRENT FLIGHT PLAN [ICAO]—The flight plan, including changes, if any, brought about by subsequent clearances.

CVFP APPROACH—(See CHARTED VISUAL FLIGHT PROCEDURE APPROACH).

CWA—(See CENTER WEATHER ADVISORY).

(See WEATHER ADVISORY).

D

DA [ICAO]—(See ICAO Term DECISION ALTITUDE/ DECISION HEIGHT).

DAIR—(See DIRECT ALTITUDE AND IDENTITY READOUT).

DANGER AREA [ICAO]—An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.

Note: The term "Danger Area" is not used in reference to areas within the United States or any of its possessions or territories.

DATA BLOCK—(See ALPHANUMERIC DISPLAY).

DEAD RECKONING—Dead reckoning, as applied to flying, is the navigation of an airplane solely by means of computations based on airspeed, course, heading, wind direction, and speed, groundspeed, and elapsed time.

DECISION ALTITUDE/DECISION HEIGHT [ICAO]—A specified altitude or height (A/H) in the precision approach at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.

Note 1: Decision altitude [DA] is referenced to mean sea level [MSL] and decision height [DH] is referenced to the threshold elevation.

Note 2: The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path.

DECISION HEIGHT—With respect to the operation of aircraft, means the height at which a decision must be made during an ILS, MLS, or PAR instrument approach to either continue the approach or to execute a missed approach.

(See ICAO term DECISION ALTITUDE/DECISION HEIGHT).

DECODER—The device used to decipher signals received from ATCRBS transponders to effect their display as select codes.

(See CODES). (See RADAR).

DEFENSE VISUAL FLIGHT RULES—Rules applicable to flights within an ADIZ conducted under the visual flight rules in Part 91.

(See AIR DEFENSE IDENTIFICATION ZONE). (Refer to Part 91). (Refer to Part 99).

DELAY INDEFINITE (REASON IF KNOWN) EXPECT FURTHER CLEARANCE (TIME)—Used by ATC to inform a pilot when an accurate estimate of the delay time and the reason for the delay cannot immediately be determined; e.g., a disabled aircraft on the runway, terminal or center area saturation, weather below landing minimums, etc.

(See EXPECT FURTHER CLEARANCE (TIME)).

DELAY TIME—The amount of time that the arrival must lose to cross the meter fix at the assigned meter fix time. This is the difference between ACLT and VTA.

DEPARTURE CENTER—The ARTCC having jurisdiction for the airspace that generates a flight to the impacted airport.

DEPARTURE CONTROL—A function of an approach control facility providing air traffic control service for departing IFR and, under certain conditions, VFR aircraft.

(See APPROACH CONTROL FACILITY, to AIM).

DEPARTURE SEQUENCING PROGRAM—A program designed to assist in achieving a specified interval over a common point for departures.

DEPARTURE TIME—The time an aircraft becomes airborne.

DESCENT SPEED ADJUSTMENTS—Speed deceleration calculations made to determine an accurate VTA. These calculations start at the transition point and use arrival speed segments to the vertex.

DETRESFA (DISTRESS PHASE) [ICAO]—The code word used to designate an emergency phase wherein there is reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger or require immediate assistance.

DEVIATIONS—

1. A departure from a current clearance, such as an off course maneuver to avoid weather or turbulence.
2. Where specifically authorized in the FAR's and requested by the pilot, ATC may permit pilots to deviate from certain regulations.

(Refer to AIM).

DF—(See DIRECTION FINDER).

DF APPROACH PROCEDURE—Used under emergency conditions where another instrument approach procedure cannot be executed. DF guidance for an instrument approach is given by ATC facilities with DF capability.

(See DF GUIDANCE). (See DIRECTION FINDER). (Refer to AIM).

DF FIX—The geographical location of an aircraft obtained by one or more direction finders.

(See DIRECTION FINDER).

DF GUIDANCE—Headings provided to aircraft by facilities equipped with direction finding equipment. These headings, if followed, will lead the aircraft to a predetermined point such as the DF station or an airport. DF guidance is given to aircraft in distress or to other aircraft which request the service. Practice DF guidance is provided when workload permits.

(See DIRECTION FINDER). (See DF FIX). (Refer to AIM).

DF STEER—(See DF GUIDANCE).

DH—(See DECISION HEIGHT).

DH [ICAO]—(See ICAO Term DECISION ALTITUDE/ DECISION HEIGHT).

DIRECT—Straight line flight between two navigational aids, fixes, points, or any combination thereof. When used by pilots in describing off-airway routes, points defining direct route segments become compulsory reporting points unless the aircraft is under radar contact.

DIRECT ALTITUDE AND IDENTITY READOUT—The DAIR System is a modification to the AN/TPX–42 Interrogator System. The Navy has two adaptations of the DAIR System-Carrier Air Traffic Control Direct Altitude and Identification Readout System for Aircraft Carriers and Radar Air Traffic Control Facility Direct Altitude and Identity Readout System for land-based terminal operations. The DAIR detects, tracks, and predicts secondary radar aircraft targets. Targets are displayed by means of computer-generated symbols and alphanumeric characters depicting flight identification, altitude, ground speed, and flight plan data. The DAIR System is capable of interfacing with ARTCC's.

DIRECTION FINDER—A radio receiver equipped with a directional sensing antenna used to take bearings on a radio transmitter. Specialized radio direction finders are used in aircraft as air navigation aids. Others are ground-based, primarily to obtain a "fix" on a pilot requesting orientation assistance or to locate downed aircraft. A location "fix" is established by the intersection of two or more bearing lines plotted on a navigational chart using either two separately located Direction Finders to obtain a fix on an aircraft or by a pilot plotting the bearing indications of his DF on two separately located ground-based transmitters, both of which can be identified on his chart. UDF's receive signals in the ultra high frequency radio broadcast band; VDF's in the very high frequency band; and UVDF's in both bands. ATC provides DF service at those air traffic control towers and flight service stations listed in the Airport/Facility Directory and the DOD FLIP IFR En Route Supplement.

(See DF GUIDANCE). (See DF FIX).

DISCRETE BEACON CODE—(See DISCRETE CODE).

DISCRETE CODE—As used in the Air Traffic Control Radar Beacon System (ATCRBS), any one of the 4096 selectable Mode 3/A aircraft transponder codes except those ending in zero zero; e.g., discrete codes: 0010, 1201, 2317, 7777; nondiscrete codes: 0100, 1200, 7700. Nondiscrete codes are normally reserved for radar facilities that are not equipped with discrete decoding capability and for other purposes such as emergencies (7700), VFR aircraft (1200), etc.

(See RADAR). (Refer to AIM).

DISCRETE FREQUENCY—A separate radio frequency for use in direct pilot-controller communications in air traffic control which reduces frequency congestion by controlling the number of aircraft operating on a particular frequency at one time. Discrete frequencies are normally designated for each control sector in en route/terminal ATC facilities. Discrete frequencies are listed in the Airport/Facility Directory and the DOD FLIP IFR En Route Supplement.

(See CONTROL SECTOR).

DISPLACED THRESHOLD—A threshold that is located at a point on the runway other than the designated beginning of the runway.

(See THRESHOLD). (Refer to AIM).

DISTANCE MEASURING EQUIPMENT—Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.

(See TACAN). (See VORTAC). (See MICROWAVE LANDING SYSTEM).

DISTRESS—A condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.

DIVE BRAKES—(See SPEED BRAKES).

DIVERSE VECTOR AREA—In a radar environment, that area in which a prescribed departure route is not required as the only suitable route to avoid obstacles. The area in which random radar vectors below the MVA/MIA, established in accordance with the TERPS criteria for diverse departures obstacles and terrain avoidance, may be issued to departing aircraft.

DME—(See DISTANCE MEASURING EQUIPMENT).

DME FIX—A geographical position determined by reference to a navigational aid which provides distance and azimuth information. It is defined by a specific distance in nautical miles and a radial, azimuth, or course (i.e., localizer) in degrees magnetic from that aid.

(See DISTANCE MEASURING EQUIPMENT). (See FIX). (See MICROWAVE LANDING SYSTEM).

DME SEPARATION—Spacing of aircraft in terms of distances (nautical miles) determined by reference to distance measuring equipment (DME).

(See DISTANCE MEASURING EQUIPMENT).

DOD FLIP—Department of Defense Flight Information Publications used for flight planning, en route, and terminal operations. FLIP is produced by the Defense Mapping Agency for world-wide use. United States Government Flight Information Publications (en route charts and instrument approach procedure charts) are incorporated in DOD FLIP for use in the National Airspace System (NAS).

DOMESTIC AIRSPACE—Airspace which overlies the continental land mass of the United States plus Hawaii and U.S. possessions. Domestic airspace extends to 12 miles offshore.

DOWNBURST—A strong downdraft which induces an outburst of damaging winds on or near the ground. Damaging winds, either straight or curved, are highly divergent. The sizes of downbursts vary from 1/2 mile or less to more than 10 miles. An intense down burst often causes widespread damage. Damaging winds, lasting 5 to 30 minutes, could reach speeds as high as 120 knots.

DOWNWIND LEG—(See TRAFFIC PATTERN).

DRAG CHUTE—A parachute device installed on certain aircraft which is deployed on landing roll to assist in deceleration of the aircraft.

DSP—(See DEPARTURE SEQUENCING PROGRAM).

DT—(See DELAY TIME).

DUE REGARD—A phase of flight wherein an aircraft commander of a State-operated aircraft assumes responsibility to separate his aircraft from all other aircraft. *(See also Chapter 1, Word Meanings).*

DUTY RUNWAY—(See RUNWAY IN USE/ACTIVE RUNWAY/DUTY RUNWAY).

DVA—(See DIVERSE VECTOR AREA).

DVFR—(See DEFENSE VISUAL FLIGHT RULES).

DVFR FLIGHT PLAN—A flight plan filed for a VFR aircraft which intends to operate in airspace within which the ready identification, location, and control of aircraft are required in the interest of national security.

DYNAMIC—Continuous review, evaluation, and change to meet demands.

DYNAMIC RESTRICTIONS—Those restrictions imposed by the local facility on an "as needed" basis to manage unpredictable fluctuations in traffic demands.

E

EARTS—(See EN ROUTE AUTOMATED RADAR TRACKING SYSTEM).

EDCT—(See EXPECTED DEPARTURE CLEARANCE TIME).

EFC—(See EXPECT FURTHER CLEARANCE (TIME)).

ELT—(See EMERGENCY LOCATOR TRANSMITTER).

EMERGENCY—A *distress* or an *urgency* condition.

EMERGENCY LOCATOR TRANSMITTER—A radio transmitter attached to the aircraft structure which operates from its own power source on 121.5 mHz and 243.0 mHz. It aids in locating downed aircraft by radiating a downward sweeping audio tone, 2–4 times per second. It is designed to function without human action after an accident.

(Refer to Part 91.3). (Refer to AIM).

EMERGENCY SAFE ALTITUDE—(See MINIMUM SAFE ALTITUDE).

E-MSAW—(See EN ROUTE MINIMUM SAFE ALTITUDE WARNING).

ENTRY POINT—The point at which an aircraft transitions from an offshore control area to oceanic airspace.

ENGINEERED PERFORMANCE STANDARDS—A mathematically derived runway capacity standard. EPS's are calculated for each airport on an individual basis and reflect that airport's aircraft mix, operating procedures, runway layout, and specific weather conditions. EPS's do not give consideration to staffing, experience levels, equipment outages, and in-trail restrictions as does the AAR.

EN ROUTE AIR TRAFFIC CONTROL SERVICES—Air traffic control service provided aircraft on IFR flight plans, generally by centers, when these aircraft are operating between departure and destination terminal areas. When equipment, capabilities, and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft.

(See NAS STAGE A). (See AIR ROUTE TRAFFIC CONTROL CENTER). (Refer to AIM).

EN ROUTE AUTOMATED RADAR TRACKING SYSTEM—An automated radar and radar beacon tracking system. Its functional capabilities and design are essentially the same as the terminal ARTS IIIA system except for the EARTS capability of employing both short-range (ASR) and long-range (ARSR) radars, use of full digital radar displays, and fail-safe design.

(See AUTOMATED RADAR TERMINAL SYSTEMS).

EN ROUTE CHARTS—(See AERONAUTICAL CHART).

EN ROUTE DESCENT—Descent from the en route cruising altitude which takes place along the route of flight.

EN ROUTE FLIGHT ADVISORY SERVICE—A service specifically designed to provide, upon pilot request, timely weather information pertinent to his type of flight, intended route of flight, and altitude. The FSS's providing this service are listed in the Airport/Facility Directory.

(See FLIGHT WATCH). (Refer to AIM).

EN ROUTE HIGH ALTITUDE CHARTS—(See AERONAUTICAL CHART).

EN ROUTE LOW ALTITUDE CHARTS—(See AERONAUTICAL CHART).

EN ROUTE MINIMUM SAFE ALTITUDE WARNING—A function of the NAS Stage A en route computer that aids the controller by alerting him when a tracked aircraft is below or predicted by the computer to go below a predetermined minimum IFR altitude (MIA).

EN ROUTE SPACING PROGRAM—A program designed to assist the exit sector in achieving the required in-trail spacing.

EPS—(See ENGINEERED PERFORMANCE STANDARDS).

ESP—(See EN ROUTE SPACING PROGRAM).

ESTIMATED ELAPSED TIME [ICAO]—The estimated time required to proceed from one significant point to another. (See ICAO Term TOTAL ESTIMATED ELAPSED TIME).

ESTIMATED OFF-BLOCK TIME [ICAO]—The estimated time at which the aircraft will commence movement associated with departure.

ESTIMATED TIME OF ARRIVAL—The time the flight is estimated to arrive at the gate (scheduled operators) or the actual runway on times for nonscheduled operators.

ESTIMATED TIME EN ROUTE—The estimated flying time from departure point to destination (lift-off to touchdown).

ETA—(See ESTIMATED TIME OF ARRIVAL).

ETE—(See ESTIMATED TIME EN ROUTE).

EXECUTE MISSED APPROACH—Instructions issued to a pilot making an instrument approach which means continue inbound to the missed approach point and execute the missed approach procedure as described on the Instrument Approach Procedure Chart or as previously assigned by ATC. The pilot may climb immediately to the altitude specified in the missed approach procedure upon making a missed approach. No turns should be initiated prior to reaching the missed approach point. When conducting an ASR or PAR approach, execute the assigned missed approach procedure immediately upon receiving instructions to "execute missed approach."

(Refer to AIM).

EXPECT (ALTITUDE) AT (TIME) or (FIX)—Used under certain conditions to provide a pilot with an altitude to be used in the event of two-way communications failure. It also provides altitude information to assist the pilot in planning.

(Refer to AIM).

EXPECTED DEPARTURE CLEARANCE TIME—The runway release time assigned to an aircraft in a controlled departure time program and shown on the flight progress strip as an EDCT.

EXPECT FURTHER CLEARANCE (TIME)—The time a pilot can expect to receive clearance beyond a clearance limit.

EXPECT FURTHER CLEARANCE VIA (AIRWAYS, ROUTES OR FIXES)—Used to inform a pilot of the routing he can expect if any part of the route beyond a short range clearance limit differs from that filed.

EXPEDITE—Used by ATC when prompt compliance is required to avoid the development of an imminent situation.

F

FAF—(See FINAL APPROACH FIX).

FA MESSAGE—The data entered into the ARTCC computers that activates delay processing for an impacted airport. The FA data includes the delay factor for flight plans that have not been assigned delays under CT message processing. The delay factor appears on flight progress strips in the form of an EDCT (e.g., EDCT 1820). FA processing assigns delays in 15–minute time blocks. FA's control numbers of aircraft within a specified time block but do not spread aircraft out evenly throughout the time block.

FAP—(See FINAL APPROACH POINT).

FAST FILE—A system whereby a pilot files a flight plan via telephone that is tape recorded and then transcribed for transmission to the appropriate air traffic facility. Locations having a fast file capability are contained in the Airport/Facility Directory.

(Refer to AIM).

FCLT—(See FREEZE CALCULATED LANDING TIME).

FEATHERED PROPELLER—A propeller whose blades have been rotated so that the leading and trailing edges are nearly parallel with the aircraft flight path to stop or minimize drag and engine rotation. Normally used to indicate shutdown of a reciprocating or turboprop engine due to malfunction.

FEDERAL AIRWAYS—(See LOW ALTITUDE AIRWAY STRUCTURE).

FEEDER FIX—The fix depicted on Instrument Approach Procedure Charts which establishes the starting point of the feeder route.

FEEDER ROUTE—A route depicted on instrument approach procedure charts to designate routes for aircraft to proceed from the en route structure to the initial approach fix (IAF).

(See INSTRUMENT APPROACH PROCEDURE).

FERRY FLIGHT—A flight for the purpose of:

1. Returning an aircraft to base.
2. Delivering an aircraft from one location to another.
3. Moving an aircraft to and from a maintenance base.—Ferry flights, under certain conditions, may be conducted under terms of a special flight permit.

FIELD ELEVATION—(See AIRPORT ELEVATION).

FILED—Normally used in conjunction with flight plans, meaning a flight plan has been submitted to ATC.

FILED EN ROUTE DELAY—Any of the following preplanned delays at points/areas along the route of flight which require special flight plan filing and handling techniques.

1. Terminal Area Delay. A delay within a terminal area for touch-and-go, low approach, or other terminal area activity.
2. Special Use Airspace Delay. A delay within a Military Operating Area, Restricted Area, Warning Area, or ATC Assigned Airspace.
3. Aerial Refueling Delay. A delay within an Aerial Refueling Track or Anchor.

FILED FLIGHT PLAN—The flight plan as filed with an ATS unit by the pilot or his designated representative without any subsequent changes or clearances.

FINAL—Commonly used to mean that an aircraft is on the final approach course or is aligned with a landing area.

(See FINAL APPROACH COURSE). (See FINAL APPROACH-IFR). (See TRAFFIC PATTERN). (See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

FINAL APPROACH [ICAO]—That part of an instrument approach procedure which commences at the specified final approach fix or point, or where such a fix or point is not specified,

a) At the end of the last procedure turn, base turn or inbound turn of a racetrack procedure, if specified; or

b) At the point of interception of the last track specified in the approach procedure; and ends at a point in the vicinity of an aerodrome from which:

1) A landing can be made; or

2) A missed approach procedure is initiated.

FINAL APPROACH COURSE—A published MLS course, a straight line extension of a localizer, a final approach radial/bearing, or a runway centerline all without regard to distance.

(See FINAL APPROACH-IFR). (See TRAFFIC PATTERN).

FINAL APPROACH FIX—The fix from which the final approach (IFR) to an airport is executed and which identifies the beginning of the final approach segment. It is designated on Government charts by the Maltese Cross symbol for nonprecision approaches and the lightning bolt symbol for precision approaches; or when ATC directs a lower-than-published Glideslope/path Intercept Altitude, it is the resultant actual point of the glideslope/path intercept.

(See FINAL APPROACH POINT). (See GLIDESLOPE INTERCEPT ALTITUDE). (See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

FINAL APPROACH-IFR—The flight path of an aircraft which is inbound to an airport on a final instrument approach course, beginning at the final approach fix or point and extending to the airport or the point where a circle-to-land maneuver or a missed approach is executed.

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE). (See FINAL APPROACH FIX). (See FINAL APPROACH COURSE). (See FINAL APPROACH POINT). (See ICAO term FINAL APPROACH).

FINAL APPROACH POINT—The point, applicable only to a nonprecision approach with no depicted FAF (such as an on-airport VOR), where the aircraft is established inbound on the final approach course from the procedure turn and where the final approach descent may be commenced. The FAP serves as the FAF and identifies the beginning of the final approach segment.

(See FINAL APPROACH FIX). (See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

FINAL APPROACH SEGMENT—(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

FINAL APPROACH SEGMENT [ICAO]—That segment of an instrument approach procedure in which alignment and descent for landing are accomplished.

FINAL APPROACH-VFR—(See TRAFFIC PATTERN).

FINAL CONTROLLER—The controller providing information and final approach guidance during PAR and ASR approaches utilizing radar equipment.

(See RADAR APPROACH).

FINAL MONITOR AID—A high resolution color display that is equipped with the controller alert system hardware/software which is used in the precision runway monitor (PRM) system. The display includes alert algorithms providing the target predictors, a color change alert when a target penetrates or is predicted to penetrate the no transgression zone (NTZ), a color change alert if the aircraft transponder becomes inoperative, synthesized voice alerts, digital mapping, and like features contained in the PRM system.

(See RADAR APPROACH).

FIR—(See FLIGHT INFORMATION REGION).

FIRST TIER CENTER—The ARTCC immediately adjacent to the impacted center.

FIX—A geographical position determined by visual reference to the surface, by reference to one or more radio NAVAIDs, by celestial plotting, or by another navigational device.

FIX BALANCING—A process whereby aircraft are evenly distributed over several available arrival fixes reducing delays and controller workload.

FLAG—A warning device incorporated in certain airborne navigation and flight instruments indicating that:

1. Instruments are inoperative or otherwise not operating satisfactorily, or
2. Signal strength or quality of the received signal falls below acceptable values.

FLAG ALARM—(See FLAG).

FLAMEOUT—Unintended loss of combustion in turbine engines resulting in the loss of engine power.

FLIGHT CHECK—A call-sign prefix used by FAA aircraft engaged in flight inspection/certification of navigational aids and flight procedures. The word "recorded" may be added as a suffix; e.g., "Flight Check 320 recorded" to indicate that an automated flight inspection is in progress in terminal areas.

(See FLIGHT INSPECTION). (Refer to AIM).

FLIGHT FOLLOWING—(See TRAFFIC ADVISORIES).

FLIGHT INFORMATION REGION—An airspace of defined dimensions within which Flight Information Service and Alerting Service are provided.

1. Flight Information Service. A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.
2. Alerting Service. A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid and to assist such organizations as required.

FLIGHT INFORMATION SERVICE—A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

FLIGHT INSPECTION—Inflight investigation and evaluation of a navigational aid to determine whether it meets established tolerances.

(See NAVIGATIONAL AID). (See FLIGHT CHECK).

FLIGHT LEVEL—A level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury. Each is stated in three digits that represent hundreds of feet. For example, flight level 250 represents a barometric altimeter indication of 25,000 feet; flight level 255, an indication of 25,500 feet.

(See ICAO term FLIGHT LEVEL).

FLIGHT LEVEL [ICAO]—A surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hPa (1013.2 mb), and is separated from other such surfaces by specific pressure intervals.

Note 1: A pressure type altimeter calibrated in accordance with the standard atmosphere:

a) When set to a QNH altimeter setting, will indicate altitude;

b) When set to a QFE altimeter setting, will indicate height above the QFE reference datum; and

c) When set to a pressure of 1013.2 hPa (1013.2 mb), may be used to indicate flight levels.

Note 2: The terms 'height' and 'altitude', used in Note 1 above, indicate altimetric rather than geometric heights and altitudes.

FLIGHT LINE—A term used to describe the precise movement of a civil photogrammetric aircraft along a predetermined course(s) at a predetermined altitude during the actual photographic run.

FLIGHT MANAGEMENT SYSTEMS—A computer system that uses a large data base to allow routes to be preprogrammed and fed into the system by means of a data loader. The system is constantly updated with respect to position accuracy by reference to conventional navigation aids. The sophisticated program and its associated data base insures that the most appropriate aids are automatically selected during the information update cycle.

FLIGHT PATH—A line, course, or track along which an aircraft is flying or intended to be flown.

(See TRACK). (See COURSE).

FLIGHT PLAN—Specified information relating to the intended flight of an aircraft that is filed orally or in writing with an FSS or an ATC facility.

(See FAST FILE). (See FILED). (Refer to AIM).

FLIGHT PLAN AREA—The geographical area assigned by regional air traffic divisions to a flight service station for the purpose of search and rescue for VFR aircraft, issuance of notams, pilot briefing, in-flight services, broadcast, emergency services, flight data processing, international operations, and aviation weather services. Three letter identifiers are assigned to every flight service station and are annotated in AFD's and Order 7350.6 as tie-in-facilities.

(See FAST FILE). (See FILED). (Refer to AIM).

FLIGHT RECORDER—A general term applied to any instrument or device that records information about the performance of an aircraft in flight or about conditions encountered in flight. Flight recorders may make records of airspeed, outside air temperature, vertical acceleration, engine RPM, manifold pressure, and other pertinent variables for a given flight.

(See ICAO term FLIGHT RECORDER).

FLIGHT RECORDER [ICAO]—Any type of recorder installed in the aircraft for the purpose of complementing accident/incident investigation.

Note: See Annex 6 Part I, for specifications relating to flight recorders.

FLIGHT SERVICE STATION—Air traffic facilities which provide pilot briefing, en route communications and VFR search and rescue services, assist lost aircraft and aircraft in emergency situations, relay ATC clearances, originate Notices to Airmen, broadcast aviation weather and NAS information, receive and process IFR flight plans, and monitor NAVAID's. In addition, at selected locations, FSS's provide Enroute Flight Advisory Service (Flight Watch), take weather observations, issue airport advisories, and advise Customs and Immigration of transborder flights.

(Refer to AIM).

FLIGHT STANDARDS DISTRICT OFFICE—An FAA field office serving an assigned geographical area and staffed with Flight Standards personnel who serve the aviation industry and the general public on matters relating to the certification and operation of air carrier and general aviation aircraft. Activities include general surveillance of operational safety, certification of airmen and aircraft, accident prevention, investigation, enforcement, etc.

FLIGHT TEST—A flight for the purpose of:

1. Investigating the operation/flight characteristics of an aircraft or aircraft component.
2. Evaluating an applicant for a pilot certificate or rating.

FLIGHT VISIBILITY—(See VISIBILITY).

FLIGHT WATCH—A shortened term for use in air-ground contacts to identify the flight service station providing En Route Flight Advisory Service; e.g., "Oakland Flight Watch."

(See EN ROUTE FLIGHT ADVISORY SERVICE).

FLIP—(See DOD FLIP).

FLOW CONTROL—Measures designed to adjust the flow of traffic into a given airspace, along a given route, or bound for a given aerodrome (airport) so as to ensure the most effective utilization of the airspace.

(See QUOTA FLOW CONTROL). (Refer to AIRPORT/FACILITY DIRECTORY).

FLY HEADING (DEGREES)—Informs the pilot of the heading he should fly. The pilot may have to turn to, or continue on, a specific compass direction in order to comply with the instructions. The pilot is expected to turn in the shorter direction to the heading unless otherwise instructed by ATC.

FMA—(See FINAL MONITOR AID).

FMS—(See FLIGHT MANAGEMENT SYSTEM)

FORMATION FLIGHT—More than one aircraft which, by prior arrangement between the pilots, operate as a single aircraft with regard to navigation and position reporting. Separation between aircraft within the formation is the responsibility of the flight leader and the pilots of the other aircraft in the flight. This includes transition periods when aircraft within the formation are maneuvering to attain separation from each other to effect individual control and during join-up and breakaway.

1. A standard formation is one in which a proximity of no more than 1 mile laterally or longitudinally and within 100 feet vertically from the flight leader is maintained by each wingman.
2. Nonstandard formations are those operating under any of the following conditions:
   a. When the flight leader has requested and ATC has approved other than standard formation dimensions.

b. When operating within an authorized altitude reservation (ALTRV) or under the provisions of a letter of agreement.

c. When the operations are conducted in airspace specifically designed for a special activity.

(See ALTITUDE RESERVATION). (Refer to Part 91).

FRC—(See REQUEST FULL ROUTE CLEARANCE).

FREEZE/FROZEN—Terms used in referring to arrivals which have been assigned ACLT's and to the lists in which they are displayed.

FREEZE CALCULATED LANDING TIME—A dynamic parameter number of minutes prior to the meter fix calculated time of arrival for each aircraft when the TCLT is frozen and becomes an ACLT (i.e., the VTA is updated and consequently the TCLT is modified as appropriate until FCLT minutes prior to meter fix calculated time of arrival, at which time updating is suspended and an ACLT and a frozen meter fix crossing time (MFT) is assigned).

FREEZE SPEED PARAMETER—A speed adapted for each aircraft to determine fast and slow aircraft. Fast aircraft freeze on parameter FCLT and slow aircraft freeze on parameter MLDI.

FSDO—(See FLIGHT STANDARDS DISTRICT OFFICE).

FSPD—(See FREEZE SPEED PARAMETER).

FSS—(See FLIGHT SERVICE STATION).

FUEL DUMPING—Airborne release of usable fuel. This does not include the dropping of fuel tanks.

(See JETTISONING OF EXTERNAL STORES).

FUEL REMAINING—A phrase used by either pilots or controllers when relating to the fuel remaining on board until actual fuel exhaustion. When transmitting such information in response to either a controller question or pilot initiated cautionary advisory to air traffic control, pilots will state the APPROXIMATE NUMBER OF MINUTES the flight can continue with the fuel remaining. All reserve fuel SHOULD BE INCLUDED in the time stated, as should an allowance for established fuel gauge system error.

FUEL SIPHONING—Unintentional release of fuel caused by overflow, puncture, loose cap, etc.

FUEL VENTING—(See FUEL SIPHONING).

G

GADO—(See GENERAL AVIATION DISTRICT OFFICE).

GATE HOLD PROCEDURES—Procedures at selected airports to hold aircraft at the gate or other ground location whenever departure delays exceed or are anticipated to exceed 15 minutes. The sequence for departure will be maintained in accordance with initial call-up unless modified by flow control restrictions. Pilots should monitor the ground control/clearance delivery frequency for engine start/taxi advisories or new proposed start/taxi time if the delay changes.

(See FLOW CONTROL).

GCA—(See GROUND CONTROLLED APPROACH).

GENERAL AVIATION—That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of public convenience and necessity from the Civil Aeronautics Board and large aircraft commercial operators.

(See ICAO term GENERAL AVIATION).

GENERAL AVIATION [ICAO]—All civil aviation operations other than scheduled air services and nonscheduled air transport operations for remuneration or hire.

GENERAL AVIATION DISTRICT OFFICE—An FAA field office serving a designated geographical area and staffed with Flight Standards personnel who have the responsibility for serving the aviation industry and the general public on all matters relating to the certification and operation of general aviation aircraft.

GEO MAP—The digitized map markings associated with the ASR-9 Radar System.

GLIDEPATH—(See GLIDESLOPE).

GLIDEPATH INTERCEPT ALTITUDE—(See GLIDESLOPE INTERCEPT ALTITUDE).

GLIDESLOPE—Provides vertical guidance for aircraft during approach and landing. The glideslope/glidepath is based on the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS/MLS, or
2. Visual ground aids, such as VASI, which provide vertical guidance for a VFR approach or for the visual portion of an instrument approach and landing.
3. PAR. Used by ATC to inform an aircraft making a PAR approach of its vertical position (elevation) relative to the descent profile.

(See ICAO term GLIDEPATH).

GLIDEPATH [ICAO]—A descent profile determined for vertical guidance during a final approach.

GLIDESLOPE INTERCEPT ALTITUDE—The minimum altitude to intercept the glideslope/path on a precision approach. The intersection of the published intercept altitude with the glideslope/path, designated on Government charts by the lightning bolt symbol, is the precision FAF; however, when ATC directs a lower altitude, the resultant lower intercept position is then the FAF.

(See FINAL APPROACH FIX). (See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

GLOBAL POSITIONING SYSTEM—A space-base radio positioning, navigation, and time-transfer system being developed by Department of Defense. When fully deployed, the system is intended to provide highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users. The system will be unaffected by weather, and will provide a worldwide common grid reference system. The GPS concept is predicated upon accurate and continuous knowledge of the spatial position of each satellite in the system with respect to time and distance from a transmitting satellite to the user. The GPS receiver automatically selects appropriate signals from the satellites in view and translates these into a three-dimensional position, velocity, and time. Predictable system accuracy for civil users is projected to be 100 meters horizontally. Performance standards and certification criteria have not yet been established.

GO AHEAD—Proceed with your message. Not to be used for any other purpose.

GO AROUND—Instructions for a pilot to abandon his approach to landing. Additional instructions may follow. Unless otherwise advised by ATC, a VFR aircraft or an aircraft conducting visual approach should overfly the runway while climbing to traffic pattern altitude and enter the traffic pattern via the crosswind leg. A pilot on an IFR flight plan making an instrument approach should execute the published missed approach procedure or proceed as instructed by ATC; e.g., "Go around" (additional instructions if required).

(See LOW APPROACH). (See MISSED APPROACH).

GPS—(See Global Positioning System)

GROUND CLUTTER—A pattern produced on the radar scope by ground returns which may degrade other radar returns in the affected area. The effect of ground clutter is minimized by the use of moving target indicator (MTI) circuits in the radar equipment resulting in a radar presentation which displays only targets which are in motion.

(See CLUTTER).

GROUND CONTROLLED APPROACH—A radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio. The approach may be conducted with surveillance radar (ASR) only or with both surveillance and precision approach radar (PAR). Usage of the term "GCA" by pilots is discouraged except when referring to a GCA facility. Pilots should specifically request a "PAR" approach when a precision radar approach is desired or request an "ASR" or "surveillance" approach when a nonprecision radar approach is desired.

(See RADAR APPROACH).

GROUND DELAY—The amount of delay attributed to ATC, encountered prior to departure, usually associated with a CDT program.

GROUND SPEED—The speed of an aircraft relative to the surface of the earth.

GROUND STOP—Normally, the last initiative to be utilized; this method mandates that the terminal facility will not allow any departures to enter the ARTCC airspace until further notified.

GROUND VISIBILITY—(See VISIBILITY).

H

HAA—(See HEIGHT ABOVE AIRPORT).

HAL—(See HEIGHT ABOVE LANDING).

HANDOFF—An action taken to transfer the radar identification of an aircraft from one controller to another if the aircraft will enter the receiving controller's airspace and radio communications with the aircraft will be transferred.

HAT—(See HEIGHT ABOVE TOUCHDOWN).

HAVE NUMBERS—Used by pilots to inform ATC that they have received runway, wind, and altimeter information only.

HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE—Continuous recorded hazardous inflight weather forecasts broadcasted to airborne pilots over selected VOR outlets defined as an HIWAS BROADCAST AREA.

HAZARDOUS WEATHER INFORMATION—Summary of significant meteorological information (SIGMET/WS), convective significant meteorological information (convective SIGMET/WST), urgent pilot weather reports (urgent PIREP/UUA), center weather advisories (CWA), airmen's meteorological information (AIRMET/WA) and any other weather such as isolated thunderstorms that are rapidly developing and increasing in intensity, or low ceilings and visibilities that are becoming widespread which is considered significant and are not included in a current hazardous weather advisory.

HEAVY (AIRCRAFT)—(See AIRCRAFT CLASSES).

HEIGHT ABOVE AIRPORT—The height of the Minimum Descent Altitude above the published airport elevation. This is published in conjunction with circling minimums.

(See MINIMUM DESCENT ALTITUDE).

HEIGHT ABOVE LANDING—The height above a designated helicopter landing area used for helicopter instrument approach procedures.

(Refer to Part 97).

HEIGHT ABOVE TOUCHDOWN—The height of the Decision Height or Minimum Descent Altitude above the highest runway elevation in the touchdown zone (first 3,000 feet of the runway). HAT is published on instrument approach charts in conjunction with all straight-in minimums.

(See DECISION HEIGHT). (See MINIMUM DESCENT ALTITUDE).

HELICOPTER—Rotorcraft that, for its horizontal motion, depends principally on its engine-driven rotors.

(See ICAO term HELICOPTER).

HELICOPTER [ICAO]—A heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.

HELIPAD—A small, designated area, usually with a prepared surface, on a heliport, airport, landing/takeoff area, apron/ramp, or movement area used for takeoff, landing, or parking of helicopters.

HELIPORT—An area of land, water, or structure used or intended to be used for the landing and takeoff of helicopters and includes its buildings and facilities if any.

HERTZ—The standard radio equivalent of frequency in cycles per second of an electromagnetic wave. Kilohertz (kHz) is a frequency of one thousand cycles per second. Megahertz (mHz) is a frequency of one million cycles per second.

HF—(See HIGH FREQUENCY).

HF COMMUNICATIONS—(See HIGH FREQUENCY COMMUNICATIONS).

HIGH FREQUENCY—The frequency band between 3 and 30 mHz.

(See HIGH FREQUENCY COMMUNICATIONS).

HIGH FREQUENCY COMMUNICATIONS—High radio frequencies (HF) between 3 and 30 mHz used for air-to-ground voice communication in overseas operations.

HIGH SPEED EXIT—(See HIGH SPEED TAXIWAY).

HIGH SPEED TAXIWAY—A long radius taxiway designed and provided with lighting or marking to define the path of aircraft, traveling at high speed (up to 60 knots), from the runway center to a point on the center of a taxiway. Also referred to as long radius exit or turn-off taxiway. The high speed taxiway is designed to expedite aircraft turning off the runway after landing, thus reducing runway occupancy time.

HIGH SPEED TURNOFF—(See HIGH SPEED TAXIWAY).

HIWAS—(See HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE).

HIWAS AREA—(See HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE).

HIWAS BROADCAST AREA—A geographical area of responsibility including one or more HIWAS outlet areas assigned to an AFSS/FSS for hazardous weather advisory broadcasting.

HIWAS OUTLET AREA—An area defined as a 150 NM radius of a HIWAS outlet, expanded as necessary to provide coverage.

HOLDING PROCEDURE—(See HOLD PROCEDURE).

HOLD PROCEDURE—A predetermined maneuver which keeps aircraft within a specified airspace while awaiting further clearance from air traffic control. Also used during ground operations to keep aircraft within a specified area or at a specified point while awaiting further clearance from air traffic control.

(See HOLDING FIX). (Refer to AIM).

HOLDING FIX—A specified fix identifiable to a pilot by NAVAID's or visual reference to the ground used as a reference point in establishing and maintaining the position of an aircraft while holding.

(See FIX). (See VISUAL HOLDING). (Refer to AIM).

HOLDING POINT [ICAO]—A specified location, identified by visual or other means, in the vicinity of which the position of an aircraft in flight is maintained in accordance with air traffic control clearances.

HOLD FOR RELEASE—Used by ATC to delay an aircraft for traffic management reasons; i.e., weather, traffic volume, etc. Hold for release instructions (including departure delay information) are used to inform a pilot or a controller (either directly or through an authorized relay) that a departure clearance is not valid until a release time or additional instructions have been received.

(See ICAO term HOLDING POINT).

HOMING—Flight toward a NAVAID, without correcting for wind, by adjusting the aircraft heading to maintain a relative bearing of zero degrees.

(See BEARING). (See ICAO term HOMING).

HOMING [ICAO]—The procedure of using the direction-finding equipment of one radio station with the emission of another radio station, where at least one of the stations is mobile, and whereby the mobile station proceeds continuously towards the other station.

HOVER CHECK—Used to describe when a helicopter/VTOL aircraft requires a stabilized hover to conduct a performance/power check prior to hover taxi, air taxi, or takeoff. Altitude of the hover will vary based on the purpose of the check.

HOVER TAXI—Used to describe a helicopter/VTOL aircraft movement conducted above the surface and in ground effect at airspeeds less than approximately 20 knots. The actual height may vary, and some helicopters may require hover taxi above 25 feet AGL to reduce ground effect turbulence or provide clearance for cargo slingloads.

(See AIR TAXI). (See HOVER CHECK). (Refer to AIM).

HOW DO YOU HEAR ME?—A question relating to the quality of the transmission or to determine how well the transmission is being received.

HZ—(See HERTZ).

I

IAF—(See INITIAL APPROACH FIX).

IAP—(See INSTRUMENT APPROACH PROCEDURE).

ICAO—(See INTERNATIONAL CIVIL AVIATION ORGANIZATION).

ICAO [ICAO]—(See ICAO Term INTERNATIONAL CIVIL AVIATION ORGANIZATION).

IDENT—A request for a pilot to activate the aircraft transponder identification feature. This will help the controller to confirm an aircraft identity or to identify an aircraft.

(Refer to AIM).

IDENT FEATURE—The special feature in the Air Traffic Control Radar Beacon System (ATCRBS) equipment. It is used to immediately distinguish one displayed beacon target from other beacon targets.

(See IDENT).

IF—(See INTERMEDIATE FIX).

IFIM—(See INTERNATIONAL FLIGHT INFORMATION MANUAL).

IF NO TRANSMISSION RECEIVED FOR (TIME)—Used by ATC in radar approaches to prefix procedures which should be followed by the pilot in event of lost communications.

(See LOST COMMUNICATIONS).

IFR—(See INSTRUMENT FLIGHT RULES).

IFR AIRCRAFT—An aircraft conducting flight in accordance with instrument flight rules.

IFR CONDITIONS—Weather conditions below the minimum for flight under visual flight rules.

(See INSTRUMENT METEOROLOGICAL CONDITIONS).

IFR DEPARTURE PROCEDURE—(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES).

(Refer to AIM).

IFR FLIGHT—(See IFR AIRCRAFT).

IFR LANDING MINIMUMS—(See LANDING MINIMUMS).

IFR MILITARY TRAINING ROUTES (IR)—Routes used by the Department of Defense and associated Reserve and Air Guard units for the purpose of conducting low-altitude navigation and tactical training in both IFR and VFR weather conditions below 10,000 feet MSL at airspeeds in excess of 250 knots IAS.

IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES—*Federal Aviation Regulations*, Part 91, prescribes standard takeoff rules for certain civil users. At some airports, obstructions or other factors require the establishment of nonstandard takeoff minimums, departure procedures, or both to assist pilots in avoiding obstacles during climb to the minimum en route altitude. Those airports are listed in NOS/DOD Instrument Approach Charts (IAP's) under a section entitled "IFR Takeoff Minimums and Departure Procedures." The NOS/DOD IAP chart legend illustrates the symbol used to alert the pilot to nonstandard takeoff minimums and departure procedures. When departing IFR from such airports or from any airports where there are no departure procedures, SID's, or ATC facilities available, pilots should advise ATC of any departure limitations. Controllers may query a pilot to determine acceptable departure directions, turns, or headings after takeoff. Pilots should be familiar with the departure procedures and must assure that their aircraft can meet or exceed any specified climb gradients.

ILS—(See INSTRUMENT LANDING SYSTEM).

ILS CATEGORIES—1. ILS Category I. An ILS approach procedure which provides for approach to a height above touchdown of not less than 200 feet and with runway visual range of not less than 1,800 feet.—2. ILS Category II. An ILS approach procedure which provides for approach to a height above touchdown of not less than 100 feet and with runway visual range of not less than 1,200 feet.—3. ILS Category III:

a. IIIA.—An ILS approach procedure which provides for approach without a decision height minimum and with runway visual range of not less than 700 feet.

b. IIIB.—An ILS approach procedure which provides for approach without a decision height minimum and with runway visual range of not less than 150 feet.

c. IIIC.—An ILS approach procedure which provides for approach without a decision height minimum and without runway visual range minimum.

IM—(See INNER MARKER).

IMC—(See INSTRUMENT METEOROLOGICAL CONDITIONS).

IMMEDIATELY—Used by ATC when such action compliance is required to avoid an imminent situation.

INCERFA Uncertainty Phase) [ICAO]—A situation wherein uncertainty exists as to the safety of an aircraft and its occupants.

INCREASE SPEED TO (SPEED)—(See SPEED ADJUSTMENT).

INERTIAL NAVIGATION SYSTEM—An RNAV system which is a form of self-contained navigation.

(See Area Navigation/RNAV.).

INFLIGHT REFUELING—(See AERIAL REFUELING).

INFLIGHT WEATHER ADVISORY—(See WEATHER ADVISORY).

INFORMATION REQUEST—A request originated by an FSS for information concerning an overdue VFR aircraft.

INITIAL APPROACH FIX—The fixes depicted on instrument approach procedure charts that identify the beginning of the initial approach segment(s).

(See FIX). (See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

INITIAL APPROACH SEGMENT—(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

INITIAL APPROACH SEGMENT [ICAO]—That segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fix or point.

INLAND NAVIGATION FACILITY—A navigation aid on a North American Route at which the common route and/or the noncommon route begins or ends.

INNER MARKER—A marker beacon used with an ILS (CAT II) precision approach located between the middle marker and the end of the ILS runway, transmitting a radiation pattern keyed at six dots per second and indicating to the pilot, both aurally and visually, that he is at the designated decision height (DH), normally 100 feet above the touchdown zone elevation, on the ILS CAT II approach. It also marks progress during a CAT III approach.

(See INSTRUMENT LANDING SYSTEM). (Refer to AIM).

INNER MARKER BEACON—(See INNER MARKER).

INREQ—(See INFORMATION REQUEST).

INS—(See INERTIAL NAVIGATION SYSTEM).

INSTRUMENT APPROACH—(See INSTRUMENT APPROACH PROCEDURE).

INSTRUMENT APPROACH PROCEDURE—A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. It is prescribed and approved for a specific airport by competent authority.

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE). (Refer to Part 91). (See AIM).

1. U.S. civil standard instrument approach procedures are approved by the FAA as prescribed under Part 97 and are available for public use.
2. U.S. military standard instrument approach procedures are approved and published by the Department of Defense.
3. Special instrument approach procedures are approved by the FAA for individual operators but are not published in Part 97 for public use.

(See ICAO term INSTRUMENT APPROACH PROCEDURE).

INSTRUMENT APPROACH PROCEDURE [ICAO]—A series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en route obstacle clearance criteria apply.

INSTRUMENT APPROACH PROCEDURES CHARTS—(See AERONAUTICAL CHART).

INSTRUMENT FLIGHT RULES—Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.

(See VISUAL FLIGHT RULES). (See INSTRUMENT METEOROLOGICAL CONDITIONS). (See VISUAL METEOROLOGICAL CONDITIONS). (Refer to AIM). (See ICAO term INSTRUMENT FLIGHT RULES).

INSTRUMENT FLIGHT RULES [ICAO]—A set of rules governing the conduct of flight under instrument meteorological conditions.

INSTRUMENT LANDING SYSTEM—A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer.

(See LOCALIZER).

2. Glideslope.

(See GLIDESLOPE).

3. Outer Marker.

(See OUTER MARKER).

4. Middle Marker.

(See MIDDLE MARKER).

5. Approach Lights.

(See AIRPORT LIGHTING).

(Refer to Part 91). (See AIM).

INSTRUMENT METEOROLOGICAL CONDITIONS—Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.

(See VISUAL METEOROLOGICAL CONDITIONS). (See INSTRUMENT FLIGHT RULES). (See VISUAL FLIGHT RULES).

INSTRUMENT RUNWAY—A runway equipped with electronic and visual navigation aids for which a precision or nonprecision approach procedure having straight-in landing minimums has been approved.

(See ICAO term INSTRUMENT RUNWAY).

INSTRUMENT RUNWAY [ICAO]—One of the following types of runways intended for the operation of aircraft using instrument approach procedures:

a) Nonprecision Approach Runway—An instrument runway served by visual aids and a nonvisual aid providing at least directional guidance adequate for a straight-in approach.

b) Precision Approach Runway, Category I—An instrument runway served by ILS and visual aids intended for operations down to 60 m (200 feet) decision height and down to an RVR of the order of 800 m.

c) Precision Approach Runway, Category II—An instrument runway served by ILS and visual aids intended for operations down to 30 m (100 feet) decision height and down to an RVR of the order of 400 m.

d) Precision Approach Runway, Category III—An instrument runway served by ILS to and along the surface of the runway and:

A. Intended for operations down to an RVR of the order of 200 m (no decision height being applicable) using visual aids during the final phase of landing;

B. Intended for operations down to an RVR of the order of 50 m (no decision height being applicable) using visual aids for taxiing;

C. Intended for operations without reliance on visual reference for landing or taxiing.

Note 1: See Annex 10 Volume I, Part I Chapter 3, for related ILS specifications.

Note 2: Visual aids need not necessarily be matched to the scale of nonvisual aids provided. The criterion for the selection of visual aids is the conditions in which operations are intended to be conducted.

INTERMEDIATE APPROACH SEGMENT—(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

INTERMEDIATE APPROACH SEGMENT [ICAO]—That segment of an instrument approach procedure between either the intermediate approach fix and the final approach fix or point, or between the end of a reversal, race track or dead reckoning track procedure and the final approach fix or point, as appropriate.

INTERMEDIATE FIX—The fix that identifies the beginning of the intermediate approach segment of an instrument approach procedure. The fix is not normally identified on the instrument approach chart as an intermediate fix (IF).

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

INTERMEDIATE LANDING—On the rare occasion that this option is requested, it should be approved. The departure center, however, must advise the ATCSCC so that the appropriate delay is carried over and assigned at the intermediate airport. An intermediate landing airport within the arrival center will not be accepted without coordination with and the approval of the ATCSCC.

INTERNATIONAL AIRPORT—Relating to international flight, it means:

1. An airport of entry which has been designated by the Secretary of Treasury or Commissioner of Customs as an international airport for customs service.
2. A landing rights airport at which specific permission to land must be obtained from customs authorities in advance of contemplated use.
3. Airports designated under the Convention on International Civil Aviation as an airport for use by international commercial air transport and/or international general aviation.

(Refer to AIRPORT/FACILITY DIRECTORY). (Refer to IFIM). (See ICAO term INTERNATIONAL AIRPORT).

INTERNATIONAL AIRPORT [ICAO]—Any airport designated by the Contracting State in whose territory it is situated as an airport of entry and departure for international air traffic, where the formalities incident to customs, immigration, public health, animal and plant quarantine and similar procedures are carried out.

INTERNATIONAL CIVIL AVIATION ORGANIZATION [ICAO]—A specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

ICAO Regions include:

AFI African-Indian Ocean Region
CAR Caribbean Region
EUR European Region
MID/ASIA Middle East/Asia Region
NAM North American Region
NAT North Atlantic Region
PAC Pacific Region
SAM South American Region

INTERNATIONAL FLIGHT INFORMATION MANUAL—A publication designed primarily as a pilot's preflight planning guide for flights into foreign airspace and for flights returning to the U.S. from foreign locations.

INTERROGATOR—The ground-based surveillance radar beacon transmitter-receiver, which normally scans in synchronism with a primary radar, transmitting discrete radio signals which repetitiously request all transponders on the mode being used to reply. The replies received are mixed with the primary radar returns and displayed on the same plan position indicator (radar scope). Also, applied to the airborne element of the TACAN/DME system.

(See TRANSPONDER). (Refer to AIM).

INTERSECTING RUNWAYS—Two or more runways which cross or meet within their lengths.

(See INTERSECTION).

INTERSECTION—

1. A point defined by any combination of courses, radials, or bearings of two or more navigational aids.
2. Used to describe the point where two runways, a runway and a taxiway, or two taxiways cross or meet.

INTERSECTION DEPARTURE—A departure from any runway intersection except the end of the runway. *(See INTERSECTION).*

INTERSECTION TAKEOFF—(See INTERSECTION DEPARTURE).

IR—(See IFR MILITARY TRAINING ROUTES).

I SAY AGAIN—The message will be repeated.

J

JAMMING—Electronic or mechanical interference which may disrupt the display of aircraft on radar or the transmission/reception of radio communications/navigation.

JET BLAST—Jet engine exhaust (thrust stream turbulence).

(See WAKE TURBULENCE).

JET ROUTE—A route designed to serve aircraft operations from 18,000 feet MSL up to and including flight level 450. The routes are referred to as "J" routes with numbering to identify the designated route; e.g., J105.

(See [redacted] Class A airspace). (Refer to Part 71).

JET STREAM—A migrating stream of high-speed winds present at high altitudes.

JETTISONING OF EXTERNAL STORES—Airborne release of external stores; e.g., tiptanks, ordnance.

(See FUEL DUMPING). (Refer to Part 91).

JOINT USE RESTRICTED AREA—(See RESTRICTED AREA).

K

KNOWN TRAFFIC—With respect to ATC clearances, means aircraft whose altitude, position, and intentions are known to ATC.

L

LAA—(See LOCAL AIRPORT ADVISORY).

LAAS—(See LOW ALTITUDE ALERT SYSTEM).

LANDING AREA—Any locality either on land, water, or structures, including airports/heliports and intermediate landing fields, which is used, or intended to be used, for the landing and takeoff of aircraft whether or not facilities are provided for the shelter, servicing, or for receiving or discharging passengers or cargo.
(See ICAO term LANDING AREA).

LANDING AREA [ICAO]—That part of a movement area intended for the landing or takeoff of aircraft.

LANDING DIRECTION INDICATOR—A device which visually indicates the direction in which landings and takeoffs should be made.
(See TETRAHEDRON). (Refer to AIM).

LANDING DISTANCE AVAILABLE [ICAO]—The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

LANDING MINIMUMS—The minimum visibility prescribed for landing a civil aircraft while using an instrument approach procedure. The minimum applies with other limitations set forth in Part 91 with respect to the Minimum Descent Altitude (MDA) or Decision Height (DH) prescribed in the instrument approach procedures as follows:

1. Straight-in landing minimums. A statement of MDA and visibility, or DH and visibility, required for a straight-in landing on a specified runway, or
2. Circling minimums. A statement of MDA and visibility required for the circle-to-land maneuver.

Descent below the established MDA or DH is not authorized during an approach unless the aircraft is in a position from which a normal approach to the runway of intended landing can be made and adequate visual reference to required visual cues is maintained.

(See STRAIGHT-IN LANDING). (See CIRCLE-TO-LAND MANEUVER). (See DECISION HEIGHT). (See MINIMUM DESCENT ALTITUDE). (See VISIBILITY). (See INSTRUMENT APPROACH PROCEDURE). (Refer to Part 91).

LANDING ROLL—The distance from the point of touchdown to the point where the aircraft can be brought to a stop or exit the runway.

LANDING SEQUENCE—The order in which aircraft are positioned for landing.
(See APPROACH SEQUENCE).

LAST ASSIGNED ALTITUDE—The last altitude/flight level assigned by ATC and acknowledged by the pilot.
(See MAINTAIN). (Refer to Part 91).

LATERAL SEPARATION—The lateral spacing of aircraft at the same altitude by requiring operation on different routes or in different geographical locations.
(See SEPARATION).

LDA—(See LOCALIZER TYPE DIRECTIONAL AID).

LDA [ICAO]—(See ICAO Term LANDING DISTANCE AVAILABLE).

LF—(See LOW FREQUENCY).

LIGHTED AIRPORT—An airport where runway and obstruction lighting is available.
(See AIRPORT LIGHTING). (Refer to AIM).

LIGHT GUN—A handheld directional light signaling device which emits a brilliant narrow beam of white, green, or red light as selected by the tower controller. The color and type of light transmitted can be used to approve or disapprove anticipated pilot actions where radio communication is not available. The light gun is used for controlling traffic operating in the vicinity of the airport and on the airport movement area.
(Refer to AIM).

LOCALIZER—The component of an ILS which provides course guidance to the runway.
(See INSTRUMENT LANDING SYSTEM). (Refer to AIM). (See ICAO term LOCALIZER COURSE).

LOCALIZER COURSE [ICAO]—The locus of points, in any given horizontal plane, at which the DDM (difference in depth of modulation) is zero.

LOCALIZER TYPE DIRECTIONAL AID—A NAVAID used for nonprecision instrument approaches with utility and accuracy comparable to a localizer but which is not a part of a complete ILS and is not aligned with the runway.
(Refer to AIM).

LOCALIZER USABLE DISTANCE—The maximum distance from the localizer transmitter at a specified altitude, as verified by flight inspection, at which reliable course information is continuously received.
(Refer to AIM).

LOCAL AIRPORT ADVISORY [LAA]—A service provided by flight service stations or the military at airports not serviced by an operating control tower. This service consists of providing information to arriving and departing aircraft concerning wind direction and speed, favored runway, altimeter setting, pertinent known traffic, pertinent known field conditions, airport taxi routes and traffic patterns, and authorized instrument approach procedures. This information is advisory in nature and does not constitute an ATC clearance.
(See AIRPORT ADVISORY AREA).

LOCAL TRAFFIC—Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.
(See TRAFFIC PATTERN).

LOCATOR [ICAO]—An LM/MF NDB used as an aid to final approach.
Note: A locator usually has an average radius of rated coverage of between 18.5 and 46.3 km (10 and 25 NM).

LONGITUDINAL SEPARATION—The longitudinal spacing of aircraft at the same altitude by a minimum distance expressed in units of time or miles.
(See SEPARATION). (Refer to AIM).

LONG RANGE NAVIGATION—(See LORAN).

LORAN—An electronic navigational system by which hyperbolic lines of position are determined by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran A operates in the 1750–1950 kHz frequency band. Loran C and D operate in the 100–110 kHz frequency band.
(Refer to AIM).

LOST COMMUNICATIONS—Loss of the ability to communicate by radio. Aircraft are sometimes referred to as NORDO (No Radio). Standard pilot procedures are specified in Part 91. Radar controllers issue procedures for pilots to follow in the event of lost communications during a radar approach when weather reports indicate that an aircraft will likely encounter IFR weather conditions during the approach.
(Refer to Part 91). (See AIM).

LOW ALTITUDE AIRWAY STRUCTURE—The network of airways serving aircraft operations up to but not including 18,000 feet MSL.
(See AIRWAY). (Refer to AIM).

LOW ALTITUDE ALERT, CHECK YOUR ALTITUDE IMMEDIATELY—(See SAFETY ALERT).

LOW ALTITUDE ALERT SYSTEM—An automated function of the TPX–42 that alerts the controller when a Mode C transponder-equipped aircraft on an IFR flight plan is below a predetermined minimum safe altitude. If requested by the pilot, LAAS monitoring is also available to VFR Mode C transponder-equipped aircraft.

LOW APPROACH—An approach over an airport or runway following an instrument approach or a VFR approach including the go-around maneuver where the pilot intentionally does not make contact with the runway.
(Refer to AIM).

LOW FREQUENCY—The frequency band between 30 and 300 kHz.
(Refer to AIM).

M

MAA—(See MAXIMUM AUTHORIZED ALTITUDE).

MACH NUMBER—The ratio of true airspeed to the speed of sound; e.g., MACH .82, MACH 1.6.
(See AIRSPEED).

MACH TECHNIQUE [ICAO]—Describes a control technique used by air traffic control whereby turbojet aircraft operating successively along suitable routes are cleared to maintain appropriate MACH numbers for a relevant portion of the en route phase of flight. The principle objective is to achieve improved utilization of the airspace and to ensure that separation between successive aircraft does not decrease below the established minima.

MAINTAIN—

1. Concerning altitude/flight level, the term means to remain at the altitude/flight level specified. The phrase "climb and" or "descend and" normally precedes "maintain" and the altitude assignment; e.g., "descend and maintain 5,000."
2. Concerning other ATC instructions, the term is used in its literal sense; e.g., maintain VFR.

MAKE SHORT APPROACH—Used by ATC to inform a pilot to alter his traffic pattern so as to make a short final approach.
(See TRAFFIC PATTERN).

MANDATORY ALTITUDE—An altitude depicted on an instrument Approach Procedure Chart requiring the aircraft to maintain altitude at the depicted value.

MAP—(See MISSED APPROACH POINT).

MARKER BEACON—An electronic navigation facility transmitting a 75 mHz vertical fan or boneshaped radiation pattern. Marker beacons are identified by their modulation frequency and keying code, and when received by compatible airborne equipment, indicate to the pilot, both aurally and visually, that he is passing over the facility.
(See OUTER MARKER). (See MIDDLE MARKER). (See INNER MARKER). (Refer to AIM).

MARSA—(See MILITARY AUTHORITY ASSUMES RESPONSIBILITY FOR SEPARATION OF AIRCRAFT).

MAXIMUM AUTHORIZED ALTITUDE—A published altitude representing the maximum usable altitude or flight level for an airspace structure or route segment. It is the highest altitude on a Federal airway, jet route, area navigation low or high route, or other direct route for which an MEA is designated in Part 95 at which adequate reception of navigation aid signals is assured.

MAYDAY—The international radiotelephony distress signal. When repeated three times, it indicates imminent and grave danger and that immediate assistance is requested.
(See PAN-PAN). (Refer to AIM).

MCA—(See MINIMUM CROSSING ALTITUDE).

MDA—(See MINIMUM DESCENT ALTITUDE).

MEA—(See MINIMUM EN ROUTE IFR ALTITUDE).

METEOROLOGICAL IMPACT STATEMENT—An unscheduled planning forecast describing conditions expected to begin within 4 to 12 hours which may impact the flow of air traffic in a specific center's (ARTCC) area.

METER FIX TIME/SLOT TIME—A calculated time to depart the meter fix in order to cross the vertex at the ACLT. This time reflects descent speed adjustment and any applicable time that must be absorbed prior to crossing the meter fix.

METER LIST DISPLAY INTERVAL—A dynamic parameter which controls the number of minutes prior to the flight plan calculated time of arrival at the meter fix for each aircraft, at which time the TCLT is frozen and becomes an ACLT; i.e., the VTA is updated and consequently the TCLT modified as appropriate until frozen at which time updating is suspended and an ACLT is assigned. When frozen, the flight entry is inserted into the arrival sector's meter list for display on the sector PVD. MLDI is used if filed true airspeed is less than or equal to freeze speed parameters (FSPD).

METERING—A method of time-regulating arrival traffic flow into a terminal area so as not to exceed a predetermined terminal acceptance rate.

METERING AIRPORTS—Airports adapted for metering and for which optimum flight paths are defined. A maximum of 15 airports may be adapted.

METERING FIX—A fix along an established route from over which aircraft will be metered prior to entering terminal airspace. Normally, this fix should be established at a distance from the airport which will facilitate a profile descent 10,000 feet above airport elevation [AAE] or above.

METERING POSITION(S)—Adapted PVD's and associated "D" positions eligible for display of a metering position list. A maximum of four PVD's may be adapted.

METERING POSITION LIST—An ordered list of data on arrivals for a selected metering airport displayed on a metering position PVD.

MFT—(See METER FIX TIME/SLOT TIME).

MHA—(See MINIMUM HOLDING ALTITUDE).

MIA—(See MINIMUM IFR ALTITUDES).

MICROBURST—A small downburst with outbursts of damaging winds extending 2.5 miles or less. In spite of its small horizontal scale, an intense microburst could induce wind speeds as high as 150 knots

(Refer to AIM).

MICROWAVE LANDING SYSTEM—A precision instrument approach system operating in the microwave spectrum which normally consists of the following components:

1. Azimuth Station.
2. Elevation Station.
3. Precision Distance Measuring Equipment.

(See MLS CATEGORIES).

MIDDLE COMPASS LOCATOR—(See COMPASS LOCATOR).

MIDDLE MARKER—A marker beacon that defines a point along the glideslope of an ILS normally located at or near the point of decision height (ILS Category I). It is keyed to transmit alternate dots and dashes, with the alternate dots and dashes keyed at the rate of 95 dot/dash combinations per minute on a 1300 Hz tone, which is received aurally and visually by compatible airborne equipment.

(See MARKER BEACON). (See INSTRUMENT LANDING SYSTEM). (Refer to AIM).

MID RVR—(See VISIBILITY).

MILES-IN-TRAIL—A specified distance between aircraft, normally, in the same stratum associated with the same destination or route of flight.

MILITARY AUTHORITY ASSUMES RESPONSIBILITY FOR SEPARATION OF AIRCRAFT—A condition whereby the military services involved assume responsibility for separation between participating military aircraft in the ATC system. It is used only for required IFR operations which are specified in letters of agreement or other appropriate FAA or military documents.

MILITARY OPERATIONS AREA—(See SPECIAL USE AIRSPACE).

MILITARY TRAINING ROUTES—Airspace of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots IAS.

(See IFR MILITARY TRAINING ROUTES). (See VFR MILITARY TRAINING ROUTES).

MINIMA—(See MINIMUMS).

MINIMUM CROSSING ALTITUDE—The lowest altitude at certain fixes at which an aircraft must cross when proceeding in the direction of a higher minimum en route IFR altitude (MEA).

(See MINIMUM EN ROUTE IFR ALTITUDE).

MINIMUM DESCENT ALTITUDE—The lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach or during circle-to-land maneuvering in execution of a standard instrument approach procedure where no electronic glideslope is provided.

(See NONPRECISION APPROACH PROCEDURE).

MINIMUM EN ROUTE IFR ALTITUDE—The lowest published altitude between radio fixes which assures acceptable navigational signal coverage and meets obstacle clearance requirements between those fixes. The MEA prescribed for a Federal airway or segment thereof, area navigation low or high route, or other direct route applies to the entire width of the airway, segment, or route between the radio fixes defining the airway, segment, or route.

(Refer to Part 91). (Refer to Part 95). (Refer to AIM).

MINIMUM FUEL—Indicates that an aircraft's fuel supply has reached a state where, upon reaching the destination, it can accept little or no delay. This is not an emergency situation but merely indicates an emergency situation is possible should any undue delay occur.

(Refer to AIM).

MINIMUM HOLDING ALTITUDE—The lowest altitude prescribed for a holding pattern which assures navigational signal coverage, communications, and meets obstacle clearance requirements.

MINIMUM IFR ALTITUDES—Minimum altitudes for IFR operations as prescribed in Part 91. These altitudes are published on aeronautical charts and prescribed in Part 95 for airways and routes, and in Part 97 for standard instrument approach procedures. If no applicable minimum altitude is prescribed in FAR 95 or FAR 97, the following minimum IFR altitude applies:

1. In designated mountainous areas, 2,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or
2. Other than mountainous areas, 1,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or
3. As otherwise authorized by the Administrator or assigned by ATC.

(See MINIMUM EN ROUTE IFR ALTITUDE). (See MINIMUM OBSTRUCTION CLEARANCE ALTITUDE). (See MINIMUM CROSSING ALTITUDE). (See MINIMUM SAFE ALTITUDE). (See MINIMUM VECTORING ALTITUDE). (Refer to Part 91).

MINIMUM OBSTRUCTION CLEARANCE ALTITUDE—The lowest published altitude in effect between radio fixes on VOR airways, off-airway routes, or route segments which meets obstacle clearance requirements for the entire route segment and which assures acceptable navigational signal coverage only within 25 statute (22 nautical) miles of a VOR.

(Refer to Part 91). (Refer to Part 95).

MINIMUM NAVIGATION PERFORMANCE SPECIFICATION—A set of standards which require aircraft to have a minimum navigation performance capability in order to operate in MNPS designated airspace. In addition, aircraft must be certified by their State of Registry for MNPS operation.

MINIMUM NAVIGATION PERFORMANCE SPECIFICATIONS AIRSPACE—Designated airspace in which MNPS procedures are applied between MNPS certified and equipped aircraft. Under certain conditions, non-MNPS aircraft can operate in MNPSA. However, standard oceanic separation minima is provided between the non-MNPS aircraft and other traffic. Currently, the only designated MNPSA is described as follows:

1. Between FL 275 and FL 400;
2. Between latitudes 27– N and the North Pole;
3. In the east, the eastern boundaries of the CTA's Santa Maria Oceanic, Shanwick Oceanic, and Reykjavik;
4. In the west, the western boundaries of CTA's Reykjavik and Gander Oceanic and New York Oceanic excluding the area west of 60– W and south of 38– 30' N.

MINIMUM RECEPTION ALTITUDE—The lowest altitude at which an intersection can be determined.

(Refer to Part 95).

MINIMUM SAFE ALTITUDE—

1. The minimum altitude specified in Part 91 for various aircraft operations.
2. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance for emergency use within a specified distance from the navigation facility upon which a procedure is predicated. These altitudes will be identified as Minimum Sector Altitudes or Emergency Safe Altitudes and are established as follows:
   a. Minimum Sector Altitudes. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance within a 25–mile radius of the navigation facility upon which the procedure is predicated. Sectors depicted on approach charts must be at least 90 degrees in scope. These altitudes are for emergency use only and do not necessarily assure acceptable navigational signal coverage.

(See ICAO term Minimum Sector Altitude).

   b. Emergency Safe Altitudes. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance in nonmountainous areas and 2,000 feet of obstacle clearance in designated mountainous areas within a 100–mile radius of the navigation facility upon which the procedure is predicated and normally used only in military procedures. These altitudes are identified on published procedures as "Emergency Safe Altitudes."

MINIMUM SAFE ALTITUDE WARNING—A function of the ARTS III computer that aids the controller by alerting him when a tracked Mode C–equipped aircraft is below or is predicted by the computer to go below a predetermined minimum safe altitude.

(Refer to AIM).

MINIMUM SECTOR ALTITUDE (ICAO)—The lowest altitude which may be used under emergency conditions which will provide a minimum clearance of 300 m (1,000 feet) above all obstacles located in an area contained within a sector of a circle of 46 km (25 NM) radius centered on a radio aid to navigation.

MINIMUMS—Weather condition requirements established for a particular operation or type of operation; e.g., IFR takeoff or landing, alternate airport for IFR flight plans, VFR flight, etc.

(See LANDING MINIMUMS). (See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES). (See VFR CONDITIONS). (See IFR CONDITIONS). (Refer to Part 91). (Refer to AIM).

MINIMUM VECTORING ALTITUDE—The lowest MSL altitude at which an IFR aircraft will be vectored by a radar controller, except as otherwise authorized for radar approaches, departures, and missed approaches. The altitude meets IFR obstacle clearance criteria. It may be lower than the published MEA along an airway or J-route segment. It may be utilized for radar vectoring only upon the controller's determination that an adequate radar return is being received from the aircraft being controlled. Charts depicting minimum vectoring altitudes are normally available only to the controllers and not to pilots.

(Refer to AIM).

MINUTES-IN-TRAIL—A specified interval between aircraft expressed in time. This method would more likely be utilized regardless of altitude.

MIS—(See METEOROLOGICAL IMPACT STATEMENT).

MISSED APPROACH—

1. A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. The route of flight and altitude are shown on instrument approach procedure charts. A pilot executing a missed approach prior to the Missed Approach Point (MAP) must continue along the final approach to the MAP. The pilot may climb immediately to the altitude specified in the missed approach procedure.
2. A term used by the pilot to inform ATC that he is executing the missed approach.
3. At locations where ATC radar service is provided, the pilot should conform to radar vectors when provided by ATC in lieu of the published missed approach procedure.

(See Missed Approach Point) (Refer to AIM).

MISSED APPROACH POINT—A point prescribed in each instrument approach procedure at which a missed approach procedure shall be executed if the required visual reference does not exist.

(See MISSED APPROACH). (See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

MISSED APPROACH PROCEDURE [ICAO]—The procedure to be followed if the approach cannot be continued.

MISSED APPROACH SEGMENT—(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

MLDI—(See METER LIST DISPLAY INTERVAL).

MLS—(See MICROWAVE LANDING SYSTEM).

MLS CATEGORIES—

1. MLS Category I. An MLS approach procedure which provides for an approach to a height above touchdown of not less than 200 feet and a runway visual range of not less than 1,800 feet.
2. MLS Category II. Undefined until data gathering/analysis completion.
3. MLS Category III. Undefined until data gathering/analysis completion.

MM—(See MIDDLE MARKER).

MNPS—(See MINIMUM PERFORMANCE SPECIFICATION).

MNPSA—(See MINIMUM PERFORMANCE SPECIFICATIONS AIRSPACE).

MOA—(See MILITARY OPERATIONS AREA).

MOCA—(See MINIMUM OBSTRUCTION CLEARANCE ALTITUDE).

MODE—The letter or number assigned to a specific pulse spacing of radio signals transmitted or received by ground interrogator or airborne transponder components of the Air Traffic Control Radar Beacon System (ATCRBS). Mode A (military Mode 3) and Mode C (altitude reporting) are used in air traffic control.

(See TRANSPONDER). (See INTERROGATOR). (See RADAR). (Refer to AIM). (See ICAO term MODE).

MODE (SSR MODE) [ICAO]—The letter or number assigned to a specific pulse spacing of the interrogation signals transmitted by an interrogator. There are 4 modes, A, B, C and D specified in Annex 10, corresponding to four different interrogation pulse spacings.

MODE C INTRUDER ALERT—A function of certain air traffic control automated systems designed to alert radar controllers to existing or pending situations between a tracked target (known IFR or VFR aircraft) and an untracked target (unknown IFR or VFR aircraft) that requires immediate attention/action.

(See CONFLICT ALERT).

MONITOR—(When used with communication transfer) listen on a specific frequency and stand by for instructions. Under normal circumstances do not establish communications.

MOVEMENT AREA—The runways, taxiways, and other areas of an airport/heliport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with a tower, specific approval for entry onto the movement area must be obtained from ATC.

(See ICAO term MOVEMENT AREA).

MOVEMENT AREA [ICAO]—That part of an aerodrome to be used for the takeoff, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).

MOVING TARGET INDICATOR—An electronic device which will permit radar scope presentation only from targets which are in motion. A partial remedy for ground clutter.

MRA—(See MINIMUM RECEPTION ALTITUDE).

MSA—(See MINIMUM SAFE ALTITUDE).

MSAW—(See MINIMUM SAFE ALTITUDE WARNING).

MTI—(See MOVING TARGET INDICATOR).

MTR—(See MILITARY TRAINING ROUTES).

MULTICOM—A mobile service not open to public correspondence used to provide communications essential to conduct the activities being performed by or directed from private aircraft.

MULTIPLE RUNWAYS—The utilization of a dedicated arrival runway(s) for departures and a dedicated departure runway(s) for arrivals when feasible to reduce delays and enhance capacity.

MVA—(See MINIMUM VECTORING ALTITUDE).

N

NAS—(See NATIONAL AIRSPACE SYSTEM).

NAS STAGE A—The en route ATC system's radar, computers and computer programs, controller plan view displays (PVDs/Radar Scopes), input/output devices, and the related communications equipment which are integrated to form the heart of the automated IFR air traffic control system. This equipment performs Flight Data Processing (FDP) and Radar Data Processing (RDP). It interfaces with automated terminal systems and is used in the control of en route IFR aircraft.
(Refer to AIM).

NATIONAL AIRSPACE SYSTEM—The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material. Included are system components shared jointly with the military.

NATIONAL BEACON CODE ALLOCATION PLAN AIRSPACE—Airspace over United States territory located within the North American continent between Canada and Mexico, including adjacent territorial waters outward to about boundaries of oceanic control areas (CTA)/Flight Information Regions (FIR).
(See FLIGHT INFORMATION REGION).

NATIONAL FLIGHT DATA CENTER—A facility in Washington D.C., established by FAA to operate a central aeronautical information service for the collection, validation, and dissemination of aeronautical data in support of the activities of government, industry, and the aviation community. The information is published in the National Flight Data Digest.
(See NATIONAL FLIGHT DATA DIGEST).

NATIONAL FLIGHT DATA DIGEST—A daily (except weekends and Federal holidays) publication of flight information appropriate to aeronautical charts, aeronautical publications, Notices to Airmen, or other media serving the purpose of providing operational flight data essential to safe and efficient aircraft operations.

NATIONAL SEARCH AND RESCUE PLAN—An interagency agreement which provides for the effective utilization of all available facilities in all types of search and rescue missions.

NAVAID—(See NAVIGATIONAL AID).

NAVAID CLASSES—VOR, VORTAC, and TACAN aids are classed according to their operational use. The three classes of NAVAID's are:

T-Terminal.

L-Low altitude.

H-High altitude.

The normal service range for T, L, and H class aids is found in the AIM. Certain operational requirements make it necessary to use some of these aids at greater service ranges than specified. Extended range is made possible through flight inspection determinations. Some aids also have lesser service range due to location, terrain, frequency protection, etc. Restrictions to service range are listed in Airport/Facility Directory.

NAVIGABLE AIRSPACE—Airspace at and above the minimum flight altitudes prescribed in the FAR's including airspace needed for safe takeoff and landing.
(Refer to Part 91).

NAVIGATIONAL AID—Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight.
(See AIR NAVIGATION FACILITY).

NBCAP AIRSPACE—(See NATIONAL BEACON CODE ALLOCATION PLAN AIRSPACE).

NDB—(See NONDIRECTIONAL BEACON).

NEGATIVE—"No," or "permission not granted," or "that is not correct."

NEGATIVE CONTACT—Used by pilots to inform ATC that:

1. Previously issued traffic is not in sight. It may be followed by the pilot's request for the controller to provide assistance in avoiding the traffic.
2. They were unable to contact ATC on a particular frequency.

NFDC—(See NATIONAL FLIGHT DATA CENTER).

NFDD—(See NATIONAL FLIGHT DATA DIGEST).

NIGHT—The time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time.
(See ICAO term NIGHT).

NIGHT [ICAO]—The hours between the end of evening civil twilight and the beginning of morning civil twilight or such other period between sunset and sunrise as may be specified by the appropriate authority.
Note. Civil twilight ends in the evening when the centre of the sun's disk is 6 degrees below the horizon and begins in the morning when the centre of the sun's disk is 6 degrees below the horizon.

NO GYRO APPROACH—A radar approach/vector provided in case of a malfunctioning gyro-compass or directional gyro. Instead of providing the pilot with headings to be flown, the controller observes the radar track and issues control instructions "turn right/left" or "stop turn" as appropriate.
(Refer to AIM).

NO GYRO VECTOR—(See NO GYRO APPROACH).

NONAPPROACH CONTROL TOWER—Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the [redacted] Class D airspace. The primary function of a nonapproach control tower is the sequencing of aircraft in the traffic pattern and on the landing area. Nonapproach control towers also separate aircraft operating under instrument flight rules clearances from approach controls and centers. They provide ground control services to aircraft, vehicles, personnel, and equipment on the airport movement area.

NONCOMMON ROUTE/PORTION—That segment of a North American Route between the inland navigation facility and a designated North American terminal.

NONCOMPOSITE SEPARATION—Separation in accordance with minima other than the composite separation minimum specified for the area concerned.

NONDIRECTIONAL BEACON—An L/MF or UHF radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his bearing to or from the radio beacon and "home" on or track to or from the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

(See COMPASS LOCATOR). (See AUTOMATIC DIRECTION FINDER).

NONMOVEMENT AREAS—Taxiways and apron (ramp) areas not under the control of air traffic.

NONPRECISION APPROACH—(See NONPRECISION APPROACH PROCEDURE).

NONPRECISION APPROACH PROCEDURE—A standard instrument approach procedure in which no electronic glideslope is provided; e.g., VOR, TACAN, NDB, LOC, ASR, LDA, or SDF approaches.

NONRADAR—Precedes other terms and generally means without the use of radar, such as:

1. Nonradar Approach. Used to describe instrument approaches for which course guidance on final approach is not provided by ground-based precision or surveillance radar. Radar vectors to the final approach course may or may not be provided by ATC. Examples of nonradar approaches are VOR, NDB, TACAN, and ILS/MLS approaches.

(See FINAL APPROACH-IFR). (See FINAL APPROACH COURSE). (See RADAR APPROACH). (See INSTRUMENT APPROACH PROCEDURE).

2. Nonradar Approach Control. An ATC facility providing approach control service without the use of radar.

(See APPROACH CONTROL FACILITY). (See APPROACH CONTROL SERVICE).

3. Nonradar Arrival. An aircraft arriving at an airport without radar service or at an airport served by a radar facility and radar contact has not been established or has been terminated due to a lack of radar service to the airport. *(See RADAR ARRIVAL). (See RADAR SERVICE).*

4. Nonradar Route. A flight path or route over which the pilot is performing his own navigation. The pilot may be receiving radar separation, radar monitoring, or other ATC services while on a nonradar route.

(See RADAR ROUTE).

5. Nonradar Separation. The spacing of aircraft in accordance with established minima without the use of radar; e.g., vertical, lateral, or longitudinal separation.

(See RADAR SEPARATION). (See ICAO term NONRADAR SEPARATION).

NONRADAR SEPARATION [ICAO]—The separation used when aircraft position information is derived from sources other than radar.

NOPAC—(See NORTH PACIFIC).

NORDO—(See LOST COMMUNICATIONS).

NORTH AMERICAN ROUTE—A numerically coded route preplanned over existing airway and route systems to and from specific coastal fixes serving the North Atlantic. North American Routes consist of the following:

1. Common Route/Portion. That segment of a North American Route between the inland navigation facility and the coastal fix.
2. NonCommon Route/Portion. That segment of a North American Route between the inland navigation facility and a designated North American terminal.
3. Inland Navigation Facility. A navigation aid on a North American Route at which the common route and/or the noncommon route begins or ends.
4. Coastal Fix. A navigation aid or intersection where an aircraft transitions between the domestic route structure and the oceanic route structure.

NORTH MARK—A beacon data block sent by the host computer to be displayed by the ARTS on a 360 degree bearing at a locally selected radar azimuth and distance. The North Mark is used to ensure correct range/azimuth orientation during periods of CENRAP.

NORTH PACIFIC—An organized route system between the Alaskan west coast and Japan.

NOTAM—(See NOTICE TO AIRMEN).

NOTICE TO AIRMEN—A notice containing information (not known sufficiently in advance to publicize by other means) concerning the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System) the timely knowledge of which is essential to personnel concerned with flight operations.

1. NOTAM(D). A NOTAM given (in addition to local dissemination) distant dissemination beyond the area

of responsibility of the Flight Service Station. These NOTAM's will be stored and available until canceled.

2. NOTAM(L). A NOTAM given local dissemination by voice and other means, such as telautograph and telephone, to satisfy local user requirements.

3. FDC NOTAM. A NOTAM regulatory in nature, transmitted by USNOF and given system wide dissemination.

(See ICAO term NOTAM).

NOTAM [ICAO]—A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Class I Distribution—Distribution by means of telecommunication.

Class II Distribution—Distribution by means other than telecommunications.

NOTICES TO AIRMEN PUBLICATION—A publication issued every 14 days, designed primarily for the pilot, which contains current NOTAM information considered essential to the safety of flight as well as supplemental data to other aeronautical publications. The contraction NTAP is used in NOTAM text.

(See NOTICE TO AIRMEN).

NTAP—(See NOTICES TO AIRMEN PUBLICATION).

NUMEROUS TARGETS VICINITY (LOCATION)—A traffic advisory issued by ATC to advise pilots that targets on the radar scope are too numerous to issue individually.

(See TRAFFIC ADVISORIES).

O

OALT—(See OPERATIONAL ACCEPTABLE LEVEL OF TRAFFIC).

OBSTACLE—An existing object, object of natural growth, or terrain at a fixed geographical location or which may be expected at a fixed location within a prescribed area with reference to which vertical clearance is or must be provided during flight operation.

OBSTACLE FREE ZONE—The OFZ is a three dimensional volume of airspace which protects for the transition of aircraft to and from the runway. The OFZ clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible NAVAID locations that are fixed by function. Additionally, vehicles, equipment, and personnel may be authorized by air traffic control to enter the area using the provisions of Order 7110.65, Air Traffic Control, paragraph 3–5. The runway OFZ and when applicable, the inner–approach OFZ, and the inner–transitional OFZ, comprise the OFZ.

1. Runway OFZ. The runway OFZ is a defined volume of airspace centered above the runway. The runway OFZ is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The runway OFZ extends 200 feet beyond each end of the runway. The width is as follows:
   (a) For runways serving large airplanes, the greater of:
      (1) 400 feet, or
      (2) 180 feet, plus the wingspan of the most demanding airplane, plus 20 feet per 1,000 feet of airport elevation.
   (b) For runways serving only small airplanes:
      (1) 300 feet for precision instrument runways.
      (2) 250 feet for other runways serving small airplanes with approach speeds of 50 knots, or more.
      (3) 120 feet for other runways serving small airplanes with approach speeds of less than 50 knots.
2. Inner–approach OFZ. The inner–approach OFZ is a defined volume of airspace centered on the approach area. The inner–approach OFZ applies only to runways with an approach lighting system. The inner–approach OFZ begins 200 feet from the runway threshold at the same elevation as the runway threshold and extends 200 feet beyond the last light unit in the approach lighting system. The width of the inner–approach OFZ is the same as the runway OFZ and rises at a slope of 50 (horizontal) to 1 (vertical) from the beginning.
3. Inner–transitional OFZ. The inner transitional surface OFZ is a defined volume of airspace along the sides of the runway and inner–approach OFZ and applies only to precision instrument runways. The inner–transitional surface OFZ slopes 3 (horizontal) to 1 (vertical) out from the edges of the runway OFZ and inner–approach OFZ to a height of 150 feet above the established airport elevation.

(Refer to AC 150/5300–13, Chap. 3. and Order 7110.65, Para. 3–5).

OBSTRUCTION—Any object/obstacle exceeding the obstruction standards specified by Part 77, Subpart C.

OBSTRUCTION LIGHT—A light or one of a group of lights, usually red or white, frequently mounted on a surface structure or natural terrain to warn pilots of the presence of an obstruction.

OCEANIC AIRSPACE—Airspace over the oceans of the world, considered international airspace, where oceanic separation and procedures per the International Civil Aviation Organization are applied. Responsibility for the provisions of air traffic control service in this airspace is delegated to various countries, based generally upon geographic proximity and the availability of the required resources.

OCEANIC DISPLAY AND PLANNING SYSTEM—An automated digital display system which provides flight data processing, conflict probe, and situation display for oceanic air traffic control.

OCEANIC NAVIGATIONAL ERROR REPORT—A report filed when an aircraft exiting oceanic airspace has been observed by radar to be off course. ONER reporting parameters and procedures are contained in Order 7110.82, Monitoring of Navigational Performance In Oceanic Areas.

OCEANIC PUBLISHED ROUTE—A route established in international airspace and charted or described in flight information publications, such as Route Charts, DOD Enroute Charts, Chart Supplements, NOTAM's, and Track Messages.

OCEANIC TRANSITION ROUTE—An ATS route established for the purpose of transitioning aircraft to/from an organized track system.

ODAPS—(See OCEANIC DISPLAY AND PLANNING SYSTEM).

OFF COURSE—A term used to describe a situation where an aircraft has reported a position or is observed on radar at a point not on the ATC-approved route of flight.

OFFSHORE CONTROL AREA—That portion of airspace between the U.S 12–mile limit and the oceanic CTA/FIR boundary within which air traffic control is exercised. These areas are established to permit the application of domestic procedures in the provision of air traffic control services. Offshore control area is generally synonymous with Federal Aviation Regulations, Part 71, Subpart E, "Control Areas and Control Area Extensions."

OFF-ROUTE VECTOR—A vector by ATC which takes an aircraft off a previously assigned route. Altitudes assigned by ATC during such vectors provide required obstacle clearance.

OFFSET PARALLEL RUNWAYS—Staggered runways having centerlines which are parallel.

OFT—(See OUTER FIX TIME).

OM—(See OUTER MARKER).

OMEGA—An RNAV system designed for long-range navigation based upon ground-based electronic navigational aid signals.

ONER—(See OCEANIC NAVIGATIONAL ERROR REPORT).

OPERATIONAL—(See DUE REGARD).

ON COURSE—

1. Used to indicate that an aircraft is established on the route centerline.
2. Used by ATC to advise a pilot making a radar approach that his aircraft is lined up on the final approach course.

(See ON-COURSE INDICATION).

ON-COURSE INDICATION—An indication on an instrument, which provides the pilot a visual means of determining that the aircraft is located on the centerline of a given navigational track, or an indication on a radar scope that an aircraft is on a given track.

OPERATIONAL ACCEPTABLE LEVEL OF TRAFFIC—An air traffic activity level associated with the designed capacity for a sector or airport. The OALT considers dynamic changes in staffing, personnel experience levels, equipment outages, operational configurations, weather, traffic complexity, aircraft performance mixtures, transitioning flights, adjacent airspace, handoff/point-out responsibilities, and other factors that may affect an air traffic operational position or system element. The OALT is normally considered to be the total number of aircraft that any air traffic functional position can accommodate for a defined period of time under a given set of circumstances.

OPPOSITE DIRECTION AIRCRAFT—Aircraft are operating in opposite directions when:

1. They are following the same track in reciprocal directions; or
2. Their tracks are parallel and the aircraft are flying in reciprocal directions; or
3. Their tracks intersect at an angle of more than 135°.

OPTION APPROACH—An approach requested and conducted by a pilot which will result in either a touch-and-go, missed approach, low approach, stop-and-go, or full stop landing.

(See CLEARED FOR THE OPTION). (Refer to AIM).

ORGANIZED TRACK SYSTEM—A movable system of oceanic tracks that traverses the North Atlantic between Europe and North America the physical position of which is determined twice daily taking the best advantage of the winds aloft.

ORGANIZED TRACK SYSTEM—A series of ATS routes which are fixed and charted; i.e., CEP, NOPAC, or flexible and described by NOTAM; i.e., NAT TRACK MESSAGE.

OTR—(See OCEANIC TRANSITION ROUTE).

OTS—(See ORGANIZED TRACK SYSTEM).

OUT—The conversation is ended and no response is expected.

OUTER AREA (associated with [redacted])—Nonregulatory airspace surrounding designated [redacted] airports wherein ATC provides radar vectoring and sequencing on a full-time basis for all IFR and participating VFR aircraft. The service provided in the outer area is called [redacted] which includes: IFR/IFR-standard IFR separation; IFR/VFR-traffic advisories and conflict resolution; and VFR/VFR-traffic advisories and, as appropriate, safety alerts. The normal radius will be 20 nautical miles with some variations based on site-specific requirements. The outer area extends outward from the primary [redacted] airport and extends from the lower limits of radar/radio coverage up to the ceiling of the approach control's delegated airspace excluding the [redacted] and other airspace as appropriate.

(See CONTROLLED AIRSPACE). (See CONFLICT RESOLUTION).

OUTER COMPASS LOCATOR—(See COMPASS LOCATOR).

OUTER FIX—A general term used within ATC to describe fixes in the terminal area, other than the final approach fix. Aircraft are normally cleared to these fixes by an Air Route Traffic Control Center or an Approach Control Facility. Aircraft are normally cleared from these fixes to the final approach fix or final approach course.

OUTER FIX—An adapted fix along the converted route of flight, prior to the meter fix, for which crossing times are calculated and displayed in the metering position list.

OUTER FIX TIME—A calculated time to depart the outer fix in order to cross the vertex at the ACLT. The time reflects descent speed adjustments and any applicable delay time that must be absorbed prior to crossing the meter fix.

OUTER MARKER—A marker beacon at or near the glideslope intercept altitude of an ILS approach. It is keyed to transmit two dashes per second on a 400 Hz tone, which is received aurally and visually by compatible airborne equipment. The OM is normally located four to seven miles from the runway threshold on the extended centerline of the runway.

(See MARKER BEACON). (See INSTRUMENT LANDING SYSTEM). (Refer to AIM).

OVER—My transmission is ended; I expect a response.

OVERHEAD MANEUVER—A series of predetermined maneuvers prescribed for aircraft (often in formation) for entry into the VFR traffic pattern and to proceed to a landing. An overhead manuever is not an IFR approach procedure. These aircraft shall be considered VFR and the IFR flight plan is cancelled when the aircraft crosses the landing threshold on the initial approach portion of the manuever. The pattern usually specifies the following:

1. The radio contact required of the pilot.
2. The speed to be maintained.
3. An initial approach 3 to 5 miles in length.
4. An elliptical pattern consisting of two 180 degree turns.
5. A break point at which the first 180 degree turn is started.
6. The direction of turns.
7. Altitude (at least 500 feet above the conventional pattern).
8. A "Roll-out" on final approach not less than 1/4 mile from the landing threshold and not less than 300 feet above the ground.

OVERLYING CENTER—The ARTCC facility that is responsible for arrival/departure operations at a specific terminal.

P

P TIME—(See PROPOSED DEPARTURE TIME).

PAN-PAN—The international radio-telephony urgency signal. When repeated three times, indicates uncertainty or alert followed by the nature of the urgency.
(See MAYDAY). (Refer to AIM).

PAR—(See PRECISION APPROACH RADAR).

PAR [ICAO]—(See ICAO Term PRECISION APPROACH RADAR).

PARALLEL ILS APPROACHES—Approaches to parallel runways by IFR aircraft which, when established inbound toward the airport on the adjacent final approach courses, are radar-separated by at least 2 miles.
(See FINAL APPROACH COURSE). (See SIMULTANEOUS ILS APPROACHES).

PARALLEL MLS APPROACHES—(See PARALLEL ILS APPROACHES).

PARALLEL OFFSET ROUTE—A parallel track to the left or right of the designated or established airway/route. Normally associated with Area Navigation (RNAV) operations.
(See AREA NAVIGATION).

PARALLEL RUNWAYS—Two or more runways at the same airport whose centerlines are parallel. In addition to runway number, parallel runways are designated as L (left) and R (right) or, if three parallel runways exist, L (left), C (center), and R (right).

PATWAS—(See PILOTS AUTOMATIC TELEPHONE WEATHER ANSWERING SERVICE).

PBCT—(See PROPOSED BOUNDARY CROSSING TIME).

PCA—See POSITIVE CONTROL AREA).

PERMANENT ECHO—Radar signals reflected from fixed objects on the earth's surface; e.g., buildings, towers, terrain. Permanent echoes are distinguished from "ground clutter" by being definable locations rather than large areas. Under certain conditions they may be used to check radar alignment.

PHOTO RECONNAISSANCE—Military activity that requires locating individual photo targets and navigating to the targets at a preplanned angle and altitude. The activity normally requires a lateral route width of 16 NM and altitude range of 1,500 feet to 10,000 feet AGL.

PIDP—(See PROGRAMMABLE INDICATOR DATA PROCESSOR).

PILOT BRIEFING—A service provided by the FSS to assist pilots in flight planning. Briefing items may include weather information, NOTAMS, military activities, flow control information, and other items as requested.
(Refer to AIM).

