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Crew Coordination Exportable Evaluation Package for Army Aviation

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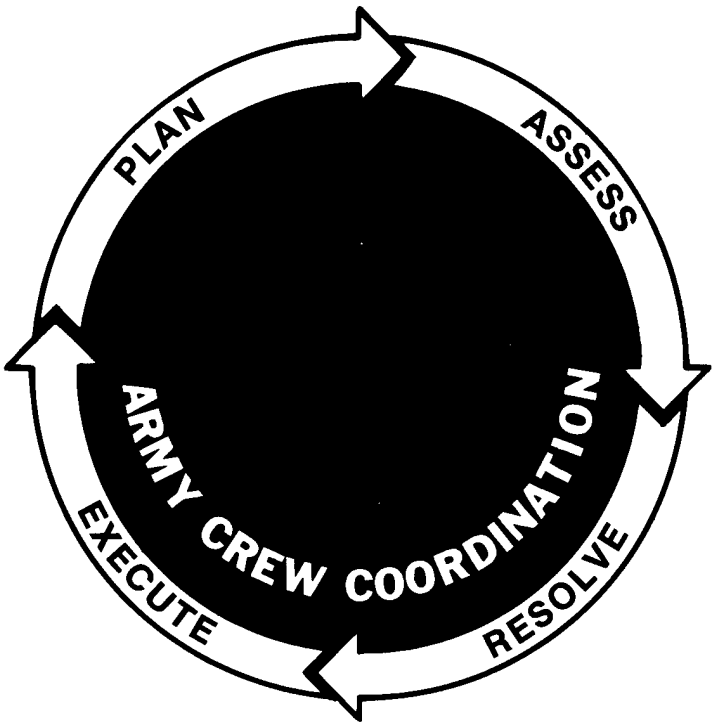

CREW COORDINATION EXPORTABLE EVALUATION PACKAGE FOR ARMY AVIATION

October 1992

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Aviation R&D Activity

DRC® DYNAMICS RESEARCH CORPORATION

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Contents

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Introduction

U.S. Army aviation operations present a demanding flight environment. Army aviators are required to fly in unforgiving tactical and environmental circumstances, in which acceptable courses of action to meet contingencies and unforeseen events often need to be determined within seconds. The ability of an aircrew to interact quickly and effectively under these conditions is essential to both safety and mission success.

The U.S. Army Aviation Center (USAAVNC) has developed and approved a new training and evaluation program for Army crew coordination. The Army's Crew Coordination Training Program introduces and emphasizes the principles of aircrew coordination and crew performance, as opposed to the traditional emphasis on individual aviator performance, to meet the demanding requirements of Army aviation. Research and testing to validate the exportable training and evaluation package confirmed that we are certain about what to teach and how to evaluate crew coordination for Army aviation. This program will change our way of doing business and greatly enhance our warfighting effectiveness.

..... Purpose .....

This exportable package distributes evaluation methods and materials approved by the USAAVNC for units to evaluate crew coordination refresher and continuation training. Developed and tested in conjunction with the Crew Coordination Exportable Training Course, these methods and materials provide the detail needed to implement the evaluation guidance published in the Aircrew Training Manuals (ATM). The package also includes suggestions on applying crew coordination evaluation results to unit operations.

..... Background .....

Over the last several years, the Army Research Institute Aviation Research and Development Activity (ARIARDA) has engaged in experimental research and the development of a new training and evaluation program for Army crew coordination. The research helped determine specific relationships between crew coordination behaviors and safe and effective mission performance. Research findings identified several areas in which aircrew training and evaluation needed to be directly addressed:

- Team relationships and crew climate
- Mission planning and rehearsal

- Management of crew workload in the cockpit
- Cockpit communication procedures
- Cross-monitoring of crewmembers

In 1991, the USAAVNC established a special crew coordination Working Group to incorporate crew coordination considerations into the Army aviation program. The Aircrew Training Program Commander's Guide to Individual and Crew Training, Training Circular 1-210, describes the crew coordination training and evaluation philosophy.

> "Planning, preflight, and in-flight tasks involve the cooperative effort of all crewmembers. The prescribed tasks, conditions, standards, and descriptions explain each crewmember's responsibility for the successful completion of maneuvers. Each crewmember must understand the actions and directives of the other crewmembers. This enhances crew coordination and unit interoperability and helps to prevent accidents caused by crew error.
>
> Aircrew training manuals published after this manual will incorporate the concept of crew coordination and training as a crew rather than training exclusively as an individual."

ATMs that incorporate crew coordination guidance are being introduced Army-wide for implementation. To support the concepts contained in these training manuals, the USAAVNC and ARI developed a field exportable training and evaluation package for crew coordination. A key component of the Army's Crew Coordination Program is an objective method for assessing crew-level performance.

2

Evaluation Method

This section describes the method and how evaluators are trained in its use for evaluating crew coordination performance.

..... Description .....

This method for evaluating crew coordination is consistent with evaluation guidelines in the Army's ATMs. The materials in this evaluation package provide precisely defined measures and grading scales for the crew coordination skills in the ATM standards.

The crew coordination evaluation method complements the sequence of activities for crewmember and crew flight evaluations described in Chapter 8 of the ATMs.

1. Phase 1 - Introduction. In this phase, the evaluator confirms the purpose of the evaluation (for example, to certify the crew's completion of refresher training, or to demonstrate proficiency in crew tasks) and discusses the criteria to be used (for example, ATM task standards, and Crew Coordination Basic Qualities).

2. Phase 2 - Oral Examination. Crews must have a working knowledge and understanding of the crew coordination subject area. The evaluator selects items from the list of crew coordination sample questions and/or locally constructed questions.

3. Phase 3 - Flight Evaluation. This phase consists of a mission briefing and premission planning and rehearsal, mission execution in a flight simulator or aircraft, and a crew-level after-action review. Evaluators use scenario materials to brief the mission and to provide the information necessary for flight planning. While video recording the crew's premission planning and rehearsal, evaluators observe and rate performance of Crew Coordination Basic Qualities. During mission execution, evaluators coordinate scenario events and use evaluation materials (for example, rating guidance, and scenario-specific evaluator worksheets) to observe and rate the crew's performance of Crew Coordination Basic Qualities.

4. Phase 4 - Debriefing. During this phase, the evaluator video records the crew-level after-action review. The evaluator observes and rates the crew before posting ratings and grades to the grade slip. Evaluators then use their worksheets and play back selected portions of the videotapes during the crew debriefing.

..... Training .....

Instructor pilots (IPs) and unit trainers (UTs) are instructed in crew coordination principles, Basic Qualities, and the evaluation method. IPs are then designated as qualified crew coordination evaluators for a unit. UTs may teach academics and administer training flights during crew coordination initial and refresher training. IPs conduct evaluations to certify training course completion and continuation training proficiency.

The evaluation method is an integral part of the crew coordination training course and constitutes major sections of the training course's Trainer Guide and Instructor Guide materials. Specific sections of the training course provide detailed instructions and practical experience on the use of the evaluation method:

1. Evaluation Procedures and Scenario Development. Procedures for assessing crew coordination performance and guidelines for developing scenarios.

2. Aircrew Coordination Training Grade Slips. Describes the grade slips and the expanded grading system for evaluating aircrew coordination training.

3. Aircrew Coordination Evaluation Workshop Exercises. Provides evaluators with classroom exercises to recognize and evaluate crew coordination performance.

4. Aircrew Coordination Evaluation Process. Provides a summary of evaluation actions to include video recording options.

5. Scenario Guidance. Provides specific guidance and examples to develop crew coordination evaluation scenarios for visual flight simulators or situational training exercises conducted in aircraft.

6. Scenario Familiarization and Evaluation. Familiarizes evaluators with a complete simulator scenario and provides experience evaluating crews in the simulator or aircraft.

3

Instructions for Use

This section provides users with general instructions on how to apply the methods and materials in this package. Specific instructions are included in the discussion of each crew coordination evaluation item in this package.

It is extremely important to recognize that the methods and materials in this package are to be used to evaluate crew coordination continuation training in units. Some of the contents of this package closely resemble the materials used to evaluate crews in the course of instruction for initial crew coordination training. The materials in the training course are to be used only when conducting the initial crew coordination training course or when administering refresher training to crewmembers who demonstrate a lack of proficiency in crew coordination skills. The methods and materials in this package are derived from those in the exportable training course and are designed to evaluate crew coordination continuation training and to implement the guidance in the ATMs.

IPs certified as having completed the Army Crew Coordination Instructor Course will conduct crew coordination evaluations. UTs who are certified as having completed the Army Crew Coordination Instructor Course may conduct evaluations only if no certified IPs are in the unit.

Discussions and instructions detailing the items in this package that refer to the crew coordination training course are intended to remind users of their previous instruction. References to the course of instruction or extracts from course evaluation materials are included to make comparisons and promote understanding. Both generic and specific examples are included in the evaluation materials presented. Generic examples (grade slip, evaluator worksheet, etc.) will require modification to unit, aircraft, missions, and crew tasks. Specific materials (guidance on video recording, scenario development, and ratings, etc.) can be applied or reproduced without modification.

The following general instructions apply to the evaluation techniques and tools indicated below:

1. **Grade Slips.** Supplement the Battle-Rostered Crew Evaluation/Training Grade Slip (DA 7121-R) with the Aircrew Coordination Evaluation (ACE) Checklist to record Crew Coordination Basic Quality ratings.

2. **Evaluator Worksheet.** Develop scenario-specific worksheets to sequence crew tasks and record notes for grade slip preparation.