PILOT IN COMMAND—The pilot responsible for the operation and safety of an aircraft during flight time.
(Refer to Part 91).

PILOTS AUTOMATIC TELEPHONE WEATHER ANSWERING SERVICE—A continuous telephone recording containing current and forecast weather information for pilots.
(See FLIGHT SERVICE STATION). (Refer to AIM).

PILOT'S DISCRETION—When used in conjunction with altitude assignments, means that ATC has offered the pilot the option of starting climb or descent whenever he wishes and conducting the climb or descent at any rate he wishes. He may temporarily level off at any intermediate altitude. However, once he has vacated an altitude, he may not return to that altitude.

PILOT WEATHER REPORT—A report of meteorological phenomena encountered by aircraft in flight.
(Refer to AIM).

PIREP—(See PILOT WEATHER REPORT).

POINT OUT—(See RADAR POINT OUT).

POLAR TRACK STRUCTURE—A system of organized routes between Iceland and Alaska which overlie Canadian MNPS Airspace.

POSITION REPORT—A report over a known location as transmitted by an aircraft to ATC.
(Refer to AIM).

POSITION SYMBOL—A computer-generated indication shown on a radar display to indicate the mode of tracking.

POSITIVE CONTROL—The separation of all air traffic within designated airspace by air traffic control.

See POSITIVE CONTROL AREA

POSITIVE CONTROL AREA See CONTROLLED AIRSPACE

PRACTICE INSTRUMENT APPROACH—An instrument approach procedure conducted by a VFR or an IFR aircraft for the purpose of pilot training or proficiency demonstrations.

PREARRANGED COORDINATION—A standardized procedure which permits an air traffic controller to enter the airspace assigned to another air traffic controller without verbal coordination. The procedures are defined in a facility directive which ensures standard separation between aircraft.

PRECIPITATION—Any or all forms of water particles (rain, sleet, hail, or snow) that fall from the atmosphere and reach the surface.

PRECISION APPROACH—(See PRECISION APPROACH PROCEDURE).

PRECISION APPROACH PROCEDURE—A standard instrument approach procedure in which an electronic glideslope/glidepath is provided; e.g., ILS/MLS and PAR.

(See INSTRUMENT LANDING SYSTEM). (See MICROWAVE LANDING SYSTEM). (See PRECISION APPROACH RADAR).

PRECISION APPROACH RADAR—Radar equipment in some ATC facilities operated by the FAA and/or the military services at joint-use civil/military locations and separate military installations to detect and display azimuth, elevation, and range of aircraft on the final approach course to a runway. This equipment may be used to monitor certain nonradar approaches, but is primarily used to conduct a precision instrument approach (PAR) wherein the controller issues guidance instructions to the pilot based on the aircraft's position in relation to the final approach course (azimuth), the glidepath (elevation), and the distance (range) from the touchdown point on the runway as displayed on the radar scope.

(See GLIDEPATH). (See PAR). (Refer to AIM).—The abbreviation "PAR" is also used to denote preferential arrival routes in ARTCC computers.

(See PREFERENTIAL ROUTES). (See ICAO term PRECISION APPROACH RADAR).

PRECISION APPROACH RADAR [ICAO]—Primary radar equipment used to determine the position of an aircraft during final approach, in terms of lateral and vertical deviations relative to a nominal approach path, and in range relative to touchdown.

Note: Precision approach radars are designed to enable pilots of aircraft to be given guidance by radio communication during the final stages of the approach to land.

PRECISION RUNWAY MONITOR—Provides air traffic controllers with high precision secondary surveillance data for aircraft on final approach to closely spaced parallel runways. High resolution color monitoring displays (FMA) are required to present surveillance track data to controllers along with detailed maps depicting approaches and no transgression zone.

PREFERENTIAL ROUTES—Preferential routes (PDR's, PAR's, and PDAR's) are adapted in ARTCC computers to accomplish inter/intrafacility controller coordination and to assure that flight data is posted at the proper control positions. Locations having a need for these specific inbound and outbound routes normally publish such routes in local facility bulletins, and their use by pilots minimizes flight plan route amendments. When the workload or traffic situation permits, controllers normally provide radar vectors or assign requested routes to minimize circuitous routing. Preferential routes are usually confined to one ARTCC's area and are referred to by the following names or acronyms:

1. Preferential Departure Route (PDR). A specific departure route from an airport or terminal area to an en route point where there is no further need for flow control. It may be included in a Standard Instrument Departure (SID) or a Preferred IFR Route.
2. Preferential Arrival Route (PAR). A specific arrival route from an appropriate en route point to an airport or terminal area. It may be included in a Standard Terminal Arrival (STAR) or a Preferred IFR Route. The abbreviation "PAR" is used primarily within the ARTCC and should not be confused with the abbreviation for Precision Approach Radar.
3. Preferential Departure and Arrival Route (PDAR). A route between two terminals which are within or immediately adjacent to one ARTCC's area. PDAR's are not synonymous with Preferred IFR Routes but may be listed as such as they do accomplish essentially the same purpose.

(See PREFERRED IFR ROUTES). (See NAS STAGE A).

PREFERRED IFR ROUTES—Routes established between busier airports to increase system efficiency and capacity. They normally extend through one or more ARTCC areas and are designed to achieve balanced traffic flows among high density terminals. IFR clearances are issued on the basis of these routes except when severe weather avoidance procedures or other factors dictate otherwise. Preferred IFR Routes are listed in the Airport/Facility Directory. If a flight is planned to or from an area having such routes but the departure or arrival point is not listed in the Airport/Facility Directory, pilots may use that part of a Preferred IFR Route which is appropriate for the departure or arrival point that is listed. Preferred IFR Routes are correlated with SID's and STAR's and may be defined by airways, jet routes, direct routes between NAVAID's, Waypoints, NAVAID radials/DME, or any combinations thereof.

(See STANDARD INSTRUMENT DEPARTURE). (See STANDARD TERMINAL ARRIVAL). (See PREFERENTIAL ROUTES). (See CENTER'S AREA). (Refer to AIRPORT/FACILITY DIRECTORY). (Refer to NOTICES TO AIRMEN PUBLICATION).

PRE-FLIGHT PILOT BRIEFING—(See PILOT BRIEFING).

PREVAILING VISIBILITY—(See VISIBILITY).

PRM—(See PRECISION RUNWAY MONITOR).

PROCEDURE TURN—The maneuver prescribed when it is necessary to reverse direction to establish an aircraft on the intermediate approach segment or final approach course. The outbound course, direction of turn, distance within which the turn must be completed, and minimum altitude are specified in the procedure. However, unless otherwise restricted, the point at which the turn may be commenced and the type and rate of turn are left to the discretion of the pilot.
(See ICAO term PROCEDURE TURN).

PROCEDURE TURN [ICAO]—A manoeuvre in which a turn is made away from a designated track followed by a turn in the opposite direction to permit the aircraft to intercept and proceed along the reciprocal of the designated track.

Note 1: Procedure turns are designated "left" or "right" according to the direction of the initial turn.

Note 2: Procedure turns may be designated as being made either in level flight or while descending, according to the circumstances of each individual approach procedure.

PROCEDURE TURN INBOUND—That point of a procedure turn maneuver where course reversal has been completed and an aircraft is established inbound on the intermediate approach segment or final approach course. A report of "procedure turn inbound" is normally used by ATC as a position report for separation purposes.
(See FINAL APPROACH COURSE). (See PROCEDURE TURN). (See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

PROFILE DESCENT—An uninterrupted descent (except where level flight is required for speed adjustment; e.g., 250 knots at 10,000 feet MSL) from cruising altitude/level to interception of a glideslope or to a minimum altitude specified for the initial or intermediate approach segment of a nonprecision instrument approach. The profile descent normally terminates at the approach gate or where the glideslope or other appropriate minimum altitude is intercepted.

PROGRAMMABLE INDICATOR DATA PROCESSOR—The PIDP is a modification to the AN/TPX–42 interrogator system currently installed in fixed RAPCON's. The PIDP detects, tracks, and predicts secondary radar aircraft targets. These are displayed by means of computer-generated symbols and alphanumeric characters depicting flight identification, aircraft altitude, ground speed, and flight plan data. Although primary radar targets are not tracked, they are displayed coincident with the secondary radar targets as well as with the other symbols and alphanumerics. The system has the capability of interfacing with ARTCC's.

PROGRESS REPORT—(See POSITION REPORT).

PROGRESSIVE TAXI—Precise taxi instructions given to a pilot unfamiliar with the airport or issued in stages as the aircraft proceeds along the taxi route.

PROHIBITED AREA—(See SPECIAL USE AIRSPACE).
(See ICAO term PROHIBITED AREA).

PROHIBITED AREA [ICAO]—An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited.

PROPOSED BOUNDARY CROSSING TIME—Each center has a PBCT parameter for each internal airport. Proposed internal flight plans are transmitted to the adjacent center if the flight time along the proposed route from the departure airport to the center boundary is less than or equal to the value of PBCT or if airport adaptation specifies transmission regardless of PBCT.

PROPOSED DEPARTURE TIME—The time a scheduled flight will depart the gate (scheduled operators) or the actual runway off time for nonscheduled operators. For EDCT purposes, the ATCSCC adjusts the "P" time for scheduled operators to reflect the runway off times.

PROTECTED AIRSPACE—The airspace on either side of an oceanic route/track that is equal to one-half the lateral separation minimum except where reduction of protected airspace has been authorized.

PT—(See PROCEDURE TURN).

PTS—(See POLAR TRACK STRUCTURE).

PUBLISHED ROUTE—A route for which an IFR altitude has been established and published; e.g., Federal Airways, Jet Routes, Area Navigation Routes, Specified Direct Routes.

Q

QUEUING—(See STAGING/QUEUING).

LOW—(See QUOTA FLOW CONTROL).

QNE—The barometric pressure used for the standard altimeter setting (29.92 inches Hg.).

QNH—The barometric pressure as reported by a particular station.

QUADRANT—A quarter part of a circle, centered on a NAVAID, oriented clockwise from magnetic north as follows: NE quadrant 000–089, SE quadrant 090–179, SW quadrant 180–269, NW quadrant 270–359.

QUICK LOOK—A feature of NAS Stage A and ARTS which provides the controller the capability to display full data blocks of tracked aircraft from other control positions.

QUOTA FLOW CONTROL—A flow control procedure by which the Central Flow Control Function (CFCF) restricts traffic to the ARTC Center area having an impacted airport, thereby avoiding sector/area saturation. *(See AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER). (Refer to AIRPORT/FACILITY DIRECTORY).*

R

RADAR—A device which, by measuring the time interval between transmission and reception of radio pulses and correlating the angular orientation of the radiated antenna beam or beams in azimuth and/or elevation, provides information on range, azimuth, and/or elevation of objects in the path of the transmitted pulses.

1. Primary Radar. A radar system in which a minute portion of a radio pulse transmitted from a site is reflected by an object and then received back at that site for processing and display at an air traffic control facility.

2. Secondary Radar/Radar Beacon (ATCRBS). A radar system in which the object to be detected is fitted with cooperative equipment in the form of a radio receiver/transmitter (transponder). Radar pulses transmitted from the searching transmitter/receiver (interrogator) site are received in the cooperative equipment and used to trigger a distinctive transmission from the transponder. This reply transmission, rather than a reflected signal, is then received back at the transmitter/receiver site for processing and display at an air traffic control facility.

(See TRANSPONDER). (See INTERROGATOR). (Refer to AIM). (See ICAO term RADAR). (See ICAO term PRIMARY RADAR). (See ICAO term SECONDARY RADAR).

RADAR [ICAO]—A radio detection device which provides information on range, azimuth and/or elevation of objects.

Primary Radar.—Radar system which uses reflected radio signals.

Secondary Radar.—Radar system wherein a radio signal transmitted from a radar station initiates the transmission of a radio signal from another station.

RADAR ADVISORY—The provision of advice and information based on radar observations.

(See ADVISORY SERVICE).

RADAR ALTIMETER—(See RADIO ALTIMETER).

RADAR APPROACH—An instrument approach procedure which utilizes Precision Approach Radar (PAR) or Airport Surveillance Radar (ASR).

(See SURVEILLANCE APPROACH). (See AIRPORT SURVEILLANCE RADAR). (See PRECISION APPROACH RADAR). (See INSTRUMENT APPROACH PROCEDURE). (Refer to AIM). (See ICAO term RADAR APPROACH).

RADAR APPROACH [ICAO]—An approach, executed by an aircraft, under the direction of a radar controller.

RADAR APPROACH CONTROL FACILITY—A terminal ATC facility that uses radar and nonradar capabilities to provide approach control services to aircraft arriving, departing, or transiting airspace controlled by the facility

(See APPROACH CONTROL SERVICE).

Provides radar ATC services to aircraft operating in the vicinity of one or more civil and/or military airports in a terminal area. The facility may provide services of a ground controlled approach (GCA); i.e., ASR and PAR approaches. A radar approach control facility may be operated by FAA, USAF, US Army, USN, USMC, or jointly by FAA and a military service. Specific facility nomenclatures are used for administrative purposes only and are related to the physical location of the facility and the operating service generally as follows:

Army Radar Approach Control (ARAC) (Army).

Radar Air Traffic Control Facility (RATCF) (Navy/FAA).

Radar Approach Control (RAPCON) (Air Force/FAA).

Terminal Radar Approach Control (TRACON) (FAA).

Tower/Airport Traffic Control Tower (ATCT) (FAA). (Only those towers delegated approach control authority.).

RADAR ARRIVAL—An aircraft arriving at an airport served by a radar facility and in radar contact with the facility.

(See NONRADAR).

RADAR BEACON—(See RADAR).

RADAR CONTACT—

1. Used by ATC to inform an aircraft that it is identified on the radar display and radar flight following will be provided until radar identification is terminated. Radar service may also be provided within the limits of necessity and capability. When a pilot is informed of "radar contact," he automatically discontinues reporting over compulsory reporting points.

(See RADAR FLIGHT FOLLOWING). (See RADAR CONTACT LOST). (See RADAR SERVICE). (See RADAR SERVICE TERMINATED). (Refer to AIM).

2. The term used to inform the controller that the aircraft is identified and approval is granted for the aircraft to enter the receiving controllers airspace.

(See ICAO term RADAR CONTACT).

RADAR CONTACT LOST—Used by ATC to inform a pilot that radar data used to determine the aircraft's position is no longer being received, or is no longer reliable and radar service is no longer being provided. The loss may be attributed to several factors including the aircraft merging with weather or ground clutter, the aircraft operating below radar line of sight coverage, the aircraft entering an area of poor radar return, failure of the aircraft transponder, or failure of the ground radar equipment. (See Clutter) (See Radar Contact)

(See CLUTTER). (See RADAR CONTACT).

RADAR CLUTTER [ICAO]—The visual indication on a radar display of unwanted signals.

RADAR CONTACT [ICAO]—The situation which exists when the radar blip or radar position symbol of a particular aircraft is seen and identified on a radar display.

RADAR ENVIRONMENT—An area in which radar service may be provided.

(See RADAR CONTACT). (See RADAR SERVICE). (See ADDITIONAL SERVICES). (See TRAFFIC ADVISORIES).

RADAR FLIGHT FOLLOWING—The observation of the progress of radar identified aircraft, whose primary navigation is being provided by the pilot, wherein the controller retains and correlates the aircraft identity with the appropriate target or target symbol displayed on the radar scope.

(See RADAR CONTACT). (See RADAR SERVICE). (Refer to AIM).

RADAR IDENTIFICATION—The process of ascertaining that an observed radar target is the radar return from a particular aircraft.

(See RADAR CONTACT). (See RADAR SERVICE). (See ICAO term RADAR IDENTIFICATION).

RADAR IDENTIFICATION [ICAO]—The process of correlating a particular radar blip or radar position symbol with a specific aircraft.

RADAR IDENTIFIED AIRCRAFT—An aircraft, the position of which has been correlated with an observed target or symbol on the radar display.

(See RADAR CONTACT). (See RADAR CONTACT LOST).

RADAR MONITORING—(See RADAR SERVICE).

RADAR NAVIGATIONAL GUIDANCE—(See RADAR SERVICE).

RADAR POINT OUT—An action taken by a controller to transfer the radar identification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred.

RADAR REQUIRED—A term displayed on charts and approach plates and included in FDC Notams to alert pilots that segments of either an instrument approach procedure or a route are not navigable because of either the absence or unusability of a NAVAID. The pilot can expect to be provided radar navigational guidance while transiting segments labeled with this term.

(See RADAR ROUTE). (See RADAR SERVICE).

RADAR ROUTE—A flight path or route over which an aircraft is vectored. Navigational guidance and altitude assignments are provided by ATC.

(See FLIGHT PATH). (See ROUTE).

RADAR SEPARATION—(See RADAR SERVICE).

RADAR SERVICE—A term which encompasses one or more of the following services based on the use of radar which can be provided by a controller to a pilot of a radar identified aircraft.

1. Radar Monitoring. The radar flight-following of aircraft, whose primary navigation is being performed by the pilot, to observe and note deviations from its authorized flight path, airway, or route. When being applied specifically to radar monitoring of instrument approaches; i.e., with precision approach radar (PAR) or radar monitoring of simultaneous ILS/MLS approaches, it includes advice and instructions whenever an aircraft nears or exceeds the prescribed PAR safety limit or simultaneous ILS/MLS no transgression zone.

(See ADDITIONAL SERVICES). (See TRAFFIC ADVISORIES).

2. Radar Navigational Guidance. Vectoring aircraft to provide course guidance.

3. Radar Separation. Radar spacing of aircraft in accordance with established minima.

(See ICAO term RADAR SERVICE).

RADAR SERVICE [ICAO]—Term used to indicate a service provided directly by means of radar.

Radar Monitoring.—The use of radar for the purpose of providing aircraft with information and advice relative to significant deviations from nominal flight path.

Radar Separation.—The separation used when aircraft position information is derived from radar sources.

RADAR SERVICE TERMINATED—Used by ATC to inform a pilot that he will no longer be provided any of the services that could be received while in radar contact. Radar service is automatically terminated, and the pilot is not advised in the following cases:

1. An aircraft cancels its IFR flight plan, except within a TCA, Class B airspace, ARSA, Class C airspace, a TRSA, or where Stage II Basic Radar service is provided.

2. An aircraft conducting an instrument, visual, or contact approach has landed or has been instructed to change to advisory frequency.

3. An arriving VFR aircraft, receiving radar service to a tower-controlled airport within a TCA, Class B airspace, ARSA, Class C airspace, a TRSA, or where Stage II Basic Radar service is provided, has landed; or to all other airports, is instructed to change to tower or advisory frequency.

4. An aircraft completes a radar approach.

RADAR SURVEILLANCE—The radar observation of a given geographical area for the purpose of performing some radar function.

RADAR TRAFFIC ADVISORIES—Advisories issued to alert pilots to known or observed radar traffic which may affect the intended route of flight of their aircraft.

(See TRAFFIC ADVISORIES).

RADAR TRAFFIC INFORMATION SERVICE—(See TRAFFIC ADVISORIES).

RADAR VECTORING [ICAO]—Provision of navigational guidance to aircraft in the form of specific headings, based on the use of radar.

RADAR WEATHER ECHO INTENSITY LEVELS—Existing radar systems cannot detect turbulence. However, there is a direct correlation between the degree of turbulence and other weather features associated with thunderstorms and the radar weather echo intensity. The National Weather Service has categorized radar weather echo intensity for precipitation into six levels. These levels are sometimes expressed during communications as "VIP LEVEL" 1 through 6 (derived from the component of the radar that produces the information-Video Integrator and Processor). The following list gives the "VIP LEVELS" in relation to the precipitation intensity within a thunderstorm:

Level 1. WEAK
Level 2. MODERATE
Level 3. STRONG
Level 4. VERY STRONG
Level 5. INTENSE
Level 6. EXTREME

(See AC00-45).

RADIAL—A magnetic bearing extending from a VOR/VORTAC/TACAN navigation facility.

RADIO—

1. A device used for communication.
2. Used to refer to a flight service station; e.g., "Seattle Radio" is used to call Seattle FSS.

RADIO ALTIMETER—Aircraft equipment which makes use of the reflection of radio waves from the ground to determine the height of the aircraft above the surface.

RADIO BEACON—(See *NONDIRECTIONAL BEACON*).

RADIO DETECTION AND RANGING—(See RADAR).

RADIO MAGNETIC INDICATOR—An aircraft navigational instrument coupled with a gyro compass or similar compass that indicates the direction of a selected NAVAID and indicates bearing with respect to the heading of the aircraft.

RAMP—(See APRON).

RANDOM ALTITUDE—An altitude inappropriate for direction of flight and/or not in accordance with paragraph 4-40.

RANDOM ROUTE—Any route not established or charted/published or not otherwise available to all users.

RC—(See ROAD RECONNAISSANCE).

RCAG—(See REMOTE COMMUNICATIONS AIR/GROUND FACILITY).

RCC—(See RESCUE COORDINATION CENTER).

RCO—(See REMOTE COMMUNICATIONS OUTLET).

RCR—(See RUNWAY CONDITION READING).

READ BACK—Repeat my message back to me.

RECEIVING CONTROLLER—A controller/facility receiving control of an aircraft from another controller/facility.

RECEIVING FACILITY—(See RECEIVING CONTROLLER).

REDUCE SPEED TO (SPEED)—(See SPEED ADJUSTMENT).

REIL—(See RUNWAY END IDENTIFIER LIGHTS).

RELEASE TIME—A departure *time restriction issued* to a pilot by ATC (either directly or through an authorized relay) when necessary to separate a departing aircraft from other traffic.

(See ICAO term RELEASE TIME).

RELEASE TIME [ICAO]—Time prior to which an aircraft should be given further clearance or prior to which it should not proceed in case of radio failure.

REMOTE COMMUNICATIONS AIR/GROUND FACILITY—An unmanned VHF/UHF transmitter/receiver facility which is used to expand ARTCC air/ground communications coverage and to facilitate direct contact between pilots and controllers. RCAG facilities are sometimes not equipped with emergency frequencies 121.5 mHz and 243 0 mHz.

(Refer to AIM).

REMOTE COMMUNICATIONS OUTLET—An unmanned communications facility remotely controlled by air traffic personnel. RCO's serve FSS's. RTR's serve terminal ATC facilities. An RCO or RTR may be UHF or VHF and will extend the communication range of the air traffic facility. There are several classes of RCO's and RTR's. The class is determined by the number of transmitters or receivers. Classes A through G are used primarily for air/ground purposes. RCO and RTR class O facilities are nonprotected outlets subject to undetected and prolonged outages. RCO (O's) and RTR (O's) were established for the express purpose of providing ground-to-ground communications between air traffic control specialists and pilots located at a satellite airport for delivering en route clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times. As a secondary function, they may be used for advisory purposes whenever the aircraft is below the coverage of the primary air/ground frequency.

REMOTE TRANSMITTER/RECEIVER—(See REMOTE COMMUNICATIONS OUTLET).

REPORT—Used to instruct pilots to advise ATC of specified information; e.g., "Report passing Hamilton VOR."

REPORTING POINT—A geographical location in relation to which the position of an aircraft is reported.

(See COMPULSORY REPORTING POINTS). (Refer to AIM). (See ICAO term REPORTING POINT).

REPORTING POINT [ICAO]—A specified geographical location in relation to which the position of an aircraft can be reported.

REQUEST FULL ROUTE CLEARANCE—Used by pilots to request that the entire route of flight be read verbatim in an ATC clearance. Such request should be made to preclude receiving an ATC clearance based on the original filed flight plan when a filed IFR flight plan has been revised by the pilot, company, or operations prior to departure.

RESCUE COORDINATION CENTER—A search and rescue (SAR) facility equipped and manned to coordinate and control SAR operations in an area designated by the SAR plan. The U.S. Coast Guard and the U.S. Air Force have responsibility for the operation of RCC's.

(See ICAO term RESCUE CO-ORDINATION CENTRE).

RESCUE CO-ORDINATION CENTRE [ICAO]—A unit responsible for promoting efficient organization of search and rescue service and for co-ordinating the conduct of search and rescue operations within a search and rescue region.

RESTRICTED AREA—(See SPECIAL USE AIRSPACE).

(See ICAO term RESTRICTED AREA).

RESTRICTED AREA [ICAO]—An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions.

RESUME OWN NAVIGATION—Used by ATC to advise a pilot to resume his own navigational responsibility. It is issued after completion of a radar vector or when radar contact is lost while the aircraft is being radar vectored.

(See RADAR CONTACT LOST). (See RADAR SERVICE TERMINATED).

RMI—(See RADIO MAGNETIC INDICATOR).

RNAV—(See AREA NAVIGATION).

RNAV [ICAO]—(See ICAO Term AREA NAVIGATION).

RNAV APPROACH—An instrument approach procedure which relies on aircraft area navigation equipment for navigational guidance.

(See INSTRUMENT APPROACH PROCEDURE). (See AREA NAVIGATION).

ROAD RECONNAISSANCE—Military activity requiring navigation along roads, railroads, and rivers. Reconnaissance route/route segments are seldom along a straight line and normally require a lateral route width of 10 NM to 30 NM and an altitude range of 500 feet to 10,000 feet AGL.

ROGER—I have received all of your last transmission. It should not be used to answer a question requiring a yes or a no answer.

(See AFFIRMATIVE). (See NEGATIVE).

ROLLOUT RVR—(See VISIBILITY).

ROUTE—A defined path, consisting of one or more courses in a horizontal plane, which aircraft traverse over the surface of the earth.

(See AIRWAY). (See JET ROUTE). (See PUBLISHED ROUTE). (See UNPUBLISHED ROUTE).

ROUTE SEGMENT—As used in Air Traffic Control, a part of a route that can be defined by two navigational fixes, two NAVAID's, or a fix and a NAVAID.

(See FIX). (See ROUTE). (See ICAO term ROUTE SEGMENT).

ROUTE SEGMENT [ICAO]—A portion of a route to be flown, as defined by two consecutive significant points specified in a flight plan.

RSA—(See RUNWAY SAFETY AREA).

RTR—(See REMOTE TRANSMITTER/RECEIVER).

RUNWAY—A defined rectangular area on a land airport prepared for the landing and takeoff run of aircraft along its length. Runways are normally numbered in relation to their magnetic direction rounded off to the nearest 10 degrees; e.g., Runway 01, Runway 25.

(See PARALLEL RUNWAYS). (See ICAO term RUNWAY).

RUNWAY [ICAO]—A defined rectangular area on a land aerodrome prepared for the landing and takeoff of aircraft.

RUNWAY CENTERLINE LIGHTING—(See AIRPORT LIGHTING).

RUNWAY CONDITION READING—Numerical decelerometer readings relayed by air traffic controllers at USAF and certain civil bases for use by the pilot in determining runway braking action. These readings are routinely relayed only to USAF and Air National Guard Aircraft.

(See BRAKING ACTION).

RUNWAY END IDENTIFIER LIGHTS—(See AIRPORT LIGHTING).

RUNWAY GRADIENT—The average slope, measured in percent, between two ends or points on a runway. Runway gradient is depicted on Government aerodrome sketches when total runway gradient exceeds 0.3%.

RUNWAY HEADING—The magnetic direction that corresponds with the runway centerline extended, not the painted runway number. When cleared to "fly or maintain runway heading," pilots are expected to fly or maintain the heading that corresponds with the extended centerline of the departure runway. Drift correction shall not be applied; e.g., Runway 4, actual magnetic heading of the runway centerline 044, fly 044.

RUNWAY IN USE/ACTIVE RUNWAY/DUTY RUNWAY—Any runway or runways currently being used for takeoff or landing. When multiple runways are used, they are all considered active runways. In the metering sense, a selectable adapted item which specifies the landing runway configuration or direction of traffic flow. The adapted optimum flight plan from each transition fix to the vertex is determined by the runway configuration for arrival metering processing purposes.

RUNWAY LIGHTS—(See AIRPORT LIGHTING).

RUNWAY MARKINGS—(See AIRPORT MARKING AIDS).

RUNWAY OVERRUN—In military aviation exclusively, a stabilized or paved area beyond the end of a runway, of the same width as the runway plus shoulders, centered on the extended runway centerline.

RUNWAY PROFILE DESCENT—An instrument flight rules (IFR) air traffic control arrival procedure to a runway published for pilot use in graphic and/or textual form and may be associated with a STAR. Runway Profile Descents provide routing and may depict crossing altitudes, speed restrictions, and headings to be flown from the en route structure to the point where the pilot will receive clearance for and execute an instrument approach procedure. A Runway Profile Descent may apply to more than one runway if so stated on the chart.

(Refer to AIM).

RUNWAY SAFETY AREA—A defined surface surrounding the runway prepared, or suitable, for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The dimensions of the RSA vary and can be determined by using the criteria contained within Advisory Circular 150/5300–13, Chapter 3. Figure 3–1 in Advisory Circular 150/5300–13 depicts the RSA. The design standards dictate that the RSA shall be:

1. Cleared, graded, and have no potentially hazardous ruts, humps, depressions, or other surface variations;
2. Drained by grading or storm sewers to prevent water accumulation;
3. Capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and,
4. Free of objects, except for objects that need to be located in the runway safety area because of their function. These objects shall be constructed on low impact resistant supports (frangible mounted structures) to the lowest practical height with the frangible point no higher than 3 inches above grade.

(Refer to AC 150/5300–13, Chap. 3.).

RUNWAY USE PROGRAM—A noise abatement runway selection plan designed to enhance noise abatement efforts with regard to airport communities for arriving and departing aircraft. These plans are developed into runway use programs and apply to all turbojet aircraft 12,500 pounds or heavier; turbojet aircraft less than 12,500 pounds are included only if the airport proprietor determines that the aircraft creates a noise problem. Runway use programs are coordinated with FAA offices, and safety criteria used in these programs are developed by the Office of Flight Operations. Runway use programs are administered by the Air Traffic Service as "Formal" or "Informal" programs.

1. Formal Runway Use Program. An approved noise abatement program which is defined and acknowledged in a Letter of Understanding between Flight Operations, Air Traffic Service, the airport proprietor, and the users. Once established, participation in the program is mandatory for aircraft operators and pilots as provided for in Part 91.129.
2. Informal Runway Use Program. An approved noise abatement program which does not require a Letter of Understanding, and participation in the program is voluntary for aircraft operators/pilots.

RUNWAY VISIBILITY VALUE—(See VISIBILITY).

RUNWAY VISUAL RANGE—(See VISIBILITY).

S

SAFETY ALERT—A safety alert issued by ATC to aircraft under their control if ATC is aware the aircraft is at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain, obstructions, or other aircraft. The controller may discontinue the issuance of further alerts if the pilot advises he is taking action to correct the situation or has the other aircraft in sight.

1. Terrain/Obstruction Alert. A safety alert issued by ATC to aircraft under their control if ATC is aware the aircraft is at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain/obstructions; e.g., "Low Altitude Alert, check your altitude immediately."
2. Aircraft Conflict Alert. A safety alert issued by ATC to aircraft under their control if ATC is aware of an aircraft that is not under their control at an altitude which, in the controller's judgment, places both aircraft in unsafe proximity to each other. With the alert, ATC will offer the pilot an alternate course of action when feasible; e.g., "Traffic Alert, advise you turn right heading zero niner zero or climb to eight thousand immediately."

The issuance of a safety alert is contingent upon the capability of the controller to have an awareness of an unsafe condition. The course of action provided will be predicated on other traffic under ATC control. Once the alert is issued, it is solely the pilot's prerogative to determine what course of action, if any, he will take.

SAIL BACK—A maneuver during high wind conditions (usually with power off) where float plane movement is controlled by water rudders/opening and closing cabin doors.

SAME DIRECTION AIRCRAFT—Aircraft are operating in the same direction when:

1. They are following the same track in the same direction; or
2. Their tracks are parallel and the aircraft are flying in the same direction; or
3. Their tracks intersect at an angle of less than 45 degrees.

SAR—(See SEARCH AND RESCUE).

SAY AGAIN—Used to request a repeat of the last transmission. Usually specifies transmission or portion thereof not understood or received; e.g., "Say again all after ABRAM VOR."

SAY ALTITUDE—Used by ATC to ascertain an aircraft's specific altitude/flight level. When the aircraft is climbing or descending, the pilot should state the indicated altitude rounded to the nearest 100 feet.

SAY HEADING—Used by ATC to request an aircraft heading. The pilot should state the actual heading of the aircraft.

SDF—(See SIMPLIFIED DIRECTIONAL FACILITY).

SEA LANE—A designated portion of water outlined by visual surface markers for and intended to be used by aircraft designed to operate on water.

SEARCH AND RESCUE—A service which seeks missing aircraft and assists those found to be in need of assistance. It is a cooperative effort using the facilities and services of available Federal, state and local agencies. The U.S. Coast Guard is responsible for coordination of search and rescue for the Maritime Region, and the U.S. Air Force is responsible for search and rescue for the Inland Region. Information pertinent to search and rescue should be passed through any air traffic facility or be transmitted directly to the Rescue Coordination Center by telephone.

(See FLIGHT SERVICE STATION). (See RESCUE COORDINATION CENTER). (Refer to AIM).

SEARCH AND RESCUE FACILITY—A facility responsible for maintaining and operating a search and rescue (SAR) service to render aid to persons and property in distress. It is any SAR unit, station, NET, or other operational activity which can be usefully employed during an SAR Mission; e.g., a Civil Air Patrol Wing, or a Coast Guard Station.

(See SEARCH AND RESCUE).

SECTIONAL AERONAUTICAL CHARTS—(See AERONAUTICAL CHART).

SECTOR LIST DROP INTERVAL—A parameter number of minutes after the meter fix time when arrival aircraft will be deleted from the arrival sector list.

SEE AND AVOID—A visual procedure wherein pilots of aircraft flying in visual meteorological conditions (VMC), regardless of type of flight plan, are charged with the responsibility to observe the presence of other aircraft and to maneuver their aircraft as required to avoid the other aircraft. Right-of-way rules are contained in Part 91.

(See INSTRUMENT FLIGHT RULES). (See VISUAL FLIGHT RULES). (See VISUAL METEOROLOGICAL CONDITIONS). (See INSTRUMENT METEOROLOGICAL CONDITIONS).

SEGMENTED CIRCLE—A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

(Refer to AIM).

SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE—An instrument approach procedure may have as many as four separate segments depending on how the approach procedure is structured.

1. Initial Approach. The segment between the initial approach fix and the intermediate fix or the point where the aircraft is established on the intermediate course or final approach course.

(See ICAO term INITIAL APPROACH SEGMENT).

2. Intermediate Approach. The segment between the intermediate fix or point and the final approach fix.

(See ICAO term INTERMEDIATE APPROACH SEGMENT).

3. Final Approach. The segment between the final approach fix or point and the runway, airport, or missed approach point.

(See ICAO term FINAL APPROACH SEGMENT).

4. Missed Approach. The segment between the missed approach point or the point of arrival at decision height and the missed approach fix at the prescribed altitude.

(Refer to Part 97). (See ICAO term MISSED APPROACH PROCEDURE).

SELECTED GROUND DELAYS—A traffic management procedure whereby selected flights are issued ground delays to better regulate traffic flows over a particular fix or area.

SEPARATION—In air traffic control, the spacing of aircraft to achieve their safe and orderly movement in flight and while landing and taking off.

(See SEPARATION MINIMA). (See ICAO term SEPARATION).

SEPARATION [ICAO]—Spacing between aircraft, levels or tracks.

SEPARATION MINIMA—The minimum longitudinal, lateral, or vertical distances by which aircraft are spaced through the application of air traffic control procedures.

(See SEPARATION).

SERVICE—A generic term that designates functions or assistance available from or rendered by air traffic control. For example, Class C service would denote the ATC services provided within a Class C airspace area.

SEVERE WEATHER AVOIDANCE PLAN—An approved plan to minimize the affect of severe weather on traffic flows in impacted terminal and/or ARTCC areas. SWAP is normally implemented to provide the least disruption to the ATC system when flight through portions of airspace is difficult or impossible due to severe weather.

SEVERE WEATHER FORECAST ALERTS—Preliminary messages issued in order to alert users that a Severe Weather Watch Bulletin (WW) is being issued. These messages define areas of possible severe thunderstorms or tornado activity. The messages are unscheduled and issued as required by the National Severe Storm Forecast Center at Kansas City, Missouri.

(See SIGMET). (See CONVECTIVE SIGMET). (See CWA). (See AIRMET).

SFA—(See SINGLE FREQUENCY APPROACH).

SFO—(See SIMULATED FLAMEOUT).

SHF—(See SUPER HIGH FREQUENCY).

SHORT RANGE CLEARANCE—A clearance issued to a departing IFR flight which authorizes IFR flight to a specific fix short of the destination while air traffic control facilities are coordinating and obtaining the complete clearance.

SHORT TAKEOFF AND LANDING AIRCRAFT
AIRCRAFT—An aircraft which, at some weight within its approved operating weight, is capable of operating from a STOL runway in compliance with the applicable STOL characteristics, airworthiness, operations, noise, and pollution standards.

(See VERTICAL TAKEOFF AND LANDING AIRCRAFT).

SIAP—(See STANDARD INSTRUMENT APPROACH PROCEDURE).

SIDESTEP MANEUVER—A visual maneuver accomplished by a pilot at the completion of an instrument approach to permit a straight-in landing on a parallel runway not more than 1,200 feet to either side of the runway to which the instrument approach was conducted.

(Refer to AIM).

SIGMET—A weather advisory issued concerning weather significant to the safety of all aircraft. SIGMET advisories cover severe and extreme turbulence, severe icing, and widespread dust or sandstorms that reduce visibility to less than 3 miles.

(See AWW). (See CONVECTIVE SIGMET). (See CWA). (See AIRMET). (Refer to AIM). (See ICAO term SIGMET INFORMATION).

SIGMET INFORMATION [ICAO]—Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations.

SIGNIFICANT METEOROLOGICAL INFORMATION—(See SIGMET).

SIGNIFICANT POINT—A point, whether a named intersection, a NAVAID, a fix derived from a NAVAID(s), or geographical coordinate expressed in degrees of latitude and longitude, which is established for the purpose of providing separation, as a reporting point, or to delineate a route of flight.

SIMPLIFIED DIRECTIONAL FACILITY—A NAVAID used for nonprecision instrument approaches. The final approach course is similar to that of an ILS localizer except that the SDF course may be offset from the runway, generally not more than 3 degrees, and the course may be wider than the localizer, resulting in a lower degree of accuracy.

(Refer to AIM).

SIMULATED FLAMEOUT—A practice approach by a jet aircraft (normally military) at idle thrust to a runway. The approach may start at a relatively high altitude over a runway (high key) and may continue on a relatively high and wide downwind leg with a high rate of descent and a continuous turn to final. It terminates in a landing or low approach. The purpose of this approach is to simulate a flameout.

(See FLAMEOUT).

SIMULTANEOUS ILS APPROACHES—An approach system permitting simultaneous ILS/MLS approaches to airports having parallel runways separated by at least 4,300 feet between centerlines. Integral parts of a total system are ILS/MLS, radar, communications, ATC procedures, and appropriate airborne equipment.

(See PARALLEL RUNWAYS). (Refer to AIM).

SIMULTANEOUS MLS APPROACHES—(See SIMULTANEOUS ILS APPROACHES).

SIMULTANEOUS OPERATIONS ON INTERSECTING RUNWAYS—Operations which include simultaneous takeoffs and landings and/or simultaneous landings when a landing aircraft is able and is instructed by the controller to hold short of the intersecting runway or designated hold short point. Pilots are expected to promptly inform the controller if the hold short clearance cannot be accepted.

(See PARALLEL RUNWAYS). (Refer to AIM).

SINGLE DIRECTION ROUTES—Preferred IFR Routes which are sometimes depicted on high altitude en route charts and which are normally flown in one direction only.

(See PREFERRED IFR ROUTES). (Refer to AIRPORT/FACILITY DIRECTORY).

SINGLE FREQUENCY APPROACH—A service provided under a letter of agreement to military single-piloted turbojet aircraft which permits use of a single UHF frequency during approach for landing. Pilots will not normally be required to change frequency from the beginning of the approach to touchdown except that pilots conducting an en route descent are required to change frequency when control is transferred from the air route traffic control center to the terminal facility. The abbreviation "SFA" in the DOD FLIP IFR Supplement under "Communications" indicates this service is available at an aerodrome.

SINGLE-PILOTED AIRCRAFT—A military turbojet aircraft possessing one set of flight controls, tandem cockpits, or two sets of flight controls but operated by one pilot is considered single-piloted by ATC when determining the appropriate air traffic service to be applied.

(See SINGLE FREQUENCY APPROACH).

SLASH—A radar beacon reply displayed as an elongated target.

SLDI—(See SECTOR LIST DROP INTERVAL).

SLOT TIME—(See METER FIX TIME/SLOT TIME).

SLOW TAXI—To taxi a float plane at low power or low RPM.

SN—(See SYSTEM STRATEGIC NAVIGATION).

SPEAK SLOWER—Used in verbal communications as a request to reduce speech rate.

SPECIAL EMERGENCY—A condition of air piracy or other hostile act by a person(s) aboard an aircraft which threatens the safety of the aircraft or its passengers.

SPECIAL INSTRUMENT APPROACH PROCEDURE—(See INSTRUMENT APPROACH PROCEDURE).

SPECIAL USE AIRSPACE—Airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Types of special use airspace are:

1. Alert Area. Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft. Alert Areas are depicted on aeronautical charts for the information of nonparticipating pilots. All activities within an Alert Area are conducted in accordance with Federal Aviation Regulations, and pilots of participating aircraft as well as pilots transiting the area are equally responsible for collision avoidance.

2. Controlled Firing Area. Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons and property on the ground.

3. Military Operations Area (MOA). An MOA is an airspace assignment of defined vertical and lateral dimensions established outside positive control Class A airspace to separate/segregate certain military activities from IFR traffic and to identify for VFR traffic where these activities are conducted.

(Refer to AIM).

4. Prohibited Area. Designated airspace within which the flight of aircraft is prohibited.

(Refer to En Route Charts, AIM).

5. Restricted Area. Airspace designated under Part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use and IFR/VFR operations in the area may be authorized by the controlling ATC facility when it is not being utilized by the using agency. Restricted areas are depicted on en route charts. Where joint use is authorized, the name of the ATC controlling facility is also shown.

(Refer to Part 73). (Refer to AIM).

6. Warning Area. Airspace which may contain hazards to nonparticipating aircraft in international airspace.

SPECIAL VFR CONDITIONS—Weather conditions in a control zone which are less than basic VFR and in which some aircraft are permitted flight under Visual Flight Rules. Meteorological conditions that are less than those required for basic VFR flight in Class B, C, D, or E surface areas and in which some aircraft are permitted flight under visual flight rules.

(See SPECIAL VFR OPERATIONS). (Refer to Part 91).

SPECIAL VFR FLIGHT [ICAO]—A VFR flight cleared by air traffic control to operate within a control zone Class B, C, D, and E surface areas in meterological conditions below VMC.

SPECIAL VFR OPERATIONS—Aircraft operating in accordance with clearances within control zone Class B, C, D, and E surface areas in weather conditions less than the basic VFR weather minima. Such operations must be requested by the pilot and approved by ATC.

(See SPECIAL VFR CONDITIONS). (See ICAO term SPECIAL VFR FLIGHT).

SPEED—(See AIRSPEED).

(See GROUND SPEED).

SPEED ADJUSTMENT—An ATC procedure used to request pilots to adjust aircraft speed to a specific value for the purpose of providing desired spacing. Pilots are expected to maintain a speed of plus or minus 10 knots or 0.02 mach number of the specified speed.

Examples of speed adjustments are:

1. "Increase/reduce speed to mach point (number)."
2. "Increase/reduce speed to (speed in knots)" or "Increase/reduce speed (number of knots) knots."

SPEED BRAKES—Moveable aerodynamic devices on aircraft that reduce airspeed during descent and landing.

SPEED SEGMENTS—Portions of the arrival route between the transition point and the vertex along the optimum flight path for which speeds and altitudes are specified. There is one set of arrival speed segments adapted from each transition point to each vertex. Each set may contain up to six segments.

SQUAWK (Mode, Code, Function)—Activate specific modes/codes/functions on the aircraft transponder; e.g., "Squawk three/alpha, two one zero five, low."

(See TRANSPONDER).

STAGING/QUEUING—The placement, integration, and segregation of departure aircraft in designated movement areas of an airport by departure fix, EDCT, and/or restriction.

STANDARD INSTRUMENT APPROACH PROCEDURE—(See INSTRUMENT APPROACH PROCEDURE).

STANDARD INSTRUMENT DEPARTURE—A preplanned instrument flight rule (IFR) air traffic control departure procedure printed for pilot use in graphic and/or textual form. SID's provide transition from the terminal to the appropriate en route structure.

(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES). (Refer to AIM).

STANDARD INSTRUMENT DEPARTURE CHARTS—(See AERONAUTICAL CHART).

STANDARD RATE TURN—A turn of three degrees per second.

STANDARD TERMINAL ARRIVAL—A preplanned instrument flight rule (IFR) air traffic control arrival procedure published for pilot use in graphic and/or textual form. STAR's provide transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area.

STANDARD TERMINAL ARRIVAL CHARTS—(See AERONAUTICAL CHART).

STAND BY—Means the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority. Also means to wait as in "stand by for clearance." The caller should reestablish contact if a delay is lengthy. "Stand by" is not an approval or denial.

STAR—(See STANDARD TERMINAL ARRIVAL).

STATE AIRCRAFT—Aircraft used in military, customs and police service, in the exclusive service of any government, or of any political subdivision, thereof including the government of any state, territory, or possession of the United States or the District of Columbia, but not including any government-owned aircraft engaged in carrying persons or property for commercial purposes.

STATIC RESTRICTIONS—Those restrictions that are usually not subject to change, fixed, in place, and/or published.

STATIONARY RESERVATIONS—Altitude reservations which encompass activities in a fixed area. Stationary reservations may include activities, such as special tests of weapons systems or equipment, certain U.S. Navy carrier, fleet, and anti-submarine operations, rocket, missile and drone operations, and certain aerial refueling or similar operations.

STEPDOWN FIX—A fix permitting additional descent within a segment of an instrument approach procedure by identifying a point at which a controlling obstacle has been safely overflown.

STEP TAXI—To taxi a float plane at full power or high RPM.

STEP TURN—A maneuver used to put a float plane in a planing configuration prior to entering an active sea lane for takeoff. The STEP TURN maneuver should only be used upon pilot request.

STEREO ROUTE—A routinely used route of flight established by users and ARTCC's identified by a coded name; e.g., ALPHA 2. These routes minimize flight plan handling and communications.

STOL AIRCRAFT—(See SHORT TAKEOFF AND LANDING AIRCRAFT).

STOP ALTITUDE SQUAWK—Used by ATC to inform an aircraft to turn-off the automatic altitude reporting feature of its transponder. It is issued when the verbally reported altitude varies 300 feet or more from the automatic altitude report.
(See ALTITUDE READOUT). (See TRANSPONDER).

STOP AND GO—A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point.
(See LOW APPROACH). (See OPTION APPROACH).

STOP BURST—(See STOP STREAM).

STOP BUZZER—(See STOP STREAM).

STOPOVER FLIGHT PLAN—A flight plan format which permits in a single submission the filing of a sequence of flight plans through interim full-stop destinations to a final destination.

STOP SQUAWK (Mode or Code)—Used by ATC to tell the pilot to turn specified functions of the aircraft transponder off.
(See STOP ALTITUDE SQUAWK). (See TRANSPONDER).

STOP STREAM—Used by ATC to request a pilot to suspend electronic countermeasure activity.
(See JAMMING).

STOPWAY—An area beyond the takeoff runway no less wide than the runway and centered upon the extended centerline of the runway, able to support the airplane during an aborted takeoff, without causing structural damage to the airplane, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff.

STRAIGHT-IN APPROACH-IFR—An instrument approach wherein final approach is begun without first having executed a procedure turn, not necessarily completed with a straight-in landing or made to straight-in landing minimums.
(See STRAIGHT-IN LANDING). (See LANDING MINIMUMS). (See STRAIGHT-IN APPROACH-VFR).

STRAIGHT-IN APPROACH-VFR—Entry into the traffic pattern by interception of the extended runway centerline (final approach course) without executing any other portion of the traffic pattern.
(See TRAFFIC PATTERN).

STRAIGHT-IN LANDING—A landing made on a runway aligned within 30° of the final approach course following completion of an instrument approach.
(See STRAIGHT-IN APPROACH-IFR).

STRAIGHT-IN LANDING MINIMUMS—(See LANDING MINIMUMS).

STRAIGHT-IN MINIMUMS—(See STRAIGHT-IN LANDING MINIMUMS).

SUBSTITUTIONS—Users are permitted to exchange CTA's. Normally, the airline dispatcher will contact the ATCSCC with this request. The ATCSCC shall forward approved substitutions to the TMU's who will notify the appropriate terminals. Permissible swapping must not change the traffic load for any given hour of an EQF program.

SUBSTITUTE ROUTE—A route assigned to pilots when any part of an airway or route is unusable because of NAVAID status. These routes consist of:

1. Substitute routes which are shown on U.S. Government charts.
2. Routes defined by ATC as specific NAVAID radials or courses.
3. Routes defined by ATC as direct to or between NAVAID's.

SUNSET AND SUNRISE—The mean solar times of sunset and sunrise as published in the Nautical Almanac, converted to local standard time for the locality concerned. Within Alaska, the end of evening civil twilight and the beginning of morning civil twilight, as defined for each locality.

SUPER HIGH FREQUENCY—The frequency band between 3 and 30 gigahertz (gHz). The elevation and azimuth stations of the microwave landing system operate from 5031 mHz to 5091 mHz in this spectrum.

SUPPLEMENTAL WEATHER SERVICE LOCATION—Airport facilities staffed with contract personnel who take weather observations and provide current local weather to pilots via telephone or radio. (All other services are provided by the parent FSS).

SUPPS—Refers to ICAO Document 7030 Regional Supplementary Procedures. SUPPS contain procedures for each ICAO Region which are unique to that Region and are not covered in the worldwide provisions identified in the ICAO Air Navigation Plan. Procedures contained in chapter 8 are based in part on those published in SUPPS.

SURFACE AREA—The airspace contained by the lateral boundary of the Class B, C, D, or E airspace designated for an airport that begins at the surface and extends upward.

SURPIC—A description of surface vessels in the area of a Search and Rescue incident including their predicted positions and their characteristics.

(See Paragraph 10-83, Emergency Assistance).

SURVEILLANCE APPROACH—An instrument approach wherein the air traffic controller issues instructions, for pilot compliance, based on aircraft position in relation to the final approach course (azimuth), and the distance (range) from the end of the runway as displayed on the controller's radar scope. The controller will provide recommended altitudes on final approach if requested by the pilot.
(Refer to AIM).

SWAP—(See SEVERE WEATHER AVOIDANCE PLAN).

SWSL—(See SUPPLEMENTAL WEATHER SERVICE LOCATION).

SYSTEM STRATEGIC NAVIGATION—Military activity accomplished by navigating along a preplanned route using internal aircraft systems to maintain a desired track. This activity normally requires a lateral route width of 10 NM and altitude range of 1,000 feet to 6,000 feet AGL with some route segments that permit terrain following.

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TACAN—(See TACTICAL AIR NAVIGATION).

TACAN-ONLY AIRCRAFT—An aircraft, normally military, possessing TACAN with DME but no VOR navigational system capability. Clearances must specify TACAN or VORTAC fixes and approaches.

TACTICAL AIR NAVIGATION—An ultra-high frequency electronic rho-theta air navigation aid which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.

(See VORTAC). (Refer to AIM).

TAILWIND—Any wind more than 90 degrees to the longitudinal axis of the runway. The magnetic heading of the runway shall be used as the basis for determining the longitudinal axis.

TAKEOFF AREA—(See LANDING AREA).

TAKE–OFF DISTANCE AVAILABLE [ICAO]—The length of the take–off run available plus the length of the clearway, if provided.

TAKE–OFF RUN AVAILABLE [ICAO]—The length of runway declared available and suitable for the ground run of an aeroplane take–off.

TARGET—The indication shown on a radar display resulting from a primary radar return or a radar beacon reply.

(See RADAR). (See TARGET SYMBOL). (See ICAO term TARGET).

TARGET [ICAO]—In radar:

1. Generally, any discrete object which reflects or retransmits energy back to the radar equipment.
2. Specifically, an object of radar search or surveillance.

TARGET RESOLUTION—A process to ensure that correlated radar targets do not touch. Target resolution shall be applied as follows:

1. Between the edges of two primary targets or the edges of the ASR–9 primary target symbol.
2. Between the end of the beacon control slash and the edge of a primary target.
3. Between the ends of two beacon control slashes.—MANDATORY TRAFFIC ADVISORIES AND SAFETY ALERTS SHALL BE ISSUED WHEN THIS PROCEDURE IS USED.

Note: This procedure shall not be provided utilizing mosaic radar systems.

TARGET SYMBOL—A computer-generated indication shown on a radar display resulting from a primary radar return or a radar beacon reply.

TAXI—The movement of an airplane under its own power on the surface of an airport (Part 135.100–Note). Also, it describes the surface movement of helicopters equipped with wheels.

(See AIR TAXI). (See HOVER TAXI). (Refer to AIM). (Refer to Part 135.100).

TAXI INTO POSITION AND HOLD—Used by ATC to inform a pilot to taxi onto the departure runway in takeoff position and hold. It is not authorization for takeoff. It is used when takeoff clearance cannot immediately be issued because of traffic or other reasons.

(See CLEARED FOR TAKEOFF).

TAXI PATTERNS—Patterns established to illustrate the desired flow of ground traffic for the different runways or airport areas available for use.

TCAS—(See TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM).

TCH—(See THRESHOLD CROSSING HEIGHT).

TCLT—(See TENTATIVE CALCULATED LANDING TIME).

TDZE—(See TOUCHDOWN ZONE ELEVATION).

TELEPHONE INFORMATION BRIEFING SERVICE—A continuous telephone recording of meteorological and/or aeronautical information.

(Refer to AIM).

TENTATIVE CALCULATED LANDING TIME—A projected time calculated for adapted vertex for each arrival aircraft based upon runway configuration, airport acceptance rate, airport arrival delay period, and other metered arrival aircraft. This time is either the VTA of the aircraft or the TCLT/ACLT of the previous aircraft plus the AAI, whichever is later. This time will be updated in response to an aircraft's progress and its current relationship to other arrivals.

TERMINAL AREA—A general term used to describe airspace in which approach control service or airport traffic control service is provided.

TERMINAL AREA FACILITY—A facility providing air traffic control service for arriving and departing IFR, VFR, Special VFR, and on occasion en route aircraft.

(See APPROACH CONTROL FACILITY). (See TOWER).

TERMINAL CONTROL AREA—See CONTROLLED AIRSPACE.

TERMINALVFR RADAR SERVICE—A national program instituted to extend the terminal radar services provided IFR aircraft to VFR aircraft. Pilot participation in the program is urged but is not mandatory. The program is divided into two parts and referred to as Stage II and Stage III. The Stage service provided at a particular location is contained in the Airport/Facility Directory. A national program instituted to extend the terminal radar services provided instrument flight rules (IFR) aircraft to visual flight rules (VFR) aircraft. The program is divided into two parts and referred to as Stage II and Stage III. The Stage service provided at a particular location is contained in the Airport/Facility Directory. Stage II service is terminal radar service area (TRSA) service, Class B service and Class C service. The type of service provided at a particular location is contained in the Airport/Facility Directory.

1. Basic Radar Service originally comprised two basic radar services (traffic advisories and limited vectoring to VFR aircraft). These services are provided by all commissioned terminal radar facilities, but the term "Stage I" has been deleted from use. Radar Advisory and Sequencing for VFR Aircraft provides, in addition to the basic radar services, vectoring and sequencing on a full-time basis to arriving VFR aircraft. The purpose is to adjust the flow of arriving IFR and VFR aircraft into the traffic pattern in a safe and orderly manner and to provide traffic advisories to departing VFR aircraft. Basic Radar Service. These services are provided for VFR aircraft by all commissioned terminal radar facilities. Basic radar service includes safety alerts, traffic advisories, limited radar vectoring when requested by the pilot, and sequencing at locations where procedures have been established for this purpose and/or when covered by a letter of agreement. The purpose of this service is to adjust the flow of arriving IFR and VFR aircraft into the traffic pattern in a safe and orderly manner and to provide traffic advisories to departing VFR aircraft.

2. TRSA Service: Radar sequencing and Separation Service for VFR Aircraft provides, in addition to the basic radar services separation between all participating VFR aircraft. The purpose is to provide separation between all participating VFR aircraft and all IFR aircraft operating within the airspace defined as a TRSA service or Terminal Control Area (TCA). TRSA Service. This service provides, in addition to basic radar service, sequencing of all IFR and participating VFR aircraft to the primary airport, and separation between all participating VFR aircraft. The purpose of this service is to provide separation between all participating VFR aircraft and all IFR aircraft operating within the area defined as a TRSA.

3. Class C Service: This service provides, in addition to basic radar service, approved separation between IFR, and VFR aircraft, and sequencing of VFR aircraft, and sequencing of VFR arrivals to the primary airport. Class C Service. This service provides, in addition to basic radar service, approved separation of aircraft based on IFR, VFR, and/or weight, and sequencing of VFR arrivals to the primary airport(s).

(See CONTROLLED AIRSPACE). (See TERMINAL RADAR SERVICE AREA). (Refer to AIM). (Refer to AIRPORT/FACILITY DIRECTORY).

TERMINAL RADAR SERVICE AREA—Airspace surrounding designated airports wherein ATC provides radar vectoring, sequencing, and separation on a full-time basis for all IFR and participating VFR aircraft. Service provided in a TRSA is called Stage III Service. The AIM contains an explanation of TRSA. TRSA's are depicted on VFR aeronautical charts. Pilot participation is urged but is not mandatory.

(See TERMINAL RADAR PROGRAM). (Refer to AIM). (Refer to AIRPORT/FACILITY DIRECTORY).

TERMINAL-VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION—A very high frequency terminal omnirange station located on or near an airport and used as an approach aid.

(See NAVIGATIONAL AID). (See VOR).

TERRAIN FOLLOWING—The flight of a military aircraft maintaining a constant AGL altitude above the terrain or the highest obstruction. The altitude of the aircraft will constantly change with the varying terrain and/or obstruction.

TETRAHEDRON—A device normally located on uncontrolled airports and used as a landing direction indicator. The small end of a tetrahedron points in the direction of landing. At controlled airports, the tetrahedron, installed, should be disregarded because tower instructions supersede the indicator.

(See SEGMENTED CIRCLE). (Refer to AIM).

TF—(See TERRAIN FOLLOWING).

THAT IS CORRECT—The understanding you have is right.

360 OVERHEAD—(See OVERHEAD APPROACH).

THRESHOLD—The beginning of that portion of the runway usable for landing.

(See AIRPORT LIGHTING). (See DISPLACED THRESHOLD).

THRESHOLD CROSSING HEIGHT—The theoretical height above the runway threshold at which the aircraft's glideslope antenna would be if the aircraft maintains the trajectory established by the mean ILS glideslope or MLS glidepath.

(See GLIDESLOPE). (See THRESHOLD).

THRESHOLD LIGHTS—(See AIRPORT LIGHTING).

TIBS—(See TELEPHONE INFORMATION BRIEFING SERVICE).

TIME GROUP—Four digits representing the hour and minutes from the 24–hour clock. Time groups without time zone indicators are understood to be UTC (Coordinated Universal Time); e.g., "0205." The term "Zulu" is used when ATC procedures require a reference to UTC. A time zone designator is used to indicate local time; e.g., "0205M." The end and the beginning of the day are shown by "2400" and "0000," respectively.

TMPA—(See TRAFFIC MANAGEMENT PROGRAM ALERT).

TMU—(See TRAFFIC MANAGEMENT UNIT).

TODA [ICAO]—(See ICAO Term TAKE–OFF DISTANCE AVAILABLE).

TORA [ICAO]—(See ICAO Term TAKE–OFF RUN AVAILABLE).

TORCHING—The burning of fuel at the end of an exhaust pipe or stack of a reciprocating aircraft engine, the result of an excessive richness in the fuel air mixture.

TOTAL ESTIMATED ELAPSED TIME [ICAO]—For IFR flights, the estimated time required from take-off to arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the destination aerodrome, to arrive over the destination aerodrome. For VFR flights, the estimated time required from takeoff to arrive over the destination aerodrome.

(See ESTIMATED ELAPSED TIME).

TOUCH-AND-GO—An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway.

TOUCH-AND-GO LANDING—(See TOUCH-AND-GO).

TOUCHDOWN—

1. The point at which an aircraft first makes contact with the landing surface.
2. Concerning a precision radar approach (PAR), it is the point where the glide path intercepts the landing surface.

(See ICAO term TOUCHDOWN).

TOUCHDOWN [ICAO]—The point where the nominal glide path intercepts the runway.

Note: Touchdown as defined above is only a datum and is not necessarily the actual point at which the aircraft will touch the runway.

TOUCHDOWN RVR—(See VISIBILITY).

TOUCHDOWN ZONE—The first 3,000 feet of the runway beginning at the threshold. The area is used for determination of Touchdown Zone Elevation in the development of straight-in landing minimums for instrument approaches.

(See ICAO term TOUCHDOWN ZONE).

TOUCHDOWN ZONE [ICAO]—The portion of a runway, beyond the threshold, where it is intended landing aircraft first contact the runway.

TOUCHDOWN ZONE ELEVATION—The highest elevation in the first 3,000 feet of the landing surface. TDZE is indicated on the instrument approach procedure chart when straight-in landing minimums are authorized.

(See TOUCHDOWN ZONE).

TOUCHDOWN ZONE LIGHTING—(See AIRPORT LIGHTING).

TOWER—A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the [redacted] Class D airspace area regardless of flight plan or weather conditions (IFR or VFR). A tower may also provide approach control services (radar or nonradar).

[redacted] *(See AIRPORT TRAFFIC CONTROL SERVICE). (See APPROACH CONTROL FACILITY). (See APPROACH CONTROL SERVICE). (See MOVEMENT AREA). (See TOWER EN ROUTE CONTROL SERVICE). (Refer to AIM). (See ICAO term AERODROME CONTROL TOWER).*

TOWER EN ROUTE CONTROL SERVICE—The control of IFR en route traffic within delegated airspace between two or more adjacent approach control facilities. This service is designed to expedite traffic and reduce control and pilot communication requirements.

TOWER TO TOWER—(See TOWER EN ROUTE CONTROL SERVICE).

TPX–42—A numeric beacon decoder equipment/system. It is designed to be added to terminal radar systems for beacon decoding. It provides rapid target identification, reinforcement of the primary radar target, and altitude information from Mode C.

(See AUTOMATED RADAR TERMINAL SYSTEMS). (See TRANSPONDER).

TRACK—The actual flight path of an aircraft over the surface of the earth.

(See COURSE). (See ROUTE). (See FLIGHT PATH). (See ICAO term TRACK).

TRACK [ICAO]—The projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (True, Magnetic, or Grid).

TRAFFIC—

1. A term used by a controller to transfer radar identification of an aircraft to another controller for the purpose of coordinating separation action. Traffic is normally issued:
   (a) in response to a handoff or point out,
   (b) in anticipation of a handoff or point out, or

(c) in conjunction with a request for control of an aircraft.

2. A term used by ATC to refer to one or more aircraft.

TRAFFIC ADVISORIES—Advisories issued to alert pilots to other known or observed air traffic which may be in such proximity to the position or intended route of flight of their aircraft to warrant their attention. Such advisories may be based on:

1. Visual observation.
2. Observation of radar identified and nonidentified aircraft targets on an ATC radar display, or
3. Verbal reports from pilots or other facilities.

The word "traffic" followed by additional information, if known, is used to provide such advisories; e.g., "Traffic, 2 o'clock, one zero miles, southbound, eight thousand."

Traffic advisory service will be provided to the extent possible depending on higher priority duties of the controller or other limitations; e.g., radar limitations, volume of traffic, frequency congestion, or controller workload. Radar/nonradar traffic advisories do not relieve the pilot of his responsibility to see and avoid other aircraft. Pilots are cautioned that there are many times when the controller is not able to give traffic advisories concerning all traffic in the aircraft's proximity; in other words, when a pilot requests or is receiving traffic advisories, he should not assume that all traffic will be issued.

(Refer to AIM).

(Identification), TRAFFIC ALERT. ADVISE YOU TURN LEFT/RIGHT (specific heading if appropriate), AND/OR CLIMB/DESCEND (specific altitude if appropriate) IMMEDIATELY.—(See SAFETY ALERT).

TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM—An airborne collision avoidance system based on radar beacon signals which operates independent of ground-based equipment. TCAS-I generates traffic advisories only. TCAS-II generates traffic advisories, and resolution (collision avoidance) advisories in the vertical plane.

TRAFFIC INFORMATION—(See TRAFFIC ADVISORIES).

TRAFFIC IN SIGHT—Used by pilots to inform a controller that previously issued traffic is in sight.

(See NEGATIVE CONTACT). (See TRAFFIC ADVISORIES).

TRAFFIC MANAGEMENT PROGRAM ALERT—A term used in a Notice to Airmen (NOTAM) issued in conjunction with a special traffic management program to alert pilots to the existence of the program and to refer them to either the Notices to Airmen publication or a special traffic management program advisory message for program details. The contraction TMPA is used in NOTAM text.

TRAFFIC MANAGEMENT UNIT—The entity in ARTCC's and designated terminals responsible for direct involvement in the active management of facility traffic. Usually under the direct supervision of an assistant manager for traffic management.

TRAFFIC NO FACTOR—Indicates that the traffic described in a previously issued traffic advisory is no factor.

TRAFFIC NO LONGER OBSERVED—Indicates that the traffic described in a previously issued traffic advisory is no longer depicted on radar, but may still be a factor.

TRAFFIC PATTERN—The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

1. Upwind Leg. A flight path parallel to the landing runway in the direction of landing.
2. Crosswind Leg. A flight path at right angles to the landing runway off its upwind end.
3. Downwind Leg. A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.
4. Base Leg. A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.
5. Final Approach. A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. An aircraft making a straight-in approach VFR is also considered to be on final approach.

(See STRAIGHT-IN APPROACH-VFR). (See TAXI PATTERNS). (Refer to AIM). (Refer to Part 91). (See ICAO term AERODROME TRAFFIC CIRCUIT).

TRANSCRIBED WEATHER BROADCAST—A continuous recording of meteorological and aeronautical information that is broadcast on L/MF and VOR facilities for pilots.

(Refer to AIM).

TRANSFER OF CONTROL—That action whereby the responsibility for the separation of an aircraft is transferred from one controller to another.

(See ICAO term TRANSFER OF CONTROL).

TRANSFER OF CONTROL [ICAO]—Transfer of responsibility for providing air traffic control service.

TRANSFERRING CONTROLLER—A controller/facility transferring control of an aircraft to another controller/facility.

(See ICAO term TRANSFERRING UNIT/CONTROLLER).

TRANSFERRING FACILITY—(See TRANSFERRING CONTROLLER).

TRANSFERRING UNIT/CONTROLLER [ICAO]—Air traffic control unit/air traffic controller in the process of transferring the responsibility for providing air traffic control service to an aircraft to the next air traffic control unit/air traffic controller along the route of flight.

Note: See definition of *accepting unit/controller.*

TRANSITION—

1. The general term that describes the change from one phase of flight or flight condition to another; e.g., transition from en route flight to the approach or transition from instrument flight to visual flight.
2. A published procedure (SID Transition) used to connect the basic SID to one of several en route airways/jet routes, or a published procedure (STAR Transition) used to connect one of several en route airways/jet routes to the basic STAR.

(Refer to SID/STAR Charts).

TRANSITION AREA—See CONTROLLED AIRSPACE.

TRANSITIONAL AIRSPACE—That portion of controlled airspace wherein aircraft change from one phase of flight or flight condition to another.

TRANSITION POINT—A point at an adapted number of miles from the vertex at which an arrival aircraft would normally commence descent from its en route altitude. This is the first fix adapted on the arrival speed segments.

TRANSMISSOMETER—An apparatus used to determine visibility by measuring the transmission of light through the atmosphere. It is the measurement source for determining runway visual range (RVR) and runway visibility value (RVV).

(See VISIBILITY).

TRANSMITTING IN THE BLIND—A transmission from one station to other stations in circumstances where two-way communication cannot be established, but where it is believed that the called stations may be able to receive the transmission.

TRANSPONDER—The airborne radar beacon receiver/transmitter portion of the Air Traffic Control Radar Beacon System (ATCRBS) which automatically receives radio signals from interrogators on the ground, and selectively replies with a specific reply pulse or pulse group only to those interrogations being received on the mode to which it is set to respond.

(See INTERROGATOR). (Refer to AIM). (See ICAO term TRANSPONDER).

TRANSPONDER [ICAO]—A receiver/transmitter which will generate a reply signal upon proper interrogation; the interrogation and reply being on different frequencies.

TRANSPONDER CODES—(See CODES).

TRSA—(See TERMINAL RADAR SERVICE AREA).

TURBOJET AIRCRAFT—An aircraft having a jet engine in which the energy of the jet operates a turbine which in turn operates the air compressor.

TURBOPROP AIRCRAFT—An aircraft having a jet engine in which the energy of the jet operates a turbine which drives the propeller.

TWEB—(See TRANSCRIBED WEATHER BROADCAST).

TVOR—(See TERMINAL-VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION).

TWO-WAY RADIO COMMUNICATIONS FAILURE—(See LOST COMMUNICATIONS).

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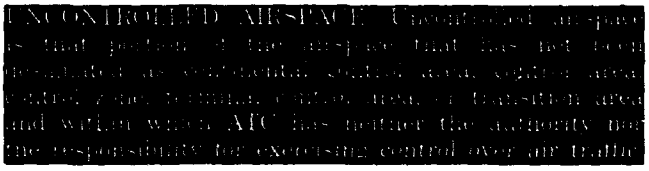
UDF—(See DIRECTION FINDER).

UHF—(See ULTRAHIGH FREQUENCY).

ULTRAHIGH FREQUENCY—The frequency band between 300 and 3,000 mHz. The bank of radio frequencies used for military air/ground voice communications. In some instances this may go as low as 225 mHz and still be referred to as UHF.

ULTRALIGHT VEHICLE—An aeronautical vehicle operated for sport or recreational purposes which does not require FAA registration, an airworthiness certificate, nor pilot certification. They are primarily single occupant vehicles, although some two-place vehicles are authorized for training purposes. Operation of an ultralight vehicle in certain airspace requires authorization from ATC. *(See Part 103).*

UNABLE—Indicates inability to comply with a specific instruction, request, or clearance.



UNDER THE HOOD—Indicates that the pilot is using a hood to restrict visibility outside the cockpit while simulating instrument flight. An appropriately rated pilot is required in the other control seat while this operation is being conducted. *(Refer to Part 91).*

UNICOM—A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOMs are shown on aeronautical charts and publications.

(See AIRPORT/FACILITY DIRECTORY). (Refer to AIM).

UNPUBLISHED ROUTE—A route for which no minimum altitude is published or charted for pilot use. It may include a direct route between NAVAIDS, a radial, a radar vector, or a final approach course beyond the segments of an instrument approach procedure.

(See PUBLISHED ROUTE). (See ROUTE).

UPWIND LEG—(See TRAFFIC PATTERN).

URGENCY—A condition of being concerned about safety and of requiring timely but not immediate assistance; a potential *distress* condition.

(See ICAO term URGENCY).

URGENCY [ICAO]—A condition concerning the safety of an aircraft or other vehicle, or of person on board or in sight, but which does not require immediate assistance.

USAFIB—(See ARMY AVIATION FLIGHT INFORMATION BULLETIN).

UVDF—(See DIRECTION FINDER).

V

VASI—(See VISUAL APPROACH SLOPE INDICATOR).

VDF—(See DIRECTION FINDER).

VDP—(See VISUAL DESCENT POINT).

VECTOR—A heading issued to an aircraft to provide navigational guidance by radar.
(See ICAO term RADAR VECTORING).

VERIFY—Request confirmation of information; e.g., "verify assigned altitude."

VERIFY SPECIFIC DIRECTION OF TAKEOFF (OR TURNS AFTER TAKEOFF)—Used by ATC to ascertain an aircraft's direction of takeoff and/or direction of turn after takeoff. It is normally used for IFR departures from an airport not having a control tower. When direct communication with the pilot is not possible, the request and information may be relayed through an FSS, dispatcher, or by other means.
(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES).

VERTEX—The last fix adapted on the arrival speed segments. Normally, it will be the outer marker of the runway in use. However, it may be the actual threshold or other suitable common point on the approach path for the particular runway configuration.

VERTEX TIME OF ARRIVAL—A calculated time of aircraft arrival over the adapted vertex for the runway configuration in use. The time is calculated via the optimum flight path using adapted speed segments.

VERTICAL SEPARATION—Separation established by assignment of different altitudes or flight levels.
(See SEPARATION). (See ICAO term VERTICAL SEPARATION).

VERTICAL SEPARATION [ICAO]—Separation between aircraft expressed in units of vertical distance.

VERTICAL TAKEOFF AND LANDING AIRCRAFT—Aircraft capable of vertical climbs and/or descents and of using very short runways or small areas for takeoff and landings. These aircraft include, but are not limited to, helicopters.
(See SHORT TAKEOFF AND LANDING AIRCRAFT).

VERY HIGH FREQUENCY—The frequency band between 30 and 300 mHz. Portions of this band, 108 to 118 mHz, are used for certain NAVAIDS; 118 to 136 mHz are used for civil air/ground voice communications. Other frequencies in this band are used for purposes not related to air traffic control.

VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION—(See VOR).

VERY LOW FREQUENCY—The frequency band between 3 and 30 kHz.

VFR—(See VISUAL FLIGHT RULES).

VFR AIRCRAFT—An aircraft conducting flight in accordance with visual flight rules.
(See VISUAL FLIGHT RULES).

VFR CONDITIONS—Weather conditions equal to or better than the minimum for flight under visual flight rules. The term may be used as an ATC clearance/instruction only when:

1. An IFR aircraft requests a climb/descent in VFR conditions.
2. The clearance will result in noise abatement benefits where part of the IFR departure route does not conform to an FAA approved noise abatement route or altitude.
3. A pilot has requested a practice instrument approach and is not on an IFR flight plan.—All pilots receiving this authorization must comply with the VFR visibility and distance from cloud criteria in Part 91. Use of the term does not relieve controllers of their responsibility to separate aircraft in ICA[illegible] Class B and Class C airspace or TRSA's as required by FAA Order 7110.65. When used as an ATC clearance/instruction, the term may be abbreviated "VFR," e.g., "MAINTAIN VFR," "CLIMB/DESCEND VFR," etc.

VFR FLIGHT—(See VFR AIRCRAFT).

VFR MILITARY TRAINING ROUTES—Routes used by the Department of Defense and associated Reserve and Air Guard units for the purpose of conducting low-altitude navigation and tactical training under VFR below 10,000 feet MSL at airspeeds in excess of 250 knots IAS.

VFR NOT RECOMMENDED—An advisory provided by a flight service station to a pilot during a preflight or inflight weather briefing that flight under visual flight rules is not recommended. To be given when the current and/or forecast weather conditions are at or below VFR minimums. It does not abrogate the pilot's authority to make his own decision.

VFR-ON-TOP—ATC authorization for an IFR aircraft to operate in VFR conditions at any appropriate VFR altitude (as specified in FAR and as restricted by ATC). A pilot receiving this authorization must comply with the VFR visibility, distance from cloud criteria, and the minimum IFR altitudes specified in Part 91. The use of this term does not relieve controllers of their responsibility to separate aircraft in ICA[illegible] Class B and Class C airspace or TRSA's as required by FAA Order 7110.65.

VFR TERMINAL AREA CHARTS—(See AERONAUTICAL CHART).

VHF—(See VERY HIGH FREQUENCY).

VHF OMNIDIRECTIONAL RANGE/TACTICAL AIR NAVIGATION—(See VORTAC).

VIDEO MAP—An electronically displayed map on the radar display that may depict data such as airports, heliports, runway centerline extensions, hospital emergency landing areas, NAVAID's and fixes, reporting points, airway/route centerlines, boundaries, handoff points, special use tracks, obstructions, prominent geographic features, map alignment indicators, range accuracy marks, minimum vectoring altitudes.

VISIBILITY—The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night. Visibility is reported as statute miles, hundreds of feet or meters.

(Refer to Part 91). (See AIM).

1. Flight Visibility. The average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.
2. Ground Visibility. Prevailing horizontal visibility near the earth's surface as reported by the United States National Weather Service or an accredited observer.
3. Prevailing Visibility. The greatest horizontal visibility equaled or exceeded throughout at least half the horizon circle which need not necessarily be continuous.
4. Runway Visibility Value (RVV). The visibility determined for a particular runway by a transmissometer. A meter provides a continuous indication of the visibility (reported in miles or fractions of miles) for the runway. RVV is used in lieu of prevailing visibility in determining minimums for a particular runway.
5. Runway Visual Range (RVR). An instrumentally derived value, based on standard calibrations, that represents the horizontal distance a pilot will see down the runway from the approach end. It is based on the sighting of either high intensity runway lights or on the visual contrast of other targets whichever yields the greater visual range. RVR, in contrast to prevailing or runway visibility, is based on what a pilot in a moving aircraft should see looking down the runway. RVR is horizontal visual range, not slant visual range. It is based on the measurement of a transmissometer made near the touchdown point of the instrument runway and is reported in hundreds of feet. RVR is used in lieu of RVV and/or prevailing visibility in determining minimums for a particular runway.
   a. Touchdown RVR. The RVR visibility readout values obtained from RVR equipment serving the runway touchdown zone.
   b. Mid-RVR. The RVR readout values obtained from RVR equipment located midfield of the runway.
   c. Rollout RVR. The RVR readout values obtained from RVR equipment located nearest the rollout end of the runway.

(See ICAO term VISIBILITY). (See ICAO term FLIGHT VISIBILITY). (See ICAO term GROUND VISIBILITY). (See ICAO term RUNWAY VISUAL RANGE).

VISIBILITY [ICAO]—The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night.

Flight Visibility.—The visibility forward from the cockpit of an aircraft in flight.

Ground Visibility.—The visibility at an aerodrome as reported by an accredited observer.

Runway Visual Range [RVR].—The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

VISUAL APPROACH—An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

(See ICAO term VISUAL APPROACH).

VISUAL APPROACH [ICAO]—An approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain.

VISUAL APPROACH SLOPE INDICATOR—(See AIRPORT LIGHTING).

VISUAL DESCENT POINT—A defined point on the final approach course of a nonprecision straight-in approach procedure from which normal descent from the MDA to the runway touchdown point may be commenced, provided the approach threshold of that runway, or approach lights, or other markings identifiable with the approach end of that runway are clearly visible to the pilot.

VISUAL FLIGHT RULES—Rules that govern the procedures for conducting flight under visual conditions. The term "VFR" is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

(See INSTRUMENT FLIGHT RULES). (See INSTRUMENT METEOROLOGICAL CONDITIONS). (See VISUAL METEOROLOGICAL CONDITIONS). (Refer to Part 91). (Refer to AIM).

VISUAL HOLDING—The holding of aircraft at selected, prominent geographical fixes which can be easily recognized from the air.

(See HOLDING FIX).

VISUAL METEOROLOGICAL CONDITIONS—Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.

(See INSTRUMENT FLIGHT RULES). (See INSTRUMENT METEOROLOGICAL CONDITIONS). (See VISUAL FLIGHT RULES).

VISUAL SEPARATION—A means employed by ATC to separate aircraft in terminal areas. There are two ways to effect this separation:

1. The tower controller sees the a[illegible]ed and issues instructions, as necessa[illegible]sure that the aircraft avoid each other.
2. A pilot sees the other aircraft involved and upon instructions from the controller provides his own separation by maneuvering his aircraft as necessary to avoid it. This may involve following another aircraft or keeping it in sight until it is no longer a factor.

(See and Avoid). (Refer to Part 91).

VLF—(See VERY LOW FREQUENCY).

VMC—(See VISUAL METEOROLOGICAL CONDITIONS).

VOR—A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the National Airspace System. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature. Voice features may be used by ATC or FSS for transmitting instructions/information to pilots.

(See NAVIGATIONAL AID). (Refer to AIM).

VORTAC—A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site.

(See DISTANCE MEASURING EQUIPMENT). (See NAVIGATIONAL AID). (See TACAN). (See VOR). (Refer to AIM).

VORTICES—Circular patterns of air created by the movement of an airfoil through the air when generating lift. As an airfoil moves through the atmosphere in sustained flight, an area of area of low pressure is created above it. The air flowing from the high pressure area to the low pressure area around and about the tips of the airfoil tends to roll up into two rapidly rotating vortices, cylindrical in shape. These vortices are the most predominant parts of aircraft wake turbulence and their rotational force is dependent upon the wing loading, gross weight, and speed of the generating aircraft. The vortices from medium to heavy aircraft can be of extremely high velocity and hazardous to smaller aircraft.

(See AIRCRAFT CLASSES). (See WAKE TURBULENCE). (Refer to AIM).

VOR TEST SIGNAL—(See VOT).

VOT—A ground facility which emits a test signal to check VOR receiver accuracy. Some VOT's are available to the user while airborne, and others are limited to ground use only.

(Refer to Part 91). (See AIM). (See AIRPORT/FACILITY DIRECTORY).

VR—(See VFR MILITARY TRAINING ROUTES).

VTA—(See VERTEX TIME OF ARRIVAL).

VTOL AIRCRAFT—(See VERTICAL TAKEOFF AND LANDING AIRCRAFT).

W

WA—(See AIRMET).
(See WEATHER ADVISORY).

WAKE TURBULENCE—Phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air.
(See AIRCRAFT CLASSES). (See JET BLAST). (See VORTICES). (Refer to AIM).

WARNING AREA—(See SPECIAL USE AIRSPACE).

WAYPOINT—A predetermined geographical position used for route/instrument approach definition, or progress reporting purposes, that is defined relative to a VORTAC station or in terms of latitude/longitude coordinates.

WEATHER ADVISORY—In aviation weather forecast practice, an expression of hazardous weather conditions not predicted in the area forecast, as they affect the operation of air traffic and as prepared by the NWS.
(See SIGMET). (See AIRMET).

WHEN ABLE—When used in conjunction with ATC instructions, gives the pilot the latitude to delay compliance until a condition or event has been reconciled. Unlike "pilot discretion," when instructions are prefaced "when able," the pilot is expected to seek the first opportunity to comply. Once a maneuver has been initiated, the pilot is expected to continue until the specifications of the instructions have been met. "When able," should not be used when expeditious compliance is required.

WILCO—I have received your message, understand it, and will comply with it.

WIND SHEAR—A change in wind speed and/or wind direction in a short distance resulting in a tearing or shearing effect. It can exist in a horizontal or vertical direction and occasionally in both.

WING TIP VORTICES—(See VORTICES).

WORDS TWICE—

1. As a request: "Communication is difficult. Please say every phrase twice."
2. As information: "Since communications are difficult, every phrase in this message will be spoken twice."

WORLD AERONAUTICAL CHARTS—(See AERONAUTICAL CHART).

WS—(See SIGMET).
(See WEATHER ADVISORY).

WST—(See CONVECTIVE SIGMET).
(See WEATHER ADVISORY).

APPENDIX A
AIRCRAFT INFORMATION

TYPE ENGINE ABBREVIATIONS

P=piston

T=jet/turboprop

J=jet.

CLIMB AND DESCENT RATES

Climb and descent rates based on average enroute climb/descent profiles at median weight between maximum gross takeoff and landing weights.

SOIR

SOIR means "simultaneous operations on intersecting runways;" corresponding group distance criteria can be found in FAA Order 7210.3, Chapter 12.

SRS

SRS means "same runway separation;" categorization criteria is specified in paragraph 3–105.

NOTES

* Denotes single-piloted military turbojet aircraft or aircraft to receive the same procedural handling as a single-piloted military turbojet aircraft.

*** Denotes amphibian aircraft.

Fixed-Wing Aircraft

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
AERONCA (USA-see Bellanca).							
AERO SPACELINES (USA).							
Guppy	AP52	—	4P/L	600	750	5	III
Mini Guppy	AP3M	—	4P/L	600	750	5	III
Pregnant Guppy	AP1P	—	4P/L	600	750	5	III
Super Guppy	AP25	—	4T/L	1,500	1,500	5	III
Super Turbine Guppy	AP45	—	4T/L	1,500	1,500	5	III
AEROSPATIALE (France).							
Caravelle	S210	—	2J/L	2,300	2,000	4	III
Corvette SN601	S601	—	2J/L	2,500	2,000	3	III
Rallye Club MS880/881/883/100S/100ST	S880	—	1P/S	500	500	3	I
Rallye Commodore Series MS892	S892	—	1P/S	630	630	2	I
Rallye Minerva Series MS894	S894	—	1P/S	750	750	2	I
Super Rallye MS885/886	S885	—	1P/S	1,000	1,000	2	I
AEROSPATIALE/AERITALIA (France/Italy).							
ATR 42–200/300	AT42	—	2T/L	2,000	2,000	3	III
ATR 72	AT72	—	2T/L	2,000	2,000	3	III
AEROSPATIALE/BRITISH AEROSPACE (France/UK).							
Concorde	CONC	—	4J/H	5,000	5,000	5	III
AIRBUS INDUSTRIES (International).							
A300	EA30	—	2J/H	3,500	3,500	4	III
A310	EA31	—	2J/H	3,500	3,500	4	III
A320	EA32	—	2J/L	3,500	3,500	4	III
ALON, INC. (USA).							
Aircoupe A2	F02	—	1P/S	630	630	2	I
ASTRA JET (USA-see Israel Aircraft Industries & Astra Jet).							

Fixed-Wing Aircraft—CONTINUED

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
AVIONS MUDRY ET CIE (France).							
Cap 10/B	CP10	—	1P/L	1,500	2,000	2	I
Cap 20LS–200	CP20	—	1P/L	1,500	2,000	2	I
BEAGLE AIRCRAFT (UK).							
B.121 Pup Series	BT10	—	1P/S	575	750	1	I
B.206 Beagle Series	BT6S	—	2P/S	1,200	1,300	2	II
BEECH AIRCRAFT COMPANY (USA).							
Airliner/Model 99	BE99	—	2T/S	1,750	1,750	3	II
Baron 55/Chochise	BE55	T42	2P/S	1,700	1,700	2	II
Baron 58	BE58	—	2P/S	1,730	1,730	2	II
Beech F90	BE9F	—	2T/S	2,600	2,600	3	II
Beech 1900/C	BE02	—	2T/L	2,400	2,400	4	III
Bonanza 33	BE33	—	1P/S	1,000	1,000	2	I
Bonanza 35	BE35	—	1P/S	1,200	1,200	2	I
Bonanza 36	BE36	—	1P/S	1,100	1,100	2	I
Duke 60	BE60	—	2P/S	1,600	1,600	4	II
Duchess 76	BE76	—	2P/S	1,500	1,500	2	II
Jet 400	BE40	—	2J/S	3,300	3,300	3	III
King Air C90, E90	BE90	—	2T/S	2,000	2,000	3	II
King Air 100/A	BE10	U21F	2T/S	2,250	2,250	4	II
King Air 100B	BE1B	—	2T/S	2,250	2,250	4	II
Mentor	BE45	T34	1P/S	1,150	1,150	2	I
Queen Air 65/A65/70	BE65	—	2P/S	1,375	1,375	2	II
Queen Air 80	BE80	—	2P/S	1,275	1,275	2	II
Seminole	—	U8	2P/S	1,200	1,200	2	II
Sierra 24	BE24	—	1P/S	1,000	1,000	2	I
Skipper 77	BE77	—	1P/S	750	750	2	I
Sport 19	BE19	—	1P/S	680	680	2	I
Stagger Wing 17	BE17	—	1P/S	1,375	1,375	2	I
Starship, Model 2000	BEST	—	2T/L	2,650	2,650	3	III
Sundowner 23, Musketeer 23	BE23	—	1P/S	740	800	2	I
Super H18	BE8S	—	2P/S	1,400	1,400	2	II
Super King Air 200, Huron	BE20	C12	2T/S	2,450	2,500	4	II
Super King Air 200HDC	BE2H	—	2T/S	2,450	2,500	3	II
Super King Air 300	BE30	—	2T/L	3,000	3,000	4	III
Super King Air 300LW	BE3L	—	2T/S	3,000	3,000	4	II
Super King Air 350	BE3B	—	2T/L	3,000	3,000	4	III
Travelair 95	BE95	—	2P/S	1,250	1,250	2	II
Twin Beech 18	BE18	C45	2P/S	1,400	1,000	2	II
Twin Bonanza 50	BE50	—	2P/S	1,600	1,600	2	II
Ute	—	U21	2T/S	2,000	2,000	3	II
BELLANCA AIRCRAFT (includes Aeronca, Champion, Downer, Northern) (USA).							
Aeronca Champion	AR58	—	1P/S	500	500	2	I
Aeronca Chief/Super Chief	AR11	—	1P/S	500	500	2	I
Aeronca Sedan	AR15	—	1P/S	500	500	2	I
Challenger	CH8	—	1P/S	1,150	1,000	2	I
Champion	CH5	—	1P/S	750	750	2	I
Champion Citabria	CH10	—	1P/S	1,120	1,120	2	I
Champion Citabria 7ECA	CH9	—	1P/S	725	725	2	I
Champion Lancer 402	CH40	—	2P/S	650	1,000	2	II
Cruisair Sr., Cruismaster 14–19	BL14	—	1P/S	1,030	1,030	2	I
Decathlon	BL30	—	1P/S	900	1,000	2	I
Model 8GCBC Scout	BL28	—	1P/S	1,080	1,080	2	I
Model 17–30A, Super Viking 300A	BL26		1P/S	1,210	1,210	2	I
Turbo Viking	BL31		1P/S	1,000	1,200	2	I
BOEING COMPANY (USA).							
707–100/200 Series, VC–137	B707	V1	4J/L	3,500	3,500	5	III

Fixed-Wing Aircraft—CONTINUED

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
707–300/400 Series	B07H	—	4J/H	3,500	3,500	5	III
720/B	B720	—	4J/L	3,000	3,000	5	III
727 (all series)	B727	C22	3J/L	4,500	4,500	4	III
737/200 Series	B737	T43	2J/L	3,000	3,000	4	III
737–300/500 Series	B73S	—	2J/L	5,500	3,500	4	III
737–400 Series	B73F	—	2J/L	6,500	3,500	5	III
747–100/200/300 Series	B747	E4/ VC25	4J/H	3,000	3,000	5A	III
747–400 Series	B74F	—	4J/H	3,000	3,000	5	III
747SP/SUD	B74S	—	4J/H	3,000	3,000	5	III
757 (all series)	B757	—	2J/L	2,500	2,500	4	III
767 (all series)	B767	—	2J/H	3,500	3,500	5	III
E3 Sentry, EC–137	—	E3A	4J/H	3,500	4,000	5	III
	—	E137	4J/H	3,500	3,500	5	III
Stearman	B75	—	1P/S	840	840	2	I
Stratofortress	—	B52	8J/H	3,000	3,000	5	III
Stratofreighter	—	KC97	4P/L	2,500	3,000	4	III
Stratolifter B717	—	C135	4J/L	2,000	2,000	5	III
Stratotanker KC–135	—	KC35	4J/L	2,500	3,000	5	III
Stratotanker KC–135E	—	KE35	4J/L	5,000	3,000	5	III
Stratotanker KC–135R	—	KR35	4J/H	5,000	3,000	5	III
BRITISH AEROSPACE (BAe) (UK).							
Advance Turboprop (ATP)	BATP	—	2T/L	3,000	3,000	3	III
BAC One-Eleven	BA11	—	2J/L	2,400	2,400	4	III
BAe 146–100/200 Series	BA46	—	4J/L	3,500	3,500	4	III
BAe HS 125 Series 400/600/700	HS25	—	2J/L	2,500	2,000	3	III
BAe Harrier	—	AV8*	1J/L	5,000	8,000	4	III
BAe HS 748 Series 2	HS74	—	2T/L	2,500	2,000	4	III
BAe Jetstream 31	B31	—	2T/L	2,300	2,300	3	III
BRITTEN NORMAN LTD. (a subsidiary of Pilatus Aircraft LTD.) (UK).							
BN–2A/B Islander	BN2	—	2P/S	1,250	1,250	2	II
BN–2T Turbine Islander	BN2T	—	2T/S	1,500	1,500	2	II
BN–2A Mark III Trislander	BN3	—	3P/S	1,200	1,000	2	III
Trident	HS21	—	3J/L	3,000	3,000	4	III
VC–10	BA10	VC10	4J/H	1,900	2,000	5	III
Viscount	VC7	—	4T/L	1,200	1,500	4	III
Vulcan	—	VLCN	4J/H	4,500	3,000	5	III
BUSHMASTER AIRCRAFT CORP. (USA).							
Model 2000	BU20	—	3P/L	2,000	2,000	3	III
CAMAIR AIRCRAFT CORP. (USA).							
Model 480, Twin Navion/CTN-A thru D	CM48	—	2P/S	1,800	2,000	3	II
CANADAIR LTD. (Canada).							
CL600/610 Challenger	CL60	—	2J/L	5,000	6,000	4	III
CESSNA AIRCRAFT COMPANY (USA).							
AGWagon/AGTruck/AGHusky 188	C188	—	1P/S	1,000	1,000	2	I
Bird Dog 305/321	C305	O1	1P/S	1,150	1,150	2	I
Caravan I 208A	C208	—	1T/S	1,400	1,400	2	I
Cardinal 177	C177	—	1P/S	850	1,000	2	I
Centurion/II	C210	—	1P/S	900	1,000	2	I
Cessna 120	C120	—	1P/S	640	640	2	I
Cessna 140	C14	—	1P/S	640	640	2	I
Cessna 150	C150	—	1P/S	670	1,000	2	I
Cessna 152	C152	—	1P/S	750	1,000	2	I
Cessna 170	C170	—	1P/S	690	1,000	2	I
Cessna 190	C190	—	1P/S	1,090	1,090	2	I
Cessna 195	C195	—	1P/S	1,200	1,200	2	I
Cessna 310	C310	U3	2P/S	2,800	2,000	2	II

Fixed-Wing Aircraft—CONTINUED

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
Cessna 318	—	T37*	2J/S	3,000	3,000	2	III
Cessna 335	C335	—	2P/S	2,200	2,000	2	II
Cessna 340	C340	—	2P/S	2,900	2,000	2	II
Cessna 401	C401	—	2P/S	2,700	2,000	2	II
Cessna 402	C402	—	2P/S	2,500	2,000	2	II
Cessna 411	C411	—	2P/S	2,800	2,000	2	II
Chancellor 414	C414	—	2P/S	2,300	2,000	2	II
Citation I	C500	—	2J/S	3,100	3,500	3	III
Citation I-SP	C501	—	2J/S	4,300	3,000	3	III
Citation II/-S2	C550	T47	2J/L	5,300	3,000	3	III
Citation II-SP	C551	—	2J/S	5,300	3,000	3	III
Citation III	C650	—	2J/L	3,900	4,000	3	III
Citation V	C560	—	2J/L	6,000	3,500	4	III
Conquest/II–441	C441	—	2T/S	4,200	3,000	2	II
Corsair/Conquest I–425	C425	—	2T/S	3,500	2,500	2	II
Crusader 303	C303	—	2P/S	3,500	3,000	2	II
Dragonfly 318E	—	A37*	2J/S	3,370	3,000	2	III
Golden Eagle 421	C421	—	2P/S	3,200	2,000	2	II
Skyhawk 172/Cutlass/Mescalero	C172	T41	1P/S	650	1,000	2	I
Skyknight 320	C320	—	2P/S	2,900	2,000	2	II
Skylane 182/RG, Turbo Skylane/RG	C182	—	1P/S	890	1,000	2	I
Skylark 175	C175	—	1P/S	850	1,000	2	I
Skymaster 336	C336	—	2P/S	1,340	1,340	2	II
Skywagon 180	C180	—	1P/S	1,130	1,130	2	I
Skywagon 185	C185	—	1P/S	1,000	1,000	2	I
Stationair 6, Turbo Stationair 6	C206	—	1P/S	975	1,000	2	I
Stationair/Turbo Stationair 7/8	C207	—	1P/S	810	1,000	2	I
Super Skymaster 337	C337	O2	2P/S	1,250	1,500	2	II
Super Skywagon/Super Skylane	C205	—	1P/S	965	1,000	2	I
Titan 404	C404	—	2P/S	2,600	2,000	2	II
CHAMPION (USA-see Bellanca Aircraft).							
CONSTRUCCIONES AERONAUTICAS (CASA) (Spain).							
C–212 Aviocar	CA21	—	2P/L	900	900	2	III
CHRISTEN INDUSTRIES, INC. (USA).							
Model A–1 Huskey	CIA1	—	1P/S	1,500	1,500	2	I
CURTIS-WRIGHT CORP. (USA).							
Commando	CW20	C46	2P/L	600	700	3	III
DASSAULT-BREGUET (France).							
Falcon 10	DA01	—	2J/L	2,300	1,600	3	III
Falcon 20/C thru F, Fan Jet Falcon (FJF)	DA02	—	2J/L	2,000	2,400	3	III
Mystere Falcon 50	DA05	—	3J/L	1,800	1,600	4	III
Mystere Falcon 200, Falcon 20G/GF	DA20	HU25	2J/L	1,900	2,000	3	III
Mystere Falcon 900	DA90	—	3J/L	2,000	1,700	4	III
DEHAVILLAND (Canada/UK).							
Albatross	DH91	—	4P/L	700	900	4	III
Beaver DHC–2	DH2	U6	1P/S	840	1,000	2	I
Buffalo DHC–5D/E	DH5	C8	2T/L	2,000	1,500	3	III
Caribou DHC–4	DH4	C7	2P/L	1,350	1,000	3	III
Chipmunk DHC–1	DH1	—	1P/S	900	1,000	2	I
Comet 2	DH62	—	4J/L	2,950	2,000	5	III
Comet 4	DH64	—	4J/L	2,850	2,000	5	III
DASH 7 DHC–7	DH7	—	4T/L	4,000	4,000	2**	III
DASH 8 DHC–8	DH8	—	2T/L	1,500	1,500	3	III
Dove DH–104	DH10	—	2P/S	1,420	1,420	2	II
Heron DH–114	DH11	—	4P/S	1,075	1,075	2	III
Otter DHC–3	DH3	U1	1P/S	750	1,000	2	I
Turbo Beaver DHC–2T	DH2T	—	1T/S	1,220	1,000	2	I

Fixed-Wing Aircraft—CONTINUED

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
Twin Otter DHC–6 (all series)	DH6	U18	2T/S	1,600	1,800	2	II
DORNIER GmbH (FRG).							
Do 27	DO27	—	1P/S	700	800	2	I
Do 28/128	DO28	—	2P/S	1,500	1,500	3	II
Do 228–100 Series	DO81	—	2T/S	2,000	2,000	2	II
Do 228–200 Series	DO82	—	2T/L	2,000	2,000	2	III
EMBRAER (Brazil).							
Bandeirante EMB–110	E110	—	2T/S	1,500	1,500	3	II
Brasilia EMB–120	E120	—	2T/L	2,300	2,300	4	III
FAIRCHILD INDUSTRIES (USA-includes Swearingen Aviation).							
Cornell	FA62	—	1P/S	650	650	2	I
Friendship F27	FA27	—	2T/L	3,000	3,000	3	III
Flying Box Car	FA24	C119	2P/L	750	750	4	III
Merlin IIA/B, III/B/C, IVA	SW2	—	2T/S	2,350	2,500	3	II
Metro III, Merlin IVC	SW3	—	2T/L	2,350	2,500	3	III
Metro, II/A	SW4	—	2T/S	2,400	2,500	3	III
Pilatus/Peacemaker	PL6	AV23	1P/S	580	600	1	I
Provider	—	C123	2P/L	890	1,000	4	III
Thunderbolt II	—	A10A*	2J/L	6,000	5,000	4	III
FOKKER BV (Netherlands).							
Friendship F27	FK27	—	2T/L	3,000	3,000	3	III
Fellowship F28	FK28	—	2J/L	4,650	2,000	4	III
Fokker 50	FK05	—	2J/L	3,500	3,500	4	III
Fokker 100	FK10	—	2J/L	3,500	3,500	4	III
FOXJET INTERNATIONAL INC. (USA).							
F600	FXJ	—	2J/S	2,500	2,500	2	III
GATES LEARJET CORP. (USA).							
Learjet 23	LR23	—	2J/S	4,500	4,000	3	III
Learjet 24	LR24	—	2J/L	4,500	4,000	3	III
Learjet 25	LR25	—	2J/L	4,500	4,000	4	III
Learjet 28	LR28	—	2J/L	4,500	4,000	4	III
Learjet 29	LR29	—	2J/L	4,500	4,000	4	III
Learjet 35	LR35	C21	2J/L	4,500	4,000	4	III
Learjet 36	LR36	—	2J/L	4,500	4,000	4	III
Learjet 55	LR55	—	2J/L	5,000	4,000	4	III
GENERAL DYNAMICS CORP. (USA).							
Canso/Catalina***	CV14	PBY5	2P/L	600	600	4	III
Convair 240	CV24	—	2P/L	1,000	800	4	III
Convair 340, Liner, Samaritan	CV34	C131	2P/L	900	900	4	III
Convair 440	CV44	—	2P/L	900	900	4	III
Convair 580	CV58	—	2T/L	1,500	1,500	4	III
Convair 600	CV60	—	2T/L	1,500	1,500	4	III
Convair 640	CV64	—	2T/L	1,500	1,800	4	III
Convair 880	CV88	—	4J/L	2,250	2,500	5	III
Convair 990	CV99	—	4J/L	2,500	2,500	5	III
F–111/FB–111	—	F111*	2J/L	5,000	5,000	5	III
Fighting Falcon	—	F16*	1J/L	8,000	5,000	5	III
Valiant 34	CV13	—	1P/S	600	750	3	I
GOVERNMENT AIRCRAFT FACTORIES (Australia).							
N22B Nomad	N22B	—	2T/S	1,300	1,100	2	II
N24A Nomad	N24A	—	2T/S	1,300	1,100	2	II
GRUMMAN AEROSPACE CORP. (USA).							
Albatross***	G64	U16	2P/L	1,500	1,500	3	III
American TR/TS–2	AA2	—	1P/S	1,000	1,500	2	I
Cheetah AA–5/A/B	AA5	—	1P/S	660	1,000	2	I
Cougar G–93	G93	F9*	1J/L	3,300	3,000	5	III

Fixed-Wing Aircraft—CONTINUED

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
Cougar GA-7	GA7	—	2P/S	1,600	1,500	2	II
Goose/Super Goose	G21	—	2P/L	1,000	1,000	4	III
Greyhound	—	C2	2T/L	1,000	2,200	4	III
Hawkeye	—	E2	2T/L	2,690	3,000	5	III
Intruder	—	A6*	2J/L	7,500	5,000	5	III
Mallard***	G73	—	2P/L	1,600	1,600	3	III
Model G-164/Turbo Ag-Cat	G164	—	1P/S	1,500	1,500	2	I
Mohawk	G134	OV1	2T/S	2,100	1,300	3	I
Tomcat	—	F14*	2J/L	6,000	4,000	5	III
Widgeon/Super Widgeon	G44	—	2P/L	1,000	1,500	3	III
Yankee AA-1B/C	AA1	—	1P/S	750	1,000	2	I
GULFSTREAM AEROSPACE CORP. (USA).							
GAC 159-C, Gulfstream I	G159	VC4	2T/L	2,000	2,000	4	III
Gulfstream II	G2	VC11	2J/L	5,000	4,000	4	III
Gulfstream III	G3	C20	2J/L	5,000	4,000	4	III
Gulfstream IV	G4	—	2J/L	5,000	4,000	4	III
HAMBURGER FLUGZEUBAU (FRG).							
HFB-320 Hansajet	HF32	—	2J/L	4,500	4,500	3	III
HANDLEY PAGE (UK).							
Jetstream HP-137	HP13	—	2T/S	2,100	2,100	3	II
HAMILTON AVIATION (USA).							
Westwind III	WSW	—	2T/S	2,000	2,000	2	II
HELIO AIRCRAFT COMPANY (USA).							
H-250 Courier MarkII	HE25	—	1P/S	850	1,000	1	I
H-295 Super Courier	HE29	U10	1P/S	1,000	1,500	1	I
H-391 Courier	HE39	—	1P/S	400	500	1	I
H-395 Super Courier	HE35	—	1P/S	500	650	1	I
H-550/A Stallion	HE55	AU24	1T/S	2,200	2,200	1	I
H-580 Twin Courier	HE58	—	2P/S	1,250	1,500	1	II
H-634	HE63	—	2T/S	1,500	1,500	1	II
ILYUSHIN (USSR).							
IL-62	IL62	—	4J/H	3,500	2,500	5	III
IL-76	IL76	—	4J/H	3,000	2,500	5	III
ISRAEL AIRCRAFT INDUSTRIES (Israel).							
101 Avara	RV01	—	2T/L	1,300	1,000	3	III
1123 Westwind	WW23	—	2J/L	4,000	3,500	4	III
1124 Westwind	WW24	—	2J/L	4,000	3,500	4	III
1124A Westwind 2	WW4A	—	2J/L	4,000	3,500	4	III
ISRAEL AIRCRAFT INDUSTRIES & ASTRA JET (Israel/USA).							
Astra 1125 Westwind	AJ25	—	2J/L	4,000	3,500	4	III
LAKE AIRCRAFT (USA).							
LA-250 Renegade/SeaFury***	LA25	—	1P/S	680	680	2	I
LA-250 Turbo Renegade/Turbo SeaFury***	LA2T	—	1P/S	760	760	2	I
LA-4/A/B***	LA04	—	1P/S	1,000	1,000	2	I
LA-4-200 Buccaneer***	LA42	—	1P/S	1,200	1,000	2	I
LEARAVIA CORP. (USA).							
Lear Fan Model 2100	LRF	—	2J/L	2,000	1,500	2	III
LOCKHEED CORP. (USA).							
C-5 Galaxy	—	C5A	4J/H	2,500	2,000	5	III
C-141 Starlifter	—	C141	4J/H	3,500	3,000	5	III
Constellation 649	L649	—	4P/L	2,000	2,000	5	III
Constellation 749	L749	—	4P/L	2,000	2,000	5	III
Electra 188, Model 185/285 Orion	L188	P3	4T/L	1,850	2,000	4	III
F-104 Starfighter	—	F104*	1J/L	5,000	4,000	5	III
L-1011 Tri-Star (all series)	L101	—	3J/H	3,500	3,000	5	III
Lodestar	L18	—	2P/L	1,800	2,000	3	III

Fixed-Wing Aircraft—CONTINUED

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
Model 382 Hercules, 100 Series Commercial Hercules, Model 100–50 Hercules, Regional Airfreighter.	L382	C130	4T/L	1,500	1,500	4	III
Model 1329 Jetstar	L329	C140	4J/L	4,000	3,500	4	III
Model 1329–5 Jetstar II	L295	—	4J/L	4,000	3,000	4	III
Starliner	L164	—	4P/L	1,500	1,500	5	III
Super Constellation	L49	—	4P/L	1,620	1,620	5	III
T–1 Sea Star	—	T1*	1J/L	3,300	3,000	5	III
T–33/F–80 Shooting Star	—	T33*	2J/L	2,000	2,000	4	III
	—	F80*	2J/L	2,000	2,000	4	III
TR–1	—	TR1*	1J/L	6,000	6,000	5	III
U–2	—	U2*	1J/L	6,000	6,000	5	III
Viking	—	S3A	2J/L	2,000	2,000	4	III
MARTIN COMPANY (Division of Martin Marietta) (USA).							
Martin 202	M202	—	2P/L	1,600	1,500	3	III
Martin 404	M404	—	2P/L	1,600	1,500	3	III
MAULE AIRCRAFT CORP. (USA).							
M–4 Strata-Rocket	ML4	—	1P/S	1,000	1,000	2	I
M–5 180C/200/235C Lunar-Rocket, 210TC Star-Rocket, Patroller.	ML5	—	1P/S	1,000	1,000	2	I
M–6 235 Super-Rocket	ML6	—	1P/S	1,500	1,000	2	I
MCDONNELL-DOUGLAS CORP. (USA).							
DC–6/B Liftmaster	DC6	C118	4P/L	1,000	1,000	4	III
DC–7/B/C Seven Seas/Speed Freighter	DC7	—	4P/L	1,250	1,250	5	III
DC–8 (all series)	DC8	—	4J/L	3,000	3,000	5	III
DC–9	DC9	C9	2J/L	3,000	3,000	4	III
	—	VC9	2J/L	3,000	3,000	4	III
DC–9 Super/MD–80 Series	MD8	—	2J/L	3,500	3,000	4	III
DC–10 (all series)	DC10	KC10	3J/H	2,400	2,000	5	III
F–15 Eagle	—	F15*	2J/L	8,000	5,000	5	III
F/A–18 Hornet	—	F18	2J/L	8,000	6,000	5	III
	—	A18	2J/L	8,000	6,000	5	III
Invader	—	B26	2P/L	1,000	1,000	4	III
Pnantom II	—	F4*	2J/L	8,000	6,000	4	III
	—	RF4*	2J/L	8,000	6,000	4	III
Skyhawk	—	A4*	1J/L	5,000	5,000	5	III
	—	OA4	1J/L	5,000	5,000	5	III
	—	TA4	1J/L	5,000	5,000	5	III
Skymaster	DC4	C54	4P/L	2,300	2,300	4	III
Skynight	—	F10*	2J/L	5,000	5,000	5	III
Skytrain	DC3	C47	2P/L	1,200	1,200	3	III
	—	VC47	2P/L	1,200	1,200	3	III
Skywarrior	—	A3*	2J/L	5,000	6,000	4	III
Super DC–3	DC3S	C117	2P/L	1,330	1,330	3	III
Super DC–8 Series	DC8S	—	4J/H	5,500	5,500	5	III
MESSERSCHMITT-BOLKOW-BLOHM (MBB) (FRG).							
BO 209 Monsun	ME29	—	1P/S	1,100	1,100	2	I
HFB 320 Hansa Jet	ME32	—	2J/L	3,500	3,000	4	III
ME 108 Taifun	ME08	—	1P/S	400	500	1	III
MITSUBISHI AIRCRAFT INTERNATIONAL INC. (USA/Japan).							
Mitsubishi Diamond I/MU–300	MU3	—	2J/L	3,500	4,000	3	III
Mitsubishi MU–2	MU2	—	2T/S	3,500	3,000	2	II
MU–2B–40 Solitaire	MU24	—	2T/S	4,000	3,000	2	II
MU–2B–60 Marquise	MU26	—	2T/S	4,000	3,000	2	II
MOONEY AIRCRAFT CORP. (USA).							
M–18 Mooney Mite	MO18	—	1P/S	750	750	2	I

Fixed-Wing Aircraft—CONTINUED

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
Mark 10 Cadet	MO10	—	1P/S	800	800	2	I
Mark 20	MO20	—	1P/S	1,000	1,000	2	I
Mark 21/Mooney Ranger	MO21	—	1P/S	1,000	1,000	2	I
Mark 22	MO22	—	1P/S	1,300	1,300	2	I
Mooney 201/M20J	MO2J	—	1P/S	1,000	1,000	2	I
Turbo Mooney 231/M20K	MO2K	—	1P/S	1,500	1,200	2	I
NAVION RANGEMASTER AIRCRAFT CORP. (USA).							
Rangemaster	NA1	—	1P/S	1,250	1,500	2	I
Twin Navion	NA16	—	2P/S	1,800	1,500	3	II
NIHON KOKUKI SEIZO KABUSHIKI KAISHA & NATIONAL AEROPLANE MANUFACTURING COMPANY. (Japan).							
YS-11/A	YS11	—	2T/L	1,500	1,500	3	III
NOORDYUN AVIATION LTD. (Canada).							
Norseman Mk IV	NO4	—	1P/S	700	1,000	2	I
Norseman Mk V	NO5	—	1P/S	700	1,000	2	I
Norseman Mk VI	NO6	—	1P/S	800	1,000	2	I
NORD AVIATION (Affiliate of Aerospatiale) (France).							
Martinet NC701/702	—	MART	2P/L	1,250	1,250	3	III
Nortalas 25C1	—	NORD	2P/L	1,500	1,500	3	III
Super Broussard 260/262	ND26	—	2T/L	2,500	2,000	3	III
Transall C-160	ND16	—	2T/L	2,000	2,000	3	III
NORTHERN AVIATION (USA-see Bellanca).							
NORTHRUP CORP. (USA).							
Freedom Fighter, Tiger II	—	F5*	2J/L	8,000	5,000	5	III
T-38 Talon	—	T38*	2J/S	8,000	5,000	5	III
PARTENAVIA CONSTRUZIONI AERONAUTICHE SpA (Italy).							
P.66C Charlie	PN66	—	1P/S	800	1,000	1	I
P.68 Victor	PN68	—	2P/S	1,200	1,000	1	I
PARTENAVIA & AERITALIA (Italy).							
AP.68TP	PN6P	—	2T/S	1,500	1,500	2	II
PIAGGIO (Industrie Aeronautiche E Meccaniche Rinaldo Piaggio SpA) (Italy).							
P.136 Royal Gull***	P136	—	2P/S	1,250	1,500	2	II
P.166 Portofino***	P166	—	2P/S	1,350	1,500	2	II
Vespa Jet	P808	—	2J/L	4,000	3,500	3	III
PILATUS FLUGZEUGWERKE AG (Switzerland).							
PC-6 Porter	PL6	—	1P/S	600	600	1	I
PC-6A/B Turbo Porter	PL6A	—	1T/S	1,250	1,500	1	I
PIPER AIRCRAFT CORP. (USA).							
Aero Star 600/700	PA60	—	2P/S	1,500	1,500	2	II
Model S-2/A/B/S	PIS2	—	1P/S	1,500	1,500	2	I
Apache	PA23	—	2P/S	1,050	1,000	2	II
Aztec	PAZT	U11	2P/S	1,500	1,500	2	II
Brave	PA36	—	1P/S	800	1,000	2	I
Cherokee, Archer, Dakota/Warrior	PA28	T35	1P/S	750	1,000	2	I
Cherokee Arrow IV	PARO	—	1P/S	900	1,000	2	I
Cherokee Six, Lance, Saratoga	PA32	—	1P/S	850	1,000	2	I
Cheyenne/II	PAYE	—	2T/S	2,400	2,000	3	II
Cheyenne I	PA41	—	2T/S	2,200	2,000	3	II
Cheyenne III/IV, 400LS	PA42	—	2T/S	2,400	2,000	3	II
Chieftan, Mohave, Navajo, T-1020	PA31	—	2P/S	1,500	1,500	2	II
Clipper	PA16	—	1P/S	500	500	2	I
Comanche	PA24	—	1P/S	900	1,000	2	I

Fixed-Wing Aircraft—CONTINUED

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
Cruiser	PA5	—	1P/S	500	500	2	I
Cub Special	PA11	—	1P/S	500	500	2	I
Cub Trainer	PA2	—	1P/S	500	500	2	I
Family Cruiser	PA14	—	1P/S	600	600	2	I
Malibu	PA46	—	1P/S	1,000	1,000	2	I
Pacer	PA20	—	1P/S	850	1,000	2	I
Pawnee	PA25	—	1P/S	650	650	2	I
Seminole	PA44	—	2P/S	1,100	1,000	2	II
Seneca	PA34	—	2P/S	1,300	1,300	2	II
Super Cruiser	PA12	—	1P/S	600	600	2	I
Super Cub	PA18	U7	1P/S	1,000	1,000	2	I
T-1040	PAT4	—	1P/S	1,300	1,200	2	I
Tomahawk	PA38	—	1P/S	750	750	2	I
Tri-Pacer, Colt	PA22	—	1P/S	1,000	1,000	2	I
Twin Comanche	PA30	—	2P/S	1,500	1,500	2	II
Vagabond	PA17	—	1P/S	500	500	2	I
Vagabond Trainer	PA15	—	1P/S	500	500	2	I
PITTS AEROBATICS (Manufactured by Christen Industries, Inc.)(USA).							
Model S-1S/T	PIS1	—	1P/S	1,500	1,500	2	I
RILEY AIRCRAFT CORP. (USA).							
M65 Rocket	RY65	—	2P/S	1,500	1,500	2	II
ROCKWELL INTERNATIONAL CORP. (USA).							
Aero Commander 112	AC12	—	1P/S	1,000	1,200	2	I
Aero Commander 685	AC85	—	2P/S	1,500	1,500	2	II
Aero Commander 695	AC95	—	2P/S	1,500	1,500	3	II
Air-Cruiser	AC72	—	2P/S	1,300	1,300	3	II
Lancer	—	B1*	4J/H	3,000	5,000	5	III
Bronco	—	OV10*	2T/S	2,000	2,500	3	II
Buckeye	—	T2*	2J/L	5,700	6,000	5	III
Commander 112A	AC2A	—	1P/S	1,000	1,200	2	I
Commander 112TC	AC2T	—	1T/S	1,200	1,500	2	I
Commander 114	AC14	—	1P/S	1,000	1,500	2	I
Commander 200	AC20	—	1P/S	1,400	1,000	2	I
Commander 500	AC50	—	2P/S	1,340	1,500	2	II
Commander 520	AC52	—	2P/S	1,340	1,500	2	II
Commander 560	AC56	—	2P/S	1,400	1,500	2	II
Darter 100/150	AC10	—	1P/S	850	850	2	I
Grand Commander 680	AC60	—	2P/S	1,250	1,250	2	II
Jet Commander	AC21	—	2J/L	5,000	4,500	3	III
Jet Commander 840/980/1000	AC84	—	2T/S	2,500	2,500	3	II
Jet Prop Commander	AC69	—	2T/S	2,500	1,500	2	II
Lark	LARK	—	1P/S	700	1,000	2	I
Mitchell	—	B25	2P/L	980	980	3	III
Mustang	—	P51	1P/S	2,500	2,500	3	III
Navion	N145	—	1P/S	750	600	2	I
Sabre	—	F86*	1J/L	4,000	4,000	5	III
Sabreliner 65	N265	T39	2J/L	4,000	3,500	3	III
Super Commander 680S	AC68	U4	2P/S	1,375	1,375	2	II
Super Sabre	—	F100*	1J/L	4,000	4,000	5	III
Texan	N6	T6	1P/S	800	800	2	I
Trojan	—	T28	1P/S	2,500	2,500	2	I
Turbo Commander 690C	AC6T	—	2T/S	2,500	3,000	2	III
SAAB & FAIRCHILD INDUSTRIES (Sweden/USA).							
Model SF-340	SF34	—	2T/L	2,000	2,000	3	III
SHORT BROTHERS LTD. (UK).							
Shorts 330	SH33	—	2T/L	1,380	1,380	3	III
Shorts 360	SH36	—	2T/L	1,400	1,400	3	III

Fixed-Wing Aircraft—CONTINUED

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
Shorts SC.7 Skyvan	SH7	—	2T/S	1,500	1,500	3	II
SIAI MARCHETTI SpA (Italy).							
SF.260TP	M260	—	1P/S	1,200	1,100	1	I
SILVAIRE (USA).							
Luscombe	SL8	—	1P/S	900	1,000	2	I
STINSON (USA).							
Reliant (Vultee)	ST77	—	1P/S	700	700	2	I
Voyager/Station Wagon (Model 105/108)	ST75	—	1P/S	750	1,000	2	I
SUD AVIATION (Affiliate of Aerospatiale) (France).							
SE–210 Caravelle	S210	—	2J/L	2,500	2,500	4	III
SWEARINGEN AVIATION (USA-see Fairchild Industries).							
TAYLORCRAFT AVIATION CORP. (USA).							
F–15A Tourist	TC15	—	1P/S	800	1,000	2	I
F–19 Sportsman 100	TC19	—	1P/S	800	1,000	2	I
F–20A Topper	TC20	—	1P/S	1,000	1,000	2	I
Model F–21	TC21	—	1P/S	1,100	1,100	2	I
TED SMITH AEROSTAR CORP. (USA).							
Aero Star	TS60	—	2P/S	1,800	1,500	2	II
VFW-FOKKER (Zentralgesellschaft VFW-Fokker mbH (FRG/Netherlands).							
VFW 614	VF14	—	2J/L	3,100	3,000	3	III
VOUGHT CORP. (USA).							
Corsair II	—	A7*	1J/L	8,000	6,000	5	III
Swift	GC1	—	1P/S	1,000	1,000	1	I

APPENDIX B
AIRCRAFT INFORMATION

Helicopters/Rotorcraft

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS
AEROSPATIALE (France).							
Lama	HR15	—	1T/S	1,000	1,000	1	
Alouette II	HR30	—	1T/S	1,280	1,280	1	
Alouette III	HR60	—	1T/S	1,500	1,500	1	
Dauphine	HR36	—	1T/S	1,400	1,500	1	
Dauphine 2	HR3C	HH65	2T/S	1,800	1,000	1	
Ecurevil/AStar	HR35	—	1T/S	1,000	1,000	1	
Gazelle	HR34	—	1T/S	1,620	1,620	1	
Puma/Super Puma	HR33	—	2T/L	1,250	1,500	2	
Super Frelon	HR32	—	3T/L	1,200	1,500	2	
Twin Star	HR55	—	2T/S	1,350	1,300	2	
AUGUSTA (Constuzioni Aeronautiche Giovanni Agusta SpA) (Italy).							
Model 147J-3B-1	A47J	—	1P/S	500	500	1	
Model A 109/A/A-II	A109	—	2T/S	1,620	1,500	1	
Model 212 ASW	A212	—	2T/S	1,420	1,420	1	
BELL HELICOPTER TEXTRON (USA).							
Biglifter	BH14	—	1T/L	1,500	1,500	2	
Cobra	BH09	AH1	1T/S	1,375	1,375	1	
Jet Ranger/Long Ranger/Sea Ranger/Kiowa/Model 206	BH06	H57	1T/S	1,200	1,000	1	
	—	OH58	1T/S	1,200	1,000	1	
Huey/Iroquois/Model 205 A-1	BH05	UH1	1T/S	1,500	1,500	1	
Sioux/Model 47	BH47	H13	1P/S	1,000	1,000	1	
Twin Huey, Model 212, Model 214B/B-1/ST, Model 412.	BHTH	UH1N	2T/S	1,420	1,420	1	
Model 222	BH22	—	2T/S	1,500	1,000	1	
BOEING VERTOL COMPANY (USA).							
Chinook Model 234	HV47	CH47	2T/L	1,500	1,500	2	
Model 105	B105	—	2T/S	1,500	1,500	1	
Sea Knight	HV07	CH46	2T/L	2,130	2,130	2	
BRANTLEY-HYNES HELICOPTER, INC. (USA).							
Model B-2/A/B	HB42	—	1P/S	1,400	1,400	1	
Model 305	HB43	—	1P/S	1,300	1,300	1	
ENSTROM CORP. (USA).							
Falcon/Model F-28/A/C/F, Sentinel/Model F-28-FP, Model 280.	HF28	—	1P/S	800	800	1	
Shark/Model 280FX	HF80	—	1P/S	1,200	1,200	1	
Turbo Shark	HF8C	—	1P/S	1,500	1,500	1	
FAIRCHILD/REPUBLIC (includes Hiller) (USA).							
Hiller UH-12/Raven	HH12	OH23	1P/S	1,500	1,500	1	
KAMAN AEROSPACE CORPORATION (USA).							
H-2 Seasprite	—	H2	2T/L	2,400	2,400	2	
Huskie 600-3/5	HK60	H43	1T/L	2,000	2,000	2	
KAWASAKI HEAVY INDUSTRIES LTD. (Japan).							
KV-107/II	KH17	—	2T/L	1,500	1,500	2	
MCDONNELL-DOUGLAS HELICOPTERS (includes Hughes Helicopters) (USA).							

Helicopters/Rotorcraft—CONTINUED

Manufacturer	Type Designator		Description	Performance Information			
(Country)/Model	Civil	Military	Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SOIR Group	SRS Cat.
Model 77/Apache	HU64	AH64	2T/L	1,500	1,500	2	I
Model 269	HU26	—	1P/S	1,000	1,000	1	I
Model 300/C	HU30	—	1P/S	1,200	1,200	1	I
Model 500C	HU50	—	1P/S	1,500	1,500	1	I
Osage	—	H55	1P/S	1,000	1,000	1	I
Pawnee, Model 369, Model 500D/MD/MG	HU35	OH6	1T/S	1,500	1,500	1	I
MESSERSCHMIDTT-BOELKOW-BLOHM (MBB) (FRG).							
Model BO 105	HM05	—	2T/S	1,200	1,200	1	I
MBB/KAWASAKI (FRG/Japan).							
Model BK 117	HM17	—	2T/S	1,500	1,500	1	I
ROBINSON HELICOPTER COMPANY INC. (USA).							
Model R22	HR22	—	1P/S	800	800	1	I
SCHWEIZER AIRCRAFT CORP. (USA).							
Model 269C	HT26	—	1P/S	1,000	1,000	1	I
SIKORSKY AIRCRAFT (USA).							
Blackhawk S–70	SK70	H60	2T/L	2,000	2,000	2	I
Chickasaw S–55	SK55	H19	1P/S	800	1,000	1	I
Choctaw/Seashore/Seaboat S–58	SK58	H34	1P/L	1,120	1,120	2	I
LAMPS MK3	—	SH60	2T/L	2,000	2,000	2	I
Model S–51	SK51	—	1P/L	1,000	1,000	2	I
Model S–52	SK52	—	1P/L	950	1,000	2	I
Model S–59	SK59	—	1P/L	1,200	1,200	2	I
Model S–62	SK62	H52	1T/S	1,020	1,000	1	I
Model S–69	SK69	H59	1T/S	1,100	1,100	1	I
Model S–76	SK76	—	2T/S	1,300	1,300	1	I
Mojave S–56	SK56	H37	2P/L	970	1,000	2	I
Sea King S–61	SK61	H3	2T/L	1,500	1,500	2	I
Sea Stallion S–65	SK65	H53	2T/L	1,500	1,500	2	I
Skycrane S–64E/F, Tarhe S–64	SK64	H54	2T/L	1,300	1,300	2	I
WESTLAND HELICOPTERS LTD. (UK).							
WG 30	WL30	—	2T/S	1,200	1,200	1	I

APPENDIX C
AIRCRAFT INFORMATION

SPECIFIC HOMEBUILT/EXPERIMENTAL AIRCRAFT NOTES:

* Configuration diversity and the fact that airworthiness certificates are issued to aircraft builders, vice manufacturers, necessitates the assignment of generic aircraft type designators based on cruise performance, rather than specific manufacturer a normal descriptive/performance information.

** All performance criteria has been estima because configuration diversity precludes determin precise aircraft-specific information.

Homebuilt and Experimental Aircraft*

Designator Criteria	Type Designator	Performance Information**			
		Climb Rate (fpm)	Descent Rate (fpm)	*SOIR Group*	SRS C egory
Aircraft with cruise (indicated) airspeeds of 100 knots or less	HXA	500	500	1	I
Aircraft with cruise (indicated) airspeeds of greater than 100 knots, up to and including 200 knots.	HXB	750	750	1	I
Aircraft with cruise (indicated) airspeeds greater than 200 knots	HXC	1,000	1,000	2	I

APPENDIX D

STANDARD OPERATING PRACTICE (SOP) FOR THE TRANSFER OF POSITION RESPONSIBILITY

1. PURPOSE

This appendix prescribes the method and step-by-step process for conducting a position relief briefing and transferring position responsibility from one specialist to another.

2. DISCUSSION

In all operational facilities, the increase in traffic density and the need for the expeditious movement of traffic without compromising safety have emphasized the importance of the position relief process.

The contents, methods, and practices used for position relief and briefings vary among personnel, and pertinent information is often forgotten or incompletely covered. Major problems occur whenever there is a heavy reliance upon memory, unsupported by routines or systematic reminders. This SOP addresses the complete task of transferring position responsibility and the associated relief briefing.

Position relief unavoidably provides workload for specialists at the time of relief. The intent of this SOP is to make the transfer of position responsibility take place smoothly and to ensure a complete transfer of information with a minimum amount of workload. The method takes advantage of a self-briefing concept in which the relieving specialist obtains needed status information by reading from the Status Information Area/s to begin the relief process. Up to the moment information related to the control of aircraft or vehicular movements requires verbal exchanges between specialists during the relief process. The method also specifies the moment when the transfer of position responsibility occurs.

In the final part of the relief process, the specialist being relieved monitors and reviews the position to ensure that nothing has been overlooked or incorrectly displayed and that the transfer of position responsibility occurred with a complete briefing.

3. TERMS

The following terms are important for a complete understanding of this SOP:

a. Status Information Area (SIA). Manual automatic displays of the current status of positi related equipment and operational conditions procedures.

b. Written Notes. Manually recorded items information kept at designated locations on t position of operation. They may be an eleme of the Status Information Area/s.

c. Checklist. An ordered listing of items be covered during a position relief.

4. PRECAUTIONS

a. Specialists involved in the position reli process should not rush or be influenced to ru

b. During position operation, each item of stat information which is or may be an operatio factor for the relieving specialist should be record as soon as it is operationally feasible so t it will not be forgotten or incorrectly record

c. Extra care should be taken when more th one specialist relieves or is being relieved fr a position at the same time; e.g., combining decombining positions. Such simultaneous reli should be approached with caution.

5. RESPONSIBILITIES

a. The specialist being relieved shall be resp sible for ensuring that any pertinent status informat of which he/she is aware is relayed to the reliev specialist and is either:

1. Accurately displayed in the Status Infor tion Area/s for which he/she has responsibil or

2. Relayed to the position having responsibi for accurately displaying the status informat

b. The relieving specialist shall be respons for ensuring that, prior to accepting responsib for the position, any unresolved questions pertai to the operation of the position are resolved.

c. The relieving specialist and the speci being relieved shall share equal responsibility the completeness and accuracy of the pos relief briefing.

5c Note.—The "sharing" of this responsibility means th specialist being relieved is obligated to provide a com

accurate briefing and the relieving specialist is obligated to ensure that a briefing takes place and is to his/her total satisfaction.

d. The specialists engaged in a position relief shall conduct the relief process at the position being relieved unless other procedures have been established and authorized by the facility air traffic manager.

6. STEP-BY-STEP PROCESS

Relieving Specialist	*Specialist Being Relieved*
a. *PREVIEW THE POSITION*	
1. Follow checklist and review the Status Information Area/s.	
(Note.—This sub-step may be replaced by an authorized pre-position briefing provided an equivalent review of checklist items is accomplished.)	
2. Observe position equipment, operational situation, and the work environment.	
3. Listen to voice communications and observe other operational actions.	
4. Observe current and pending aircraft and vehicular traffic and correlate with flight and other movement information.	
5. Indicate to the specialist being relieved that the position has been previewed and that the verbal briefing may begin.	
Note.—Substeps 6a2, 3, and 4 may be conducted concurrently or in any order.	
b. *VERBAL BRIEFING*	1. Brief the relieving specialist on the abnormal status of items not listed on the Status Information Area/s as well as on any items of special interest calling for verbal explanation or additional discussion.
	2. Brief on traffic if applicable.
3. Ask questions necessary to ensure a complete understanding of the operational situation.	
	4. Completely answer any questions asked.
c. *ASSUMPTION OF POSITION RESPONSIBILITY*	
1. Make a statement or otherwise indicate to the specialist being relieved that position responsibility has been assumed.	
	2. Release the position to the relieving specialist.
d. *REVIEW THE POSITION*	
1. Sign-on the position unless a facility directive authorizes substep 6d8.	
2. Check, verify, and update the information obtained in steps 6a and b.	
3. Check position equipment in accordance with existing directives.	
	4. Review checklist, Status Information Area/s, written notes, and other prescribed sources of information and advise the relieving specialist of known omissions, updates, or inaccuracies.
	5. Observe overall position operation to determine if assistance is needed.

6. If assistance is needed, provide or summon it as appropriate.
7. Advise the appropriate position regarding known Status Information Area/s omissions, updates, or inaccuracies.
8. Sign-on the relieving specialist if appropriate.
9. Sign off the position in accordance with existing directives or otherwise indicate that the relief process is complete.

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CHANGE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

7110.65H CHG 2

2/4/94

SUBJ: AIR TRAFFIC CONTROL

1. PURPOSE: This change transmits revised pages to Order 7110.65H, AIR TRAFFIC CONTROL.

2. DISTRIBUTION: This change is distributed to select offices in Washington Headquarters, regional offices, FAA Technical Center, FAA Aeronautical Center, all air traffic control facilities, international aviation field offices, and interested aviation public.

3. EFFECTIVE DATE: April 28, 1994.

4. EXPLANATION OF CHANGES: See the Explanation of Changes attachment.

5. DISPOSITION OF TRANSMITTAL: Retain this transmittal until superseded by a new basic order.

6. PAGE CONTROL CHART: See the attachment for the page control chart.

William H. Pollard
Associate Administrator
for Air Traffic

Distribution: ZAT-710

Initiated By: ATP-100

EXPLANATION OF CHANGES

7110.65H – CHG 2

April 28, 1994

Direct questions through appropriate facility/region staff to the Office of Primary Interest (OPI).

a. 1–25 ABBREVIATIONS. There will be no operational impact from the addition of these abbreviations.(ATP–130)

b. 2–20 WAKE TURBULENCE CAUTIONARY ADVISORIES. This change incorporates the change transmitted by GENOT 7110.103, dated December 23, 1993. (ATP–120)

c. 2–52 EN ROUTE DATA ENTRIES. This change adds "minimum fuel" to pertinent remarks for terminal and en route flight data entries and adds a suggested procedure for pilots in a minimum fuel status to use when changing frequencies. (ATP–130)

d. 2–53 TERMINAL DATA ENTRIES. Same as c. (ATP–130)

e. 2–59 CONTROL INFORMATION SYMBOLS. Same as c. (ATP–130)

f. 2–81 INTERPHONE MESSAGE FORMAT. The development of the VSCS communications system requires the controller at both ends of the line to clearly identify themselves. There will be no operational impact but there is a training impact that will be addressed in the briefing of this change and implementation of VSCS switch equipment. (ATP–120)

g. 2–87 FACILITY IDENTIFICATION. The implementation of VSCS equipment will allow override of a controller position without a clear visual indication of what line or facility is activating the override. It is therefore mandatory that both positions clearly identify themselves. There will be no operational impact from the addition of this procedure but it will ensure the safety and integrity of the system. (ATP–100)

h. 2–101 NAVAID TERMS. Changes provide a phraseology examples for clearing an aircraft for a GPS approach and provide an updated explanation of the GPS system. (ATP–130)

i. 2–111 HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE (HIWAS). Note was deleted because it conflicted with phraseology. (ATP–120)

j. 2–131 ARRIVAL/DEPARTURE RUNWAY VISIBILITY. Changed "and" to "or" to correct the intent of issuing mid–point and roll–out RVR values. (ATP–120)

k. 2–141 OPERATING PROCEDURES. This change permits air traffic controllers to ONLY advise pilots of a new ATIS code when no operationally pertinent changes have occurred. This change will permit controllers to provide only the pertinent operational information that changed in an updated ATIS broadcast after initial contact is established. Controllers will continue to provide weather, runways, approach information, and pertinent NOTAM's when pilots are unable to receive the ATIS broadcast. (ATP–120)

l. 3–11 SURFACE AREA RESTRICTIONS. This change will permit air traffic controllers to approve aerobatic practice activity within the surface area, provided such operations are conducted in accordance with an LOA and have no impact on other traffic. (ATP–120)

m. 3–81 TAXI AND GROUND MOVEMENT OPERATION. This is a change to reflect that it may be necessary to issue progressive taxi instructions during reduced visibility conditions. (ATP–120)

n. 3–84 PRECISION APPROACH CRITICAL AREA. Editorial change to correct discrepancy in last sentence. (ATP–120)

o. 3–106 WAKE TURBULENCE SEPARATION FOR INTERSECTION DEPARTURES. Pilots of all aircraft may request a deviation to the wake turbulence interval when taking off behind a heavy aircraft from an intersection on the same runway or parallel runways separated by less than 2,500 feet. Pilots of all aircraft are able to provide visual separation/spacing behind preceding heavy aircraft when conducting successive touch–and–go and stop–and–go operations. Controllers are required to issue wake turbulence cautionary advisories and position of leading aircraft. (ATP–120)

p. 3–122 SAME RUNWAY SEPARATION. This change incorporates the change transmitted by

GENOT 7110.103, dated December 23, 1993. (ATP–120)

q. 3–123 INTERSECTING RUNWAY SEPARATION. Same as p. (ATP–120)

r. 4–61 EXCEPTIONS. The software version A4e1.2 to the HOST system allows the automation system to pass the interim altitude assigned to an aircraft. This change is to clarify to the facilities there is still a need to define the use of this procedure in the appropriate letters of agreement or inter/intrafacility directive. (ATP–100)

s. 4–65 ALTITUDE INFORMATION. This change reinforces the requirement that controllers use only UTC clock time when issuing instructions to climb or descend reference a time. In addition, guidance is provided on issuing revised instructions when a pilot is unable to accept an altitude restriction. (ATP–130)

t. 4–100 APPROACH CLEARANCE. Changes provide a phraseology examples for clearing an aircraft for a GPS approach and provide an updated explanation of the GPS system. (ATP–130)

u. 5–29 VFR CODE ASSIGNMENTS. This change will permit the issuance of a discrete code to an aircraft in the controller's area of jurisdiction provided that coordination is accomplished with the facility/sector who has control jurisdiction prior to providing services to the aircraft. (ATP–120)

v. 5–62 METHODS. This change incorporates procedures to implement the software version A4e1.2 to the HOST system that will be delivered starting in April, 1994. This version allows the automation system to pass the interim altitude assigned to an aircraft. This change is to clarify to the facilities there is still a need to define the use of this software functional procedure in the appropriate letters of agreement or inter/intrafacility directives. Additionally, this change incorporates an approved employee suggestion to add 5–62b1 Note, 5–62b1 Example, and 5–62b3 Note. Also, this paragraph is being upgraded to show present equipment enhancements of EDARC and DBRITE. (ATP–100)

w. 5–64 TRANSFERRING CONTROLLER HANDOFF. The software version A4e1.2 to the HOST system allows the automation system to pass the interim altitude assigned to an aircraft. This change is to clarify to the facilities there is still a need to define the use of this procedure in the appropriate letters of agreement or inter/intrafacility directives. (ATP–100)

x. 5–65 RECEIVING CONTROLLER HANDOFF. Same as w.(ATP–100)

y. 5–66 POINT OUT. Same as w.(ATP–100)

z. 5–76 ADJACENT AIRSPACE. Incorporates an interpretation concerning the termination of radar service for aircraft operating VFR and departing Class B airspace.(ATP–120)

aa. 5–100 APPLICATION. This change revises the requirement to obtain pilot concurrence for speed adjustments "at or above FL290" to "at or above FL390." (ATP–130)

bb. 5–101 METHODS. Same as aa. (ATP–130)

cc. 5–126 SIMULTANEOUS ILS/MLS APPROACHES. This change adds authorization and conditions for implementation of triple simultaneous approaches. (ATP–120)

dd. 5–216 INHIBITING MINIMUM SAFE ALTITUDE WARNING (MSAW). A recent ARTS "patch" placed the terminal ARTS controller in the position of not being able to comply with this paragraph. This "patch" allows for VFR inter–terminal handoffs by using discrete code subsets from the ARTCC, however these codes are MSAW processed and the terminal controller cannot literally comply with this paragraph. This editorial change will allow the terminal ARTS controller to comply with this paragraph when using the "patch". (ATP–120)

ee. 7–10 VISUAL SEPARATION. Change added "or designated area" to permit nonapproach control towers operating in Class E airspace to provide visual separation. (ATP–120)

ff. 7–40 AUTHORIZATION. Change eliminates the confusion with the literal interpretation of "transiting." Allows SVFR clearance for aircraft operating in the pattern when VFR cannot be maintained. (ATP–130)

gg. 7–45 CLIMB TO VFR. Phraseology – Defined the area SVFR can be conducted and corrected wording in first parenthesis. (ATP–120)

hh. 7–90 APPLICATION. Change added transponder requirement as stated in CFR 91.215 and referenced Part 91.215. (ATP–120)

ii. 7–92 SEPARATION. Change requires wake turbulence cautionary advisories as specified in paragraph 2–20 and requires wake turbulence separation for all conditions described in paragraph 5–72d and e. Previous requirements only provided for aircraft following heavy jets. (ATP–120)

jj. 7–113 SEPARATION. Change requires wake turbulence separation for all conditions described in paragraph 5–72d and e. Previous requirements only provided for aircraft below/behind heavy jets. Change also requires wake turbulence cautionary advisories as specified in paragraph 2–20. (ATP–120)

kk. NOTE: All additional pag icating changes are replacements due to Editoria ections.

ll. PILOT/CONTROLLER GLOSSARY

1. AREA NAVIGATION. Changes provide a phraseology examples for clearing an aircraft for a GPS approach and provide an updated explanation of the GPS system. (ATP–130)

2. CHARTED VISUAL FLIGHT PROCEDURE APPROACH. This change to the definition of CVFP clarifies pilot responsibility for cloud clearance and visibility requirements. (ATP–120)

3. CONTROLLED AIRSPACE. This change corrects a problem with having two definitions of "outer area" in the Pilot/Controller Glossary. (ATP–120)

4. GLOBAL POSITIONING SYSTEM. Same as 1. (ATP–130)

5. SEE AND AVOID. This change to the definition of see and avoid in the PCG clarifies the actual intent of what is meant by see and avoid by removing any reference to visual meteorological conditions. (ATP–120)

6. VISUAL APPROACH. This change to the definition of visual approach clarifies pilot responsibility for cloud clearance and visibility requirements. (ATP–120)

7. VOICE SWITCHING AND CONTROL SYSTEM. The development and implementation of a new communications system switch requires an update to the glossary. There will be no operational impact from the addition of these terms but it will ensure the understanding of the terms being used in new system. (ATP–120)

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1–25 ABBREVIATIONS

As used in this manual, the following abbreviations have the meanings indicated. (See Table 1–25[1]).

Table 1–25[1]

Abbreviation	*Meaning*
A/A	Air-to-Air
AAL	Above aerodrome level
AAR	Airport acceptance rate
AAT	Associate Administrator for Air Traffic
ABM	Abeam
ABN	Aerodrome beacon
ABT	About
AC	Altocumulus
ACC	Area Control Center
ACCID	Notification of an aircraft accident
ACLS	Automatic Carrier Landing System
ACP	Area Command Post
ADC	Aerospace Defense Command
ADIZ	Air defense identification zone (to be pronounced "AY-DIZ")
ADJ	Adjacent
ADR	Advisory route
ADZ	Advise
ADZY	Advisory
AFD	Airport/Facility Directory
AFI	ICAO African-Indian Ocean Region
AFIL	Flight plan filed in the air
AFIS	Aerodrome flight information service
AFM	Yes or affirm or affirmative or that is correct
AIM	Airman's Information Manual
AIP	Aeronautical Information Publication
AIREP	Air report
AIRMET	Airmen's meteorological information
ALERFA	Alert Phase code (Alerting Service)
ALNOT	Alert notice
ALS	Approach light system
ALTRV	Altitude reservation
AMB	Ambiguity—A disparity greater than 2 miles exists between the position declared for a target by ARTS and another facility's computer declared position during inter-facility handoff
AMS	Aeronautical mobile service
AMSL	Above mean sea level
AMVER	Automated Mutual-Assistance Vessel Rescue System
ANG	Air National Guard
ANS	Answer
APREQ	Approval request
AR	Atlantic Route
ARAC	Radar approach control facility (USA)
ARCP	Air refueling control point
ARINC	Aeronautical Radio Incorporated
ARIP	Air refueling initial point
ARSR	Air route surveillance radar
ARTCC	Air route traffic control center
ASD	Aircraft situation display
ASDE	Airport surface detection equipment
ASP	Arrival sequencing program
ASR	Airport surveillance radar
ATC	Air traffic control
ATCAA	ATC assigned airspace
ATCSCC	Air Traffic Control System Command Center
ATCRBS	Air traffic control radar beacon system
ATCT	Airport traffic control tower
ATD	Actual time of departure
ATH	Office of Air Traffic System Effectiveness
ATIS	Automatic terminal information service
ATM	Office of Air Traffic System Management
ATPAC	Air Traffic Procedures Advisory Committee
ATP	Air Traffic Rules and Procedures Service
ATR	Air Traffic Plans and Requirements Service
ATS	Air Traffic Service
ATS	Office of Air Traffic Evaluations and Analysis
ATZ	Office of Air Traffic Program Management
AVSNFO	Aviation Standards National Field Office
BASE	Cloud base
BR	Bahama Route
CACT	Civil air carrier turbojet
CAR	ICAO Caribbean Region
CARF	Central Altitude Reservation Function
CAT	Clear air turbulence
CAVOC	Visibility, cloud and present weather better than prescribed values or conditions (to be pronounced "KAV-OH-KAY")
CCC	Regional Communications Control Center
CELNAV	Celestial navigation training
CENPAC	Central North Pacific
CENRAP	Center Radar Presentation
CEP	Central East Pacific
CERAP	Combined Center/RAPCON
CFWSUM	Central flow weather service unit meteorologist
CH	Channel
CHG	Modification (message type designator)
CI	Cirrus
CIT	Near or over large towns
CIV	Civil
CM	Centimetre
CMB	Climb
CMPL	Completion or comleted or complete
CNL	Cancel or cancelled
CNL	Flight plan cancellation (message type designator)
CNS	Continuous
COM	Communications
CONC	Concrete
COP	Change-over point
CPL	Current Flight Plan
CTA	Control Area
CVFP	Charted Visual Flight Procedure
CWA	Center Weather Advisory
DETRESFA	Distress Phase code (Alerting Service)
DF	Direction finder
DH	Decision height
DMAAC	Defense Mapping Agency Aerospace Center
DMAHC	Defense Mapping Agency Hydrographic Center
DME	Distance measuring equipment compatible with TACAN
DOE	Department of Energy
DR	Dead Reckoning
DSP	Departure sequencing program
DVFR	Defense Visual Flight Rules
EB	Eastbound

Table 1–25[1]—CONTINUED

Abbreviation	*Meaning*
ECM	Electronic counter measure
EET	Estimated elapsed time
EFAS	En route flight advisory service
EFC	Expect further clearance
EFIS	Electronic Flight Information System
EFIS	Electronic Flight Instrument System
EFM	En Route flow management
EHF	Extremely high frequency [30,000 to 300,000 MHz]
ELBA	Emergency location beacon - aircraft
ELT	Emergency locator transmitter
EOVM	Emergency obstruction video map
ESP	En Route spacing program
ETA	Estimated time of arrival
EUR	ICAO European Region
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FDEP	Flight data entry and printout
FIFO	Flight Inspection Field Office
FIR	Flight information region
FL	Flight level
FLIP	Flight Information Publication
FLY	Fly or flying
FM	From
FMS	Flight Management System
FMSP	Flight Management System Procedure
FNA	Final approach
FPL	Filed flight plan (message type designator)
FRC	Full route clearance necessary
FRONT	Front (relating to weather)
FSDO	Flight Standards District Office
FSS	Flight service station
FTS	Federal Telecommunications System
FW/SVFR	Fixed-Wing Special Visual Flight Rules
GCA	Ground controlled approach
GEN	General
GEO	Geographic of true
GLD	Glider
GND	Ground
GNDCK	Ground check
GNSS	Global Navigation Satellite System
GP	Glide path
GPS	Global Positioning System
GR	Hail or soft hail
GRADU	Gradual or gradually
HIRL	High intensity runway lights
ICAO	International Civil Aviation Organization
IDENT	Aircraft identification
IFIM	International Flight Information Manual
IFR	Instrument flight rules
IFSS	International flight service station
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
INCERFA	Uncertainty Phase code (Alerting Service)
INF	Inland Navigation Facility
INREQ	Information request
INS	Inertial Navigation System
IR	IFR military training route
JATO	Jet assisted takeoff
LAWRS	Limited aviation weather reporting station
LLWAS	Low level windshear alert system
LORAN	Long-range Navigation System
L/MF	Low/medium frequency

Table 1–25[1]—CONTINUED

Abbreviation	*Meaning*
MACH	MACH Number
MALS	Medium intensity approach light system
MALSR	Medium approach light system with runway alignment indicator lights
MAP	Missed approach point
MARSA	Military authority assumes responsibility for separation of aircraft
MCA	Minimum crossing altitude
MDA	Minimum descent altitude
MEA	Minimum en route (IFR) altitude
MIA	Minimum IFR altitude
MID/ASIA	ICAO Middle East/Asia Region
MIRL	Medium intensity runway lights
MIT	Miles-in trail
MITO	Minimum interval takeoff
MLS	Microwave Landing System
MNPS	Minimum Navigation Performance Specifications
MNPSA	Minimum Navigation Performance Specification Airspace
MNT	Monitor or monitoring or monitored
MNTN	Maintain
MOA	Military operations area
MOC	Minimum obstacle clearance (required)
MOCA	Minimum obstruction clearance altitude
MOD	Moderate (used to qualify icing, turbulence, interference or static reports)
MRA	Minimum reception altitude
MSAW	Minimum Safe Altitude Warning
MSL	Mean sea level
MTI	Moving target indicator
MTR	Military training route
MVA	Minimum vectoring altitude
NAM	ICAO North American Region
NAR	North American Route
NAT	ICAO North Atlantic Region
NAS	National Airspace System
NAT	Not ARTS tracked (ARTS is not tracking the target and no ambiguity check can be made)
NBCAP	National Beacon Code Allocation Plan
NDB	Nondirectional radio beacon
NM	Nautical Mile
NOAA	National Oceanic and Atmospheric Administration
NOPAC	North Pacific
NORAD	North American Aerospace Defense Command
NOS	National Ocean Service
NOTAM	Notice to Airmen
NWS	National Weather Service
NTZ	No transgression zone
OALT	Operational acceptable levels of traffic
ODALS	Omnidirectional approach lighting system
ODAPS	Oceanic Display and Planning System
ONER	Oceanic Navigational Error Report
OTR	Oceanic Transition Route
OTS	NAT Organized Track System
PAC	ICAO Pacific Region
PAR	Precision approach radar
PAR	Preferential arrival route (Stage A)
PBCT	Proposed Boundary Crossing Time
PDAR	Preferential departure arrival route

Table 1–25[1]—CONTINUED

Abbreviation	*Meaning*
PDR	Preferential departure route
PIDP	Programmable Indicator Data Processor
PO	Dust devils
POB	Persons on board
PPI	Plan position indicator
PPR	Prior permission required
PTS	Polar Track Structure
RAC	Department of Energy special flight
RAIL	Runway alignment indicator lights
RAPCON	Radar approach control facility (USAF)
RATCF	Radar air traffic control facility (USN)
RBS	Radar bomb scoring
RCC	Rescue Coordination Center
RCLS	Runway centerline system
RCR	Runway condition reading
RE	Recent (used to qualify weather phenomena such as rain, e.g. recent rain = RERA)
REC	Receive or receiver
REDL	Runway edge light(s)
REF	Reference to...or refer to...
REIL	Runway end identifier lights
RITE	Right (direction of turn)
RL	Report leaving
RLA	Relay to
RLLS	Runway lead-in lighting system
RMK	Remark
RNAV	Area Navigation
RNG	Radio range
ROBEX	Regional OPMET bulletin exchange (scheme)
RRTE	Reroute
RVR	Runway visual range
RVV	Runway visibility value
SAC	Strategic Air Command
SAFI	Semi-automatic flight inspection
SAM	ICAO South American Region
SAR	Search and rescue
SARPS	Standards and Recommended Practices (ICAO)
SAT	Saturday
SB	Southbound
SC	Stratocumulus
SELCAL	Selective calling system
SFA	Single frequency approach
SFO	Simulated flameout
SID	Standard instrument departure
SIGMET	Significant meteorological information

Table 1–25[1]—CONTINUED

Abbreviation	*Meaning*
STAR	Standard terminal arrival
STMC	Supervisory traffic management coordinator
STMP	Sector traffic management program
STOL	Short takeoff and landing
STR	Strategic Training Range
SURPIC	Surface Picture
SVFR	Special Visual Flight Rules
SWAP	Severe weather avoidance plan
TACAN	TACAN-UHF navigational aid (omnidirectional course and distance information)
TCAS	Traffic Alert and Collision Avoidance System
TDZL	Touchdown zone light system
TMC	Traffic management coordinator
TMCIC	Traffic management coordinator in charge
TMU	Traffic management unit
TRACAB	Terminal radar approach control in tower cab
TRACON	Terminal radar approach control
TRSA	Terminal radar service area
UHF	Ultra high frequency
USA	United States Army
USAF	United States Air Force
USN	United States Navy
UTC	Coordinated Universal Time
UTM	Unsuccessful transmission message
VCE	VSCS Console Equipment
VFR	Visual flight rules
VHF	Very high frequency
VLF	Very Low Frequency
VMC	Visual Meteorological Conditions
VOR	VHF navigational aid (omnidirectional course information)
VOR-DME	Collocated VOR and DME navigational aids (VHF course and UHF distance information)
VORTAC	Collocated VOR and TACAN navigation aids (VHF and UHF course and UHF distance information)
VR	VFR military training route
VSCS	Voice Switching and Control System
WATRS	West Atlantic Route System
WSFO	Weather Service Forecast Office
WSO	Weather Service Office

or if past the final approach fix (nonprecision approach), or the outer marker, or the fix used in lieu of the outer marker (precision approach),

THE, *as appropriate,* MDA/DH (if known) IS (altitude).

b. Aircraft Conflict/Mode C Intruder Alert—Immediately issue/initiate an alert to an aircraft if you are aware of another aircraft at an altitude which you believe places them in unsafe proximity. If feasible, offer the pilot an alternate course of action.

2–6b Note.—When an alternate course of action is given, end the transmission with the word "IMMEDIATELY."

Phraseology:

(Identification) TRAFFIC ALERT (position of traffic if time permits),

ADVISE YOU TURN LEFT/RIGHT (specific heading, if appropriate),

and/or

CLIMB/DESCEND (specific altitude if appropriate), IMMEDIATELY.

2–6 Reference.—Conflict Mode C Intruder Alert, paragraph 5–190. En Route Minimum Safe Altitude Warning (E-MSAW), paragraph 5–191. Conflict Alert, paragraph 5–215. Altitude Filters, paragraph 5–225.

2–7 IN-FLIGHT EQUIPMENT MALFUNCTIONS

a. When a pilot reports an in-flight equipment malfunction, determine the nature and extent of any special handling desired.

2–7a Note.—In-flight equipment malfunctions include partial or complete failure of equipment which may affect either safety and/or the ability of the flight to proceed under IFR in the air traffic control system. Controllers may expect reports form pilots regarding VOR, TACAN, ADF, GPS, or low frequency navigation receivers, impairment of air-ground communications capability, or other equipment deemed appropriate by the pilot (e.g. airborne weather radar). Pilots should communicate the nature and extent of any assistance desired from air traffic control.

b. Provide the maximum assistance possible consistent with equipment, workload, and any special handling requested.

c. Relay to other controllers or facilities who will subsequently handle the aircraft all pertinent details concerning the aircraft and any special handling required or being provided.

2–8 MINIMUM FUEL

If an aircraft declares a state of "minimum fuel," inform any facility to whom control jurisdiction is transferred of the minimum fuel problem and be alert for any occurrence which might delay the aircraft en route.

2–8 Note.—Use of the term "minimum fuel" indicates recognition by a pilot that his fuel supply has reached a state where, upon reaching destination, he cannot accept any undue delay. This is not an emergency situation but merely an advisory that indicates an emergency situation is possible should any undue delay occur. A minimum fuel advisory does not imply a need for traffic priority. Common sense and good judgment will determine the extent of assistance to be given in minimum fuel situations. If, at any time, the remaining usable fuel supply suggests the need for traffic priority to ensure a safe landing, the pilot should declare an emergency and report fuel remaining in minutes.

2–9 REPORTING ESSENTIAL FLIGHT INFORMATION

Report as soon as possible to the appropriate FSS, airport manager's office, ARTCC, approach control facility, operations office, or military operations office any information concerning components of the NAS or any flight conditions which may have an adverse effect on air safety.

2–9 Note.—FSS's are responsible for classifying and disseminating Notices to Airmen.

2–9 Reference.—Timely Information, paragraph 3–32. Service Limitations, paragraph 5–6. FAA Order 7210.3, Periodic Maintenance, paragraph 3–2. USN, see OPNAVINST 2112.2D.

2–10 NAVAID MALFUNCTIONS

When an aircraft reports a NAVAID malfunction, take the following actions:

2–10 Note.—The sequence of the actions are not intended to circumvent good judgment should the circumstances so dictate.

2–10 Reference.—FAA Order 7210.3, System Component Malfunctions, paragraph 3–51.

a. Request a report from a second aircraft.

b. If the second aircraft reports normal operations, continue use and inform the first aircraft. Record the incident on FAA Form 7230–4 or appropriate Military Form.

c. If the second aircraft confirms the malfunction or in the absence of a second aircraft report, activate the standby equipment or request the monitor facility to activate.

d. If normal operation is reported after the standby equipment is activated, continue use, record the incident on FAA Form 7230–4 or appropriate Military Form, and notify Airway Facilities (AF) personnel (the Systems Engineer of the ARTCC when an en route aid is involved).

e. If continued malfunction is reported after the standby equipment is activated or the standby equipment cannot be activated, inform AF personnel and request advice on whether or not the aid should be shut down. In the absence of a second aircraft report, advise the AF personnel of the time of the initial aircraft report and the estimated time a second aircraft report could be obtained.

2–11 USE OF MARSA

a. MARSA may only be applied to military operations specified in a letter of agreement or other appropriate FAA or military document.

2–11a Note.—Application of MARSA is a military command prerogative. It will not be invoked indiscriminately by individual units or pilots. It will be used only for IFR operations requiring its use. Commands authorizing MARSA will ensure that its implementation and terms of use are documented and coordinated with the control agency having jurisdiction over the area in which the operations are conducted. Terms of use will assign responsibility and provide for separation among participating aircraft.

b. ATC facilities do not invoke or deny MARSA. Their sole responsibility concerning the use of MARSA is to provide separation between military aircraft engaged in MARSA operations and other nonparticipating IFR aircraft.

c. DOD shall ensure that military pilots requesting special-use airspace/ATCAA's have coordinated with the scheduling agency, have obtained approval for entry, and are familiar with the appropriate MARSA procedures. ATC is not responsible for determining which military aircraft are authorized to enter special-use airspace/ATCAA's.

2–11 Reference.—Military Aerial Refueling, paragraph 9–29.

2–12 MILITARY PROCEDURES

a. Military procedures in the form of *additions*, modifications, and exceptions to the basic FAA procedure are prescribed herein when a common procedure has not been attained or to fulfill a specific requirement. They shall be applied by:ATC facilities operated by that service.

2–12a Examples.—

An Air Force facility providing service for an Air Force Base would apply USAF procedures to all traffic regardless of class.

A Navy facility providing service for a Naval Air Station would apply USN procedures to all traffic regardless of class.

b. ATC facilities, regardless of their parent organization (FAA, USAF, USN, USA), supporting a designated military airport exclusively. This designation determines which military procedures are to be applied.

2–12b Examples.—

An FAA facility supports a USAF Base exclusively—USAF procedures are applied to all traffic at that base.

An FAA facility provides approach control service for a Naval Air Station as well as supporting a civil airport—Basic FAA procedures are applied at both locations by the FAA facility.

A USAF facility supports a USAF Base and provides approach control service to a satellite civilian airport—USAF procedures are applied at both locations by the USAF facility.

2–12b Reference.—Annotations, paragraph 1–24.

c. Other ATC facilities when specified in a letter of agreement.

2–12c Example.—

A USAF unit is using a civil airport supported by an FAA facility—USAF procedures will be applied as specified in a letter of agreement between the unit and the FAA facility to the aircraft of the USAF unit. Basic FAA procedures will be applied to all other aircraft.

2–13 FORMATION FLIGHTS

Control formation flights as a single aircraft. When individual control is requested, issue advisory information which will assist the pilots in attaining separation. When pilot reports indicate separation has been established, issue control instructions as required.

2–13 Note 1.—Separation responsibility between aircraft within the formation during transition to individual control rests with the pilots concerned until standard separation has been attained.

2–13 Note 2.—Formation join-up and breakaway will be conducted in VFR weather conditions unless prior authorization has been obtained from ATC or individual control has been approved.

2–13 Reference.—Additional Separation for Formation Flights, paragraph 5–74. Pilot/Controller Glossary term—Formation Flight.

2–14 COORDINATE USE OF AIRSPACE

a. Ensure that the necessary coordination has been accomplished before you allow an aircraft under your control to enter another controller's area of jurisdiction.

b. Before you *issue control instructions* directly to an aircraft which is within another controller's area of jurisdiction that will change that aircraft's heading, route, speed, or altitude, ensure that coordination has been accomplished with each of the controllers listed below whose area of jurisdiction is affected by those instructions unless otherwise specified by a letter of agreement or a facility directive:

1. The controller within whose area of jurisdiction the control instructions will be issued.

2. The controller receiving the transfer of control.

3. Any intervening controller(s) through whose area of jurisdiction the aircraft will pass.

c. If you issue control instructions to an aircraft through a source other than another controller (e.g. ARINC, FSS, another pilot) ensure that the necessary coordination has been accomplished with any controllers listed in subparagraphs 2–14b1, 2–14b2, and 2–14b3 whose area of jurisdiction is affected by those instructions unless otherwise specified by a letter of agreement or a facility directive.

2–14 Reference.—Control Transfer, paragraph 2–15. Adjacent Airspace, paragraph 5–76. Transferring Controller Handoff, paragraph 5–64. Receiving Controller Handoff, paragraph 5–65.

2–15 CONTROL TRANSFER

a. Transfer control responsibility at a prescribed or coordinated location, time, fix, or altitude and only after eliminating any potential conflict with

other aircraft for which you have separation responsibility.

2–15 Reference.—Coordinate Use of Airspace, paragraph 2–14. Transfering Controller Handoff, paragraph 5–64. Receiving Controller Handoff, paragraph 5–65.

b. When you transfer control of an aircraft while it is within your area of jurisdiction, issue any instructions to the receiving controller that may be necessary to provide separation from other aircraft for which you have separation responsibility.

c. Assume control of an aircraft only after it is in your area of jurisdiction unless specifically coordinated or as specified by letter of agreement or a facility directive.

2–16 SURFACE AREAS

a. Coordinate with the appropriate nonapproach control tower on an individual aircraft basis before issuing a clearance which would require flight within a surface area for which the tower has responsibility unless otherwise specified in a letter of agreement.

2–16a References.—FAA Order 7210.3, Letters of Agreement, paragraph 4–30. Operating on or in the Vicinity of an Airport, Part 91.127. Pilot/Controller Glossary term—Surface Area.

b. Coordinate with the appropriate control tower for transit authorization when you are providing radar traffic advisory service to an aircraft that will enter another facility's airspace.

2–16b Note.—The pilot is not expected to obtain his own authorization through each area when in contact with a radar facility.

c. Transfer communications to the appropriate facility, if required, prior to operation within a surface area for which the tower has responsibility.

2–16c References.—Radio Communications Transfer, paragraph 2–17. Operations in Class D airspace, Part 91.129.

2–16 Reference.—Surface Area Restrictions, paragraph 3–11. Application, paragraph 7–60.

2–17 RADIO COMMUNICATIONS TRANSFER

a. Transfer radio communications before an aircraft enters the receiving controller's area of jurisdiction unless otherwise coordinated or specified by a letter of agreement or a facility directive.

b. Transfer radio communications by specifying the following:

2–17b Note.—Radio communications transfer procedures may be specified by a letter of agreement or contained in the route description of an MTR and as published in the DOD Planning AP/1B (AP/3).

1. The facility name or location name and terminal function to be contacted. *TERMINAL:* Omit the location name when transferring communications to another controller within your facility except as required in paragraph 5–137.

2. Frequency to use except the following may be omitted:

(a) FSS frequency.

(b) Departure frequency if previously given or published on a SID chart for the procedure issued.

(c) *TERMINAL:*

(1) Ground or local control frequency if in your opinion the pilot knows which frequency is in use.

(2) The numbers preceding the decimal point if the ground control frequency is in the 121 mHz bandwidth.

2–17b Examples.—

"Contact tower."

"Contact ground."

"Contact ground point seven."

"Contact ground, one two zero point eight."

"Contact Huntington Radio."

"Contact departure."

"Contact Los Angeles Center, one two three point four."

3. Time, fix, altitude, or specifically when to contact a facility. You may omit this when compliance is expected upon receipt.

2–17b3 Note.—Airman's Information Manual, ARTCC Communications, paragraph *5–30, informs pilots that they are* expected to maintain a listening watch on the transferring controller's frequency until the time, fix, or altitude specified.

Phraseology:

CONTACT (facility name or location name and terminal function), (frequency).

If required,

AT (time, fix, or altitude).

c. In situations where an operational advantage will be gained, and following coordination with the receiving controller, you may instruct aircraft on the ground to monitor the receiving controller's frequency.

2–17c Examples.—

"Monitor tower."

"Monitor ground."

"Monitor ground point seven."

"Monitor ground, one two zero point eight."

d. In situations where a sector has multiple frequencies or when sectors are combined using multiple frequencies and the aircraft will remain under your jurisdiction, transfer radio communication by specifying the following:

Phraseology:

(Identification) CHANGE TO MY FREQUENCY (state frequency).

2–17d Example.—

"United Two Twenty-two change to my frequency one two three point four."

2–17d Reference.—Airman's Information Manual, Contact Procedures, paragraph 4–32d(2).

e. Avoid issuing a frequency change to helicopters known to be single-piloted during air-taxiing, hovering, or low-level flight. Whenever possible, relay necessary control instructions until the pilot is able to change frequency.

2–17e Note.—Most light helicopters are flown by one pilot and require the constant use of both hands and feet to maintain control. Although flight control friction devices assist the pilot, changing frequency near the ground could result in inadvertent ground contact and consequent loss of control. Pilots are expected to advise ATC of their single-pilot status if unable to comply with a frequency change.

2–17e Reference.—Airman's Information Manual, Communications, paragraph 4–63.

f. In situations where the controller does not want the pilot to change frequency but the pilot is expecting or may want a frequency change, use the following phraseology.

Phraseology:
REMAIN THIS FREQUENCY.

2–17 Reference.—Clearance Information, paragraph 4–80. Communication Transfer, paragraph 5–167.

2–18 OPERATIONAL REQUESTS

Respond to a request from another controller, a pilot or vehicle operator by one of the following verbal means:

a. Restate the request in complete or abbreviated terms followed by the word "APPROVED." The phraseology "APPROVED AS REQUESTED" may be substituted in lieu of a lengthy readback.

Phraseology:
(Requested operation) APPROVED.

or

APPROVED AS REQUESTED.

b. State restrictions followed by the word "APPROVED."

Phraseology:
(Restriction and/or additional instructions, requested operation) APPROVED.

c. State the word "UNABLE" and, time permitting, a reason.

Phraseology:
UNABLE (requested operation)

and when necessary,

(reason and/or additional instructions.)

d. State the words "STAND BY."

2–18d Note.– "Stand by" is not an approval or denial. The controller acknowledges the request and will respond at a later time.

2–18 Reference.—Route or Altitude Amendments, paragraph 4–14. Traffic Advisories, paragraph 2–21. Methods, paragraph 7–112.

2–19 WAKE TURBULENCE

a. Apply wake turbulence procedures to aircraft operating behind heavy jets and, where indicated, to small aircraft behind large aircraft.

2–19a Note.—Paragraph 5–72e specifies increased radar separation for small type aircraft landing behind large or heavy aircraft because of the possible effects of wake turbulence.

b. The separation minima shall continue to touchdown for all IFR aircraft not making a visual approach or maintaining visual separation.

2–19 Reference.—Approach Separation Responsibility, paragraph 5–124.

2–20 WAKE TURBULENCE CAUTIONARY ADVISORIES

a. Issue wake turbulence cautionary advisories and the position, altitude if known, and direction of flight of the heavy jets or B–757's to:

2–20a Reference.—AC 90–23, Pilot Responsibility, paragraph 12D.

1. *TERMINAL:* VFR aircraft not being radar vectored but are behind heavy jets or B–757's. (See Figure 2–20[1]).

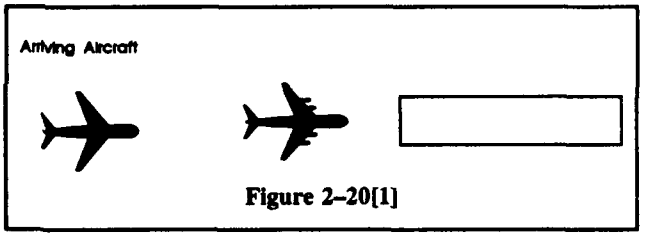


Figure 2–20[1]

2. IFR aircraft that accept a visual approach or visual separation.

2–20a2 Reference.—Visual Approach, paragraph 7–30.

3. *TERMINAL:* VFR arriving aircraft that have previously been radar vectored and the vectoring has been discontinued.

b. Issue cautionary information to any aircraft if in your opinion wake turbulence may have an adverse effect on it. When traffic is known to be a heavy aircraft, include the word *heavy* in the description.

2–20b Note.—Wake turbulence may be encountered by aircraft in flight as well as when operating on the airport movement area. Because wake turbulence is unpredictable, the controller is not responsible for anticipating its existence or effect. Although not mandatory during ground operations, controllers may use the words *jet blast, propwash,* or *rotorwash,* in lieu of *wake turbulence,* when issuing a caution advisory.

2–20b Reference.—AC 90–23. Pilot/Controller Glossary terms—Aircraft Classes and Wake Turbulence.

Phraseology:
CAUTION WAKE TURBULENCE (traffic information).

2–20 Reference.—Visual Separation, paragraph 7–10.

2–21 TRAFFIC ADVISORIES

Unless an aircraft is operating within Class A airspace or omission is requested by the pilot, issue traffic advisories to all aircraft (IFR or VFR) on your frequency when in your judgment their proximity may diminish to less than the applicable separation minima. Where no separation minima applies, such as for VFR aircraft outside of Class B and Class C airspace, or a TRSA, issue traffic advisories to those aircraft on your frequency when in your judgment their proximity warrants it. Provide this service as follows:

a. To radar identified aircraft:

1. Azimuth from aircraft in terms of the 12–hour clock, or

2. When rapidly maneuvering aircraft prevent accurate issuance of traffic as in 1 above, specify the direction from an aircraft's position in terms of the eight cardinal compass points (N, NE, E, SE, S, SW, W, and NW). This method shall be terminated at the pilot's request.

3. Distance from aircraft in miles.

4. Direction in which traffic is proceeding and/or relative movement of traffic.

2–21a4 Note.—Relative movement includes closing, converging, parallel same direction, opposite direction, diverging, overtaking, crossing *left to right, crossing right to left.*

5. If known, type of aircraft and altitude.

2–21a5 Reference.—Description of Aircraft Types, paragraph 2–89.

Phraseology:

TRAFFIC, (number) O'CLOCK,

or when appropriate,

(direction) (number) MILES, (direction)-BOUND *and/or* (relative movement),

and if known,

(type of aircraft and altitude).

or when appropriate,

(type of aircraft and relative position), (number of feet) FEET ABOVE/BELOW YOU.

If altitude is unknown,

ALTITUDE UNKNOWN.

2–21a Examples.—

"Traffic, eleven o'clock, one zero miles, southbound, converging, DC–8, one seven thousand."

"Traffic, twelve o'clock, one five miles, opposite direction, altitude unknown."

"Traffic, ten o'clock, one two miles, southeast bound, one thousand feet below you."

6. When requested by the pilot, issue radar vectors to assist in avoiding the traffic, provided the aircraft to be vectored is within your area of jurisdiction or coordination has been effected with the sector/facility in whose area the aircraft is operating.

7. If unable to provide vector service, inform the pilot.

2–21a7 Reference.—Operational Requests, paragraph 2–18.

8. Inform the pilot of the following when traffic you have issued is not reported in sight:

(a) The traffic is no factor.

(b) The traffic is no longer depicted on radar.

Phraseology:

TRAFFIC NO FACTOR/NO LONGER OBSERVED,

or

(number) O'CLOCK TRAFFIC NO FACTOR/NO LONGER OBSERVED,

or

(direction) TRAFFIC NO FACTOR/NO LONGER OBSERVED.

b. To aircraft that are not radar identified:

1. Distance and direction from fix.

2. Direction in which traffic is proceeding.

3. If known, type of aircraft and altitude.

4. ETA over the fix the aircraft is approaching, if appropriate.

Phraseology:

TRAFFIC, (number) MILES/MINUTES (direction) OF (airport or fix), (direction)-BOUND,

and if known,

(type of aircraft and altitude),

ESTIMATED (fix) (time),

or

TRAFFIC, NUMEROUS AIRCRAFT VICINITY (location).

If altitude is unknown,

ALTITUDE UNKNOWN.

2–21b Examples.—

"Traffic, one zero miles east of Forsythe V-O-R, southbound, M–D Eighty, descending to one six thousand."

"Traffic, reported one zero miles west of Downey V-O-R, northbound, Apache, altitude unknown, estimated Joliet V-O-R one three one five."

"Traffic, eight minutes west of Chicago Heights V-O-R, westbound, Mooney, eight thousand, estimated Joliet V-O-R two zero three five."

"Traffic, numerous aircraft, vicinity of Delia Airport."

c. For aircraft displaying Mode C, not radar identified, issue indicated altitude.

2–21c Example.—

"Traffic, one o'clock, six miles, eastbound, altitude indicates six thousand five hundred."

2–21 Reference.—Traffic Information, paragraph 3–6 Visual Separation, paragraph 7–10. VFR Departure Information, paragraph 7–69.

2–22 BIRD ACTIVITY INFORMATION

a. Issue advisory information on pilot-reported, tower-observed, or radar-observed and pilot-verified bird activity. Include position, species or size of birds, if known, course of flight, and altitude. Do this for at least 15 minutes after receipt of such information from pilots or from adjacent facilities unless visual observation or subsequent reports reveal the activity is no longer a factor.

2–22a Examples.—

"Flock of geese, one o'clock, seven miles, northbound, last reported at four thousand."

"Flock of small birds, southbound along Mohawk River, last reported at three thousand."

"Numerous flocks of ducks, vicinity Lake Winnebago, altitude unknown."

b. Relay bird activity information to adjacent facilities and to FSS's whenever it appears it will become a factor in their areas.

2–23 TRANSFER OF POSITION RESPONSIBILITY

The transfer of position responsibility shall be accomplished in accordance with the "Standard Operating Practice (SOP) for the Transfer of Position Responsibility," and the appropriate facility directives each time the operational responsibility for a position is transferred from one specialist to another.

2–24 WHEELS DOWN CHECK

USA/USAF/USN

Remind aircraft to check wheels down on each approach unless the pilot has previously reported wheels down for that approach.

2–24 Note.—The intent is solely to remind the pilot to lower the wheels, not to place responsibility on the controller.

a. Tower shall issue the wheels down check at an appropriate place in the pattern.

Phraseology:

CHECK WHEELS DOWN.

b. Approach/arrival control, GCA shall issue the wheels down check as follows:

1. To aircraft conducting ASR, PAR, or radar monitored approaches, before the aircraft starts descent on final approach.

2. To aircraft conducting instrument approaches and remaining on the radar facility's frequency, before the aircraft passes the outer marker/final approach fix.

Phraseology:

WHEELS SHOULD BE DOWN

2–25 SUPERVISORY NOTIFICATION

Ensure supervisor/controller–in–charge (CIC) personnel are aware of conditions which impact sector/position operations including, but not limited to, the following:

a. Weather.

b. Equipment status.

c. Potential sector overload.

d. Emergency situations.

e. Special flights/operations.

2–26 PILOT DEVIATION NOTIFICATION

When it appears that the actions of a pilot constitute a pilot deviation notify the pilot, work load permitting.

Phraseology:

"(Identification) POSSIBLE PILOT DEVIATION ADVISE YOU CONTACT (facility) AT (telephone number)."

2–26 Reference.– Order 8020.11, Aircraft Accident and Incident, Notification, Investigation, and Reporting, Chapter 3, paragraph 82, Pilot Deviations.

2–27 TCAS RESOLUTION ADVISORIES

a. After being informed that an aircraft under your control jurisdiction is responding to a TCAS Resolution Advisory (RA), you should not knowingly issue control instructions that are contrary to the RA being communicated to you by the flightcrew. Continue to provide safety alerts and traffic advisories for the subject aircraft and all other aircraft under your control jurisdiction as appropriate.

b. You should not assume that other aircraft in proximity to the subject aircraft are involved in the RA maneuver or are aware of the subject aircraft's intended maneuvers and should continue to provide those aircraft with control instructions, safety alerts, and traffic advisories.

c. Once the subject aircraft has begun the maneuver a maneuver in response to an RA, the controller is not responsible for providing standard separation between the aircraft that is responding to an RA and any other aircraft, airspace, terrain or obstructions. Responsibility for standard separation resumes when one of the following conditions is met:

1. The responding aircraft has returned to its assigned altitude.

2. The flightcrew informs you that the TCAS maneuver is completed and you observe that standard separation has been reestablished.

3. The subject aircraft has executed an alternate clearance and you observe that standard separation has been reestablished.

2–28 thru 2–29 RESERVED

Section 3. FLIGHT PROGRESS STRIPS

2–50 GENERAL

Use flight progress strips to post current data on air traffic and clearances required for control and other air traffic control services. To prevent misinterpretation when data is hand printed, use standard hand-printed characters.

2–50 Note.—Unused flight progress strips, made available because of the design of strip printers whereby several blank strips are ejected to reach the first printed strip, should be saved and used for manual strip preparation.

a. Enter on the appropriate strip without delay the estimated times, clearance information, position reports, and any other IFR flight data received over any communications channel.

b. Maintain only necessary current data and remove the strips from the flight progress boards when no longer required for control purposes. To correct, update, or preplan information:

1. Do not erase or overwrite any item. Use an "X" to delete a climb/descend and maintain arrow, an at or above/below symbol, a cruise symbol, and unwanted altitude information. Write the new altitude information immediately adjacent to it and within the same space. For other items, draw a horizontal line through it, and write the new item immediately adjacent to it and within the same space.

2. Do not draw a horizontal line through an altitude being vacated until after the aircraft has reported or is observed (valid Mode C) leaving the altitude.

3. Preplanning may be accomplished in red pencil.

c. Enter the time of arrival (at approach control locations, the time over release point) for aircraft landing within your sector jurisdiction as follows:

1. *EN ROUTE:* Within controlled airspace—On the appropriate fix strip.

2. *EN ROUTE:* Within Class G airspace and a flight advisory area—On the strip of the fix nearest the point of landing.

d. Manually prepared strips shall conform to the format of machine-generated strips and manual strip preparation procedures will be modified simultaneously with the operational implementation of changes in the machine-generated format. (See Figure 2–50[1]).

Figure 2–50[1]
Standard Recording of Hand-printed Characters

Typed	Hand Printed	Typed	Hand Printed
A	A	T	T
B	B	U	U
C	C	V	V
D	D	W	W
E	E	X	X
F	F	Y	Y
G	G	Z	Z
H	H		
I	I	1	1
J	J	2	2
K	K	3	3
L	L	4	4
M	M	5	5
N	N	6	6
O	O	7	7
P	P	8	8
Q	Q	9	9
R	R	0	Ø
S	S		

NOTE: A slant line crossing through the numberal zero an underline of the letter "s" on handwritten portions of flight progress strips are required only when there is reason to believe the lack of these markings could lead to a misunderstanding. A slant line crossing through the numeral zero is required on all weather data.

2–51 ARRANGEMENT OF POSTINGS

EN ROUTE

Arrange flight progress strips, as specified by a facility directive, under the appropriate fix designator(s).

2–52 EN ROUTE DATA ENTRIES

a. Enter the information specified below in the correspondingly numbered spaces of the flight progress strips (FAA Form 7230–19):

1. Verification symbol if required.
2. Revision number.
3. Aircraft identification.

4. Number of aircraft if more than one, TCAS/ heavy aircraft indicator if appropriate, type of aircraft, and aircraft equipment suffix. The TCAS indicator is "T/," the heavy aircraft indicator is "H/," and for aircraft that are both TCAS and heavy the indicator is "B/."

5. Filed true airspeed.

6. Sector number.

7. Computer identification number if required.

8. Estimated groundspeed.

9. Revised ground speed or strip request (SR) originator.

10. Strip number.

11. Previous fix.

12. Estimated time over previous fix.

13. Revised estimated time over previous fix.

14. Actual time over previous fix, or actual departure time entered on first fix posting after departure.

14a. Plus time expressed in minutes from the previous fix to the posted fix.

15. Center-estimated time over fix (in hours and minutes), or clearance information for departing aircraft.

16. Arrows to indicate if aircraft is departing (↑) or arriving (↓).

17. Pilot-estimated time over fix.

18. Actual time over fix, time leaving holding fix, arrival time at nonapproach control airport, or symbol indicating cancellation of IFR flight plan for arriving aircraft, or departure time (actual or assumed).

19. Fix. For departing aircraft, add proposed departure time.

20. Altitude (in hundreds of feet) information.

21. Next posted fix or coordination fix.

22. Pilot's estimated time over next fix.

23. Arrows to indicate north (↑), south (↓), east (→), or west (←) direction of flight if required.

24. Requested altitude.

25. Point of origin, route as required for control and data relay, and destination.

26. Pertinent remarks, minimum fuel, point out/ radar vector/speed adjustment information or sector/ position number (when applicable in accordance with paragraph 2–30c).

27. Mode 3/A beacon code if applicable.

28. Miscellaneous control data (expected further clearance time, time cleared for approach, etc.).

29–30. Transfer of control data and coordination indicators. (See Figure 2–52[1]).

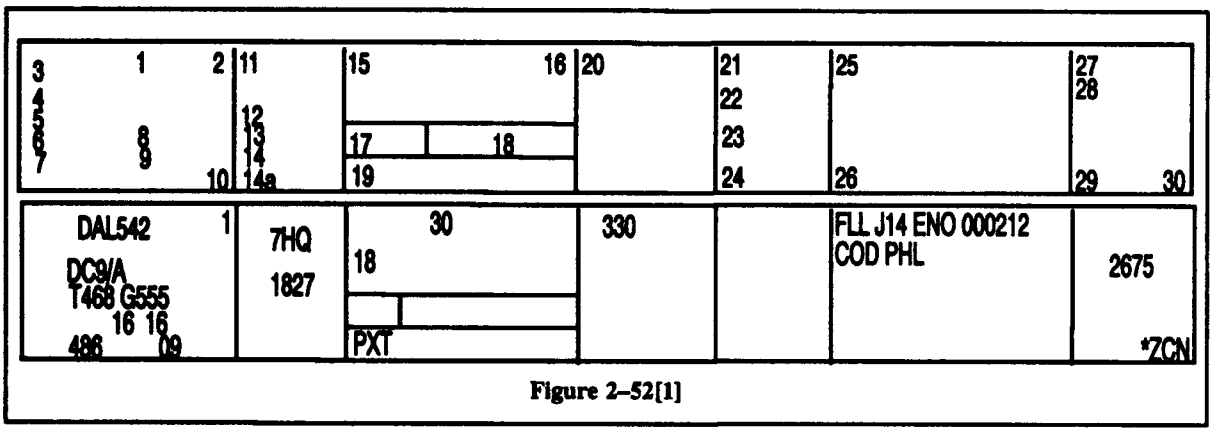


Figure 2–52[1]

b. Latitude/longitude coordinates may be used to define waypoints and may be substituted for nonadapted NAVAID's in space 25 of domestic en route flight progress strips provided it is necessary to accommodate a random RNAV route request.

c. Facility Air Traffic Managers may authorize the optional use of spaces 13, 14, 14a, 22, 23, 24, and 28 for point out information, radar vector information, speed adjustment information, or transfer of control data.

2–53 TERMINAL DATA ENTRIES

Enter the information specified below in the correspondingly numbered spaces of the flight progress strips (FAA Forms 7230–7.1, 7230–7.2, and 7230–8): (See Figure 2–53[1]).

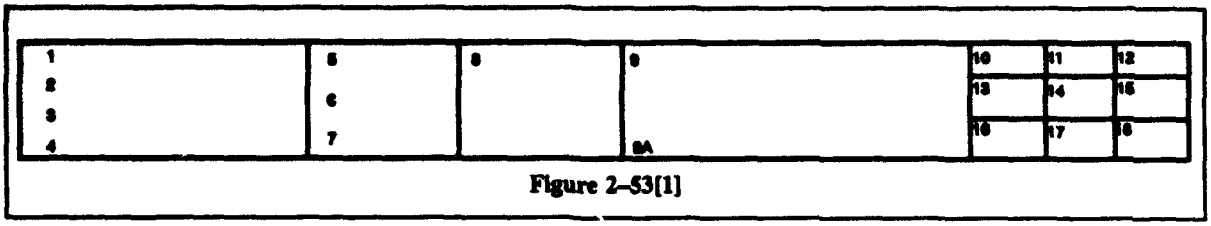


Figure 2–53[1]

2–53 Note 1.—National standardization of items (10 through 18) is not practical because of regional and local variations in operating methods; e.g., single fix, multiple fix, radar, tower en route control, etc.

2–53 Note 2.—Air Traffic managers at FDEP locations may authorize reduced lateral spacing between fields so as to print all FDEP data to the left of the strip perforation when using FAA Form 7230–7.2. All items will retain the same relationship to each other as they do when the full length strip (FAA Form 7230–7.1) is used.

2–53 Note 3.—Air traffic managers at automated terminal radar facilities may waive the requirement to use flight progress strips provided:

a. Backup systems such as multiple radar sites/systems or single site radars with CENRAP are utilized.

b. Local procedures are documented in a facility directive. These procedures should include but not be limited to:

1. Departure areas and/or procedures.

2. Arrival procedures.

3. Overflight handling procedures.

4. Transition from radar to nonradar.

5. Transition from ARTS to non–ARTS.

c. No misunderstanding will occur as a result of no strip usage.

d. Unused flight progress strips, facility developed forms and/or blank notepads shall be provided for controller use.

e. Facilities shall revert to flight progress strip usage if backup systems referred to in subparagraph 2–53a are not available.

a. Arrivals:

1. Aircraft identification.

2. Revision number (FDEP locations only).

2A. Strip request originator. (At FDEP locations this indicates the sector or position that requested a strip be printed.)