3. **Mission Performance Measures.** Select appropriate measures that relate crew coordination evaluation results to unit operations (e.g., rounds or missiles on target; difference between planned and actual time of arrival).

If differences exist between the evaluation guidance in TC 1-210 and/or the ATMs and this evaluation package, TC 1-210 and the ATMs take precedence.

4

Video Recording Guidance

The evaluation method incorporates video and/or audio recording and playback of crewmember interactions. Video and/or audio playback and review of aircrew actions has proven to be a powerful training and evaluation technique for crew coordination, making it possible to record the aircrew during all phases of a mission (that is, premission planning and rehearsal, mission execution in the simulator or aircraft, and crew-level after-action review).

The types of audio-visual equipment available to aircrew coordination continuation training evaluators will determine the extent to which this evaluation opportunity is realized. The equipment listed in Table 4-1 is representative of what is needed to fully support aircrew coordination continuation training conducted by units in the field. Although all of this equipment may not be available at installation audio-visual support centers, the use of less than optimal equipment configurations will be worth the effort.

Table 4-1. Audio Visual Support

Audio-Visual Equipment, (Quantity), & Approximate cost	Premission Planning	Mission Execution	After-action Review
Video camera w/tripod (1) $900	X		X
Compact video camera (1-3) $1,800 each		X[1]	
Video recorder player (1) $400	X[2]	X[2]	X[2]
Monitor (1) $200	X[2]	X[2]	X[2]
Audio recorder (1) $100	X[3]	X[3]	X[3]

Notes:

1 Cockpit location may create air worthiness considerations. Requires a multiplexer (screen splitter) to monitor multiple cameras simultaneously.

2 Required to "live action" record and monitor aircrews and playback for evaluation effect and debriefing.

3 Alternative to video camera, VCR, and monitor.

The scenario periods in the simulator or STXs in the aircraft should be recorded on video and/or audio tape so that 1) the evaluator and aircrew can review them during the evaluator's debriefing and 2) the evaluator can review them when making ratings. As stated above, both the premission planning and rehearsal and the crew-level after-action review should also be videotaped. If video recording is not possible in the simulator or aircraft, cockpit conversations can be recorded during the flight phase using an audio tape recorder. Evaluators should coordinate with installation audio/visual support personnel to acquire the necessary equipment and technical assistance. Small, relatively inexpensive cameras and video recorders significantly added to the training value of simulator sessions during the USAAVNC aircrew coordination research experience. The aviation maintenance support organization should be consulted to resolve any airworthiness issues.

A video camera with tripod can be placed in each briefing room to record each crew's premission planning and rehearsal and after-action review. A tripod-mounted camera can also be placed in the simulator computer room to record the front-view computer-generated image that the crew sees. Compact video cameras can be used in the cockpit to record a frontal view of each crewmember's activities and in the simulator computer room to record selected flight data readouts. Video recorders can be placed in the after-action review room for play back. Video recorders can also be located in the simulator computer room to record images from the four cameras using a multiplexer (screen splitter). Monitors should be collocated with recorders.

5

Scenario Development Guidance

This section provides general and specific guidance for developing realistic tactical scenarios to accurately evaluate crew coordination. The information in this section interprets and extends the broad guidance on developing scenarios contained in doctrine and training literature.

..... General .....

Scenarios developed to support aircrew coordination continuation training should:

- Focus on the unit's mission essential task list (METL)
- Be consistent with the guidance for crew training that is contained in TC 1-210, "Aircrew Training Program, Commanders Guide to Individual and Crew Training," and the appropriate aircraft ATM
- Emphasize crew tasks developed as a part of the unit's collective training program

Scenarios should be conducted in flight simulators, when available. If flight simulators are not available, or the unit's assigned aircraft have no compatible simulator, scenarios should be conducted in the aircraft.

Scenarios should include common tactical missions for the type of aviation unit undergoing the training (e.g., cavalry, assault, attack, medium lift) and for the specific mission types of aircraft assigned to the unit (e.g., utility, observation, cargo, attack, reconnaissance).

Scenarios should require the aircrew to coordinate, both internally and externally, to successfully accomplish the mission. To that end, the scenarios should incorporate:

- Terrain flight
- Threat avoidance
- Instrument flight
- Weapons engagements
- External loads

- Emergencies and other abnormal events that emphasize crew coordination rather than individual aviator skills

The Battle-Rostered Crew Evaluation/Training Grade Slip and ACE Checklist in Section 6 of this evaluation package will be used to document scenario training.

..... Simulator Scenarios .....

Evaluators who conduct aircrew coordination continuation training for aircraft with visual flight simulators should develop at least two simulator scenarios.

Each scenario period should last approximately 5.0 hours and should consist of a:

- 1.5-hour premission planning phase
- 1.75-hour flight phase
- 1.75-hour crew-level after-action review and debriefing phase

When available, preplanned scenarios developed by the supporting simulator facility can be utilized, but they will need to be refined to be useful when evaluating crew coordination continuation training.

Unexpected events that require crew coordination should be incorporated into the preplanned scenarios. Example events include:

- Inadvertent entry into instrument meteorological conditions and any necessary instrument approaches
- Aircraft emergencies
- Nonroutine mission changes

Scenarios should be based on the crawl-walk-run philosophy and should be tailored to the appropriate level of unit proficiency. Simulator missions can be conducted:

- During the day
- At night using night vision devices (NVD)
- In mission oriented protective posture (MOPP)
- In electronic warfare (EW) conditions

..... Aircraft Scenarios .....

Evaluators who conduct aircrew coordination continuation training for aircraft without flight simulators should develop at least two situational training exercises (STXs). Like the simulator scenarios, each STX should last approximately 5.0 hours and consist of the following:

- 1.5-hour premission planning phase
- 1.75-hour flight phase
- 1.75-hour crew-level after-action review and debriefing phase

Within acceptable risk criteria, STXs should include unexpected events that require crew coordination. Example events include:

- Inadvertent entry into instrument meteorological conditions and any necessary instrument approaches
- Aircraft emergencies
- Nonroutine mission changes

STXs should be based on the crawl-walk-run philosophy and should be tailored to the appropriate level of unit proficiency. STXs can be conducted:

- During the day
- At night using NVD
- In MOPP
- In EW conditions

STXs conducted in aircraft with two-place configurations will place additional burdens on IPs and UTs. In addition to performing duties as evaluators, IPs and UTs will have to perform duties as crewmembers (role-play) to fully exercise the aircrew coordination requirements included in the STXs. Aircraft ATMs state that, "In all phases of instruction and evaluation, the evaluator is expected to perform as a crewmember in good faith." Previous experience with the AH-64 Instructor Pilot Course at the U. S. Army Aviation Center revealed that IPs could successfully perform these duties. As the students gained proficiency, the IPs were able to increase the amount of role-playing during each training flight. The more IPs are able to role-play during an STX, the more training value the crew will receive during the exercise. As stated in the ATMs, ***"The examinee must know that he is being supported by a fully functioning crewmember."***

Scenario Development Process

Each aircrew coordination evaluation scenario, whether executed in a simulator or in an aircraft, should be well thought through and relevant to the unit being trained. Developing an effective evaluation scenario can present a challenge, even to the most experienced IP or UT. The following development steps and information sources provide a start point and approach for the scenario developer:

1. Select a common tactical mission(s). (Sources: Unit OPLANs; FMs; ARTEP MTPs; Table 5-1, Missions of Army Aviation Aircraft, this section).

2. Identify unit mission essential tasks. (Source: Unit operations and training staff).

3. Incorporate activities that emphasize crew coordination. (Sources: TC 1-210; Aircraft ATM; General paragraph, this section).

4. Develop a scenario outline. (Sources: Sample Scenario, this section; simulator facility).

5. Identify activity breakpoints and describe the major activities and focus for each scenario segment. (Sources: FMs; ARTEP MTPs; Sample Scenario, this section).

6. Select ATM tasks. (Sources: FMs; Aircraft ATM).

7. Transpose scenario outline to the tactical training area available. (Sources: Unit operations and training staff; simulator facility).

8. Develop OPORD and/or air mission briefing to include an instructor operator script for simulator scenarios. (Sources: AR 95-1; FMs; ARTEP MTPs; Unit SOP; Sample Scenario, this section; Aircraft ATM; simulator facility).

Scenario Materials

Evaluators should instill a sense of unit mission and mission planning realism to aircrew coordination continuation training by providing the scenario-based materials shown in Table 5-2.

Table 5-1. Missions of Army Aviation Aircraft*

Mission	Roles	Aircraft
Observation Observation helicopters perform visual observation and target acquisition.	- Reconnaissance (route, area, zone) - Security (cover, guard, screen) - Command, control, communications, and intelligence enhancement - Aerial adjustment of field artillery - Surveillance - NBC reconnaissance - Laser designation for precision guided munitions (OH-58D only)	OH-6A, OH-58A, OH-58C, OH-58D, and RAH-66
Attack The primary mission of attack helicopters is to destroy enemy armored, mechanized, and helicopter forces.	- Antiarmor - Antipersonnel - Air combat - Suppression of enemy air defenses - Joint air attack team operations - Joint second echelon attack - Antimateriel - Laser designation for precision guided munitions (AH-64 only)	AF-64, RAH-66, AH-1E, AH-1S, AH-1P, AH-1F, and UH-1M
Utility **Rotary Wing** Utility helicopters perform a variety of missions to include air assault, air movement, command and control, and MEDEVAC operations.	- Air assault and combat assault of combat forces - Air movement of supplies, equipment, and personnel - Aerial evacuation of equipment, casualties, and prisoners of war - Aerial delivery of scatterable mines and sensors - Combat search and rescue - Command, control, communications, and intelligence enhancement	UH-1H, UH-1V (MEDEVAC), and UH-60A
Fixed Wing Utility fixed-wing aircraft are employed to move personnel and equipment and to support commanders and their staffs.	- Command, control, communications, and intelligence enhancement - Administration - Liaison - Aeromedical evacuation	U-21A, C-12A/C, UV-18A, and C-20

Table 5-1. Missions of Army Aviation Aircraft* (Cont.)

Mission	Roles	Aircraft
Cargo Cargo helicopters perform a variety of missions from air movement of combat power to air movement of troops and cargo.	- Air-move combined arms forces and equipment - Emplace field artillery and other fire support assets - Reposition tactical air defense weapons and systems - Perform medical evacuation - Move combat power, troops, logistical supplies, and equipment forward, laterally, and rearward - Perform logistics over-the-shore operations - Air-move conventional, nuclear, and chemical munitions	CH-47A, CH-47B, CH-47C, CH-47D, CH-54A, and CH-54B
Special Electronic Mission Aircraft Special electronic mission aircraft perform a variety of intelligence and electronic warfare operations.	- Process and relay high value intelligence information to maneuver commanders - Provide communications intelligence - Provide electronic collection - Collect, process, and analyze infrared, radar, and photographic imagery - Support deception operations to deceive and deny critical combat information to enemy forces - Provide direction finding, interception, and jamming of communications emitters	EH-1, EH-60, RV/OV-1, RU-21, and RC-12
Special Operations Aviation SOA aircraft perform a variety of missions to support special operations forces.	- Clandestinely penetrate denied enemy areas - Assault, resupply, insert, or extract SOF - Conduct aerial security, reconnaissance, surveillance, and electronic warfare support of special operations missions - Provide airborne command, control, and communications enhancement - Support coordinated and synchronized joint, combined, or host-nation special operations - Perform aircraft strategic self-deployment operations - Perform limited aeromedical evacuation - Perform search and rescue operations - Conduct aerial mine delivery operations - Perform general aviation support missions, as necessary	MH-6, AH-6, MH-60K, and MH-47E

*Source: FM 1-100, Doctrinal Principles for Army Aviation in Combat Operations, February 1989

Table 5-2. Scenario Materials

Scenario Item	Examinee	Evaluator	Simulator Operator
OPORD and/or Air Mission Briefing[1]	X	X	X
Scenario Outline		X	X
Scenario Segment Info		X	X
Tactical Map	X	X	X
Approach Plate	X	X	X
Grade Slip		X	

Note:

1 Provide an instructor operator script for simulator scenarios

..... Sample Scenario .....

The sample air assault and air movement scenario provides examples of scenario materials for evaluators. The scenario, as written, is sufficiently generic for utility and cargo helicopters and, with minor modifications, can accommodate other platforms.

Sample Scenario Outline

Mission: Air Assault & Air Movement

Segment	Performance Measures	ATM Tasks
1. Premission Planning	Mission Planning & Rehearsal Mission briefing/brief-back	2078-Terrain flt msn plan 1004-PPC 1000-Mission brief
2. AA to PZ	Material malfunction (major)	1007-Start/run-up 1016-Hover pwr ck 1018-VMC takeoff 1026-Elect-aided nav 2079-Terrain flt nav 2081-Terrain flt 1023-Fuel mgt proced 1068-Emergency 1095-Operate ASE 2008-Evasive maneuvers 1028-VMC approach
3. PZ to LZ to PZ	Navigation (corridors) Time to fly segment Time of arrival Threat avoidance & evasion Material malfunction (minor)	1016-Hover pwr ck 1018-VMC takeoff 2009-Multiaircraft opns 1026-Elect-aided nav 2079-Terrain flt nav 2081-Terrain flt 1023-Fuel mgt proced 1095-Operate ASE 2008-Evasive maneuvers 1028-VMC approach
4. PZ to LZ to PZ	Navigation (corridors) Time to fly segment Threat avoidance & evasion	2016-External load opns 1016-Hover pwr ck 1018-VMC takeoff 1026-Elect-aided nav 2079-Terrain flt nav 2081-Terrain flt 1023-Fuel mgt proced 1095-Operate ASE 2008-Evasive maneuvers 1028-VMC approach

Sample Scenario Outline (Cont.)

Mission: Air Assault & Air Movement

Segment	Performance Measures	ATM Tasks
5. PZ to AA	Inadvertant IMC Instrument recovery	1018-VMC takeoff 1026-Elect-aided nav 2079-Terrain flt nav 2081-Terrain flt 1023-Fuel mgt proced 1095-Operate ASE 2008-Evasive maneuvers 1083-VHIRP 1076-Radio nav 1081-Non-precision appr

Sample Scenario - Segment Information

SEGMENT 1: **Premission planning**

DESCRIPTION: The premission planning segment begins when the crew receives the mission briefing and includes all preparatory tasks associated with planning the tactical mission. These tasks include terrain flight mission planning, performance planning, assigning crewmember responsibilities, and all required briefings and brief-backs. The segment ends when the crew completes all required briefings and prepares to enter the simulator.

SEGMENT 2: **Movement from the assembly area (AA) to the initial pick-up zone (PZ)**

DESCRIPTION: The segment begins when the crew enters the simulator and verifies that initial start and run-up procedures are complete. During this segment, the crew repositions the aircraft from the AA to the initial PZ in preparation for an air assault mission. The segment includes an emergency caused by an aircraft system malfunction which should result in a precautionary landing in the PZ. The segment ends when the crew completes the precautionary landing.

SEGMENT 3: **Cross-FLOT air assault mission**

DESCRIPTION: The segment begins when the troops have been loaded on the aircraft. It involves moving troops along a prescribed route in a medium-to-high threat environment, delivering them to the LZ, and then returning to the PZ. The crew will act as flight lead for a flight of 5 UH-60 helicopters with no changes in lead or formation. The crew must accurately navigate within prescribed corridors while avoiding and evading threat to deliver the troops to the correct location at the correct time. The segment includes a minor malfunction which will be removed as soon as the crew detects and *verbally recognizes* the malfunction. The segment ends when the crew returns to the PZ.

SEGMENT 4: **External load air movement mission**

DESCRIPTION: The segment begins when the crew takes off to pick up the external load. It involves moving an external load along a prescribed route in a medium-to-high threat environment to resupply a friendly unit located near the forward line of troops (FLOT). The crew must accurately navigate within prescribed corridors while avoiding and evading threat to deliver the external load to the correct location. The crew then returns to the PZ in preparation for a follow-on mission. The segment ends when the aircraft returns to the PZ.

SEGMENT 5: **Movement from the PZ to the assembly area**

DESCRIPTION: The segment begins when the aircraft departs the PZ enroute back to the AA. During the flight, the crew encounters an inadvertent entry into instrument meteorological conditions (IMC). The crew must then plan and execute a nonprecision instrument approach to transition back to visual meteorological conditions (VMC). The segment ends when the crew completes a safe landing.

Sample Scenario OPORD

UNCLASSIFIED

OPORD 07-91

REFERENCES: Map Sheet 2317 II

TIME ZONE USED THROUGHOUT ORDER: Local

TASK ORGANIZATION:

TF A/7-101
A/7-101
TM/PFDR

1. SITUATION

   a. Enemy Situation:

      (1) Terrain: The area of operations is vegetated/desert with rolling hills. Valleys run generally north-south.

      (2) Weather: Sunrise 0600, Sunset 2000
      Moonrise 2130, Moonset 0445
      Percent illumination 30
      Temperature +24
      Pressure altitude max +500
      Winds 240/10
      Low ceilings (1000') and decreasing visibility (1.5 miles) throughout the day

      (3) Forces: Inf/Ar Bde vic VK 9483 augmented with ADA, FA, and air support.

   b. Friendly Situation:

      (1) 3rd Inf Bde vic WK 15 65 will conduct a daylight attack to secure the high ground at Objectives Alpha, Vic VK 98 80 and Bravo, Vic 87 77.

2. MISSION: Conduct air assault from PZ CALVIN (WK064 554) with TF 2-505 to destroy Class V storage site Vic VK 87 78 (Objective Charlie) and return to PZ HOBBES (VK 904 544). On order, pick up ammunition (M102 A22 Bag) at PZ HOBBES, deliver to C 1/76 FA at LZ JON (WK 006 676), and return to CALVIN. Be prepared to conduct additional resupply missions from CALVIN.

Sample Scenario OPORD (Cont.)

3. EXECUTION:

   a. Concept of the operation: This is a priority mission. The first mission is a five aircraft air assault to destroy an ammunition storage site in conjunction with 3rd Brigade's main attack. TF 2-505 must be in place prior to the main attack. Timing is crucial for this operation. Except for the required radio call at RP1, the air assault mission will be conducted under radio silence. The second mission is a resupply mission for an artillery battery so they can continue to support the attack. Flight corridors will be used for both missions.

   b. Techniques of Movement:

      (1) Air Assault: From CALVIN to SP1 (LUCY), WK 065 585; Via Corridor 1 to ACP1, WK 035 687; ACP2, WK 029 745; ACP3, WK 010 790; RP1 (LINUS), VK 920 790. See overlay.