3. Number of aircraft if more than one, TCAS/heavy aircraft indicator if appropriate, type of aircraft, and aircraft equipment suffix. The TCAS indicator is "T/," the heavy aircraft indicator is "H/," and for aircraft that are both TCAS and heavy the indicator is "B/."

4. Computer identification number if required.

5. Secondary radar (beacon) code assigned.

6. Previous fix (FDEP locations) or inbound airway.

2–53a6 Note.—The previous fix will be printed at FDEP locations. Use of the inbound airway is restricted to facilities where flight data is received via interphone when agreed upon by the center and terminal facilities.

7. Coordination fix.

8. Estimated time of arrival at the coordination fix or destination airport.

9. Altitude (in hundreds of feet) and remarks.

9A. Minimum fuel, destination airport/point out/radar vector/speed adjustment information. Air Traffic managers may authorize the omission of any of these items, except minimum fuel, if no misunderstanding will result, and they may authorize the optional use of spaces 2A and 10–18 for point out/radar vector or speed adjustment information.

2–53a9A Note.—Authorized omissions and optional use of spaces shall be specified in the facility directive concerning strip marking procedures.

10 through 18. Enter data as specified by a facility directive. Radar facility personnel need not enter data in these spaces except when nonradar procedures are used or when radio recording equipment is inoperative.

b. Departures:

1. Aircraft identification.

2. Revision number (FDEP locations only).

2A. Strip request originator. (At FDEP locations this indicates the sector or position that requested a strip be printed.)

3. Number of aircraft if more than one, TCAS/heavy aircraft indicator if appropriate, type of aircraft, and aircraft equipment suffix. The TCAS indicator is "T/," the heavy aircraft indicator is "H/," and for aircraft that are both TCAS and heavy the indicator is "B/."

4. Computer identification number if required.

5. Secondary radar (beacon) code assigned.

6. Proposed departure time.

7. Requested altitude.

8. Departure airport.

2–53b6, 7, and 8 Reference.—See subparagraph 2–53a9A Note.

9. Machine-generated—Route, destination, and remarks. Manually enter altitude/altitude restrictions in the order flown if appropriate.

Manually prepared—Clearance limit, route, altitude/altitude restrictions in the order flown, if appropriate, and remarks.

9A. Point out/radar vector/speed adjustment information. Air Traffic managers may authorize the optional use of spaces 2A and 10–18 for this information.

10 through 18. Enter data as specified by a facility directive. Items, such as departure time, runway used for takeoff, check marks to indicate information forwarded or relayed, may be entered in these spaces.

c. Overflights:

1. Aircraft identification.

2. Revision number (FDEP locations only).

2A. Strip request originator. (At FDEP locations this indicates the sector or position that requested a strip be printed.)

3. Number of aircraft if more than one, TCAS/heavy aircraft indicator if appropriate, type of aircraft, and aircraft equipment suffix. The TCAS indicator is "T/," the heavy aircraft indicator is "H/," and for aircraft that are both TCAS and heavy the indicator is "B/."

4. Computer identification number if required.

5. Secondary radar (beacon) code assigned.

6. Coordination fix.

7. Overflight coordination indicator (FDEP locations only).

2–53c7 Note.—The overflight coordination indicator identifies the facility to which flight data has been forwarded.

8. Estimated time of arrival at the coordination fix.

9. Altitude and route of flight through the terminal area.

9A. Point out/radar vector/speed adjustment information. Air Traffic managers may authorize the optional use of spaces 2A and 10–18 for this information.

10 through 18. Enter data as specified by a facility directive.

2–54 AIRCRAFT IDENTITY

Indicate aircraft identity by one of the following using combinations not to exceed seven alphanumeric characters:

a. Civil aircraft, including air carrier—Aircraft letter—digit registration number including the letter "T" prefix for air taxi aircraft, the letter "L" for lifeguard aircraft, 3–letter aircraft company designator specified in the Contractions Handbook followed by the trip or flight number. Use the operating air carrier's company name in identifying equipment interchange flights.

2–54a Examples.—

"N12345." "TN5552Q." "AAL192." "LN751B."

2–54a Note.—The letter "L" is not to be used for air carrier/taxi lifeguard aircraft.

b. Military—

1. Prefixes indicating branch of service and/or type of mission followed by the last 5 digits of the serial number (the last 4 digits for CAF/CAM/CTG). (See Table 2–54[1] and Table 2–54[2]).

Table 2–54[1]
Branch of Service Prefix

Prefix	*Branch*
A	U.S. Air Force
C	U.S. Coast Guard
G	Air or Army National Guard
R	U.S. Army
VM	U.S. Marine Corps
VV	U. S. Navy
CAF	Canadian Armed Force
CAM	Canadian Armed Force (Transport Command)
CTG	Canadian Coast Guard

Table 2–54[2]
Military Mission Prefix

Prefix	*Mission*
E	Medical Air Evacuation
F	Flight Check
L	LOGAIR (USAF Contract)
M	AMC (Air Mobility Command)
S	Special Air Mission

2. Pronounceable words of 3, 4, 5, and 6 letters followed by a 4–, 3–, 2–, or 1–digit number.

2–54b2 Example.—

"SAMP Three One Six."

3. Assigned double-letter 2–digit flight number.

4. Navy or Marine fleet and training command aircraft, one of the following:

(a) The service prefix and 2 letters (use phonetic alphabet equivalent) followed by 2 or 3 digits.

(b) The service prefix and a digit and a letter (use phonetic alphabet equivalent) followed by 2 or 3 digits.

c. Special-use—Approved special-use identifiers.

2–55 AIRCRAFT TYPE

Use the approved codes listed in Appendices A thru D to indicate aircraft type.

2–56 USAF/USN UNDERGRADUATE PILOTS

To identify aircraft piloted by solo USAF/USN undergraduate student pilots (who may occasionally request revised clearances because they normally are restricted to flight in VFR conditions), the aircraft identification in the flight plan shall include the letter "Z" as a suffix. Do not use this suffix, however, in ground-to-air communication.

2–56 Note.—USAF solo students who have passed an instrument certification check may penetrate cloud layers in climb or descent only. Requests for revised clearances to avoid clouds in level flight can still be expected. This does not change the requirement to use the letter "Z" as a suffix to the aircraft identification.

2–56 Reference.—Aircraft Identification, paragraph 2–88; FAA Order 7610.4, Chapter 12, Section 10.

2–57 AIRCRAFT EQUIPMENT SUFFIX

a. Indicate, for both VFR and IFR operations, the aircraft's radar transponder, DME, or RNAV capability by adding the appropriate symbol, preceded by a slant. (See Table 2–57[1]).

Table 2–57[1]
Aircraft Equipment Suffix

	NO DME	DME	TACAN ONLY	RNAV	FMS/EFIS
No transponder.	/X	/D	/M	/W	
Transponder [no altitude capability].	/T	/B	/N	/C	
Transponder [with altitude encoding].	/U	/A	/P	/R	/G – FMS/EFIS/ RNAV

Table 2–57[1] Note.— The /G suffix will only be used by U.S. air carriers operating to and from airports within the United States. Air carriers must obtain approval from the Flight Standards Service prior to filing /G. An aircraft operator must obtain approval from the Flight Standards Service prior to filing "/G" suffix.

b. When forwarding this information, state the aircraft type followed by the word "slant" and the appropriate phonetic letter equivalent of the suffix.

2–57 Examples.—

"D-C Six slant tango."

"F-Four-C slant november."

"F-Eight-E slant papa."

"Seven-Oh-Seven slant romeo."

2–58 CLEARANCE STATUS

Use an appropriate clearance symbol followed by a dash (—) and other pertinent information to clearly show the clearance status of an aircraft. To indicate delay status use:

a. The symbol "H" at the clearance limit when holding instructions have been included in the aircraft's original clearance. Show detailed holding information following the dash when holding differs from the established pattern for the fix; i.e., turns, leg lengths, etc.

b. The symbols "F" or "O" to indicate the clearance limit when a delay is not anticipated.

2–59 CONTROL SYMBOLOGY

Use authorized control and clearance symbols or abbreviations for recording clearances, reports, and instructions. Control status of aircraft must always be current. You may use:

a. Plain language markings when it will aid in understanding information.

b. Locally approved identifiers. Use these only within your facility and not on teletypewriter or interphone circuits.

c. Plain sheets of paper to record information when flight progress strips are not used. (See Table 2–59[1] and Table 2–59[2]).

Table 2–59[1]
Clearance Abbreviations

Abbreviation	*Meaning*
A	Cleared to airport (point of intended landing)
B	Center clearance delivered
C	ATC clears (when clearance relayed through non-ATC facility)

Table 2–59[1]– CONTINUED
Clearance Abbreviations

Abbreviation	*Meaning*
CAF	Cleared as filed
D	Cleared to depart from the fix
F	Cleared to the fix
H	Cleared to hold and instructions issued
L	Cleared to land
N	Clearance not delivered
O	Cleared to the outer marker
PD	Cleared to climb/descend at pilot's discretion
Q	Cleared to fly specified sectors of a NAVAID defined in terms of courses, bearings, radials or quadrants within a designated radius.
T	Cleared through (for landing and takeoff through intermediate point)
V	Cleared over the fix
X	Cleared to cross (airway, route, radial) at (point)
Z	Tower jurisdiction

Table 2–59[2]
Miscellaneous Abbreviations

Abbreviation	*Meaning*
BC	Back course approach

Table 2–59[2]—CONTINUED
Miscellaneous Abbreviations

Abbreviation	*Meaning*
CT	Contact approach
FA	Final approach
FMS	Flight Management System Approach
I	Initial approach
ILS	ILS approach
MA	Missed approach
MLS	MLS approach
NDB	Nondirectional radio beacon approach
OTP	VFR conditions-on-top
PA	Precision approach
PT	Procedure turn
RH	Runway Heading
RP	Report immediately upon passing (fix/altitude)
RX	Report crossing
SA	Surveillance approach
SI	Straight-in approach
TA	TACAN approach
TL	Turn left
TR	Turn right
VA	Visual approach
VR	VOR approach

2–59 Control Information Symbols (See Figure 2–59[1] and Figure 2–59[2]).

Symbols	Meaning
T →( )	Depart (direction, if specified)
↑	Climb and maintain
↓	Descend and maintain
→	Cruise
@	At
X	Cross
→M→	Maintain
⌝	Join or intercept airway/jet route/track or course
▪	While in controlled airspace
△	While in control area
↘△	Enter control area
△↗	Out of control area
NW ⊖ ⊖↗ NE ⊖→ E	Cleared to enter, depart or through surface area. Indicated direction of flight by arrow and appropriate compass letter. Maintain Special VFR conditions (altitude if appropriate) while in surface area
250 K	Aircraft requested to adjust speed to 250 knots.
-20 K	Aircraft requested to reduce speed to 20 knots.
+30 K	Aircraft requested to increase speed to 30 knots.
W	Local Special VFR operations in the vicinity of (name) airport are authorized until(time). Maintain special VFR conditions (altitude if appropriate).
>	Before
<	After or Past
170 (red)	Inappropriate altitude/flight level for direction of flight. (Underline assigned altitude/flight level in red.)
/	Until
( )	Alternate instructions
Restriction	Restriction
T↓	At or Below
↑⊥	At or Above
-(Dash)	From-to (route, time, etc.)
(Alt)B(Alt)	Indicates a block altitude assignment. Altitudes are inclusive, and the first altitude shall be lower than the second. Example: 310B370
v <	Clearance void if aircraft not off ground by (time)

NOTE: The absence of an airway route number between two fixes in the route of flight indicates "direct"; no symbol or abbreviation is required.

Figure 2–59[1]

Symbols	Meaning
℄	Pilot cancelled flight plan
✓	EN ROUTE: Aircraft has reported at assigned altitude, Example: 80 ✓
✓	TERMINAL/FSS: Information forwarded (indicated information forwarded as required)
○ (red)	EN ROUTE: Information or revised information forwarded. (Circle, in red, inappropriate altitude/flight level for direction of flight or other control information when coordinated. Also circle, in red, the time (minutes and altitude when a flight plan or estimate is forwarded. Use this method in both inter-center and intra-center coordination.)
(80)	Other than assigned altitude reported (circle reported altitude)
10 / 6	DME holding (use with mileages) (Upper figure indicates distance from station to DME fix, lower figure indicates length of holding pattern. In this example, the DME fix is 10 miles out with a 6 mile pattern indicated.
(ml.)(dir.)	DME arc of VORTAC, TACAN, or MLS.
(freq.)	Contact (facility) or (freq.), (time, fix, or altitude if appropriate). Insert frequency only when it is other than standard.
R	Radar contact.
R	EN ROUTE: Requested altitude (preceding altitude information)
R	Radar service terminated
R	Radar contact lost
RV	Radar vector
RV	Pilot resumed own navigation
(R)	Radar handoff (circle symbol when handoff completed)
E (red)	EMERGENCY
W (red)	WARNING
P	Point out initiated. Indicate the appropriate facility, sector or position. Example: PZFW.
FUEL	Minimum fuel

NOTE: The absence of an airway route number between two fixes in the route of flight indicates "direct"; no symbol or abbreviation is required.

Figure 2–59[2]

2–59 Reference.—Exceptions, paragraph 4–61.

2–60 thru 2–69 RESERVED

Section 4. RADIO AND INTERPHONE COMMUNICATIONS

2–70 RADIO COMMUNICATIONS

Use radio frequencies for the special purposes for which they are intended. A single frequency may be used for more than one function except as follows:

TERMINAL: When combining positions in the tower, do not use ground control frequency for airborne communications.

2–70 Note.—Due to the limited number of frequencies assigned to towers for the ground control function, it is very likely that airborne use of a ground control frequency could cause interference to other towers or interference to your aircraft from another tower. When combining these functions, it is recommended combining them on local control. The ATIS may be used to specify the desired frequency.

2–71 MONITORING

Monitor interphones and assigned radio frequencies continuously.

2–71 Note.—Although all FAA facilities, including RAPCON's and RATCF's, are required to monitor all assigned frequencies continuously, USAF facilities may not monitor all unpublished discrete frequencies.

2–72 PILOT ACKNOWLEDGMENT/ READBACK

a. When issuing clearances, instructions, or information, ensure acknowledgment by the pilot.

2–72a Note.—Pilots may acknowledge clearances, instructions, or other information by using "Wilco," "Roger," "Affirmative," or other words or remarks.

2–72a Reference.—Airman's Information Manual, Contact Procedures, paragraph 4–32c.

b. If altitude, heading, or other items are read back by the pilot, ensure the readback is correct. If incorrect or incomplete, make corrections as appropriate.

2–73 AUTHORIZED INTERRUPTIONS

As necessary, authorize a pilot to interrupt his communications guard.

2–73 Note.—Some users have adopted procedures to insure uninterrupted receiving capability with ATC when a pilot with only one operative communications radio must interrupt his communications guard because of a safety related problem requiring airborne communications with his company. In this event, pilots will request approval to abandon guard on the assigned ATC frequency for a mutually agreeable time period. Additionally, they will inform controllers of the NAVAID voice facility and the company frequency they will monitor.

2–74 AUTHORIZED TRANSMISSIONS

Transmit only those messages necessary for air traffic control or otherwise contributing to air safety.

2–74 Reference.—FAA Order 7210.3, Authorized Messages Not Directly Associated With AT Services, paragraph 3–21.

2–75 FALSE OR DECEPTIVE COMMUNICATIONS

Take action to detect, prevent, and report:

a. False, deceptive, or phantom controller communications to an aircraft or controller. The following shall be accomplished when false or deceptive communications occur:

1. Correct false information.
2. Broadcast an alert to aircraft operating on all frequencies within the area where deceptive or phantom transmissions have been received.

2–75a2 Example.—

"Attention all aircraft. False air traffic control instructions have been received in the area of Long Beach Airport. Exercise extreme caution on all frequencies and verify instructions."

3. Collect pertinent information regarding the incident.
4. Notify the Area Supervisor of the false, deceptive, or phantom transmission and report all relevant information pertaining to the incident

2–76 AUTHORIZED RELAYS

a. Relay operational information to aircraft or aircraft operators as necessary. Do not agree to handle such messages on a regular basis. Give the source of any such message you relay.

b. Relay official FAA messages as required.

2–76b Note.—The FAA Administrator and Deputy Administrator will sometimes use code phrases to identify themselves in air-to-ground communications as follows:

a. Administrator—"Safeair One."

b. Deputy Administrator—"Safeair Two."

2–76b Example.—

"Miami Center, Jetstar One, this is Safeair One, (message)".

c. Relay operational information to military aircraft flight planned to or operating on IR's.

2–77 RADIO MESSAGE FORMAT

Communication for both initiation and reply via radio with an aircraft by using the following format and procedures:

a. Sector/position initial radio contact:

1. Identification of aircraft.
2. Identification of ATC unit.
3. Message (if any).
4. The word "over" if required.

b. Subsequent radio transmissions from the same sector/position shall use the same format as subparagraph 2–77a, except the identification of the ATC unit may be omitted.

TERMINAL: You may omit aircraft identification after initial contact when conducting the final portion of a radar approach.

2–77a1 Reference.—Aircraft Identification, paragraph 2–88.

2–78 ABBREVIATED TRANSMISSIONS

Transmissions may be abbreviated as follows:

a. Use the identification prefix and the last 3 digits or letters of the aircraft identification after communications have been established. Do not abbreviate similar sounding aircraft identifications or the identification of an air carrier or other civil aircraft having an FAA authorized call sign.

2–78a Reference.—Aircraft Identification, paragraph 2–88.

b. Omit the facility identification after communication has been established.

c. Transmit the message immediately after the callup (without waiting for the aircraft's reply) when the message is short and receipt is generally assured.

d. Omit the word "over" if the message obviously requires a reply.

2–79 INTERPHONE TRANSMISSION PRIORITIES

Give priority to interphone transmissions as follows:

a. First priority—Emergency messages including essential information on aircraft accidents or suspected accidents. After an actual emergency has passed, give a lower priority to messages relating to that accident.

b. Second priority—Clearances and control instructions.

c. Third priority—Movement and control messages using the following order of preference when possible:

1. Progress reports.
2. Departure or arrival reports.
3. Flight plans.

d. Fourth priority—Movement messages on VFR aircraft.

2–80 PRIORITY INTERRUPTION

Use the words "emergency" or "control" for interrupting lower priority messages when you have an emergency or control message to transmit.

2–81 INTERPHONE MESSAGE FORMAT

Use the following format for interphone intra/interfacility communications:

a. Both the caller and receiver identify their facility and/or position in a manner that insures they will not be confused with another position.

2–81a Note.—Other means of identifying a position, such as substituting departure or arrival gate/fix names for position identification, may be used. However, it must be operationally beneficial, and the procedure fully covered in a letter of agreement or a facility directive, as appropriate.

2–81a Example.—
Caller—"Albuquerque Center Sixty Three, Amarillo Departure."

Receiver—"Indianapolis Center Sixty Three, Indy Approach."

b. Between two facilities which utilize numeric position identification, the caller must identify both facility and position.

2–81b Example.—
Caller—"Albuquerque Sixty Three, Fort Worth Eighty Two."

c. The receiver states the position identification followed by an acknowledgment of the call.

2–81c Note.—If operationally beneficial, subparagraphs 2–81a and c may be reversed.

d. The caller states the message.

e. The receiver states the response to the caller's message followed by the receiver's operating initials.

f. The caller states his or her operating initials.

2–81 Example 1.—
Caller—"Denver High, R Twenty-five."

Receiver—"Denver High."

Caller—"Request direct Denver for Eastern Three Twenty-eight."

Receiver—"Eastern Three Twenty-eight direct Denver approved. H.F."

Caller—"G.M."

2–81 Example 2.—
Receiver—"Denver High, go ahead override."

Caller—"R Twenty-five, request direct Denver for Eastern Three Twenty-eight."

Receiver—"Eastern Three Twenty-eight direct Denver approved. H.F."

Caller—"G.M."

2–81 Example 3.—
Caller—("Bolos" is a departure gate in Houston ARTCC's Sabine sector)-"Bolos, Houston local."

Receiver—"Bolos."

Caller—"Request Flight Level three five zero for American twenty-five."

Receiver—"American twenty-five Flight Level three five zero approved, A.C."

Caller—"G.M."

2–81 Example 4.—
Caller–"Sector 12, Ontario Approach, APREQ."

Receiver–"Sector 12."

Caller–"Cactus Five Forty–Two heading one three zero and climbing to one four thousand."

Receiver–"Cactus Five Forty–two heading one three zero and climbing to one four thousand approved. B.N."

Caller–"A.M."

2–81 Example 5.—
Caller–"Zanesville, Columbus, seventy–three line, handoff."

Receiver–"Zanesville."

Caller–"Five miles east of Appleton VOR, United Three sixty–six."

Receiver–"United Three sixty–six, radar contact, A.Z."

Caller–"M.E."

g. Identify the interphone voice line on which the call is being made when two or more such lines are collocated at the receiving operating position.

2–81g Examples—

"Washington Center, Washington Approach on the 57 line"

"Chicago Center, O'Hare Tower handoff on the Departure West line."

2–82 INTERPHONE MESSAGE TERMINATION

Terminate interphone messages with your operating initials.

2–83 WORDS AND PHRASES

Use the words or phrases in radiotelephone and interphone communication as contained in the Pilot/Controller Glossary. The word "heavy" shall be used as part of the identification of heavy jet aircraft as follow:

TERMINAL: In all communications with or about heavy jet aircraft.

EN ROUTE: The use of the word heavy may be omitted except as follows:

a. In communications with a terminal facility about heavy jet operations.

b. In communications with or about heavy jet aircraft with regard to an airport where the en route center is providing approach control service.

c. In communications with or about heavy jet aircraft when the separation from a following aircraft may become less than 5 miles by approved procedure.

d. When issuing traffic advisories.

2–83 Example.—

"United Fifty-eight heavy."

2–83 Note 1. Most airlines will use the word "heavy" following the company prefix and trip number when establishing communications or when changing frequencies within a terminal facility's area.

2–83 Note 2. When in radiotelephone communications with "AIR FORCE ONE" or "AIR FORCE TWO", do not add the heavy designator to the call sign. State only the call sign "AIR FORCE ONE/TWO" regardless of the type aircraft.

2–84 EMPHASIS FOR CLARITY

Emphasize appropriate digits, letters, or similar sounding words to aid in distinguishing between similar sounding aircraft identifications. Additionally:

a. Notify each pilot concerned when communicating with aircraft having similar sounding identifications.

2–84a Examples.—

"United Thirty-one United, Miami Center, Eastern Thirty-one is also on this frequency, acknowledge." "Eastern Thirty-one Eastern, Miami Center, United Thirty-one is also on this frequency, acknowledge."

2–84a Reference.—Aircraft Identification, paragraph 2–88. FAA Order 7210.3, Aircraft Identification Problems, paragraph 2–12.

b. Notify the area supervisor-in-charge of any duplicate flight identification numbers or phonetically similar-sounding call signs when the aircraft are operating simultaneously within the same sector.

2–84b Note.—This is especially important when this occures on a repetitive, rather than an isolated, basis.

2–85 ICAO PHONETICS

Use the ICAO pronunciation of numbers and, as necessary to clarify individual letters. (See the ICAO radiotelephony alphabet and pronunciation in Table 2–85[1]).

Table 2–85[1]
ICAO Phonetics

Character	*Word*	*Pronunciation*
0	Zero	ZE—RO
1	One	WUN
2	Two	TOO
3	Three	TREE
4	Four	FOW—ER
5	Five	FIFE
6	Six	SIX
7	Seven	SEV—EN
8	Eight	AIT
9	Nine	NIN—ER
A	Alfa	ALFAH
B	Bravo	BRAHVOH
C	Charlie	CHARLEE
D	Delta	DELLTAH
E	Echo	ECKOH
F	Foxtrot	FOKSTROT
G	Golf	GOLF
H	Hotel	HOHTELL
I	India	INDEE AH
J	Juliett	JEWLEE ETT
K	Kilo	KEYLOH
L	Lima	LEEMAH
M	Mike	MIKE
N	November	NOVEMBER
O	Oscar	OSSCAH
P	Papa	PAHPAH
Q	Quebec	KEHBECK
R	Romeo	ROWME OH
S	Sierra	SEEAIRAH
T	Tango	TANGGO
U	Uniform	YOUNEE FORM
V	Victor	VIKTAH
W	Whiskey	WISSKEY
X	X-ray	ECKSRAY
Y	Yankee	YANGKEY
Z	Zulu	ZOOLOO

Note.—Syllables to be emphasized in pronunciation are in bold face.

2–86 NUMBERS USAGE

State numbers as follows:

a. Serial numbers—The separate digits.

2–86a Examples.—Table 2–86[1]:

Number	*Statement*
11,495	"One one four niner five."
20,069	"Two zero zero six niner."

b. Altitudes or flight levels:

1. Altitudes—Pronounce each digit in the number of hundreds or thousands followed by the word "hundred" or "thousand" as appropriate.

2–86b1 Example 1.—Table 2–86[2]:

Altitude	*Statement*
10,000	"One zero thousand."
11,000	"One one thousand."
17,900	"One seven thousand niner hundred."

2–86b1 Note.—Altitudes may be restated in group form for added clarity if the controller chooses.

2–86b1 Example 2.—Table 2–86[3]

Altitude	*Statement*
10,000	"Ten thousand."
11,000	"Eleven thousand."
17,900	"Seventeen thousand niner hundred."

2. Flight levels—The words "flight level" followed by the separate digits of the flight level.

2–86b2 Examples.—Table 2–86[4]:

Flight level	*Statement*
180	"Flight level one eight zero"
275	"Flight level two seven five"

3. MDA/DH Altitudes—The separate digits of the MDA/DH altitude

2–86b3 Examples.—Table 2–86[5]:

MDA/DH Altitude	*Statement*
1,320	"Minimum descent altitude, one three two zero"
486	"Decision height, four eight six"

c. Time:

1. General time information—The 4 separate digits of the hour and minutes based on the 24–hour clock in terms of Coordinated Universal Time (UTC).

2–86c1 Examples.—Table 2–86[6]:

Time (12 hr.)	*Time (24 hr.)*	*Statement*
1:15 a.m.	0115	"Zero one one five."
1:15 p.m.	1315	"One three one five."

2. Upon request—The 4 separate digits of the hours and minutes in terms of UTC by stating "Zulu" followed by the local standard time equivalent.

2–86c2 Example.—Table 2–86[7]:

Time	*Statement*
1430 PST (2230 UTC)	"Two two three zero Zulu, one four three zero Pacific."

3. Time check—The word "time" followed by the 4 separate digits of the hour and minutes, and nearest quarter minute.

2–86c3 Example.—Table 2–86[8]:

Time	*Statement*
1415 3/4	"Time, one four one five and three-quarters."

4. Abbreviated time—The separate digits of the minutes only.

2–86c4 Examples.—Table 2–86[9]:

Time	*Statement*
1415	"One five."
1420	"Two zero."

d. Field elevation—The words "field elevation" followed by the separate digits of the elevation.

2–86d Examples.—Table 2–86[10]:

Elevation	*Statement*
17 feet	"Field elevation, one seven."
817 feet	"Field elevation, eight one seven."
2,817 feet	"Field elevation, two eight one seven."

e. The number "0" as "zero" except where it is used in approved "group form" for authorized aircraft call signs, and in stating altitudes.

2–86e Example.—Table 2–86[11]:

	Statement
	"Field elevation one six zero."
	"Heading three zero zero."
	"Western five thirty."
	"Eastern Metro four hundred."
	"One zero thousand five hundred."

2–86e Reference.—subparagraph 2–86b and paragraph 2–87a1.

f. Altimeter setting—The word "altimeter" followed by the separate digits of the altimeter setting.

2–86f Example.—Table 2–86[12]:

Setting	*Statement*
30.01	"Altimeter, three zero zero one."

g. Surface wind—The word "wind" followed by the separate digits of the indicated wind direction to the nearest 10–degree multiple, the word "at," and the separate digits of the indicated velocity in knots.

2–86g Examples.—

"Wind zero three zero at two five."

"Wind two seven zero at one five gusts three five."

h. Heading—The word "heading" followed by the three separate digits of the number of degrees, omitting the word "degrees." Use heading 360 degrees to indicate a north heading.

2–86h Examples.—Table 2–86[13]:

Heading	*Statement*
5 degrees	"Heading zero zero five."
30 degrees	"Heading zero three zero."
360 degrees	"Heading three six zero."

i. Radar beacon codes—The separate digits of the 4–digit code.

2–86i Examples.—Table 2–86[14]:

Code	*Statement*
1000	"One zero zero zero."
2100	"Two one zero zero."

j. Runways—The word "runway," followed by the separate digits of the runway designation. For a parallel runway, state the word "left," "right," or "center" if the letter "L," "R," or "C" is included in the designation.

2–86j Examples.—Table 2–86[15]:

Designation	*Statement*
3	"Runway Three."
8L	"Runway Eight Left."
27R	"Runway Two Seven Right."

k. Frequencies—

1. The separate digits of the frequency, inserting the word "point" where the decimal point occurs. Omit digits after the second digit to the right of the decimal point. When the frequency is in the L/MF band, include the word "kiloHertz."

2–86k1 Examples.—Table 2–86[16]:

Frequency	*Statement*
126.55 mHz	"One two six point five five."
369.0 mHz	"Three six niner point zero."
121.5 mHz	"One two one point five."
135.275 mHz	"One three five point two seven."
302 kHz	"Three zero two kiloHertz."

2. *USAF/USN:* Local channelization numbers may be used in lieu of frequencies for locally based aircraft when local procedures are established to ensure that local aircraft and ATC facilities use the same channelization.

2–86k2 Example.—Table 2–86[17]:

Frequency	*Statement*
275.8 mHz	"Local channel one six."

3. Issue MLS/TACAN frequencies by stating the assigned two-or three-digit channel number.

2–86k3 Examples.—

"M-L-S channel five three zero."

"TACAN channel nine seven."

l. Speeds—

1. The separate digits of the speed followed by "knots" except as required by Methods (Speed Adjustment) paragraph 5–101.

2–86l1 Examples.—Table 2–86[18]:

Speed	*Statement*
250	"Two five zero knots."
190	"One niner zero knots."

2. The separate digits of the mach number preceded by "mach."

2–86l2 Examples.—Table 2–86[19]:

Mach Number	*Statement*
1.5	"Mach one point five."
0.64	"Mach point six four."
0.7	"Mach point seven."

m. Miles—The separate digits of the mileage followed by the word *mile.*

2–86m Examples.—

"Three zero mile arc east of Nottingham."

"Traffic, one o'clock, two five miles, northbound, D-C Eight, flight level two seven zero."

2–87 FACILITY IDENTIFICATION

Identify facilities as follows:

a. Airport traffic control towers—State the name of the facility followed by the word "tower." Where military and civil airports are located in the same general area and have similar names, state the name of the military service followed by the name of the military facility and the word "tower."

2–87a Examples.—

"Columbus Tower."

"Barksdale Tower."

"Navy Jacksonville Tower."

b. Air route traffic control centers—State the name of the facility followed by the word "center."

c. Approach control facilities, including RAPCON's, RATCF's, and ARAC's—State the name of the facility followed by the word "approach." Where military and civil facilities are located in the same general area and have similar names, state the name of the military service followed by the name of the military facility and the word "approach."

2–87c Examples.—
"Denver Approach."

"Griffiss Approach."

"Navy Jacksonville Approach."

d. Functions within a terminal facility—State the name of the facility followed by the name of the function.

2–87d Examples.—
"Boston Departure."

"La Guardia Clearance Delivery."

"O'Hare Ground."

e. FAA flight service stations—State the name of the station followed by the word "radio."

2–87e Example—
"Altoona Radio."

f. Radar facilities having ASR or PAR but not providing approach control service—State the name of the facility, followed by the letters "G-C-A."

2–87f Examples.—
"Corpus Christi G-C-A."

"Davison G-C-A."

2–88 AIRCRAFT IDENTIFICATION

Identify aircraft as follows: use the full identification in reply to aircraft with similar sounding identifications. For other aircraft, the same identification may be used in reply that the pilot used in his initial callup except use the correct identification after communications have been established.

2–88 Reference.—Radio Message Format, paragraph 2–77. Abbreviated Transmissions, paragraph 2–78. Emphasis for Clarity, paragraph 2–84. Numbers Usage, paragraph 2–86.

a. Civil–State the aircraft type, the model, the manufacturer's name, or the prefix "November" followed by the ICAO phonetic pronunciation of the numbers/letters of the aircraft registration.

2–88a Examples.—
"Jet Commander One Four Two Four."

"Douglas Three Zero Five Romeo."

"Bonanza One Two Three Four Tango."

"November One Two Three Four Golf."

"Bell Two Seven Three Three."

2–88a Note.—The prefix "November" denotes a U.S. aircraft registry.

1. Air carrier and other civil aircraft having FAA authorized call signs—State the call sign followed by the flight number in group form.

2–88a1 Example 1.—
"American Fifty-two."

"Delta One Hundred."

"Eastern Metro One Ten."

"General Motors Thirty Fifteen."

"United One Zero One."

"Delta Zero One Zero."

"Eastern Ten Zero Four."

2–88a1 Note.—"Group form" is the pronunciation of a series of numbers as the whole number, or pairs of numbers they represent rather than pronouncing each separate digit. The use of group form may, however, be negated by four–digit identifiers or the placement of zeros in the identifier. Air carrier and other civil aircraft having FAA authorized call signs may be pronounced using single digits if necessary for clarity.

2–88a1 Example 2.—
"United Five One Seven."

"United Five Seven Zero."

2. If aircraft identification becomes a problem when the procedures specified in 1 are used, the call sign shall be restated after the flight number of the aircraft involved.

2–88a2 Examples—
"American Five Twenty-one American."

"Commuter Six Eleven Commuter."

"General Motors Thirty-seven General Motors."

2–88a2 Reference.—FAA Order 7210.3, Aircraft Identification Problems, paragraph 2–12.

3. Air taxi and commercial operators not having FAA authorized call signs—State the prefix "TANGO" on initial contact, if used by the pilot, followed by the registration number. The prefix may be dropped in subsequent communications.

2–88a3 Examples.—
"Tango Mooney Five Five Five Two Quebec."

"Tango November One Two Three Four."

b. Air carrier/taxi ambulance—State the prefix, "Lifeguard," if used by the pilot, followed by the call sign and flight number in group form.

2–88b Example.—
"LIFEGUARD Delta Fifty-one."

c. Civilian airborne ambulance—State the word "LIFEGUARD" followed by the numbers/letters of the registration number.

2–88c Example.—
"LIFEGUARD Two Six Four Six."

d. U.S. military—State one of the following:

1. The service name, followed by the word "copter," when appropriate, and the last 5 digits of the serial number.

2–88d1 Examples.—
"Navy Five Six Seven One Three."

"Coast Guard Six One Three Two Seven."

"Air Guard One Three Five Eight Six"

"Army Copter Three Two One Seven Six."

2–88d1 Note.—If aircraft identification becomes a problem, procedures in subparagraph 2–88a2 above will apply.

2. Special military operations—State one of the following followed by the last 5 digits of the serial number:

(a) Air evacuation flights—"AIR EVAC," "MARINE AIR EVAC," or "NAVY AIR EVAC."

2–88d2(a) Example.—
"AIR EVAC One Seven Six Five Two."

(b) Rescue flights—(Service name) "RESCUE."

2–88d2(b) Example.—
"Air Force RESCUE Six One Five Seven Niner."

(c) Air Mobility Command (AMC)—"REACH"

2–88d2(c) Example.—
"REACH Seven Eight Five Six Two."

(d) Special Air Mission—"SAM."

2–88d2(d) Example.—
"U.S. SAM Niner One Five Six Two."

(e) USAF Contract Aircraft—"LOGAIR"

2–88d2(e) Example.—
"LOGAIR Seven Five Eight Two Six."

3. Military tactical and training:

(a) U.S. Air Force, Air National Guard, Military District of Washington priority aircraft, and USAF civil disturbance aircraft—Pronounceable words of 3, 4, 5 or 6 letters followed by a 4, 3, 2, or 1–digit number.

2–88d3(a) Examples.—
"Paul Two Zero."

"Pat One Five Seven."

"Gaydog Four."

2–88d3(a) Note.—When the "Z" suffix described in paragraph 2–56 is added to identify aircraft piloted by USAF undergraduate pilots, the call sign will be limited to a combination of six characters.

(b) Navy or Marine fleet and training command aircraft—The service name and 2 letters, or a digit and a letter (use letter phonetic equivalents), followed by 2 or 3 digits.

2–88d3(b) Examples.—
"Navy Golf Alfa Two One."

"Marine Four Charlie Two Three Six."

(c) NORAD interceptors—An assigned double letter 2–digit flight number.

2–88d3(c) Example.—
"Alfa Kilo One Five."

e. Foreign registry—State one of the following:

1. Civil—State the aircraft type or the manufacturer's name followed by the letters/numbers of the aircraft registration, or state the letters or digits of the aircraft registration or call sign.

2–88e1 Examples.—
"Stationair F-L-R-B."

"C-F-L-R-B."

2–88e1 Note.—Letters may be spoken individually or phonetically.

2. Air carrier—The abbreviated name of the operating company, followed by:

(a) The letters or digits of the registration or call sign.

2–88e2(a) Example.—
"Air France F-L-R-L-G."

(b) The flight number in group form, or you may use separate digits if that is the format used by the pilot.

2–88e2(b) Examples.—
"Scandinavian Sixty-eight."

"Scandinavian Six Eight."

3. Military—Except Canada, the name of the country and the military service followed by the separate digits or letters of the registration or call sign. Canadian Armed Force aircraft shall be identified by the word "Canforce" followed by the separate digits of the serial number, except that the Transport Command of the Canadian Armed Force shall be identified by the words "Canadian Military" and the Canadian Coast Guard shall be identified as "Canadian Coast Guard" followed by the separate digits of the serial number.

2–88e3 Examples.—
"CANFORCE Five Six Two Seven."

"Brazilian Air Force Five Three Two Seven Six."

f. Presidential aircraft and Presidential family aircraft:

1. When the President is aboard a military aircraft, state the name of the military service, followed by the word "One."

2–88f1 Examples.—
"Air Force One." 'Army One." 'Marine One."

(2) When the President is aboard a civil aircraft, state the words "Executive One."

(3) When a member of the President's family is aboard any aircraft, if the U.S. Secret Service or the White House Staff determines it is necessary, state the words "Executive One Foxtrot."

2–88f Reference.—Operational Priority, paragraph 2–4d.

g. Vice Presidential aircraft:

1. When the Vice President is aboard a military aircraft, state the name of the military service, followed by the word "Two."

2–88g1 Examples.—
"Air Force Two." "Army Two." "Marine Two."

2. When the Vice President is aboard a civil aircraft, state the words "Executive Two."

3. When a member of the Vice President's family is aboard any aircraft, if the U.S. Secret Service or the White House Staff determines it is necessary, state the words "Executive Two Foxtrot."

2–88g Reference.—Operational Priority, paragraph 2–4d.

h. DOT and FAA flights: The following alphanumeric identifiers and radio/interphone call-signs are established for use in air/ground communications when the Secretary of Transportation, Deputy Secretary of Transportation, FAA Administrator or FAA Deputy Administrator have a requirement to identify themselves. (See Table 2–88[1]).

Table 2–88[1]

	Identifier	Call-sign
Secretary of Transportation	DOT–1	Transport–1
Deputy Secretary of Transportation	DOT–2	Transport–2
Administrator, Federal Aviation Administration	FAA–1	Safeair–1
Deputy Administrator, Federal Aviation Administration	FAA–2	Safeair–2

i. Other Special Flights:

1. Department of Energy flights - State the letters "R-A-C" (use phonetic alphabet equivalents) followed by the last 4 separate digits of the aircraft registration number.

2–88i1 Example.—
"Romeo Alfa Charlie One Six Five Three."

2. Semiautomatic Flight Inspections—State the code name "SAFI" followed by the separate digits of the grid number as filed.

2–88i2 Example.—
"Denver Center, SAFI Five Two Seven."

3. Flight Inspection of Navigational Aids - State the call sign "FLIGHT CHECK" followed by the digits of the registration number.

2–88i3 Example.—
"Flight Check Three Niner Six Five Four."

4. USAF aircraft engaged in aerial sampling missions—State the call sign "SAMP" followed by the last three digits of the serial number.

2–88i4 Example.—
"SAMP Three One Six."

2–88i(4) Reference.— SAMP, paragraph 9–33.

j. Use a pilot's name in identification of an aircraft only in special or emergency situations.

2–89 DESCRIPTION OF AIRCRAFT TYPES

Except as provided in subparagraph 2–89d, describe aircraft as follows when issuing traffic information.

a. Military:

1. Military designator, with numbers spoken in group form, or

2–89a1 Examples.—
"F-Fifteen." "B-One."

"Air Force bomber." "Navy fighter."

"Fighter." "Bomber."

2. Service and type, or

3. Type only if no confusion or misidentification is likely.

b. Air Carrier:

1. Manufacturer's name or model.

2. Add the company name or other identifying features when confusion or misidentification is likely.

2–89b Examples.—
"L-Ten-Eleven." "American MD-Eighty." "United Seven Thirty-seven."

2–89b Note.—*TERMINAL:* Pilots of "interchange" aircraft are expected to inform the tower on the first radio contact the name of the operating company and trip number followed by the company name, as displayed on the aircraft, and the aircraft type.

c. General Aviation and Air Taxi:

1. Manufacturer's model, name, or designator.

2. Add color when considered advantageous.

2–89c Examples.—
"Tri-Pacer." "PA Twenty-two."

"Cessna Four-Oh-One." "Blue and White King Air"

"Airliner."

"Sikorsky S–Seventy–Six."

d. When issuing traffic information to aircraft following a heavy jet, specify the word "heavy" before the manufacturer's name and model.

2–89d Examples.—
"Heavy L-Ten-Eleven."

"Heavy Boeing Seven Forty-seven."

2–89 Reference.—Traffic Advisories, paragraph 2–21a5.

2–90 AIRSPACE CLASSES

Class A, Class B, Class C, Class D, Class E and Class G airspace are pronounced in individual letter form. Only use ICAO phonetic pronunciation of letters to clarify the class of airspace.

2–90 Examples.—
"Cessna 123 Mike Romeo cleared to enter Class B airspace"

"Sikorski 123 Tango Sierra cleared to enter New York Class Bravo airspace"

2–91 thru 2–99 RESERVED

Section 5. ROUTE AND NAVAID DESCRIPTION

2–100 AIRWAYS AND ROUTES.

Describe airways, routes, or jet routes as follows:

a. VOR/VORTAC/TACAN airways or jet routes—State the word "Victor" or the letter "J" followed by the number of the airway or route in group form. For RNAV routes add the word "Romeo."

2–100a Examples.—

"Victor Twelve."

"J Five Thirty-three."

"Victor Seven Ten Romeo."

"J Eight Thirty Romeo."

"Offset one zero miles right of J Eight Thirty Romeo."

b. VOR/VORTAC/TACAN alternate airways—State the word "Victor" followed by the number of the airway in group form and the alternate direction.

2–100b Example.—

"Victor Twelve South."

c. L/MF airways—State the color of the airway followed by the number in group form.

2–100c Example.—

"Blue Eighty-one."

d. Named Routes - State the words "North American Route" or "Bahama Route" followed by the number of the route in group form.

2–100d Examples.—

"North American Route Fifty."

"Bahama Route Fifty-five Victor."

e. Air Traffic Service (ATS) routes - State the letter/s of the route phonetically, followed by the number of the route in group form.

2–100e Example.—

"Romeo Twenty," "Alfa Fifty," "Golf Sixty-one," "Bravo Twenty-six," "Alfa Seven," "Romeo Seventy-seven," "Alfa Seven Hundred."

f. MTR's—State the letters followed by the number of the route in group form.

2–100f Example.—

"I-R Five Thirty-one."

2–101 NAVAID TERMS

Describe radials, arcs, courses, bearings, and quadrants of NAVAID's as follows:

a. VOR/VORTAC/TACAN/MLS/GPS Waypoint—State the name of the NAVAID or GPS Waypoint followed by the separate digits of the radial/azimuth/bearing (omitting the word "degrees") and the word "radial/azimuth/bearing."

2–101a Examples.—

"Appleton zero five zero radial."

"Lindburg Runway Two Seven M-L-S, two six zero azimuth."

b. Arcs about VOR-DME/VORTAC/TACAN/MLS NAVAID's—State the distance in miles from the NAVAID followed by the words "mile arc," the direction from the NAVAID in terms of the eight principal points of the compass, the word "of," and the name of the NAVAID.

2–101b Example.—

"Two zero mile arc southwest of O'Hare Runway Two Seven Left M-L-S."

c. Quadrant within a radius of NAVAID—State direction from NAVAID in terms of the quadrant; e.g., NE, SE, SW, NW, followed by the distance in miles from the NAVAID.

2–101c Example.—

"Cleared to fly northeast quadrant of Phillipsburg VOR-TAC within four zero mile radius."

2–101c Reference.—Route Use, paragraph 4–50h. Pilot/Controller Glossary *term*—Quadrant.

d. Nondirectional beacons—State the course to or the bearing from the radio beacon, omitting the word "degree," followed by the words "course to" or "bearing from," the name of the radio beacon, and the words "radio beacon."

2–101d Example.—

"Three four zero bearing from Randolph Radio Beacon."

e. Microwave Landing System—States the azimuth to or azimuth from the Microwave Landing System, omitting the word "degree" followed by the words "azimuth to" or "azimuth from," the name of the Microwave Landing System, and the word MLS.

2–101e Example.—

"Two six zero azimuth to Linburgh Runway two seven MLS."

2–102 NAVAID FIXES

Describe fixes determined by reference to a radial/localizer/azimuth and distance from a VOR-DME/VORTAC/TACAN/ILS-DME or MLS as follows:

a. When a fix is not named, state the name of the NAVAID followed by a specified radial/localizer/azimuth, and state the distance in miles followed by the phrase "mile fix".

2–102a Examples.—

"Appleton zero five zero radial three seven mile fix."

"Reno localizer back course 4 mile fix."

"Hobby Runway One Two M-L-S zero niner zero azimuth one two mile fix."

b. When a fix is charted on a SID, STAR, enroute chart, or approach plate, state the name of the fix.

c. Use specific terms to describe a fix. Do not use expressions such as "passing Victor Twelve" or "passing J Eleven."

2–102c Reference.—Fix Use, paragraph 4–5.

2–103 thru 2–109 RESERVED

Section 6. WEATHER INFORMATION

2–110 FAMILIARIZATION

Become familiar with pertinent weather information when coming on duty, and stay aware of current weather information needed to perform air traffic control duties.

2–111 HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE (HIWAS)

Controllers shall advise pilots of hazardous weather that may impact operations within 150 NM of their sector or area of jurisdiction. Hazardous weather information contained in HIWAS broadcasts include: Airmens Meteorological Information (AIRMET), Significant Meteorological Information (SIGMET), Convective SIGMET (WST), Urgent Pilot Weather Reports (UUA), and Center Weather Advisories (CWA). Facilities shall review alert messages to determine the geographical area and operational impact for hazardous weather information broadcasts. The broadcast is not required if aircraft on your frequency/frequencies will not be affected.

a. Controllers within commissioned HIWAS areas shall:

1. Broadcast a HIWAS alert on all frequencies, except emergency, upon receipt of hazardous weather information. Controllers are required to disseminate data based on the operational impact on the sector or area of control jurisdiction.

Phraseology:

ATTENTION ALL AIRCRAFT. HAZARDOUS WEATHER INFORMATION (SIGMET, Convective SIGMET, AIRMET, Urgent Pilot Weather Report (UUA), or Center Weather Advisory (CWA), Number or Numbers) FOR (Geographical Area) AVAILABLE ON INFLIGHT ADVISORY FREQUENCIES.

b. Controllers outside of commissioned HIWAS areas shall:

1. Advise pilots of the availability of hazardous weather advisories. Pilots requesting additional information should be directed to contact the nearest Flight Watch or Flight Service.

2. Apply the same procedure when HIWAS outlets, or outlets with radio coverage extending into your sector or airspace under your jurisdiction, are out of service.

Phraseology:

ATTENTION ALL AIRCRAFT. HAZARDOUS WEATHER INFORMATION FOR (geographical area) AVAILABLE FROM FLIGHT WATCH OR FLIGHT SERVICE.

c. Terminal facilities have the option to limit hazardous weather information broadcasts as follows: Tower cab and approach control facilities may opt to broadcast hazardous weather information alerts only when any part of the area described is within 50 NM of the airspace under their jurisdiction.

2–111 Reference.—Airman's Information Manual, paragraph 7–5 through paragraph 7–9.

2–112 PIREP INFORMATION

Significant PIREP information includes reports of strong frontal activity, squall lines, thunderstorms, light to severe icing, windshear and turbulence (including clear air turbulence) of moderate or greater intensity, or other conditions pertinent to flight safety.

2–112 References.—Low Level Windshear Advisories, paragraph 3–8. FAA Order 7210.3, Handling of SIGMET's, CWA's, and PIREP's, paragraph 8–30; and FAA Order 7210.3, SIGMET and PIREP Handling, paragraph 12–30.

a. Solicit PIREP's when requested or when one of the following conditions exist or are forecast for your area of jurisdiction:

1. Ceilings at or below 5,000 feet. These PIREP's shall include cloud base/top reports when feasible. *TERMINAL:* Ensure that at least one descent/climb-out PIREP, including cloud base/s, top/s, and other related phenomena, is obtained each hour when there is a ceiling at or below 5,000 feet.

2. Visibility (surface or aloft) at or less than 5 miles.

3. Thunderstorms and related phenomena.

4. Turbulence of moderate degree or greater.

5. Icing of light degree or greater.

6. Windshear.

7. *TERMINAL:* Braking Action Advisories are in effect.

2–112a7 References.—Braking Action Advisories, paragraph 3–34. Pilot/Controller Glossary—Braking Action Advisories.

b. Record with the PIREP's:

1. Time.

2. Aircraft position.

3. Type aircraft.

4. Altitude.

c. Obtain PIREP's directly from the pilot, or if the PIREP has been requested by another facility, you may instruct the pilot to deliver it directly to that facility.

Phraseology:

REQUEST FLIGHT CONDITIONS.

or if appropriate,

REQUEST (specific conditions — ie., ride, ceiling, visibility, etc.) CONDITIONS.

if necessary,

OVER (fix),

or

ALONG PRESENT ROUTE,

or

BETWEEN (fix) and (fix).

d. Handle PIREP's as follows:

1. Relay pertinent PIREP information to concerned aircraft in a timely manner.

2. *EN ROUTE:* Relay all operationally significant PIREP's to the facility weather coordinator.

3. *TERMINAL:* Relay all operationally significant PIREP's to:

(a) The appropriate intrafacility positions.

(b) The FSS serving the area in which the report was obtained.

2–112d3(b) Note.—The FSS is responsible for Service A dissemination.

(c) Other concerned terminal or en route ATC facilities, including non-FAA facilities.

(d) Use the words *gain* and/or *loss* when describing to pilots the effects of windshear on airspeed.

2–112d3(d) Examples.—

"Delta Seven Twenty-one, a Boeing Seven Twenty-seven, previously reported windshear, loss of two five knots at four hundred feet."

"U.S. Air Seventy-six, a D-C Niner, previously reported windshear, gain of twenty-five knots between niner hundred and six hundred feet, followed by a loss of five zero knots between five hundred feet and the surface."

2–112d3(d) Reference.—Airman's Information Manual, Windshear PIREPS, paragraph 7–22a.

2–113 WEATHER AND CHAFF SERVICES

a. Issue pertinent information on observed/reported weather or chaff areas. Provide radar navigational guidance and/or approve deviations around weather or chaff areas when requested by the pilot. Do not use the word "turbulence" in describing radar-derived weather.

1. Issue weather and chaff information by defining the area of coverage in terms of azimuth (by referring to the 12–hour clock) and distance from the aircraft or by indicating the general width of the area and the area of coverage in terms of fixes or distance and direction from fixes.

2. When a deviation cannot be approved as requested and the situation permits, suggest an alternative course of action.

b. In areas of significant weather, plan ahead and be prepared to suggest, upon pilot request, the use of alternative routes/altitudes.

2–113b Note.—Weather significant to the safety of aircraft includes such conditions as tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, windshear, moderate to extreme turbulence (including CAT), and light to severe icing.

c. Inform any tower for which you provide approach control services if you observe any weather echoes on radar which might affect their operations.

Phraseology:

WEATHER/CHAFF AREA BETWEEN (number) O'CLOCK AND (number) O'CLOCK (number) MILES,

or

(number) MILE BAND OF WEATHER/CHAFF FROM (fix or number of miles and direction from fix) TO (fix or number of miles and direction from fix),

or

LEVEL (number) WEATHER ECHO BETWEEN (number) O'CLOCK AND (number) O'CLOCK, (number) MILES. MOVING (direction) AT (number) KNOTS, TOPS (altitude).

or

DEVIATION APPROVED, (restrictions if necessary), ADVISE WHEN ABLE TO:

RETURN TO COURSE,

or

RESUME OWN NAVIGATION

or

FLY HEADING (heading)

or

PROCEED DIRECT TO (name of NAVAID). UNABLE DEVIATION (state possible alternate courses of action).

2–113c Example 1.—

"Level five weather echo between eleven o'clock and one o'clock, one zero miles. Moving east at two zero knots, tops flight level three niner zero."

2–113c Example 2.—

"Level four weather echo between ten o'clock and two o'clock, one five miles. Weather area is two five miles in diameter."

2–113c Note.—Phraseology using level number is only applicable when the radar weather echo intensity information is determined by NWS radar equipment or ASR–9 radar equipment.

2–113c Reference.—Pilot/Controller Glossary term—Radar Weather Echo Intensity Levels.

d. The area supervisor/area manager/controller-in-charge shall verify the ASR–9 weather channel information by the best means available (e.g., pilot reports, local tower personnel, etc.) if the weather data display by the ASR–9 is reported as questionable or erroneous. Errors in weather radar presentation shall be reported to the AF technician and the AT supervisor shall determine if the weather channel is to be disabled and a NOTAM distributed.

Section 7. ALTIMETER SETTINGS

2–120 CURRENT SETTINGS

a. Current altimeter settings shall be obtained from direct-reading instruments or directly from weather reporting stations.

2–120a Reference.—FAA Order 7210.3, Chapter 2, Section 8, Wind/Altimeter Information.

b. If a pilot requests the altimeter setting in millibars, ask the nearest weather reporting station for the equivalent millibar setting.

c. *USAF/USA:* Use the term "Estimated Altimeter" for altimeter settings reported or received as estimated.

2–120 Reference.—Departure Information, paragraph 3–100. Landing Information, paragraph 3–120. Approach Information by Approach Control Facilities, paragraph 4–92.

2–121 ALTIMETER SETTING ISSUANCE BELOW LOWEST USABLE FL

a. *TERMINAL:* Identify the source of an altimeter setting when issued for a location other than the aircraft's departure or destination airport.

b. *EN ROUTE:* Identify the source of all altimeter settings when issued.

Phraseology:

THE (facility name) (time of report if more than one hour old) ALTIMETER (setting).

c. Issue the altimeter setting:

1. To en route aircraft at least one time while operating in your area of jurisdiction. Issue the setting for the nearest reporting station along the aircraft's route of flight:

2–121c1 Note.—Part 91.121(1) requires that the pilot set his altimeter to the setting of a station along his route of flight within 100 miles of the aircraft if one is available. However, issuance of the setting of an adjacent station during periods that a steep gradient exists will serve to inform the pilot of the difference between the setting he is using and the pressure in the local area and better enable him to choose a more advantageous setting within the limitations of Part 91.121.

2. *TERMINAL:* To all departures. Unless specifically requested by the pilot, the altimeter setting need not be issued to local aircraft operators who have requested this omission in writing or to scheduled air carriers.

2–121c2 Reference.—Departure Information, paragraph 3–100.

3. *TERMINAL:* To arriving aircraft on initial contact or as soon as possible thereafter. The tower may omit the altimeter if the aircraft is sequenced or vectored to the airport by the approach control having jurisdiction at that facility.

2–121c3 Reference.—Approach Information by Approach Control Facilities, paragraph 4–92a; Approach Information, paragraph 5–131a.

4. *EN ROUTE:* For the destination airport to arriving aircraft approximately 50 miles from the destination if an approach control facility does not serve the airport.

d. If the altimeter setting must be obtained by the pilot of an arriving aircraft from another source, instruct the pilot to obtain the altimeter setting from that source.

2–121d Note 1.—The destination altimeter setting, whether from a local or remote source, is the setting upon which the instrument approach is predicated.

2–121d Note 2.—Approach charts for many locations specify the source of altimeter settings as non-FAA facilities, such as UNICOM's.

e. When issuing clearance to descend below the lowest usable flight level, advise the pilot of the altimeter setting of the weather reporting station nearest the point the aircraft will descend below that flight level.

f. Department of Defense (DOD) aircraft which will operate on "single altimeter settings" (FAR Exemption 2861A) shall be issued altimeter settings in accord with standard procedures while the aircraft are en route to and from their restricted areas, MOA's, and ATC Assigned Airspace areas.

2–121f Reference.—FAA Order 7210.3, Single Altimeter Setting FAR Exemption 2861A Operations paragraph 6–71.

g. When the barometric pressure is greater than 31.00 inches Hg., issue the altimeter setting and:

1. En Route/Arrivals-Advise pilots to remain set on 31.00 inches until reaching final approach segment.

2. Departures-Advise pilots to set 31.00 inches prior to reaching any mandatory/crossing altitude or 1,500 feet AGL, whichever is lower.

Phraseology:

ALTIMETER, THREE ONE TWO FIVE, SET THREE ONE ZERO ZERO UNTIL REACHING THE FINAL APPROACH FIX.

or

ALTIMETER, THREE ONE ONE ZERO, SET THREE ONE ZERO ZERO PRIOR TO REACHING ONE THOUSAND THREE HUNDRED.

2–121g Note 1.—Aircraft with Mode C altitude reporting will be displayed on the controller's radar scope with a uniform altitude offset above the assigned altitude. With an actual altimeter of 31.28 inches, the Mode C equipped aircraft will show 3,300 feet when assigned 3,000 feet. This will occur unless local directives authorize entering the altimeter setting 31.00 into the computer system regardless of the actual barometric pressure.

2–121g Note 2.—Flight Standards will implement high barometric pressure procedures by NOTAM defining the geographic area affected.

2–121g Note 3.—Airports unable to accurately measure barometric pressures above 31.00 inches Hg. will report the barometric pressure as "missing" or "in excess of 31.00 inches of

Hg." Flight operations to or from those airports are restricted to VFR weather conditions.

2–121g2 Reference.—Airman's Information Manual, Procedures, paragraph 7–41.

2–121 Reference.— Landing Information, paragraph 3–120.

2–122 thru 2–129 RESERVED

Section 8. RUNWAY VISIBILITY REPORTING—TERMINAL

2–130 FURNISH RVR/RVV VALUES

Where RVR or RVV equipment is operational, irrespective of subsequent operation or non-operation of navigational or visual aids for the application of RVR/RVV as a takeoff or landing minima, furnish the values for the runway in use in accordance with paragraph 2–132.

2–130 Note.—Readout capability of different type/model RVR equipment varies. For example, older equipment minimum readout value is 600 feet. Newer equipment may have minimum readout capability as low as 100 feet. Readout value increments also may differ. Older equipment have minimum readout increments of 200 feet. New equipment increments below 800 feet are 100 feet.

2–130 Reference.—FAA Order 6560.10, Runway Visual Range (RVR). FAA Order 6750.24, ILS Electronic Requirements.

2–131 ARRIVAL/DEPARTURE RUNWAY VISIBILITY

a. Issue current touchdown RVR/RVV for the runway/s in use:

1. When prevailing visibility is 1 mile or less regardless of the value indicated.

2. When RVR/RVV indicates a reportable value regardless of the prevailing visibility.

2–131a2 Note.—Reportable values are: RVR 6,000 feet or less; RVV 1 1/2 miles or less.

3. When it is determined from a reliable source that the indicated RVR value differs by more than 400 feet from the actual conditions within the area of the transmissometer, the RVR data is not acceptable and shall not be reported.

2–131a3 Note.—A reliable source is considered to be a certified weather observer, air traffic controller, flight service specialist, or pilot.

4. When the observer has reliable reports, or has otherwise determined that the instrument values are not representative of the associated runway, the data shall not be used.

b. Issue both mid–point and roll–out RVR when the value of either is less than 2,000 feet or either is less than the touchdown value.

c. Local control shall issue the current RVR/RVV to each aircraft prior to landing or departure in accordance with subparagraphs 2–131 a and b.

2–132 TERMINOLOGY

a. Provide RVR/RVV information by stating the runway, the abbreviation RVR/RVV, and the indicated value. When issued along with other weather elements, transmit these values in the normal sequence used for weather reporting.

2–132a Examples.—

"Runway One Four R-V-R two thousand four hundred."

"Runway Three Two R-V-V three quarters."

b. When two or more RVR systems serve the runway in use, report the indicated values for the different systems in terms of touchdown, mid, and rollout as appropriate.

2–132b Examples.—

"Runway Two Two Left R-V-R two thousand, rollout one thousand eight hundred."

"Runway Two Seven Right R-V-R one thousand, mid eight hundred, rollout six hundred."

c. When there is a requirement to issue an RVR or RVV value and a visibility condition greater or less than the reportable values of the equipment is indicated, state the condition as "MORE THAN" or "LESS THAN" the appropriate minimum or maximum readable value.

2–132c Examples.—

"Runway Three Six R-V-R more than six thousand."

"Runway Niner R-V-R one thousand, rollout less than six hundred."

d. When a readout indicates a rapidly varying visibility condition (1,000 feet or more for RVR; one or more reportable values for RVV), report the current value followed by the range of visibility variance.

2–132d Examples.—

"Runway Two Four R-V-R two thousand, variable one thousand six hundred to three thousand."

"Runway Three One R-V-V three-quarters, variable one-quarter to one."

2–132 Reference.—Furnish RVR/RVV Values, paragraph 2–130.

2–133 thru 2–139 RESERVED

Section 9. AUTOMATIC TERMINAL INFORMATION SERVICE PROCEDURES

2–140 APPLICATION

Use the ATIS, where available, to provide noncontrol airport and terminal area operational and meteorological information to aircraft.

a. Identify each message by a phonetic letter code word at both the beginning and the end of the message except where omissions are required because of special programs or equipment.

1. Each alphabet letter phonetic word shall be used sequentially, except as authorized in subparagraph 2–140a2, beginning with "Alfa," ending with "Zulu," and repeated without regard to the beginning of a new day. Identify the first resumed broadcast message with "Alfa" or the first assigned alphabet letter word in the event of a broadcast interruption of more than 12 hours.

2. Specific sequential portions of the alphabet may be assigned between facilities or an arrival and departure ATIS when designated by a Letter of Agreement or facility directive.

2–140a2 Reference.—FAA Order 7210.3, Automatic Terminal Information Service (ATIS), paragraph 12–40.

b. The ATIS recording shall be reviewed for completeness, accuracy, speech rate, and proper enunciation before being transmitted.

c. Arrival and departure messages, when broadcast separately, need only contain information appropriate for that operation.

2–141 OPERATING PROCEDURES

a. Make a new recording when any of the following occur:

1. Upon receipt of any new official weather regardless of whether there is or is not a change in values.

2. When runway braking action reports are received that indicate runway braking is worse than that which is included in the current ATIS broadcast.

3. When there is a change in any other pertinent data, such as runway change, instrument approach in use, new or canceled NOTAM's/ PIREP's/HIWAS Update etc.

b. When a pilot acknowledges that he has received the ATIS broadcast, controllers may omit those items contained in the broadcasts if they are current. Rapidly changing conditions will be issued by ATC, and the ATIS will contain the following:

2–141b Example.—

"Latest ceiling/visibility/altimeter/wind/(other conditions) will be issued by approach control/tower."

c. Broadcast on all appropriate frequencies to advise aircraft of a change in the ATIS code/ message.

d. Controllers shall ensure that pilots receive all operationally pertinent information contained in the ATIS broadcast. Ask the pilot to confirm receipt of the current ATIS information if the pilot does not initally state the appropriate ATIS code. Controllers shall ensure that changes to pertinent operational information is provided after the initial confirmation of ATIS information is established. Issue the current weather, runway in use, approach information, and pertinent NOTAM's to pilots who are unable to receive the ATIS.

2–141d Example.—

"Verify you have information ALPHA."

"Information BRAVO now current, visibility three miles."

"Information CHARLIE now current, Measured Ceiling 1500 Broken."

2–142 CONTENT

Include the following in ATIS broadcast as appropriate:

a. Time of weather sequence (UTC). Weather information consisting of ceiling, visibility, obstructions to vision, temperature, dew point, wind direction and velocity, altimeter, a density altitude advisory when appropriate, and other pertinent remarks included in the official weather observation. Wind direction, velocity, and altimeter shall be reported from certified direct reading instruments. Temperature and dew point should be reported from certified direct reading sensors when available. Always include weather observation remarks of lightening, cumulonimbus, and towering cumulus clouds.

b. The ceiling/sky condition, visibility, and obstructions to vision may be omitted if the ceiling is above 5,000 feet and the visibility is more than 5 miles.

2–142b Example.—

A remark may be made, "The weather is better than five thousand and five."

c. Instrument/visual approach/s in use. Specify landing runway/s unless the runway is that to which the instrument approach is made.

d. Departure runway/s (to be given only if different from landing runway/s or in the instance of a "departure only" ATIS).

e. NOTAM's and notification of PIREP's pertinent to operations in the terminal area. Inform pilots of where hazardous weather is occurring and how the information may be obtained.

f. Runway braking action or friction reports when provided. Include the time of the report and a word describing the cause of the runway friction problem.

Phraseology:

RUNWAY (number) MU (first value, second value, third value) AT (time), (cause).

2–142f Example.—

"RUNWAY TWO SEVEN, MU FORTY-TWO, FORTY-ONE, TWENTY-EIGHT AT ONE ZERO ONE EIGHT ZULU, ICE."

2–142f Reference.—Braking Action Advisories, paragraph 3–34.

g. Other optional information as local conditions dictate in coordination with ATC. This may include such items as VFR arrival frequencies, temporary airport conditions, SOIR operations being conducted, or other perishable items that may appear only for a matter of hours or a few days on the ATIS message.

h. Low level windshear (LLWS) when reported by pilots or is detected on a low level windshear alert system (LLWAS).

2–142h Reference.—Low Level Windshear Advisories, paragraph 3–8.

i. A statement which advises the pilot to readback instructions to hold short of a runway. The air traffic manager may elect to remove this requirement 60 days after implementation provided that removing the statement from the ATIS does not result in increased requests from aircraft for readback of hold short instructions.

j. Instructions for the pilot to acknowledge receipt of the ATIS message by informing the controller on initial contact.

2–142j Example.—

"Boston Tower information Delta. One four zero zero Zulu. Measured ceiling four thousand five hundred broken. Visibility one zero. Temperature three four. Dew point two eight. Wind two five zero at one zero. Altimeter three zero one zero. ILS–DME Runway Two Seven Approach in use. Departing Runway Two Two Right. HAZARDOUS WEATHER INFORMATION FOR (Geographical area) AVAILABLE ON HIWAS, FLIGHT WATCH OR FLIGHT SERVICE. Advise on initial contact you have Delta."

2–143 thru 2–149 RESERVED

Chapter 3. AIRPORT TRAFFIC CONTROL—TERMINAL

Section 1. GENERAL

3–1 PROVIDE SERVICE

Provide airport traffic control service based only upon observed or known traffic and airport conditions.

3–1 Note.—When operating in accordance with Title 14 of the Code of Federal Regulations, it is the responsibility of the pilot to avoid collision with other aircraft. However, due to the limited space around terminal locations, traffic information can aid pilots in avoiding collision between aircraft operating within Class B, Class C, or Class D surface areas and the terminal radar service areas, and transiting aircraft operating in proximity to terminal locations.

3–2 PREVENTIVE CONTROL

Provide preventive control service only to aircraft operating in accordance with a letter of agreement. When providing this service, issue advice or instructions only if a situation develops which requires corrective action.

3–2 Note.—Preventive control differs from other airport traffic control in that repetitious, routine approval of pilot action is eliminated. Controllers intervene only when they observe a traffic conflict developing.

3–3 USE OF ACTIVE RUNWAYS

The local controller has primary responsibility for operations conducted on the active runway and must control the use of those runways. Positive coordination and control is required as follows:

3–3 Note.—Exceptions may be authorized only as provided in paragraph 1–9 and FAA Order 7210.3, paragraph 12–7 where justified by extraordinary circumstances at specific locations.

3–3 Reference.—FAA Order 7210.3, Use of Active Runways, paragraph 12–7b.

a. Ground control must obtain approval from local control before authorizing an aircraft or a vehicle to cross or use any portion of an active runway.

b. When the local controller authorizes another controller to cross an active runway, the local controller shall verbally specify the runway to be crossed preceded by the word "cross."

Phraseology:

CROSS (runway) AT (intersection if necessary).

c. The ground controller shall advise the local controller when the coordinated runway operation is complete. This may be accomplished verbally or through visual aids as specified by a facility directive.

d. *USA/USAF NOT APPLICABLE* Authorization for aircraft/vehicles to taxi/proceed on or along an active runway, for purposes other than crossing, shall be provided via direct communications on the appropriate local control frequency. This authorization may be provided on the ground control frequency after coordination with local control is completed for those operations specifically described in a facility directive.

3–3d Note.– The USA and USAF establish local operating procedures in accordance with USA and USAF directives.

e. The local controller shall coordinate with the ground controller before using a runway not previously designated as active.

3–3 Reference.—Coordination Between Local and Ground Controllers, paragraph 3–4.

3–4 COORDINATION BETWEEN LOCAL AND GROUND CONTROLLERS

Local and ground controllers shall exchange information as necessary for the safe and efficient use of airport runways and movement areas. This may be accomplished via verbal means, flight progress strips, other written information, or automation displays. As a minimum, provide aircraft identification and applicable runway/intersection/taxiway information as follows:

a. Ground control shall notify local control when a departing aircraft has been taxied to a runway other than one previously designated as active.

3–4a Reference.—Use of Active Runways, paragraph 3–3. FAA Order 7210.3, Selecting Active Runways, paragraph 12–6.

b. Ground control shall notify local control of any aircraft taxied to an intersection for takeoff, unless departure from that intersection is specifically designated via prior coordination or facility directive as the standard operating procedure for the runway to be used. When standard procedures require departures to use a specific intersection, ground control shall notify local control when aircraft are taxied to other portions of the runway for departure.

3–4b Reference.—Intersection Departure, paragraph 3–106.

c. When the runways in use for landing/departing aircraft are not visible from the tower or the aircraft using them are not visible on radar, advise the local/ground controller of the aircraft's location before releasing the aircraft to the other controller.

3–5 VEHICLES/EQUIPMENT/PERSONNEL ON RUNWAYS

a. Ensure that the runway to be used is free of all known ground vehicles, equipment, and personnel before a departing aircraft starts takeoff or a landing aircraft crosses the runway threshold.

b. Vehicles, equipment, and personnel in direct communications with the control tower, may be authorized to operate up to the edge of an active runway surface when necessary. Provide advisories as specified in paragraph 3–6, Traffic Information, and paragraph 3–84d, Precision Approach Critical Areas, as appropriate.

Phraseology:

PROCEED AS REQUESTED; and if necessary, (additional instructions or information)

3–5 Note.—Establishing hold lines/signs is the responsibility of the airport manager. Standards for surface measurements, markings, and signs are contained in Advisory Circulars 150/5300–13, 150/5340–1, and 150/5340–18. The operator is responsible to properly position the aircraft, vehicle, or equipment at the appropriate hold line/sign or designated point. The requirements in paragraph 3–12, Visually Scanning Runways, remain valid as appropriate.

3–5 Reference.—Runway Proximity, paragraph 3–83, Touch-and-Go or Stop-and-Go or Low Approach, paragraph 3–91. Altitude Restricted Low Approach, paragraph 3–129. AC 150/5300–13, Airport Design, Part 91.129 Operation at Airports With Operating Control Towers, AIM paragraph 2–22 and Pilot/Controller Glossary.

3–6 TRAFFIC INFORMATION

a. Describe vehicles, equipment, or personnel on or near the movement area in a manner which will assist pilots in recognizing them.

3–6a Examples.—

"Mower left of Runway Two Seven."

"Trucks crossing approach end of Runway Two Five."

"Workman on Taxiway Bravo."

"Aircraft left of Runway One Eight."

b. Describe the relative position of traffic in an easy to understand manner, such as "to your right" or "ahead of you."

3–6b Examples.—

"Traffic, Eastern DC–9 on downwind leg to your left."

"Twin Bonanza inbound from outer marker on straight-in approach to Runway One Seven."

c. When using a certified tower radar display, you may issue traffic advisories using the standard radar phraseology prescribed in paragraph 2–21.

3–6 Reference.— Altitude Restricted Low Approach, paragraph 3–129.

3–7 POSITION DETERMINATION

a. Determine the position of an aircraft before issuing taxi instructions or takeoff clearance.

3–7 Note.—The aircraft's position may be determined visually by the controller, by pilots, or through the use of the ASDE.

b. When a local controller delivers or amends an ATC clearance to an aircraft awaiting departure and that aircraft is holding short of a runway or is holding in position on a runway, an additional clearance shall be issued to prevent the possibility of the aircraft inadvertently taxiing onto the runway and/or beginning takeoff roll. In such cases, append one of the following ATC instructions as appropriate:

1. HOLD SHORT OF RUNWAY, *or*
2. HOLD IN POSITION.

3–8 LOW LEVEL WINDSHEAR ADVISORIES

When low level windshear is reported by pilots or detected on any of the Doppler or Low Level Windshear Alert Systems (LLWAS), a statement shall be included on the ATIS for 20 minutes following the last report or indication of windshear.

3–8 Reference.—PIREP Information, paragraph 2–112. Content, paragraph 2–142. Landing Information, paragraph 3–120.

Phraseology:

LOW LEVEL WINDSHEAR ADVISORIES IN EFFECT.

At facilities without ATIS, ensure that windshear information is broadcast to all arriving and departing aircraft for 20 minutes following the last report or indication of windshear.

a. At locations equipped with LLWAS, the local controller shall provide wind information as follows:

3–8a Note.—The LLWAS is designed to detect low level windshear conditions around the periphery of an airport. It does not detect windshear beyond that limitation.

3–8a Reference.—FAA Order 7210.3, Low Level Windshear Alert System (LLWAS), paragraph 12–32.

1. If an alert is received, issue the centerfield wind and the displayed field boundary wind.

Phraseology:

WINDSHEAR ALERT. CENTERFIELD WIND (direction) AT (velocity). (Location of sensor) BOUNDARY WIND (direction) AT (velocity).

2. If multiple alerts are received, issue an advisory that there are windshear alerts in two/several/all quadrants. After issuing the advisory, issue the centerfield wind in accordance with paragraph 3–100b followed by the field boundary wind most appropriate to the aircraft operation.

Phraseology:

WINDSHEAR ALERTS TWO/SEVERAL/ALL QUADRANTS. CENTERFIELD WIND (direction) AT (velocity). (Location of sensor) BOUNDARY WIND (direction) AT (velocity).

3. If requested by the pilot, issue specific field boundary wind information even though the LLWAS may not be in alert status.

3–8a3 Note.—The requirements of subparagraphs 3–8a and 3–8b, paragraph 3–100, and paragraph 3–120 (reference issuance of wind information) remain valid as appropriate.

b. "Improved" LLWAS systems are designed to detect windshear in the vicinity of the centerfield

sensor as well as around the periphery. Locations equipped with "improved" LLWAS systems will issue centerfield wind variance when an alert is received from the centerfield area.

Phraseology:
WINDSHEAR ALERT, CENTERFIELD WIND (direction) AT (velocity) VARYING TO (direction) AT (velocity).

c. LLWAS "Network Expansion" and LLWAS systems that are integrated with Terminal Doppler Weather radars (TDWR) provide the capability of displaying microburst alerts, windshear alerts, and wind information oriented to the threshold or departure end of a runway.

1. If a windshear or microburst alert is received for the runway in use, issue the displayed alert information for that runway to arriving and departing aircraft.

Phraseology:
WINDSHEAR/MICROBURST ALERT, (windspeed) KNOT GAIN/LOSS, (location).

2. If requested by the pilot or deemed appropriate by the controller, issue the displayed wind information oriented to the threshold or departure end of the runway.

Phraseology:
(runway) DEPARTURE/THRESHOLD WIND (direction) AT (velocity).

3. Alerts occurring on the edge of the system, or if the system is unable to distinguish between windshear and microbursts; an alert message will be displayed advising of a possible windshear outside of the system network.

Phraseology:
(appropriate wind or alert information) POSSIBLE WINDSHEAR OUTSIDE THE NETWORK.

4. If unstable conditions produce multiple alerts, issue an advisory of multiple windshear/microburst alerts followed by specific alert or wind information.

Phraseology:
MULTIPLE WINDSHEAR/MICROBURST ALERTS (specific alert or wind information).

5. When a microburst is detected, a statement shall be included on the ATIS broadcast, "MICROBURST ADVISORIES IN EFFECT." This item shall be included on the ATIS for at least 1 hour following the microburst alert.

6. The LLWAS "Network Expansion" is designed to operate with as many as three sensors inoperative. Whenever one to three sensors are inoperative, the system will display this information in the status area. When an LLWAS sensor is inoperative and windshear/microburst activity is likely; (e.g.-frontal activity, convective storms, PIREPS), a statement shall be included on the ATIS, "LLWAS IMPAIRED FOR WINDSHEAR AND MICROBURST DETECTION."

3–9 USE OF TOWER RADAR DISPLAYS

a. Local controllers may use certified tower radar displays for the following purposes:

1. To determine an aircraft's identification, exact location, or spatial relationship to other aircraft.

3–9a1 Note.—This authorization does not alter visual separation procedures. When employing visual separation, the provisions of paragraph 7–10 apply unless otherwise authorized by AAT–1.

3–9a1 Reference.—Primary Radar Identification Methods, paragraph 5–51; Beacon Identification Methods, paragraph 5–52; ARTS/PIDP Identification Methods, paragraph 5–53.

2. To provide aircraft with radar traffic advisories.

3. To provide a direction or suggested headings to VFR aircraft as a method for radar identification or as an advisory aid to navigation.

Phraseology:
(Identification), PROCEED (direction)-BOUND, (other instructions or information as necessary),

or

(identification), SUGGESTED HEADING (degrees), (other instructions as necessary).

3–9a3 Note.—It is important that the pilot be aware of the fact that the directions or headings being provided are suggestions or are advisory in nature. This is to keep the pilot from being inadvertently mislead into assuming that radar vectors (and other associated radar services) are being provided when in fact, they are not.

4. To provide information and instructions to aircraft operating within the surface area for which the tower has responsibility.

3–9a4 Example.—
"Turn base leg now."

3–9a Note.—Unless otherwise authorized, tower radar displays are intended to be an aid to local controllers in meeting their responsibilities to the aircraft operating on the runways or within the surface area. They are not intended to provide radar benefits to pilots except for those accrued through a more efficient and effective local control position. In addition, local controllers at nonapproach control towers must devote the majority of their time to visually scanning the runways and local area; an assurance of continued positive radar identification could place distracting and operationally inefficient requirements upon the local controller. Therefore, since the requirements of paragraph 5–50 cannot be assured, the radar functions prescribed above are not considered to be radar services and pilots should not be advised of being in "radar contact."

b. Additional functions may be performed provided the procedures have been reviewed and authorized by appropriate management levels.

3–9 Reference.—Minima, paragraph 5–72.

3–10 OBSERVED ABNORMALITIES

When requested by a pilot or when you deem it necessary, inform an aircraft of any observed abnormal aircraft condition.

Phraseology:
(Item) APPEAR/S (observed condition).

3–10 Examples.—

"Landing gear appears up."

"Landing gear appears down and in place."

"Rear baggage door appears open."

3–11 SURFACE AREA RESTRICTIONS

a. If traffic conditions permit, approve a pilot's request to cross Class C or Class D surface areas or exceed the Class C or Class D airspace speed limit. Do not, however, approve a speed in excess of 250 knots (288 mph) unless the pilot informs you a higher minimum speed is required.

3–11a Note.—Part 91.117 permits speeds in excess of 250 knots (288 mph) when so required or recommended in the airplane flight manual or required by normal military operating procedures.

3–11a Reference.—Surface Areas, paragraph 2–16.

b. Do not approve a pilot's request or ask a pilot to conduct unusual maneuvers within surface areas of Class B, C, or D airspace if they are not essential to the performance of the flight. *EXCEPTION:* A pilot's request to conduct aerobatic practice activities may be approved, when operating in accordance with a Letter of Agreement (LOA), and the activity will have no adverse affect on safety of the air traffic operation or result in a reduction of service to other users.

3–11b Reference.—FAA Order 7210.3, Aerobatic Practice Activities, paragraph 6–78.

3–11b Note.—These unusual maneuvers include unnecessary low passes, unscheduled flybys, practice instrument approaches to altitudes below specified minima (unless a landing or touch-and-go is to be made), or any so-called "buzz jobs" wherein a flight is conducted at a low altitude and/or a high rate of speed for thrill purposes. Such maneuvers increase hazards to persons and property and contribute to noise complaints.

3–12 VISUALLY SCANNING RUNWAYS

a. Local controllers shall visually scan runways to the maximum extent possible.

b. Ground control shall assist local control in visually scanning runways, especially when runways are in close proximity to other movement areas.

3–13 ESTABLISHING TWO-WAY COMMUNICATIONS

Pilots are required to establish two-way radio communications before entering the Class D airspace. If the controller responds to a radio call with, "(a/c callsign) standby," radio communications have been established and the pilot can enter the Class D airspace. If workload or traffic conditions prevent immediate provision of Class D services, inform the pilot to remain outside the Class D airspace until conditions permit the services to be provided.

Phraseology:

(a/c callsign) REMAIN OUTSIDE THE CLASS D AIRSPACE AND STANDBY.

3–13 Reference.—Visual Separation, paragraph 7–10.

3–14 thru 3–19 RESERVED

Section 3. AIRPORT CONDITIONS

3–30 LANDING AREA CONDITION

If you observe or are informed of any condition which affects the safe use of a landing area:

3–30 Note 1.—The airport management/military operations office is responsible for observing and reporting the condition of the landing area.

3–30 Note 2.—It is the responsibility of the agency operating the airport to provide the tower with current information regarding airport conditions.

3–30 Note 3.—A disabled aircraft on a runway, after occupants are clear, is normally handled by Flight Standards and airport management/military operations office personnel in the same manner as any obstruction; e.g., construction equipment.

a. Relay the information to the airport manager/military operations office concerned.

b. Copy verbatim any information received and record the name of the person submitting it.

c. Confirm information obtained from other than authorized airport or FAA personnel unless this function is the responsibility of the military operations office.

3–30c Note.—Civil airport managers are required to provide a list of airport employees who are authorized to issue information concerning conditions affecting the safe use of the airport.

d. If you are unable to contact the airport management or operator, issue a Notice to Airmen publicizing an unsafe condition and inform the management or operator as soon as practicable.

3–30d Example.—

"Disabled aircraft on runway."

3–30d Note 1.—Legally, only the airport management/military operations office can close a runway.

3–30d Note 2.—Military controllers are not authorized to issue Notices to Airmen. It is the responsibility of the military operations office.

e. Issue to aircraft only factual information, as reported by the airport management concerning the condition of the runway surface, describing the accumulation of precipitation.

3–30e Example.—

"All runways covered by compacted snow six inches deep."

3–30 Reference.—Airport Conditions, paragraph 4–90.

3–31 CLOSED/UNSAFE RUNWAY INFORMATION

If an aircraft requests to takeoff, land, or touch-and-go on a closed or unsafe runway, inform the pilot the runway is closed or unsafe, and

a. If the pilot persists in his request, quote him the appropriate parts of the Notice to Airmen applying to the runway and inform him that a clearance cannot be issued.

b. Then, if the pilot insists and in your opinion the intended operation would not adversely affect other traffic, inform him that the operation will be at his own risk.

Phraseology:

RUNWAY (runway number) CLOSED/UNSAFE.

If appropriate,

(quote Notice to Airmen information), UNABLE TO ISSUE DEPARTURE/LANDING/TOUCH-AND-GO CLEARANCE.

DEPARTURE/LANDING/TOUCH-AND-GO WILL BE AT YOUR OWN RISK.

c. Except as permitted by paragraph 4–106, where parallel runways are served by separate ILS/MLS systems and one of the runways is closed, the ILS/MLS associated with the closed runway should not be used for approaches unless not using the ILS/MLS would have an adverse impact on the operational efficiency of the airport.

3–31 Reference.—Landing Clearance, paragraph 3–124. Airport Conditions, paragraph 4–90.

3–32 TIMELY INFORMATION

Issue airport condition information necessary for an aircraft's safe operation in time for it to be useful to the pilot. Include the following, as appropriate:

a. Construction work on or immediately adjacent to the movement area.

b. Rough portions of the movement area.

c. Braking conditions caused by ice, snow, slush, or water.

d. Snowdrifts or piles of snow on or along the edges of the area and the extent of any plowed area.

e. Parked aircraft on the movement area.

f. Irregular operation of part or all of the airport lighting system.

g. Other pertinent airport conditions.

3–32 Reference.—Airport Conditions, paragraph 4–90. Reporting Essential Flight Information, paragraph 2–9. Altitude Restricted Low Approach, paragraph 3–129.

3–33 BRAKING ACTION

Furnish quality of braking action, as received from pilots or the airport management, to all aircraft as follows:

a. Describe the quality of braking action using the terms "good," "fair," "poor," "nil," or a combination of these terms. If the pilot or airport management reports braking action in other than the foregoing terms, ask him to categorize braking action in these terms.

3–33a Note.—The term "nil" is used to indicate bad or no braking action.

b. Include type of aircraft or vehicle from which the report is received.

3–33a and b Examples.—

"Braking action fair to poor, reported by a heavy D-C Ten."

"Braking action poor, reported by a Boeing Seven Twenty-seven."

c. If the braking action report affects only a portion of a runway, obtain enough information from the pilot or airport management to describe the braking action in terms easily understood by the pilot.

3–33c Examples.—

"Braking action poor first half of runway, reported by a Lockheed Ten Eleven."

"Braking action poor beyond the intersection of Runway Two Seven, reported by a Boeing Seven Twenty-seven."

3–33c Note.—Descriptive terms, such as the first or the last half of the runway, should normally be used rather than landmark descriptions, such as opposite the fire station, south of a taxiway, etc. Landmarks extraneous to the landing runway are difficult to distinguish during low visibility, at night, or anytime a pilot is busy landing an aircraft.

d. Furnish runway friction measurement readings/values as received from airport management to aircraft as follows:

1. Furnish information as received from the airport management to pilots on the ATIS at locations where friction measuring devices, such as MU–Meter, Saab Friction Tester (SFT), and Skiddometer are in use. Use the runway followed by the MU number for each of the three runway segments, time of report, and a word describing the cause of the runway friction problem.

3–33d1 Example.—

"RUNWAY TWO SEVEN, MU FORTY–TWO, FORTY–ONE, TWENTY–EIGHT AT ONE ZERO ONE EIGHT ZULU, ICE."

2. Issue the runway surface condition and/or the Runway Condition Reading (RCR), if provided, to all USAF and ANG aircraft. Issue the RCR to other aircraft upon pilot request.

3–33d2 Example.—

"Ice on runway, RCR zero five, patchy."

3–33d2 Note 1.—USAF has established RCR procedures for determining the average deceleration readings of runways under conditions of water, slush, ice, or snow. The use of the RCR code is dependent upon the pilot's having a "stopping capability chart" specifically applicable to his aircraft.

3–33d2 Note 2.—USAF offices furnish RCR information at airports serving USAF and ANG aircraft.

3–33d2 Reference.—Airport Conditions, paragraph 4–90.

3–33 Reference.—Braking Action Advisories, paragraph 3–34 .

3–34 BRAKING ACTION ADVISORIES

a. When runway braking action reports are received from pilots or the airport management which include the terms "poor" or "nil" or whenever weather conditions are conducive to deteriorating or rapidly changing runway conditions, include on the ATIS broadcast the statement "Braking Action Advisories are in effect."

3–34a Reference.—FAA Order 7210.3, Automatic Terminal Information Service, paragraph 12–40.

b. During the time Braking Action Advisories are in effect, take the following action:

1. Issue the latest braking action report for the runway in use to each arriving and departing aircraft early enough to be of benefit to the pilot. When possible, include reports from heavy jet aircraft when the arriving or departing aircraft is a heavy jet.

2. If no report has been received for the runway of intended use, issue an advisory to that effect.

Phraseology:

NO BRAKING ACTION REPORTS RECEIVED FOR RUNWAY (runway number).

3. Advise the airport management that runway braking action reports of "poor" or "nil" have been received.

3–34b3 Reference.—FAA Order 7210.3, Letters of Agreement, paragraph 4–30.

4. Solicit PIREP's of runway braking action.

3–34b4 Reference.—PIREP Information, paragraph 2–112.

c. Include runway friction measurement/values received from airport management on the ATIS. Furnish the information when requested by the pilot in accordance with paragraph 3–33.

3–34 Reference.—Content, paragraph 2–142. Departure Information, paragraph 3–100. Landing Information, paragraph 3–120. Airport Conditions, paragraph 4–90.

3–35 ARRESTING SYSTEM OPERATION

a. For normal operations, arresting systems remotely controlled by air traffic control shall remain in the retracted or down position.

3–35a Note 1.—USN Runway Arresting Gear-Barriers are not operated by air traffic control personnel. Readiness/rigging of the equipment is the responsibility of the operations department.

3–35a Note 2.—A request to raise a barrier or hook cable means the barrier or cable on the departure end of the runway. If an approach end engagement is required, the pilot or military authority will specifically request that the approach end cable be raised.

3–35 Reference.—FAA Order 7610.4, paragraph 9–31 through paragraph 9–35.

b. Raise aircraft arresting systems whenever:

1. Requested by a pilot.

3–35b1 Note.—The standard emergency phraseology for a pilot requesting an arresting system to be raised for immediate engagement is "Barrier-Barrier-Barrier" or "Cable-Cable-Cable."

2. Requested by military authority; e.g., airfield manager, supervisor of flying, mobile control officer, etc.

3. A military jet aircraft is landing with known or suspected radio failure or conditions (drag chute/hydraulic/electrical failure, etc.) that indicate an arresting system may be needed. Exceptions are authorized for military aircraft which cannot engage an arresting system (C–9, C–141, C–5, T–39, etc.) and should be identified in a letter of agreement and/or appropriate military directive.

c. When requested by military authority due to freezing weather conditions or malfunction of the activating mechanism, the barrier/cable may remain in a raised position provided aircraft are advised.

Phraseology:

YOUR DEPARTURE/LANDING WILL BE TOWARD/OVER A RAISED BARRIER/CABLE ON RUNWAY (number), (location, distance, as appropriate).

d. Inform civil and U.S. Army aircraft whenever rubber supported cables are in place at the approach end of the landing runway, and include the distance of the cables from the threshold. This information may be omitted if it is published in the "Notices to Airmen" publication/DOD FLIP.

3–35d Example.—

"Runway One Four arresting cable one thousand feet from threshold."

e. When arresting system operation has been requested, inform the pilot of the indicated barrier/cable position.

Phraseology:

(Identification), BARRIER/CABLE INDICATES UP/DOWN. CLEARED FOR TAKEOFF/TO LAND.

f. Time permitting, advise pilots of the availability of all arresting systems on the runway in question when a pilot requests barrier information.

g. If an aircraft engages a raised barrier/cable, initiate crash alarm procedures immediately.

h. For preplanned practice engagements not associated with emergencies, crash alarm systems need not be activated if—in accordance with local military operating procedures—all required notifications are made before the practice engagement.

3–35 Reference.—Airport Conditions, paragraph 4–90.

3–36 FAR FIELD MONITOR (FFM) REMOTE STATUS UNIT

a. Background.

1. To meet the demand for more facilities capable of operating under CAT III weather, Type II equipment is being upgraded to Integrity Level 3. This integrity level will support operations which place a high degree of reliance on ILS guidance for positioning through touchdown.

2. Installation of the FFM remote status indicating units is necessary to attain the integrity necessary to meet internationally agreed upon reliability values in support of CAT III operations on Type II ILS equipment. The remote status indicating unit used in conjunction with Type II equipment adds a third integrity test; thereby, producing an approach aid which has integrity capable of providing Level 3 service.

3. The remote status sensing unit, when installed in the tower cab, will give immediate indications of localizer out-of-tolerance conditions. The alarm in the FFM remote status sensing unit indicates an inoperative or an out-of-tolerance localizer signal; e.g., the course may have shifted due to equipment malfunction or vehicle/aircraft encroachment into the critical area.

b. Procedures.