      (2) Resupply: From HOBBES east northeast via corridor 3 to the high ground in grid square 02 59, then north to the Jagst river, then northwest along the river to JON. See overlay.

   c. Fires: C 1/76/M102, Priority of fires (1) 2-505 (2) 3rd Bde

   d. Coordinating Instructions:

      (1) Assembly area is SUSIE
      (2) Penetrate FLOT vic ACP2
      (3) Friendly ADA status/IFF is Tight/Off 1 km prior to FLOT
      (4) Actions on enemy contact will be reported immediately

4. SERVICE SUPPORT:

   a. Class III, FARP locations at CALVIN, HOBBES
   b. Class V, AA SUSIE and FARP locations at CALVIN, HOBBES

Sample Scenario OPORD (Cont.)

5. COMMAND AND SIGNAL:

   a. Command

      (1) AATF Cdr location - CALVIN

   b. Signal

      (1) CEOI in effect

      (2) Callsigns:
      TF 7/101 Avn TOC - P41
      2-505 AATF TOC - Y35
      C1-76 FA - S21
      Team Pathfinder (CALVIN) - C44
      Team Pathfinder (HOBBES) - H44

6. SAFETY:

   a. Safety is the primary and overriding consideration.
   b. Reactions to all in-flight and ground emergencies will be IAW unit SOP, aircraft operator's manual, commander's pre-accident plan, and the judgment of the PC.
   c. All crewmembers will be pre-briefed by the PC.

OFFICIAL:

SHEEHAN
CW4, Operations Officer

Sample Scenario
Air Mission Briefing

Roll Call _____ Time Zone Used: Local

Time Hack: 1630

OPORD References: Map Sheet 2317 II

Task Organization

TF 7/101:

a. A/7-101
b. TM/PFDR

1. SITUATION

a. Enemy Forces

(1) Weather

Ceiling: 1000 Vis: 1.5 miles Winds: 240/10 Max Temp: +24 Max PA: +500

Max DA: +1000 EENT: 2030 BMNT: 0530 DEW PT: +20 Spread: 4

SR: 0600 SS: 2000 MR: 2130 MS: 0445 % Illum: 30

Weather Warnings/Advisories: Low ceilings and decreasing visibility throughout the day

NOTAMS: VOR, ILS, and PAR out of service at Harris Airfield

(2) Inf/Ar forces: BDE Vic VK 94 83

(3) Artillery forces: Unk

(4) ADA forces: Vic VK 96 75; Vic VK 98 75; Vic VK 86 77; Vic VK 88 67

(5) Air Support: Unk

Sample Scenario
Air Mission Briefing (Cont.)

b. Friendly Forces

(1) 3rd Inf Bde	Vic WK 15 65 will conduct a daylight attack to secure the high ground at Objectives Alpha, Vic VK 98 80 and Bravo, Vic 87 77.
(2) TF 2-505	Vic WK 06 55
(3) Atk/Cav	2/101 ATK supports cross FLOT air assault

c. Attachments and Detachments Team Alpha Pathfinders

2. MISSION

a. Conduct air assault from PZ CALVIN (WK 064 554) with TF 2-505 to destroy Class V storage site Vic VK 87 78 (Objective Charlie) and return to PZ HOBBES (VK 904 544).

b. On order, pick up ammunition (M102 howitzer and A22 Bag) at PZ HOBBES, deliver to C 1/76 FA at LZ JON (WK 006 676), and return to CALVIN. Be prepared to conduct additional resupply missions from CALVIN.

3. EXECUTION

a. Concept of the operation: This is a priority mission. The first mission is a five aircraft air assault to destroy an ammunition storage site in conjunction with 3rd Brigade's main attack. TF 2-505 must be in place prior to the main attack. Timing is crucial for this operation. Except for the required radio call at RP1, the air assault mission will be conducted under radio silence. The second mission is a resupply mission for an artillery battery so they can continue to support the attack. Flight corridors will be used for both missions.

b. Maneuver

(1) # aircraft by type/unit:	5 UH-60A/A 7/101
(2) Routes/corridors:	See overlay
(3) Objective:	CHARLIE Vic VK 87 78
(4) Times:	TBA
(5) Phasing:	NA

Sample Scenario
Air Mission Briefing (Cont.)

c. Fires

(1) FA unit/type: C 1/76/M102

Priority of fires: 1. 2-505 2. 3rd Bde

SEAD information: NA

(2) Close air support: NA

ATK/CAV: 2/101 ATK preps LZ 1 minute prior

Battle positions: NA

****QUESTIONS****

d. Sub-unit instructions

(1) Crews, duties, freqs, call signs:

Call signs	PC	PI	Aircraft	Duties
M21	Ownship	Ownship	749	Lead/SOP
M22	TBA	TBA	811	Chalk #2/SOP
M23	TBA	TBA	212	Chalk #3/SOP
M24	TBA	TBA	694	Chalk #4/SOP
M25	TBA	TBA	580	Trail/SOP

Internal frequencies: FM1--32.25
VHF--122.7
UHF--242.6

(2) Commo/line-up/take-off times: TBA

e. Staging Plan

(1) PZ location:

SUSIE	CALVIN	HOBBES
WK 155 525	WK 064 554	VK 904 544

(2) PZ times:

NA	TBA	TBA

(3) Route to PZ:

NA (starting point)	Direct from SUSIE	See overlay

Sample Scenario
Air Mission Briefing (Cont.)

(4) PZ markings/control:

None	Inverted Y/ contact C44 3 KMs out	Inverted Y/ contact H44 at RP2

(5) Formation/direction:

NA	NA/270°	Trail/240°

(6) ATK/CAV coord: NA

(7) ACL/Cargo/Weight

Air assault: 11/pax/2640

Resupply mission: NA/M102 and A22 bag/5360

(8) Sling load procedures: SOP

(9) Light signals (beacon): SOP

(10) Spare aircraft procedures: SOP

(11) Special msn equip: SOP

f. Air Movement Plan

(1) Routes

(a) Air Assault: SP1 (LUCY), WK 065 585; via corridor #1 to ACP1, WK 035 687; ACP2, WK 029 745; ACP3, WK 010 790; RP1 (LINUS), VK 920 790. See overlay.

(b) Resupply: From HOBBES via corridor #3 to the high ground at WK 02 59, then north to the Jagst river, then northwest along the river to JON. See overlay.

(2) Penetration points: Cross FLOT vic ACP2.

(3) Enroute formation/rotor separation/angle: Free cruise/2-3/30°-45°

(4) Enroute airspeed: As required to meet LZ time
RP inbound: 60 KIAS

(5) Deception measures: NA

Sample Scenario
Air Mission Briefing (Cont.)

(6)	ATK/CAV mission:	2/101 ATK joins flight after ACP1
(7)	Abort criteria:	Three aircraft
(8)	Air movement table:	NA
(9)	Threat break-up procedures:	SOP
(10)	Door guns:	Out at FLOT
(11)	Cargo doors:	Open
(12)	External lighting:	SOP
(13)	Crew chief position:	SOP
(14)	Lead change procedures:	SOP
(15)	Formation exit procedures:	SOP
(16)	Lost contact/in-flight join-up:	SOP
(17)	Downed aircraft:	SOP
(18)	DAARP/SAR plan:	SOP
(19)	SERE plan:	SOP
(20)	SEAD plan:	NA

g. Landing Plan

(1) LZ locations:

JON	GARFIELD	ODIE
(ext load)	(asslt-pri)	(asslt-alt)
WK 006 676	VK 894 784	VK 905 773

(2) LZ times:

NA	TBA	TBA

(3) Formation/Direction:

NA/270°	Trail/240°	Trail/240°

(4) LZ markings/control:

None/contact	None/contact	None/contact
S21 3 KM's out	Y35 prior to RP1	Y35 prior to RP1

Sample Scenario
Air Mission Briefing (Cont.)

(5) ATK/CAV mission: 2/101 ATK preps LZ 1 minute prior

(6) Go arounds: SOP

(7) Takeoff in chalk order when ready; Trail calls formation

h. Laager Plan: NA

i. Extraction Plan: NA

j. Return Air Movement Plan

(1) Routes

(a) Air Assault: SP2 (BEETLE), VK 880 750; via corridor #2 to ACP4, VK 873 656; RP2 (SARGE), VK 905 588. See overlay.

(b) Resupply: From JON southeast via corridor #4 along the Jagst river to CALVIN. See overlay.

(2) Penetration points: Cross FLOT vic ACP4

(3) Formation/airspeed: Free cruise/80 KIAS

(4) ATK/CAV: NA

(5) LZ locations:

HOBBES	CALVIN

(6) Formation/direction:

Trail/240°	NA/270°

(7) LZ markings/control:

Inverted Y/contact H44 at RP2	Inverted Y/contact C44 3 KMs out

k. Coordinating Instructions:

(1) MOPP level/NBC warning status: NA

(2) Friendly ADA status/IFF: Tight/Off 1 KM prior to FLOT

(3) Weapon control status: NA

(4) AD warning status: NA

Sample Scenario
Air Mission Briefing (Cont.)

(5) M60D control status: Free

(6) Lost commo: SOP

(7) NVG specific procedures: NA

(8) VHIRP/IIMC procedures:

(a) Base altitude: 2500'

(b) Heading: Turn to 090°

(c) Airfield: Harris

(d) Frequency 125.4 VHF/391.9 UHF

(9) Weather decision time/location: 1800/SUSIE

(10) Debrief location/time: SUSIE/SOP

****QUESTIONS****

4. SERVICE SUPPORT

a. Class I: Coke and candy machine

b. Class III:

(1) FARP location/marking/diagram: CALVIN & HOBBES

(2) FARP frequency/call sign: 37.50/C44 & H44

(3) FARP procedures: SOP

c. Class V: Pick-up 38 cal and bayonets at SUSIE

5. COMMAND AND SIGNAL

a. Command

(1) AATF Cdr's location: CALVIN

(2) Avn TF AMC: Chalk #3

(3) Internal chain of command: Chalk #3, #1, Trail

Sample Scenario
Air Mission Briefing (Cont.)

b. Signal

(1) Additional call signs and frequencies:

UNIT	FREQ	CALL SIGN
TF 7/101 Avn TOC (SUSIE)	40.40	P41
2-505 AATF TOC (CALVIN)	30.30	Y35
C 1/76 FA (JON)	35.70	S21
Team Pathfinder (CALVIN)	37.50	C44
Team Pathfinder (HOBBES)	37.50	H44

(2) Code Words: SOP

(3) Challenge/Password: Chicken/Lips

MISSION BRIEF BACK

FINAL QUESTIONS

Sample Scenario
Instructor Operator Script

1. Crew begins mission from assembly area SUSIE (WK 1550 5250). The simulator should be operating (aircraft running) and all checklist items completed through the Engine Runup check.

2. After taxi, hover, and before takeoff checks have been completed, crew (M21) should call P41 (TF 7-101 Avn TOC) on FM 40.40 departing for PZ CALVIN. P41 should acknowledge this transmission. (Briefing officer will have provided the crew with a time to be at CALVIN)

3. M21 should call C44 (Pathfinders at CALVIN) on FM 37.50 approximately 3 kilometers out for landing instructions. C44 should indicate that the PZ is clear and landing should be made to the west at pilot's discretion, and direct M21 to contact Y35 (2-505 AATF TOC) on FM 30.30 for a mission update after landing.

4. After completing the radio transmission between M21 and C44, initiate the major malfunction (decreasing % RPM R). If M21 fails to call, initiate the malfunction approximately 3 kilometers out from CALVIN.

5. After aircraft has landed, restore all aircraft systems to normal and administratively inform the crew. If required, have crew complete the flight into CALVIN.

6. M21 should call Y35 on FM 30.30. Y35 should inform M21 that the air assault mission is still "as briefed" and will depart CALVIN in 8 minutes Y35 should tell M21 to reposition to the field north of the FARP for formation line-up and provide the following additional information:

- Current local time
- Hard LZ time (= current local time + 23 minutes)
- M21 must call Y35 at the RP (LINUS) for LZ instructions
- The other four aircraft are inbound to CALVIN and should be on the ground in 3 minutes
- Line-up and departure heading should be to the north

7. When M21 is in position for formation line-up, I/O, acting as crew chief, will assist with loading of troops and let the crew know when the other aircraft have joined-up.

8. When M21 initiates commo checks, I/O answers in chalk order sequence for all other aircraft in the flight (M22-M25).

9. Once flight is formed on the ground, trail (M25) calls M21 with "Beacon".

10. M21 should call C44 for departure. C44 should indicate that the winds are 240/10 and clear M21 for takeoff to the north at pilot's discretion.

11. M21 should call Y35 just prior to RP1 (LINUS) for LZ instructions. Y35 informs M21 to land at ODIE (alt LZ).

Sample Scenario
Instructor Operator Script (Cont.)

12. As the aircraft departs ODIE, initiate a slow fuel leak in one fuel cell by decreasing fuel quantity approximately 50-100 lbs every 30 seconds. As the malfunction is initiated, transmit "*Sir, I think we just took small arms fire from behind us*" over intercom to let the data collectors know it has been started. As soon as the crew detects the slow leak, stop decreasing the fuel quantity. If the crew has not detected the leak after there is a 500 lb imbalance between fuel cells, stop decreasing the fuel.

13. M21 should call H44 (Pathfinders at HOBBES) on FM 37.50 at RP2 (SARGE) for landing instructions. H44 should indicate that the winds are 240/10 and landing should be made to the southwest at pilot's discretion.

14. On final approach to HOBBES, position external load #67 (M102 howitzer with A22 bag) in the PZ.

15. Once in HOBBES, H44 should position M21 in preparation for the external load mission. If M21 requests fuel, H44 directs M21 to the FARP. Crew chief will assist with refueling and let the crew know when they are ready for the external load mission. Departing the FARP, crew chief takes over and directs aircraft over the load, completes hook-up, and prepares aircraft for takeoff.

16. M21 should call H44 for departure. H44 should clear M21 for takeoff to the northeast at pilot's discretion.

17. Place howitzer on the ground in LZ JON.

18. M21 should call S21 (C 1/76 FA) on FM 35.70 approximately 3 kilometers out of JON for landing instructions. S21 should indicate that the landing direction is generally to the west and instruct M21 to drop the load north of the howitzer on the ground. Crew chief should assist in positioning aircraft and dropping load in JON.

19. If M21 calls S21 departing JON, S21 should acknowledge the call.

20. Vicinity the high ground in grid WK 04 62, decrease visibility until the crew enters inadvertent IMC.

21. Just prior to entry into IMC, turn off the threat.

Sample Scenario
Instructor Operator Script (Cont.)

22. M21 should call Tactical approach control on VHF 125.4 or UHF 391.9 to indicate they are inadvertent IMC. Tactical approach directs a turn for radar identification. After positive identification:

- issue an appropriate heading to the Ryann LOM
- tell the crew to maintain 3000 feet
- provide advance approach information at Harris AAF:
  winds 240/10
  Runway 20 in use
  M800 OVC , 1 mile visibility
  altimeter 2993
- advise the crew to expect the NDB 20 approach.

[NOTE: The aircraft should be positioned and/or directed so it takes approximately 5 minutes to reach the Ryann LOM]

23. After verifying that M21 is receiving the Ryann LOM suitable for navigation:

- clear M21 direct to the Ryann LOM
- issue a clearance for the NDB 20 approach
- terminate radar coverage
- direct M21 to report crossing the Ryann LOM outbound.

24. M21 should call tactical approach at Ryann LOM outbound. Tactical approach directs M21 to contact Harris tower at Ryann LOM inbound.

25. M21 should call Harris tower at Ryann LOM inbound. Tower should inform M21 that the winds are 240/10 and they are cleared to land.

26. After M21 lands at Harris, the mission is terminated.

NOTES:

1. If M21 become misoriented during any segment of the tactical flight and transmits "STUMBLE", I/O will act as chalk #2 (M22) and transmit approximate location (grid square).

2. If M21 makes an obvious wrong turn or deviates off course, I/O will not issue any corrective instructions (i.e., "check nav left/right").

3. M21 gets one chance at the NDB 20 approach. If they do not break out or miss the approach for any reason, the I/O will terminate the mission.

6

Evaluation Techniques and Tools

This section provides detailed information on the techniques and tools approved for evaluating crew coordination in continuation training. The techniques (evaluation process, mission performance measures, etc.) and tools (ACE Checklist, Evaluator Worksheet, etc.) in this section are designed to accommodate all Army aircraft--rotary and fixed wing.

..... Evaluation Process .....

Evaluation of aircrew coordination is required to identify strengths and weaknesses in the Army's Crew Coordination Program. The evaluation process for crew coordination continuation training implements the guidelines in Chapter 8 of the ATMs and the Army's crew coordination philosophy.

Guidelines

Commanders determine the emphasis of crew coordination in their units. Evaluators implement the Crew Coordination Program and set the tone for evaluation sessions by their demeanor. Although a coldly professional approach may get the job done, it is contrary to the team approach advocated by crew coordination training. Each individual evaluator and crewmember, rated and non-rated, contributes to the mission; therefore, each one should actively participate in the evaluation process.

An open and frank manner, together with a nurturing style of evaluation, will advance the team approach to mission accomplishment. Evaluators play an essential role in determining whether evaluations contribute positively to each crew's experience base and the effectiveness of the unit's aircrew coordination training.

Evaluation Activities

The activities described below and summarized in Table 6-1 constitute the evaluation process for crew coordination continuation training.

1. The evaluator greets the crew and explains the nature of the flight as an announced or a no-notice recertification evaluation. The crew will be advised that the information gained from the flight will be used to improve aircrew coordination training. As such, each evaluation ride is part of an ongoing effort to improve the Army Crew Coordination Program.

(Note: If video cameras are used to tape the premission planning session, they should be loaded and turned on before the crew enters the mission planning room so that the crew's attention is not diverted to the cameras.)

2. Evaluators will issue all materials required by the crew to plan the flight per unit SOP and published regulations. The evaluator will complete all identifying information required on the evaluation forms and conduct an oral examination of the crew's working knowledge and understanding of crew coordination. The evaluator will then observe and rate the crew during its premission flight planning activities. As with other segments of evaluation missions, an unsatisfactory grade on crew coordination during the premission planning phase does not terminate the mission.

(Note: If the premission planning and rehearsal portion of the evaluation ride is being videotaped, the evaluator must retrieve the videocassette before moving to the simulator or flight line. If the simulator or flight portion is videotaped, a videotape should be loaded and the camera(s) turned on before the crew either enters the simulator or begins engine start procedures.)

3. If the evaluation mission is flown in an aircraft or simulator that requires the evaluator to operate as a member of the crew, the evaluator must use judgment in role playing. The evaluator must be fair both to the procedures for evaluation and to the crewmember(s) when evaluating the flight. If the mission is flown in an aircraft or simulator not requiring the evaluator to participate as a crewmember, the evaluator need only observe and rate.