1. Operation of the FFM remote sensing unit will be based on the prevailing weather. The FFM remote sensing unit shall be operational when the weather is below CAT I ILS minimums.

2. When the weather is less than that required for CAT I operations, the GRN–27 FFM remote status sensing unit shall be set at:

(a) "CAT II" when the RVR is less than 2,400 feet;

(b) "CAT III" when the RVR is less than 1,200 feet.

3. When the remote status unit indicates that the localizer FFM is in alarm (aural warning following the preset delay) and:

(a) The aircraft is outside the middle marker (MM), check for encroachment those portions of the critical area that can be seen from the tower. It is understood that the entire critical area may not be visible due to low ceilings and poor visibility. The check is strictly to determine possible causal factors for the out-of-tolerance situation. If the alarm has not cleared prior to the aircraft's arriving at the MM, immediately issue an advisory that the FFM remote status sensing unit indicates the localizer is unreliable.

(b) The aircraft is between the MM and the inner marker (IM), immediately issue an advisory that the FFM remote status sensing unit indicates the localizer is unreliable.

Phraseology:

CAUTION, MONITOR INDICATES RUNWAY (number) LOCALIZER UNRELIABLE.

(c) The aircraft has passed the IM, there is no action requirement. Although the FFM has been modified with filters which dampen the effect of false alarms, you may expect alarms when aircraft are located between the FFM and the localizer antenna either on landing or on takeoff.

3–36 Reference.—Airport Conditions,paragraph 4–90.

3–37 thru 3–39 RESERVED

Section 4. AIRPORT LIGHTING

3–40 EMERGENCY LIGHTING

Whenever you become aware that an emergency has or will occur, take action to provide for the operation of all appropriate airport lighting aids as required.

3–40 Reference.—Lighting Requirements, paragraph 10–41.

3–41 RUNWAY END IDENTIFIER LIGHTS

When separate on-off controls are provided, operate runway end identifier lights:

a. When the associated runway lights are lighted. Turn the REIL off after:

1. An arriving aircraft has landed.
2. A departing aircraft has left the traffic pattern area.
3. It is determined that the lights are of no further use to the pilot.

b. As required by facility directives to meet local conditions.

c. As requested by the pilot.

d. Operate intensity setting in accordance with the values in the Table 3–41[1] except as prescribed in subparagraphs 3–41b and c.

Table 3–41[1]
REIL Intensity Setting—Three Step System.

Settings	*Visibility*	
	Day	*Night*
3	Less than 2 miles	Less than 1 mile
2	2 to 5 miles inclusive	1 to but not including 3 miles
1	When requested	3 miles or more

3–42 VISUAL APPROACH SLOPE INDICATORS (VASI)

VASI systems with remote on-off switching shall be operated when they serve the runway in use and where intensities are controlled in accordance with the Table 3–42[1] and Table 3–42[2] except:

a. As required by facility directives to meet local conditions.

b. As required by the pilot.

Table 3–42[1]
VASI Intensity Setting—Two Step System

Step	*Period/Condition*
High	Day—Sunrise to sunset.
Low	Night—Sunset to sunrise.

Table 3–42[2]
VASI Intensity Setting—Three Step System.

Step	*Period/Condition*
High	Day—Sunrise to sunset.
Medium	Twilight—From sunset to 30 minutes after sunset and from 30 minutes before sunrise to sunrise, and during twilight in Alaska.*
Low	Night—From 30 minutes after sunset to 30 minutes before sunrise.

*During a 1 year period, twilight may vary 26 to 43 minutes between 25 and 49N latitude.

3–42 Note.—The basic FAA standard for VASI systems permits independent operation by means of photoelectric device. This system has no on-off control feature and is intended for continuous operation. Other VASI systems in use include those that are operated remotely from the control tower. These systems may consist of either a photoelectric intensity control with only an on-off switch, a two step intensity system, or a three step intensity system.

3–42 Reference.—FAA Order 7210.3, VASI Systems, paragraph 12–64. FAA Order 6850.2, Visual Guidance Lighting Systems.

3–43 APPROACH LIGHTS

Operate approach lights:

a. Between sunset and sunrise when one of the following conditions exists:

1. They serve the landing runway.
2. They serve a runway to which an approach is being made but aircraft will land on another runway.

b. Between sunrise and sunset when the ceiling is less than 1,000 feet or the prevailing visibility is 5 miles or less and approaches are being made to:

1. A landing runway served by the lights.
2. A runway served by the lights but aircraft are landing on another runway.
3. The airport, but landing will be made on a runway served by the lights.

c. As requested by the pilot.

d. As you deem necessary, if not contrary to pilot's request.

3–43 Note.—In the interest of energy conservation, the ALS should be turned off when not needed for aircraft operations.

3–43 Reference.—ALS Intensity Settings, paragraph 3–44.

3–44 ALS INTENSITY SETTINGS

When operating ALS as prescribed in paragraph 3–43, operate intensity controls in accordance with the values in Table 3–44[1] except:

a. When facility directives specify other settings to meet local atmospheric, topographic, and twilight conditions.

b. As requested by the pilot.

c. As you deem necessary, if not contrary to pilot's request.

Table 3–44[1]
ALS Intensity Setting

Step	*Visibility—(Applicable to runway served by lights)*	
	Day	*Night*
5	Less than 1 mile*	When requested
4	1 to but not including 3 miles	When requested
3	3 to but not including 5 miles	Less than 1 mile*
2	5 to but not including 7 miles	1 to 3 miles inclusive
1	When requested	Greater than 3 miles

*and/or 6,000 feet or less of the RVR on the runway served by the ALS and RVR.

3–44 Note.—Daylight Steps 2 and 3 provide recommended settings applicable to conditions in subparagraphs b and c. At night, use step 4 or 5 only when requested by a pilot.

3–45 SEQUENCED FLASHING LIGHTS

Operate Sequenced Flashing Lights:

3–45 Note.—SFL are a component of the ALS and cannot be operated when the ALS is off.

a. When the visibility is less than 3 miles and instrument approaches are being made to the runway served by the associated ALS.

b. As requested by the pilot.

c. As you deem necessary, if not contrary to pilot's request.

3–46 MALSR/ODALS

Operate MALSR/ODALS that have separate on-off and intensity setting controls in accordance with Table 3–46[1] and Table 3–46[2] excep..

a. When facility directives specify other settings to meet local atmospheric, topographic, and twilight conditions.

b. As requested by the pilot.

c. As you deem necessary if not contrary to pilot's request.

Table 3–46[1]
Two Step MALS/One Step RAIL/Two Step ODALS

Settings		*Visibility*	
		Day	*Night*
MALS/ODALS RAIL	Hi On	Less than 3 miles	Less than 3 miles*
MALS/ODALS RAIL	Low Off	When requested	3 miles or more

* At locations providing part-time control tower service, if duplicate controls are not provided in the associated FSS, the MALSR/ODALS shall be set to low intensity during the hours of darkness when the tower is unmanned.

Table 3–46[2] Three Step MALS/Three Step RAIL/ Three Step ODALS

Settings	*Visibility*	
	Day	*Night*
3	Less than 2 miles	Less than 1 mile
2	2 to 5 miles inclusive	1 to but not including 3 miles*
1	When requested	3 miles or more

*At locations providing part-time control tower service, if duplicate controls are not provided in the FSS on the airport, the air-to-ground radio link shall be activated during the hours of darkness when the tower is unmanned. If there is no radio air-to-ground control, the MALSR/ODALS shall be set on intensity setting 2 during the hours of darkness when the tower is unmanned.

Table 3–46[2] Reference.—FAA Order 7210.3, Operation of Lights When Tower is Closed, paragraph 12–61.

3–47 ALSF–2/SSALR

a. When the prevailing visibility is 3/4 mile or less or the RVR is 4,000 feet or less, operate the ALSF–2 system as follows:

1. As requested by the pilot.

2. As you deem necessary if not contrary to pilot request.

b. Operate the SSALR system when the conditions in subparagraph 3–47a are not a factor.

3–48 RUNWAY EDGE LIGHTS

Operate the runway edge light system/s serving the runway/s in use as follows:

a. Between sunset and sunrise, turn the lights on:

1. For departures—Before an aircraft taxies onto the runway and until it leaves the Class B, Class C, or Class D surface area.

2. For arrivals—

(a) IFR aircraft—Before the aircraft begins final approach, or

(b) VFR aircraft—Before the aircraft enters the Class B, Class C, or Class D surface area, and

(c) Until the aircraft has taxied off the landing runway.

b. Between sunrise and sunset, turn the lights on as shown in subpargraphs a1 and 2 above when the surface visibility is less than 2 miles.

c. As required by facility directives to meet local conditions.

d. Different from subparagraphs 3–48a, b, or c when:

1. You consider it necessary, or

2. Requested by a pilot and no other known aircraft will be adversely affected.

3–48d2 Note.—Pilots may request lights to be turned on or off contrary to subparagraphs 3–48a, b, or c. However, Part 135 operators are required to land/takeoff on lighted runways/heliport landing areas at night.

e. Do not turn on the runway edge lights when a NOTAM closing the runway is in effect.

3–48 Note.—Application concerns use for takeoffs/landings/approaches and does not preclude turning lights on for use of unaffected portions of a runway for taxiing aircraft, surface vehicles, maintenance, repair, etc.

3–48 Reference.—Simultaneous Approach and Runway Edge Light Operation, paragraph 3–53. FAA Order 7210.3, Incompatible Light System Operation, paragraph 12–62; Runway Edge Lights Associated with Medium Approach Light System/Runway Alignment Indicator Lights, paragraph 12–67.

3–49 HIGH INTENSITY RUNWAY, RUNWAY CENTERLINE, AND TOUCHDOWN ZONE LIGHTS

Operate high intensity runway and associated runway centerline and touchdown zone lights in accordance with Table 3–49[1], except:

a. Where a facility directive specifies other settings to meet local conditions.

b. As requested by the pilot.

c. As you deem necessary, if not contrary to pilot request.

Table 3–49[1]
HIRL, RCLS, TDZL Intensity Setting

Step	*Visibility*	
	Day	*Night*
5	Less than 1 mile*	When requested
4	1 to but not including 2 miles*	Less than 1 mile*
3	2 to but not including 3 miles	1 to but not including 3 miles*
2	When requested	3 to 5 miles inclusive
1	When requested	More than 5 miles

*and/or appropriate RVR/RVV equivalent.

Table 3–49[1]—CONTINUED
HIRL, RCLS, TDZL Intensity Setting

3–50 HIRL ASSOCIATED WITH MALSR

Operate HIRL which control the associated MALSR in accordance with Table 3–50[1], except:

a. As requested by the pilot.

b. As you deem necessary, if not contrary to the pilot's request.

Table 3–50[1]
HIRL associated with MALSR

Step	*Visibility*	
	Day	*Night*
5	Less than 1 mile	When requested
4	1 to but not including 2 miles	Less than 1 mile
3	2 to but not including 3 miles	1 to but not including 3 miles
2	When requested	3 to 5 miles inclusive
1	When requested	More than 5 miles

3–50 Note.—When going from a given brightness step setting to a lower setting, rotation of the brightness control to a point below the intended step setting and then back to the appropriate step setting will ensure that the MALSR will operate at the appropriate brightness.

3–50 Reference.—Medium Intensity Runway Lights, paragraph 3–52.

3–51 HIRL CHANGES AFFECTING RVR

Keep the appropriate approach controller or PAR controller informed, in advance if possible, of HIRL changes that affect RVR.

3–52 MEDIUM INTENSITY RUNWAY LIGHTS

Operate MIRL or MIRL which control the associated MALSR in accordance with Table 3–52[1], except:

a. As requested by the pilot.

b. As you deem necessary, if not contrary to the pilot's request.

Table 3–52[1]
MIRL Intensity Setting

Step	*Visibility*	
	Day	*Night*
3	Less than 2 miles	Less than 1 mile

Table 3–52[1]—CONTINUED
MIRL Intensity Setting

Step	Visibility	
	Day	Night
2	2 to 3 miles	1 to 3 miles
1	When requested	More than 3 miles

3–52 Reference.—See HIRL Associated with MALSR, paragraph 3–50 Note.

3–53 SIMULTANEOUS APPROACH AND RUNWAY EDGE LIGHT OPERATION

Turn on the runway edge lights for the runway in use whenever the associated approach lights are on. If multiple runway light selection is not possible, you may leave the approach lights on and switch the runway lights to another runway to accommodate another aircraft

3–53 Reference.—Runway Edge Lights, paragraph 3–48.

3–54 HIGH SPEED TURNOFF LIGHTS

Operate high speed turnoff lights:

a. Whenever the associated runway lights are used for arriving aircraft. Leave them on until the aircraft has either entered a taxiway or passed the last light.

b. As required by facility directives to meet local conditions.

c. As requested by the pilot.

3–55 TAXIWAY LIGHTS

Operate taxiway lights in accordance with Table's 3–55[1], 3–55[2], or 3–55[3] except:

a. Where a facility directive specifies other settings or times to meet local conditions.

b. As requested by the pilot.

c. As you deem necessary, if not contrary to pilot request.

Table 3–55[1]
Three Step Taxiway Lights

Step	Visibility	
	Day	Night
3	Less than 1 mile	When requested
2	When requested	Less than 1 mile
1	When requested	1 mile or more

Table 3–55[2]
Five Step Taxiway Lights

Step	Visibility	
	Day	Night
5	Less than 1 mile	When requested
4	[illegible]	Less than 1 mile
3	When requested	1 mile or more
1 & 2	When requested	When requested

Table 3–55[3]
One Step Taxiway Lights

Day	Night
Less than 1 mile	On

3–55 Note. AC/150 5340–24 contains recommended brightness levels for variable setting taxiway lights.

3–56 OBSTRUCTION LIGHTS

If controls are provided, turn the lights on between sunset and sunrise.

3–57 ROTATING BEACON

If controls are provided, turn the rotating beacon on:

a. Between sunset and sunrise.

b. Between sunrise and sunset when the reported ceiling or visibility is below basic VFR minima.

3–58 thru 3–59 RESERVED

Section 7. TAXI AND GROUND MOVEMENT PROCEDURES

3–80 GROUND TRAFFIC MOVEMENT

Issue by radio or directional light signals specific instructions which approve or disapprove the movement of aircraft, vehicles, equipment, or personnel on the movement area.

a. Do not issue *conditional* instructions that are dependent upon the movement of an arrival aircraft on or approaching the runway or a departure aircraft established on a takeoff roll. Do not say, "Taxi into position and hold behind landing traffic," or "Taxi/proceed across Runway Three Six behind departing/landing Jetstar." The above requirements do not preclude issuing instructions to follow an aircraft observed to be operating on the movement area in accordance with an ATC clearance/instruction and in such a manner that the instructions to follow are not ambiguous.

b. Do not use the word "cleared" in conjunction with authorization for aircraft to taxi or equipment/vehicle/personnel operations. Use the prefix "taxi," "proceed," or "hold," as appropriate, for aircraft instructions and "proceed" or "hold" for equipment/vehicles/personnel.

c. Intersection departures may be initiated by a controller or a controller may authorize an intersection departure if a pilot requests. Issue the measured distance from the intersection to the runway end rounded "down" to the nearest 50 feet to any pilot who requests and to all military aircraft, unless use of the intersection is covered in appropriate directives.

3–80c Note.— Exceptions are authorized where specific military aircraft routinely make intersection takeoffs and procedures are defined in appropriate directives. The authority exercising operational control of such aircraft ensures that all pilots are thoroughly familiar with these procedures, including the usable runway length from the applicable intersection.

d. State the runway intersection when authorizing an aircraft to taxi into position to hold or when clearing an aircraft for takeoff from an intersection.

Phraseology:

RUNWAY (number) AT (taxiway designator) further instructions as needed.

RUNWAY (number) AT (taxiway designator), TAXI INTO POSITION AND HOLD.

if requested or required,

RUNWAY (number) AT (taxiway designator) INTERSECTION DEPARTURE, (remaining length) FEET AVAILABLE.

3–81 TAXI AND GROUND MOVEMENT OPERATION

Issue, as required or requested, the route for the aircraft/vehicle to follow on the movement area in concise and easy to understand terms.

a. When authorizing a vehicle to proceed on the movement area or an aircraft to taxi to any point other than an assigned takeoff runway, absence of holding instructions authorizes an aircraft/vehicle to cross all taxiways and runways that intersect the taxi route. If it is the intent to hold the aircraft/vehicle short of any given point along the taxi route, issue the route if necessary, then state the holding instructions.

3–81a Note.— Movement of aircraft or vehicles on nonmovement areas is the responsibility of the pilot, the aircraft operator, or the airport management.

Phraseology:

HOLD POSITION.

HOLD FOR (reason)

CROSS (runway/taxiway)

or

TAXI/CONTINUE TAXIING/PROCEED:

VIA (route),

or

ON (runway number or taxiways, etc.),

or

TO (location),

or

(direction),

or

ACROSS RUNWAY (number).

or

VIA (route), HOLD SHORT OF (location)

or

FOLLOW (traffic) (restrictions as necessary)

or

BEHIND (traffic)

3–81a Examples.—

"Cross Runway Two Eight Left."

"Taxi/continue taxiing/proceed to the hanger."

"Taxi/continue taxiing/proceed straight ahead then via ramp to the hanger."

"Taxi/continue taxiing/proceed on Taxiway Charlie, hold short of Runway Two Seven."

b. When authorizing an aircraft to taxi to an assigned takeoff runway and hold short instructions are not issued, specify the runway preceded by "taxi to," and issue taxi instructions if necessary. This authorizes the aircraft to "cross" all runways/taxiways which the taxi route intersects except the assigned takeoff runway. This does not authorize the aircraft to "enter" or "cross" the assigned takeoff runway at any point.

Phraseology:

TAXI TO RUNWAY (number) VIA . . .

3–81b Examples.—
"Taxi to Runway One Two."

"Taxi to Runway Three Six via Taxiway Echo."

c. Specify the runway for departure, any necessary taxi instructions, and hold short restrictions when an aircraft will be required to hold short of a runway along the taxi route.

Phraseology:
RUNWAY (number),

TAXI/PROCEED VIA (route if necessary),

HOLD:

SHORT OF (runway number),

or
SHORT OF (location),

or

ON (taxi strip, runup pad, etc.),

and if necessary,

TRAFFIC (traffic information),

or

FOR (reason).

3–81c Example.—
"Runway 36 Left, taxi via Taxiway Charlie, hold short of Runway 27 Right."

d. Request a read back of runway hold short instructions when they are not received from the pilot/vehicle operator.

Phraseology:
READBACK HOLD INSTRUCTIONS.

3–81d Example 1.—
"American Four Ninety Two, Runway 36 Left, taxi via Taxiway Charlie, hold short of Runway 27 Right."

"American Four Ninety Two, Roger."

"American Four Ninety Two, Read Back Hold Instructions."

3–81d Example 2.—
"Cleveland Tower, American Sixty Three is ready for departure."

"American Sixty Three hold short of Runway 23 Left, traffic one mile final."

"American Sixty Three Roger."

"American Sixty Three Read Back Hold Instructions."

3–81d Example 3.—
"OPS Three proceed via Taxiway Charlie hold short of Runway 27."

"OPS Three roger."

"OPS Three, Read Back Hold Instructions."

3–81d Note.— Readback hold instructions phraseology may be initiated for any point on a movement area when the controller believes the readback is necessary.

e. Issue progressive taxi/ground movement instructions when:

1. Pilot/operator requests.

2. The specialist deems it necessary due to traffic or field conditions, e.g., construction or closed taxiways.

3. As necessary during reduced visibility, especially when the taxi route is not visible from the tower.

f. Progressive ground movement instructions include step-by-step routing directions.

3–81 Reference.— Runway Proximity, paragraph 3–83. Taxi and Ground Movement Operation, paragraph 3–140.

3–82 GROUND OPERATIONS

WAKE TURBULENCE APPLICATION

Avoid clearances which require:

a. Heavy jet aircraft to use greater than normal taxiing power.

b. Small aircraft or helicopters to taxi in close proximity to taxiing or hover-taxi helicopters.

3–82 Reference.— AC 90–23, Wake Turbulence, paragraph 10 and paragraph 11.

3–83 RUNWAY PROXIMITY

Hold a taxiing aircraft or vehicle clear of the runway as follows:

a. Instruct aircraft or vehicle to hold short of a specific runway.

b. Instruct aircraft or vehicle to hold at a specified point.

c. Issue traffic information as necessary.

Phraseology:
HOLD SHORT OF/AT (runway number or specific point), (traffic or other information).

3–83 Note.— Establishing hold lines/signs is the responsibility of the airport manager. The standards for surface measurements, markings, and signs are contained in AC 150/5300–13, AC 150/5340–1 and AC 150/5340–18. The operator is responsible for properly positioning the aircraft, vehicle, or equipment at the appropriate hold line/sign or designated point. The requirements in paragraph 3–12, Visually Scanning Runways, remain valid as appropriate.

3–83 Reference.— Taxi and Ground Movement Operation, paragraph 3–81; Altitude Restricted Low Approach, paragraph 3–129, Vehicles/ Equipment/Personnel on Runways, paragraph 3–5.

3–84 PRECISION APPROACH CRITICAL AREA

a. Instrument Landing System (ILS) critical area dimensions are described in FAA Order 6750.16, Siting Criteria for Instrument Landing Systems. Aircraft and vehicle access to the ILS/MLS critical area must be controlled to ensure the integrity of ILS/MLS course signals whenever conditions are less than reported ceiling 800 feet and/or visibility less than 2 miles. Do not authorize vehicles/aircraft to operate in or over the critical area, except as specified in subparagraph 3–84a1, whenever an arriving aircraft is inside the ILS outer marker (OM) or the fix used in lieu of the OM unless the arriving aircraft has reported the runway in sight or is circling to land on another runway.

Phraseology:
HOLD SHORT OF (Runway) ILS/MLS CRITICAL AREA.

1. LOCALIZER CRITICAL AREA

(a) Do not authorize vehicle or aircraft operations in or over the area when an arriving aircraft is inside the instrument landing system (ILS) outer marker (OM) or the fix used in lieu of the OM when conditions are less than reported ceiling 800 feet and/or visibility 2 miles, except:

(1) A preceding arriving aircraft on the same or another runway that passes over or through the area while landing or exiting the runway.

(2) A preceding departing aircraft or missed approach on the same or another runway that passes through or over the area.

(b) In addition to subparagraph 3–84a1(a), do not authorize vehicles or aircraft operations in or over the area when an arriving aircraft is inside the middle marker when conditions are less than reported ceiling 200 feet and/or RVR 2,000 feet.

2. GLIDESLOPE CRITICAL AREA – Do not authorize vehicles or aircraft operations in or over the area when an arriving aircraft is inside the ILS OM or the fix used in lieu of the OM unless the arriving aircraft has reported the runway in sight or is circling to land on another runway when conditions are less than reported ceiling 800 feet and/or visibility less than 2 miles.

b. Air carriers commonly conduct "coupled" or "autoland" operations to satisfy maintenance, training, or reliability program requirements. Promptly issue an advisory if the critical area will not be protected when an arriving aircraft advises that a "coupled," "CAT III," "autoland," or similar type approach will be conducted and the weather is a reported ceiling of 800 feet or more, and the visibility is 2 miles or more.

Phraseology:
ILS/MLS CRITICAL AREA NOT PROTECTED.

c. The Department of Defense (DOD) is authorized to define criteria for protection of precision approach critical areas at military controlled airports. This protection is provided to all aircraft operating at that military controlled airport. Waiver authority for DOD precision approach critical area criteria rests with the appropriate military authority.

3–84 Note.— Signs and markings are installed by the airport operator to define the ILS/MLS critical area. No point along the longitudinal axis of the aircraft is permitted past the hold line for holding purposes. The operator is responsible to properly position the aircraft, vehicle, or equipment at the appropriate hold line/sign or designated point. The requirements in paragraph 3–12, Visually Scanning Runways, remain valid as appropriate.

3–84 Reference 1.— Advisory Circular 150/5340–1, Marking Paved Areas on Airports.

3–84 Reference 2.— Airman's Information Manual.

3–85 thru 3–89 RESERVED

Section 9. DEPARTURE PROCEDURES AND SEPARATION

3–100 DEPARTURE INFORMATION

Provide current departure information, as appropriate, to departing aircraft. Departure information contained in the ATIS broadcast may be omitted if the pilot states the appropriate ATIS code. Runway, wind, and altimeter may be omitted if a pilot uses the phrase "have numbers." Issue departure information by including the following:

3–100 Note.—Pilot use of "have numbers" does not indicate receipt of the ATIS broadcast.

a. Runway in use.

b. Surface wind from direct readout dials. At LLWAS locations, centerfield wind from the LLWAS display.

c. Altimeter setting.

3–100c Reference.—Current Settings, paragraph 2–120.

d. Time, when requested.

e. Issue the official ceiling and visibility, when available, to a departing aircraft before takeoff as follows:

1. To a VFR aircraft when weather is below VFR conditions.

2. To an IFR aircraft when weather is below VFR conditions or highest takeoff minima, whichever is greater.

3–100e2 Note.—Standard takeoff minimums are published in Part 91.175(f). Takeoff minima other than standard are prescribed for specific airports/runways and published in a tabular form supplement to the NOS instrument approach procedures charts and appropriate FAA Forms 8260.

f. Taxi information, as necessary. You need not issue taxi route information unless the pilot specifically requests it.

g. *USAF NOT APPLICABLE.* An advisory to "check density altitude" when appropriate.

3–100g Reference.—FAA Order 7210.3, Broadcast Density Altitude Advisory, paragraph 2–145.

h. Issue braking action for the runway in use as received from pilots or the airport management when Braking Action Advisories are in effect.

3–100h Reference.—Braking Action Advisories, paragraph 3–34. Pilot/Controller Glossary—Braking Action Advisories.

3–100 Reference.—Altimeter Setting Issuance Below Lowest Usable FL, paragraph 2–121. Low Level Wind Shear Advisories, paragraph 3–8.

3–101 DEPARTURE DELAY INFORMATION

USA/USAF/USN NOT APPLICABLE

When gate-hold procedures are in effect, issue the following departure delay information as appropriate:

3–101 Reference.—FAA Order 7210.3, Gate Hold Procedures, paragraph 12–42.

a. Advise departing aircraft the time at which the pilot can expect to receive engine startup advisory.

Phraseology:

GATE HOLD PROCEDURES ARE IN EFFECT. ALL AIRCRAFT CONTACT (position) ON (frequency) FOR ENGINE START TIME. EXPECT ENGINE START/TAXI (time).

b. Advise departing aircraft when to start engines and/or to advise when ready to taxi.

Phraseology:

START ENGINES, ADVISE WHEN READY TO TAXI

or

ADVISE WHEN READY TO TAXI

c. If the pilot requests to hold in a delay absorbing area, the request shall be approved if space and traffic conditions permit.

d. Advise all aircraft on GC/FD frequency upon termination of gate hold procedures.

Phraseology:

GATE HOLD PROCEDURES NO LONGER IN EFFECT.

3–102 DEPARTURE CONTROL INSTRUCTIONS

Inform departing IFR and TRSA VFR aircraft of the following:

a. *Before takeoff—*

1. Issue the appropriate departure control frequency and beacon code. The departure control frequency may be omitted if a SID has been or will be assigned and the departure control frequency is published on the SID.

Phraseology:

DEPARTURE FREQUENCY WILL BE (frequency), SQUAWK (code).

2. Inform all departing IFR military turboprop/turbojet aircraft (except transport and cargo types) to change to departure control frequency. If the local controller has departure frequency override, transmit urgent instructions on this frequency. If the override capability does not exist, transmit urgent instructions on the emergency frequency.

Phraseology:

CHANGE TO DEPARTURE.

b. After takeoff—

1. When the aircraft is about ½ mile beyond the runway end, instruct civil aircraft and military transport and cargo types to contact departure control provided further communication with you is not required.

2. Do not request departing military turboprop/turbojet aircraft (except transport and cargo types) to make radio frequency or radar beacon changes before the aircraft reaches 2,500 feet above the surface.

3–102 Reference.—Visual Separation, paragraph 7–10.

3–103 TAKEOFF POSITION HOLD

a. Authorize an aircraft to taxi into position and hold, except as restricted in subparagraph 3–103c, when takeoff clearance cannot be issued because of traffic. Issue traffic information to any aircraft so authorized. Traffic information may be omitted when the traffic is another aircraft which has landed on or is taking off the same runway and is clearly visible to the holding aircraft. Do not use conditional phrases such as "behind landing traffic" or "after the departing aircraft."

b. First state the runway number followed by the taxi into position clearance when more than one runway is active.

Phraseology:

RUNWAY (number), TAXI INTO POSITION AND HOLD

or,

when only one runway is active:

TAXI INTO POSITION AND HOLD.

c. Do not authorize an aircraft to taxi into position and hold at an intersection between sunset and sunrise or at anytime when the intersection is not visible from the tower.

d. *USN:* Do not authorize aircraft to taxi into takeoff position to hold simultaneously on intersecting runways.

Phraseology:

CONTINUE HOLDING,

or

TAXI OFF THE RUNWAY.

3–103d Reference.—Altitude Restricted Low Approach, paragraph 3–129.

e. *USAF/USN:* When issuing additional instructions or information to an aircraft holding in takeoff position, include instructions to continue holding or taxi off the runway, unless it is cleared for takeoff.

Phraseology:

CONTINUE HOLDING,

or

TAXI OFF THE RUNWAY.

3–103e Reference.— Altitude Restricted Low Approach, paragraph 3–129.

3–104 ANTICIPATING SEPARATION

Takeoff clearance need not be withheld until prescribed separation exists if there is a reasonable assurance it will exist when the aircraft starts takeoff roll.

3–105 SAME RUNWAY SEPARATION

Separate a departing aircraft from a preceding departing or arriving aircraft using the same runway by ensuring that it does not begin takeoff roll until:

a. The other aircraft has departed and crossed the runway end or turned to avert any conflict. If you can determine distances by reference to suitable landmarks, the other aircraft need only be airborne if the following minimum distance exists between aircraft:

1. When only Category I aircraft are involved—*3,000 feet.*

2. When a Category I aircraft is preceded by a Category II aircraft—*3,000 feet.*

3. When either the succeeding or both are Category II aircraft—*4,500 feet.*

4. When either is a Category III aircraft—*6,000 feet.*

5. When the succeeding aircraft is a helicopter, visual separation may be applied in lieu of using distance minima. (See Figure 3–105[1] and Figure 3–105[2]).

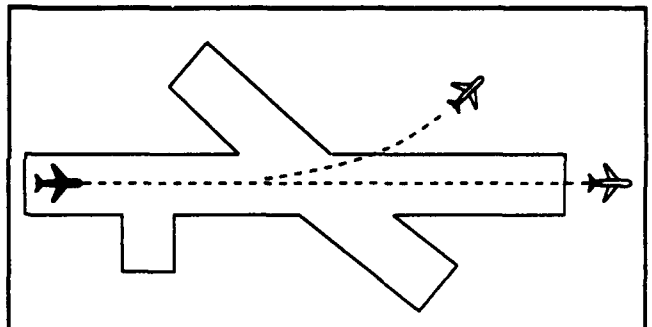


Figure 3–105[1]

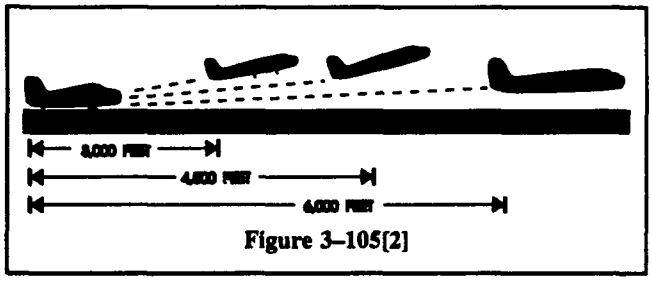


Figure 3–105[2]

3–105a Note.—Aircraft same runway separation (SRS) Categories are specified in Appendix A, B, and C and based upon the following definitions:

Category I— "Small" weight class (12,500 lbs. or less), single-engine, propeller-driven aircraft, and all helicopters.

Category II— "Small" weight class (12,500 lbs. or less), twin-engine, propeller-driven aircraft.

Category III— All other aircraft.

b. A preceding landing aircraft is clear of the runway. (See Figure 3–105[3]).

3–105b Reference.—Pilot/Controller Glossary—Clear of the Runway

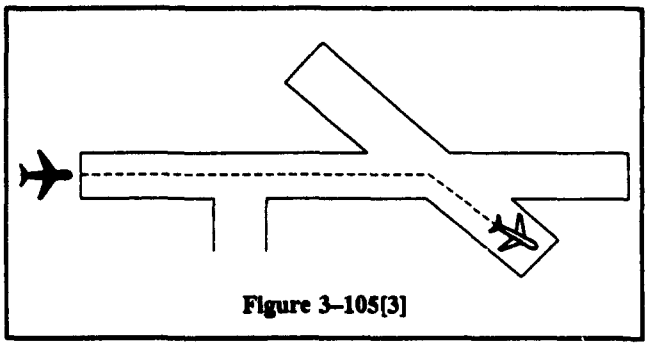


Figure 3–105[3]

WAKE TURBULENCE APPLICATION

c. Do not issue clearances which imply or indicate approval of rolling takeoffs by heavy jet aircraft.

d. Do not issue clearances to a small aircraft to taxi into position and hold on the same runway behind a departing heavy jet aircraft to apply the necessary intervals.

3–105d Reference.—AC 90–23, Wake Turbulence.

e. The minima in paragraph 5–72d may be applied in lieu of the 2–minute requirement in subparagraph 3–105f. When paragraph 5–72d minima are applied, ensure that the appropriate radar separation exists at or prior to the time an aircraft becomes airborne when taking off behind a heavy jet.

3–105e Note.—The pilot may request additional separation; i.e., 2 minutes vs. 4 miles, but should make this request before taxiing on the runway.

f. Separate IFR/VFR aircraft taking off behind a heavy jet departure by *2 minutes,* when departing:

3–105f Note.—Takeoff clearance to the following aircraft should not be issued until *2 minutes* after the heavy jet begins takeoff roll.

1. The same runway. (See Figure 3–105[4]).

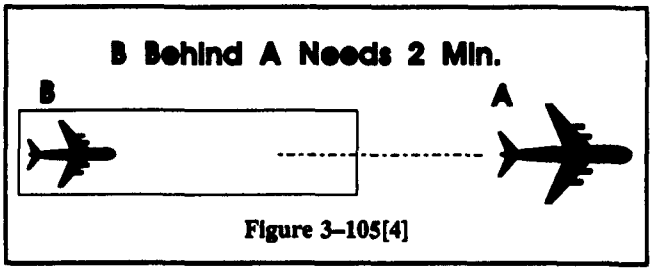


Figure 3–105[4]

2. A parallel runway separated by less than 2,500 feet.

g. Separate an aircraft from a heavy jet when operating on a runway with a displaced landing threshold if projected flight paths will cross—*2 minutes* when:

1. A departure follows a heavy jet arrival.
2. An arrival follows a heavy jet departure.

h. The 2–minute minima need not be applied if the pilot of a departing IFR/VFR aircraft has initiated a request to deviate from the 2–minute interval. In this case, issue a wake turbulence cautionary advisory before clearing the aircraft for takeoff.

i. Separate a small aircraft behind a large aircraft taking off or making a low/missed approach when utilizing opposite direction takeoffs on the same runway by *3 minutes* unless a pilot has initiated a request to deviate from the 3–minute interval. In the latter case, issue a wake turbulence advisory before clearing the aircraft for takeoff.

3–105i Note.—A request for takeoff does not initiate a waiver request; the request for takeoff must be accompanied by a request to deviate from the 3–minute rule.

3–105i Reference.—Aircraft Weight Classes and Groups: Appendix A, Appendix B, and Appendix C.

j. Separate aircraft behind a heavy jet departing or making a low/missed approach when utilizing opposite direction takeoffs or landings on the same or parallel runways separated by less than 2,500 feet - *3 minutes.*

k. Inform an aircraft when it is necessary to hold in order to provide the required *3–minute* interval.

Phraseology:

HOLD FOR WAKE TURBULENCE.

3–105 Reference.—Wake Turbulence Separation for Intersection Departures, paragraph 3–106.

3–106 WAKE TURBULENCE SEPARATION FOR INTERSECTION DEPARTURES

a. Apply the following wake turbulence criteria for intersection departures:

1. Separate a small aircraft taking off from an intersection on the same runway (same or opposite direction takeoff) behind a preceding departing large aircraft by ensuring that the small aircraft does not start takeoff roll until at least 3 minutes after the large aircraft has taken off.

2. Separate any aircraft taking off from an intersection on the same runway (same or opposite direction takeoff) and parallel runways separated by less than 2,500 feet, by ensuring that the aircraft does not start takeoff roll until at least 3 minutes after a heavy aircraft has taken off.

3. Inform an aircraft when it is necessary to hold in order to provide the required 3–minute interval.

Phraseology:

HOLD FOR WAKE TURBULENCE.

3–106a Note.— Aircraft conducting touch–and–go and stop–and–go operations are considered to be departing from an intersection, reference paragraph 3–91.

b. The 3–minute interval is not required when:

1. A pilot has initiated a request to deviate from that interval, or

3–106b1 Note.– A request for takeoff does not initiate a waiver request; the request for takeoff must be accomplished by a request to deviate from the 3–minute interval.

2. USA NOT APPLICABLE. The intersection is 500 feet or less from the departure point of the preceding aircraft and both aircraft are taking off in the same direction.

3. Successive touch–and–go and stop–and–go operations are conducted with a small aircraft following a large aircraft in the pattern, or large aircraft departing the same runway, provided the pilot of the small aircraft is maintaining visual separation/spacing behind the preceding large aircraft. Issue a wake turbulence cautionary advisory and the position of the large aircraft.

3–106b3 Example.—

"Caution wake turbulence, DC–9 on base leg."

4. Successive touch–and–go and stop–and–go operations are conducted with any aircraft following a heavy aircraft in the pattern, or heavy aircraft departing the same runway, provided the pilot of the aircraft is maintaining visual separation/spacing behind the preceding heavy aircraft. Issue a wake turbulence cautionary advisory and the position of the heavy aircraft.

3–106b4 Example.—

"Caution wake turbulence, heavy Lockheed C5A departing runway two three."

5. If action is initiated to reduce the separation between successive touch–and–go or stop–and–go operations, apply 3 minutes separation.

c. When applying the provision of subparagraph 3–106b:

1. Issue a wake turbulence advisory before clearing the aircraft for takeoff.

2. Do not clear the intersection departure for an immediate takeoff.

3. Issue a clearance to permit the trailing aircraft to deviate from course enough to avoid the flight path of the preceding large departure when applying subparagraph 3–106b1 or 2.

4. Separation requirements in accordance with paragraph 3–105a must also apply.

3–106b and c Reference.– Aircraft Categories, paragraph 3–105a Note.

3–107 INTERSECTING RUNWAY SEPARATION

Separate departing aircraft from an aircraft using an intersecting runway, or nonintersecting runways when the flight paths intersect, by ensuring that the departure does not begin takeoff roll until one of the following exists:

a. The preceding aircraft has departed and passed the intersection, has crossed the departure runway, or is turning to avert any conflict. (See Figure 3–107[1] and Figure 3–107[2]).

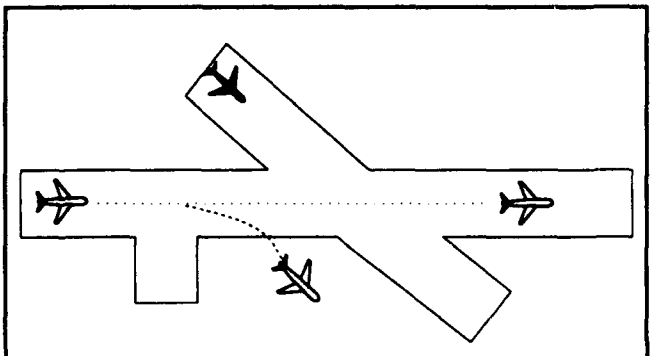


Figure 3–107[1]

b. A preceding arriving aircraft is clear of the landing runway, completed the landing roll and will hold short of the intersection, passed the intersection, or has crossed over the departure runway. (See Figure 3–107[3] and Figure 3–107[4]).

3–107b Reference.— Pilot/Controller Glossary—Clear of the Runway

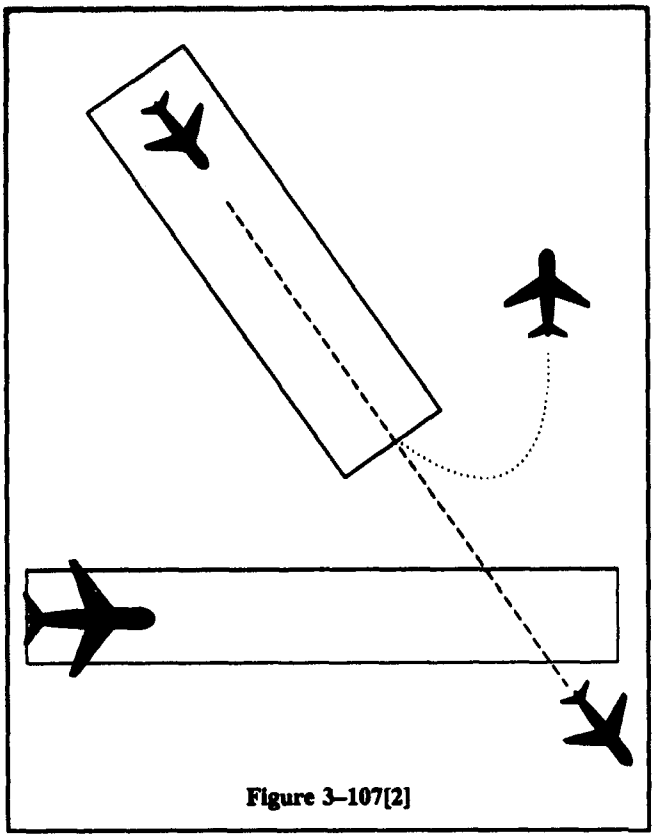


Figure 3–107[2]

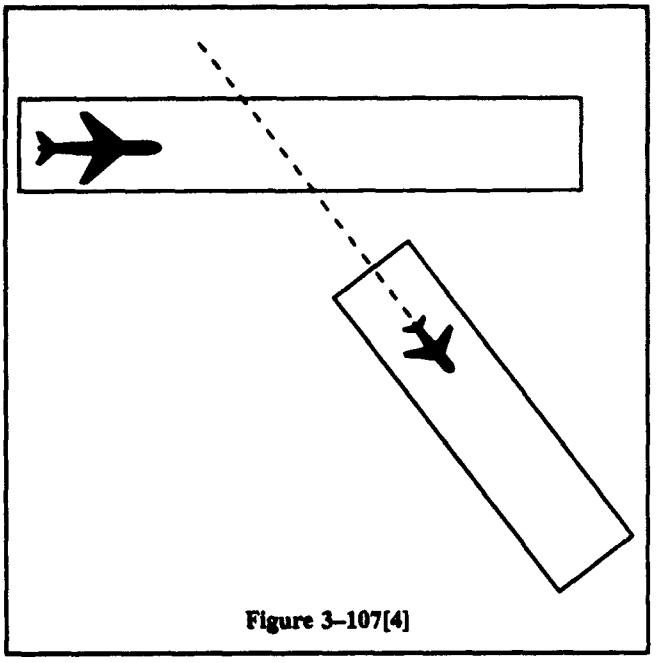


Figure 3–107[4]

WAKE TURBULENCE APPLICATION

c. Separate IFR/VFR aircraft taking off behind a heavy jet departure by *2 minutes* when departing:

3–107c Note.—Takeoff clearance to the following aircraft should not be issued until 2 minutes after the heavy jet begins takeoff roll.

1. Crossing runways if projected flight paths will cross. (See Figure 3–107[5]).

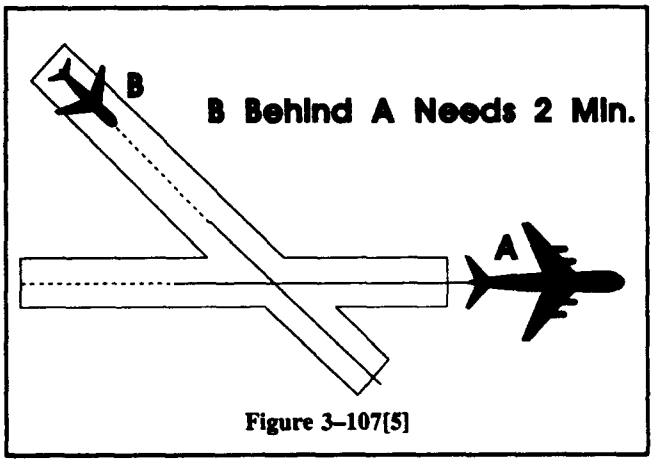


Figure 3–107[5]

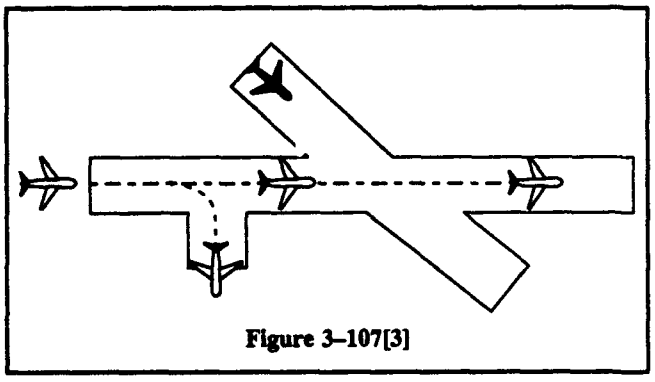


Figure 3–107[3]

2. A parallel runway separated by 2,500 feet or more if projected flight paths will cross. (See Figure 3–107[6]).

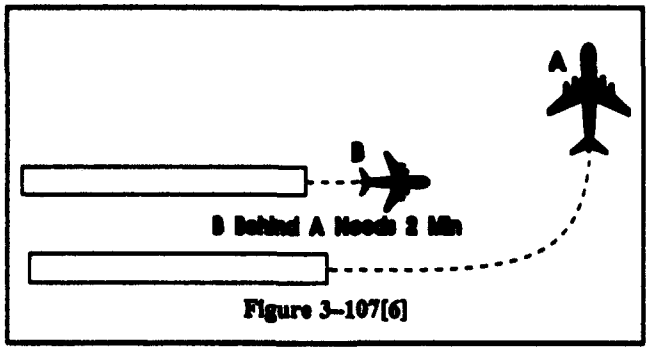


Figure 3–107[6]

d. Separate IFR/VFR aircraft departing behind a landing heavy jet on a crossing runway if the departure will fly through the airborne path of the arrival— *2 minutes.* (See Figure 3–107[7]).

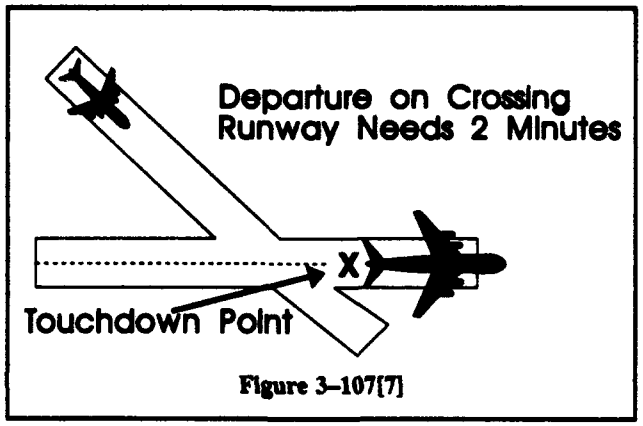


Figure 3–107[7]

e. The *2–minute* minima need not be applied if the pilot of a departing IFR/VFR aircraft has initiated a request to deviate from the *2–minute* interval. In this case, issue a wake turbulence cautionary advisory before clearing the aircraft for takeoff.

3–107 Reference.— Successive or Simultaneous Departures, paragraph 5–113. Departures and Arrivals on Parallel or Non-Intersecting Diverging Runways, paragraph 5–115.

3–108 TAKEOFF CLEARANCE

a. When only one runway is active, issue takeoff clearance.

Phraseology:
CLEARED FOR TAKEOFF.

3–108a Note.—Turbine-powered aircraft may be considered ready for takeoff when they reach the runway unless they advise otherwise.

3–108a Reference.—Departure Terminology, paragraph 4–30.

b. When more than one runway is active, first state the runway number followed by the takeoff clearance.

Phraseology:
RUNWAY (number), CLEARED FOR TAKEOFF.

3–108b Example.—
"Runway Two Seven. Cleared for takeoff."

c. *USA/USN:* Issue surface wind and takeoff clearance to aircraft.

Phraseology:
WIND (surface wind in direction and velocity).

CLEARED FOR TAKEOFF.

3–109 CANCELLATION OF TAKEOFF CLEARANCE

Cancel a previously issued clearance for takeoff and inform the pilot of the reason if circumstances require. Once an aircraft has started takeoff roll, cancel the takeoff clearance only for the purpose of safety.

3–109 Note.—In no case should a takeoff clearance be canceled after an aircraft has started its takeoff roll solely for the purpose of meeting traffic management requirements/EDCT's.

Phraseology:
CANCEL TAKEOFF CLEARANCE (reason).

3–110 thru 3–119 RESERVED

Section 10. ARRIVAL PROCEDURES AND SEPARATION

3–120 LANDING INFORMATION

Provide current landing information, as appropriate, to arriving aircraft. Landing information contained in the ATIS broadcast may be omitted if the pilot states the appropriate ATIS code. Runway, wind, and altimeter may be omitted if a pilot uses the phrase "have numbers." Issue landing information by including the following:

2–120 Note.—Pilot use of "have numbers" does not indicate receipt of the ATIS broadcast.

a. Specific traffic pattern information (may be omitted if the aircraft is to circle the airport to the left).

Phraseology:

ENTER LEFT/RIGHT BASE. STRAIGHT-IN. MAKE STRAIGHT-IN. STRAIGHT-IN APPROVED. RIGHT TRAFFIC. MAKE RIGHT TRAFFIC. RIGHT TRAFFIC APPROVED. CONTINUE.

b. Runway in use.

c. Surface wind

d. Altimeter setting.

3–120d Reference.—Current Settings, paragraph 2–120.

e. Any supplementary information

f. Clearance to land.

g. Requests for additional position reports. Use prominent geographical fixes which can be easily recognized from the air, preferably those depicted on sectional charts. This does not preclude the use of the legs of the traffic pattern as reporting points.

3–120g Note.—At some locations, VFR checkpoints are depicted on Sectional Aeronautical and Terminal Area Charts. In selecting geographical fixes, depicted VFR checkpoints are preferred unless the pilot exhibits a familiarity with the local area.

h. Ceiling and visibility if either is below basic VFR minima.

i. Low level windshear advisories when available.

3–120i Reference.—Low Level Windshear Advisories, paragraph 3–8.

j. Issue braking action for the runway in use as received from pilots or the airport management when Braking Action Advisories are in effect.

3–120j Reference.—Braking Action Advisories, paragraph 3–34. Pilot/Controller Glossary—Braking Action Advisories.

3–121 FORWARDING APPROACH INFORMATION BY NONAPPROACH CONTROL FACILITIES

a. Forward the following, as appropriate, to the control facility having IFR jurisdiction in your area. You may eliminate those items that, because of local conditions or situations, are fully covered in a letter of agreement or a facility directive.

1. When you clear an arriving aircraft for a visual approach.

3–121a1 Reference.—Visual Approach, paragraph 7–30.

2. Aircraft arriving time.

3. Cancellation of IFR flight plan.

4. Information on a missed approach, unreported, or overdue aircraft.

5. Runway in use.

6. Weather as required.

3–121a6 Reference.—Reporting Weather Conditions, paragraph 2–115.

b. When the weather is below 1,000 feet or 3 miles or the highest circling minimums, whichever is greater, issue current weather to aircraft executing an instrument approach if it changes from that on the ATIS or that previously forwarded to the center/approach control.

3–122 SAME RUNWAY SEPARATION

a. Separate an arriving aircraft from another aircraft using the same runway by ensuring that the arriving aircraft does not cross the landing threshold until one of the following conditions exists or unless authorized in paragraph 3–131:

1. The other aircraft has landed and is clear of the runway. Between sunrise and sunset, if you can determine distances by reference to suitable landmarks and the other aircraft has landed, it need not be clear of the runway if the following minimum distance from the landing threshold exists: (See Figure 3–122[1]).

3–122a1 Reference.— Pilot/Controller Glossary—Clear of the Runway.

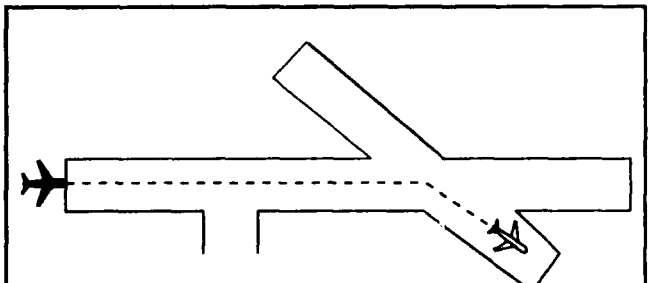


Figure 3–122[1]

(a) When a Category I aircraft is landing behind a Category I or II— *3,000 feet.* (See Figure 3–122[2]).

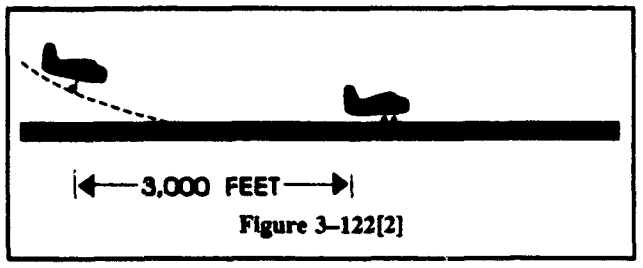


Figure 3–122[2]

(b) When a Category II aircraft is landing behind a Category I or II— *4,500 feet.* (See Figure 3–122[3]).

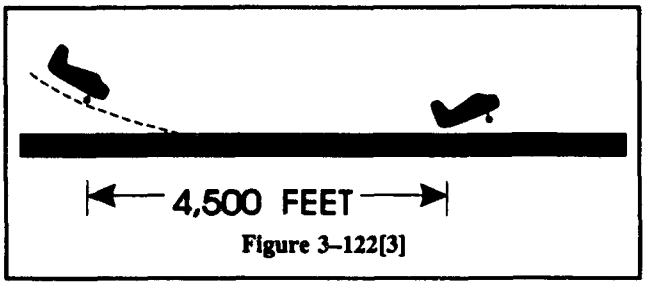


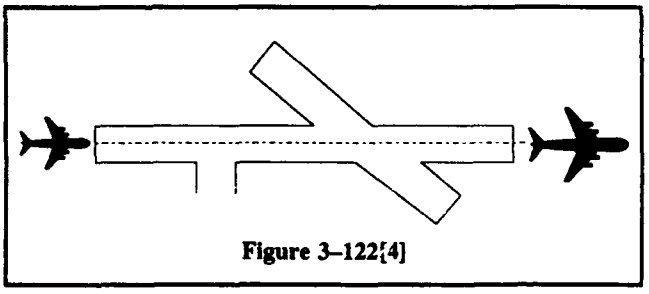
Figure 3–122[3]

2. The other aircraft has departed and crossed the runway end. If you can determine distances by reference to suitable landmarks and the other aircraft is airborne, it need not have crossed the runway end if the following minimum distance from the landing threshold exists:

(a) Category I aircraft landing behind Category I or II— *3,000 feet.*

(b) Category II aircraft landing behind Category I or II— *4,500 feet.*

(c) When either is a category III aircraft— *6,000 feet.* (See Figure 3–122[4] and Figure 3–122[5]).


Figure 3–122[4]

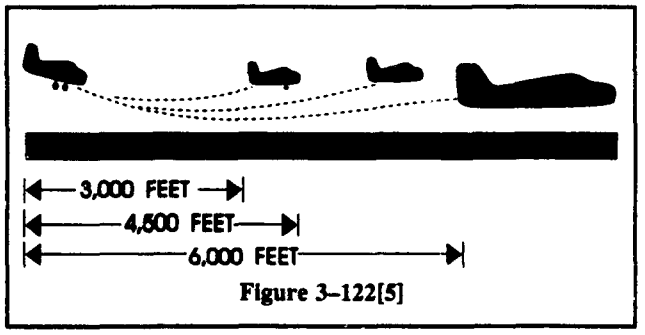


Figure 3–122[5]

3. When the succeeding aircraft is a helicopter, visual separation may be applied in lieu of using distance minima.

WAKE TURBULENCE APPLICATION

b. Issue wake turbulence cautionary advisories and the position, altitude if known, and direction of flight of the heavy jets or B–757's to aircraft landing behind a departing/arriving heavy jet or B–757 on the same or parallel runways separated by less than 2,500 feet.

3–122b Reference.—AC 90–23, Pilot Responsibility, paragraph 12.

3–122b Example 1.—

"Runway Two Seven Left cleared to land, caution wake turbulence, heavy Boeing 747 departing Runway Two Seven Right."

3–122b Example 2.—

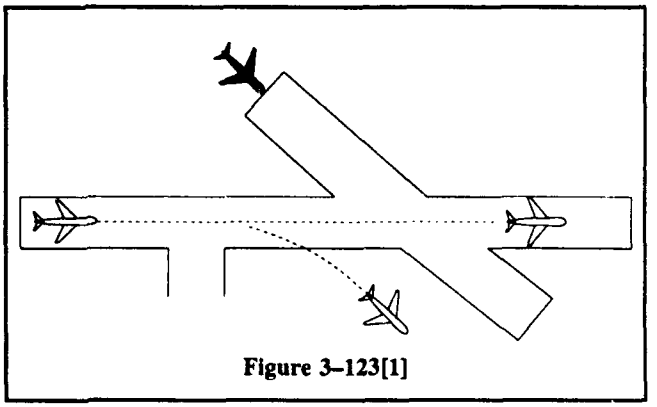
"Number two to land, following a Boeing 757 on two-mile final. Caution wake turbulence."

3–122 Reference.—Altitude Restricted Low Approach, paragraph 3–129.

3–123 INTERSECTING RUNWAY SEPARATION

a. Separate an arriving aircraft using one runway from another aircraft using an intersecting runway or a nonintersecting runway when the flight paths intersect by ensuring that the arriving aircraft does not cross the landing threshold or flight path of the other aircraft until one of the following conditions exists:

1. The preceding aircraft has departed and passed the intersection/flight path or is airborne and turning to avert any conflict. (See Figure 3–123[1] and Figure 3–123[2]).


Figure 3–123[1]

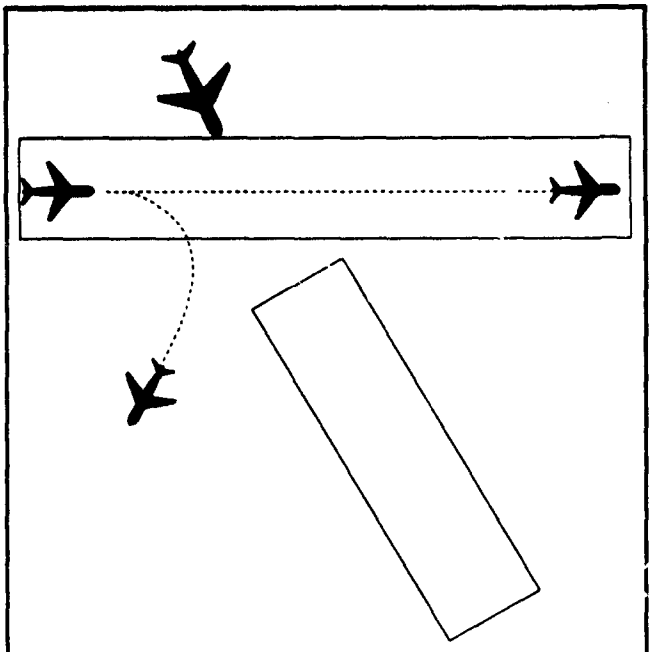


Figure 3–123[2]

2. A preceding arriving aircraft is clear of the landing runway, completed landing roll and will hold short of the intersection/flight path, or has passed the intersection/flight path. (See Figure 3–123[3] and Figure 3–123[4]).

3–123a2 Reference.— Pilot/Controller Glossary—Clear of the Runway.

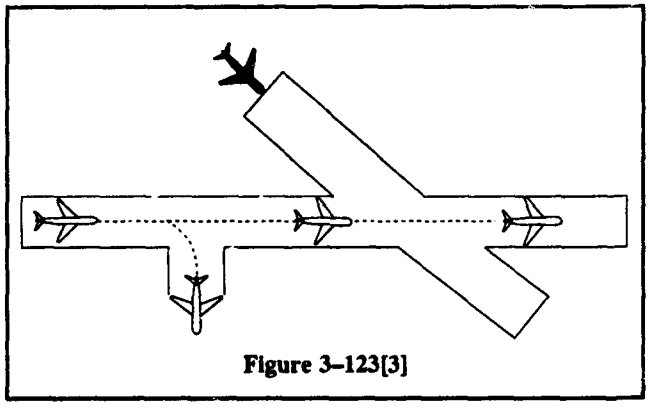


Figure 3–123[3]

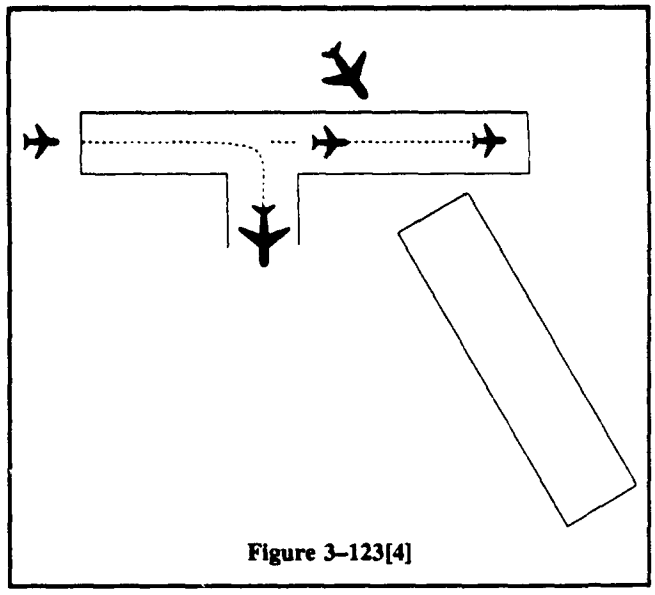


Figure 3–123[4]

b. *USN NOT APPLICABLE. (USAF ONLY:* Major command approval required prior to conducting simultaneous operations on intersecting runways). An aircraft may be authorized to takeoff from one runway while another aircraft lands simultaneously on an intersecting runway or an aircraft lands on one runway while another aircraft lands simultaneously on an intersecting runway. The procedure shall be approved by the Air Traffic Manager and be in accordance with a facility directive. The following conditions apply:

3–123b Note.—Application of these procedures does not relieve controllers from the responsibility of providing other appropriate separation contained in this Order.

3–123b Reference.—FAA Order 7210.3, Simultaneous Operations on Intersecting Runways, paragraph 12–36.

1. A simultaneous takeoff and landing operation shall only be conducted in VFR conditions.

2. Instruct the landing aircraft to hold short of the intersecting runway being used by the aircraft taking off. In the case of simultaneous landings and no operational benefit is lost, restrict the aircraft in the lesser Group.

Phraseology:

HOLD SHORT OF RUNWAY (runway number), (traffic or other information).

3–123b2 Note.—Pilots who prefer to use the full length of the runway or a runway different from that specified are expected to advise ATC prior to landing.

3. Issue traffic information to both aircraft involved and obtain an acknowledgment from each.

3–123b Example 1.—

"Runway One Eight cleared to land, hold short of Runway One Four Left, traffic landing Runway One Four Left."

"Runway One Four Left cleared to land, traffic landing Runway One Eight will hold short of the intersection."

3–123b Example 2.—

"Runway Three Six cleared to land, hold short of Runway Three Three, traffic departing Runway Three Three."

"Traffic landing Runway Three Six will hold short of the intersection, Runway Three Three cleared for takeoff."

4. Issue the measured distance from the landing threshold to the hold short point rounded "down" to the nearest 50–foot increment if requested by either aircraft.

3–123b4 Example.—

"Five thousand fifty feet available."

5. The conditions in subparagraphs 3–123b2, 3, and 4 shall be met in sufficient time for the pilots to take other action, if desired, and no later than the time landing clearance is issued.

6. Both runways must be dry with no reports that braking action is less than good.

7. There is no tailwind for the landing aircraft restricted to hold short of the intersection.The wind may be described as "calm" when appropriate.

3–123b7 Reference.—Calm Wind Conditions, paragraph 2–114.

8. The aircraft restricted to hold short is listed in Appendix A, Appendix B, and Appendix C.

9. STOL aircraft operations are in accordance with a letter of agreement with the aircraft operator/ pilot, the aircraft is listed as a Group 1 in Appendix A, B, and C or the pilot confirms that it is a STOL aircraft.

WAKE TURBULENCE APPLICATION

c. Separate IFR/VFR aircraft landing behind a departing heavy jet on a crossing runway if the arrival will fly through the airborne path of the departure— *2 minutes* or the appropriate radar separation minima. (See Figure 3–123[5]).

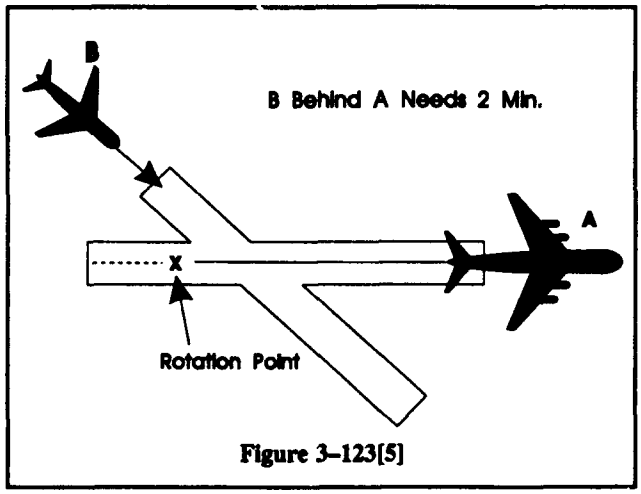


Figure 3–123[5]

d. Issue wake turbulence cautionary advisories and the position, altitude if known, and direction of flight of the heavy jets or B–757's to:

3–123d Reference.—AC 90–23, Pilot Responsibility, paragraph 12.

1. IFR/VFR aircraft landing on crossing runways behind a departing heavy jet or B–757; if the arrival flight path will cross the takeoff path behind the heavy jet or B–757 and behind the heavy jet or B–757 rotation point. (See Figure 3–123[6]).

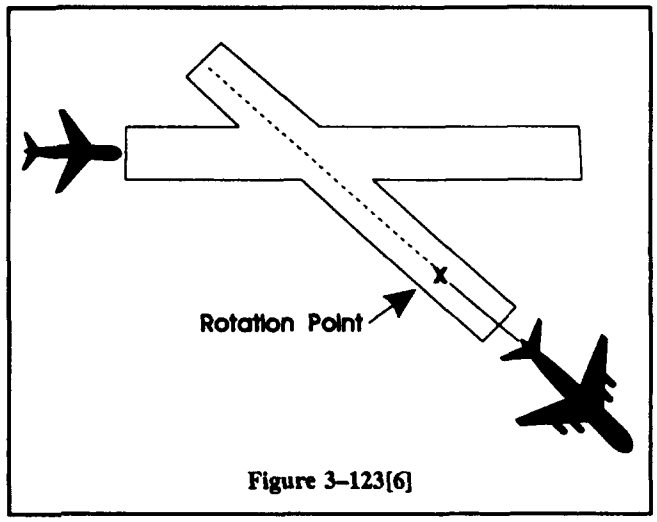


Figure 3–123[6]

3–123d1 Example.—

"Runway Niner cleared to land. Caution wake turbulence, heavy C141 departing Runway One Five."

2. VFR aircraft landing on a crossing runway behind an arriving heavy jet or B–757 if the arrival flight path will cross. (See Figure 3–123[7]).

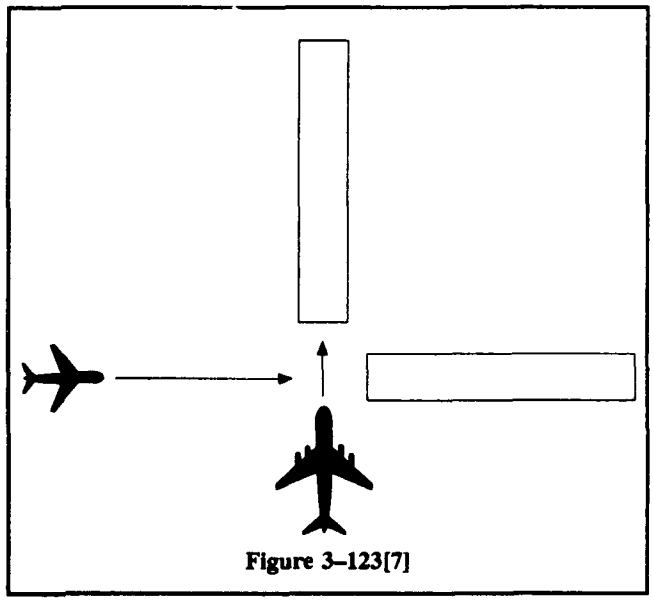


Figure 3–123[7]

3–123d2 Example.—

"Runway Niner cleared to land. Caution wake turbulence, Boeing 757 landing Runway Three Six."

3–123 Reference.—Approaches to Multiple Runways, paragraph 7–33.

3–124 LANDING CLEARANCE

Issue landing clearance. Restate the landing runway whenever there is a possibility of a conflict with another aircraft which is using or planning to

use another runway, or an instrument approach is being conducted to a closed runway.

Phraseology:

CLEARED TO LAND,

or

RUNWAY (designator) CLEARED TO LAND.

USA/USAF/USN Issue surface wind when clearing an aircraft to land, touch-and-go, stop-and-go, low approach, or the option. Restate the landing runway whenever there is a possibility of a conflict with another aircraft which is using or is planning to use another runway.

Phraseology:

WIND (surface wind direction and velocity),

CLEARED TO LAND,

or

WIND (surface wind direction and velocity),

RUNWAY (designator) CLEARED TO LAND.

3–124 Note.—A clearance to land means that appropriate separation on the landing runway will be ensured. A landing clearance does not relieve the pilot from compliance with any previously issued restriction.

3–125 ANTICIPATING SEPARATION

Landing clearance to a succeeding aircraft in a landing sequence need not be withheld if you observe the positions of the aircraft and determine that prescribed runway separation will exist when the aircraft cross the landing threshold. Issue traffic information to the succeeding aircraft.

3–125 Example.—

"Delta Forty-two cleared to land. Traffic is Eastern DC–9 over approach lights."

3–125 Reference.—Closed/Unsafe Runway Information, paragraph 3–31.

3–126 LANDING CLEARANCE WITHOUT VISUAL OBSERVATION

When an arriving aircraft reports at a position where he should be seen but has not been visually observed, advise the aircraft as a part of the landing clearance that it is not in sight and restate the landing runway.

Phraseology:

NOT IN SIGHT, RUNWAY (number) CLEARED TO LAND.

3–126 Note.—Aircraft observance on the BRITE radar display satisfies the visually observed requirement.

3–127 WITHHOLDING LANDING CLEARANCE

Do not withhold a landing clearance indefinitely even though it appears a violation of Title 14 of the Code of Federal Regulations has been committed. The apparent violation might be the result of an emergency situation. In any event, assist the pilot to the extent possible.

3–128 RUNWAY EXITING

a. Instruct aircraft where to turn–off the runway after landing, when appropriate, and advise the aircraft to hold short of a runway or taxiway if required for traffic.

Phraseology:

TURN LEFT/RIGHT (turning point),

or

IF ABLE, TURN LEFT/RIGHT (turning point)

and if required

HOLD SHORT OF (runway).

3–128a Note— Runway exiting or taxi instructions should not normally be issued to an aircraft prior to, or immediately after, touchdown.

b. Taxi instructions shall be provided to the aircraft by the local controller when:

1. Compliance with air traffic control (ATC) instructions will be required before the aircraft can change to ground control, or

2. The aircraft will be required to enter a taxiway/runway/ramp area, other than the one used to exit the landing runway, in order to taxi clear of the landing runway.

3–128b Example.—U.S. Air Ten Forty Two, turn right next taxiway, cross Taxiway Bravo, hold short of Taxiway Charlie, contact ground point seven.

3–128b Note 1.—An aircraft is expected to taxi clear of the runway unless otherwise directed by ATC. In the absence of ATC instructions, an aircraft should taxi clear of the landing runway even if that requires the aircraft to protrude into or enter another taxiway/runway/ramp area. This does not authorize an aircraft to cross a subsequent taxiway/runway/ramp after clearing the landing runway.

3–128b Note 2.—The pilot is responsible for ascertaining when the aircraft is clear of the runway.

c. Ground control and local control shall protect a taxiway/runway/ramp intersection if an aircraft is required to enter that intersection to clear the landing runway.

3–128c Reference.—FAA Order 7210.3, paragraph 12–7, Use of Active Runways.

d. Request a readback of runway hold short instructions when not received from the pilot.

Phraseology:

"American Four Ninety Two, turn left at taxiway Charlie, hold short of Runway 27 Right."

"American Four Ninety Two, Roger."

"American Four Ninety Two, read back hold instructions."

3–128 Note.— Readback hold instructions phraseology may be initiated for any point on a movement area when the controller believes the readback is necessary.

3–129 ALTITUDE RESTRICTED LOW APPROACH

A low approach with an altitude restriction of not less than 500 feet above the airport may be authorized except over an aircraft in takeoff

position or a departure aircraft. Do not clear aircraft for restricted altitude low approaches over personnel unless airport authorities have advised these personnel that the approaches will be conducted. Advise the approaching aircraft of the location of applicable ground traffic, personnel, or equipment.

3–129 Note 1.—The 500 feet restriction is a minimum. Higher altitudes should be used when warranted. For example, 1,000 feet is more appropriate for heavy aircraft operating over unprotected personnel or small aircraft on or near the runway.

3–129 Note 2.—This authorization includes altitude restricted low approaches over preceding landing or taxiing aircraft. Restricted low approaches are not authorized over aircraft in takeoff position or departing aircraft.

Phraseology:

CLEARED LOW APPROACH AT OR ABOVE (altitude). TRAFFIC (description and location).

3–129 Reference.—Vehicles/Equipment/Personnel on Runways, paragraph 3–5; Traffic Information, paragraph 3–6; Light Signals, paragraph 3–20; Timely Information, paragraph 3–32; Takeoff Position Hold, paragraph 3–103; Same Runway Separation, paragraph 3–122.

3–130 CLOSED TRAFFIC

Approve/disapprove pilot requests to remain in closed traffic for successive operations subject to local traffic conditions.

Phraseology:

LEFT/RIGHT (if required) CLOSED TRAFFIC APPROVED. REPORT (position if required),

or

UNABLE CLOSED TRAFFIC, (additional information as required).

3–130 Note.—Segregated traffic patterns for helicopters to runways and other areas may be established by letter of agreement or other local operating procedures.

3–130 Reference.—Runway Proximity, paragraph 3–83. Takeoff Position Hold, paragraph 3–103. Same Runway Separation, paragraph 3–122.

3–131 OVERHEAD MANEUVER

Issue the following to arriving aircraft that will conduct an overhead maneuver:

a. Pattern altitude and direction of traffic. Omit either or both if standard or when you know the pilot is familiar with a nonstandard procedure.

Phraseology:

PATTERN ALTITUDE (altitude). RIGHT TURNS.

b. Request for report on initial approach.

Phraseology:

REPORT INITIAL.

c. "Break" information and request for pilot report. Specify the point of "break" only if nonstandard. Request the pilot to report "break" if required for traffic or other reasons.

Phraseology:

BREAK AT (specified point).

REPORT BREAK.

d. Overhead maneuver patterns are developed at airports where aircraft have an operational need to conduct the maneuver. An aircraft conducting an overhead maneuver is on visual flight rules (VFR) and the IFR flight plan is cancelled when the aircraft reaches the "initial point" on the initial approach portion of the maneuver. The existence of a standard overhead maneuver pattern does not eliminate the possible requirement for an aircraft to conform to conventional rectangular patterns if an overhead maneuver cannot be approved.

3–131 Note.— Aircraft operating to an airport without a functioning control tower must initiate cancellation of the IFR flight plan prior to executing the overhead manuever or after landing.

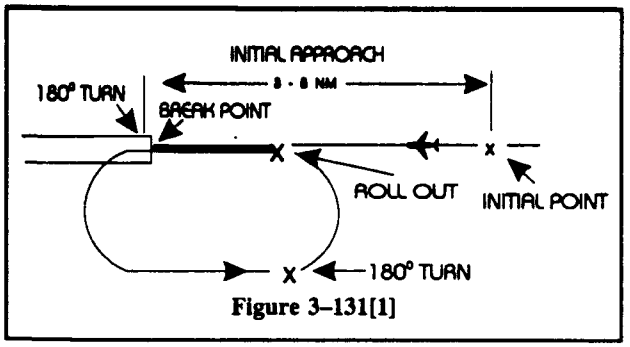


Figure 3–131[1]

3–131 Examples.—

"Air Force Three Six Eight, Runway Six, wind zero seven zero at eight, pattern altitude six thousand, report initial."

"Air Force Three Six Eight, break at midfield, report break"

"Air Force Three Six Eight, cleared to land."

"Alfa Kilo Two Two, Runway Three One, wind three three zero at one four, right turns, report initial."

"Alfa Kilo Two Two, report break."

"Alfa Kilo Two Two, cleared to land."

e. Timely and positive controller action is required to prevent a conflict when an overhead pattern could extend into the path of a departing or a missed approach aircraft. Local procedures and/or coordination requirements should be set forth in an appropriate Letter of Agreement, facility directive, base flying manual etc, when the frequency of occurrence warrants.

3–132 SIMULATED FLAMEOUT OPERATIONS/PRACTICE PRECAUTIONARY APPROACHES

Military aircraft may be authorized to make SFO/practice precautionary approaches if the following conditions are met:

3–132 Note.—Practice precautionary/flameout approaches are authorized only for specific aircraft. Precautionary approaches, however, might be made by any aircraft when engine failure is considered possible. The practice precautionary approach maneuvering area/altitudes may not conform to the standard flameout maneuvering area/altitudes.

3–132 Reference.—Low Approach and Touch-and-Go, paragraph 4–111. FAA Order 7610.4, paragraph 9–37.

Section 3. DEPARTURE PROCEDURES

4–30 DEPARTURE TERMINOLOGY

Avoid using the term "takeoff" except to actually clear an aircraft for takeoff or to cancel a takeoff clearance. Use such terms as "depart," "departure," or "fly" in clearances when necessary.

4–30 Reference. — Takeoff Clearance, paragraph 3–108, Cancellation of Takeoff Clearance, paragraph 3–109.

4–31 DEPARTURE CLEARANCES

Include the following items in IFR departure clearances:

4–31 Note.—When considered necessary, controllers or pilots may initiate readbacks of a clearance. Some pilots may be required by company rule to do so.

a. Always include the airport of departure when issuing a departure clearance for relay to an aircraft by an FSS, dispatcher, etc.

b. Clearance Limit—Specify the destination airport when practicable, even though it is outside controlled airspace. Issue short range clearances as provided for in any procedures established for their use.

c. Departure Procedures—

1. Specify direction of takeoff/turn or initial heading/azimuth to be flown after takeoff as follows:

(a) Locations with Airport Traffic Control Service—Specify these items as necessary.

(b) Locations without Airport Traffic Control Service, but within a Class E surface area—Specify these items if necessary. Obtain/solicit the pilot's concurrence concerning these items before issuing them in a clearance.

4–31c1(b) Note.—Direction of takeoff and turn after takeoff can be obtained/solicited directly from the pilot, or relayed by an FSS, dispatcher, etc., as obtained/solicited from the pilot.

(c) At all other airports—Do not specify direction of takeoff/turn after takeoff. If necessary to specify an initial heading/azimuth to be flown after takeoff, issue the initial heading/azimuth so as to apply only within controlled airspace.

2. When IFR departure procedures are published for a location and pilot compliance is necessary to insure separation, include the published departure procedure as part of the ATC clearance.

4–31c2 Note.—IFR takeoff minimums and departure procedures are prescribed for specific airports/runways and published in a tabular form supplement to the NOS Instrument Approach Procedure Charts and appropriate FAA Forms 8260. These procedures are identified on Instrument Approach Procedure charts with a symbol "SYM".

3. Compatibility with a procedure issued may be verified by asking the pilot if items obtained/solicited will allow him to comply with local traffic pattern, terrain, or obstruction avoidance.

Phraseology:

FLY RUNWAY HEADING.

DEPART (direction or runway).

TURN LEFT/RIGHT.

WHEN ENTERING CONTROLLED AIRSPACE (instruction), FLY HEADING (degrees) UNTIL REACHING (altitude, point, or fix) BEFORE PROCEEDING ON COURSE.

FLY A (degree) BEARING/AZIMUTH FROM/TO (fix) UNTIL (time),

or

UNTIL REACHING (fix or altitude),

and if required,

BEFORE PROCEEDING ON COURSE.

4–31c3 Examples.—

"Verify right turn after departure will allow compliance with local traffic pattern," or "Verify this clearance will allow compliance with terrain or obstruction avoidance."

4–31c3 Note.—If a published IFR departure procedure is not included in an ATC clearance, compliance with such a procedure is the pilot's prerogative.

4. SID's:

(a) Assign a SID or FMSP (including transition if necessary). Assign a Preferential Departure Route (PDR) or the route filed by the pilot only when a SID or FMSP is not established for the departure route to be flown or the pilot has indicated that he does not wish to use a SID or FMSP.

Phraseology:

(SID/FMSP name and number) DEPARTURE.

(SID/FMSP name and number) DEPARTURE, (transition name) TRANSITION.

4–31c4(a) Examples.—

"Stroudsburg One Departure."

"Stroudsburg One Departure, Sparta Transition."

"Stroudsburg One RNAV Departure."

4–31c4(a) Note.—If a pilot does not wish to use a SID or FMSP issued in an ATC clearance or any other SID or FMSP published for that location, he is expected to advise ATC.

(b) If it is necessary to assign a crossing altitude which differs from the SID or FMSP altitude, repeat the changed altitude to the pilot for emphasis.

Phraseology:

(SID/FMSP name) DEPARTURE, EXCEPT (revised altitude information). I SAY AGAIN (revised altitude information).

4–31c4(b) Examples.—

"Stroudsburg One Departure, except cross Quaker at five thousand. I say again, cross Quaker at five thousand."

"Astoria Two RNAV Departure, except cross Astor waypoint at six thousand. I say again, cross Astor waypoint at six thousand."

(c) Specify altitudes when they are not included in the SID or FMSP.

Phraseology:

4–31c4(c) Examples.—

"Stroudsburg One Departure. Cross Jersey intersection at four thousand. Cross Range intersection at six thousand."

"Engle Two RNAV Departure. Cross Pilim waypoint at or above five thousand. Cross Engle waypoint at or above seven thousand. Cross Gorge waypoint at niner thousand."

d. Route of flight—Specify one or more of the following:

1. Airway, route, course, heading, azimuth, arc, or vector.

2. The routing a pilot can expect if any part of the route beyond a short range clearance limit differs from that filed.

Phraseology:

EXPECT FURTHER CLEARANCE VIA (airways, routes, or fixes.).

e. Altitude—Use one of the following in the order of preference listed:

4–31e2 Note. 1—Turbojet aircraft equipped with afterburner engines may occasionally be expected to use afterburning during their climb to the en route altitude. When so advised by the pilot, the controller may be able to plan his traffic to accommodate the high performance climb and allow the pilot to climb to his planned altitude without restriction.

1. Assign the altitude requested by the pilot.

2. Assign an altitude, as near as possible to the altitude requested by the pilot, and

(a) Inform the pilot when to expect clearance to the requested altitude unless instructions are contained in the specified SID or FMSP, or

(b) If the requested altitude is not expected to be available, inform the pilot what altitude can be expected and when/where to expect it.

4–31e2 Note. 2—

a. The Code of Federal Regulations (CFR), Part 91.185, says that in the event of a two-way radio communication failure, in VFR conditions or if VFR conditions are encountered after the failure, the pilot shall continue the flight under VFR and land as soon as practicable. That section also says that when the failure occurs in IFR conditions the pilot shall continue flight at the highest of the following altitudes or flight levels for the route segment being flown:

1. The altitude or flight level assigned in the last ATC clearance received.

2. The minimum altitude (converted, if appropriate, to minimum flight level as prescribed in Part 91.121(c)) for IFR operations. (This altitude should be consistent with MEA's, MOCA's, etc.)

3. The altitude or flight level ATC has advised may be expected in a further clearance.

b. If the expected altitude is the highest of the preceding choices, the pilot should begin to climb to that expected altitude at the time or fix specified in the clearance. The choice to climb to the expected altitude is not applicable if the pilot has proceeded beyond the specified fix or if the time designated in the clearance has expired.

Phraseology:

CLIMB AND MAINTAIN (the altitude as near as possible to the pilots requested altitude). EXPECT (the requested altitude or an altitude different from the requested altitude) AT (time or fix), and if applicable, (pilot's requested altitude) IS NOT AVAILABLE.

4–31e2 Examples.—

A pilot has requested flight level 350. Flight level 230 is immediately available and flight level 350 will be available at the Appleton zero five zero radial 35 mile fix. The clearance will read: "Climb and maintain flight level two three zero. Expect flight level three five zero at Appleton zero five zero radial three five mile fix."

A pilot has requested 9,000 feet. An altitude restriction is required because of facility procedures or requirements. Assign the altitude and advise the pilot at what fix/time the pilot may expect the requested altitude. The clearance could read: "Climb and maintain five thousand. Expect niner thousand one zero minutes after departure."

A pilot has requested 17,000 feet which is unavailable. You plan 15,000 feet to be the pilot's highest altitude prior to descent to the pilot's destination but only 13,000 feet is available until San Jose VOR. Advised the pilot of the expected altitude change and at what fix/time to expect clearance to 15,000 feet. The clearance will read: Climb and maintain one three thousand. Expect one five thousand at San Jose. One seven thousand is not available.

4–31 Reference.—Abbreviated Departure Clearance, paragraph 4–32. Initial Heading, paragraph 5–111.

4–32 ABBREVIATED DEPARTURE CLEARANCE

a. Issue an abbreviated departure clearance if its use reduces verbiage and the following conditions are met:

4–32a Reference.—IFR-VFR and VFR-IFR Flights, paragraph 4–17.

1. The route of flight filed with ATC has not been changed by the pilot, company, operations officer, input operator, or in the stored flight plan program prior to departure.

4–32a1 Note.—A pilot will not accept an abbreviated clearance if the route of flight filed with ATC has been changed by him or the company or the operations officer before departure. He is expected to inform the control facility on initial radio contact if he cannot accept the clearance. It is the responsibility of the company or operations officer to inform the pilot when they make a change.

2. All ATC facilities concerned have sufficient route of flight information to exercise their control responsibilities.

4–32a2 Note.—The route of flight information to be provided may be covered in letters of agreement.

3. When the flight will depart IFR, destination airport information is relayed between the facilities concerned prior to departure.

4–32a3 Example 1.—

A tower or flight service station relay of destination airport information to the center when requesting clearance. "Request clearance for United Four Sixty-one to O'Hare."

4–32a3 Example 2.—

A center relay to the tower or flight service station when initiating a clearance, "Clearance for United Four Sixty-one to O'Hare."

Section 5. ALTITUDE ASSIGNMENT AND VERIFICATION

4–60 FLIGHT DIRECTION

Clear aircraft at altitudes according to the Table 4–60[1].

Table 4–60[1]
Altitude Assignment

Aircraft Operating	*On course degrees magnetic*	*Assign*	*Examples*
Below 3,000 feet above surface	Any course	Any altitude	
Below FL 290	0 through 179	Odd cardinal altitudes or flight levels at intervals of 2,000 feet	3,000, 5,000, FL250, FL270
	180 through 359	Even cardinal altitudes or flight levels at intervals of 2,000 feet	4,000, 6,000, FL240, FL260
At or above FL 290	0 through 179	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 290	FL290, FL330, FL370
	180 through 359	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 310	FL310, FL350, FL390
One way routes (except in composite systems)	Any course	Any cardinal altitude or flight level below FL 290 or any odd cardinal flight level at or above FL 290	FL270, FL280, FL310, FL330
Within an ALTRV	Any course	Any altitude or flight level	
In transition to/from or within Oceanic airspace where composite separation is authorized	Any course	Any odd or even cardinal flight level including those above FL290	FL280, FL290, FL300, FL310, FL320, FL330, FL340
In aerial refueling tracks and anchors	Any course	Altitude blocks as requested. Any altitude or flight level	050B080, FL180B220, FL280B310

4–60 Note. —Oceanic separation procedures are supplemented in Chapter 8, Section 7, Section 8, Section 9, and Section 10.

4–60 Reference.—Exceptions, paragraph 4–61. Altitude Assignments, paragraph 7–84. Separation Minima, paragraph 9–51.

4–61 EXCEPTIONS

When traffic, meteorological conditions, or aircraft operational limitations prevent assignment of altitudes prescribed in paragraph 4–60, assign any cardinal altitude or flight level below FL 290 or any odd cardinal flight level at or above FL 290 without regard to direction of flight as follows:

4–61 Note.—See paragraph 2–59 for control abbreviations and symbols to be used in conjunction with this paragraph.

a. For traffic conditions, take this action only if one of the following conditions exists:

1. Aircraft remain within a facility's area and prior approval is obtained from other affected positions or sectors or the operations are covered in a Facility Directive.

2. Aircraft will proceed beyond the facility's area and specific operations and procedures permitting random altitude assignment are covered in a letter of agreement between the appropriate facilities.

4–61a Note.—Those en route facilities using HOST software that provides capability for passing interim altitude shall include the specific operations and procedures for use of this procedure in a letter of agreement between the appropriate facilities.

3. Military aircraft are operating on random routes and prior approval is obtained from the facility concerned.

b. For meteorological conditions, take this action only if you obtain prior approval from other affected positions or sectors within your facility and, if necessary, from the adjacent facility concerned.

c. For aircraft operational limitations, take this action only if the pilot informs you the available

appropriate altitude exceeds the operational limitations of his aircraft and only after you obtain prior approval from other affected positions or sectors within your facility and, if necessary, from the adjacent facility concerned.

d. For mission requirements, take this action only when the aircraft is operating on an MTR.

4–61 Reference.—Altitude Assignments, paragraph 7–84. Separation Minima, paragraph 9–51.

4–62 LOWEST USABLE FLIGHT LEVEL

If a change in atmospheric pressure affects a usable flight level in your area of jurisdiction, use Table 4–62[1] to determine the lowest usable flight level to clear aircraft at or above 18,000 feet msl.

Table 4–62[1]
Lowest Usable FL

Altimeter Setting	*Lowest Usable FL*
29.92" or higher	180
29.91" to 28.92"	190
28.91" to 27.92"	200

4–62 Reference.—Separation Minima, paragraph 9–51.

4–63 ADJUSTED MINIMUM FLIGHT LEVEL

When the prescribed minimum altitude for IFR operations is at or above 18,000 feet MSL and the atmospheric pressure is less than 29.92", add the appropriate adjustment factor from Table 4–63[1] to the flight level equivalent of the minimum altitude in feet to determine the adjusted minimum flight level.

Table 4–63[1]
Minimum FL Adjustment

Altimeter Setting	*Adjustment Factor*
29.92" or higher	None
29.91" to 29.42"	500 feet
29.41" to 28.92"	1,000 feet
28.91" to 28.42"	1,500 feet
28.41" to 27.92"	2,000 feet

4–64 MINIMUM EN ROUTE ALTITUDES

Except as provided in subparagraphs a and b below, assign altitudes at or above the MEA for the route segment being flown. When a lower MEA for subsequent segments of the route is applicable, issue the lower MEA only after the aircraft is over or past the Fix/NAVAID beyond which the lower MEA applies unless a crossing restriction at or above the higher MEA is issued.

a. An aircraft may be cleared below the MEA but not below the MOCA for the route segment being flown if the altitude assigned is at least 300 feet above the floor of controlled airspace and one of the following conditions are met:

4–64a Note.—Controllers must be aware that in the event of radio communications failure, a pilot will climb to the MEA for the route segment being flown.

1. Nonradar procedures are used only within 22 miles of a VOR, VORTAC, or TACAN.

2. Radar procedures are used only when an operational advantage is realized and the following actions are taken:

(a) Radar navigational guidance is provided until the aircraft is within 22 miles of the NAVID, and

(b) Lost communications instructions are issued.

b. An aircraft may be cleared to operate on jet routes below the MEA (but not below the prescribed minimum altitude for IFR operations) or above the maximum authorized altitude if, in either case, radar service is provided.