   During the simulator or flight mission, the evaluator will judge both crew coordination and technical flight skills. The weight placed on either category in determining a crew task grade on the Battle-Rostered Crew Evaluation/Training Grade Slip is the evaluator's decision, based on experience. Guidelines for evaluating aircrews are provided in this section. As is customary, evaluators should keep notes to use in determining grade slip entries prior to, and for use during, the evaluator's post-flight debriefing. Evaluators will fill in the grade slips or evaluator worksheets as completely as possible during the flight.

4. Evaluators may require more time to refer to the behavioral rating guidance in completing the Basic Qualities section of the Aircrew Coordination Evaluation (ACE) Checklist. This period of time will decrease with experience. If more time is needed to complete grade slips and organize debriefing comments, evaluators should not hesitate to place the crew on a short break immediately after the crew's after-action review.

(Note: If the after-action review is being videotaped, it is important that the videotape be loaded and the camera turned on before the crew enters the after-action review room. Once the crew completes its after-action review, turn-off the video camera before the evaluator debrief.)

5. Subsequent to the crew-level after-action review, the evaluator will conduct a comprehensive debriefing of the entire evaluation session from premission planning through after-action review. During this debriefing, the evaluator will point out examples of both good and bad crew coordination and involve the crew in these discussions. Active participation in this process is the key to improvement. If the mission was videotaped, video playback may be used as an aid in reviewing the mission. Again, the evaluator's review should provide a positive learning experience for the crew and contribute to its crew coordination knowledge base. Evaluators should instill a non-threatening environment and encourage crewmembers to self-evaluate their performance during the evaluator debriefing. Comment on Crew Coordination Basic Qualities rated superior and ask open-ended questions to explore the crew's perception of Basic Qualities rated marginal, poor, or very poor.

6. Upon completing the review, evaluators will finalize all records and retrieve reusable training materials, including the videotape. If the evaluation mission was videotaped, erase the tape and return it along with the grade slips to the unit training manager. Training managers maintain the evaluation grade slips in accordance with Section IV, Records, TC 1-210, and the appropriate ATM.

Sample Oral Examination Questions

Oral examination questions enable evaluators to assess the crew's working knowledge and understanding of crew coordination. The evaluator should ask each crewmember 2 to 3 questions before issuing the mission briefing. Correct responses to the following sample questions are in italics. This sample set of questions is not exhaustive; evaluators should design additional questions that relate crew coordination to their particular interests and unit (for example, unique missions, known problem areas or crew tasks, local regulations, SOP).

Table 6-1. Evaluation Actions

Actions	Video Recording Option
1. Greet the crew and explain the nature of the flight (announced or no-notice recertification evaluation) and the evaluator's role	Load the camera in the planning area; turn the camera on when the crew enters the planning area
2. Issue the training materials and complete the crew information section of the evaluation forms; conduct oral examination; brief the mission; evaluate premission planning and rehearsal	Turn the camera off after premission planning and rehearsal; take the tape to the simulator or the flight line
3. Observe and evaluate mission execution during the flight (crewmember or observer); take notes for grade slips and evaluator debrief	Load and turn on the camera/recorder before entering the simulator or aircraft; upon flight completion take the tape to the after-action review area
4. Observe and evaluate the crew-level after-action review; complete the grade slips (declare a short break as required before the debrief)	Load and turn on the camera before entering the after-action review area; turn off the camera before the evaluator debrief
5. Debrief the crew on the entire mission; use open-ended questions to facilitate a crew self-evaluation	Use video playback to emphasize teaching and evaluation points
6. Finalize records and retrieve training materials; release the crew	Erase the tape(s) and return to the unit training manager

Sample Oral Examination Questions

1. Crew coordination contributes to:

   A. Mission safety
   B. Mission effectiveness
   C. *Both A and B*
   D. Reduced crew workload

2. According to the 1989 US Army Safety Center and Army Research Institute Study, communications was related to ____ percent of aircraft accidents.

   A. 76
   B. *41*
   C. 35
   D. 24

3. What is crew coordination?

   Crew coordination is defined as the interaction between crewmembers (communication) and actions (sequence and timing) necessary for flight tasks to be performed efficiently, effectively, and safely. It involves the effective utilization of all available resources--hardware, software, and liveware.

4. The Army Crew Coordination Program outlined ____ Crew Coordination Objectives and ____ Crew Coordination Basic Qualities.

   A. 5, 8
   B. 8, 13
   C. 3, 5
   D. *5, 13*

5. Aircrew Training Manuals (ATMs) separate crew coordination tasks from technical flight tasks.

   A. True
   B. *False*

6. Discuss the Two Challenge Rule.

The key to early response to incapacitation lies in the ability to establish a norm against which the results of incapacitation can be measured. The two-challenge rule provides for automatic assumption of duties from any crewmember who fails to respond to two consecutive challenges. This overcomes our natural tendency to believe the pilot flying must know what he is doing, even as he departs from established parameters.

7. Aircrew coordination applies to rated aviators only.

   A. True
   B. *False*

8. Good communication and crew coordination are as important as technical flight proficiency for flight safety and mission accomplishment.

   A. *True*
   B. False

9. Pilots in command should employ the same style of leadership in all situations and with all crewmembers.

   A. True
   B. *False*

10. Nonrated crewmembers should be actively involved in planning the mission.

    A. *True*
    B. False

11. An essential element of premission planning is discussing crew responsibilities and required actions for abnormal events.

    A. *True*
    B. False

12. Thinking through difficult segments, events, and tasks is primarily the pilot in command's responsibility.

    A. True
    B. *False*

13. The pilot in command is solely responsible for leadership of the crew team.

    A. True
    B. *False*

14. What are the two contrasting decision making techniques discussed in the Crew Coordination Training Program?

    A. Classical and Modern
    B. *Analytic and Automatic*
    C. Theory X and Theory Y
    D. Structured and Unstructured

15. The pilot in command should use the entire crew to help maintain situation awareness.

    A. *True*
    B. False

16. Crewmembers should be aware of other crewmember's workload.

    A. *True*
    B. False

17. Cross monitoring other crewmember's performance can help break a series of errors or poor judgements.

    A. *True*
    B. False

18. Discuss examples of the types of information to be reported as part of mission situational awareness.

    A. *Aircraft position and status*
    B. *Equipment status*
    C. *Personnel status*
    D. *Environment and battlefield conditions*
    E. *Changes to mission objectives*

19. Name three of the Five Hazardous Attitudes.

    A. *Anti-Authority*
    B. *Impulsivity*
    C. *Invulnerability*
    D. *Machoism*
    E. *Resignation*

20. A debriefing and after-action review of procedures and decisions after each mission are important for developing and maintaining effective crew coordination.

    A. *True*
    B. False

21. A battle rostered crew that is crew coordination trained would have a more favorable risk assessment rating.

    A. *True*
    B. False

22. Aircrew coordination training can help offset the risk associated with a non-battle rostered crew.

    A. *True*
    B. False

23. The Army Crew Coordination Program seeks to _____ the pilot in command's authority while encouraging the utilization of the entire crew through situational (flight) team leadership.

    A. *Increase*
    B. Decrease

24. Who in aviation units is responsible for implementing the commander's crew coordination program?

    A. *Instructor Pilot*
    B. Unit Trainer
    C. Pilot in Command
    D. Pilot

..... Grade Slips .....

As in initial crew coordination training, objective and reliable evaluations of crew performance are based on the Crew Coordination Basic Qualities and the behaviorally anchored rating system. The grade slip techniques and tools in this section provide a means for evaluating crew tasks in continuation training with the same precision that was used to certify crewmember completion of the initial crew coordination training course. The following instructions supplement the aircrew grading information in Chapter 9 of the ATMs.

Battle-Rostered Crew Evaluation/Training Grade Slip

The ATMs specify that the Battle-Rostered Crew Evaluation/Training Grade Slip be used to record the results of crew coordination continuation training evaluations. This is the same grade slip that is used to certify completion of initial crew coordination training. Complete the grade slip (Figure 6-1) as instructed in the ATM with the following exceptions:

1. Use the ACE Checklist of Crew Coordination Basic Qualities and Evaluator Worksheet entries for each crew task as input. The ACE Checklist and Evaluator Worksheet are described in this section.

2. Enter the grade (S, U, or NA) for each crew task based on Evaluator Worksheet entries.

3. Use the space on the back of the grade slip to explain superior, poor, and very poor crew coordination performance based on the ACE Checklist and Evaluator Worksheet notes.

4. Circle S, U, or NA to indicate the overall flight grade based on the ACE Checklist and Evaluator Worksheet notes.

5. Attach the completed ACE Checklist to the Battle-Rostered Crew Evaluation/Training Grade Slip.

Aircrew Coordination Evaluation (ACE) Checklist

Like the Battle-Rostered Crew Evaluation/Training Grade Slip, the ACE Checklist is identical for all simulators and Army aircraft. The ACE Checklist requires a summary rating of the crew's performance for each Crew Coordination Basic Quality for the entire flight. This information complements the evaluator's comments and overall flight grade determination. Complete the ACE Checklist (Figure 6-2) as follows:

BATTLE-ROSTERED CREW EVALUATION/TRAINING GRADE SLIP
For use of this form, see Aircraft ATM; the proponent agency is TRADOC

BATTLE-ROSTERED CREW EXAMINEES/ TRAINEES	NAME	RANK
	PC:	
	PI:	
	NONRATED CREW MEMBERS DUTY SYMBOL NAME	RANK
	UNIT:	
EVALUATOR/ INSTRUCTOR	NAME	RANK
	UNIT:	

CREW DATA

TOTAL BATTLE-ROSTERED CREW HOURS	DATE DESIGNATED A BATTLE-ROSTERED CREW:
PURPOSE: EVALUATION/TRAINING	
TIME TODAY:	CUMULATIVE TIME:

TYPE AIRCRAFT: _____

CREW TASK 1 _____ D/N/NVD		CREW TASK 6 _____ D/N/NVD	
CREW TASK 2 _____ D/N/NVD		CREW TASK 7 _____ D/N/NVD	
CREW TASK 3 _____ D/N/NVD		CREW TASK 8 _____ D/N/NVD	
CREW TASK 4 _____ D/N/NVD		CREW TASK 9 _____ D/N/NVD	
CREW TASK 5 _____ D/N/NVD		CREW TASK 10 _____ D/N/NVD	

DAY	NIGHT	WX	SIMULATOR	NVG	NVS

EVALUATOR/INSTRUCTOR RECOMMENDATIONS

☐ (ISSUE) (VALIDATE) CREW QUALIFICATIONS

☐ (SUSPEND) (REVOKE) CREW QUALIFICATIONS

☐ REQUIRES ADDITIONAL (FLIGHT) (ACADEMIC) (SIMULATION DEVICE) TRAINING

☐ SEE BACK FOR COMMENTS

I HAVE DEBRIEFED THE EXAMINEES/TRAINEES AND INFORMED THEM OF THEIR STATUS.
EVALUATOR'S/INSTRUCTOR'S SIGNATURE: _____

WE HAVE BEEN DEBRIEFED BY THE EVALUATOR/INSTRUCTOR AND UNDERSTAND OUR CURRENT STATUS.

PC'S SIGNATURE: _____

PI'S SIGNATURE: _____

NONRATED CREW MEMBER'S SIGNATURES: _____

_____

OVERALL GRADE FOR THIS FLIGHT IS: | S | U | NA | DATE:_____

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Figure 6-1. Battle-Rostered Crew Evaluation Training Grade Slip (page 1)

COMMENTS

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Figure 6-1. Battle-Rostered Crew Evaluation Training Grade Slip (page 2)

1. Enter crew and date information to associate the ACE Checklist with the Battle-Rostered Crew Evaluation/Training Grade Slip it supports. Enter the names and ranks of the PC, PI, and NCMs in the blanks provided. Show last names first. Then enter the date in the space provided.

2. Consult the behavioral anchored rating guidance, described in this section, for evaluating crew performance of each Basic Quality.

3. Determine a summary rating (1, 2 . . . 7) for each Basic Quality using the evaluation guidance rating scale. The rating scale is described in this section and reproduced at the bottom of the ACE Checklist.

(Note: Careful use of the rating guidance is necessary. Evaluators are reminded that Basic Quality ratings must be thoroughly guided by the behavioral description of each Basic Quality. Do not compare one crew's behavior to another's; compare behaviors to the behavioral descriptions.)

4. Enter the summary rating in the rating block for each Basic Quality.

5. Sign the Instructor Pilot block.

6. Attach the ACE Checklist to the Battle-Rostered Crew Evaluation/Training Grade Slip it supports.

..... Rating Guidance .....

The 13 Crew Coordination Basic Qualities used to teach and evaluate crew performance in initial crew coordination training are central to the evaluation of continuation training. The rating techniques and tools in this section are to assist evaluators in making objective and reliable evaluations.

Effectiveness Factors

To make accurate assessments of crew coordination, evaluators must be confident that they can identify the Crew Coordination Basic Qualities (BQ) influencing a crew's performance. Effectiveness factors, used to structure the subjects in the academic portion of the Army Crew Coordination Course, can assist evaluators in determining which Basic Quality(ies) contribute to a crew task. Following are the Basic Qualities and their associated effectiveness factors:

AIRCREW COORDINATION EVALUATION (ACE) CHECKLIST

For use of this form, see Aircrew Coordination Exportable Evaluation Package for Army Aviation.

PC _____ Date _____

PI _____

NCM _____

_____

NO	CREW COORDINATION BASIC QUALITIES	RATING
1	Establish and maintain flight team leadership and crew climate (Crew Climate)	
2	Premission planning and rehearsal accomplished (Plan & Rehearse)	
3	Application of appropriate decision making techniques (Decision Tech)	
4	Prioritize actions and distribute workload (Workload)	
5	Management of unexpected events (Unexp Events)	
6	Statements and directives clear, timely, relevant, complete, and verified (Info Xfer)	
7	Maintenance of mission situational awareness (Sit Aware)	
8	Decisions and actions communicated and acknowledged (Comm/Ack)	
9	Supporting information and actions sought from crew (Info Sought)	
10	Crewmember actions mutually cross-monitored (Cross Monitor)	
11	Supporting information and actions offered by crew (Info Offered)	
12	Advocacy and assertion practiced (Advoc/Assert)	
13	Crew-level after-action reviews accomplished (AAR)	

Evaluator's Signature:

Notes:
Consult the behavioral anchored rating guidance. Enter a summary rating (1, 2 ... 7) in the rating block for each Basic Quality. Refer to the rating scale below.

RATING SCALE

Very Poor	Poor	Marginal	Acceptable	Good	Very Good	Superior
1	2	3	4	5	6	7

Figure 6-2. Aircrew Coordination Evaluation (ACE) Checklist

BQ 1 Establish and maintain flight team leadership and crew climate

Leadership Style
Professional Respect
Resolution of Disagreements
Crewmember Attitudes

BQ 2 Premission planning and rehearsal accomplished

Premission Flight Planning
Premission Rehearsal
In-Flight Replanning and Rehearsal

BQ 3 Application of appropriate decision making techniques

High Time Stressed Decisions
Moderate/Low Time Stressed Decisions

BQ 4 Prioritize actions and distribute workload

Task Prioritization
Workload Distribution

BQ 5 Management of unexpected events

Crew Preparation and Composure
Resource Management

BQ 6 Statements and directives are clear, timely, relevant, complete, and verified

Adequacy and Timeliness
Clarity
Acknowledgement

BQ 7 Maintenance of mission situational awareness

Awareness Level of Crew
Awareness of Factors Inhibiting Attention

BQ 8 Decisions and actions communicated and acknowledged

Communication of Decisions and Actions
Clarification and Acknowledgement

BQ 9 Supporting information and actions sought from crew

Solicitation of Crew Input
Solicitation of Crew Assistance

BQ 10 Crewmember actions mutually cross monitored

Scanning for Crew Error
Two-Challenge Rule

BQ 11 Supporting information and actions offered by crew

Anticipation and Offering of Required Information
Anticipation and Offering of Required Assistance

BQ 12 Advocacy and assertion practiced

Advocacy
Rank or Experience Intimidation

BQ 13 Crew-level after-action reviews accomplished

Critique and Improvement of Crew Performance

Rating Scale

The numeric rating scale shown below will be used to assess the level of behavior that crews exhibit for each Basic Quality. These ratings will be posted to the ACE Checklist for each continuation training evaluation. Each Basic Quality is rated using a seven-point scale with values ranging from 1 (very poor) to 7 (superior):

Very Poor	Poor	Marginal	Accept-able	Good	Very Good	Superior
1	2	3	4	5	6	7

Rating Guidelines

Written descriptions of the types of behaviors and levels of performance are shown for rating values 1, 4, and 7. These descriptions serve as behavioral "anchors" and are designed to assist evaluators in determining how well a crew performs on each Basic Quality in relation to a well-defined set of behaviors. The "anchors" are the standard for making ratings--avoid comparing one crew's performance with that of another crew's;

rate a crew's performance in relation to the "anchors." To ensure reliable ratings, evaluators must continue to refer to the anchors when making rating responses until they are *completely* confident and *fully* understand how to rate each Basic Quality.

In completing a Basic Quality rating, evaluators must decide whether the behaviors observed fall into the low end of the Basic Quality range (values 1 or 2), the middle of the range (values 3, 4, or 5), or the high end of the range (values 6 or 7). Once the general range of response is selected, use the anchors to help select the final rating value. For example, if a crew did an adequate job of premission planning and rehearsal, the rating would come from the middle of the range (3, 4, or 5). After determining this, review the behavioral description (anchor) associated with value 4 to determine if crew performance resembled this description (4 value), was somewhat less than this description (3 value), or was a little better than this description (5 value). Use the end-point anchors similarly to help determine ratings that fall near the ends of the scale.

Army aviation crews that have little or no training in aircrew coordination techniques will score most frequently in the lower half of the scale. Most other crews, however, will fall into the middle area of the scale. Keep in mind that although Army aviators have well developed basic flying skills, as a group, their aircrew coordination skills will be much like the rest of the population. A few crews will have strong coordination and communication skills, a few will have weak skills, and a significant number will have moderate skills.

Basic Qualities and Behavioral Anchors

BASIC QUALITY 1. Establish and maintain flight team leadership and crew climate (Crew Climate)

Explanation:

This rating assesses the quality of relationships among the crew and the overall climate of the flight deck. Aircrews are teams with a designated leader and clear lines of authority and responsibility. The pilot-in-command sets the tone of the crew and maintains the working environment. Effective leaders use their authority but do not operate without the participation of other crewmembers. When crewmembers disagree on a course of action, rate the crew's effectiveness in resolving the disagreement. Note: Traditional leadership centralizes leadership in the leader with followers fully dependent on the leader. Functional leadership assigns leadership and followership roles as the situation evolves. Flight team leadership recognizes the impact of leadership style on the working environment. Regardless of leadership style, the pilot-in-command retains final decision and direction authority.