4–64b Note.—Minimum en route and maximum authorized altitudes for certain jet route segments have been established above the floor of the jet route structure due to limitations on navigational signal coverage.

c. Where a higher altitude is required because of an MEA, the aircraft shall be cleared to begin climb to the higher MEA as follows:

1. If no MCA is specified, prior to or immediately after passing the fix where the higher MEA is designated. (See Figure 4–64[1]).

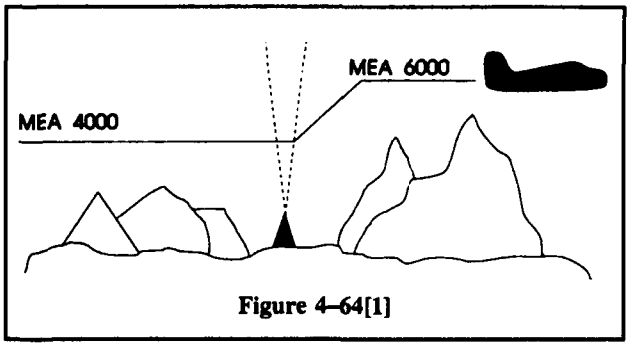


Figure 4–64[1]

2. If a MCA is specified, prior to the fix so as to cross the fix at or above the MCA. (See Figure 4–64[2]).

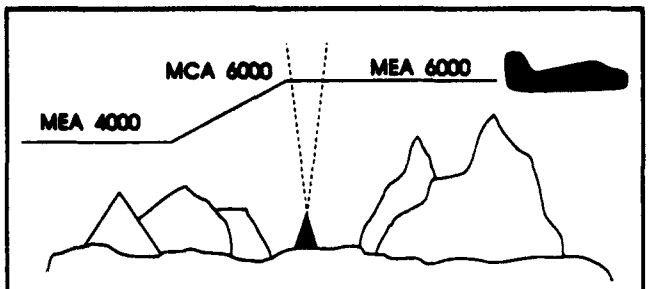


Figure 4–64[2]

d. Where MEA's have not been established, clear an aircraft at or above the minimum altitude for IFR operations prescribed by Part 91.177.

4–64 Reference.—IFR-VFR and VFR-IFR Flights, paragraph 4–17. Route Use, paragraph 4–30. Application, paragraph 5–90. Altitude Assignments, paragraph 7–84.

4–65 ALTITUDE INFORMATION

Issue altitude instructions as follows:

4–65 Reference.—Clearance Items, paragraph 4–10.

a. Altitude to maintain or cruise. When issuing cruise in conjunction with an airport clearance limit and an unpublished route will be used, issue an appropriate crossing altitude to ensure terrain clearance until the aircraft reaches a fix, point, or route where the altitude information is available to the pilot. When issuing a cruise clearance to an airport which does not have a published instrument approach, a cruise clearance without a crossing restriction may be issued.

Phraseology:

MAINTAIN/CRUISE (altitude). MAINTAIN (altitude) UNTIL (time), or PAST (fix), or (number of miles or minutes) MILES/MINUTES PAST (fix).

CROSS (fix, point) or INTERCEPT (route) AT OR ABOVE (altitude), CRUISE (altitude).

4–65a Note 1.—The crossing altitude must assure IFR obstruction clearance to the point where the aircraft is established on a segment of a published route or instrument approach procedure.

4–65a Note 2.—When an aircraft is issued a cruise clearance to an airport which does not have a published instrument approach procedure, it is not possible to satisfy the requirement for a crossing altitude that will ensure terrain clearance until the aircraft reaches a fix, point, or route where altitude information is available to the pilot. Under those conditions, a cruise clearance without a crossing restriction authorizes a pilot to determine the minimum IFR altitude as prescribed in Part 91.119 and descend to it at pilot discretion if it is lower than the altitude specified in the cruise clearance.

b. Instructions to climb or descend, including restrictions, as required.

1. When issuing instructions to climb or to descend reference time to provide separation, use only a UTC clock time.

4–65b Example.—

"United Four Seventeen, climb to reach one three thousand at two two one five."

2. The pilot is expected to be level at 13,000 feet at 2215UTC.

4–65b Reference 1.—Issuing alternative instructions, paragraph 4–65h.

4–65b Reference 2.—Combining speed reduction with decent clearance, paragraph 5–101c.

Phraseology:

CLIMB/DESCEND AND MAINTAIN (altitude).

If required,

AFTER PASSING (fix),

or

AT (time).

CLIMB/DESCEND AND MAINTAIN (altitude) WHEN ESTABLISHED AT LEAST (number of miles or minutes) MILES/MINUTES PAST (fix) ON THE (NAVAID) (specified) RADIAL.

CLIMB/DESCEND TO REACH (altitude) AT (time or fix),

or

A POINT (number of miles) MILES (direction) OF (name of DME NAVAID).

c. Specified altitude over a specified fix.

Phraseology:

CROSS (fix) AT (altitude).

CROSS (fix) AT OR ABOVE/BELOW (altitude).

d. A specified altitude over a specified fix for that portion of a descent clearance where descent at pilot's discretion is permissible. At any other time it is practicable. authorize climb/descent at pilot's discretion.

Phraseology:

CLIMB/DESCEND AT PILOT'S DISCRETION.

4–65d Example 1.—

"United Four Seventeen, descend and maintain six thousand."

The pilot is expected to commence descent upon receipt of the clearance and to descend at the suggested rates specified in the Airman's Information Manual (AIM) Section on ATC Clearances/Separations, Adherence to Clearance paragraph 4–88 until reaching the assigned altitude of 6,000 feet.

4–65d Example 2.—

"United Four Seventeen, descend at pilot's discretion, maintain six thousand."

The pilot is authorized to conduct descent within the context of the term "at pilot's discretion" as described in the AIM.

4–65d Example 3.—

"United Four Seventeen cross Lakeview V-O-R at or above flight level two zero zero, descend and maintain six thousand."

The pilot is authorized to conduct descent "at pilot's discretion" until reaching Lakeview VOR. He/she must comply with the clearance provision to cross the Lakeview VOR at or above FL 200, and after passing Lakeview VOR, he/she is expected to descend at the rates specified in the AIM until reaching the assigned altitude of 6,000 feet.

4–65d Example 4.—

"United Four Seventeen, cross Lakeview V-O-R at and maintain six thousand."

The pilot is authorized to conduct descent "at pilot's discretion," but must comply with the clearance provision to cross Lakeview VOR at 6,000 feet.

4–65d Example 5.—

"United Four Seventeen, descend now to flight level two seven zero, cross Lakeview V-O-R at or below one zero thousand, descend and maintain six thousand."

The pilot is expected to promptly execute and complete descent to FL 270 upon receipt of the clearance. After reaching FL 270, he/she is authorized to descend "at pilot's discretion" until reaching Lakeview VOR. He/she must comply with the clearance provision to cross Lakeview VOR at or below 10,000 feet. After Lakeview VOR, he/she is expected to descend at the rates specified in the AIM until reaching 6,000 feet.

4–65d Note. 1—A descent clearance which specifies a crossing altitude authorizes descent at pilot's discretion for that portion of the flight to which the crossing altitude restriction applies. Any other time that authorization to descend at pilot's discretion is intended, it must be specifically stated by the controller.

4–65d Note. 2—The pilot may need to know of any future restrictions that might affect the descent, including those that may be issued in another sector, in order to properly plan a descent at pilot's discretion.

4–65d Note 3.—Controllers need to be aware that the descent rates in the AIM are only suggested and aircraft will not always descend at those rates.

4–65d Reference.—Pilot/Controller Glossary—Pilot's Discretion.

e. When a portion of a climb/descent may be authorized at the pilot's discretion, specify the altitude the aircraft must climb/descend to followed by the altitude to maintain at the pilot's discretion.

Phraseology:

CLIMB/DESCEND NOW TO (altitude), THEN CLIMB/DESCEND AT PILOT'S DISCRETION MAINTAIN (altitude).

4–65e Example.—

"United three ten, descend now to flight level two eight zero, then descend at the pilot's discretion maintain flight level two four zero."

The pilot is expected to commence descent upon receipt of the clearance and to descend at the suggested rates specified in the Airman's Information Manual (AIM) Section on ATC Clearances/Separations, Adherence to Clearances paragraph 4–88, until reaching flight level 280. At that point, the pilot is authorized to continue descent to flight level 240 within the context of the term "at pilot's discretion" as described in the AIM

4–65e Note.— Controllers need to be aware that the descent rates in the AIM are only suggested and aircraft will not always descend at those rates.

f. When the "pilot's discretion" portion of a climb/descent clearance is being canceled by assigning a new altitude, inform the pilot that the new altitude is an "amended altitude."

4–65f Example.—

American Eighty Three, at flight level 280, has been cleared to descend at pilot's discretion to flight level 240. Subsequently, the altitude assignment is changed to flight level 260 and pilot's discretion is not authorized. In the above situation, the appropriate clearance would be:

"American Eighty Three, amend altitude, descend and maintain flight level two six zero."

g. Altitude assignments involving more than one altitude.

Phraseology:

MAINTAIN BLOCK (altitude) THROUGH (altitude).

h. When a pilot is unable to accept a clearance, issue revised instructions to ensure positive control and standard separation.

4–65h Note 1.— CFR Part 91.123 states that a pilot is not allowed to deviate from an ATC clearance "that has been obtained...unless an amended clearance is obtained" (except when an emergency exists). A pilot is therefore expected to advise the controller if a clearance cannot be accepted when the clearance is issued. "We will try" and other such acknowledgements do not constitute pilot acceptance of an ATC clearance.

4–65h Note 2.— Controllers are expected to issue ATC clearances which conform with normal operational capabilities for each aircraft and do not require "last minute" amendments to ensure standard separation. "Expedite" is not to be used in lieu of appropriate restrictions to ensure separation.

4–65h Reference.—Providing assistance in emergencies, paragraph 10–3.

4–66 ANTICIPATED ALTITUDE CHANGES

If practicable, inform an aircraft when to expect climb or descent clearance or to request altitude change from another facility.

Phraseology:

EXPECT HIGHER/LOWER ALTITUDE IN (number of miles or minutes) MILES/MINUTES,

or

AT (fix). REQUEST ALTITUDE CHANGE FROM (name of facility).

If required,

AT (time, fix, or altitude).

4–66 Reference.—IFR Flight Progress Data, paragraph 2–35.

4–67 ALTITUDE CONFIRMATION—NONRADAR

a. Request a pilot to confirm assigned altitude on initial contact and when position reports are received unless:

4–67a Note.—For the purpose of this paragraph, "initial contact" means a pilot's first radio contact with each sector/position.

1. The pilot states the assigned altitude, or
2. You assign a new altitude to a climbing or descending aircraft, or
3. *TERMINAL:* The aircraft was transferred to you from another sector/position within your facility (intrafacility).

Phraseology:

In level flight situations,

VERIFY AT (altitude).

In climbing/descending situations,

VERIFY ASSIGNED ALTITUDE (altitude).

b. *USA:* Reconfirm all pilot altitude readbacks.

Phraseology:

If altitude readback is correct,

AFFIRMATIVE (altitude).

If altitude readback is not correct,

NEGATIVE. CLIMB/DESCEND AND MAINTAIN (Altitude),

or

NEGATIVE. MAINTAIN (altitude).

4–68 thru 4–69 RESERVED

Section 8. APPROACH CLEARANCE PROCEDURES

4–100 APPROACH CLEARANCE

a. Clear aircraft for "standard" or "special" instrument approach procedures only. To require an aircraft to execute a particular instrument approach procedure, specify in the approach clearance the name of the approach as published on the approach chart. Where more than one procedure is published on a single chart and a specific procedure is to be flown, amend the approach clearance to specify execution of the specific approach to be flown. If only one instrument approach of a particular type is published, the approach need not be identified by the runway reference. An aircraft conducting an ILS/MLS approach when the glideslope/glidepath is reported out of service shall be advised at the time an approach clearance is issued. Where adequate radar coverage exists, radar facilities may vector aircraft to the final approach course in accordance with paragraph 5–120.

Phraseology:

CLEARED (type) APPROACH.

For a straight-in-approach—IFR,

CLEARED STRAIGHT-IN (type) APPROACH.

To authorize a pilot to execute his choice of instrument approach,

CLEARED APPROACH.

Where more than one procedure is published on a single chart and a specific procedure is to be flown,

CLEARED (specific procedure to be flown) APPROACH.

To authorize a pilot to execute an ILS/MLS approach when the glideslope/glidepath is out of service,

CLEARED (type) APPROACH, GLIDESLOPE/GLIDEPATH UNUSABLE.

4–100a Examples.—

"Cleared Approach."

"Cleared V-O-R Approach."

"Cleared V-O-R Runway Three Six Approach."

"Cleared F-M-S Approach."

"Cleared F-M-S Runway Three Six Approach."

"Cleared I-L-S Approach."

"Cleared Localizer Back Course Runway One Three Approach."

"Cleared R-NAV Runway Two Two Approach."

"Cleared GPS Runway Two Approach."

"Cleared Branch One R-NAV Arrival and R-NAV Runway One Three Approach."

"Cleared I-L-S Runway Three Six Approach, glideslope unusable."

"Cleared M-L-S Approach."

"Cleared M-L-S Runway Three Six Approach."

"Cleared M-L-S Runway Three Six Approach, glidepath unusable."

4–100a Note 1.—Clearances authorizing instrument approaches are issued on the basis that, if visual contact with the ground is made before the approach is completed, the entire approach procedure will be followed unless the pilot receives approval for a contact approach, is cleared for a visual approach, or cancels his IFR flight plan.

4–100a Note 2.—Approach clearances are issued based on known traffic. The receipt of an approach clearance does not relieve the pilot of his responsibility to comply with applicable Parts of Title 14 of the Code of Federal Regulations and the notations on instrument approach charts which levy on the pilot the responsibility to comply with or act on an instruction; e.g., "Straight-in minima not authorized at night," "Procedure not authorized when glideslope/glidepath not used," "Use of procedure limited to aircraft authorized to use airport," or "Procedure not authorized at night."

4–100a Note 3.—The name of the approach, as published, is used to identify the approach, even though a component of the approach aid, other than the localizer on an ILS or the azimuth on an MLS is inoperative. Where more than one procedure to the same runway is published on a single chart, each must adhere to all final approach guidance contained on that chart, even though each procedure will be treated as a separate entity when authorized by FAA7110.65TOC For example, Instrument Approach Procedures published on a chart as either *Hi-VOR/DME* or *TACAN 1* would be stated as either "Hi V-O-R/D-M-E 1 Runway Six Left Approach" or "Hi TACAN 1 Runway Six Left Approach." The use of numerical identifiers in the approach name, such as "Hi TACAN 1 Rwy 6L or Hi TACAN 2 Rwy 6L," denotes multiple straight-in approaches to the same runway that use the same approach aid. Alphabetical suffixes denote a procedure that does not meet the criteria for straight-in landing minimums authorization."

4–100a Reference.—FAA Order 8260.3, United States Standards for Terminal Instrument Approach Procedures.

4–100a Note 4.—Part 91.116 requires a pilot to receive a clearance for a procedure turn when vectored to a final approach fix or position, conducting a timed approach, or when the procedure specifies "No PT."

4–100a Note 5.—An aircraft which has been cleared to a holding fix and prior to reaching that fix is issued a clearance for an approach, but not issued a revised routing; i.e., "proceed direct to. . . ." may be expected to proceed via the last assigned route, a feeder route (if one is published on the approach chart), and then to commence the approach as published. If, by following the route of flight to the holding fix, the aircraft would overfly an IAF or the fix associated with the beginning of a feeder route to be used, the aircraft is expected to commence the approach using the published feeder route to the IAF or from the IAF as appropriate; i.e., the aircraft would not be expected to overfly and return to the IAF or feeder route.

b. For aircraft operating on unpublished routes, issue the approach clearance only after the aircraft is: (See Figure 4–100[1]).

1. Established on a segment of a published route or instrument approach procedure.

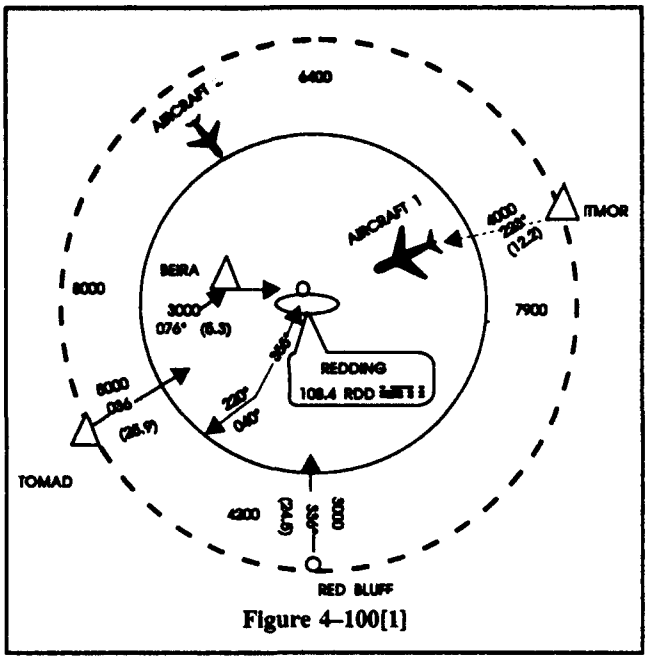


Figure 4–100[1]

4–100b1 Example.—

Aircraft 1: The aircraft is established on a segment of a published route at 5,000 feet. "Cleared V-O-R Runway Three Four Approach."

2. Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure.

4–100b2 Example.—

Aircraft 2: The aircraft is inbound to the VOR on an unpublished direct route at 7,000 feet. The minimum IFR altitude for IFR operations (Part 91.177) along this flight path to the VOR is 5,000 feet. "Cross the Redding V-O-R at or above five thousand, cleared V-O-R Runway Three Four Approach."

4–100b2 Note 1.—The altitude assigned must assure IFR obstruction clearance from the point at which the approach clearance is issued until established on a segment of a published route or instrument approach procedure.

4–100b2 Note 2.—If the altitude assignment is VFR-on-top, it is conceivable that the pilot may elect to remain high until arrival over the final approach fix which may require the pilot to circle to descend so as to cross the final approach fix at an altitude that would permit landing.

c. Except when applying radar procedures, timed or visual approaches, clear an aircraft for an approach to an airport when the preceding aircraft has landed or canceled IFR flight plan.

d. Where instrument approaches require radar monitoring and radar services are not available, do not use the phraseology "cleared approach," which allows the pilot his choice of instrument approaches.

4–101 CLEARANCE LIMIT

Issue approach or other clearances, as required, specifying the destination airport as the clearance limit if airport traffic control service is not provided even though this is a repetition of the initial clearance.

4–102 RELAYED APPROACH CLEARANCE

TERMINAL

Include the weather report, when it is required and available, when an approach clearance is relayed through a communication station other than an air carrier company radio. You may do this by telling the station to issue current weather.

4–103 ALTITUDE ASSIGNMENT FOR MILITARY HIGH ALTITUDE INSTRUMENT APPROACHES

Altitudes above those shown on the High Altitude Instrument Approach Procedures chart may be specified when required for separation.

4–103 Note.—To preclude the possibility of aircraft exceeding rate-of-descent or airspeed limitations, the maximum altitudes which may be assigned for any portion of the high altitude instrument approach procedure will be determined through coordination between the ATC facility concerned and the military authority which originated the high altitude instrument approach procedure.

4–103 Reference.—Military Turbojet En route Descent, paragraph 4–84.

4–104 SPECIFYING ALTITUDE

Specify in the approach clearance the altitude shown in the approach procedures when adherence to that altitude is required for separation. When vertical separation will be provided from other aircraft by pilot adherence to the prescribed maximum, minimum, or mandatory altitudes, the controller may omit specifying the altitude in the approach clearance.

4–104 Note.—Use NOS or DMAAC instrument approach procedures charts appropriate for the aircraft executing the approach.

4–105 CIRCLING APPROACH

a. Circling approach instructions may only be given for aircraft landing at airports with operational control towers.

b. Include in the approach clearance instructions to circle to the runway in use if landing will be made on a runway other than that aligned with the direction of instrument approach. When the direction of the circling maneuver in relation to the airport/runway is required, state the direction (eight cardinal compass points) and specify a left or right base/downwind leg as appropriate.

Phraseology:

CIRCLE TO RUNWAY (number),

or

CIRCLE (direction using eight cardinal compass points) OF THE AIRPORT/RUNWAY FOR A LEFT/RIGHT BASE/ DOWNWIND TO RUNWAY (number).

4–105b Note.—Where Standard Instrument Approach Procedures authorize circling approaches, they provide a basic mini-

mum of 300 feet of obstacle clearance at the MDA within the circling area considered. The dimensions of these areas, expressed in distances from the runways, vary for the different approach categories of aircraft. In some cases a SIAP may otherwise restrict circling approach maneuvers.

c. Do not issue clearances, such as "extend downwind leg," which might cause an aircraft to exceed the circling approach area distance from the runways within which required circling approach obstacle clearance is assured.

4–106 SIDE-STEP MANEUVER

TERMINAL

Side-Step Maneuver—When authorized by an instrument approach procedure, you may clear an aircraft for an approach to one runway and inform the aircraft that landing will be made on a parallel runway.

4–106 Example.—

"Cleared I-L-S Runway Seven Left Approach. Side-step to Runway Seven Right."

4–106 Note.—Side-step maneuvers require higher weather minima/MDA. These higher minima/MDA are published on the instrument approach charts.

4–106 Reference.—Closed/Unsafe Runway Information, paragraph 3–31. Pilot/Controller Glossary—Side-Step Maneuver.

4–107 COMMUNICATIONS RELEASE

If an IFR aircraft intends to land at an airport not served by a tower or FSS, approve a change to the advisory service frequency when you no longer require direct communications.

Phraseology:

CHANGE TO ADVISORY FREQUENCY APPROVED.

4–107 Note.—An exhaustive frequency change permits the aircraft to receive timely local airport traffic information in accordance with AC 90–42.

4–107 Reference.—Arrival Instructions, paragraph 5–123.

4–108 MISSED APPROACH

Except in the case of a VFR aircraft practicing an instrument approach, an approach clearance automatically authorizes the aircraft to execute the missed approach procedure depicted for the instrument approach being flown. An alternate missed approach procedure as published on the appropriate FAA Form 8260 may be assigned when necessary. Once an aircraft commences a missed approach, it may be radar vectored.

4–108 Note 1.—Alternate missed approach procedures are published on the appropriate FAA Form 8260 only and require a detailed clearance when they are issued to the pilot.

4–108 Note 2.—In the event of a missed approach involving a turn, unless otherwise cleared, the pilot will proceed to the missed approach point before starting that turn

4–108 Reference.— Practice Approaches, paragraph 4–110.

4–109 APPROACH INFORMATION

Specify the following in the approach clearance when the pilot says he is unfamiliar with the procedure:

a. Initial approach altitude.

b. Direction and distance from the holding fix within which procedure turn is to be completed

c. Altitude at which the procedure turn is to be made.

d. Final approach course and altitude.

e. Missed approach procedures if considered necessary.

Phraseology:

INITIAL APPROACH AT (altitude), PROCEDURE TURN AT (altitude) (number) MINUTES/MILES (direction), FINAL APPROACH ON (name of NAVAID) (specified) COURSE/RADIAL/AZIMUTH AT (altitude).

4–110 PRACTICE APPROACHES

Except for military aircraft operating at military airfields, ensure that neither VFR nor IFR practice approaches disrupt the flow of other arriving and departing IFR or VFR aircraft. Authorize, withdraw authorization, or refuse to authorize practice approaches as traffic conditions require. Normally, approaches in progress should not be terminated.

4–110 Note.—The priority afforded other aircraft over practice *instrument approaches is not intended to be so rigidly applied* that it causes grossly inefficient application of services.

a. Separation.

1. IFR aircraft practicing instrument approaches shall be afforded standard separation in accordance with Chapter 3, Chapter 4, Chapter 5, Chapter 6, and Chapter 7 minima until:

(a) The aircraft lands, and the flight is terminated, or

(b) The pilot cancels the flight plan.

2. Where procedures require application of IFR separation to VFR aircraft practicing instrument approaches, standard IFR separation in accordance with Chapter 3, Chapter 4, Chapter 5, Chapter 6, and Chapter 7 shall be provided. Controller responsibility for separation begins at the point where the approach clearance becomes effective. Except for heavy aircraft, *500 feet* vertical separation may be applied between VFR aircraft and between a VFR and an IFR aircraft.

4–110a2 References.—FAA Order 7210.3, paragraph 8–43. FAA Order 7210.3, paragraph 12–44.

3. Where separation services are not provided to VFR aircraft practicing instrument approaches, the controller shall;

(a) Instruct the pilot to maintain VFR.

(b) Advise the pilot that separation services are not provided.

(c) Provide traffic information or advise the pilot to contact the appropriate facility.

4–110a3 Example.

"(aircraft identification) maintain VFR, practice approach approved, no separation services provided."

4. If an altitude is assigned, including at-or-above/below altitudes, the altitude specified must meet MVA, minimum safe altitude, or minimum IFR altitude criteria.

4–110a4 Reference.—Altitude Assignments, paragraph 7–84.

5. All VFR aircraft shall be instructed to maintain VFR on initial contact or as soon as possible thereafter.

4–110a5 Note.—This advisory is intended to remind the pilot that even though ATC is providing IFR-type instructions, the pilot is responsible for compliance with the applicable Parts of Title 14 of the Code of Federal Regulations governing VFR flight.

b. Missed Approaches.

1. Unless alternate instructions have been issued, IFR aircraft are automatically authorized to execute the missed approach depicted for the instrument approach being flown.

4–110b1 Reference.—Missed Approach, paragraph 4–108.

2. VFR aircraft are not automatically authorized to execute the missed approach procedure. This authorization must be specifically requested by the pilot and approved by the controller. When a missed approach has been approved, separation shall be provided throughout the missed approach.

4–110 Reference.—Visual Separation, paragraph 7–10.

4–111 LOW APPROACH AND TOUCH-AND-GO

Consider an aircraft cleared for a touch-and-go, low approach, or practice approach as an arriving aircraft until that aircraft touches down or crosses the landing threshold; thereafter, consider the aircraft as a departing aircraft. Before the aircraft begins its final descent, issue the appropriate departure instructions the pilot is to follow upon completion of the approach (in accordance with paragraph 4–31). Climb-out instructions must include a specific heading or a route of flight and altitude, except when the aircraft will maintain VFR and contact the tower.

4–111 Examples.—

"After completing low approach, climb and maintain six thousand. Turn right, heading three six zero."

"Maintain VFR, contact tower."

(Issue other instructions as appropriate.)

4–111 Note.—Climb-out instructions may be omitted after the first approach if instructions remain the same.

3. Presidential aircraft regardless of altitude.

b. Issue traffic information to those aircraft listed in subparagraph a. whose targets appear likely to merge unless the aircraft are separated by more than the appropriate vertical separation minima.

5–8b Example.—

"Traffic twelve o'clock, seven miles, eastbound, DC–8, at one seven thousand."

"United sixteen and American twenty–five, traffic twelve o'clock, one zero miles, opposite direction, eastbound seven twenty seven at flight level three three zero, westbound DC–9 at flight level three one zero."

c. If the pilot requests, vector his aircraft to avoid merging with the target of previously issued traffic.

5–8c Note.—Aircraft closure rates are so rapid that when applying merging target procedures, controller issuance of traffic must be commenced in ample time for the pilot to decide if a vector is necessary.

d. If unable to provide vector service, inform the pilot.

5–9 HOLDING PATTERN SURVEILLANCE

Provide radar surveillance of outer fix holding pattern airspace areas, or any portions thereof, shown on your radar scope (displayed on the video map or scribed on the map overlay) whenever aircraft are holding there. Attempt to detect any that stray outside the area. If you detect an aircraft straying outside the area, assist it to return to the assigned airspace.

5–10 DEVIATION ADVISORIES

Inform an aircraft when it is observed in a position and on a track which will obviously cause the aircraft to deviate from its protected airspace area. If necessary, assist the aircraft to return to the assigned protected airspace.

5–10 Reference.—Route or Altitude Amendments, paragraph 4–14. Methods, paragraph 7–112.

5–11 RADAR FIX POSTING

EN ROUTE

Except during full NAS Stage A operations, at least once in each sector record on the flight progress strip the time of observed position of each aircraft in "radar contact" with respect to a fix shown on the radar display.

5–12 POSITION REPORTING

a. If necessary, you may request an aircraft to provide an estimate or report over a specific fix.

5–12a Note.—After an aircraft receives the statement "radar contact" from ATC, it discontinues reporting over compulsory reporting points. It resumes normal position reporting when ATC informs it "radar contact lost" or "radar service terminated."

5–12a Reference.—Pilot/Controller Glossary term—Radar Contact.

b. When required, inform an aircraft of its position with respect to a fix or airway.

Phraseology:

OVER/PASSING (fix)

(Number of miles) MILES FROM (fix).

(Number of miles) MILES (direction) OF (fix, airway, or location).

CROSSING/JOINING/DEPARTING (airway or route).

INTERCEPTING/CROSSING (name of NAVAID) (specified) RADIAL.

5–13 RADAR SERVICE TERMINATION

a. Inform aircraft when radar service is terminated.

Phraseology:

RADAR SERVICE TERMINATED (nonradar routing if required).

b. Radar service is automatically terminated and the aircraft need not be advised of termination when:

5–13b Note.—Termination of radar monitoring when conducting simultaneous ILS/MLS approaches is prescribed in paragraph 5–126h3. Termination of radar monitoring where PAR equipment is used to monitor approaches is prescribed in paragraph 5–182e.

1. An aircraft cancels its IFR flight plan, except within Class B airspace, Class C airspace, TRSA, or where basic radar service is provided.

2. An aircraft conducting an instrument, visual, or contact approach has landed or has been instructed to change to advisory frequency.

5–13b2 Note.—At tower-controlled airports where radar coverage does not exist to within 1/2 mile of the end of the runway, arriving aircraft shall be informed when radar service is terminated.

5–13b2 Reference.—FAA Order 7210.3, Radar Tolerances, paragraph 12–55a.

3. *TERMINAL:* An arriving VFR aircraft receiving radar service to a tower-controlled airport within Class B airspace, Class C airspace, TRSA, or where basic radar service is provided has landed, or to all other airports, is instructed to change to tower or advisory frequency.

4. *TERMINAL:* An aircraft completes a radar approach.

5–13 Reference.—Service Provided When Tower is Inoperative, paragraph 7–71.

5–14 thru 5–19 RESERVED

a. Code 7700 when the pilot declares an emergency and the aircraft is not radar identified.

Phraseology:
SQUAWK MAYDAY ON 7700.

b. After radio and radar contact have been established, you may request other than single-piloted helicopters and single-piloted turbojet aircraft to change from Code 7700 to another code appropriate for your radar beacon code environment.

5–27b Note 1.—The code change, based on pilot concurrence, the nature of the emergency, and current flight conditions will signify to other radar facilities that the aircraft in distress is identified and under ATC control.

5–27b Note 2.—Pilots of single-piloted helicopters and single-piloted turbojet aircraft may be unable to reposition transponder controls during the emergency.

Phraseology:
RADAR CONTACT (position). IF FEASIBLE, SQUAWK (code).

5–27 Reference.—Beacon Identification Methods, paragraph 5–52.

c. The following shall be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of code 7700:

1. TERMINAL: Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

2. EN ROUTE: An appropriate keyboard entry shall be made to ensure en route MSAW (EMSAW) alarm processing.

5–28 RADIO FAILURE

When you observe a Code 7600 display, apply the procedures in paragraph 10–43.

5–28 Note.—Should a transponder-equipped aircraft experience a loss of two-way radio communications capability, the pilot can be expected to adjust his transponder to Code 7600.

5–28 Reference.—Beacon Identification Methods, paragraph 5–52.

5–29 VFR CODE ASSIGNMENTS

a. For VFR aircraft receiving radar advisories, assign an appropriate Function Code or computer–assigned code for the code environment in which you are providing service.

5–29a Note 1.—paragraph 5–21, paragraph 5–22, and paragraph 5–23 specify code assignments procedures to follow for the three code environments.

5–29a Note 2.—paragraph 5–25 a, b, and c specify the Function Code allocation from which an appropriate code for the aircraft indicated in subparagraph 5–29a should be selected. In the terminal environment, additional Function Codes may be authorized by the regional Air Traffic division.

1. If the aircraft is outside of your area of responsibility and an operational benefit will be gained by retaining the aircraft on your frequency for the purpose of providing services, ensure that coordination has been effected:

(a) As soon as possible after positive identification, and

(b) Prior to issuing a control instruction or providing a service other than a safety alert/traffic advisory.

5–29a1(b) Note.—Safety alerts/traffic advisories may be issued to an aircraft prior to coordination if an imminent situation may be averted by such action. Coordination should be effected as soon as possible thereafter.

b. Instruct IFR aircraft which cancel an IFR flight plan and are not requesting radar advisory service and VFR aircraft for which radar advisory service is being terminated to squawk the VFR code.

Phraseology:
SQUAWK VFR.

or

SQUAWK 1200.

5–29b Note.—VFR aircraft which fly authorized SAR missions for the USAF or USCG may be advised to squawk 1277 in lieu of 1200 while en route to/from or within the designated search area.

5–29b Reference.—FAA Order 7110.66, National Beacon Code Allocation Plan.

c. When an aircraft changes from VFR to IFR, the controller shall assign a beacon code to Mode C equipped aircraft that will allow MSAW alarms.

5–29 Reference.—Beacon Identification Methods, paragraph 5–52.

5–30 BEACON CODE FOR PRESSURE SUIT FLIGHTS AND FLIGHTS ABOVE FL 600

a. Mode 3/A, Code 4400, and discrete codes 4401 through 4477 are reserved for use by R–71, F–12, U–2, B–57, pressure suit flights, and aircraft operations above FL 600.

5–30a Note.—The specific allocation of the special use codes in subset 4400 is in FAA Order 7110.66.

b. Ensure that aircraft remain on Code 4400 or one of the special use discrete codes in the 4400 subset if filed as part of the flight plan. Except when unforeseen events, such as weather deviations, equipment failure, etc., cause more than one aircraft with same Mode 3/A discrete beacon codes to be in the same or adjacent ARTCC's airspace at the same time, a controller may request the pilot to make a code change, squawk standby, or to stop squawk as appropriate.

5–30b Note.—Due to the inaccessibility of certain equipment to the flight crews, Code 4400 or a discrete code from the 4400 subset is preset on the ground and will be used throughout the flight profile including operations below FL 600. Controllers should be cognizant that not all aircraft may be able to accept the transponder changes identified in the Exception. Emergency code 7700, however, can be activated.

5–30 Reference.—Beacon Identification Methods, paragraph 5–52.

5–31 AIR DEFENSE EXERCISE BEACON CODE ASSIGNMENT

EN ROUTE

Ensure exercise faker aircraft remain on the exercise flight plan filed discrete beacon code.

5–31 Note 1.—NORAD will ensure exercise faker aircraft flight plans are filed containing discrete beacon codes from the Department of Defense code allocation specified in FAA Order 7610.4, Appendix 5.

5–31 Note 2.—NORAD will ensure that those faker aircraft assigned the same discrete beacon code are not flight planned in the same or any adjacent ARTCC's airspace at the same time. (Simultaneous assignment of codes will only occur when operational requirements necessitate.)

5–31 Reference.—Beacon Identification Methods, paragraph 5–52.

5–32 STANDBY OR LOW SENSITIVITY OPERATION

You may instruct an aircraft operating on an assigned code to change transponder to "standby" or "low sensitivity" position:

5–32 Note.—National standards no longer require improved transponder to be equipped with the low sensitivity feature. Therefore, aircraft with late model transponders will be unable to respond to a request to "squawk low."

a. When approximately 15 miles from its destination and you no longer desire operation of the transponder.

b. When necessary to reduce clutter in a multi-target area, or to reduce "ring-around" or other phenomena, provided you instruct the aircraft to return to "normal sensitivity" position as soon as possible thereafter.

Phraseology:

SQUAWK STANDBY,

or

SQUAWK LOW/NORMAL.

5–32 Reference.—Beacon Identification Methods, paragraph 5–52.

5–33 CODE MONITOR

Continuously monitor the Mode 3/A radar beacon codes assigned for use by aircraft operating within your area of responsibility when nonautomated beacon decoding equipment (e.g., 10–channel decoder) is used to display the target symbol.

5–33 Note 1.—When you are notified by pilots of VFR aircraft that they are unable to comply with VFR code changes because of high performance maneuvering requiring rapid transition through the altitudes where transponder changes should be made, you may assign (and monitor) whichever one of the VFR codes is most applicable to the situation. If appropriate, assign Code 4000.

5–33 Note 2.—In addition to alphanumeric and control symbology processing enhancements, the ARTS and the TPX–42 systems are equipped with automatic beacon decoders. Therefore, in facilities where the automatic beacon decoders are providing the control slash video, there is no requirement to have the nonautomated decoding equipment simultaneously operating.

5–33 Reference.—FAA Order 7210.3, Monitoring of Mode 3/A Radar Beacon Codes, paragraph 3–83.

a. This includes the appropriate IFR code actually assigned and, additionally, Code 1200 and Code 1277 unless your area of responsibility includes only positive control airspace. During periods when ring-around or excessive VFR target presentations derogate the separation of IFR traffic, the monitoring of VFR code 1200 and Code 1277 may be temporarily discontinued.

b. Positions of operation which contain a restricted or warning area or VR route within or immediately adjacent to their area of jurisdiction shall monitor Code 4000 and any other code used in lieu of 4000 within the warning/restricted area or VR route. If by local coordination with the restricted/warning area or VR route user a code other than 4000 is to be exclusively used, then this code shall be monitored.

c. If a normally assigned beacon code disappears, check for a response on the following codes in the order listed and take appropriate action:

5–33c Note.—When codes 7500 and/or 7600 have been preselected, it will be necessary for the ID-SEL-OFF switches for these codes to be left in the OFF position so that beacon target for an aircraft changing to one of these codes will disappear, thereby alerting the controller to make the check. This check will not be required if automatic alerting capability exists.

1. Code 7500 (hijack code).

5–33c1 Reference.—Hijacked Aircraft, paragraph 10–15.

2. Code 7600 (loss of radio communications code).

5–34 FAILURE TO DISPLAY ASSIGNED BEACON CODE OR INOPERATIVE/MALFUNCTIONING TRANSPONDER

a. Inform an aircraft with an operable transponder that the assigned beacon code is not being displayed.

Phraseology:

(Identification) RESET TRANSPONDER, SQUAWK (appropriate code).

b. Inform an aircraft when its transponder appears to be inoperative or malfunctioning.

Phraseology:

(Identification) YOUR TRANSPONDER APPEARS INOPERATIVE/MALFUNCTIONING, RESET, SQUAWK (appropriate code).

c. Ensure that the subsequent control position in the facility or the next facility, as applicable, is notified when an aircraft transponder is malfunctioning/inoperative.

5–34 Reference.—Beacon Identification Methods, paragraph 5–52.

5–35 INOPERATIVE OR MALFUNCTIONING INTERROGATOR

Inform aircraft concerned when the ground interrogator appears to be inoperative or malfunctioning.

Phraseology:

(Name of facility or control function) BEACON INTERROGATOR INOPERATIVE / MALFUNCTIONING.

5–35 Reference.—Radar Use, paragraph 5–3. Beacon Identification Methods, paragraph 5–52.

5–36 FAILED TRANSPONDER IN CLASS A AIRSPACE

Disapprove a request or withdraw previously issued approval to operate in Class A airspace with a failed transponder solely on the basis of traffic conditions or other operational factors.

5–36 Reference.—Radar Use, paragraph 5–3. Beacon Identification Methods, paragraph 5–52.

5–37 VALIDATION OF MODE C READOUT

Ensure that Mode C altitude readouts are valid after accepting an interfacility handoff, initial track start, track start from coast/suspend tabular list, missing, or unreasonable Mode C readouts. For TPX–42 and equivalent systems ensure that altitude readout is valid immediately after identification. (TCDD-/BANS-equipped tower cabs are not required to validate Mode C readouts after receiving interfacility handoffs from TRACON's according to the procedures in paragraph 5–62a4.)

a. Consider an altitude readout valid when:

1. It varies less than 300 feet from the pilot reported altitude, or

Phraseology:

SAY ALTITUDE.

2. You receive a continuous readout from an aircraft on the airport and the readout varies by less than 300 feet from the field elevation, or

5–37a2 Note.—A continuous readout exists only when the altitude filter limits are set to include the field elevation.

5–37 Reference.—FAA Order 7210.3, Display Data, paragraph 13–22.

3. You have correlated the altitude information in your data block with the validated information in a data block generated in another facility (by verbally coordinating with the other controller) and your readout is exactly the same as the readout in the other data block.

b. When unable to validate the readout, do not use the Mode C altitude information for separation.

c. Whenever you observe an invalid Mode C readout below FL 180:

1. Issue the correct altimeter setting and confirm the pilot has accurately reported the altitude.

Phraseology:

(location) ALTIMETER (appropriate altimeter), VERIFY ALTITUDE.

2. If the altitude readout continues to be invalid:

(a) Instruct the pilot to turn off the altitude–reporting part of his/her transponder and include the reason; and,

(b) Notify the area supervisor–in–charge of the aircraft call sign.

Phraseology:

STOP ALTITUDE SQUAWK. ALTITUDE DIFFERS BY (number of feet) FEET.

d. Whenever you observe an invalid Mode C readout at or above FL 180, unless the aircraft is descending below Class A airspace:

1. Confirm that the pilot is using 29.92 inches of mercury as the altimeter setting and has accurately reported the altitude.

Phraseology:

CONFIRM USING TWO NINER NINER TWO AS YOUR ALTIMETER SETTING, VERIFY ALTITUDE.

2. If the Mode C readout continues to be invalid:

(a) Instruct the pilot to turn off the altitude–reporting part of his/her transponder and include the reason; and,

(b) Notify the area supervisor–in–charge of the aircraft call sign.

Phraseology:

STOP ALTITUDE SQUAWK. ALTITUDE DIFFERS BY (number of feet) FEET.

e. Whenever possible, inhibit altitude readouts on all consoles when a malfunction of the ground equipment causes repeated invalid readouts.

5–38 ALTITUDE CONFIRMATION—MODE C

Request a pilot to confirm assigned altitude on initial contact unless:

5–38 Note.—For the purpose of this paragraph, "initial contact" means a pilot's first radio contact with each sector/position.

a. The pilot states the assigned altitude, or

b. You assign a new altitude to a climbing or a descending aircraft, or

c. The Mode C readout is valid and indicates that the aircraft is established at the assigned altitude, or

d. *TERMINAL:* The aircraft was transferred to you from another sector/position within your facility (intrafacility).

Phraseology:

In level flight situations,

VERIFY AT (altitude).

In climbing/descending situations,

VERIFY ASSIGNED ALTITUDE (altitude).

5–38 Reference.—Beacon Identification Methods, paragraph 5–52.

5–39 ALTITUDE CONFIRMATION—NONMODE C

a. Request a pilot to confirm assigned altitude on initial contact unless:

5–39a Note.—For the purpose of this paragraph, "initial contact" means a pilot's first radio contact with each sector/position.

1. The pilot states the assigned altitude, or

2. You assign a new altitude to a climbing or a descending aircraft, or

3. *TERMINAL:* The aircraft was transferred to you from another sector/position within your facility (intrafacility).

Phraseology:

In level flight situations,

VERIFY AT (altitude).

In climbing/descending situations,

VERIFY ASSIGNED ALTITUDE (altitude).

b. *USA:* Reconfirm all pilot altitude readbacks.

Phraseology:

If the altitude readback is correct,

AFFIRMATIVE (altitude).

If the altitude readback is not correct,

NEGATIVE. CLIMB/DESCEND AND MAINTAIN (altitude),

or

NEGATIVE. MAINTAIN (altitude).

5–39 Reference.—Beacon Identification Methods, paragraph 5–52.

5–40 AUTOMATIC ALTITUDE REPORTING

Inform an aircraft when you want it to turn on/off the automatic altitude reporting feature of its transponder.

Phraseology:

SQUAWK ALTITUDE,

or

STOP ALTITUDE SQUAWK.

5–40 Note.—Controllers should be aware that not all aircraft have a capability to disengage the altitude squawk independently from the beacon code squawk. On some aircraft both functions are controlled by the same switch.

5–40 Reference.—Validation of Mode C Readout, paragraph 5–37. Beacon Identification Methods, paragraph 5–52. Pilot/Controller Glossary term—Automatic Altitude Report.

5–41 IN—FLIGHT DEVIATIONS FROM TRANSPONDER/MODE C REQUIREMENTS BETWEEN 10,000 FEET AND 18,000 FEET.

Apply the following procedures to requests to deviate from the Mode C transponder requirement by aircraft operating in the airspace of the 48 contiguous states and the District of Columbia at and above 10,000 feet MSL and below 18,000 feet MSL, excluding the airspace at and below 2,500 feet AGL.

5–41 Note.—Part 91.215(b)(5) provides, in part, that all U.S. registered civil aircraft, except balloons, gliders, and aircraft without engine-driven electrical systems, must be equipped with an operable, coded radar beacon transponder when operating in the altitude stratum listed above. Such transponders shall have a Mode 3/A 4096 code capability, replying to Mode 3/A interrogation with the code specified by ATC, or a Mode S capability, replying to Mode 3/A interrogations with the code specified by ATC. The aircraft must also be equipped with automatic pressure altitude reporting equipment having a Mode C capability that automatically replies to Mode C interrogations by transmitting pressure altitude information in 100–foot increments.

5–41 Reference.—FAA Order 7210.3, paragraph 6–70.

a. Except in an emergency, do not approve inflight requests for authorization to deviate from Part 91.215(b)(5)(i) requirements originated by aircraft without transponder equipment installed.

b. Approve or disapprove other in-flight deviation requests, or withdraw approval previously issued to such flights, solely on the basis of traffic conditions and other operational factors.

c. Adhere to the following sequence of action when an in-flight VFR deviation request is received from an aircraft with an inoperative transponder or Mode C, or is not Mode C equipped:

1. Suggest that the aircraft conduct its flight in airspace unaffected by the Title 14 Part.

2. Suggest that the aircraft file an IFR flight plan.

3. Suggest that the aircraft provide a VFR route of flight and maintain radio contact with ATC.

d. Do not approve an in-flight deviation unless the aircraft has filed an IFR flight plan or a VFR route of flight is provided and radio contact with ATC is maintained.

e. You may approve an in-flight deviation request which includes airspace outside your jurisdiction without the prior approval of the adjacent ATC sector/facility providing a transponder/Mode C status report is forwarded prior to control transfer.

f. Approve or disapprove in-flight deviation requests within a reasonable period of time or advise when approval/disapproval can be expected.

5–41 Reference.—Beacon Identification Methods, paragraph 5–52.

5–42 BEACON TERMINATION

Inform an aircraft when you want it to turn off its transponder.

Phraseology:

STOP SQUAWK.

For a military aircraft when you do not know if the military service requires that it continue operating on another mode,

Section 4. TRANSFER OF RADAR IDENTIFICATION

5–60 APPLICATION

To provide continuous radar service to an aircraft and facilitate a safe, orderly, and expeditious flow of traffic, it is often necessary to transfer radar identification of an aircraft from one controller to another. This section describes the terms, methods, and responsibilities associated with this task. Interfacility and intrafacility transfers of radar identification shall be accomplished in all areas of radar surveillance except where it is not operationally feasible. Where such constraints exist, they shall be:

a. Covered in letters of agreement which clearly state that control will not be based upon a radar handoff, or

b. Coordinated by the transferring and receiving controllers for a specified period of time.

5–60 Reference.—Coordination with Receiving Facility, paragraph 4–36.

5–61 TERMS

a. *Handoff*—An action taken to transfer the radar identification of an aircraft from one controller to another controller if the aircraft will enter the receiving controller's airspace and radio communications with the aircraft will be transferred.

b. *Radar Contact*—The term used to inform the controller initiating a handoff that the aircraft is identified and approval is granted for the aircraft to enter the receiving controller's airspace.

c. *Point Out*—An action taken by a controller to transfer the radar identification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred.

d. *Point Out Approved*—The term used to inform the controller initiating a point out that the aircraft is identified and that approval is granted for the aircraft to enter the receiving controller's airspace, as coordinated, without a communications transfer.

e. *Traffic*—A term used to transfer radar identification of an aircraft to another controller for the purpose of coordinating separation action. Traffic is normally issued (a) in response to a handoff or point out, (b) in anticipation of a handoff or point out, or (c) in conjunction with a request for control of an aircraft.

f. *Traffic Observed*—The term used to inform the controller issuing the traffic restrictions that the traffic is identified and that the restrictions issued are understood and will be complied with.

5–62 METHODS

a. Transfer the radar identification of an aircraft by at least one of the following methods:

1. Physically point to the target on the receiving controller's display.

2. Use landline voice communications.

3. Use automation capabilities.

4. *TERMINAL:* Use the "Modify" or "Quick Look" functions for data transfer between the TRACON and tower cab only if specific procedures are established in a facility directive. The local controller has the responsibility to determine whether or not conditions are adequate for the use of ARTS data on the BRITE/DBRITE.

5–62a4 Reference.—FAA Order 7210.3, Use of ARTS Modify and Quick Look Functions, paragraph 13–23.

5. *EN ROUTE:* EDARC/HOST or DARC/HOST have interfacility handoff capabilities that can be manually initiated and accepted through the Quick Action Keys (QAK), or used in automatic handoff mode as in HOST Stage A. DARC or EDARC do not have the capabilities for interfacility handoffs. Therefore, handoffs between facilities must be made via landline voice communications when operating in DARC or EDARC.

b. When making a handoff, point-out, or issuing traffic restrictions, relay information to the receiving controller in the following order:

1. The position of the target relative to a fix, map symbol, or radar target known and displayed by both the receiving and transferring controller.

5–62b1 Note.—Mileage from the reference point may be omitted when relaying the position of a target if a full data block associated with the target has been forced on the receiving controller's radar display.

5–62b1 Example.—

"Point out, southwest of Richmond VOR..."

2. The aircraft identification, as follows:

(a) The aircraft call sign, or

(b) The discrete beacon code of the aircraft during interfacility point-outs only, if both the receiving and the transferring controllers agree.

5–62b2(b) Note.—Acceptance of a point-out using the discrete beacon code as the aircraft's identification constitutes agreement.

3. The assigned altitude, appropriate restrictions, and information that the aircraft is climbing or descending, if applicable, except when inter/intrafacility directives ensure that the altitude information will be known by the receiving controller.

5–62b3 Note 1.—When physically pointing to the target, you do not have to state the aircraft position.

5–62b3 Note 2.—Those en route facilities using HOST software that provides capability for passing interim altitude shall include the specific operations and procedures for use of this procedure in a letter of agreement between the appropriate facilities.

Phraseology:

HANDOFF/POINT-OUT/TRAFFIC (aircraft position) (aircraft ID) or (discrete beacon code point-out only) (altitude, restrictions, and other appropriate information, if applicable).

c. When receiving a handoff, point-out, or traffic restrictions, respond to the transferring controller as follows:

Phraseology:

(Aircraft ID) (restrictions, if applicable) RADAR CONTACT,

or

(Aircraft ID or discrete beacon code) (restrictions, if applicable) POINT-OUT APPROVED,

or

TRAFFIC OBSERVED,

or

UNABLE (appropriate information, as required).

d. If any doubt as to target identification exists after attempting confirmation in accordance with this section, apply the provisions of paragraph 5–54.

5–62 Reference.—Validation of Mode C Readout, paragraph 5–37.

5–63 TRAFFIC

a. When using the term "traffic" for coordinating separation, the controller issuing traffic shall issue appropriate restrictions.

b. The controller accepting the restrictions shall be responsible to ensure that approved separation is maintained between the involved aircraft.

5–64 TRANSFERRING CONTROLLER HANDOFF

The transferring controller shall:

a. Complete a radar handoff prior to an aircraft's entering the airspace delegated to the receiving controller.

5–64 Reference.—Coordinate Use of Airspace, paragraph 2–14. Control Transfer, paragraph 2–15. Receiving Controller Handoff, paragraph 5–65.

b. Verbally obtain the receiving controller's approval prior to making any changes to an aircraft's flight path, altitude, or data block information while the handoff is being initiated or after acceptance, unless otherwise specified by a Letter of Agreement or a facility directive.

5–64b Note.—Those en route facilities using HOST software that provides capability for passing interim altitude shall include the specific operations and procedures for use of this procedure in a letter of agreement between the appropriate facilities.

c. Ensure that, prior to transferring communications:

1. Potential violations of adjacent airspace and potential conflicts between aircraft in their own area of jurisdiction are resolved.

2. Necessary coordination has been accomplished with all controllers through whose area of jurisdiction the aircraft will pass prior to entering the receiving controller's area of jurisdiction, except when such coordination is the receiving controller's responsibility as stated in paragraph 5–65 and unless otherwise specified by a letter of agreement or a facility directive.

3. Restrictions issued to ensure separation are passed to the receiving controller.

d. After transferring communications, continue to comply with the requirements of subparagraphs 5–64c1 and 5–64c2.

e. Comply with restrictions issued by the receiving controller unless otherwise coordinated.

f. Comply with the provisions of paragraph 2–17a and to the extent possible, transfer communications when the transfer of radar identification has been accepted.

5–64f Note.—Before the ARTS "Modify/Quick Look" function is used to transfer radar identification, a facility directive which specifies communication transfer points is required.

g. Advise the receiving controller of pertinent information not contained in the data block or flight progress strip unless covered in a letter of agreement or facility directive. Pertinent information includes:

1. Assigned heading.
2. Air speed restrictions.
3. Altitude information issued.
4. Observed track or deviation from the last route clearance.
5. The beacon code if different from that normally used or previously coordinated.
6. Any other pertinent information.

h. Ensure that the data block is associated with the appropriate target.

i. Initiate verbal coordination to verify the position of primary or nondiscrete targets when using the automated handoff functions except for intrafacility handoffs using single-sensor systems or multisensor systems operating in a mosaic RDP mode.

j. Initiate verbal coordination before transferring control of a track when "CST," "FAIL," "NONE," "NB," "NX," "IF," or "NT" is displayed in the data block.

k. Advise the receiving controller that radar monitoring is required when the aircraft is on a direct route initiated by ATC that exceeds usable navaid distances.

l. Issue restrictions to the receiving controller which are necessary to maintain separation from other aircraft within your area of jurisdiction before releasing control of the aircraft.

m. Consider the target being transferred as identified on the receiving controller's display when the receiving controller acknowledges receipt verbally or has accepted an automated handoff.

n. Accomplish the necessary coordination with any intervening controllers whose area of jurisdiction is affected by the receiving controller's delay in the climb or the descent of an aircraft through the vertical limits of your area of jurisdiction when the receiving controller advises you of that delay before accepting the transfer of radar identification unless otherwise specified by a letter of agreement or a facility directive.

5–65 RECEIVING CONTROLLER HANDOFF

The receiving controller shall:

a. Ensure that the target position corresponds with the position given by the transferring controller or that there is an appropriate association between an automated data block and the target being transferred before accepting an handoff.

5–65 Reference.—Coordinate Use of Airspace, paragraph 2–14. Control Transfer, paragraph 2–15. Transferring Controller Handoff, paragraph 5–64.

b. Issue restrictions that are needed for the aircraft to enter your sector safely before accepting the handoff.

c. Comply with restrictions issued by the initiating controller unless otherwise coordinated.

d. Before you issue control instructions directly to an aircraft that is within another controller's area of jurisdiction that will change that aircraft's heading, route, speed, altitude, or beacon code, ensure that coordination has been accomplished with each of the controllers listed below whose area of jurisdiction is affected by those instructions unless otherwise specified by a letter of agreement or a facility directive:

5–65d Note.—Those en route facilities using HOST software that provides capability for passing interim altitude shall include the specific operations and procedures for use of this procedure in a letter of agreement between the appropriate facilities.

1. The controller within whose area of jurisdiction the control instructions will be issued.

2. Any intervening controller(s) through whose area of jurisdiction the aircraft will pass.

e. After accepting a handoff from another controller, confirm the identity of primary target by advising the aircraft of its position, and of a beacon target by observing a code change, an "Ident" reply, or a "standby" squawk unless one of these was used during handoff. These provisions do not apply at those towers and GCAs which have been delegated the responsibility for providing radar separation within designated areas by the parent approach control facility and the aircraft identification is assured by sequencing or positioning prior to the handoff.

5–65e Reference.—Approach Separation Responsibility, paragraph 5–124.

f. When using appropriate equipment, consider a discrete beacon target's identity to be confirmed when:

1. The data block associated with the target being handed off indicates the computer assigned discrete beacon code is being received, or

2. You observe the deletion of a discrete code that was displayed in the data block, or

5–65f2 Note.—When the aircraft generated discrete beacon code does not match the computer assigned beacon code, the code generated will be displayed in the data block. When the aircraft changes to the assigned discrete code, the code disappears from the data block. In this instance, the observance of code removal from the data block satisfies confirmation requirements.

3. You observe the numeric display of a discrete code that an aircraft has been instructed to squawk or reports squawking.

g. Initiate verbal coordination prior to accepting control of a track when "CST," "NAT," "NT," "NONE," "NB," "NX," "OLD," "OL," "AMB," "AM," or "TU" is displayed in the data block.

1. When an automated interfacility handoff action is initiated and "AMB" or "AM" is displayed in the full data block, advise the other facility that a disparity exists between the position declared by their computer and that declared by your ARTS/PIDP.

2. When an automated interfacility handoff action is initiated and "NAT," "NT," or "TU" is displayed in the full data block, advise the other facility if a disparity exists between the position declared by their computer and the actual target position.

h. Advise the transferring controller, prior to accepting the transfer of radar identification, that you will delay the climb or the descent of an aircraft through the vertical limits of the transferring controller's area of jurisdiction, unless otherwise specified in a letter of agreement or a facility directive.

5–65h Note.—Those en route facilities using HOST software that provides capability for passing interim altitude shall include the specific operations and procedures for use of this procedure in a letter of agreement between the appropriate facilities.

i. If you decide, *after* accepting the transfer of radar identification, to delay the aircraft's climb or descent through the vertical limits of the transfer-

ing controller's area of jurisdiction, advise the ransferring controller of that decision as soon is possible. *You* now have the responsibility to ensure that the necessary coordination is accomplished with any intervening controller(s) whose area of urisdiction is affected by that delay, unless otherwise specified in a letter of agreement or a facility lirective.

5-65l Note.—Those en route facilities using HOST software hat provides capability for passing interim altitude shall include he specific operations and procedures for use of this procedure n a letter of agreement between the appropriate facilities.

5–66 POINT OUT

a. The transferring controller shall:

1. Obtain verbal approval before permitting an aircraft to enter the receiving controller's delegated airspace.

2. Obtain the receiving controller's approval before making any changes to an aircraft's flight path, altitude, or data block information after the point out has been approved.

5-66a2 Note.—Those en route facilities using HOST software that provides capability for passing interim altitude shall include the specific operations and procedures for use of this procedure in a letter of agreement between the appropriate facilities.

3. Comply with restrictions issued by the receiving controller unless otherwise coordinated.

4. Be responsible for subsequent radar handoffs and communications transfer, including flight data revisions and coordination, unless otherwise agreed to by the receiving controller or as specified in a letter of agreement.

b. The receiving controller shall:

1. Ensure that the target position corresponds with the position given by the transferring controller or that there is an association between a computer data block and the target being transferred prior to approving a point out.

2. Be responsible for separation between point out aircraft and other aircraft for which he/she has separation responsibility.

3. Issue restrictions necessary to provide separation from other aircraft within his/her area of jurisdiction.

5–67 AUTOMATED INFORMATION TRANSFER (AIT)

Transfer radar identification and/or altitude control without verbal coordination under the following conditions:

a. During radar handoff, and;

b. Via information displayed in full data blocks, and;

c. Within the same facility, except as provided in paragraph 5–68, and;

d. When following procedures specified in your facility AIT directive.

5–68 INTERFACILITY AUTOMATED INFORMATION TRANSFER

EN ROUTE

Transfer radar identification without verbal coordination under the following conditions:

a. During radar handoff, and;

b. Via information displayed in full data blocks, and;

c. On aircraft at assigned altitude in level flight, and;

d. Only the first sector within the receiving facility shall utilize the procedure, and;

e. When following procedures specified in your facility AIT directive and letter of agreement.

5–69 RESERVED

Section 5. RADAR SEPARATION

5–70 APPLICATION

a. Radar separation shall be applied to all RNAV aircraft operating on a random (impromptu) route at or below FL 450.

b. Radar separation may be applied between:

1. Radar identified aircraft.

2. An aircraft taking off and another radar-identified aircraft when the aircraft taking off will be radar-identified within 1 mile of the runway end.

3. A radar-identified aircraft and one not radar-identified when either is cleared to climb/descend through the altitude of the other provided:

(a) The performance of the radar system is adequate and, as a minimum, primary radar targets or ASR–9/Full Digital Radar Primary Symbol targets are being displayed on the display being used within the airspace within which radar separation is being applied, and

(b) Flight data on the aircraft not radar–identified indicate it is a type which can be expected to give adequate primary/ASR–9/Full Digital Radar Primary Symbol return in the area where separation is applied, and

(c) The airspace within which radar separation is applied is not less than the following number of miles from the edge of the radar display:

(1) When less than 40 miles from the antenna— *6 miles;*

(2) When 40 miles or more from the antenna— *10 miles;*

(3) Narrowband radar operations— *10 miles,* and

(d) Radar separation is maintained between the radar–identified aircraft and all observed primary, ASR–9/ Full Digital Radar Primary Symbol, and secondary radar targets until nonradar separation is established from the aircraft not radar identified, and

(e) When the aircraft involved are on the same relative heading, the radar-identified aircraft is vectored a sufficient distance from the route of the aircraft not radar identified to assure the targets are not superimposed prior to issuing the clearance to climb/descend.

5–70 Reference.—Exceptions, paragraph 4–2. Route Use, paragraph 4–50. Application, paragraph 5–50. Additional Separation for Formation Flights, paragraph 5–74. Approach Separation Responsibility, paragraph 5–124.

5–71 TARGET SEPARATION

Apply radar separation:

a. Between the centers of primary radar targets; however, do not allow a primary target to touch another primary target or a beacon control slash.

b. Between the ends of beacon control slashes.

5–71b Note.— At TPX–42 sites, the bracket video feature must be activated to display the beacon control slash.

c. Between the end of a beacon control slash and the center of a primary target.

d. All-Digital Displays: Between the centers of digitized targets. Do not allow targets to touch.

5–71 Reference.—Simultaneous ILS/MLS Approaches–Dual & Triple, paragraph 5–126.

5–72 MINIMA

Separate aircraft by the following minima:

5–72 Note.—Wake Turbulence procedures specify increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence.

a. Broadband Radar System or ASR–9/Full Digital Terminal Radar System:

1. When less than 40 miles from the antenna— *3 miles.*

2. When 40 miles or more from the antenna— *5 miles.*

EN ROUTE

b. Stage A/DARC and EARTS Mosaic:

5–72b Note.—EARTS Mosaic combines radar input from 3 to 15 sites into a single picture utilizing a mosaic grid composed of radar sort boxes.

1. Below FL 600–*5 miles.*

2. At or above FL 600–*10 miles.*

3. Within 40 miles of the antenna and below FL 180–Facility directives may specify 3 miles.

5–72b3 Note.—Where a significant operational advantage is obtained by modifying a radar site adaptation to single site coverage, facility directives are required to define the areas where 3–mile separation applies.

5–72b3 Reference.—FAA Order 7210.3, Single Site Coverage Stage A Operations, paragraph 10–20.

4. When transitioning from terminal to en route control, 3 miles increasing to 5 miles or greater, provided:

(a) The aircraft are on diverging routes/courses, and/or,

(b) The leading aircraft is and will remain faster than the following aircraft, and,

(c) Separation constantly increasing and the first center controller will establish 5 NM or other appropriate form of separation prior to the aircraft departing the first center sector, and,

(d) The proceedure is covered by a letter of agreement between the facilities involved and limited to specified routes and/or sectors/positions.

c. EARTS Sensor Mode:

72c Note 1.—EARTS Sensor mode displays information from radar input of a single site.

72c Note 2.—Procedures to convert EARTS mosaic to RTS sensor mode at each PVD will be established by facility ective.

1. When less than 40 miles from the antenna *niles.*

2. When 40 miles or more from the antenna *niles.*

AKE TURBULENCE APPLICATION

d. Separate aircraft operating directly behind, or rectly behind and less than 1,000 feet below, following an aircraft conducting an instrument proach by:

72d Note.—Consider parallel runways less than 2,500 feet art as a single runway because of the possible effects of wake bulence.

1. Heavy behind heavy-*4 miles.*

2. Small/large behind heavy-*5 miles.*

(See Figure 5–72[1] and Figure 5–72[2]).

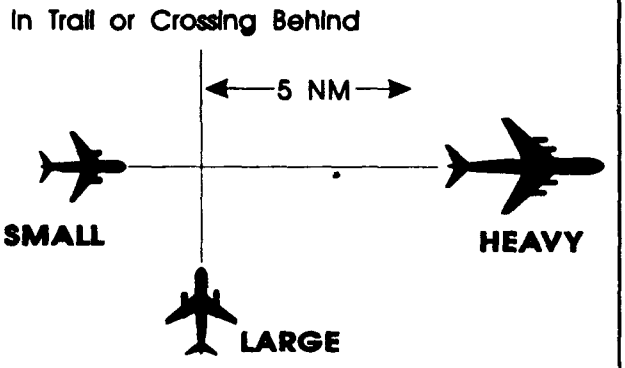


Figure 5–72[1]

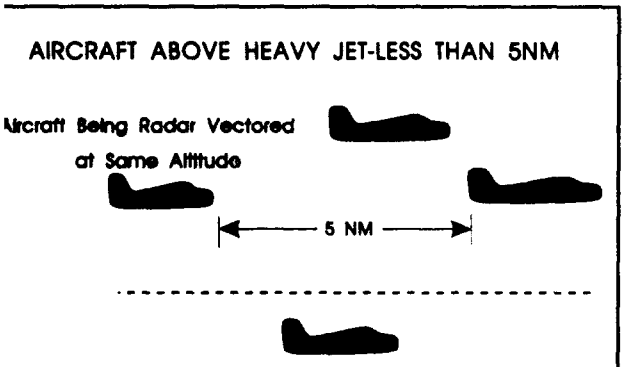


Figure 5–72[2]

'AKE TURBULENCE APPLICATION

e. *TERMINAL:* In addition to subparagraph 5–72d, parate an aircraft landing behind another aircraft on the same runway, or one making a touch-and-go, stop-and-go, or low approach by ensuring the following minima will exist at the time the preceding aircraft is over the landing threshold:

5–72e Note.—Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.

1. Small behind large-*4 miles.*

2. Small behind heavy-*6 miles.*

f. *TERMINAL:* 2.5 nautical miles (NMs) separation is authorized between aircraft established on the final approach course within 10 NMs of the landing runway when:

1. The leading aircraft's Weight Class is the same or less than the trailing aircraft;

2. Heavy aircraft and the Boeing 757 are permitted to participate in the separation reduction as the trailing aircraft only;

3. An average runway occupancy time of 50 seconds or less is documented;

4. BRITE/TCDD displays are operational and used for quick glance references;

5–72f4 Reference.—Use of Tower Radar Displays, paragraph 3–9a Note.

5. Turnoff points are visible from the control tower.

5–72 Reference.—Wake Turbulence, paragraph 2–19. Same Runway Separation, paragraph 3–105. Passing or Diverging, paragraph 5–73. Separation from Obstructions, paragraph 5–75. Successive or Simultaneous Departures, paragraph 5–113. Approach Separation Responsibility, paragraph 5–124. Sequencing, paragraph 7–66. Separation, paragraph 7–82. Separation, paragraph 7–92. FAA Order 7210.3, Reduced Separation on Final, paragraph 12–46.

5–73 PASSING OR DIVERGING

a. *TERMINAL:* Vertical separation between aircraft may be discontinued when the following conditions are met:

1. You observe that they have passed each other or that one has crossed the projected course of the other.

2. The tracks are monitored to ensure that the primary targets, beacon control slashes, or ASR–9/full digital terminal system type target symbols will not touch.

3. Their courses diverge at least 15 degrees.

b. *EN ROUTE:* Vertical separation between aircraft may be discontinued when they are on opposite courses as defined in paragraph 1–21; and

1. You are in communications with both aircraft involved; and

2. You tell the pilot of one aircraft about the other aircraft, including position, direction, type; and

3. One pilot reports having seen the other aircraft and that the aircraft have passed each other; and

4. You have observed that the radar targets have passed each other; and

5. You have advised the pilots if either aircraft is classified as a heavy aircraft.

5–73b5 Note.—Although vertical separation may be discontinued, the requirements of paragraph 5-72d and e must be applied when operating behind a heavy jet.

5–73b Examples.—

"Traffic, twelve o'clock, Boeing seven twenty seven, opposite direction. Do you have it in sight?"

If the answer is in the affirmative:

"Report passing the traffic."

When pilot reports passing the traffic and the radar targets confirm that the traffic has passed, issue apporpriate control instructions.

5–74 ADDITIONAL SEPARATION FOR FORMATION FLIGHTS

Because of the distance allowed between formation aircraft and lead aircraft, additional separation is necessary to ensure the periphery of the formation is adequately separated from other aircraft, adjacent airspace, or obstructions. Provide supplemental separation for formation flights as follows:

a. Separate a standard formation flight by adding 1 mile to the appropriate radar separation minima.

5–74a Reference.—Formation Flights, paragraph 2–13; Application, paragraph 5–70; Separation, paragraph 7–82. Pilot/Controller Glossary term—Formation Flight.

b. Separate two standard formation flights from each other by adding 2 miles to the appropriate separation minima.

c. Separate a nonstandard formation flight by applying the appropriate separation minima to the perimeter of the airspace encompassing the nonstandard formation or from the outermost aircraft of the nonstandard formation whichever applies.

d. If necessary for separation between a nonstandard formation and other aircraft, assign an appropriate beacon code to each aircraft in the formation or to the first and last aircraft in-trail.

5–74 Note.—The additional separation provided in paragraph 5–74 is not normally added to wake turbulence separation when a formation is following a heavier aircraft since none of the formation aircraft are likely to be closer to the heavier aircraft than the lead aircraft (to which the prescribed wake turbulence separation has been applied).

5–74 Reference.—Military Aerial Refueling, paragraph 9–29.

5–75 SEPARATION FROM OBSTRUCTIONS

a. Except in En route Stage A/DARC, separate aircraft from prominent obstructions depicted on the radar scope (displayed on the video/geo map, scribed on the map overlay, or displayed as a permanent echo) by the following minima:

1. When less than 40 miles from the antenna— *3 miles.*

2. When 40 miles or more from the antenna— *5 miles.*

b. Except in En route Stage A/DARC, vertical separation of aircraft above a prominent obstruction displayed as a permanent echo may be discontinued after the aircraft is passed it.

c. En route Stage A/DARC: Apply the radar separation minima specified in paragraph 5–72b1.

5–75a, b, and c Note.—The determination of what constitutes a prominent obstruction is made locally after coordination with appropriate Flight Standards representatives. Prominent obstructions shall be displayed as permanent echoes on the radar display using parrots, MTI reflectors, or RTQC symbols. Digital map marks (DMM) may be used to mark obstructions. DMM's are not to be used alone for map alignment but in conjunction with one or more of the permanent echo marking devices. When RTQC alone is used for obstruction marking, it shall be certified by Airway Facilities per the appropriate certification manual.

5–76 ADJACENT AIRSPACE

a. If coordination between the controllers concerned has not been effected, separate radar-controlled aircraft from the boundary of adjacent airspace in which radar separation is also being used by the following minima:

5–76a Reference.—Coordinate Use of Airspace, paragraph 2–14.

1. When less than 40 miles from the antenna— *1 1/2 miles.*

2. When 40 miles or more from the antenna— *2 1/2 miles.*

3. En route Stage A/DARC:

(a) Below Flight Level 600— *2 1/2 miles.*

(b) Flight Level 600 and above— *5 miles.*

b. Separate radar-controlled aircraft from the boundary of airspace in which nonradar separation is being used by the following minima:

1. When less than 40 miles from the antenna— *3 miles.*

2. When 40 miles or more from the antenna— *5 miles.*

3. En route Stage A/DARC:

(a) Below Flight Level 600— *5 miles.*

(b) Flight Level 600 and above— *10 miles.*

c. The provisions of subparagraphs 5–76a and b do not apply to VFR aircraft being provided Class B or Class C services. Ensure that targets of these aircraft do not touch the boundary of adjacent airspace.

5–76 Note.— VFR aircraft approaching Class B, C, or D airspace which is under the control jurisdiction of another air traffic control facility should either be provided with a radar hand-

off or be advised that radar service is terminated, given their position in relation to the Class B, C or D airspace, and the ATC frequency, if known, for the airspace to be entered. These actions should be accomplished in sufficient time for the pilot to obtain the required ATC approval prior to entering the airspace involved, or to avoid the airspace.

5–77 EDGE OF SCOPE

Separate a radar-controlled aircraft climbing or descending through the altitude of an aircraft that has been tracked to the edge of the scope/display by the following minima until nonradar separation has been established:

a. When less than 40 miles from the antenna— *3 miles* from edge of scope.

b. When 40 miles or more from the antenna— *5 miles* from edge of scope.

c. En route Stage A/DARC:

1. Below Flight Level 600— *5 miles.*
2. Flight Level 600 and above— *10 miles.*

5–78 BEACON TARGET DISPLACEMENT

When using a radar target display with a previously specified beacon target displacement to separate a beacon target from a primary target, adjacent *airspace, obstructions, or terrain, add a 1–mile* correction factor to the applicable minima.

5–78 Note.—The maximum allowable beacon target displacement which may be specified by the facility Air Traffic manager is ½ mile.

5–78 Reference.—FAA Order 7210.3, Monitoring of Mode 3/A Radar Beacon Codes, paragraph 3–83.

5–79 GPA 102/103 CORRECTION FACTOR

When using a radar display whose primary radar video is processed by the GPA 102/103 modification to a joint-use radar system, apply the following correction factors to the applicable minima:

a. If less than 40 miles from the antenna - add *1 mile.*

b. If 40 miles or more but not over 200 miles from the antenna - add *3 miles.*

5–80 thru 5–89 RESERVED

Section 7. SPEED ADJUSTMENT

5–100 APPLICATION

a. Keep speed adjustments to the minimum necessary to achieve or maintain required or desired spacing. Avoid adjustments requiring alternate decreases and increases. Permit pilots to resume normal speed when previously specified adjustments are no longer needed.

5–100a Note 1—It is the pilot's responsibility and prerogative to refuse speed adjustment that he considers excessive or contrary to the aircraft's operating specifications.

5–100a Note 2—Consider the following when applying speed control:

a. Determine the interval required and the point at which the interval is to be accomplished.

b. Implement speed adjustment based on the following principles:

1. Priority of speed adjustment instructions is determined by the relative speed and position of the aircraft involved and the spacing requirement.

2. Speed adjustments are not achieved instantaneously. Aircraft configuration, altitudes, and speed determine the time and distance required to accomplish the adjustment.

c. Use the following techniques in speed control situations:

1. Compensate for compression when assigning air speed adjustment in an in–trail situation by using one of the following techniques:

(a) Reduce the trailing aircraft first.

(b) Increase the leading aircraft first.

2. Assign a specific airspeed if required to maintain spacing.

3. Allow increased time and distance to achieve speed adjustments in the following situations:

(a) Higher altitudes.

(b) Greater speed.

(c) Clean configurations.

4. Ensure that aircraft are allowed to operate in a clean configuration as long as circumstances permit.

5. Keep the number of speed adjustments per aircraft to the minimum required to achieve and maintain spacing.

b. Do not assign speed adjustment to aircraft:

1. At or above FL 390 without pilot consent.

2. Executing a published high altitude instrument approach procedure.

3. In a holding pattern.

4. Inside the final approach fix on final or a point 5 miles from the runway, whichever is closer to the runway.

c. At the time approach clearance is issued, previously issued speed adjustments shall be restated if required.

5–100c Note.—Approach clearances cancel any previously assigned speed adjustment. Pilots are expected to make their own speed adjustments to complete the approach unless the adjustment are restated.

d. Express speed adjustments in terms of knots based on indicated airspeed (IAS) in 10–knot increments. At or above FL 240, speeds may be expressed in terms of mach numbers in 0.01 increments for turbojet aircraft with mach meters (i.e., mach 0.69, 0.70, 0.71, etc).

5–100d Note 1.—Pilots complying with speed adjustment instructions should maintain a speed within plus or minus 10 knots or 0.02 mach number of the specified speed.

5–100d Note 2.—When assigning speeds to achieve spacing between aircraft at different altitudes, consider that ground speed may vary with altitude. Further speed adjustment may be necessary to attain the desired spacing.

5–100 Reference.—Methods, paragraph 5–101.

5–101 METHODS

a. Instruct aircraft to:

1. Maintain present/specific speed.
2. Maintain specified speed or greater/less.
3. Maintain the highest/lowest practical speed.
4. Increase or reduce to a specified speed or by a specified number of knots.

Phraseology:

SAY AIRSPEED.

SAY MACH NUMBER.

MAINTAIN PRESENT SPEED.

MAINTAIN (specific speed) KNOTS.

MAINTAIN (specific speed) KNOTS OR GREATER.

DO NOT EXCEED (speed) KNOTS.

MAINTAIN MAXIMUM FORWARD SPEED.

MAINTAIN SLOWEST PRACTICAL SPEED.

INCREASE/REDUCE SPEED:

TO (specified speed in knots),

or

TO MACH (mach number),

or

(number of knots) KNOTS.

DO NOT EXCEED (speed) KNOTS,

5–101a Examples.—

"Increase speed to mach point seven two."

"Reduce speed to two five zero."

"Reduce speed twenty knots."

"Maintain two eight zero knots."

"Maintain maximum forward speed."

5–101a Note 1.—A pilot operating at or above 10,000 feet MSL on an assigned speed adjustment greater than 250 knots is expected to comply with Part 91.117(a) when cleared below 10,000 feet MSL without notifying FAA7110.65TOC Pilots are expected to comply with the other provisions of Part 91.117 without notification unless otherwise authorized by ATC.

5–101a Note 2.—The phrases "maintain maximum forward speed" and "maintain slowest practical speed" are primarily intended for use when sequencing a group of aircraft. As the sequencing plan develops, it may be necessary to determine the specific speed and/or make specific speed assignments.

b. To obtain pilot concurrence for a speed adjustment at or above FL 390, as required by paragraph 5–100b, or an adjustment less than the minima required in paragraph 5–102, use the following phraseology:

Phraseology:
(Speed adjustment), IF UNABLE ADVISE.

5–101b Example.—
"Reduce speed to one niner zero, if unable advise."

c. Specify which action is expected first when combining speed reduction with a descent clearance.

1. Speed reductions prior to descent.

Phraseology:
REDUCE SPEED:

TO (specified speed),

or

(number of knots) KNOTS.

THEN, DESCEND AND MAINTAIN (altitude).

2. Speed reduction following descent.

Phraseology:
DESCEND AND MAINTAIN (altitude).

THEN, REDUCE SPEED:

TO (specified speed in knots),

or

TO MACH (mach number),

or

(number of knots) KNOTS.

5–101c Note 1.—Simultaneous speed reduction and descent can be extremely difficult, particularly for turbojet aircraft. Specifying which action is to be accomplished first removes any doubt the pilot may have as to controller intent or priority.

5–101c Note 2.—When specifying descent prior to speed reduction, consider the maximum speed requirements specified in Part 91.117. It may be necessary for the pilot to level off temporarily and reduce speed prior to descending below 10,000 feet MSL.

d. Specify combined speed/altitude fix crossing restrictions.

Phraseology:
CROSS (fix) AT AND MAINTAIN (altitude) AT (specified speed) KNOTS.

5–101d Example.—
"Cross Robinsville at and maintain six thousand at two three zero knots."

5–101 Reference.—Numbers Usage, paragraph 2–86 Altitude Information, paragraph 4–65.

5–102 MINIMA

Unless a pilot concurs in the use of a lower speed, use the following minima:

a. To aircraft operating between FL 280 and 10,000 feet, a speed not less than 250 knots or the equivalent mach number.

5–102a Note.—On a standard day the mach numbers equivalent to 250 knots CAS (subject to minor variations) are: FL 240—0.6; FL 250—0.61; FL 260—0.62; FL 270—0.64; FL 280—0.65; FL 290—0.66.

b. To arrival aircraft operating below 10,000 feet:

1. Turbojet aircraft—A speed not less than 210 knots; except when the aircraft is within 20 flying miles of the runway threshold of the airport of intended landing, a speed not less than 170 knots.

2. Reciprocating engine and turboprop aircraft—A speed not less than 200 knots; except when the aircraft is within 20 flying miles of the runway threshold of the airport of intended landing, a speed not less than 150 knots.

c. Departures:

1. Turbojet aircraft—A speed not less than 230 knots.

2. Reciprocating engine and turboprop aircraft—A speed not less than 150 knots.

d. Helicopters—A speed not less than 60 knots.

5–102 Reference.—Methods, paragraph 5–101.

5–103 TERMINATION

Advise aircraft when speed adjustment is not longer needed.

Phraseology:
RESUME NORMAL SPEED.

5–104 thru 5–109 RESERVED

Section 9. RADAR ARRIVALS

5–120 VECTORS TO FINAL APPROACH COURSE

Except as provided in paragraph 7–31, vector arriving aircraft to intercept the final approach course:

a. At least 2 miles outside the approach gate unless one of the following exists:

1. When the reported ceiling is at least 500 feet above the MVA/MIA and the visibility is at least 3 miles (report may be a PIREP if no weather is reported for the airport), aircraft may be vectored to intercept the final approach course closer than 2 miles outside the approach gate but no closer than the approach gate.

2. If specifically requested by the pilot, aircraft may be vectored to intercept the final approach course inside the approach gate but no closer than the final approach fix.

b. For a precision approach, at an altitude not above the glideslope/glidepath or below the minimum glideslope intercept altitude specified on the approach procedure chart.

c. For a nonprecision approach, at an altitude which will allow descent in accordance with the published procedure.

5–120c Note.—A pilot request for an "evaluation approach," or a "coupled approach," or use of a similar term, indicates he desires the application of subparagraphs 5–120a and b.

d. EN ROUTE: At airports where controllers are required to provide vectors to the final approach course, it is required that:

1. The approach gate and, in addition, a line (solid or broken), at least 5 miles in length, depicting the final approach course--starting at or passing through the approach gate and extending away from the airport, be displayed on the radar scope, and;

2. The maximum range selected on the PVD is 125 NM, or;

3. An adjacent PVD is set at 125 NM or less, configured for the approach in use, and is utilized for the vector to the final approach course.

4. If unable to comply with 5–120d1, 5–120d2, or 5–120d3 above, issue the clearance in accordance with paragraph 4–100 of this order.

5–120 Reference.—Approach Clearance, paragraph 4–100. Final Approach Course Intersection, paragraph 5–121.

5–121 FINAL APPROACH COURSE INTERCEPTION

a. Assign headings that will permit final approach course interception on a track that does not exceed the interception angles specified in the Table 5–121[1].

Table 5–121[1]
Approach Course Interception Angle.

Distance from interception point to approach gate	*Maximum interception angle*
Less than 2 miles or Triple Simultaneous ILS/MLS Approaches in use..	20 degrees
2 miles or more	30 degrees (45 degrees for helicopters)

b. If deviations from the final approach course are observed after initial course interception, apply the following:

1. Outside the approach gate: Apply procedures in accordance with subparagraph 5–121a, if necessary, vector the aircraft for another approach.

2. Inside the approach gate: Inform the pilot of the aircraft's position and ask intentions.

Phraseology:
(Ident) (distance) MILE(S) FROM THE AIRPORT, (distance) MILE(S) RIGHT/LEFT OF COURSE, SAY INTENTIONS.

5–121 Note.—The intent is to provide for a trackcourse intercept angle judged by the controller to be no greater than specified by this procedure.

5–121 Reference.—Chapter 5, Section 9 and Section 10.

5–122 VECTORS ACROSS FINAL APPROACH COURSE

Inform the aircraft whenever a vector will take it across the final approach course and state the reason for such action.

5–122 Note.—In the event you are unable to so inform the aircraft, the pilot is not expected to turn inbound on the final approach course unless approach clearance has been issued.

Phraseology:
EXPECT VECTORS ACROSS FINAL FOR (purpose).

5–122 Example.—
"Expect vectors across final for spacing."

5–122 Reference.—Final Approach Course Interception, paragraph 5–121.

5–123 ARRIVAL INSTRUCTIONS

Issue all of the following to an aircraft before it reaches the approach gate:

a. Position relative to a fix on the final approach course. If none is portrayed on the radar display or if none is prescribed in the procedure, issue position information relative to the navigation aid which provides final approach guidance or relative to the airport.

b. Vector to intercept the final approach course if required.

c. Approach clearance except when conducting a radar approach. Issue approach clearance only after the aircraft is:

1. Established on a segment of a published route or instrument approach procedure, or

5–123c1 Example.—

Aircraft 1 was vectored to the final approach course but clearance was withheld. It is now at 4,000 feet and established on a segment of the instrument approach procedure. "Seven miles from X-ray. Cleared I-L-S Runway Three Six Approach." (See Figure 5–123[1]).

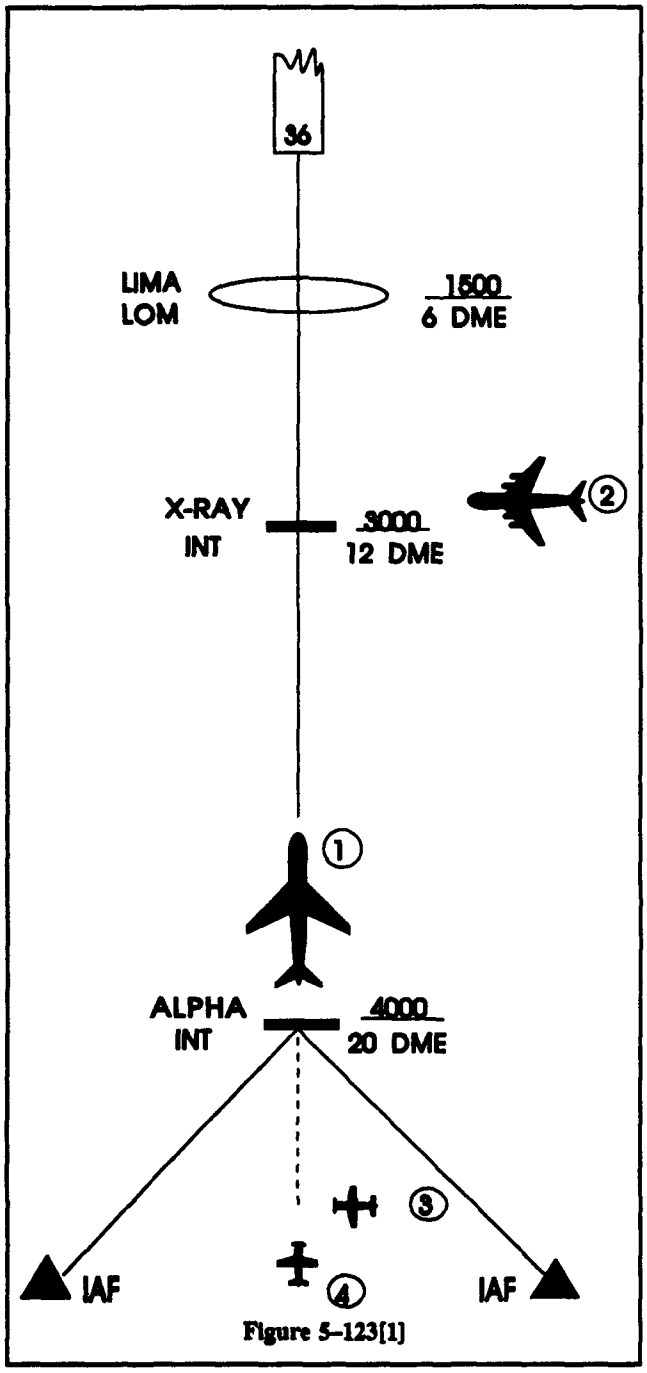


Figure 5–123[1]

2. Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure.

5–123c2 Example 1.—

Aircraft 2 is being vectored to a published segment of the final approach course, 4 miles from Lima at 2,000 feet. The MVA for this area is 2,000 feet. "Four miles from Lima. Turn right heading three four zero. Maintain two thousand until established on the localizer. Cleared I-L-S Runway Three Six Approach." (See Figure 5–123[1]).

5–123c2 Example 2.—

Aircraft 3 is being vectored to intercept the final approach course beyond the approach segments, 5 miles from Alpha at 5,000 feet. The MVA for this area is 4,000 feet. "Five miles from Alpha. Turn right heading three three zero. Cross Alpha at or above four thousand. Cleared I-L-S Runway Three Six Approach." (See Figure 5–123[1]).

5–123c2 Example 3.—

Aircraft 4 is established on the final approach course beyond the approach segments, 8 miles from Alpha at 6,000 feet. The MVA for this area is 4,000 feet. "Eight miles from Alpha. Cross Alpha at or above four thousand. Cleared I-L-S Runway Three Six Approach." (See Figure 5–123[1]).

5–123c2 Example 4.—

The aircraft is being vectored to a published segment of the MLS final approach course, 3 miles from Alpha at 4,000 feet. The MVA for this area is 4,000 feet. "Three miles from Alpha. Turn left heading two one zero. Maintain four thousand until established on the azimuth course. Cleared M-L-S Runway One Eight Approach." (See Figure 5–123[2].

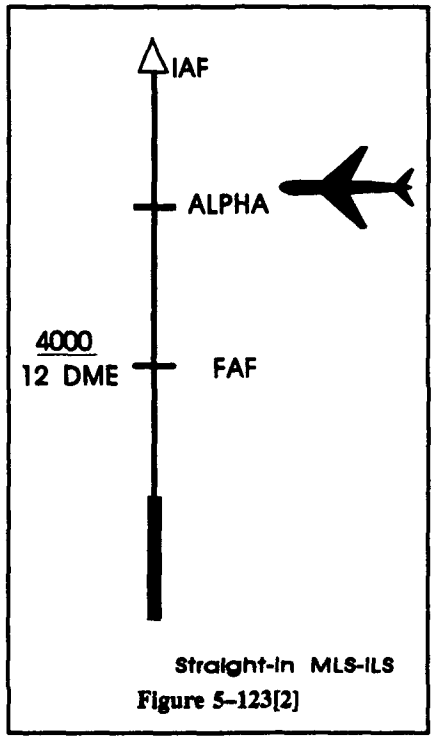


Figure 5–123[2]

5–123c2 Example 5.—

The aircraft is en route to Delta Waypoint at 6,000 feet. The MVA for this area is 4,000 feet. "Cross Delta at or above four thousand. Cleared M-L-S Runway One Eight Approach." (See Figure 5–123[3]).

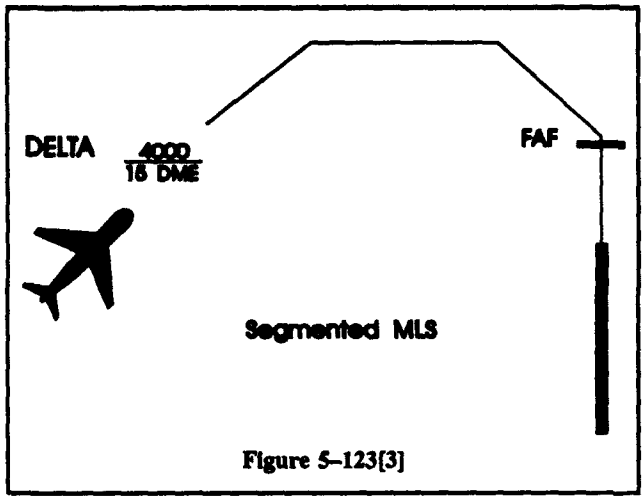


Figure 5–123[3]

5–123c2 Example 6.—

The aircraft is being vectored to an MLS curved approach, 3 miles from X-ray at 3,000 feet. "Three miles from X-ray. Turn right heading three three zero. Maintain three thousand until established on the azimuth course. Cleared M-L-S Runway One Eight Approach." (See Figure 5–123[4]).

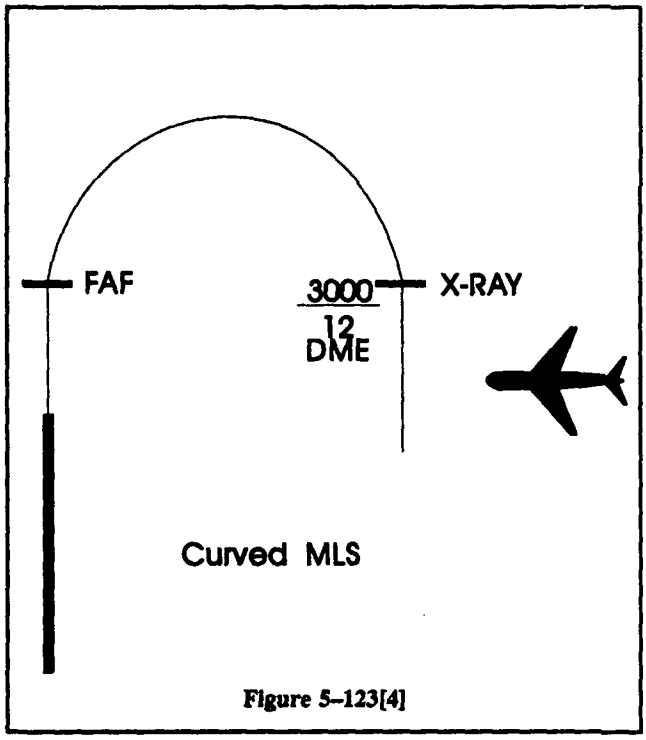


Figure 5–123[4]

5–123c2 Note 1.—The altitude assigned must assure IFR obstruction clearance from the point at which the approach clearance is issued until established on a segment of a published route or instrument approach procedure.

5–123c2 Note 2.—If the altitude assignment is VFR-on-top, it is conceivable that the pilot may elect to remain high until arrival over the final approach fix which may require the pilot to circle to descend so as to cross the final approach fix at an altitude that would permit landing.

d. Instructions to do one of the following:

5–123d Note.—The principal purpose of this paragraph is to ensure that frequency changes are made prior to passing the final approach fix. However, at times it will be desirable to retain an aircraft on the approach control frequency to provide a single-frequency approach or other radar services. When this occurs, it will be necessary to relay tower clearances or instructions to preclude changing frequencies prior to landing or approach termination.

1. Monitor local control frequency, reporting to the tower when over the approach fix.

2. Contact the tower on local control frequency.

5–123d2 Reference.—Communications Release, paragraph 4–107.

3. Contact the final controller on the appropriate frequency if radar service will be provided on final on a different frequency.

5–123d3 Reference.—Final Controller Changeover, paragraph 5–137.

4. When radar is used to establish the final approach fix, inform the pilot that after being advised that he is over the fix he is to contact the tower on local control frequency.

5–123d4 Example.—

"Three miles from final approach fix. Turn left heading zero one zero. Maintain two thousand until established on the localizer. Cleared I-L-S Runway Three Six Approach. I will advise when over the fix."

"Over final approach fix. Contact tower one one eight point one."

5–123d4 Note.—ARSR may be used for establishment of initial approach and intermediate approach fixes only. ASR must be used to establish the final approach fix.

5–123 Reference.—Final Approach Course Intersection, paragraph 5–121. Simultaneous ILS/MLS Approaches–Dual & Triple, paragraph 5–126.

5–124 APPROACH SEPARATION RESPONSIBILITY

a. The radar controller performing the approach control function is responsible for separation of radar arrivals unless visual separation is provided by the tower, or a letter of agreement/facility directive authorizes otherwise. Radar final controllers ensure that established separation is maintained between aircraft under their control and other aircraft established on the same final approach course.

5–124a Note.—The radar controller may be a controller in an ARTCC, a terminal facility, or a tower controller when authorized to perform the approach control function in a terminal area.

5–124a Reference.—Visual Separation, paragraph 7–10; Radar Separation, paragraph 5–70; Wake Turbulence, paragraph 2–19, Minima, paragraph 5–72. FAA Order 7210.3, Authorization for Separation Services by Towers, paragraph 2–14.

b. When timed approaches are being conducted, the radar controller shall maintain the radar separation specified in paragraph 6–64 until the aircraft is observed to have passed the final approach fix inbound (nonprecision approaches) or the OM or the fix used in lieu of the outer marker (precision approaches) and is within 5 miles of the runway

on the final approach course or until visual separation can be provided by the tower.

5–124 Reference.—Receiving Controller Handoff, paragraph 5–65. Final Approach Course Intersection, paragraph 5–121. Parallel ILS/MLS Approaches, paragraph 5–125. Approach Sequence, paragraph 6–61.

5–125 PARALLEL ILS/MLS APPROACHES

TERMINAL

When conducting parallel ILS, MLS, or ILS and MLS approaches:

a. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft during turn on.

b. Provide a minimum of 2.5 miles radar separation between aircraft within 10 miles of the runway end on the same localizer course and/or MLS azimuth course and comply with paragraph 5–72f.

c. Provide a minimum of 1.5 miles radar separation diagonally between successive aircraft on adjacent localizer/azimuth courses when runway centerlines are at least 2,500 feet but no more than 4,300 feet apart.

5–125c Note.—Applying this procedure does not replace the prescribed minima in 5–125b.

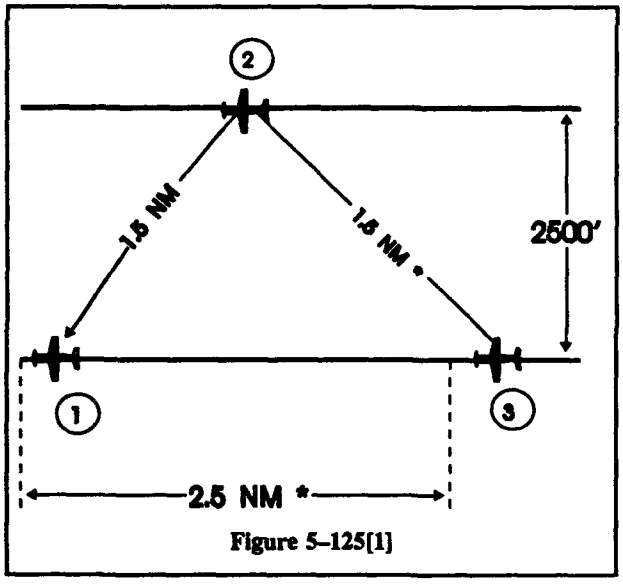


Figure 5–125[1]

In Figure 5–125[1], aircraft 2 is 1.5 miles from aircraft 1, and aircraft 3 is 1.5 miles or more from aircraft 2. *The resultant separation between aircraft 1 and 3 is at least 2.5 miles.

d. Provide a minimum of 2 miles radar separation diagonally between successive aircraft on adjacent localizer/azimuth courses where runway centerlines are more than 4,300 feet but no more than 9,000 feet apart.

5–125d Note.—Applying this procedure does not replace the prescribed minima in 5–125b.

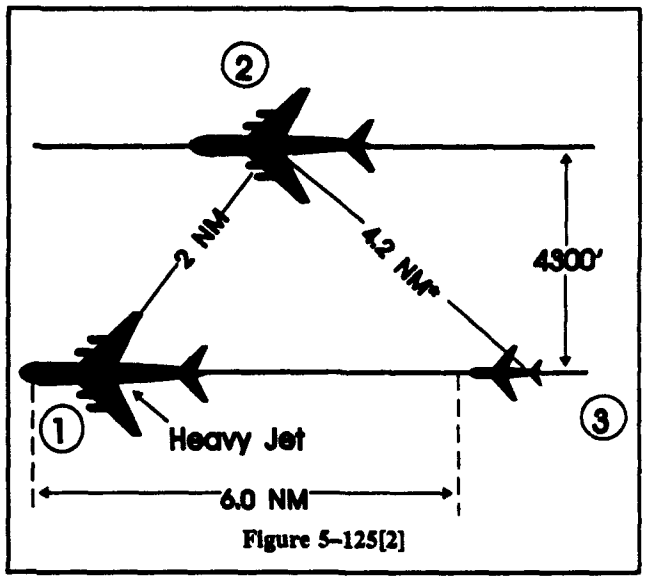


Figure 5–125[2]

In Figure 5–125[2], aircraft 2 is 2 miles from heavy aircraft 1. Aircraft 3 is a small aircraft and is 6 miles from aircraft 1. *The resultant separation between aircraft 2 and 3 is 4.2 miles.

e. The following conditions are required when applying the minimum radar separation on adjacent localizer/azimuth courses allowed in 5–125c or 5–125d:

1. Apply this separation standard only after aircraft are established on the parallel final approach course.
2. Straight-in landings will be made.
3. Missed approach procedures do not conflict.
4. Aircraft are informed that approaches to both runways are in use. This information may be provided through the ATIS.
5. Approach control shall have the interphone capability of communicating directly with the local controller at locations where separation responsibility has not been delegated to the tower.

5–125e5 Note.—The interphone capability is an integral part of this procedure when approach control has the sole separation responsibility.

5–125e5 Reference.—Approach Separation Responsibility, paragraph 5–124; FAA Order 7210.3, Authorization for Separation Services by Towers, paragraph 2–14.

f. Consideration should be given to known factors that may in any way affect the safety of the instrument approach phase of flight, such as surface wind direction and velocity, windshear alerts/reports, severe weather activity, etc. Closely monitor weather activity that could impact the final approach course. Weather conditions in the vicinity of the final approach course may dictate a change of approach in use.

5–125 Reference.—Final Approach Course Intersection, paragraph 5–121.

5–126 SIMULTANEOUS ILS/MLS APPROACHES–DUAL & TRIPLE

TERMINAL

a. Simultaneous independent ILS, MLS, or ILS and MLS approaches are authorized as follows:

1. Dual parallel runway centerlines are at least 4,300 feet apart.

2. Triple parallel runway centerlines are at least 5,000 feet apart and the airport field elevation is 999 feet MSL or less.

3. A high-resolution, color monitor with alert algorithms, such as the Final Monitor Aid or that required in the Precision Runway Monitor program shall be used to monitor approaches where:

(a) Triple parallel runway centerlines are at least 4,300 but less than 5,000 feet apart.

(b) Triple parallel runway centerlines are at least 5,000 feet apart and the airport field elevation is 1,000 feet MSL or more.

4. Straight-in landings will be made.

5. ILS, MLS, radar, and appropriate frequencies are operating normally.

b. Prior to aircraft departing an outer fix, inform aircraft that simultaneous ILS/MLS approaches are in use. This information may be provided through the ATIS.

c. On the initial vector, inform the aircraft of the ILS/MLS runway number.

Phraseology:

I-L-S RUNWAY (runway number) (left/right/center).

M-L-S RUNWAY (runway number) (left/right/center).

d. Clear the aircraft to descend to the appropriate glideslope/glidepath intercept altitude soon enough to provide a period of level flight to dissipate excess speed. Provide at least 1 mile of straight flight prior to the final approach course intercept.

5–126d Note.—Not applicable to curved and segmented MLS approaches.

e. Vector the aircraft to intercept the final approach course at an angle not greater than 30 degrees.

f. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft during turn-on to parallel final approach. Provide the minimum applicable radar separation between aircraft on the same final approach course.

5–126f Note 1.—Aircraft established on a final approach course are separated from aircraft established on an adjacent parallel final approach course(s) provided none of the aircraft penetrate the depicted "no transgression zone" (NTZ).

5–126f Note 2.—During trips, no two aircraft will be assigned the same altitude during turn–on. All three aircraft will be assigned altitudes which differ by a minimum of 1,000 feet. Example: 3,000, 4,000, 5,000; 7,000, 9,000, 8,000.

g. When assigning the final heading to intercept the final approach course, issue the following to the aircraft:

1. Position from a fix on the localizer course or the MLS azimuth course.

2. An altitude to maintain until established on the localizer course or the MLS azimuth course.

5–126g2 Reference.—Arrival Instructions, paragraph 5–123.

3. Clearance for the appropriate ILS/MLS runway number approach.

Phraseology:

POSITION (number) MILES FROM (fix). TURN (left/right) HEADING (degrees). MAINTAIN (altitude) UNTIL ESTABLISHED ON THE LOCALIZER. CLEARED I-L-S RUNWAY (number) (left/right/center) APPROACH.

POSITION (number) MILES FROM (fix) TURN (left/right) HEADING (degrees). MAINTAIN (altitude) UNTIL ESTABLISHED ON THE FINAL APPROACH COURSE. CLEARED M-L-S RUNWAY (number) (left/right/center) APPROACH.

h. Monitor all approaches regardless of weather. Monitor local control frequency to receive any aircraft transmission. Issue control instructions as necessary to ensure aircraft do not enter the NTZ.

5–126h Note 1.—Separate monitor controllers, each with transmit/receive and override capability on the local control frequency, shall ensure aircraft do not penetrate the depicted NTZ. Facility directives shall delineate responsibility for providing the minimum applicable longitudinal separation between aircraft on the same final approach course.

5–126h Note 2.—An NTZ at least 2,000 feet wide is established equidistant between extended runway centerlines and is depicted on the monitor display. The primary responsibility for navigation on the final approach course rests with the pilot. Therefore, unless longitudinal seperation is comprimised, control instructions and information are issued only to ensure separation between aircraft and that aircraft do not penetrate the NTZ. Pilots are not expected to acknowledge those transmissions unless specifically requested to do so.

5–126h Note 3.—For the purposes of ensuring an aircraft does not penetrate the NTZ, the "aircraft" is considered the center of the primary radar return for that aircraft, or, if an FMA or other color final monitor aid is used, the center of the digitized target of that aircraft. The provisions of paragraph 5–71 apply also.

1. When aircraft are observed to overshoot the turn-on or to continue on a track which will penetrate the NTZ, instruct the aircraft to return to the correct final approach course immediately.

Phraseology:

YOU HAVE CROSSED THE FINAL APPROACH COURSE. TURN (left/right) IMMEDIATELY AND RETURN TO LOCALIZER/AZIMUTH COURSE,

or

TURN (left/right) IMMEDIATELY HEADING (degrees), CLIMB AND MAINTAIN (altitude).

2. Instruct aircraft on the adjacent final approach course to alter course to avoid the deviating aircraft when an aircraft is observed penetrating the NTZ.

Phraseology:

TURN (right/left) IMMEDIATELY HEADING (degrees), CLIMB AND MAINTAIN (altitude).

3. Terminate radar monitoring when one of the following occurs:

(a) Visual separation is applied.

(b) The aircraft reports the approach lights or runway in sight.

(c) The aircraft is 1 mile or less from the runway threshold, if procedurally required and contained in facility directives.

4. Do not inform the aircraft when radar monitoring is terminated.

5. Do not apply the provisions of paragraph 5–180 for simultaneous ILS, MLS, or ILS and MLS approaches.

i. When simultaneous ILS, MLS, or ILS and MLS approaches are being conducted to parallel runways, consideration should be given to known factors that may in any way affect the safety of the instrument approach phase of flight, such as surface wind direction and velocity, windshear alerts/reports, severe weather activity, etc. Closely monitor weather activity that could impact the final approach course. Weather conditions in the vicinity of the final approach course may dictate a change of approach in use.

5–126 Reference.—Radar Service Termination, paragraph 5–13. Final Approach Course Intersection, paragraph 5–121.

5–127 SIMULTANEOUS ILS/MLS APPROACHES - HIGH UPDATE RADAR

TERMINAL

a. Authorize simultaneous independent ILS, MLS, or ILS and MLS approaches to parallel runways with centerlines separated by 3,400 to 4,300 feet when precision runway monitors are utilized with a radar update rate of 2.4 seconds or less, and:

1. Straight-in landings will be made.

2. ILS, MLS, radar, and appropriate frequencies are operating normally.

b. Inform aircraft that simultaneous ILS/MLS approaches are in use prior to aircraft departing an outer fix. This information may be provided through the ATIS.

c. Inform the aircraft of the ILS/MLS runway number on the initial vector.

Phraseology:

I-L-S RUNWAY (runway number) (left/right).

M-L-S RUNWAY (runway number) (left/right).

d. Clear the aircraft to descend to the appropriate glideslope/glidepath intercept altitude soon enough to provide a period of level flight to dissipate excess speed. Provide at least 1 mile of straight flight prior to the final approach course intercept.

5–127d Note.— Not applicable to curved and segmented MLS approaches.

e. Vector the aircraft to intercept the final approach course at an angle not greater than 30 degrees.

f. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft during turn onto parallel final approach. Provide the minimum applicable radar separation between aircraft on the same final approach course

5–127f Note— Aircraft established on a final approach course are separated from aircraft established on an adjacent parallel final approach course provided neither aircraft penetrates the depicted no transgression zone (NTZ).

g. Issue the following to an aircraft when assigning a final heading to intercept the final approach course:

1. Position from a fix on the localizer course or the MLS azimuth course.

2. An altitude to maintain until established on the localizer course or the MLS azimuth course.

5–127g2 Reference.— Arrival Instructions, paragraph 5–123

3. Clearance for the appropriate ILS/MLS runway number approach.

Phraseology:

POSITION (number) MILES FROM (fix). TURN (left/right) HEADING (degrees). MAINTAIN (altitude) UNTIL ESTABLISHED ON THE LOCALIZER. CLEARED I-L-S RUNWAY (number) (left/right) APPROACH.

or

POSITION (number) MILES FROM (fix). TURN (left/right) HEADING (degrees). MAINTAIN (altitude) UNTIL ESTABLISHED ON THE FINAL APPROACH COURSE. CLEARED M-L-S RUNWAY (number) (left/right) APPROACH.

h. Monitor all approaches regardless of weather. Monitor local control frequency to receive any aircraft transmission. Issue control instructions as necessary to ensure aircraft do not enter the NTZ.

5–127h Note 1.— Separate monitor controllers, each with transmit/receive and override capability on the local control frequency, shall ensure aircraft do not penetrate the depicted NTZ. Facility directives shall define the responsibility for providing the minimum applicable longitudinal separation between aircraft on the same final approach course.

5–127h Note 2.— An NTZ at least 2,000 feet wide is established equidistant between extended runway final approach course centerlines and shall be depicted on the monitor display. The primary responsibility for navigation on the final approach course rests with the pilot. Control instructions and information are issued only to ensure that aircraft do not penetrate the NTZ. Pilots are not expected to acknowledge those transmissions unless specifically requested to do so.

5–127h Note 3.— The aircraft is considered the center of the digitized target for that aircraft for the purposes of ensuring an aircraft does not penetrate the NTZ.

1. Instruct the aircraft to return immediately to the correct final approach course when aircraft are observed to overshoot the turn-on or continue on a track which will penetrate the NTZ.

Phraseology:
YOU HAVE CROSSED THE FINAL APPROACH COURSE. TURN (left/right) IMMEDIATELY AND RETURN TO LOCALIZER/AZIMUTH COURSE.

or

TURN (left/right) AND RETURN TO THE LOCALIZER/AZIMUTH COURSE.

2. Instruct aircraft on the adjacent final approach course to alter course to avoid the deviating aircraft when an aircraft is observed penetrating the NTZ.

Phraseology:
TURN (left/right) IMMEDIATELY HEADING (degrees), CLIMB AND MAINTAIN (altitude).

3. Terminate radar monitoring when one of the following occurs:

(a) Visual separation is applied.

(b) The aircraft reports the approach lights or runway in sight.

(c) The aircraft has landed or, in the event of a missed approach, is one-half mile beyond the departure end of the runway.

4. Do not inform the aircraft when radar monitoring is terminated.

5. Do not apply the provisions of paragraph 5–180 for simultaneous ILS, MLS, or ILS and MLS approaches.

i. Consideration should be given to known factors that may in any way affect the safety of the instrument approach phase of flight when simultaneous ILS, MLS, or ILS and MLS approaches are being conducted to parallel runways. Factors include but are not limited to wind direction/velocity, wind-shear alerts/reports, severe weather activity. Closely monitor weather activity that could impact the final approach course. Weather conditions in the vicinity of the final approach course may dictate a change of the approach in use.

5–128 thru 5–129 RESERVED

Section 10. RADAR APPROACHES—TERMINAL

5–130 APPLICATION

a. Provide radar approaches in accordance with standard or special instrument approach procedures.

b. A radar approach may be given to any aircraft upon request and may be offered to aircraft in distress regardless of weather conditions or to expedite traffic.

5–130b Note.—Acceptance of a radar approach by a pilot does not waive the prescribed weather minima for the airport or for the particular aircraft operator concerned. The pilot is responsible for determining if the approach and landing are authorized under the existing weather minima.

5–130 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–131 APPROACH INFORMATION

a. Issue the following information to an aircraft that will conduct a radar approach. Current approach information contained in the ATIS broadcast may be omitted if the pilot states the appropriate ATIS broadcast code. All items listed below, except for subparagraph 5–131a3, may be omitted after the first approach if repeated approaches are made and no change has occurred. Transmissions with aircraft in this phase of the approach should occur approximately every minute.

5–131a Reference.—Approach Information by Approach Control Facilities, paragraph 4–92.

1. Altimeter setting.

2. If available, ceiling and visibility if the ceiling at the airport of intended landing is reported below 1,000 feet or below the highest circling minimum, whichever is greater, or if the visibility is less than 3 miles. Advise pilots when weather information is available via the Automated Weather Observation System (AWOS)/Automated Surface Observation System (ASOS) and issue the appropriate frequency.

3. Issue any known changes classified as special weather observations as soon as possible. Special weather observations need not be issued after they are included in the ATIS broadcast and the pilot states the appropriate ATIS broadcast code.

4. Pertinent information on known airport conditions if they are considered necessary to the safe operation of the aircraft concerned.

5. Lost communication procedures as specified in paragraph 5–133.

b. Before starting final approach:

5–131b Note 1.—ASR approach procedures may be prescribed for specific runways, for an airport/heliport, and for helicopters only to a "point-in-space," i.e., a MAP from which a helicopter must be able to proceed to the landing area by visual reference to a prescribed surface route.

5–131b Note 2.—Occasionally, copter PAR approaches are available to runways where conventional PAR approaches have been established. In those instances where the two PAR approaches serve the same runway, the copter approach will have a steeper glide slope and a lower decision height. By the controller's designating the approach to be flown, the helicopter pilot understands which of the two approaches he has been vectored for and which set of minima apply.

1. Inform the aircraft of the type of approach, runway, airport, heliport, or other point, as appropriate, to which the approach will be made. Specify the airport name when the approach is to a secondary airport.

Phraseology:

THIS WILL BE A P-A-R/SURVEILLANCE APPROACH TO:

RUNWAY (runway number),

or

(airport name) AIRPORT, RUNWAY (runway number),

or

(airport name) AIRPORT/HELIPORT.

THIS WILL BE A COPTER P-A-R APPROACH TO:

RUNWAY (runway number),

or

(airport name) AIRPORT, RUNWAY (runway number),

or

(airport name) AIRPORT/HELIPORT.

2. For surveillance approaches, specify the location of the MAP in relation to the runway/airport/heliport.

Phraseology:

MISSED APPROACH POINT IS (distance) MILE/S FROM RUNWAY/AIRPORT/HELIPORT,

or for a Point-In-Space Approach,

A MISSED APPROACH POINT (distance) MILE/S (direction from landing area) OF (airport name) AIRPORT/HELIPORT.

5–131b1 and 2 Example.—

Helicopter Point-in-Space Approach:

"Army Copter Zulu Two, this will be a surveillance approach to a missed approach point, three point five miles south of Creedon Heliport."

5–131b Reference.—Elevation failure, paragraph 5–168.

c. Inform an aircraft making an approach to an airport not served by a tower that no traffic or landing runway information is available for that airport.

Phraseology:

NO TRAFFIC OR LANDING RUNWAY INFORMATION AVAILABLE FOR THE AIRPORT.

5–131 Reference.—Altimeter Setting Issuance Below Lowest Usable FL, paragraph 2–121. Final Approach Course Intersection, paragraph 5–121.

5–132 NO-GYRO APPROACH

When an aircraft will make a no-gyro surveillance or a PAR approach:

a. Before issuing a vector, inform the aircraft of the type of approach.

Phraseology:

THIS WILL BE A NO-GYRO SURVEILLANCE/P-A-R APPROACH.

b. Instruct the aircraft when to start and stop turn.

Phraseology:

TURN LEFT/RIGHT.

STOP TURN.

c. After turn on to final approach has been made and prior to the aircraft reaching the approach gate, instruct the aircraft to make half-standard rate turns.

Phraseology:

MAKE HALF-STANDARD RATE TURNS.

5–132 Reference.—Final Approach Course Intersection, paragraph 5–121. Elevation Failure, paragraph 5–168.

5–133 LOST COMMUNICATIONS

When weather reports indicate that an aircraft will likely encounter IFR weather conditions during the approach, take the following action as soon as possible after establishing radar identification and radio communications (may be omitted after the first approach when successive approaches are made and the instructions remain the same):

5–133 Note.—Air traffic control facilities at U.S. Army and U.S. Air Force Installations are not required to transmit lost communications instructions to military aircraft. All military facilities will issue specific lost communications instructions to civil aircraft when required.

a. If lost communications instructions will require the aircraft to fly on an unpublished route, issue an appropriate altitude to the pilot. If the lost communications instructions are the same for both pattern and final, the pattern/vector controller shall issue both. Advise the pilot that if radio communications are lost for a specified time interval (not more than 1 minute) on vector to final approach, 15 seconds on a surveillance final approach, or 5 seconds on a PAR final approach to:

1. Attempt contact on a secondary or a tower frequency.

2. Proceed in accordance with visual flight rules if possible.

3. Proceed with an approved nonradar approach, or execute the specific lost communications procedure for the radar approach being used.

5–133a3 Note.—The approved procedures are those published on the FAA Forms 8260 or applicable military document.

Phraseology:

IF NO TRANSMISSIONS ARE RECEIVED FOR (time interval) IN THE PATTERN OR FIVE/FIFTEEN SECONDS ON FINAL APPROACH, ATTEMPT CONTACT ON (frequency), AND

if the possibility exists,

PROCEED VFR. IF UNABLE:

if approved,

PROCEED WITH (nonradar approach), MAINTAIN (altitude) UNTIL ESTABLISHED ON/OVER/FIX/NAVAID/ APPROACH PROCEDURE,

or

(alternative instructions).

USN

Phraseology:

For ACLS operations using Mode I, IA, and II,

IF NO TRANSMISSIONS ARE RECEIVED FOR FIVE SECONDS AFTER LOSS OF DATA LINK, ATTEMPT CONTACT ON (frequency), AND

if the possibility exists,

PROCEED VFR. IF UNABLE:

if approved,

PROCEED WITH (nonradar approach), MAINTAIN (altitude) UNTIL ESTABLISHED ON/OVER FIX/NAVAID/ APPROACH PROCEDURE,

or

(alternative instructions).

b. If the final approach lost communications instructions are changed, differ from those for the pattern, or are not issued by the pattern controller, they shall be issued by the final controller.

c. If the pilot states that he cannot accept a lost communications procedure due to weather conditions or other reasons, request the pilot's intention.

5–133c Note.—The pilot is responsible for determining the adequacy of lost communications procedures with respect to aircraft performance, equipment capability, or reported weather.

5–133 Reference.—Final Approach Course Intersection, paragraph 5–121. Approach Information, paragraph 5–131. Elevation Failure, paragraph 5–168.

5–134 RADAR CONTACT LOST

If radar contact is lost during an approach and the aircraft has not started final approach, clear the aircraft to an appropriate NAVAID/fix for an instrument approach.

5–134 Reference.—Final Approach Course Intersection, paragraph 5–121. Final Approach Abnormalities, paragraph 5–143. Elevation Failure, paragraph 5–168.

5–135 LANDING CHECK

USA/USN

Advise the pilot to perform landing check while the aircraft is on downwind leg and in time to complete it before turning base leg. If an incomplete pattern is used, issue this before handoff to the final controller for a PAR approach, or before

Section 12. PAR APPROACHES—TERMINAL

5–160 GLIDEPATH NOTIFICATION

Inform the aircraft when it is approaching glidepath (approximately 10 to 30 seconds before final descent).

Phraseology:
APPROACHING GLIDEPATH.

5–161 DECISION HEIGHT (DH) NOTIFICATION

Provide the DH to any pilot who requests it.

Phraseology:
DECISION HEIGHT (number of feet).

5–162 DESCENT INSTRUCTION

When an aircraft reaches the point where final descent is to start, instruct it to begin descent.

Phraseology:
BEGIN DESCENT.

5–163 GLIDEPATH AND COURSE INFORMATION

a. Issue course guidance and inform the aircraft when it is on glidepath and on course, and frequently inform the aircraft of any deviation from glidepath or course. Transmissions with aircraft on precision final approach should occur approximately every 5 seconds.

Phraseology:
HEADING (heading).

ON GLIDEPATH.

ON COURSE,

or

SLIGHTLY/WELL ABOVE/BELOW GLIDEPATH.

SLIGHTLY/WELL LEFT/RIGHT OF COURSE.

5–163a Note.—Controllers should not key the radio transmitter continuously during radar approaches to preclude a lengthy communications block. The decision on how often transmitters are unkeyed is the controller's prerogative.

b. Issue trend information as required, to indicate target position with respect to the azimuth and elevation cursors and to describe target movement as appropriate corrections are issued. Trend information may be modified by the terms "RAPIDLY" or "SLOWLY", as appropriate.

5–163b Examples.—
"Going above/below glidepath."

"Going right/left of course."

"Above/below glidepath and coming down/up."

"Above/below glidepath and holding."

"Left/right of course and holding/correcting."

5–163 Reference.—Position Advisories, paragraph 5–166. Monitor Information, paragraph 5–182.

5–164 DISTANCE FROM TOUCHDOWN

Inform the aircraft of its distance from touchdown at least once each mile on final approach.

Phraseology:
(Number of miles) MILES FROM TOUCHDOWN.

5–165 DECISION HEIGHT

Inform the aircraft when it reaches the published decision height.

Phraseology:
AT DECISION HEIGHT.

5–166 POSITION ADVISORIES

a. Continue to provide glidepath and course information prescribed in paragraph 5–163a and b until the aircraft passes over threshold.

5–166 Note.—Glidepath and course information provided below decision height is advisory only. Part 91.175 outlines pilot responsibilities for descent below decision height.

b. Inform the aircraft when it is passing over the approach lights.

Phraseology:
OVER APPROACH LIGHTS.

c. Inform the aircraft when it is passing over the landing threshold and inform it of its position with respect to the final approach course.

Phraseology:
OVER LANDING THRESHOLD, (position with respect to course).

5–166 Reference.—Final Approach Abnormalities, paragraph 5–143.

5–167 COMMUNICATION TRANSFER

Issue communications transfer instructions.

Phraseology:
CONTACT (terminal control function) (frequency, if required) AFTER LANDING.

5–167 Note.—Communications transfer instructions should be delayed slightly until the aircraft is on the landing roll-out to preclude diversion of the pilot's attention during transition and touchdown.

5–167 Reference.—Radio Communications Transfer, paragraph 2–17.

5–168 ELEVATION FAILURE

a. If the elevation portion of PAR equipment fails during a precision approach:

1. Discontinue PAR instructions and tell the aircraft to take over visually or if unable, to execute a missed approach. If the aircraft executes a missed approach, apply subparagraph 5–168a2.

Phraseology:
NO GLIDEPATH INFORMATION AVAILABLE. IF RUNWAY, APPROACH/RUNWAY LIGHTS, NOT IN SIGHT, EXECUTE MISSED APPROACH/(alternative instructions).

2. If a surveillance approach, ASR or PAR without glide slope, is established for the same runway, inform the aircraft that a surveillance approach can be given. Use ASR or the azimuth portion of the PAR to conduct the approach and

apply Section 11 of this chapter. When the PAR azimuth is used, inform the pilot that mileage information will be from touchdown, and at those runways where specific minima have been established for PAR without glideslope, inform the pilot that the PAR azimuth will be used for the approach.

5–168a2 Examples.—

a. Approach information when PAR azimuth used:

"This will be a surveillance approach to Runway Three Six. Mileages will be from touchdown," or

"This will be a surveillance approach to Runway Three Six using P-A-R azimuth. Mileages will be from touchdown."

b. Descent instructions:

"Five miles from touchdown, descend to your minimum descent altitude/minimum altitude."

5–168a2 Reference.—Approach Information, paragraph 5–131; Descent Instructions, paragraph 5–153.

b. If the elevation portion of the PAR equipment is inoperative before starting a precision approach, apply subparagraph 5–168a2.

5–169 SURVEILLANCE UNUSABLE

PAR approaches may be conducted when the ASR is unusable provided a nonradar instrument approach will position the aircraft over a navigational aid or DME fix within the precision radar coverage, or an adjacent radar facility can provide a direct radar handoff to the PAR controller.

5–169 Note.—The display of the NAVAID or DME fix in accordance with paragraph 5–51b is not required provided the NAVAID or DME fix can be correlated on a PAR scope.

5–170 thru 5–179 RESERVED

Section 14. AUTOMATION—EN ROUTE

5–190 CONFLICT MODE C INTRUDER ALERT1

a. When a conflict alert or Mode C Intruder (MCI) Alert is displayed, evaluate the reason for the alert without delay and take appropriate action.

5–190a Note.—DARC does not have conflict/MCI alert capability.

5–190a Reference.—Safety Alert, paragraph 2–6.

b. If another controller is involved in the alert, initiate coordination to ensure an effective course of action. Coordination is not required when immediate action is dictated.

c. Suppressing/Inhibiting Conflict/MCI Alert.

1. The controller may s ppress the display of a Conflict/MCI Alert from a control position with the application of one of the following suppress/inhibit computer functions:

(a) The Conflict Suppress (CO) function may be used to suppress the CA/MCI display between specific aircraft for a specific alert.

5–190c1(a) Note.—See NAS-MD–678 for the EARTS Conflict Suppress message.

(b) The Group Suppression (SG) function shall be applied exclusively to inhibit the displaying of alerts among military aircraft engaged in special military operations where standard en route separation criteria do not apply.

5–190c1(b) Note.—Special military operations where the SG function would typically apply involve those activities where military aircraft routinely operate in proximities to each other that are less than standard en route separation criteria; i.e., air refueling operations, ADC practice intercept operations, etc.

2. The computer entry of a message suppressing a Conflict/MCI Alert constitutes acknowledgment for the alert and signifies that appropriate action has or will be taken.

3. The Conflict/MCI Alert may not be suppressed or inhibited at or for another control position without being coordinated.

5–191 EN ROUTE MINIMUM SAFE ALTITUDE WARNING (E-MSAW)

a. When an E-MSAW alert is displayed, immediately analyze the situation and, if necessary, take the appropriate action to resolve the alert.

5–191a Note 1.—Caution should be exercised when issuing a clearance to an aircraft in reaction to an E-MSAW alert to ensure that adjacent MIA areas are not a factor.

5–191a Note 2.—DARC does not have E-MSAW capability.

5–191a Reference.—Safety Alert, paragraph 2–6.

b. The controller may suppress the display of an E-MSAW alert from his control position with the application of one of the following suppress/inhibit computer functions:

1. The Specific Alert Suppression message may be used to inhibit the E-MSAW alerting display on a single flight for a specific alert.

2. The Indefinite Alert Suppression message shall be used exclusively to inhibit the display of E-MSAW alerts on aircraft known to be flying at an altitude that will activate the alert feature of one or more MIA areas within an ARTCC.

5–191b2 Note 1.—The Indefinite Suppression message will remain in effect for the duration of the referenced flight's active status within the ARTCC unless modified by controller action.

5–191b2 Note 2.—The Indefinite Suppression message would typically apply to military flights with clearance to fly low-level type routes that routinely require altitudes below established minimum IFR altitudes.

c. The computer entry of a message suppressing or inhibiting E-MSAW alerts constitutes acknowledgment for the alert and indicates that appropriate action has or will be taken to resolve the situation.

5–192 COMPUTER ENTRY OF ASSIGNED ALTITUDE

The data block shall always reflect the current status of the aircraft unless otherwise specified in a facility directive. Whenever an aircraft is cleared to maintain an altitude different from that in the flight plan data base, enter into the computer one of the following:

5–192 Note.—A facility directive may be published deleting the interim altitude computer entry requirements of subparagraph 5–192b. The directive would apply to those conditions where heavy traffic or sector complexity preclude meeting these entry requirements.

5–192 Reference.—FAA Order 7210.3, Waiver of Interim Altitude Requirements, paragraph 10–27.

a. The new assigned altitude if the aircraft will (climb or descend to and) maintain the new altitude, or

b. An interim altitude if the aircraft will (climb or descend to and) maintain the new altitude for a short period of time and subsequently be recleared to the altitude in the flight plan data base or a new altitude or a new interim altitude.

5–192b Note 1.—Use of the interim altitude function will ensure that the data block reflects the actual status of the aircraft and eliminate superfluous altitude updates.

5–192b Note 2.—EARTS does not have interim altitude capability

5–193 ENTRY OF REPORTED ALTITUDE

Whenever Mode C altitude information is either not available or is unreliable, enter reported altitudes into the computer as follows:

5–193 Note.—Altitude updates are required to assure maximum accuracy in applying slant range correction formulas.

a. When an aircraft reaches the assigned altitude.

b. When an aircraft at an assigned altitude is issued a clearance to climb or descend.

c. A minimum of each 10,000 feet during climb to or descent from FL 180 and above.

5–194 SELECTED ALTITUDE LIMITS

To ensure the display of Mode C targets and data blocks, take the following actions:

5–194 Note.—Exception to these requirements may be authorized for specific altitudes in certain center sectors if defined in appropriate facility directives and approved by the regional AT Division manager.

a. National Airspace System (NAS) en route Stage A/direct access radar channel (DARC): Display altitude limits in the "R" CRD when operating on NAS en route Stage A or on the plan view display (PVD) when operating on DARC and select the display filter keys on the PVD to include, as a minimum, the altitude stratum of the sector, plus:

1. 1,200 feet above the highest and below the lowest altitude or flight level of the sector where 1,000 feet vertical separation is applicable, and

2. 2,200 feet above the highest and below the lowest flight level of the sector where 2,000 feet vertical separation is applicable.

b. En Route Automated Radar Tracking System (EARTS): Display the EARTS altitude filter limits to include, as a minimum, the altitude stratum of the sector, and:

1. 1,200 feet above the highest and below the lowest altitude or flight level of the sector where 1,000 feet vertical separation is applicable, and

2. 2,200 feet above the highest and below the lowest flight level of the sector where 2,000 feet vertical separation is applicable.

5–194 Reference.—Alignment Check, paragraph 5–2.

5–195 SECTOR ELIGIBILITY

The use of the OK function is allowed to override sector eligibility only when one of the following conditions is met:

a. Prior coordination is effected.

b. The flight is within the control jurisdiction of the sector.

5–196 COAST TRACKS

Do not use coast tracks in the application of either radar or nonradar separation criteria.

5–197 CONTROLLER INITIATED COAST TRACKS

a. Initiate coast tracks only in Flight Plan Aided Tracking (FLAT) mode, except "free" coast tracking may be used as a reminder that aircraft without corresponding computer-stored flight plan information are under your control.

5–197a Note 1.—To ensure tracks are started in FLAT mode, perform a start track function at the aircraft's most current reported position, then immediately "force" the track into coast tracking by performing another start function with "CT" option in field 64. Making amendments to the stored route with trackball entry when the aircraft is rerouted, and repositioning the data block to coincide with the aircraft's position reports are methods of maintaining a coast track in FLAT mode.

5–197a Note 2.—DARC does not have the capability to initiate coast tracks.

b. Prior to initiating a coast track, ensure the following:

1. A departure message or progress report corresponding with the aircraft's current position is entered into the computer.

2. The track being started is within the Posted Time Update Interval (PTUI) of the aircraft's computer-estimated position and the Flight Plan Track Position Difference (FTPD) distance of the aircraft's flight plan route.

5–197b2 Note.—FTPD is an automation parameter, normally set to 15 miles, that is compared with the tracked target's perpendicular distance from the stored flight plan route. If the track is within the parameter miles, it is eligible for "FLAT Tracking." PTUI is an automation parameter, normally set to 3 minutes, that is compared against the difference between the calculated time of arrival and the actual time of arrival over a fix. If the difference is greater than PTUI, the flight plan's stored data will be revised and fix-time update messages will be generated.

c. As soon as practicable after the aircraft is in radar surveillance, initiate action to cause radar tracking to begin on the aircraft.

5–198 thru 5–209 RESERVED

Section 15. AUTOMATED RADAR TERMINAL SYSTEMS (ARTS)—TERMINAL

5–210 APPLICATION

ARTS may be used for identifying aircraft assigned a discrete beacon code, maintaining identity of targets, and performing handoffs of these targets between controllers.

5–210 Note.—*USAF/USN:* Where PIDP/DAIR equipment is capable of performing the functions described in this section, it may be used accordingly.

5–211 RESPONSIBILITY

This equipment does not relieve the controller of the responsibility to ensure proper identification, maintenance of identity, handoff of the correct target associated with the alphanumeric data, and separation of aircraft.

5–212 FUNCTIONAL USE

In addition to other uses specified herein, terminal automation may be used for the following functions:

a. Tracking (ARTS III and IIIA).

b. Tagging (ARTS II).

c. Handoff (ARTS II, III, and IIIA).

d. Altitude information (ARTS II, III, and IIIA).

e. Coordination (ARTS II, III, and IIIA).

f. Ground speed (ARTS III and IIIA).

g. Identification.

5–213 SYSTEM REQUIREMENTS

Use the ARTS as follows:

5–213 Note.— Locally developed procedures, operating instructions, and training material are required because of differences in equipment capability. Such locally developed procedures shall be supplemental to those contained in this section and shall be designed to make maximum use of the ARTS equipment.

a. Inform all appropriate positions before terminating or reinstating use of the ARTS at a control position. When terminating the use of ARTS, all pertinent flight data of that position shall be transferred or terminated.

b. Inform other interfaced facilities of scheduled and unscheduled shutdowns.

c. Initiate a track/tag on all aircraft to the maximum extent possible. As a minimum, aircraft identification should be entered, and automated handoff functions should be used.

d. Assigned altitude, if displayed, shall be kept current at all times. Climb and descent arrows, where available, shall be used to indicate other than level flight.

e. Do not use the automatic altitude readout of an aircraft under another controller's jurisdiction for vertical separation purposes without verbal coordination.

5–214 INFORMATION DISPLAYED

a. Two-letter ICAO designators or three-letter designators, as appropriate, shall be used unless program limitations dictate the use of a single letter alpha prefix.

b. Use of the inhibit select switches to remove displayed information no longer required shall be in accordance with local directives, which should ensure maximum required use of the equipment.

c. Information displayed in the ATIS, General Information, and Scratch Pad areas shall be in accordance with local directives.

5–215 CONFLICT ALERT

a. When a Conflict Alert is displayed, evaluate the reason for the Alert without delay and take appropriate action.

5–215a Reference.—Safety Alert, paragraph 2–6.

b. If another controller is involved in the Alert, initiate coordination to ensure an effective course of action. Coordination is not required when immediate action is dictated.

c. Suppressing/Inhibiting Conflict Alert.

1. The suppress function may be used to suppress the display of a specific Conflict Alert.

2. The inhibit function shall only be used to inhibit the display of Conflict Alert for aircraft routinely engaged in operations where standard separation criteria do not apply.

5–215c2 Note.— Examples of operations where standard separation criteria do not apply are ADC practice intercept operations and air shows.

3. Computer entry of a message suppressing a Conflict Alert constitutes acknowledgment for the Alert and signifies that appropriate action has or will be taken.

4. Conflict Alert may not be suppressed or inhibited at or for another control position without being coordinated.

5–216 INHIBITING MINIMUM SAFE ALTITUDE WARNING (MSAW)

a. Inhibit MSAW processing of VFR aircraft and aircraft that cancel instrument flight rules (IFR) flight plans unless the pilot specifically requests otherwise.

b. A low altitude alert may be suppressed from the control position. Computer entry of the suppress message constitutes an acknowledgment for the alert and indicates that appropriate action has or will be taken.

5–217 TRACK SUSPEND FUNCTION

Use the track suspend function only when data block overlap in holding patterns or in proximity of the final approach create an unworkable situation. If necessary to suspend tracks, those which are not displaying automatic altitude readouts shall be suspended. If the condition still exists, those displaying automatic altitude readouts may then be suspended.

5–218 thru 5–219 RESERVED

Section 16. TPX–42—TERMINAL

5–220 APPLICATION

Each TPX–42 facility shall utilize the equipment to the maximum extent possible consistent with local operating conditions.

5–221 RESPONSIBILITY

This equipment does not relieve the controller of the responsibility to ensure proper identification, maintenance of identity, handoff of the correct radar beacon target associated with numeric data, and the separation of aircraft.

5–222 FUNCTIONAL USE

TPX–42 may be used for the following functions:

a. Tagging.

b. Altitude information.

c. Coordination.

d. Target identity confirmation.

5–223 SYSTEM REQUIREMENTS

Use the TPX–42 system as follows:

a. TPX–42 facilities shall inform adjacent facilities of scheduled and unscheduled shutdowns.

b. To the maximum extent practicable, tags should be utilized for all controlled aircraft.

5–224 INFORMATION DISPLAYED

a. Inhibiting portions of the tag shall be in accordance with facility directives, which shall ensure maximum required use of the equipment.

b. Mode C altitude information shall not be inhibited unless a ground malfunction causes repeated discrepancies of 300 feet or more between the automatic altitude readouts and pilot reported altitudes.

5–225 ALTITUDE FILTERS

Set the altitude filters to display Mode C within each controller's area of responsibility by setting the altitude limits to encompass all altitudes under the controller's jurisdiction. Set the upper limits no lower than 1,000 feet above the highest altitude for which the controller is responsible. Normally, the lower limits should encompass the field elevation so that provisions of paragraph 2–6 and paragraph 5–37a2 may be applied. Air Traffic managers may authorize temporary suspension of this requirement when clutter is excessive.

5–226 INHIBITING LOW ALTITUDE ALERT SYSTEM (LAAS)

Assign a beacon code to a VFR aircraft or to an aircraft that has canceled its IFR flight plan to inhibit LAAS processing unless the aircraft has specifically requested LAAS.

Section 5. LATERAL SEPARATION

6–40 SEPARATION METHODS

Separate aircraft by one of the following methods:

a. Clear aircraft on different airways or routes whose widths or protected airspace do not overlap.

b. Clear aircraft below 18,000 to proceed to and report over or hold at different geographical locations determined visually or by reference to NAVAIDs.

c. Clear aircraft to hold over different fixes whose holding pattern airspace areas do not overlap each other or other airspace to be protected.

d. Clear departing aircraft to fly specified headings which diverge by at least 45 degrees.

6–41 MINIMA ON DIVERGING RADIALS.

a. Consider separation to exist between aircraft established on radials of the same NAVAID that diverge by at least 15 degrees when either aircraft is clear of the airspace to be protected for the other aircraft.

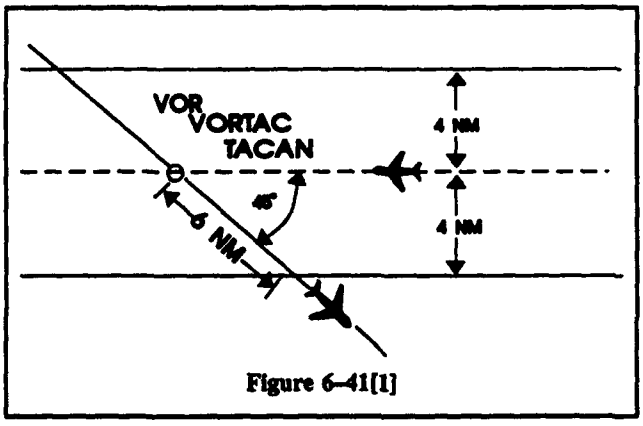


Figure 6–41[1]

6–41a Note.—The procedure may be applied to converging as well as diverging aircraft. (See Figure 6–41[1]). The aircraft depicted 6 miles from the NAVAID in subparagraph 6–41a Illustration would require vertical separation until reaching the 6–mile point. Reversing direction, the same aircraft would require vertical separation before passing the 6–mile point.

b. Use the Table 6–41[1] and Table 6–41[2] to determine the distance required for various divergence angles to clear the airspace to be protected. For divergence that falls between two values, use the lesser divergence value to obtain the distance.

Table 6–41[1]
Non-DME Divergence-Distance Minima

Divergence (Degrees)	*Distance (NM)*
15	16
20	12
25	10
30	8
35	7
45	6
55	5
90	4

Note.—This Table is for non-DME application only.

Table 6–41[2]
Divergence-Distance Minima

Divergence (degrees)	*Distance (NM)*	
	Below FL 180	*FL 180 through FL 450*
15	17	18
20	13	15
25	11	13
30	9	11
35	8	11
45	7	11
55	6	11
90	5	11

This Table is for DME application and compensates for DME slant-range error.

6–41b Note.—For altitudes of 3,000 feet or less above the elevation of the NAVAID, DME slant-range error is negligible and the values in 6–41b Table 1 may be used.

6–42 DME ARC MINIMA

Apply lateral DME separation by requiring aircraft using DME to fly an arc about a NAVAID at a specified distance using the following minima: (See Figure 6–42[1]).

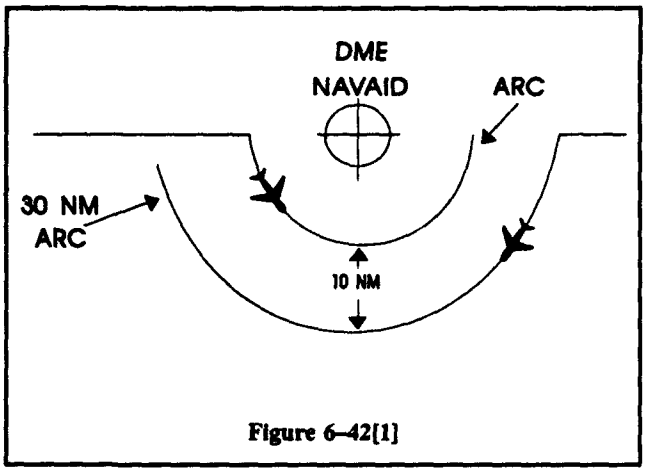


Figure 6–42[1]

6–42 Reference.—NAVAID Terms, paragraph 2–101.

a. Between different arcs about a NAVAID regardless of direction of flight:

1. At 35 miles or less from the NAVAID— *10 miles.*

2. More than 35 miles from the NAVAID— *20 miles.*

b. Between an arc about a NAVAID and other airspace to be protected: (See Figure 6–42[2]).

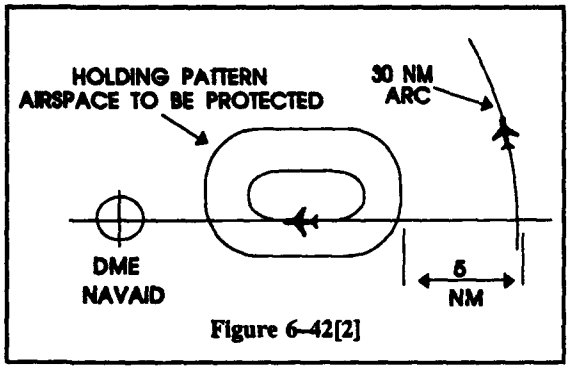


Figure 6–42[2]

6–42b Note.—The other airspace to be protected may be an MOA, a holding pattern, airway or route, ATCAA, warning area, restricted area, prohibited area, etc.

1. At 35 miles or less from the NAVAID— *5 miles.*

2. More than 35 miles from the NAVAID— *10 miles.*

Phraseology:

VIA (number of miles) MILE ARC (direction) OF (name of DME NAVAID).

6–43 MINIMA ALONG OTHER THAN ESTABLISHED AIRWAYS OR ROUTES

Protect airspace along other than established airways or routes as follows: (See Figure 6–43[1]).

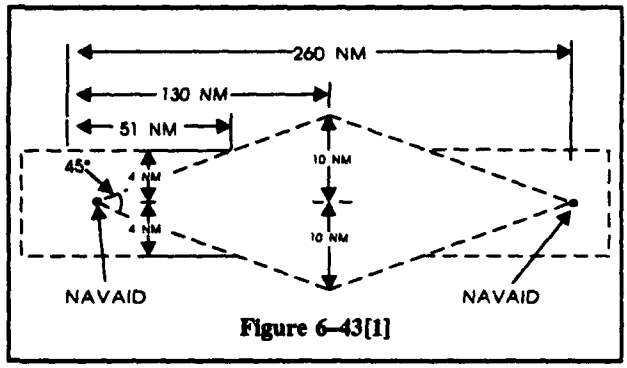


Figure 6–43[1]

6–43 Reference.—Pilot/Controller Glossary terms—Airway, Route.

a. Direct courses and course changes of 15 degrees or less:

1. Via NAVAID's or radials FL 600 and below— *4 miles* on each side of the route to a point 51 miles from the NAVAID, then increasing in width on a 4 1/2 degree angle to a width of *10 miles* on each side of the route at a distance of 130 miles from the NAVAID.

2. Via degree-distance fixes for aircraft authorized under paragraph 4–52.

(a) Below FL 180— *4 miles* on each side of the route.

(b) FL 180 to FL 600 inclusive— *10 miles* on each side of the route.

3. Via degree-distance fixes for RNAV flights above FL 450— *10 miles* on each side of the route.

6–43a3 Note.—Degree-distance RNAV flight (random routes) at FL 450 and below are provided radar separation.

b. When course change is 16 degrees through 90 degrees, protect the airspace on the overflown side beginning at the point where the course changes as follows: (See Figure 6–43[2]).

Section 6. VERTICAL SEPARATION

6–50 APPLICATION

Assign an altitude to an aircraft only after the aircraft previously at that altitude has reported or is observed (valid Mode C) leaving the altitude.

Phraseology:

REPORT LEAVING/REACHING (altitude).

REPORT LEAVING ODD/EVEN ALTITUDES/FLIGHT LEVELS.

SAY ALTITUDE.

6–50 Note.—Consider known aircraft performance characteristics, pilot furnished and/or Mode C detected information which indicate that climb/descent will not be consistent with the rates recommended in AIM

6–50 Reference.—Validation of Mode C Readout, paragraph 5–37.

6–51 MINIMA BETWEEN ALTITUDES

Separate instrument flight rules (IFR) aircraft using the following minima between altitudes:

a. Up to and including FL 290—*1,000 feet.*

b. Above FL 290—*2,000 feet,* except

1. In oceanic airspace, above FL 450 between a supersonic and any other aircraft - 4,000 feet.

2. Above FL 600 between military aircraft - *5,000 feet.*

6–51a and b. Note - Oceanic separation procedures are supplemented in Chapter 8, Section 7, Section 8, Section 9, and Section 10.

6–51 Reference.—Military Operations above FL 600, paragraph 9–30.

6–52 EXCEPTIONS

Assign an altitude to an aircraft only after the aircraft previously at that altitude has reported or is observed (valid Mode C) at or passing through another altitude separated from the first by the appropriate minimum when:

a. Severe turbulence is reported.

b. Aircraft are conducting military aerial refueling.

6–52b Reference.—Military Aerial Refueling, paragraph 9–29.

c. The aircraft previously at the altitude has been:

1. Issued a clearance permitting climb/descent at pilot's discretion.

2. Cleared to CRUISE (altitude). However, do not use Mode C to effect separation with an aircraft on a cruise clearance.

6–52c2 Note.—An aircraft assigned a Cruise clearance is assigned a block of airspace from the minimum IFR altitude up to and including the assigned cruising altitude, and climb/descent within the block is at pilot's discretion. When the pilot verbally reports leaving an altitude in descent, he may not return to that altitude.

6–52c2 Reference.—Pilot/Controller Glossary term—Cruise.

6–53 SEPARATION BY PILOTS

When pilots of aircraft in direct radio communication with each other during climb and descent concur, you may authorize the lower aircraft, if climbing, or the upper aircraft, if descending, to maintain vertical separation.

Phraseology:

MAINTAIN AT LEAST ONE/TWO THOUSAND FEET ABOVE/BELOW (identification).

6–54 thru 6–59 RESERVED

Chapter 7. VISUAL
Section 1. GENERAL

7–1 CLASS A AIRSPACE RESTRICTIONS
Do not apply visual separation or issue VFR or "VFR-on-top" clearances in Class A airspace.

7–2 VFR CONDITIONS
a. You may clear aircraft to maintain "VFR conditions" if one of the following conditions exists:

1. The pilot of an aircraft on an IFR flight plan requests a VFR climb/descent.

2. *TERMINAL:* The clearance will result in noise abatement benefits where part of the IFR departure route does not conform to an FAA-approved noise abatement route or altitude.

Phraseology:

MAINTAIN VFR CONDITIONS.

MAINTAIN VFR CONDITIONS UNTIL (time or fix).

MAINTAIN VFR CONDITIONS ABOVE/BELOW (altitude).

CLIMB/DESCEND VFR,

and if required,

BETWEEN (altitude) AND (altitude),

or

ABOVE/BELOW (altitude).

b. When, in your judgment, there is reason to believe that flight in VFR conditions may become impractical, issue an alternative clearance which will ensure separation from all other aircraft for which you have separation responsibility.

Phraseology:

IF UNABLE, (alternative procedure), AND ADVISE.

7–3 APPROACH CONTROL SERVICE FOR VFR ARRIVING AIRCRAFT
Issue the following where procedures have been established for arriving VFR aircraft to contact approach control for landing information:

a. Wind, runway, and altimeter setting at the airport of intended landing. This information may be omitted if contained in the ATIS broadcast and the pilot states the appropriate ATIS code or if the pilot uses the phrase, "have numbers."

7–3a Note.—Pilot use of "have numbers" does not indicate receipt of the ATIS broadcast.

b. Traffic information on a workload permitting basis.

c. Time or place at which the aircraft is to contact the tower on local control frequency for further landing information.

d. An aircraft may be instructed to contact approach control for landing and traffic information upon initial contact with the tower.

7–3 Reference.—Application, paragraph 7–60. Service Availability, paragraph 7–61.

7–4 VISUAL HOLDING OF VFR AIRCRAFT
TERMINAL

When it becomes necessary to hold VFR aircraft at visual holding fixes, take the following actions:

a. Clear aircraft to hold at selected, prominent geographical fixes which can be easily recognized from the air, preferably those depicted on sectional charts.

7–4a Note.—At some locations, VFR checkpoints are depicted on Sectional Aeronautical and Terminal Area Charts. In selecting geographical fixes, depicted VFR checkpoints are preferred unless the pilot exhibits a familiarity with the local area.

7–4a Reference.—Visual Holding Points, paragraph 4–74. ▮

b. Issue traffic information to aircraft cleared to hold at the same fix.

Phraseology:

HOLD AT (location) UNTIL (time or other condition),

TRAFFIC (description) HOLDING AT (fix, altitude if known),

or

PROCEEDING TO (fix) FROM (direction or fix).

7–4 Reference.—Holding, paragraph 7–64.

7–5 thru 7–9 RESERVED

Section 2. VISUAL SEPARATION

7–10 VISUAL SEPARATION

Aircraft may be separated by visual means, as provided in this paragraph, when other approved separation is assured before and after the application of visual separation. To ensure that other separation will exist, consider aircraft performance, routes of flight, and known weather conditions. Reported weather conditions must allow the aircraft to remain within sight until other separation exists. Do not apply visual separation between successive departures when departure routes and/or aircraft performance preclude maintaining separation.

7–10 Reference.—Wake Turbulence Cautionary Advisories, paragraph 2–20. Traffic Advisories, paragraph 2–21. Use of Tower Radar Displays, paragraph 3–9. Approach Separation Responsibility, paragraph 5–124. Visual Approach, paragraph 7–30. Vectors for Visual Approach, paragraph 7–31. Approaches to Multiple Runways, paragraph 7–33. Pilot/Controller Glossary terms—Visual Approach, Visual Separation.

a. *TERMINAL:* Visual separation may be applied between aircraft under the control of the same facility within the terminal area, provided:

1. Communication is maintained with at least one of the aircraft involved or the capability to communicate immediately as prescribed in 3–102a2 is available, and:

2. The aircraft are visually observed by the tower and visual separation is maintained between the aircraft by the tower. The tower shall not provide visual separation between aircraft when wake turbulence separation is required or when the lead aircraft is a B–757.

3. A pilot sees another aircraft and is instructed to maintain visual separation from the aircraft as follows:

(a) Tell the pilot about the other aircraft including position, direction and, unless it is obvious, the other aircraft's intention.

(b) Obtain acknowledgment from the pilot that the other aircraft is in sight.

(c) Instruct the pilot to maintain visual separation from that aircraft.

(d) Advise the pilot if the radar targets appear likely to converge.

7–10a3(d) Note.—Issue this advisory in conjunction with the instruction to maintain visual separation, or thereafter if the controller subsequently becomes aware that the targets are merging.

(e) If the aircraft are on converging courses, inform the other aircraft of the traffic and that visual separation is being applied.

Phraseology:

TRAFFIC, (clock position and distance), (direction)-BOUND, (type of aircraft), (intentions and other relevant information).

If applicable,

ON CONVERGING COURSE.

DO YOU HAVE IT IN SIGHT?

If the answer is in the affirmative,

MAINTAIN VISUAL SEPARATION FROM THAT TRAFFIC.

If aircraft are on converging courses, advise the other aircraft:

TRAFFIC, (clock position and distance), (direction)-BOUND, (type of aircraft). HAS YOU IN SIGHT AND WILL MAINTAIN VISUAL SEPARATION.

b. *EN ROUTE:* You may use visual separation in conjunction with visual approach procedures.

7–10b Reference.—Visual Approach, paragraph 7–30. Vectors for Visual Approach, paragraph 7–31.

c. Nonapproach control towers may be authorized to provide visual separation between aircraft within surface areas or designated areas provided other separation is assured before and after the application of visual separation. This may be applied by the nonapproach control tower providing the separation or by a pilot visually observing another aircraft and being instructed to maintain visual separation with that aircraft.

Phraseology:

VISUAL SEPARATION APPROVED BETWEEN (identification) AND (identification),

and for departing aircraft,

(departing/ succeeding aircraft) RELEASED YOUR DISCRETION.

7–10c Note.—Separation of IFR aircraft before and after application of visual separation is an IFR control function (approach/departure/en route). A nonapproach control tower by accepting authorization for visual separation becomes responsible for ensuring that separation. Separation requirements also apply to VFR aircraft when IFR, Class B, Class C or TRSA separation is prescribed.

7–10c Reference.—Practice Approaches, 4–110. Application, 5–90. Vectors for Visual Approach, 7–31. Application, 7–60. Application, 7–80. Issuance of EFC, 7–81. Separation, 7–82. Helicopter Traffic, 7–83. Altitude Assignments, 7–84. Approach Interval, 7–85. TRSA Departure Information, 7–86. Class C Services, 7–91. Separation, 7–92. Establishing Two-Way Communications, 7–93. Altitude Assignments, 7–94. Exceptions, 7–95. Application, 7–110. Methods, 7–112. Separation, 7–113. Helicopter Traffic, 7–115. Altitude assignments, 7–116.

7–11 thru 7–19 RESERVED

Section 4. APPROACHES

7–30 VISUAL APPROACH

A visual approach is an ATC authorization for an aircraft on an IFR flight plan to proceed visually to the airport of intended landing; it is not an instrument approach procedure. Also, there is no missed approach segment. An aircraft unable to complete a visual approach shall be handled as any go-around and appropriate separation must be provided.

7–30 Reference.—Wake Turbulence Cautionary Advisories, paragraph 2–20. Forwarding Approach Information by NonApproach Control Facilities, paragraph 3–121. Visual Separation, paragraph 7–10. Approaches to Multiple Runways, paragraph 7–33.

7–31 VECTORS FOR VISUAL APPROACH

A vector for a visual approach may be initiated if the reported ceiling at the airport of intended landing is at least 500 feet above the MVA/MIA and the visibility is 3 miles or more. At airports without weather reporting service there must be reasonable assurance that descent and flight to the airport can be made in VFR conditions, and the pilot must be informed that weather information is not available.

Phraseology:

(Acft ident) FLY HEADING or TURN RIGHT/LEFT HEADING (degrees) VECTOR FOR VISUAL APPROACH TO (airport name); (if appropriate) WEATHER NOT AVAILABLE.

7–31 Note.—At airports where weather information is not available, a pilot request for a visual approach indicates that descent and flight to the airport can be made in VFR conditions.

7–31 Reference.—Vectors to Final Approach Course, paragraph 5–120. Visual Separation, paragraph 7–10. Clearance for Visual Approach-Radar, paragraph 7–32. Approaches to Multiple Runways, paragraph 7–33. Sequencing, paragraph 7–66. Separation, paragraph 7–82.

7–32 CLEARANCE FOR VISUAL APPROACH

ARTCC's and approach controls may clear aircraft for visual approaches using the following procedures:

7–32 Note.— Towers may exercise this authority when authorized by a letter of agreement with the facility that provides the IFR service, or by a facility directive at collocated facilities.

a. Controllers may initiate, or pilots may request, a visual approach if an aircraft is being vectored for an instrument approach and subsequently reports:

1. The airport or the runway in sight at airports with operating control towers.

2. The airport in sight at airports without a control tower.

b. Resolve potential conflicts with all other aircraft, and ensure that weather conditions at the airport are VFR or that the pilot has been informed that weather is not available for the destination airport. Advise the pilot of the frequency to receive weather information where AWOS/ASOS is available.

c. Clear an aircraft for a visual approach when:

1. The aircraft is number one in the approach sequence, or

2. The aircraft is to follow a preceding aircraft and the pilot reports the preceding aircraft in sight and is instructed to follow it, or

7–32c2 Note.— The pilot need not report the airport/runway in sight.

3. The pilot reports the airport or runway in sight but not the preceding aircraft. Radar separation must be maintained until visual separation is provided.

d. Inform the tower of the aircraft's position prior to communications transfer at controlled airports. ARTS functions may be used provided a facility directive or a letter of agreement specifies control and communications transfer points.

Phraseology:

(Acft ident) (instructions) CLEARED VISUAL APPROACH RUNWAY (number);

or

(Acft ident) (instructions) CLEARED VISUAL APPROACH TO (airport name); (and if appropriate), WEATHER NOT AVAILABLE or AWOS/ASOS WEATHER AVAILABLE ON FREQUENCY (freq) mHz.

7–32 Reference.—Approaches to Multiple Runways, paragraph 7–33.

7–33 APPROACHES TO MULTIPLE RUNWAYS

a. All aircraft must be informed that approaches are being conducted to parallel/ intersecting/converging runways. This may be accomplished through use of the ATIS.

b. When conducting visual approaches to multiple runways, DO NOT PERMIT THE RESPECTIVE AIRCRAFTS' PRIMARY RADAR RETURNS TO MERGE UNLESS VISUAL SEPARATION IS BEING APPLIED.

c. In addition to the requirements in, paragraph 7–10, paragraph 7–30, paragraph 7–31 and, paragraph 7–32, the following conditions apply to visual approaches being conducted simultaneously to parallel, intersecting, and converging runways, as appropriate:

1. Parallel runways separated by less than 2,500 feet. Unless standard separation is provided by ATC, an aircraft must report sighting a preceding aircraft making an approach (instrument or visual) to the adjacent parallel runway. When an aircraft reports another aircraft in sight on the adjacent final approach course and visual separation is applied,

controllers must advise the succeeding aircraft to maintain visual separation. DO NOT PERMIT A HEAVY AIRCRAFT TO OVERTAKE ANOTHER AIRCRAFT. DO NOT PERMIT A LARGE AIRCRAFT TO OVERTAKE A SMALL AIRCRAFT.

2. Parallel runways separated by at least 2,500 feet, but less than 4,300 feet.

(a) Standard separation is provided until the aircraft are established on a heading which will intercept the extended centerline of the runway at an angle not greater than 30 degrees, and each aircraft has been issued and the pilot has acknowledged receipt of the visual approach clearance.

7–33c2(a) Note.—The intent of the 30 degree intercept angle is to reduce the potential for overshoots of the final, and preclude side-by-side operations with one or both aircraft in a "belly-up" configuration during the turn. Aircraft performance, speed, and the number of degrees of the turn to the final are factors to be considered by the controller when vectoring aircraft to parallel runways.

(b) Visual approaches may be conducted to one runway while visual or instrument approaches are conducted simultaneously to the other runway, provided the conditions of subparagraph 7–33c2(a) are met.

(c) When the provisions of subparagraphs 7–33c2(a) and (b) are met, it is not necessary to apply any other type of separation with aircraft on the adjacent final approach course.

3. Parallel runways separated by 4,300 feet or more.

(a) Visual approaches may be conducted simultaneously, provided standard separation is maintained until one of the aircraft has been issued and the pilot acknowledges receipt of the visual approach clearance.

(b) Visual approaches may be conducted to one runway while instrument approaches are conducted simultaneously to the other runway, provided separation is maintained until the aircraft conducting the visual approach has been issued and the pilot acknowledges the visual approach clearance.

(c) When the provisions of subparagraphs 7–33c3(a) and (b) are met it is not necessary to apply any other type of separation with aircraft on the adjacent final approach course.

4. Intersecting and converging runways. Visual approaches may be conducted simultaneously with visual or instrument approaches to another runway, provided standard separation is maintained until the aircraft conducting the visual approach have been issued and the pilot has acknowledged receipt of the visual approach clearance.

7–33c4 Note.—Although simultaneous approaches may be conducted to intersecting runways, staggered approaches may be necessary to meet the airport separation requirements specified in, paragraph 3–123.

7–33 Reference.—Charted Visual Flight Procedures (CVFP). USA/USAF/USN Not Applicable, paragraph 7–34. Separation, paragraph 7–82.

7–34 CHARTED VISUAL FLIGHT PROCEDURES (CVFP). USA/USN NOT APPLICABLE.

a. Clear an aircraft for a CVFP only when the following conditions are met:

1. The approach is conducted in a radar environment;

2. There is an operating control tower;

3. The published name of the CVFP and the landing runway are specified in the approach clearance, the reported ceiling at the airport of intended landing is at least 500 feet above the MVA/MIA, and the visibility is 3 miles or more, unless higher minimums are published for the particular CVFP;

4. When using parallel or intersecting/converging runways, the criteria specified in, paragraph 7–33 are applied.

5. An aircraft not following another aircraft on the approach reports sighting a charted visual landmark, or reports sighting a preceding aircraft landing on the same runway and has been instructed to follow that aircraft.

Phraseology:
(Acft ident) CLEARED (name of CVFP) APPROACH.

7–35 CONTACT APPROACH

Clear an aircraft for a contact approach only if the following conditions are met:

a. The pilot has requested it.

7–35a Note.—When executing a contact approach, the pilot is responsible for maintaining the required flight visibility, cloud clearance, and terrain/obstruction clearance. Unless otherwise restricted, the pilot may find it necessary to descend, climb, and/or fly a circuitous route to the airport to maintain cloud clearance and/or terrain/obstruction clearance. It is not in any way intended that controllers will initiate or suggest a contact approach to a pilot.

b. The reported ground visibility is at least 1 statute mile.

c. A standard or special instrument approach procedure has been published and is functioning for the airport of intended landing.

d. Approved separation is applied between aircraft so cleared and other IFR or Special VFR aircraft. When applying vertical separation, do not assign a fixed altitude but clear the aircraft at or below an altitude which is at least 1,000 feet below any IFR traffic but not below the minimum safe altitude prescribed in Part 91.119.

Section 5. SPECIAL VFR

7–40 AUTHORIZATION

a. Special VFR (SVFR) operations in weather conditions less than basic VFR minima are authorized:

7–40a Reference.—Operational Priority, paragraph 2–4i.

1. At any location not prohibited by Part 91, Appendix D or when an exemption to Part 91 has been granted and an associated Letter of Agreement established. Part 91 does not prohibit SVFR helicopter operations.

2. Only within the lateral boundaries of Class B, C, D, or E surface areas, below 10,000 feet MSL.

3. Only when requested by the pilot.

4. On the basis of weather conditions reported at the airport of intended landing/departure.

7–40a4 Reference.—Climb to VFR, paragraph 7–45; Ground Visibility Below One Mile, paragraph 7–46.

5. When weather conditions are not reported at the airport of intended landing/departure and the pilot advises that VFR cannot be maintained and requests Special VFR.

Phraseology:

CLEARED TO ENTER/OUT OF/THROUGH, CLASS B, CLASS C, CLASS D, or CLASS E SURFACE AREA

and if required,

(direction) OF (name) AIRPORT (specified routing),

and

MAINTAIN SPECIAL V-F-R CONDITIONS ,

and if required,

AT OR BELOW (altitude below 10,000 feet MSL)

or as applicable under an exemption from Part 91,

CLEARED FOR (coded arrival or departure procedure) ARRIVAL/DEPARTURE, (additional instructions as required).

7–40a5 Reference.– Airspace Classes, 2–90.

b. SVFR operations may be authorized for aircraft operating in or transiting a Class B, Class C, Class D, or Class E surface area when the primary airport is reporting VFR but the pilot advises that basic VFR cannot be maintained.

7–40b Note.—The basic requirements for issuance of a SVFR clearance in subparagraph 7–40a apply with the obvious exception that weather conditions at the controlling airport are not required to be less than basic VFR minima.

7–41 PRIORITY

a. SVFR flights may be approved only if arriving and departing IFR aircraft are not delayed.

7–41a Example 1.—

A SVFR aircraft has been cleared to enter , a Class B, Class C, Class D, or Class E surface area and subsequently an IFR aircraft is ready to depart or is in position to begin an approach. Less overall delay might accrue to the IFR aircraft if the SVFR aircraft is allowed to proceed to the airport and land, rather than leave , a Class B, Class C, Class D, or Class E surface area or be repositioned to provide IFR priority.

7–41a Example 2.—

A SVFR aircraft is number one for takeoff and located in such a position that the number two aircraft, an IFR flight, cannot taxi past to gain access to the runway. Less overall delay might accrue to the IFR aircraft by releasing the SVFR departure rather than by having the aircraft taxi down the runway to a runoff point so the the IFR aircraft could be released first.

7–41a Note.—The priority afforded IFR aircraft over SVFR aircraft is not intended to be so rigidly applied that inefficient use of airspace results. The controller has the prerogative of permitting completion of a SVFR operation already in progress when an IFR aircraft becomes a factor if better overall efficiency will result.

b. Inform an aircraft of the anticipated delay when a SVFR clearance cannot be granted because of IFR traffic. Do not issue an EFC or expected departure time.

Phraseology:

EXPECT (number) MINUTES DELAY, (additional instructions as necessary).

7–41 Reference.—Application, paragraph 5–90. Operational Priority, paragraph 2–4.

7–42 SEPARATION

a. Apply approved separation between:

1. SVFR aircraft.
2. SVFR aircraft and IFR aircraft.

b. Alternate SVFR helicopter separation minima may be established when warranted by the volume and/or complexity of local helicopter operations. Alternate SVFR helicopter separation minima shall be established with Letters of Agreement with the helicopter operator which shall specify, as a minimum, that SVFR helicopters are to maintain visual reference to the surface and adhere to the following aircraft separation minima:

1. 1 mile between SVFR helicopters. This separation may be reduced to 200 feet if:

(a) Both helicopters are departing simultaneously on courses that diverge by at least 30 degrees and:

(1) The tower can determine this separation by reference to surface markings, or:

(2) One of the departing helicopters is instructed to remain at least 200 feet from the other.

2. Between a SVFR helicopter and an arriving or departing IFR aircraft:

(a) 1/2 mile If the IFR aircraft is less than 1 mile from the landing airport.

(b) 1 mile If the IFR aircraft is 1 mile or more from the airport.

7–42 Note 1.—Approved separation is that prescribed for IFR with exceptions as prescribed in Chapter 7 Section 5–Special VFR. Authorization, paragraph 7–40. Priority, paragraph 7–41. Altitude Assignment, paragraph 7–43. Local Operations, paragraph 7–44. Climb to VFR, paragraph 7–45. Ground Visibility Below One Mile, paragraph 7–46. Flight Visibility Below One Mile, paragraph 7–47.

7–42 Note 2.—Radar vectors are authorized as prescribed in, paragraph 5–90.

7–42 Reference.—Operational Priority, paragraph 2–4.

7–43 ALTITUDE ASSIGNMENT

Do not assign a fixed altitude when applying vertical separation, but clear the Special VFR aircraft at or below an altitude which is at least 500 feet below any conflicting IFR traffic but not below the minimum safe altitude prescribed in Part 91.119.

Phraseology:

MAINTAIN SPECIAL V-F-R CONDITIONS AT OR BELOW (altitude).

7–43 Note 1.—Special VFR aircraft are not assigned fixed altitudes because of the clearance from clouds requirement.

7–43 Note 2.—The minimum safe altitudes are 1 over congested areas, an altitude at least 1,000 feet above the highest obstacle, and 2 over other than congested areas, an altitude at least 500 feet above the surface. Helicopters may be operated at less than the minimum altitudes prescribed in 1 and 2 above.

7–43 Reference.—Operational Priority, paragraph 2–4. Application, paragraph 5–90. Part 91.119 of Title 14.

7–44 LOCAL OPERATIONS

a. Authorize local Special VFR operations for a specified period (series of landings and takeoffs, etc.) upon request if the aircraft can be recalled when traffic or weather conditions require. Where warranted, letters of agreement may be consummated.

Phraseology:

LOCAL SPECIAL V-F-R OPERATIONS IN THE IMMEDIATE VICINITY OF (name) AIRPORT ARE AUTHORIZED UNTIL (time). MAINTAIN SPECIAL V-F-R CONDITIONS.

7–44a Reference.—FAA Order 7210.3, Appropriate Subjects, paragraph 4–31.

b. Control facilities may also authorize an FSS to transmit SVFR clearances so that only one aircraft at a time operates in the control zone unless pilots agree that they will maintain visual separation with other aircraft operating in the control zone. Such authorization concerning visual separation by pilots shall be contained in a letter of agreement between the control facility and the FAA7110.10TOC

7–44b Reference.—FAA Order 7210.3, Developing Letters of Agreement, paragraph 4–32.

7–44 Reference.—Operational Priority, paragraph 2–4.

7–45 CLIMB TO VFR

Authorize an aircraft to climb to VFR upon request if the only weather limitation is restricted visibility.

Phraseology:

CLIMB TO V-F-R WITHIN THE LATERAL BOUNDARIES OF CLASS B, CLASS C, CLASS D, or CLASS E SURFACE AREA/WITHIN (a specified distance) MILES FROM (airport name) AIRPORT, MAINTAIN SPECIAL V-F-R CONDITIONS UNTIL REACHING V-F-R.

7–45 Reference.—Operational Priority, paragraph 2–4. Authorization, paragraph 7–40. Airspace Classes, paragraph 2–90.

7–46 GROUND VISIBILITY BELOW ONE MILE

Part 91 does not prohibit helicopter SVFR flight when the visibility is less than 1–mile. Treat requests for SVFR fixed wing operations as follows when the ground visibility is officially reported at an airport as less than 1 mile:

a. Inform departing aircraft that ground visibility is less than 1 mile and that a clearance cannot be issued.

b. Inform arriving aircraft, operating outside of a Class B, Class C, Class D, or Class E surface area, that ground visibility is less than 1 mile and that, unless an emergency exists, a clearance cannot be issued.

c. Inform arriving aircraft, operating VFR/SVFR within a Class B, Class C, Class D, or Class E surface area, that ground visibility is less than 1 mile and request the pilot to advise intentions.

Phraseology:

(name of airport) VISIBILITY LESS THAN ONE MILE. ADVISE INTENTIONS.

7–46c Note.—Clear an aircraft to land at an airport with an operating control tower, traffic permitting, if the pilot reports the airport in sight. The pilot is responsible to continue to the airport or exit the surface area. Part 91.157 prohibits VFR aircraft (other than helicopters) from landing at any airport within a surface area when ground visibility is less than 1 mile. A pilot could inadvertently encounter conditions that are below SVFR minimums after entering a surface area due to rapidly changing weather. The pilot is best suited to determine the action to be taken since pilots operating under SVFR are not required to be instrument rated, and the possibility exists that flight visibility may not be the same as ground visibility. Part 91.3 authorizes a pilot encountering an in–flight emergency requiring immediate action to deviate from any rule of Part 91 to the extent required to meet that emergency. Flight into adverse weather conditions may require the pilot to execute the emergency authority granted in Part 91.3 and continue inbound to land.

d. Authorize scheduled air carrier aircraft in the United States to conduct operations if ground visibility is not less than 1/2 statute mile.

7–46d Note.—Part 121 permits landing or takeoff by domestic scheduled air carriers where a local surface restriction to visibility is not less than 1/2 statute mile, provided all turns after takeoff or before landing and all flights beyond 1 statute mile from the airport boundary can be accomplished above or outside the area so restricted. The pilot is solely responsible for determining if the nature of the visibility restriction will permit compliance with the provisions of Part 121.

e. Clear an aircraft to fly through the Class B, Class C, Class D, or Class E surface area

Section 8. CLASS C SERVICE—TERMINAL

7–90 APPLICATION

Apply Class C service procedures within the designated Class C airspace and the associated outer area. Class C services are designed to keep ATC informed of all aircraft within Class C airspace, not to exclude operations. Two–way radio communications and operational transponder are normally required for operations within Class C airspace, but operations without radio communications or transponder can be conducted by letter of agreement, facility directive, or special arrangement with Class C airspace controlling facility.

7–90 Reference.—Visual Separation, paragraph 7–10. ATC Transponder and Altitude Reporting Equipment and Use, Part 92.215.

7–91 CLASS C SERVICES

a. Class C services include the following:

1. Sequencing of all aircraft to the primary airport.

2. Standard IFR services to IFR aircraft.

3. Separation, traffic advisories, and safety alerts between IFR and VFR aircraft.

4. Mandatory traffic advisories and safety alerts between VFR aircraft.

b. Provide Class C services to all aircraft operating within Class C airspace.

c. Provide Class C services to all participating aircraft in the outer area.

d. Aircraft should not normally be held. However, if holding is necessary, inform the pilot of the expected length of delay.

e. When a radar outage occurs, advise aircraft that Class C services are not available and, if appropriate, when to contact the tower.

7–91 Reference.—Visual Separation, paragraph 7–10.

7–92 SEPARATION

Separate VFR aircraft from IFR aircraft by any one of the following:

a. Visual separation as specified in paragraph 7–10, paragraph 7–31, and paragraph 7–66.

7–92a Note.—Issue wake turbulence cautionary advisories in–accordance–with paragraph 2–20.

b. 500 feet vertical separation;

c. Target resolution when using broadband radar systems. The application of target resolution at locations not using broadband radar will be individually approved by the Air Traffic Rules and Procedures Service, ATP–1.

7–92b and c Note.—Apply the provisions of Minima, paragraph 5–7–2d and e, when wake turbulence separation is required.

7–92 Reference.—Visual Separation, paragraph 7–10.

7–93 ESTABLISHING TWO-WAY COMMUNICATIONS

Class C service requires pilots to establish two-way radio communications before entering Class C airspace. If the controller responds to a radio call with, "(a/c callsign) standby," radio communications have been established and the pilot can enter Class C airspace. If workload or traffic conditions prevent immediate provision of Class C services, inform the pilot to remain outside Class C airspace until conditions permit the services to be provided.

Phraseology:

(a/c callsign) REMAIN OUTSIDE CLASS C AIRSPACE AND STANDBY.

7–93 Reference.—Visual Separation, paragraph 7–10.

7–94 ALTITUDE ASSIGNMENTS

a. When necessary to assign altitudes to VFR aircraft, assign altitudes that meet the MVA, minimum safe altitude, or minimum IFR altitude criteria.

b. Aircraft assigned altitudes which are contrary to Part 91.159 shall be advised to resume altitudes appropriate for the direction of flight when the altitude is no longer needed for separation, when leaving the outer area or when terminating Class C service.

Phraseology:

RESUME APPROPRIATE VFR ALTITUDES.

7–94 Reference.—Visual Separation, paragraph 7–10.

7–95 EXCEPTIONS

a. VFR helicopters need not be separated from IFR helicopters. Traffic information and safety alerts shall be issued as appropriate.

b. Hot air balloons need not be separated from IFR aircraft. Traffic information and safety alerts shall be issued as appropriate.

7–96 ADJACENT AIRPORT OPERATIONS

a. Aircraft that will penetrate Class C airspace after departing controlled airports within or adjacent to Class C airspace shall be provided the same services as those aircraft departing the primary airport. Procedures for handling this situation shall be covered in a letter of agreement or a facility directive as appropriate.

b. Aircraft departing uncontrolled airports within Class C airspace shall be handled using procedures advertised in a letter to airmen.

7–97 TERMINATION OF SERVICE

Unless aircraft are landing at secondary airports or have requested termination of service while in the outer area, provide services until the aircraft departs the associated outer area. Terminate Class

C service to aircraft landing at other than the primary airport at a sufficient distance from the airport to allow the pilot to change to the appropriate frequency for traffic and airport information.

Phraseology:

CHANGE TO ADVISORY FREQUENCY APPROVED,

or

CONTACT (facility identification)

7–98 thru 7–109 RESERVED

Section 9. CLASS B SERVICE AREA—TERMINAL

7–110 APPLICATION

Apply Class B services and procedures within the designated Class B airspace.

a. No person may operate an aircraft within Class B airspace unless:

1. The aircraft has an operable two-way radio capable of communications with ATC on appropriate frequencies for that Class B airspace.

2. The aircraft is equipped with the applicable operating transponder and automatic altitude reporting equipment specified in paragraph (a) of Part 91.215, except as provided in paragraph (d) of that section.

7–111 VFR AIRCRAFT IN CLASS B AIRSPACE

a. VFR aircraft must obtain an ATC clearance to operate in Class B airspace.

7–111a Reference.—Operational Requests, paragraph 2–18. Airspace Classes, paragraph 2–90.

Phraseology:

CLEARED TO ENTER/OUT OF CLASS B AIRSPACE.

or

CLEARED TO ENTER/OUT OF (name) CLASS B AIRSPACE.

and as appropriate,

VIA DIRECT (name) VOR. MAINTAIN FOUR THOUSAND FIVE HUNDRED WHILE IN CLASS B AIRSPACE.

CLEARED TO CLIMB INTO/THROUGH CLASS B AIRSPACE.

APPROVED AS REQUESTED. (Additional instructions, as necessary.)

REMAIN OUTSIDE CLASS B AIRSPACE. (When necessary, reason and/or additional instructions.)

7–111a Note 1.—Assignment of radar headings, routes, or altitudes is based on the provision that a pilot operating in accordance with VFR is expected to advise ATC if compliance will cause violation of any Part of Title 14 of the Code of Federal Regulations.

7–111a Note 2.—Separation and sequencing for VFR aircraft is dependent upon radar. Efforts should be made to segregate VFR traffic from IFR traffic flows when a radar outage occurs.

b. Approve/deny requests from VFR aircraft to operate in Class B airspace based on workload, operational limitations and traffic conditions.

c. Inform the pilot when to expect further clearance when VFR aircraft are held either inside or outside Class B airspace.

d. Inform VFR aircraft when leaving Class B airspace.

Phraseology:

LEAVING (name) CLASS B AIRSPACE, and as appropriate, RESUME OWN NAVIGATION, REMAIN THIS FREQUENCY FOR TRAFFIC ADVISORIES, RADAR SERVICE TERMINATED, SQUAWK ONE TWO ZERO ZERO, etc.

7–112 METHODS

a. To the extent practical, clear large turbine engine-powered airplanes to/from the primary airport using altitudes and routes that avoid VFR corridors and airspace below the Class B airspace floor where VFR aircraft are operating.

7–112a Note.—Pilots operating in accordance with VFR are expected to advise ATC if compliance with assigned altitudes, headings, or routes will cause violation of any Part of Title 14 of the Code of Federal Regulations.

b. Vector aircraft to remain in Class B airspace after entry. Inform the aircraft when leaving and reentering Class B airspace if it becomes necessary to extend the flight path outside Class B airspace for spacing.

7–112b Note.—Part 91.131 states that "unless otherwise authorized by ATC, each person operating a large turbine engine-powered airplane to or from a primary airport shall operate at or above the designated floor while within the lateral limits of the Class B airspace Such authorization should be the exception rather than the rule.

7–112b Reference.—Deviation Advisories, paragraph 5–10.

c. Aircraft departing controlled airports within Class B airspace will be provided the same services as those aircraft departing the primary airport.

7–112 Reference.—Operational Request, paragraph 2–18.

7–113 SEPARATION

a. Standard IFR services to IFR aircraft.

b. VFR aircraft shall be separated from VFR/IFR aircraft that weigh more than 19,000 pounds and turbojets by no less than:

7–113b Note.—Aircraft weighing 19,000 pounds or less include all of the small category aircraft plus the B31, B32, BE02, BEST, DO82, and SW3.

1. 1 ½ miles separation, or
2. 500 feet vertical separation, or

7–113b1 and 2 Note.—Apply the provisions of Minima, paragraph 5–72d and e, when wake turbulence seperation is required.

3. Visual separation, as specified in paragraph 7–10, paragraph 7–31, and paragraph 7–66.

7–113b3 Note.— Issue wake turbulance cautionary advisories in accordance with paragraph 2–20.

c. VFR aircraft shall be separated from all VFR/IFR aircraft which weigh 19,000 pounds or less by a minimum of:

7–113c Note.—Aircraft weighing 19,000 pounds or less include all of the small category aircraft plus the B31, B32, BE02, BEST, DO82, and SW3.

1. Target resolution, or
2. 500 feet vertical separation, or

7–113c1 and 2 Note.—Apply the provisions of Minima, paragraph 5–72d and e, when wake turbulance separation is required.

3. Visual separation, as specified in paragraph 7–10, paragraph 7–31, and paragraph 7–66.

7–113c3 Note.— Issue wake turbulance cautionary advisories in accordance with paragraph 2–20.

7–113 Reference.—Pilot/Controller Glossary terms—Lateral Separation, Radar Separation, Target Resolution, Visual Separation.

7–[illegible] RAFFIC ADVISORIES

ovide mandatory traffic advisories and safety alert, between all aircraft.

b. Apply merging target procedures in accordance with paragraph 5–8.

7–115 HELICOPTER TRAFFIC

VFR helicopters need not be separated from VFR or IFR helicopters. Traffic advisories and safety alerts shall be issued as appropriate.

7–116 ALTITUDE ASSIGNMENTS

a. Altitude information contained in a clearance, instruction, or advisory to VFR aircraft shall meet MVA, minimum safe altitude, or minimum IFR altitude criteria.

b. Issue altitude assignments, if required, consistent with the provisions of Part 91.119.

7–116b Note.—The minimum safe altitudes are 1 over congested areas, an altitude at least 1,000 feet above the highest obstacle, 2 over other than congested areas, an altitude at least 500 feet above the surface.

7–116b Reference.—Flight Direction, paragraph 4–60. Exceptions, paragraph 4–61. Minimum En route Altitudes, paragraph 4–64.

c. Aircraft assigned altitudes which are contrary to Part 91.159 shall be advised to resume altitudes appropriate for the direction of flight when the altitude assignment is no longer required or when leaving Class B airspace.

Phraseology:
RESUME APPROPRIATE VFR ALTITUDES.

7–117 APPROACH INTERVAL

The tower shall specify the approach interval.

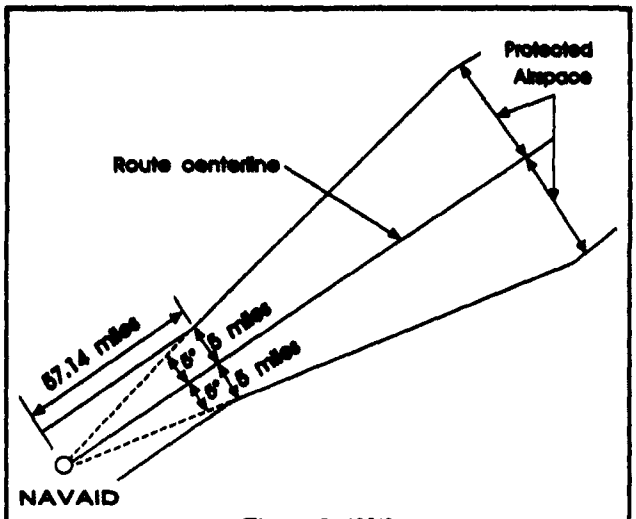


Figure 8–42[1]

b. At and above FL 240, reduce the width of the protected airspace to 10 miles on each side of the route centerline to a distance of 114.29 miles from the NAVAID, then increasing in width on a 5° angle from the route centerline, as measured at the NAVAID, to the maximum width allowable within the lateral minima; for example, 60 miles of protected airspace on each side of the centerline; i.e., a lateral separation minimum of 120 miles. (See Figure 8–42[2]).

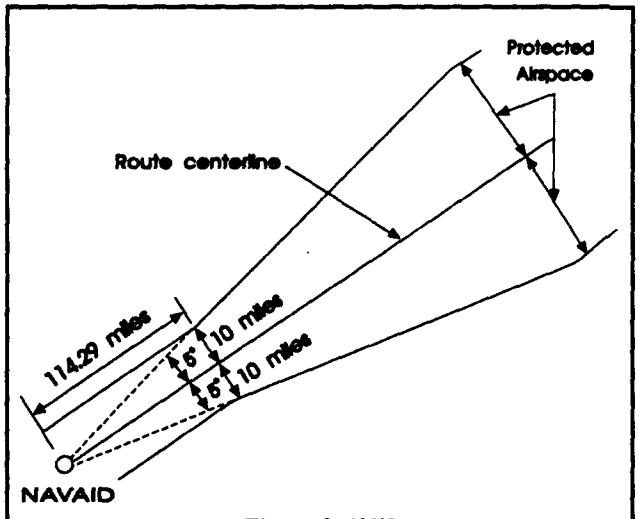


Figure 8–42[2]

8–43 TRACK SEPARATION

Apply track separation between aircraft by requiring aircraft to fly specified tracks or radials and with specified spacings as follows:

a. Same NAVAID:

1. VOR/VORTAC/TACAN. Consider separation to exist between aircraft established on radials of the same NAVAID that diverge by at least 15 degrees when either aircraft is clear of the airspace to be protected for the other aircraft. Use the table to determine the flight distance required for various divergence angles and altitudes to clear the airspace to be protected. (See Figure 8–43[1]).

Table 8–43[1].— Divergence –Distance Minima (VOR/VORTAC/TACAN)

Table 8–43[1]

Divergence (degrees)	Distance (miles)	
	FL 230 and below	FL 240 through FL 450
15–25	17	18
26–35	11	13
36–90	8	11

Note: This table compensates for DME slant range error.

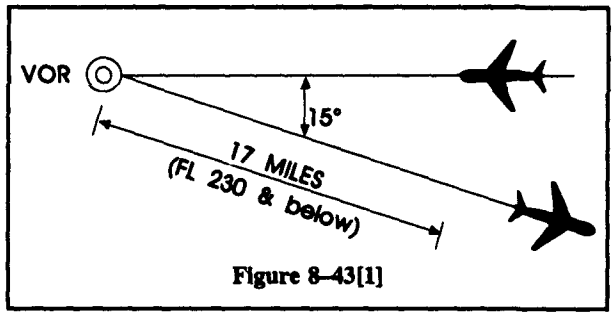


Figure 8–43[1]

2. NDB:

(a) Consider separation to exist between aircraft established on tracks of the same NAVAID that diverge by at least 30 degrees and one aircraft is at least 15 miles from the NAVAID. This separation shall not be used when one or both aircraft are inbound to the aid unless the distance of the aircraft from the facility can be readily determined by reference to the NAVAID. Use the table to determine the flight distance required for various divergence angles to clear the airspace to be protected. For divergence that falls between two values, use the lesser value to obtain the distance. (See Figure 8–43[2]).

Table 8–43[2] Divergence–Distance Minima (NDB)

Table 8–43[2]		
	Distance (miles)	
Divergence (degrees)	FL 230 and below	FL 240 through FL 450
30	16	17
45	13	14
60	9	10
75	7	8
90	6	7
Note.—This table compensates for DME slant range error.		

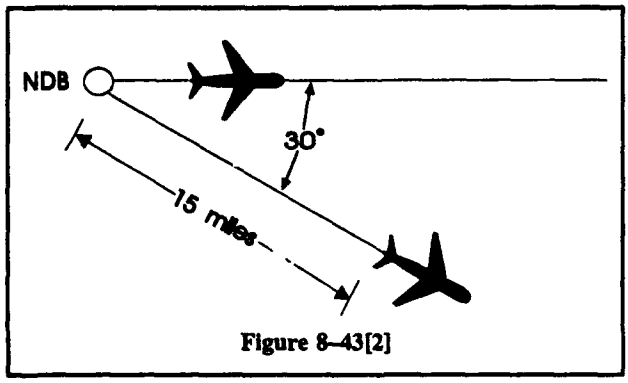


Figure 8–43[2]

(b) Clear aircraft navigating on NDB facilities in accordance with paragraph 2–101d.

b. Different NAVAID's: Separate aircraft using different navigation aids by assigning tracks so that their protected airspace does not overlap. (See Figure 8–43[3]).

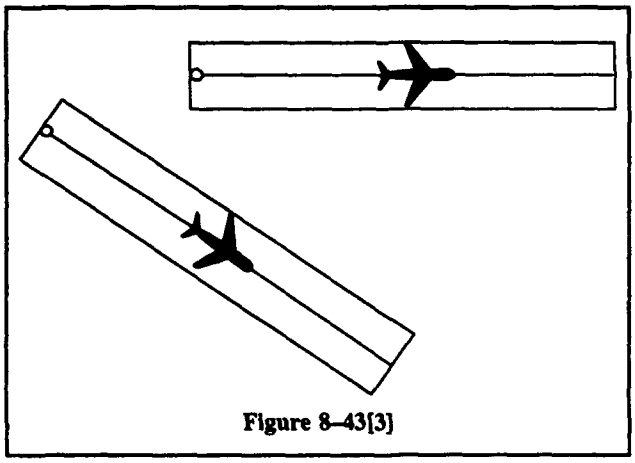


Figure 8–43[3]

c. Dead Reckoning (DR):

1. Consider separation to exist between aircraft established on tracks that diverge by at least 45 degrees when one aircraft is at least 15 miles from the point of intersection of the tracks. This point may be determined either visually or by reference to a navigation aid. (See Figure 8–43[4]).

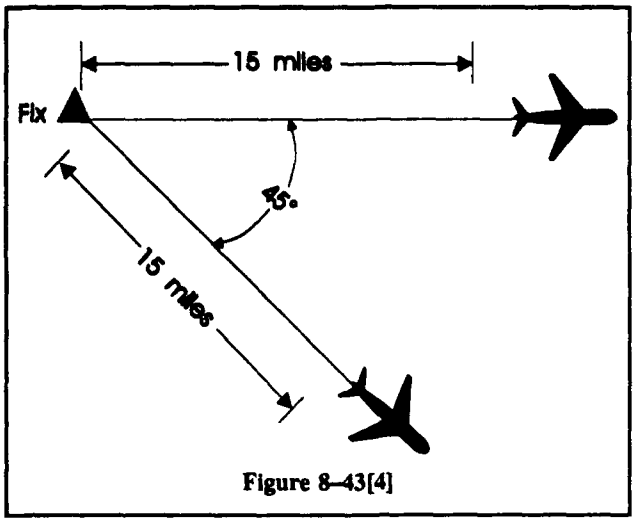


Figure 8–43[4]

8–44 thru 8–49 RESERVED

Chapter 9. SPECIAL FLIGHTS

Section 1. GENERAL

9–1 GENERAL

Provide aircraft engaged in the flight inspection of NAVAID's with maximum assistance. Unless otherwise agreed to, maintain direct contact with the pilot and exchange information regarding known traffic in the area and his intentions.

9–1 Note 1.—Many flight inspections are accomplished using automatic recording equipment, and an uninterrupted flight is necessary for successful completion of the mission. The workload for the limited number of aircraft engaged in these activities requires strict adherence to a schedule.

9–1 Note 2.—Flight inspection operations which require special participation of ground personnel, specific communications, or radar operation capabilities are considered to require special handling. These flights are coordinated with appropriate facilities before departure.

9–1 Reference.—FAA Order 8200.1, U.S. Standard Flight Inspection Manual and FAA Order 8240.41, Flight Inspection/Air Traffic Coordination.

9–2 SPECIAL HANDLING

a. Clear the aircraft according to pilot request as soon as practicable. Do not ask the pilot to deviate from his planned action except to preclude an emergency situation.

9–2a Reference.—FAA Order 8240.41, Flight Inspection/Air Traffic Coordination Appendix 1 (Flight Inspection Binder), describes certain flight inspection maneuvers in detail.

b. Issue radar advisories to the flight inspection aircraft where adequate coverage exists and to the extent permitted by workload.

c. Suggest flight path adjustments, as required, for any aircraft which will enter or penetrate an area in which a flight inspection function is being performed.

d. Provide special handling, as required, to FAA aircraft conducting flight inspections using the call sign "Flight Check." The call sign "Flight Check (Nr) recorded" indicates automated flight inspections are in progress in terminal areas.

9–2d Note.—FAA flight inspection aircraft will file flight plans using the call sign "Flight Check" during flight inspections or when inbound to conduct flight inspections. Flight plan remarks may indicate type NAVAID inspection to be accomplished; e.g. "FC OKC P."

9–3 FLIGHT CHECK AND SAFI AIRCRAFT

a. Provide special handling, as required, to expedite flight inspection of NAVAID's by Flight Check and SAFI aircraft equipped with airborne computers.

9–3a Note.—Preplanned automatic flight places the following limitations on the capability of the pilot to adhere to normal ATC clearances:

a. Route of flight—Normally requires 40 to 80 nautical miles square, and the route is planned along the grid lines irrespective of any airway structures.

b. Altitude assignment—Normally flights will be accomplished at 10,000, 15,000, or FL200. The crew can compensate for altitude changes not in excess of 2,000 feet, if necessary. For example, the pilot files 15,000; he can accept any altitude from 13,000 to 17,000.

c. En route holding—Holding is required at each turning point in the flight plan before the flight can continue on the next grid line track. The direction and duration of holding will be included in the flight plan and in the position report made on arrival over the holding point.

d. Position reporting—Standard position reporting format will be used, except that the fix code name will be used in lieu of the facility radial and distance during grid positions of flight.

9–3a Reference.—Operational Priority, paragraph 2–4c.

b. Avoid changes in the route or altitude from that filed by the pilot in the initial flight plan.

c. Do not impose air traffic control delays in excess of holding times specified in the flight plan except to preclude emergency situations.

d. Do not change the previously assigned discrete beacon code of special radar accuracy flight check aircraft.

9–3d Reference.—FAA Order 7210.3, Special Radar Accuracy Checks, paragraph 9–3; ASR Performance Checks, paragraph 12–57.

9–4 thru 9–9 RESERVED

Section 3. SPECIAL OPERATIONS

9–20 AIRCRAFT CARRYING DANGEROUS MATERIALS

a. Provide the following special handling to military aircraft or military contracted aircraft carrying dangerous materials when:

1. The words "Dangerous Cargo," or "Inert Devices," or both are contained in the remarks section of the filed flight plan, or

9–20a1 Note 1.—Certain types of military flights carrying dangerous materials require strict adherence to military regulations and flight planning along carefully selected routes. These flights must avoid heavily populated areas.

9–20a1 Note 2.—"Inert Devices" are devices containing no dangerous materials but closely resembling nuclear or explosive items that are classified as dangerous and could be easily mistaken for their dangerous counterparts.

2. The pilot uses these words in radio communication.

b. If it becomes necessary to issue a clearance to amend the route/altitude, advise the pilot:

1. Of the proposed change, and

2. The amount of delay to expect if it is necessary to maintain the present route/altitude.

c. When it becomes necessary for the pilot to refuse a clearance amending his route/altitude, he will advise if the traffic delay is acceptable or if an alternate route/altitude is desired. In such cases, offer all possible assistance.

d. When the aircraft is provided an en route descent, do not vector the aircraft from the planned route unless the pilot concurs.

e. Use special patterns and routings in areas where they have been developed for these flights. If special patterns and routings have not been developed, employ normal procedures.

9–21 CELESTIAL NAVIGATION TRAINING

EN ROUTE

a. Approve flight plans specifying celestial navigation only when it is requested for USAF or USN aircraft.

9–21a Note.—An ATC clearance must be obtained by the pilot before discontinuing conventional navigation to begin celestial navigation training. The pilot will advise when discontinuing celestial navigation and resuming conventional navigation. Celestial navigation training will be conducted within 30 NM of the route centerline specified in the en route clearance unless otherwise authorized by FAA7110.65TOC During celestial navigation training, the pilot will advise ATC before initiating any heading changes which exceed 20 degrees.

b. Within Conterminous U.S. airspace, limit celestial navigation training to transponder-equipped aircraft within areas of ARTCC radar coverage.

c. Prior to control transfer, insure that the receiving controller is informed of the nature of the celestial navigation training leg.

9–21 Reference.—*IFR Flight Progress Data, paragraph 2–35.*

9–22 DEPARTMENT OF ENERGY (DOE) SPECIAL FLIGHTS

a. Provide notification of possible route or altitude changes as far in advance as possible for "RAC" flights. The pilot will indicate if the proposed change is acceptable or if alternate routing or altitude will be requested.

9–22a Note.—DOE contracts for civil pilots to operate public aircraft to transport radioactive or high explosive materials within the Conterminous U.S. These flights operate on an IFR flight plan but principally during daylight hours and VFR conditions. These flights require flight along carefully selected routes and, in some instances, pilots will refuse clearances that require reroute or altitude changes that would derogate their objective.

b. *EN ROUTE:* Approve pilot requests to leave center frequency for operational purposes as traffic conditions permit.

c. Notify a supervisor in the event any of the following occurs with "RAC" aircraft:

1. Loss of radio contact.

2. Loss of radar contact.

3. The flight is overdue at the destination.

d. If you receive information that a "RAC" aircraft is involved in an accident, secure as much information as possible, particularly with respect to location, and immediately notify the ARTCC AM.

9–22d Note.—There is a possibility of an explosive or radiation hazard of an "RAC" aircraft involved in an accident.

9–23 EXPERIMENTAL AIRCRAFT OPERATIONS

a. When notified that an experimental aircraft requires special handling:

9–23a Note.—Part 91.319(d)(3) requires that each person operating an aircraft with an experimental certificate shall notify the control tower of the experimental nature of the aircraft when operating into or out of airports with operating control towers.

1. Clear the aircraft according to pilot requests as traffic permits and if not contrary to ATC procedures.

2. Once approved, do not ask the pilot to deviate from a planned action except to preclude an emergency situation.

b. At locations where volume or complexity of experimental aircraft operations warrant, a letter of agreement may be consummated between the facility and operator.

9–24 FAA RESEARCH AND DEVELOPMENT FLIGHTS

When coordinated in advance and traffic permits, approve requests for special flight procedures from aircraft participating in FAA research and development test activities. These special procedures shall be applied to participating aircraft/vehicles.

9–24 Note.—Special flight procedures for FAA research and development test activities must be approved by the facility air traffic manager prior to their use.

9–24 Reference.—FAA Order 7210.3, Research and Development Flights, paragraph 6–24.

9–25 FLYNET

Provide expeditious handling for civil or military aircraft using the code name "Flynet." Relay the code name as an element in the remarks position of the flight plan.

9–25 Note.—The code name "Flynet" indicates that an aircraft is transporting a Nuclear Emergency Team or a Disaster Control Team to the location of a nuclear accident or a major accident involving chemical agents or biological research materials. It is in the public interest that they reach their destination as rapidly as possible.

9–25 Reference.—Operational Priority, paragraph 2–4f. FAA Order 7610.4, "Flynet" Flights, Nuclear Emergency Teams, paragraph 12–41.

9–26 IFR MILITARY TRAINING ROUTES

a. Except for aircraft operating in the same altitude reservation, clear aircraft into an MTR provided separation will be applied between successive aircraft unless otherwise covered in a letter of agreement between the military scheduling activity and the concerned ATC facility.

Phraseology:

CLEARED INTO IR (designator).

MAINTAIN (altitude),

or

MAINTAIN IR (designator) ALTITUDE/S,

or

MAINTAIN AT OR BELOW (altitude),

or

CRUISE (altitude),

and if required,

CROSS (fix) AT OR LATER THAN (time).

b. Unless otherwise covered in a letter of agreement between the military scheduling activity and the concerned FAA facility, clear aircraft to exit an MTR.

Phraseology:

CLEARED TO (destination/clearance limit) FROM IR (designator/exit fix) VIA (route). MAINTAIN (altitude).

c. If the provisions of subparagraph 9–26a cannot be accomplished, MTR's may be designated for MARSA operations. To preclude an inadvertent compromise of MARSA standards by ATC, appropriate MARSA application for such routes shall be covered in a letter of agreement with the military scheduling activity. Establish separation between aircraft as soon as practicable after operation on the designated MARSA route is ended.

9–26c Note.—For designated MARSA routes, the military assumes responsibility for separation for MTR aircraft that have passed the primary/alternate entry fix until separation is established by ATC after operations on the MARSA route are completed.

d. The lateral airspace to be protected along an MTR is the designated width of the route.

e. Prior to an aircraft entering an MTR, request the pilot's estimate for the route's exit/alternate exit fix, his requested altitude after exiting, and, if applicable, the number of reentries on a Strategic Training Range (STR).

Phraseology:

(Call sign) CONFIRM YOUR EXIT FIX ESTIMATE AND REQUESTED ALTITUDE AFTER EXIT,

and if applicable,

THE NUMBER OF REENTRIES.

f. Forward estimates for exit/alternate exit fixes, requested altitude after exit, and, if applicable, the number of reentries on the STR.

g. Apply the procedures of paragraph 6–2, based upon the pilot's estimate for the route exit fix.

h. Clearance may be issued to amend or restrict operations on a route for ATC considerations. Where a route has been designated MARSA in accordance with subparagraph 9–26c, ATC shall not amend or restrict operations in such a manner as to compromise MARSA provisions.

9–26h Note.—When MARSA is provided through route scheduling and circumstances prevent the pilot from entering the route within established time limits, it shall be the responsibility of the pilot to inform the ATC facility and advise his intentions.

i. If an aircraft on an IR experiences a two-way radio communications failure and you are unable to determine the aircraft is proceeding VFR in accordance with Part 91.185(b)or the aircraft has not been positively radar identified:

1. Provide separation to the destination airport based on the aircraft complying with the following:

(a) Maintain to the exit/alternate exit fix the higher of the following altitudes:

(1) The minimum IFR altitude for each of the remaining route segment/s remaining on the route.

(2) The highest altitude assigned in the last ATC clearance.

(b) Depart the exit/alternate exit fix at the appropriate altitude specified in subparagraph 9–26i1(a), then climb/descend to the altitude filed

in the flight plan for the remainder of the flight, or

9–26l1(b) Note.—In the event of a two-way communications failure, ATC will be based on the following anticipated pilot action at the exit fix. Unless otherwise covered in a letter of agreement, and if the pilot is unable to comply with the VFR provisions of Part 91.185/FLIP IFR Supplement, the pilot will exercise his emergency authority, squawk transponder Code 7700, depart the exit/alternate exit fix and climb/descend (continuing to squawk 7700) to the altitude filed in the flight plan. Subsequent transponder operations will be in accordance with paragraph 9–43. Air traffic controller action from the exit fix is as prescribed in paragraph 9–1.

(c) Proceed in accordance with the lost communication procedure contained in Letters of Agreement.

2. Continue to monitor the last ATC assigned discrete code.

9–26l2 Note.—Pilots who experience a two-way radio failure will adjust their transponder to Code 7700 during climb/descent to altitude filed for the next leg of the flight plan; then change to Code 7600 for a period of 15 minutes. At the end of each 15–minute period, he will squawk 7700 for a period of 1 minute; all other times he will squawk 7600.

j. Impose delays, if needed, to eliminate conflict with nonparticipating IFR aircraft when necessary to preclude denial of IR usage. Advise the pilot of the expected length and reason for delay.

9–27 INTERCEPTOR OPERATIONS

Provide maximum assistance to expedite the movement of interceptor aircraft on active air defense (scrambles) missions until the unknown aircraft is identified in accordance with the policies and procedures published in FAA Order 7610.4.

9–27 Note.—The FAA and the military have mutually agreed to the implementation of policies and procedures for control of air defense interceptor operations. Effective coordination and cooperation between FAA and the military at all levels are essential if policy objectives are to be met.

a. The ADCF initiating the SCRAMBLE shall identify the mission as an active air defense mission.

b. ATC services shall be used for active air defense missions insofar as the circumstances and situation permits.

c. Upon request, the ATC facility shall expedite transfer of the control jurisdiction of the interceptors to the requesting ADCF.

9–28 LAW ENFORCEMENT OPERATIONS BY CIVIL AND MILITARY ORGANIZATIONS

a. Law enforcement alerts.

1. Aircraft lookouts shall not be distributed outside the FAA.

9–28a1 Reference.—FAA Order 1600.29, Law Enforcement Alert Message System. FAA Order 7210.3, Cooperation with Law Enforcement Agencies, paragraph 2–86.

2. Stolen aircraft alerts, including stolen aircraft summaries, may be distributed outside the FAA to: airport offices, air carriers, fixed base operators, and law enforcement agencies.

3. Upon receipt of knowledge concerning an aircraft for which a current law enforcement alert message is held, do the following:

(a) Forward any information on the aircraft to El Paso Intelligence Center (EPIC) and the requester when specified in the message.

(b) Immediately notify the cognizant Air Transportation Security division/staff by the most rapid means.

(c) DO NOT TAKE ANY OTHER ACTION AFFECTING THE AIRCRAFT, CARGO, CREW, OR PASSENGERS NOT NORMALLY RELATED TO JOB RESPONSIBILITIES.

b. Special law enforcement operations.

1. Special law enforcement operations include in-flight identification, surveillance, interdiction and pursuit activities performed in accordance with official civil and/or military mission responsibilities.

2. To facilitate accomplishment of these special missions, exemptions from specified Parts of Title 14 of the Code of Federal Regulations have been granted to designated Departments and Agencies. However, it is each organization's responsibility to apprise ATC of their intent to operate under an authorized exemption before initiating actual operations.

9–28b2 Reference.—FAA Order 7210.3, Exemptions from Federal Aviation Regulations, paragraph 6–34.

3. Additionally, some Departments and Agencies that perform special missions have been assigned coded identifiers to permit them to apprise ATC of ongoing mission activities and solicit special air traffic assistance.

9–28b3 Reference.—FAA Order 7110.67, Specified Aircraft Operations by Law Enforcement/Military Organizations.

9–28b3 Note.—As specified in paragraph 2–4, Operational Priority, priority of handling for aircraft operating with coded identifiers will be the same as that afforded to SAR aircraft performing a SAR mission.

c. Assistance to law enforcement aircraft operations.

1. Provide the maximum assistance possible to law enforcement aircraft, when requested, in helping them locate suspect aircraft.

2. Communicate with law enforcement aircraft, when possible and if requested, on a frequency not paired with your normal communications frequencies.

3. Do not allow assistance to law enforcement aircraft to violate any required separation minima.

4. Do not assist VFR law enforcement aircraft in any way that will create a situation which,

in your judgement, places the aircraft in unsafe proximity to terrain or other aircraft.

9–29 MILITARY AERIAL REFUELING

Authorize aircraft to conduct aerial refueling along published or special tracks at their flight plan altitude, unless otherwise requested.

Phraseology:

CLEARED TO CONDUCT REFUELING:

ALONG (number) TRACK,

or

FROM (fix) TO (fix),

and

MAINTAIN REFUELING LEVEL (altitude),

or

MAINTAIN (altitude),

or

COMMENCING AT (altitude), DESCENDING TO (altitude).

9–29 Note 1.—During aerial refueling, tanker aircraft are responsible for receiver aircraft communication with ATC and for their navigation along the track.

9–29 Note 2.—Aerial refueling airspace is not sterilized airspace and other aircraft may transit this airspace provided vertical or lateral separation is provided from refueling aircraft.

9–29 Note 3.—MARSA begins between the tanker and receiver when the tanker and receiver/s have entered the air refueling airspace and the tanker advises ATC that he is accepting MARSA.

9–29 Note 4.—MARSA ends between the tanker and receiver when the tanker advises ATC that the tanker and receiver aircraft are vertically positioned within the air refueling airspace and ATC advises MARSA is terminated.

9–29 Reference.—Use of MARSA, paragraph 2–11; Formation Flight Aircraft and Other Aircraft, paragraph 5–74. FAA Order 7610.4 Chapter 10, Aerial Refueling.

a. Provide radar assistance to the rendezvous for participating aircraft:

1. When requested, and

2. By providing vertical separation prior to MARSA declaration.

b. Do not request receiver aircraft that have been cleared to conduct air refueling and have departed the ARIP to:

1. Make code changes when less than 5 miles from the tanker.

2. Squawk Standby when less than 1 mile or more than 3 miles from the tanker.

9–29b Note.—Requests for receiver aircraft to make code changes during air refueling diverts the receiver pilot's attention during a critical phase of flight.

c. When issuing an initial air refueling clearance, you may request a receiver to squawk standby when the receiver reaches a point 3 miles from the tanker.

9–29c Note 1.—Receiver aircraft will squawk normal when separation from the tanker is greater than 3 miles.

9–29c Note 2.—Once rendezvous is completed, heading and altitude assignments may be made with the tanker concurrence with MARSA remaining in effect.

9–29c Note 3.—Upon rendezvous completion, the tanker shall keep receiver aircraft within 3 miles of the tanker until MARSA is terminated.

d. After MARSA has been declared, you should avoid issuing course or altitude changes prior to rendezvous.

9–29d Note.—Altitude or course changes issued will automatically void MARSA.

e. Do not use the altitude vacated during the refueling operation until the refueling aircraft has reported reaching the next IFR altitude.

9–29e Reference.—Exceptions, paragraph 6–52.

f. Approve requests by the tanker pilot for vectors or alternative routes or altitudes as follows:

1. Furnish vectors or alternative altitudes at any time.

2. Furnish nonradar routes only after the refueling aircraft have passed the ARCP.

9–29f Note 1.—To meet a training requirement that aerial refueling be accomplished in a nonradar environment, the military has requested that vectors be furnished only upon request.

9–29f Note 2.—The tanker commander is responsible for coordinating all in-flight requests with other aircraft in the refueling mission before submission of such requests to the center.

9–29f Note 3.—Normally, aircraft conducting aerial refueling operations will utilize at least three consecutive altitudes.

g. Unless a vector or alternative route has been furnished, clear the aircraft to depart the refueling track at a navigational reference point or egress fix.

h. Request an aircraft to report the ARIP, ARCP, or egress fix as necessary.

Phraseology:

REPORT:

A-R-I-P,

or

A-R-C-P

or

EGRESS FIX.

i. Expect the following procedures in addition to those required by the appropriate Parts of Title 14 of the Code of Federal Regulations in the event of two–way communications failure:

1. The tanker will depart the track from the highest altitude in the block.

2. The receiver will depart the track from the lowest altitude in the block.

3. Aircraft will squawk 7600 for at least 2 minutes prior to departing the track.

9–29 Reference.—Military Operations above FL 600, paragraph 9–30.

9–30 MILITARY OPERATIONS ABOVE FL 600

EN ROUTE

Control aircraft operating above FL 600 using the following procedures:

a. Flight plans involving supersonic flight are required 16 hours in advance of proposed departure times for processing and approval by the ARTCC's concerned. The originating ARTCC, where the flight plan is first filed, may waive the 16 hour advance filing requirement.

b. The route of flight shall be defined by at least one high altitude fix within each ARTCC area without regard to the distance between fixes. Additionally, the entry and exit points of turns of 90 degrees or more will be designated.

c. Elapsed times from takeoff to the first fix in each ARTCC area shall be included in the route of flight.

d. The ARTCC which originates the flight plan shall forward departure times to all ARTCC's responsible for processing the flight plan.

e. Approval of the flight plan indicates approval of both route and FL's (if stated) including operations below FL 600 (aerial refueling).

Phraseology:

CLEARED AS FILED VIA ROUTE AND FLIGHT LEVELS.

9–30e Reference.—Military Aerial Refueling, paragraph 9–29.

f. Separation. Use the following as minima in lieu of the corresponding type of separation prescribed in:

9–30f Note.—The primary method described to provide separation between two supersonic aircraft is to descend the aircraft at the lower FL and provide vertical separation since the aircraft at the higher FL may not be able to climb rapidly enough to establish the required separation. Another aspect which should be considered is that supersonic aircraft during turns, either programmed or as the result of vectors, will lose a few thousand feet. Vectoring supersonic aircraft seriously affects the range and mission objectives. Radar separation is the preferred method of separating a subsonic aircraft both from another subsonic aircraft or from a supersonic aircraft.

1. Paragraph 6–51, Minima Between Altitudes—*5,000 feet.*

9–30f1 Note 1.—The security requirements of the military services preclude the transmission of actual altitude information on the air/ground or landline circuits. A classified document detailing the plan for ascertaining altitude codes for the day should be readily available to the controllers at their positions of operation.

9–30f1 Note 2.—Pilots will report their altitude, using the coded plan, and intended flight profile on initial contact with each ARTCC.

2. Paragraph 6–43, Minima Along Other Than Established Airways or Routes—Protect the airspace 25 miles either side of the route centerline. For turns by supersonic aircraft, protect the airspace 75 miles on the overflown side and 25 miles on the other side. For turns by subsonic aircraft, protect the airspace 34 miles on the overflown side and 25 miles on the other side.

9–30 Reference.—Abbreviated Departure Clearance, paragraph 4–32.

9–31 MILITARY SPECIAL USE FREQUENCIES

EN ROUTE

a. Assign special use frequency to:

9–31a Note.—Special use frequencies are assigned to ARTCC's in such a manner that adjacent ARTCC's will not have the same frequency. They are to be used within the ARTCC area jurisdiction from the established FL base of the high altitude sectors and above. Each high altitude sector should have the capability to use the special use frequency on a shared basis.

1. USAF Tactical Air Command (TAC), U.S. Navy, and Air National Guard (ANG) single-pilot jet aircraft formations operating at night or in instrument weather conditions. Formations of five or more USAF TAC aircraft deploying either to a Continental U.S. staging base or nonstop to an overseas location are authorized to use special use frequencies at any time. Normally these deployments will be conducted within an altitude reservation.

2. U–2 and B–57 (pressure suit flights) aircraft at all altitudes/FL's except where terminal operations require the assignment of other frequencies.

9–31a2 Note.—Aerial refueling operations may require that aircraft leave the special use frequency for communications with the tanker. This will occur when the receiver is approximately 200 miles from the ARCP. The tanker aircraft will remain on the ARTCC assigned frequency and will relay clearances to the receiver as required. An alternate means of communications between the tanker and receiver is HF radio.

3. All aircraft during supersonic flight.

9–31a2 and 3 Note.—Pilots are expected to request assignment of the special use frequency in the remarks section of the flight plan or before entering supersonic flight. B–57 aircraft engaged in pressure suit operations will use the static call sign KITE and flights will normally be conducted from Dover, Eielson, Ellington, Hickman, Howard, Kirtland, and McClellan Air Force Bases.

4. E–3A AWACS mission crews when operations are being conducted as an MRU in accordance with appropriate letters of agreement.

b. The special use frequency may be assigned as "backup" for the high-altitude sector when direct communications are essential because of a potential emergency control situation.

c. Do not assign the special use frequency to the aircraft in subparagraph 9–31a1 when they will operate in airspace assigned for special military operations.

9–32 AVOIDANCE OF AREAS OF NUCLEAR RADIATION

a. Advise pilots whenever their proposed flight path will traverse a reported or forecasted area of hazardous radiation and reroute the aircraft when requested by the pilot.

9–32a Reference.—FAA Order 7610.4, Avoidance of Hazardous Radiation Areas, paragraph 4–44.

b. Inform pilots when an airfield of intended landing lies within a reported or forecasted area of hazardous radiation and request the pilot to advise his intentions.

9–33 SAMP

Provide special handling to USAF aircraft engaged in aerial sampling missions (atmosphere sampling for nuclear contamination). Honor in-flight clearance requests for altitude and route changes to the maximum extent possible. Other IFR aircraft may be recleared so that requests by SAMPLER aircraft are honored. Separation standards as outlined in this order shall be applied in all cases.

9–33 Reference.—Operational Priority, paragraph 2–4; Aircraft Identification, paragraph 2–88. Nuclear Contamination, paragraph 6–33.

9–34 SNOW TIME

Whenever a SNOW TIME ECM exercise causes the primary radar display to become unusable, take the following actions, as appropriate:

9–34 Note.—SNOW TIME exercises are large-scale electronic countermeasures (ECM) missions designed to satisfy training requirements of the U.S. military forces. The "Faker Force" aircraft are operated on an ALTRV basis along tracks established for the purpose.

9–34 Reference.—ECM/ECCM Activity, paragraph 5–5.

a. Provide radar service to the extent possible.

b. Use only secondary radar, if required, and apply radar separation only between positively identified aircraft.

c. Apply nonradar separation between all aircraft not positively identified on radar.

d. Implement "Stop Buzzer" only when aircraft safety will be compromised.

e. Curtail radar services if necessary to permit the SNOW TIME ECM exercise to continue.

9–35 AWACS/NORAD SPECIAL FLIGHTS

Do not delay E–3 AWACS aircraft identified as "AWACS/NORAD Special" flights. The following control actions are acceptable while expediting these aircraft to the destination orbit.

a. En route altitude changes +/–2,000 feet from the requested flight level.

b. Radar vectors or minor route changes that do not impede progress towards the destination orbit.

9–35 Note.—NORAD has a requirement to position E–3 AWACS aircraft at selected locations on a time-critical basis. To the extent possible these flights will utilize routes to the destination orbit that have been precoordinated with the impacted ATC facilities. To identify these flights, the words "AWACS/NORAD Special" will be included as the first item in the remarks section of the flight plan.

9–36 WEATHER RECONNAISSANCE FLIGHTS

TEAL mission aircraft fly reconnaissance flights to gather meteorological data on winter storms, hurricanes, and tropical cyclones. The routes of these aircraft are determined by movement of the storm areas and not by traffic flows.

a. When requested by the pilot, provide priority handling to TEAL mission aircraft.

b. When a dropsonde release time is received from a TEAL mission aircraft, workload and priorities permitting, controllers shall advise the mission aircraft of any traffic estimated to pass through the area of the drop at altitudes below that of the mission aircraft. This traffic advisory shall include:

1. Altitude
2. Direction of flight
3. ETA at the point closest to drop area (or at the fix/intersection where drop will occur)

9–36b Note.—A dropsondes is an 18 inch long metal cylinder that weighs 3 and 1/2 pounds, and has a parachute attached. When released from the aircraft it will fall at a rate of 1,000 feet per minute. Controllers should recognize that a dropsonde released at flight level 310 will be a factor for traffic at flight level 210 ten minutes later. It is the aircraft commander's responsibility to delay release of dropsondes if traffic is a factor. Aircraft commanders will delay release of dropsondes based solely upon traffic as issued by ATC.

c. When advised that an airborne TEAL aircraft is requesting a clearance via CARCAH, issue the clearance in accordance with this handbook, Section 2, Clearances.

9–36c Reference.— Clearance Items, paragraph 4–10. Clearance Prefix, paragraph 4–11. Delivery Instructions, 4–12.

d. If a TEAL mission aircraft must be contacted but is out of VHF, UHF, and HF radio range, advise the watch supervisor.

9–36 Reference.— Order 7210.3, paragraph 6–36, Weather Reconnaissance Flights.

9–37 thru 9–39 RESERVED

Chapter 10. EMERGENCIES

Section 1. GENERAL

10–1 EMERGENCY DETERMINATIONS

a. An emergency can be either a *Distress* or an *Urgency* condition as defined in the "Pilot/Controller Glossary."

b. A pilot who encounters a *Distress* condition should declare an emergency by beginning the initial communication with the word "Mayday," preferably repeated three times. For an *Urgency* condition, the word "Pan-Pan" should be used in the same manner.

c. If the words "Mayday" or "Pan-Pan" are not used and you are in doubt that a situation constitutes an emergency or potential emergency, handle it as though it were an emergency.

d. Because of the infinite variety of possible emergency situations, specific procedures cannot be prescribed. However, when you believe an emergency exists or is imminent, select and pursue a course of action which appears to be most appropriate under the circumstances and which most nearly conforms to the instructions in this manual.

10–1 Reference.—IFR Military Training Routes, paragraph 9–26.

10–2 OBTAINING INFORMATION

Obtain enough information to handle the emergency intelligently. Base your decision as to what type of assistance is needed on information and requests received from the pilot because he is authorized by Part 91 to determine a course of action.

10–3 PROVIDING ASSISTANCE

Provide maximum assistance to aircraft in distress. Enlist the services of available radar facilities and DF facilities operated by the FAA, the military services, and the Federal Communications Commission, as well as their emergency services and facilities, when the pilot requests or when you deem necessary.

10–3 Note 1.—The National SAR Plan assigns search and rescue responsibilities as follows:

a. To the military agencies—Conducting physical search and rescue operations.

b. To the FAA—

1. Providing emergency service to aircraft in distress.

2. Assuring that SAR procedures will be initiated if an aircraft becomes overdue or unreported. This is accomplished through the ATC system for IFR aircraft and the flight plan system for VFR aircraft.

3. Attempting to locate overdue or unreported aircraft by INREQ and ALNOT communications search.

4. Making all possible facilities available for use by the searching agencies.

10–3b4 Reference.—Operational Priority, paragraph 2–4b.

10–3 Note 2.—FSS's serve as the central points for collecting and disseminating information on an overdue or missing aircraft which is not on an IFR flight plan. Non–FSS ATC facilities that receive telephone calls or other inquiries regarding these flights shall refer these calls and inquiries to the appropriate AFSS/FSS.

10–3 Note 3.—Centers serve as the central points for collecting information, for coordinating with SAR, and for conducting a communications search by distributing any necessary ALNOT's concerning:

a. Overdue or missing IFR aircraft.

b. IFR aircraft in an emergency situation occurring in their respective areas.

c. Aircraft on a combination VFR/IFR or an airfiled IFR flight plan and 30 minutes have passed since the pilot requested IFR clearance and neither communication nor radar contact can be established with it. For SAR purposes, these aircraft are treated the same as IFR aircraft.

d. Overdue or missing aircraft which have been authorized to operate in accordance with Special VFR clearance.

10–3 Note 4.—The ARTCC serves as the central point for collecting information and coordinating with the RCC on ELT signals.

10–4 RESPONSIBILITY

a. If you are in communication with an aircraft in distress, handle the emergency and coordinate and direct the activities of assisting facilities. Transfer this responsibility to another facility only when you feel better handling of the emergency will result.

b. When you receive information about an aircraft in distress, forward detailed data to the center in whose area the emergency exists.

10–4b Note.—Notifying the center about a VFR aircraft emergency allows provision of IFR separation if considered necessary.

c. If the aircraft involved is operated by a foreign air carrier, notify the center serving the departure or destination point, when either point is within

the United States, for relay to the operator of the aircraft.

d. The ARTCC shall be responsible for receiving and relaying all pertinent ELT signal information to the appropriate authorities.

10–4d Reference.—Emergency Locator Transmitter (ELT) Signals, paragraph 10–19.

10–5 COORDINATION

Coordinate efforts to the extent possible to assist any aircraft believed overdue, lost, or in emergency status.

10–6 AIRPORT GROUND EMERGENCY

TERMINAL

When an emergency occurs on the airport proper, control other air and ground traffic to avoid conflicts in the area where the emergency is being handled. This also applies when routes within the airport proper are required for movement of local emergency equipment going to or from an emergency which occurs outside the airport proper.

10–6 Note.—Aircraft operated in proximity to accident or other emergency or disaster locations may cause hindrances to airborne and surface rescue or relief operations. Congestion, distraction or other effects, such as wake turbulence from nearby airplanes and helicopters, could prevent or delay proper execution of these operations.

10–6 Reference.—FAA Order 7210.3, Temporary Flight Restrictions, paragraph 6–40. Temporary Flight Restrictions, Part 91.137.

10–7 IN—FLIGHT EMERGENCIES INVOLVING MILITARY FIGHTER—TYPE AIRCRAFT

The design and complexity of military fighter—type aircraft places an extremely high workload on the pilot during an in—flight emergency. The pilot's full attention is required to maintain control of the aircraft. Therefore, radio frequency and transponder code changes should be avoided and radio transmissions held to a minimum, especially when the aircraft experiencing the emergency is at low altitude.

10–8 thru 10–9 RESERVED

b. Make turns while the aircraft is in VFR conditions so it will be in a position to fly a straight course while in IFR conditions.

c. Have pilot lower gear and slow aircraft to approach speed while in VFR conditions.

d. Avoid requiring a climb or descent while in a turn if in IFR conditions.

e. Avoid abrupt maneuvers.

f. Vector aircraft to VFR conditions.

g. The following shall be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of code 7700:

1. TERMINAL: Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

2. EN ROUTE: An appropriate keyboard entry shall be made to ensure en route MSAW (EMSAW) alarm processing.

10–19 EMERGENCY LOCATOR TRANSMITTER (ELT) SIGNALS

When an ELT signal is heard or reported:

a. *EN ROUTE:* Notify the Rescue Coordination Center (RCC).

10–19a Note.—FAA Form 7210–8. ELT Incident, contains standardized format for coordination with the RCC.

10–19a Reference.—FAA Order 7210.3, paragraph 11–30.

b. *TERMINAL:* Notify the ARTCC which will coordinate with the Rescue Coordination Center (RCC).

10–19a. and b Note 1.—Operational ground testing of Emergency Locator Transmitters (ELT's) has been authorized during the first 5 minutes of each hour. To avoid confusing the tests with an actual alarm, the testing is restricted to no more than three audio sweeps.

10–19a. and b Note 2.—Controllers can expect pilots to report aircraft position and time the signal was first heard, aircraft position and time the signal was last heard, aircraft position at maximum signal strength, flight altitude, and frequency of the emergency signal (121.5/243.0). (See Airman's Information Manual, Emergency Locator Transmitters, paragraph 6–14.)

c. *EN ROUTE:* Request DF facilities obtain fixes or bearings on signal. Forward bearings or fixes obtained plus any other pertinent information to the RCC.

d. *TERMINAL:* Attempt to obtain fixes or bearings on the signal.

e. Solicit the assistance of other aircraft known to be operating in the signal area.

f. *TERMINAL:* Forward fixes or bearings and any other pertinent information to the ARTCC.

10–19f Note.—*Fix information in relation to a VOR or* VORTAC (radial-distance) facilitates accurate ELT plotting by RCC and should be provided when possible.

g. *EN ROUTE:* When the ELT signal strength indicates the signal may be emanating from somewhere on an airport or vicinity thereof, notify the on-site Airway Facilities personnel and the Regional Operations Center (ROC) for their actions. This action is in addition to the above.

h. *TERMINAL:* When the ELT signal strength indicates the signal may be emanating from somewhere on the airport or vicinity therof, notify the on-site Airway Facilities personnel and the ARTCC for their action. This action is in addition to the above.

i. Air Traffic personnel shall not leave their required duty stations to locate an ELT signal source.

10–19h and i Note.—Portable handcarried receivers assigned to air traffic facilities (where no Airway Facilities personnel are available) may be loaned to responsible airport personnel or local authorities to assist in locating the ELT signal source.

j. *EN ROUTE:* Notify the RCC, the ROC, and alerted DF facilities if signal source is located/terminated.

k. *TERMINAL:* Notify the ARTCC if signal source is located/terminated.

10–19 Reference.—Responsibility, paragraph 10–4. Information Requirements, paragraph 10–10.

10–20 AIRCRAFT BOMB THREATS

a. When information is received from any source that a bomb has been placed on, in, or near an aircraft for the purpose of damaging or destroying such aircraft, notify your supervisor or the facility air traffic manager. If the threat is general in nature, handle it as a "Suspicious Activity." When the threat is targeted against a specific aircraft and you are in contact with the suspect aircraft, take the following actions as appropriate:

10–20a Note 1.—Facility supervisors are expected to notify the appropriate offices, agencies, operators/air carriers according to applicable plans, directives, and FAA Order 7210.3, paragraph 2–8 or applicable military directives.

10–20a Note 2.—"Suspicious Activity" is covered in FAA Order 7210.3, paragraph 2–85. Military facilities would report a "general" threat through the chain of command or according to service directives.

1. Advise the pilot of the threat.

2. Inform the pilot that technical assistance can be obtained from an FAA Aviation Explosives Expert.

10–20a2 Note.—An FAA Aviation Explosive Expert is on call at all times and may be contacted by calling the FAA Operations Center, Washington, DC, area code 202–863–5100, FTS 202 863–5100, ETN 521–0111, or DSN 667–5592. Technical advice can be relayed to assist civil or military air crews in their search for a bomb and in determining what precautionary action to take if one is found.

3. Ask the pilot if he desires to climb or descend to an altitude that would equalize or

reduce the outside air pressure/existing cabin air pressure differential. Issue or relay an appropriate clearance considering MEA, MOCA, MRA, and weather.

10–20a3 Note.—Equalizing existing cabin air pressure with outside air pressure is a key step which the pilot may wish to take to minimize the damage potential of a bomb.

4. Handle the aircraft as an emergency and/or provide the most expeditious handling possible with respect to the safety of other aircraft, ground facilities, and personnel.

10–20a4 Note.—Emergency handling is discretionary and should be based on the situation. With certain types of threats, plans may call for a low-key action or response.

5. Issue or relay clearances to a new destination if requested.

6. When a pilot requests technical assistance or if it is apparent that a pilot may need such assistance, do NOT suggest what actions the pilot should take concerning a bomb, but obtain the following information and notify your supervisor who will contact the FAA Aviation Explosives Expert:

10–20a6 Note.—This information is needed by the FAA Aviation Explosives Expert so that he can assess the situation and make immediate recommendations to the pilot. The Aviation Explosives Expert may not be familiar with all military aircraft configurations but he can offer technical assistance which would be beneficial to the pilot.

(a) Type, series, and model of the aircraft.

(b) Precise location/description of the bomb device if known.

(c) Other details which may be pertinent.

10–20a6(c) Note.—The following details may be of significance if known, but it is not intended that the pilot should disturb a suspected bomb/bomb container to ascertain the information: the altitude or time set for the bomb to explode, type of detonating action (barometric, time, anti-handling, remote radio transmitter), power source (battery, electrical, mechanical), type of initiator (blasting cap, flash bulb, chemical), and the type of explosive/incendiary charge (dynamite, black powder, chemical).

b. When a bomb threat involves an aircraft on the ground and you are in contact with the suspect aircraft, take the following actions in addition to those discussed in the preceding paragraph which may be appropriate:

1. If the aircraft is at an airport where tower control or FSS advisory service is not available, or if the pilot ignores the threat at any airport, recommend that takeoff be delayed until the pilot or aircraft operator establishes that a bomb is not aboard in accordance with Part 121. If the pilot insists on taking off and in your opinion the operation will not adversely affect other traffic, issue or relay an ATC clearance.

10–20b1 Reference.—Airplane Security, Part 121.538.

2. Advise the aircraft to remain as far away from other aircraft and facilities as possible, to clear the runway, if appropriate, and to taxi to an isolated or designated search area. When it is impractical or if the pilot takes an alternative action; e.g., parking and off-loading immediately, advise other aircraft to remain clear of the suspect aircraft by at least 100 yards if able.

10–20b2 Note.—Passenger deplaning may be of paramount importance and must be considered before the aircraft is parked or moved away from service areas. The decision to use ramp facilities rests with the pilot, aircraft operator/airport manager.

c. If you are unable to inform the suspect aircraft of a bomb threat or if you lose contact with the aircraft, advise your supervisor and relay pertinent details to other sectors or facilities as deemed necessary.

d. When a pilot reports the discovery of a bomb or suspected bomb on an aircraft which is airborne or on the ground, determine the pilot's intentions and comply with his requests in so far as possible. Take all of the actions discussed in the preceding paragraphs which may be appropriate under the existing circumstances.

e. The handling of aircraft when a hijacker has or is suspected of having a bomb requires special considerations. Be responsive to the pilot's requests and notify supervisory personnel. Apply hijacking procedures and offer assistance to the pilot according to the preceding paragraphs, if needed.

10–21 EXPLOSIVE DETECTION K–9 TEAMS

Take the following actions should you receive an aircraft request for the location of the nearest explosive detection K–9 team.

10–21 Reference.—FAA Order 7210.3, Explosives Detection K–9 Teams, paragraph 2–10.

a. Obtain the aircraft identification and position and advise your supervisor of the pilot request.

b. When you receive the nearest location of the explosive detection K–9 team, relay the information to the pilot.

c. If the aircraft wishes to divert to the airport location provided, obtain an estimated arrival time from the pilot and advise your supervisor.

10–22 EMERGENCY AIRPORT RECOMMENDATION

Consider the following factors when recommending an emergency airport:

a. Remaining fuel in relation to airport distances.

b. Weather conditions.

c. Airport conditions.

Section 4. CONTROL ACTIONS

10–40 TRAFFIC RESTRICTIONS

IFR traffic which could be affected by an overdue or unreported aircraft shall be restricted or suspended unless radar separation is used. The facility responsible shall restrict or suspend IFR traffic for a period of 30 minutes following the applicable time listed in subparagraphs a thru e.

a. The time at which approach clearance was delivered to the pilot.

b. The EFC time delivered to the pilot.

c. The arrival time over the NAVAID serving the destination airport.

d. The current estimate, either the control facility's or the pilot's, whichever is later, at:

1. The appropriate en route NAVAID or fix, and
2. The NAVAID serving the destination airport.

e. The release time and, if issued, the clearance void time.

10–40 Reference.—Departure Restrictions, Clearance Void Times, Hold for Release, and Release Times paragraph 4–33.

10–41 LIGHTING REQUIREMENTS

a. *EN ROUTE:* At non-tower or non-FSS locations, request the airport management to light all runway lights, approach lights, and all other required airport lighting systems for at least 30 minutes before the ETA of the unreported aircraft until the aircraft has been located or for 30 minutes after its fuel supply is estimated to be exhausted.

b. *TERMINAL:* Operate runway lights, approach lights, and all other required airport lighting systems for at least 30 minutes before the ETA of the unreported aircraft until the aircraft has been located or for 30 minutes after is fuel supply is estimated to be exhausted.

10–41 Reference.—Emergency Lighting, paragraph 3–40.

10–42 TRAFFIC RESUMPTION

After the 30–minute traffic suspension period has expired, resume normal air traffic control if the operators or pilots of other aircraft concur. This concurrence must be maintained for a period of 30 minutes after the suspension period has expired.

10–42 Reference.—Departure Restrictions, Clearance Void Times, Hold for Release, and Release Times, paragraph 4–33.

10–43 COMMUNICATIONS FAILURE

Take the following actions, as appropriate, if two-way radio communications is lost with an aircraft:

10–43 Note 1.—When an IFR aircraft experiences two-way radio communications failure, air traffic control is based on anticipated pilot actions. Pilot procedures and recommended practices are set forth in the AIM, Title 14 of the Code of Federal Regulations, and pertinent military regulations.

10–43 Note 2.—Should the pilot of an aircraft equipped with a coded radar beacon transponder experience a loss of two-way radio capability, the pilot can be expected to adjust the transponder to reply on Mode 3/A Code 7600.

a. In the event of lost communications with an aircraft under your control jurisdiction use all appropriate means available to reestablish communications with the aircraft. These may include, but not be limited to, emergency frequencies, navaids that are equipped with voice capability, FSS, Aeronautical Radio Incorporated (ARINC), etc.

10–43a Note 1.— ARINC is a commercial communications corporation which designs, constructs, operates, leases or otherwise engages in radio activities serving the aviation community. ARINC has the capability of relaying information to/from subscribing aircraft throughout the country.

10–43a Note 2.—Aircraft communications addressing and reporting system (ACARS) or selective calling (SELCAL) may be utilized to reestablish radio communications with suitably equipped aircraft. ACARS can be accessed by contacting the San Francisco ARINC communications center, watch supervisor, at 415–312–7930/7931/7932. Provide ARINC the aircraft call sign, approximate location, and contact instructions. In order to utilize the SELCAL system, the SELCAL code for the subject aircraft must be known. If the SELCAL code is not contained in the remarks section of the flight plan, contact the pertinent air carrier dispatch office to determine the code. Then contact the San Francisco ARINC communications center, watch supervisor, at 415–312–7930/7931/7932. Provide ARINC the aircraft call sign, SELCAL code, approximate location, and contact instructions.

b. Broadcast clearances through any available means of communications including the voice feature of NAVAID's.

10–43b Note 1.—Some UHF equipped aircraft have VHF navigation equipment and can receive 121.5 mHz.

10–43b Note 2.—"Any available means" includes the use of FSS and ARINC.

10–43b Reference.—Clearance Prefix, paragraph 4–11.

c. Attempt to re-establish communication by having the aircraft use its transponder or make turns to acknowledge clearances and answer questions. Request any of the following in using the transponder:

1. Request the aircraft to reply Mode 3/A "IDENT."
2. Request the aircraft to reply on Code 7600 or if already on Code 7600, the appropriate stratum code.
3. Request the aircraft to change to "stand-by" for sufficient time for you to be sure that the lack of a target is the result of the requested action.

Phraseology:

REPLY NOT RECEIVED, (appropriate instructions).

(Action) OBSERVED, (additional instructions/information if necessary).

d. Broadcast a clearance for the aircraft to proceed to its filed alternate airport at the MEA if the aircraft operator concurs.

10–43 Reference.—Radio Failure, paragraph 5–28. IFR Military Training Routes, paragraph 9–26.

10–44 thru 10–49 RESERVED

AREA NAVIGATION—A method of navigation that permits aircraft operation on any desired course within the coverage of station-referenced navigation signals or within the limits of a self-contained system capability. Random area navigation routes are direct routes, based on area navigation capability, between waypoints defined in terms of latitude/longitude coordinates, degree/distance fixes, or offsets from published or established routes/airways at a specified distance and direction. The major types of equipment are:

1. VORTAC referenced or Course Line Computer (CLC) systems, which account for the greatest number of RNAV units in use. To function, the CLC must be within the service range of a VORTAC.
2. OMEGA/VLF, although two separate systems, can be considered as one operationally. A long-range navigation system based upon Very Low Frequency radio signals transmitted from a total of 17 stations worldwide.
3. Inertial (INS) systems, which are totally self-contained and require no information from external references. They provide aircraft position and navigation information in response to signals resulting from inertial effects on components within the system.
4. MLS Area Navigation (MLS/RNAV), which provides area navigation with reference to an MLS ground facility.
5. LORAN-C is a long-range radio navigation system that uses ground waves transmitted at low frequency to provide user position information at ranges of up to 600 to 1,200 nautical miles at both en route and approach altitudes. The usable signal coverage areas are determined by the signal-to-noise ratio, the envelope-to-cycle difference, and the geometric relationship between the positions of the user and the transmitting stations.
6. GPS-is a space-base radio positioning, navigation, and time–transfer system. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users. The system is unaffected by weather, and provides a worldwide common grid reference system.

(See ICAO term AREA NAVIGATION).

AREA NAVIGATION [ICAO]—A method of navigation which permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

ARINC—An acronym for Aeronautical Radio, Inc., a corporation largely owned by a group of airlines. ARINC is licensed by the FCC as an aeronautical station and contracted by the FAA to provide communications support for air traffic control and meteorological services in portions of international airspace.

ARMY AVIATION FLIGHT INFORMATION BULLETIN—A bulletin that provides air operation data covering Army, National Guard, and Army Reserve aviation activities.

ARO—(See AIRPORT RESERVATION OFFICE).

ARRESTING SYSTEM—A safety device consisting of two major components, namely, engaging or catching devices and energy absorption devices for the purpose of arresting both tailhook and/or nontailhook-equipped aircraft. It is used to prevent aircraft from overrunning runways when the aircraft cannot be stopped after landing or during aborted takeoff. Arresting systems have various names; e.g., arresting gear, hook device, wire barrier cable.

(See ABORT). (Refer to AIM).

ARRIVAL AIRCRAFT INTERVAL—An internally generated program in hundredths of minutes based upon the AAR. AAI is the desired optimum interval between successive arrival aircraft over the vertex.

ARRIVAL CENTER—The ARTCC having jurisdiction for the impacted airport.

ARRIVAL DELAY—A parameter which specifies a period of time in which no aircraft will be metered for arrival at the specified airport.

ARRIVAL SECTOR—An operational control sector containing one or more meter fixes.

ARRIVAL SECTOR ADVISORY LIST—An ordered list of data on arrivals displayed at the PVD of the sector which controls the meter fix.

ARRIVAL SEQUENCING PROGRAM—The automated program designed to assist in sequencing aircraft destined for the same airport.

ARRIVAL TIME—The time an aircraft touches down on arrival.

ARSR—(See AIR ROUTE SURVEILLANCE RADAR).

ARTCC—(See AIR ROUTE TRAFFIC CONTROL CENTER).

ARTS—(See AUTOMATED RADAR TERMINAL SYSTEMS).

ASD—(See AIRCRAFT SITUATION DISPLAY).

ASDA—(See ACCELERATE–STOP DISTANCE AVAILABLE).

ASDA [ICAO]—(See ICAO Term ACCELERATE–STOP DISTANCE AVAILABLE).

ASDE—(See AIRPORT SURFACE DETECTION EQUIPMENT).

ASLAR—(See AIRCRAFT SURGE LAUNCH AND RECOVERY).

ASP—(See ARRIVAL SEQUENCING PROGRAM).

ASR—(See AIRPORT SURVEILLANCE RADAR).

ASR APPROACH—(See SURVEILLANCE APPROACH).

ATC—(See AIR TRAFFIC CONTROL).

ATCAA—(See ATC ASSIGNED AIRSPACE).

ATC ADVISES—Used to prefix a message of noncontrol information when it is relayed to an aircraft by other than an air traffic controller.
(See ADVISORY).

ATC ASSIGNED AIRSPACE—Airspace of defined vertical/lateral limits, assigned by ATC, for the purpose of providing air traffic segregation between the specified activities being conducted within the assigned airspace and other IFR air traffic.
(See SPECIAL USE AIRSPACE).

ATC CLEARANCE—(See AIR TRAFFIC CLEARANCE).

ATC CLEARS—Used to prefix an ATC clearance when it is relayed to an aircraft by other than an air traffic controller.

ATC INSTRUCTIONS—Directives issued by air traffic control for the purpose of requiring a pilot to take specific actions; e.g., "Turn left heading two five zero," "Go around," "Clear the runway."
(Refer to Part 91).

ATCRBS—(See RADAR).

ATC REQUESTS—Used to prefix an ATC request when it is relayed to an aircraft by other than an air traffic controller.

ATCSCC—(See AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER).

ATCSCC DELAY FACTOR—The amount of delay calculated to be assigned prior to departure.

ATCT—(See TOWER).

ATIS—(See AUTOMATIC TERMINAL INFORMATION SERVICE).

ATIS [ICAO]—(See ICAO Term AUTOMATIC TERMINAL INFORMATION SERVICE).

ATS Route [ICAO]—A specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services.

Note: The term "ATS Route" is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure, etc.

AUTOLAND APPROACH—An autoland approach is a precision instrument approach to touchdown and, in some cases, through the landing rollout. An autoland approach is performed by the aircraft autopilot which is receiving position information and/or steering commands from onboard navigation equipment(See COUPLED APPROACH).

Note: Autoland and coupled approaches are flown in VFR and IFR. It is common for carriers to require their crews to fly coupled approaches and autoland approaches (if certified) when the weather conditions are less than approximately 4,000 RVR.

AUTOMATED INFORMATION TRANSFER—A precoordinated process, specifically defined in facility directives, during which a transfer of altitude control and/or radar identification is accomplished without verbal coordination between controllers using information communicated in a full data block.

AUTOMATED MUTUAL-ASSISTANCE VESSEL RESCUE SYSTEM—A facility which can deliver, in a matter of minutes, a surface picture (SURPIC) of vessels in the area of a potential or actual search and rescue incident, including their predicted positions and their characteristics.
(See Order 7110.65, paragraph 10-73, In-Flight Contingencies).

AUTOMATED RADAR TERMINAL SYSTEMS—The generic term for the ultimate in functional capability afforded by several automation systems. Each differs in functional capabilities and equipment. ARTS plus a suffix roman numeral denotes a specific system. A following letter indicates a major modification to that system. In general, an ARTS displays for the terminal controller aircraft identification, flight plan data, other flight associated information; e.g., altitude, speed, and aircraft position symbols in conjunction with his radar presentation. Normal radar co-exists with the alphanumeric display. In addition to enhancing visualization of the air traffic situation, ARTS facilitate intra/inter-facility transfer and coordination of flight information. These capabilities are enabled by specially designed computers and subsystems tailored to the radar and communications equipments and operational requirements of each automated facility. Modular design permits adoption of improvements in computer software and electronic technologies as they become available while retaining the characteristics unique to each system.

1. ARTS II. A programmable nontracking, computer-aided display subsystem capable of modular expansion. ARTS II systems provide a level of automated air traffic control capability at terminals having low to medium activity. Flight identification and altitude may be associated with the display of secondary radar targets. The system has the capability of communicating with ARTCC's and other ATRS II, IIA, III, and IIIA facilities.
2. ARTS IIA. A programmable radar-tracking computer subsystem capable of modular expansion. The ARTS IIA detects, tracks, and predicts secondary radar targets. The targets are displayed by means of computer-generated symbols, ground speed, and

flight plan data. Although it does not track primary radar targets, they are displayed coincident with the secondary radar as well as the symbols and alphanumerics. The system has the capability of communicating with ARTCC's and other ARTS II, IIA, III, and IIIA facilities.

3. ARTS III. The Beacon Tracking Level of the modular programmable automated radar terminal system in use at medium to high activity terminals. ARTS III detects, tracks, and predicts secondary radar-derived aircraft targets. These are displayed by means of computer-generated symbols and alphanumeric characters depicting flight identification, aircraft altitude, ground speed, and flight plan data. Although it does not track primary targets, they are displayed coincident with the secondary radar as well as the symbols and alphanumerics. The system has the capability of communicating with ARTCC's and other ARTS III facilities.

4. ARTS IIIA. The Radar Tracking and Beacon Tracking Level (RT&BTL) of the modular, programmable automated radar terminal system. ARTS IIIA detects, tracks, and predicts primary as well as secondary radar-derived aircraft targets. This more sophisticated computer-driven system upgrades the existing ARTS III system by providing improved tracking, continuous data recording, and fail-soft capabilities.

AUTOMATIC ALTITUDE REPORT—(See *ALTITUDE READOUT*).

AUTOMATIC ALTITUDE REPORTING—That function of a transponder which responds to Mode C interrogations by transmitting the aircraft's altitude in 100–foot increments.

AUTOMATIC CARRIER LANDING SYSTEM—U.S. Navy final approach equipment consisting of precision tracking radar coupled to a computer data link to provide continuous information to the aircraft, monitoring capability to the pilot, and a backup approach system.

AUTOMATIC DIRECTION FINDER—An aircraft radio navigation system which senses and indicates the direction to a L/MF nondirectional radio beacon (NDB) ground transmitter. Direction is indicated to the pilot as a magnetic bearing or as a relative bearing to the longitudinal axis of the aircraft depending on the type of indicator installed in the aircraft. In certain applications, such as military, ADF operations may be based on airborne and ground transmitters in the VHF/UHF frequency spectrum.

(See BEARING). (See NONDIRECTIONAL BEACON).

AUTOMATIC TERMINAL INFORMATION SERVICE—The continuous broadcast of recorded noncontrol information in selected terminal areas. Its purpose is to improve controller effectiveness and to relieve frequency congestion by automating the repetitive transmission of essential but routine information; e.g., "Los Angeles information Alfa. One three zero zero Coordinated Universal Time. Weather, measured ceiling two thousand overcast, visibility three, haze, smoke, temperature seven one, dew point five seven, wind two five zero at five, altimeter two niner niner six. I-L-S Runway Two Five Left approach in use, Runway Two Five Right closed, advise you have Alfa."

(Refer to AIM). (See ICAO term AUTOMATIC TERMINAL INFORMATION SERVICE).

AUTOMATIC TERMINAL INFORMATION SERVICE [ICAO]—The provision of current, routine information to arriving and departing aircraft by means of continuous and repetitive broadcasts throughout the day or a specified portion of the day.

AUTOROTATION—A rotorcraft flight condition in which the lifting rotor is driven entirely by action of the air when the rotorcraft is in motion.

1. Autorotative Landing/Touchdown Autorotation. Used by a pilot to indicate that he will be landing without applying power to the rotor.
2. Low Level Autorotation. Commences at an altitude well below the traffic pattern, usually below 100 feet AGL and is used primarily for tactical military training.
3. 180 degrees Autorotation. Initiated from a downwind heading and is commenced well inside the normal traffic pattern. "Go around" may not be possible during the latter part of this maneuver.

AVIATION WEATHER SERVICE—A service provided by the National Weather Service (NWS) and FAA which collects and disseminates pertinent weather information for pilots, aircraft operators, and ATC. Available aviation weather reports and forecasts are displayed at each NWS office and FAA FSS.

(See EN ROUTE FLIGHT ADVISORY SERVICE). (See TRANSCRIBED WEATHER BROADCAST). (See WEATHER ADVISORY). (See PILOTS AUTOMATIC TELEPHONE WEATHER ANSWERING SERVICE). (Refer to AIM).

AWW—(See SEVERE WEATHER FORECAST ALERTS).

AZIMUTH (MLS)—A magnetic bearing extending from an MLS navigation facility.

Note: azimuth bearings are described as magnetic and are referred to as "azimuth" in radio telephone communications.

(See OPTION APPROACH). (Refer to AIM).

CLEARED THROUGH—ATC authorization for an aircraft to make intermediate stops at specified airports without refiling a flight plan while en route to the clearance limit.

CLEARED TO LAND—ATC authorization for an aircraft to land. It is predicated on known traffic and known physical airport conditions.

CLEARWAY—An area beyond the takeoff runway under the control of airport authorities within which terrain or fixed obstacles may not extend above specified limits. These areas may be required for certain turbine-powered operations and the size and upward slope of the clearway will differ depending on when the aircraft was certificated.

(Refer to Part 1).

CLIMBOUT—That portion of flight operation between takeoff and the initial cruising altitude.

CLIMB TO VFR—ATC authorization for an aircraft to climb to VFR conditions within Class B, C, D, and E surface areas when the only weather limitation is restricted visibility. The aircraft must remain clear of clouds while climbing to VFR.

(See Special VFR). (Refer to AIM).

CLOSED RUNWAY—A runway that is unusable for aircraft operations. Only the airport management/military operations office can close a runway.

CLOSED TRAFFIC—Successive operations involving takeoffs and landings or low approaches where the aircraft does not exit the traffic pattern.

CLT—(See CALCULATED LANDING TIME).

CLUTTER—In radar operations, clutter refers to the reception and visual display of radar returns caused by precipitation, chaff, terrain, numerous aircraft targets, or other phenomena. Such returns may limit or preclude ATC from providing services based on radar.

(See GROUND CLUTTER). (See CHAFF). (See PRECIPITATION). (See TARGET). (See ICAO term Radar Clutter).

CMNPS—(See CANADIAN MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE).

COASTAL FIX—A navigation aid or intersection where an aircraft transitions between the domestic route structure and the oceanic route structure.

CODES—The number assigned to a particular multiple pulse reply signal transmitted by a transponder.

(See DISCRETE CODE).

COMBINED CENTER-RAPCON—An air traffic facility which combines the functions of an ARTCC and a radar approach control facility.

(See AIR ROUTE TRAFFIC CONTROL CENTER). (See RADAR APPROACH CONTROL FACILITY).

COMMON POINT—A *significant point* over which two or more aircraft will report passing or have reported passing before proceeding on the same or diverging tracks. To establish/maintain longitudinal separation, a controller may determine a common point not originally in the aircraft's flight plan and then clear the aircraft to fly over the point. See significant point.

COMMON PORTION—(See COMMON ROUTE).

COMMON ROUTE—That segment of a North American Route between the inland navigation facility and the coastal fix.

COMMON TRAFFIC ADVISORY FREQUENCY (CTAF)—A frequency designed for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The CTAF may be a UNICOM, Multicom, FSS, or tower frequency and is identified in appropriate aeronautical publications.

(Refer to AC90-42).

COMPASS LOCATOR—A low power, low or medium frequency (L/MF) radio beacon installed at the site of the outer or middle marker of an instrument landing system (ILS). It can be used for navigation at distances of approximately 15 miles or as authorized in the approach procedure.

1. Outer Compass Locator (LOM). A compass locator installed at the site of the outer marker of an instrument landing system.

(See OUTER MARKER).

2. Middle Compass Locator (LMM). A compass locator installed at the site of the middle marker of an instrument landing system.

(See MIDDLE MARKER). (See ICAO term LOCATOR).

COMPASS ROSE—A circle, graduated in degrees, printed on some charts or marked on the ground at an airport. It is used as a reference to either true or magnetic direction.

COMPOSITE FLIGHT PLAN—A flight plan which specifies VFR operation for one portion of flight and IFR for another portion. It is used primarily in military operations.

(Refer to AIM).

COMPOSITE ROUTE SYSTEM—An organized oceanic route structure, incorporating reduced lateral spacing between routes, in which composite separation is authorized.

COMPOSITE SEPARATION—A method of separating aircraft in a composite route system where, by management of route and altitude assignments, a combination of half the lateral minimum specified for the area concerned and half the vertical minimum is applied.

COMPULSORY REPORTING POINTS—Reporting points which must be reported to ATC. They are designated on aeronautical charts by solid triangles or filed in a flight plan as fixes selected to define direct routes. These points are geographical locations which are defined by navigation aids/fixes. Pilots should discontinue position reporting over compulsory reporting points when informed by ATC that their aircraft is in "radar contact."

CONFLICT ALERT—A function of certain air traffic control automated systems designed to alert radar controllers to existing or pending situations between tracked targets (known IFR or VFR aircraft) that require his immediate attention/action.

(See MODE C INTRUDER ALERT).

CONFLICT RESOLUTION—The resolution of potential conflictions between aircraft that are radar identified and in communication with ATC by ensuring that radar targets do not touch. Pertinent traffic advisories shall be issued when this procedure is applied.

Note: This procedure shall not be provided utilizing mosaic radar systems.

CONSOLAN—A low frequency, long-distance NAVAID used principally for transoceanic navigations.

CONTACT

1. Establish communication with (followed by the name of the facility and, if appropriate, the frequency to be used).
2. A flight condition wherein the pilot ascertains the attitude of his aircraft and navigates by visual reference to the surface.

(See CONTACT APPROACH). (See RADAR CONTACT).

CONTACT APPROACH—An approach wherein an aircraft on an IFR flight plan, having an air traffic control authorization, operating clear of clouds with at least 1 mile flight visibility and a reasonable expectation of continuing to the destination airport in those conditions, may deviate from the instrument approach procedure and proceed to the destination airport by visual reference to the surface. This approach will only be authorized when requested by the pilot and the reported ground visibility at the destination airport is at least 1 statute mile.

(Refer to AIM).

CONTERMINOUS U.S.—The 48 adjoining States and the District of Columbia.

CONTINENTAL UNITED STATES—The 49 States located on the continent of North America and the District of Columbia.

CONTROL AREA [ICAO]—A controlled airspace extending upwards from a specified limit above the earth.

CONTROLLED AIRSPACE—An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.

Note 1 – Controlled airspace is a generic term that covers Class A, Class B, Class C, Class D, and Class E airspace.

Note 2 – Controlled airspace is also that airspace within which all aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements in Part 91 (for specific operating requirements, please refer to Part 91). For IFR operations in any class of controlled airspace, a pilot must file an IFR flight plan and receive an appropriate ATC clearance. Each Class B, Class C, and Class D airspace area designated for an airport contains at least one primary airport around which the airspace is designated (for specific designations and descriptions of the airspace classes, please refer to Part 71).

Controlled airspace in the United States is designated as follows:

1. CLASS A: Generally, that airspace from 18,000 feet MSL up to and including FL600, including the airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska. Unless otherwise authorized, all persons must operate their aircraft under IFR.
2. CLASS B: Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspaces areas resemble upside–down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace. An ATC clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace. The cloud clearance requirement for VFR operations is "clear of clouds."
3. CLASS C: Generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Although the configuration of each Class C area is individually tailored, the airspace usually consists of a surface area(s) with a 5 nautical miles radius and an outer area. Each person must establish two–way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace. VFR aircraft are only separated from IFR aircraft within the airspace.
4. CLASS D: Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted

G

GADO—(See GENERAL AVIATION DISTRICT OFFICE).

GATE HOLD PROCEDURES—Procedures at selected airports to hold aircraft at the gate or other ground location whenever departure delays exceed or are anticipated to exceed 15 minutes. The sequence for departure will be maintained in accordance with initial call-up unless modified by flow control restrictions. Pilots should monitor the ground control/clearance delivery frequency for engine start/taxi advisories or new proposed start/taxi time if the delay changes.

(See FLOW CONTROL).

GCA—(See GROUND CONTROLLED APPROACH).

GENERAL AVIATION—That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of public convenience and necessity from the Civil Aeronautics Board and large aircraft commercial operators.

(See ICAO term GENERAL AVIATION).

GENERAL AVIATION [ICAO]—All civil aviation operations other than scheduled air services and nonscheduled air transport operations for remuneration or hire.

GENERAL AVIATION DISTRICT OFFICE—An FAA field office serving a designated geographical area and staffed with Flight Standards personnel who have the responsibility for serving the aviation industry and the general public on all matters relating to the certification and operation of general aviation aircraft.

GEO MAP—The digitized map markings associated with the ASR–9 Radar System.

GLIDEPATH—(See GLIDESLOPE).

GLIDEPATH INTERCEPT ALTITUDE—(See GLIDESLOPE INTERCEPT ALTITUDE).

GLIDESLOPE—Provides vertical guidance for aircraft during approach and landing. The glideslope/glidepath is based on the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS/MLS, or
2. Visual ground aids, such as VASI, which provide vertical guidance for a VFR approach or for the visual portion of an instrument approach and landing.
3. PAR. Used by ATC to inform an aircraft making a PAR approach of its vertical position (elevation) relative to the descent profile.

(See ICAO term GLIDEPATH).

GLIDEPATH [ICAO]—A descent profile determined for vertical guidance during a final approach.

GLIDESLOPE INTERCEPT ALTITUDE—The minimum altitude to intercept the glideslope/path on a precision approach. The intersection of the published intercept altitude with the glideslope/path, designated on Government charts by the lightning bolt symbol, is the precision FAF; however, when ATC directs a lower altitude, the resultant lower intercept position is then the FAF.

(See FINAL APPROACH FIX). (See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE).

GLOBAL POSITIONING SYSTEM—1A space-base radio positioning, navigation, and time-transfer system. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users. The system is unaffected by weather, and provides a worldwide common grid reference system. The GPS concept is predicated upon accurate and continuous knowledge of the spatial position of each satellite in the system with respect to time and distance from a transmitting satellite to the user. The GPS receiver automatically selects appropriate signals from the satellites in view and translates these into three-dimensional position, velocity, and time. System accuracy for civil users is normally 100 meters horizontally.

GO AHEAD—Proceed with your message. Not to be used for any other purpose.

GO AROUND—Instructions for a pilot to abandon his approach to landing. Additional instructions may follow. Unless otherwise advised by ATC, a VFR aircraft or an aircraft conducting visual approach should overfly the runway while climbing to traffic pattern altitude and enter the traffic pattern via the crosswind leg. A pilot on an IFR flight plan making an instrument approach should execute the published missed approach procedure or proceed as instructed by ATC; e.g., "Go around" (additional instructions if required).

(See LOW APPROACH). (See MISSED APPROACH).

GPS—(See Global Positioning System)

GROUND CLUTTER—A pattern produced on the radar scope by ground returns which may degrade other radar returns in the affected area. The effect of ground clutter is minimized by the use of moving target indicator (MTI) circuits in the radar equipment resulting in a radar presentation which displays only targets which are in motion.

(See CLUTTER).

GROUND CONTROLLED APPROACH—A radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio. The approach may be conducted with surveillance radar (ASR) only or with both surveillance and precision approach radar (PAR). Usage of the term "GCA" by pilots is discouraged except when referring to a GCA facility. Pilots should specifically request a "PAR" approach when a precision radar approach is desired or request an "ASR" or "surveillance" approach when a nonprecision radar approach is desired.

(See RADAR APPROACH).

GROUND DELAY—The amount of delay attributed to ATC, encountered prior to departure, usually associated with a CDT program.

GROUND SPEED—The speed of an aircraft relative to the surface of the earth.

GROUND STOP—Normally, the last initiative to be utilized; this method mandates that the terminal facility will not allow any departures to enter the ARTCC airspace until further notified.

GROUND VISIBILITY—(See VISIBILITY).

S

SAFETY ALERT—A safety alert issued by ATC to aircraft under their control if ATC is aware the aircraft is at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain, obstructions, or other aircraft. The controller may discontinue the issuance of further alerts if the pilot advises he is taking action to correct the situation or has the other aircraft in sight.

1. Terrain/Obstruction Alert. A safety alert issued by ATC to aircraft under their control if ATC is aware the aircraft is at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain/obstructions; e.g., "Low Altitude Alert, check your altitude immediately."
2. Aircraft Conflict Alert. A safety alert issued by ATC to aircraft under their control if ATC is aware of an aircraft that is not under their control at an altitude which, in the controller's judgment, places both aircraft in unsafe proximity to each other. With the alert, ATC will offer the pilot an alternate course of action when feasible; e.g., "Traffic Alert, advise you turn right heading zero niner zero or climb to eight thousand immediately."

The issuance of a safety alert is contingent upon the capability of the controller to have an awareness of an unsafe condition. The course of action provided will be predicated on other traffic under ATC control. Once the alert is issued, it is solely the pilot's prerogative to determine what course of action, if any, he will take.

SAIL BACK—A maneuver during high wind conditions (usually with power off) where float plane movement is controlled by water rudders/opening and closing cabin doors.

SAME DIRECTION AIRCRAFT—Aircraft are operating in the same direction when:

1. They are following the same track in the same direction; or
2. Their tracks are parallel and the aircraft are flying in the same direction; or
3. Their tracks intersect at an angle of less than 45 degrees.

SAR—(See SEARCH AND RESCUE).

SAY AGAIN—Used to request a repeat of the last transmission. Usually specifies transmission or portion thereof not understood or received; e.g., "Say again all after ABRAM VOR."

SAY ALTITUDE—Used by ATC to ascertain an aircraft's specific altitude/flight level. When the aircraft is climbing or descending, the pilot should state the indicated altitude rounded to the nearest 100 feet.

SAY HEADING—Used by ATC to request an aircraft heading. The pilot should state the actual heading of the aircraft.

SDF—(See SIMPLIFIED DIRECTIONAL FACILITY).

SEA LANE—A designated portion of water outlined by visual surface markers for and intended to be used by aircraft designed to operate on water.

SEARCH AND RESCUE—A service which seeks missing aircraft and assists those found to be in need of assistance. It is a cooperative effort using the facilities and services of available Federal, state and local agencies. The U.S. Coast Guard is responsible for coordination of search and rescue for the Maritime Region, and the U.S. Air Force is responsible for search and rescue for the Inland Region. Information pertinent to search and rescue should be passed through any air traffic facility or be transmitted directly to the Rescue Coordination Center by telephone.

(See FLIGHT SERVICE STATION). (See RESCUE COORDINATION CENTER). (Refer to AIM).

SEARCH AND RESCUE FACILITY—A facility responsible for maintaining and operating a search and rescue (SAR) service to render aid to persons and property in distress. It is any SAR unit, station, NET, or other operational activity which can be usefully employed during an SAR Mission; e.g., a Civil Air Patrol Wing, or a Coast Guard Station.

(See SEARCH AND RESCUE).

SECTIONAL AERONAUTICAL CHARTS—(See AERONAUTICAL CHART).

SECTOR LIST DROP INTERVAL—A parameter number of minutes after the meter fix time when arrival aircraft will be deleted from the arrival sector list.

SEE AND AVOID—When weather conditions permit, pilots operating IFR or VFR are required to observe and maneuver to avoid other aircraft. Right-of-way rules are contained in Part 91.

SEGMENTED CIRCLE—A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

(Refer to AIM).

SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE—An instrument approach procedure may have as many as four separate segments depending on how the approach procedure is structured.

1. Initial Approach. The segment between the initial approach fix and the intermediate fix or the point where the aircraft is established on the intermediate course or final approach course.

(See ICAO term INITIAL APPROACH SEGMENT).

2. Intermediate Approach. The segment between the intermediate fix or point and the final approach fix.

(See ICAO term INTERMEDIATE APPROACH SEGMENT).

3. Final Approach. The segment between the final approach fix or point and the runway, airport, or missed approach point.

(See ICAO term FINAL APPROACH SEGMENT).

4. Missed Approach. The segment between the missed approach point or the point of arrival at decision height and the missed approach fix at the prescribed altitude.

(Refer to Part 97). (See ICAO term MISSED APPROACH PROCEDURE).

SELECTED GROUND DELAYS—A traffic management procedure whereby selected flights are issued ground delays to better regulate traffic flows over a particular fix or area.

SEPARATION—In air traffic control, the spacing of aircraft to achieve their safe and orderly movement in flight and while landing and taking off.

(See SEPARATION MINIMA). (See ICAO term SEPARATION).

SEPARATION [ICAO]—Spacing between aircraft, levels or tracks.

SEPARATION MINIMA—The minimum longitudinal, lateral, or vertical distances by which aircraft are spaced through the application of air traffic control procedures.

(See SEPARATION).

SERVICE—A generic term that designates functions or assistance available from or rendered by air traffic control. For example, Class C service would denote the ATC services provided within a Class C airspace area.

SEVERE WEATHER AVOIDANCE PLAN—An approved plan to minimize the affect of severe weather on traffic flows in impacted terminal and/or ARTCC areas. SWAP is normally implemented to provide the least disruption to the ATC system when flight through portions of airspace is difficult or impossible due to severe weather.

SEVERE WEATHER FORECAST ALERTS—Preliminary messages issued in order to alert users that a Severe Weather Watch Bulletin (WW) is being issued. These messages define areas of possible severe thunderstorms or tornado activity. The messages are unscheduled and issued as required by the National Severe Storm Forecast Center at Kansas City, Missouri.

(See SIGMET). (See CONVECTIVE SIGMET). (See CWA). (See AIRMET).

SFA—(See SINGLE FREQUENCY APPROACH).

SFO—(See SIMULATED FLAMEOUT).

SHF—(See SUPER HIGH FREQUENCY).

SHORT RANGE CLEARANCE—A clearance issued to a departing IFR flight which authorizes IFR flight to a specific fix short of the destination while air traffic control facilities are coordinating and obtaining the complete clearance.

SHORT TAKEOFF AND LANDING AIRCRAFT
AIRCRAFT—An aircraft which, at some weight within its approved operating weight, is capable of operating from a STOL runway in compliance with the applicable STOL characteristics, airworthiness, operations, noise, and pollution standards.

(See VERTICAL TAKEOFF AND LANDING AIRCRAFT).

SIAP—(See STANDARD INSTRUMENT APPROACH PROCEDURE).

SIDESTEP MANEUVER—A visual maneuver accomplished by a pilot at the completion of an instrument approach to permit a straight-in landing on a parallel runway not more than 1,200 feet to either side of the runway to which the instrument approach was conducted.

(Refer to AIM).

SIGMET—A weather advisory issued concerning weather significant to the safety of all aircraft. SIGMET advisories cover severe and extreme turbulence, severe icing, and widespread dust or sandstorms that reduce visibility to less than 3 miles.

(See AWW). (See CONVECTIVE SIGMET). (See CWA). (See AIRMET). (Refer to AIM). (See ICAO term SIGMET INFORMATION).

SIGMET INFORMATION [ICAO]—Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations.

SIGNIFICANT METEOROLOGICAL INFORMATION—(See SIGMET).

SIGNIFICANT POINT—A point, whether a named intersection, a NAVAID, a fix derived from a NAVAID(s), or geographical coordinate expressed in degrees of latitude and longitude, which is established for the purpose of providing separation, as a reporting point, or to delineate a route of flight.

SIMPLIFIED DIRECTIONAL FACILITY—A NAVAID used for nonprecision instrument approaches. The final approach course is similar to that of an ILS localizer except that the SDF course may be offset from the runway, generally not more than 3 degrees, and the course may be wider than the localizer, resulting in a lower degree of accuracy.

(Refer to AIM).

V

VASI—(See VISUAL APPROACH SLOPE INDICATOR).

VDF—(See DIRECTION FINDER).

VDP—(See VISUAL DESCENT POINT).

VECTOR—A heading issued to an aircraft to provide navigational guidance by radar.
(See ICAO term RADAR VECTORING).

VERIFY—Request confirmation of information; e.g., "verify assigned altitude."

VERIFY SPECIFIC DIRECTION OF TAKEOFF (OR TURNS AFTER TAKEOFF)—Used by ATC to ascertain an aircraft's direction of takeoff and/or direction of turn after takeoff. It is normally used for IFR departures from an airport not having a control tower. When direct communication with the pilot is not possible, the request and information may be relayed through an FSS, dispatcher, or by other means.
(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES).

VERTEX—The last fix adapted on the arrival speed segments. Normally, it will be the outer marker of the runway in use. However, it may be the actual threshold or other suitable common point on the approach path for the particular runway configuration.

VERTEX TIME OF ARRIVAL—A calculated time of aircraft arrival over the adapted vertex for the runway configuration in use. The time is calculated via the optimum flight path using adapted speed segments.

VERTICAL SEPARATION—Separation established by assignment of different altitudes or flight levels.
(See SEPARATION). (See ICAO term VERTICAL SEPARATION).

VERTICAL SEPARATION [ICAO]—Separation between aircraft expressed in units of vertical distance.

VERTICAL TAKEOFF AND LANDING AIRCRAFT—Aircraft capable of vertical climbs and/or descents and of using very short runways or small areas for takeoff and landings. These aircraft include, but are not limited to, helicopters.
(See SHORT TAKEOFF AND LANDING AIRCRAFT).

VERY HIGH FREQUENCY—The frequency band between 30 and 300 mHz. Portions of this band, 108 to 118 mHz, are used for certain NAVAIDS; 118 to 136 mHz are used for civil air/ground voice communications. Other frequencies in this band are used for purposes not related to air traffic control.

VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION—(See VOR).

VERY LOW FREQUENCY—The frequency band between 3 and 30 kHz.

VFR—(See VISUAL FLIGHT RULES).

VFR AIRCRAFT—An aircraft conducting flight in accordance with visual flight rules.
(See VISUAL FLIGHT RULES).

VFR CONDITIONS—Weather conditions equal to or better than the minimum for flight under visual flight rules. The term may be used as an ATC clearance/instruction only when:

1. An IFR aircraft requests a climb/descent in VFR conditions.
2. The clearance will result in noise abatement benefits where part of the IFR departure route does not conform to an FAA approved noise abatement route or altitude.
3. A pilot has requested a practice instrument approach and is not on an IFR flight plan.—All pilots receiving this authorization must comply with the VFR visibility and distance from cloud criteria in Part 91. Use of the term does not relieve controllers of their responsibility to separate aircraft in Class B and Class C airspace or TRSA's as required by FAA Order 7110.65. When used as an ATC clearance/instruction, the term may be abbreviated "VFR," e.g., "MAINTAIN VFR," "CLIMB/DESCEND VFR," etc.

VFR FLIGHT—(See VFR AIRCRAFT).

VFR MILITARY TRAINING ROUTES—Routes used by the Department of Defense and associated Reserve and Air Guard units for the purpose of conducting low-altitude navigation and tactical training under VFR below 10,000 feet MSL at airspeeds in excess of 250 knots IAS.

VFR NOT RECOMMENDED—An advisory provided by a flight service station to a pilot during a preflight or inflight weather briefing that flight under visual flight rules is not recommended. To be given when the current and/or forecast weather conditions are at or below VFR minimums. It does not abrogate the pilot's authority to make his own decision.

VFR-ON-TOP—ATC authorization for an IFR aircraft to operate in VFR conditions at any appropriate VFR altitude (as specified in FAR and as restricted by ATC). A pilot receiving this authorization must comply with the VFR visibility, distance from cloud criteria and the minimum IFR altitudes specified in Part 91. The use of this term does not relieve controllers of their responsibility to separate aircraft in Class B and Class C airspace or TRSA's as required by FAA Order 7110.65.

VFR TERMINAL AREA CHARTS—(See AERONAUTICAL CHART).

VHF—(See VERY HIGH FREQUENCY).

VHF OMNIDIRECTIONAL RANGE/TACTICAL AIR NAVIGATION—(See VORTAC).

VIDEO MAP—An electronically displayed map on the radar display that may depict data such as airports, heliports, runway centerline extensions, hospital emergency landing areas, NAVAID's and fixes, reporting points, airway/route centerlines, boundaries, [illegible] points, special use tracks, obstructions, prominent geographic features, map alignment indicators, range accuracy marks, minimum vectoring altitudes.

VISIBILITY—The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night. Visibility is reported as statute miles, hundreds of feet or meters.

(Refer to Part 91). (See AIM).

1. Flight Visibility. The average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.
2. Ground Visibility. Prevailing horizontal visibility near the earth's surface as reported by the United States National Weather Service or an accredited observer.
3. Prevailing Visibility. The greatest horizontal visibility equaled or exceeded throughout at least half the horizon circle which need not necessarily be continuous.
4. Runway Visibility Value (RVV). The visibility determined for a particular runway by a transmissometer. A meter provides a continuous indication of the visibility (reported in miles or fractions of miles) for the runway. RVV is used in lieu of prevailing visibility in determining minimums for a particular runway.
5. Runway Visual Range (RVR). An instrumentally derived value, based on standard calibrations, that represents the horizontal distance a pilot will see down the runway from the approach end. It is based on the sighting of either high intensity runway lights or on the visual contrast of other targets whichever yields the greater visual range. RVR, in contrast to prevailing or runway visibility, is based on what a pilot in a moving aircraft should see looking down the runway. RVR is horizontal visual range, not slant visual range. It is based on the measurement of a transmissometer made near the touchdown point of the instrument runway and is reported in hundreds of feet. RVR is used in lieu of RVV and/or prevailing visibility in determining minimums for a particular runway.
   a. Touchdown RVR. The RVR visibility readout values obtained from RVR equipment serving the runway touchdown zone.
   b. Mid-RVR. The RVR readout values obtained from RVR equipment located midfield of the runway.
   c. Rollout RVR. The RVR readout values obtained from RVR equipment located nearest the rollout end of the runway.

(See ICAO term VISIBILITY). (See ICAO term FLIGHT VISIBILITY). (See ICAO term GROUND VISIBILITY). (See ICAO term RUNWAY VISUAL RANGE).

VISIBILITY [ICAO]—The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night.

Flight Visibility.—The visibility forward from the cockpit of an aircraft in flight.

Ground Visibility.—The visibility at an aerodrome as reported by an accredited observer.

Runway Visual Range [RVR].—The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

VISUAL APPROACH—1An approach conducted on an instrument flight rules (IFR) flight plan which authorizes the pilot to proceed visually and clear of clouds to the airport. The pilot must, at all times, have either the airport or the preceding aircraft in sight. This approach must be authorized and under the control of the appropriate air traffic control facility. Reported weather at the airport must be ceiling at or above 1,000 feet and visibility of 3 miles or greater.

(See ICAO term VISUAL APPROACH).

VISUAL APPROACH [ICAO]—An approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain.

VISUAL APPROACH SLOPE INDICATOR—(See AIRPORT LIGHTING).

VISUAL DESCENT POINT—A defined point on the final approach course of a nonprecision straight-in approach procedure from which normal descent from the MDA to the runway touchdown point may be commenced, provided the approach threshold of that runway, or approach lights, or other markings identifiable with the approach end of that runway are clearly visible to the pilot.

VISUAL FLIGHT RULES—Rules that govern the procedures for conducting flight under visual conditions. The term "VFR" is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

(See INSTRUMENT FLIGHT RULES). (See INSTRUMENT METEOROLOGICAL CONDITIONS). (See VISUAL METEOROLOGICAL CONDITIONS). (Refer to Part 91). (Refer to AIM).

VISUAL HOLDING—The holding of aircraft at selected, prominent geographical fixes which can be easily recognized from the air.

(See HOLDING FIX).

VISUAL METEOROLOGICAL CONDITIONS—Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.

(See INSTRUMENT FLIGHT RULES). (See INSTRUMENT METEOROLOGICAL CONDITIONS). (See VISUAL FLIGHT RULES).

VISUAL SEPARATION—A means employed by ATC to separate aircraft in terminal areas. There are two ways to effect this separation:

1. The tower controller sees the aircraft involved and issues instructions, as necessary, to ensure that the aircraft avoid each other.
2. A pilot sees the other aircraft involved and upon instructions from the controller provides his own separation by maneuvering his aircraft as necessary to avoid it. This may involve following another aircraft or keeping it in sight until it is no longer a factor.

(See and Avoid). (Refer to Part 91).

VLF—(See VERY LOW FREQUENCY).

VMC—(See VISUAL METEOROLOGICAL CONDITIONS).

VOICE SWITCHING AND CONTROL SYSTEM—The VSCS is a computer controlled switching system that provides air traffic controllers with all voice circuits (air to ground and ground to ground) necessary for air traffic control.

(See VOICE SWITCHING AND CONTROL SYSTEM). (Refer to AIM).

VOR—A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the National Airspace System. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature. Voice features may be used by ATC or FSS for transmitting instructions/information to pilots.

(See NAVIGATIONAL AID). (Refer to AIM).

VORTAC—A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site.

(See DISTANCE MEASURING EQUIPMENT). (See NAVIGATIONAL AID). (See TACAN). (See VOR). (Refer to AIM).

VORTICES—Circular patterns of air created by the movement of an airfoil through the air when generating lift. As an airfoil moves through the atmosphere in sustained flight, an area of area of low pressure is created above it. The air flowing from the high pressure area to the low pressure area around and about the tips of the airfoil tends to roll up into two rapidly rotating vortices, cylindrical in shape. These vortices are the most predominant parts of aircraft wake turbulence and their rotational force is dependent upon the wing loading, gross weight, and speed of the generating aircraft. The vortices from medium to heavy aircraft can be of extremely high velocity and hazardous to smaller aircraft.

(See AIRCRAFT CLASSES). (See WAKE TURBULENCE). (Refer to AIM).

VOR TEST SIGNAL—(See VOT).

VOT—A ground facility which emits a test signal to check VOR receiver accuracy. Some VOT's are available to the user while airborne, and others are limited to ground use only.

(Refer to Part 91). (See AIM). (See AIRPORT/FACILITY DIRECTORY).

VR—(See VFR MILITARY TRAINING ROUTES).

VSCS—(See VOICE SWITCHING AND CONTROL SYSTEM).

VTA—(See VERTEX TIME OF ARRIVAL).

VTOL AIRCRAFT—(See VERTICAL TAKEOFF AND LANDING AIRCRAFT).

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