Superior Rating (7)

The crewmembers have very good interpersonal relationships. They respect each others' skills and appear to enjoy being with each other. The climate is very open; crewmembers freely talk and ask questions. Crewmembers encourage the individual with the most information about the situation-at-hand to participate. There is a genuine concern for good working relationships. No degrading comments or negative voice tones are used in interactions. Disagreements are perceived as a normal part of crew interactions, and the crew directly confronts the issues over which the disagreement began. Arguments or disagreements focus on behaviors or solutions rather than on personalities. Each crewmember carefully listens to others' comments. Senior crewmembers accept challenges from junior crewmembers. Alternative solutions are explored. The solution produced is a "win-win" situation in which all crewmembers' opinions are considered. The crewmembers have no hard feelings at the conclusion of the incident.

Acceptable Rating (4)

The crewmembers have sound interpersonal relationships and seem to respect each others' skills. The climate is an open one, and crewmembers are free to talk and ask mission questions. Regardless of rank or duty position, the individual with the most information about the situation-at-hand is allowed to participate. When disagreements arise, the crew directly confronts the issues over which the disagreements began. The primary focus is on behaviors or solutions, and no personal attacks are made in the heat of discussion. The solution is generally seen as reasonable. Problem resolution ends on a positive note with very little hostility or grumbling among crewmembers. Mutual respect is clearly intact.

Very Poor Rating (1)

Crew interactions are often awkward and uncomfortable. The crewmembers do not appear to like or respect each other. Crewmembers may be curt and impolite to each other. Requirements for assistance are made as commands rather than as requests for support. When disagreements arise, the crew fails to directly confront the issues. Personal attacks may arise. Senior crewmembers are resistant to recommendations from junior crewmembers. Crewmembers do not explore the range of possible solutions. They may shout and argue without finding a solution. One or more crewmembers may retreat and say nothing at all. A "win-lose" situation develops in which one crewmember is shown to be right and the other to be wrong. The crewmembers show little respect to one another except for deferring to formal rank.

BASIC QUALITY 2. Premission planning and rehearsal accomplished (Plan Rehearsal)

Explanation:

This rating assesses the premission planning and rehearsal activities that the crew performs upon receiving a mission order. Time available determines whether premission planning and rehearsal is completed prior to the flight or in the cockpit. During this period crews–

- Clarify the mission order and the commander's intent
- Assign actions, duties, and mission responsibilities
- Collect information (intelligence, communications, weather, flight planning) and develop the plan
- Conduct crew briefing to review and discuss the plan
- Identify potential problem areas and courses of action
- Assess risks
- Visualize and rehearse the mission

Although the pilot-in-command is responsible for leading this activity, evaluate the extent and manner in which the entire crew participates. Also, consider the time constraints on the crew. If there is insufficient time to conduct comprehensive planning and rehearsal, evaluate the crew on their planning and rehearsal of the most critical segments of the mission. That is, either prior to the flight or in the cockpit, did the crew address the most important issues given the time available? Note: The relationship among crewmembers should be observed during this period, but the crew climate evaluation should be made on rating Basic Quality 1, Flight Team Leadership and Crew Climate.

Examples:

- UH-60 Task 2078 and AH-64 Task 1033, Perform terrain flight mission planning: The crew will analyze the mission in terms of METT-T and plan the flight as directed by the PC. The crew will rehearse important aspects of the mission.

- UH-60 and AH-64 Task 1000, Conduct crew mission briefing: Aircrew collectively visualizes and rehearses expected and unexpected events from takeoff to tie-down; all factors of the flight; and actions, duties, and responsibilities of each crewmember.

- AH-64 and UH-60 Task 1068, Perform or describe emergency procedures: PC will include in the crew briefing the general approach to all emergency procedures requiring immediate action.

Superior Rating (7)

The entire crew discusses a detailed description of the mission and the commander's intent. All actions, duties, and mission responsibilities are partitioned and clearly assigned to specific individuals. The crew acquires new and updated information and uses it to develop the mission plan from the aircrew mission briefing. Questions and discussion about the mission, commander's intent, and specific responsibilities are encouraged. Potential problems are noted and discussed in detail. Courses of action and individual responsibilities are established in the event that potential problems actually occur. All crewmembers speak out and acknowledge an understanding of the operational risks in the mission plan. The pilot-in-command leads the crew in mentally rehearsing the entire mission by visualizing and talking the crew through potential problems and contingencies. Crewmembers acknowledge understanding their assigned responsibilities and cues for actions. The tone of the interaction is friendly and professional.

Acceptable Rating (4)

A brief description of the mission is provided to the entire crew. The mission responsibilities are partitioned and assigned to specific individuals. Actions are taken to update current information that adds to the aircrew mission briefing and helps develop the mission plan. One or more crewmembers make comments during the course of developing the mission plan. Potential mission problems are only briefly discussed. There is adequate preparation for contingencies. Crewmembers briefly discuss the operational risks in the mission plan. Mental rehearsal is initiated by the pilot-in-command or another crewmember who talks through potential problems or contingencies for one or more mission segments. Some discussion takes place to clarify responsibilities in the event of unexpected problems or contingencies. The tone of the interaction is generally friendly and businesslike.

Very Poor Rating (1)

The pilot-in-command briefs the mission with little or no attendant explanation. There is little or no discussion of responsibilities or their assignments to specific crewmembers. The pilot-in-command develops the mission plan from the aircrew mission briefing and current information. Crewmembers tend not to ask questions about the mission. If asked, questions tend to be cut off, only briefly addressed, or ignored by the other crewmembers. Little or no mention is given to potential problems or complications. No crewmember says anything about operational risks or weaknesses in the plan. Any suggestion to talk through a potential problem or mentally rehearse responsibilities is rejected as unnecessary. The tone of the interaction is business-like, abrupt, and impersonal.

BASIC QUALITY 3. Application of appropriate decision making techniques (Decision Tech)

Explanation:

This rating evaluates the manner and quality of the crew's problem solving and decision making performance throughout the planning and execution of the mission. Factors to consider in making this evaluation include (1) information available to the crewmembers, (2) time urgency of the decision, (3) objectivity reflected in the decision process, and (4) level of involvement and information exchange among the crewmembers. The time critical demands of tactical flying require many decisions to be made on an automatic, pattern-recognition basis with only a minimum level of information exchange. However, when adequate time and information are available, crewmembers are expected to engage in a more deliberate and interactive style of decision making. The evaluation of crew decision making performance should ask the following questions: (1) Did the crew use all of the available information? (2) Was the level of information exchange among crewmembers appropriate for the time available? (3) Was the type of decision process (deliberate versus automatic) appropriate for the time available?

Examples:

- UH-60 and AH-64 Task 2044, Perform actions on contact: Crew will discuss options for developing the situation, then choose a course of action that supports the intent of the unit commander's directives.

- AH-64 and UH-60 Task 2083, Negotiate wire obstacles: Crew will discuss the characteristics of the wires . . . to determine the method of crossing.

Superior Rating (7)

Crew decision making consistently reflects proper attention to available information throughout mission planning and execution. The level of crew participation and deliberate analysis of options is appropriate for the decision time available. Resulting decisions are timely and appropriate given the time urgency and level of information available in each situation. Crewmembers do not exhibit any of the known hazardous thought patterns (e.g., anti-authority, impulsivity, machoism, invulnerability, resignation, get-home-itis, overconfidence in other aviator) and appear motivated to seek the most mission effective and safe decision in each situation. The crew decides and implements a course of action before the situation jeopardizes crew performance or mission accomplishment.

Acceptable Rating (4)

Crew decisions occasionally reflect inadequate sharing or use of available information. On limited occasions, crewmembers dwell excessively on some issues while neglecting more time urgent requirements. Most decisions are timely, but crew performance begins to show signs of self-induced stress. Most decisions are appropriate for the situation, with the crew occasionally overlooking one or more factors or options. Crewmembers occasionally fail to recognize or exploit opportunities for additional planning or rehearsal, substituting instead *ad hoc* strategies or plans. Crewmembers do not exhibit any of the known hazardous thought patterns. The situation may worsen, without seriously degrading mission accomplishment, before the crew decides and implements a course of action.

Very Poor Rating (1)

Crew performance (both preflight and in-flight) reflects an inflexible style of decision making (either deliberate or automatic) regardless of time urgency. Crewmembers may engage in excessive deliberation, overlook the relative time urgency of competing decision requirements, or fall victim to inappropriate mind sets. As a result, decisions frequently lack timeliness, ignore important factors, or appear out of context. Information exchange and crewmember interaction is minimal, with the result that critical input is ignored or not sought. Crewmembers may display one or more of the known hazardous thought patterns (e.g., machoism, anti-authority, get-home-itis). The crew may be unable to decide or implement a course of action before a situation becomes critical.

BASIC QUALITY 4. Prioritize actions and distribute workload (Workload)

Explanation:

This is a rating of the effectiveness of time and work management. Rate the extent to which the crew as a team avoids being distracted from essential activities, distributes workload, and avoids individual crewmember overload.

Examples:

- AH-64 and UH-60 Task 1080, Perform procedures for two-way radio failure: P* will remain focused outside the aircraft or inside the cockpit on the instruments, as appropriate. He will not participate in troubleshooting the malfunction.

- UH-60 Task 2079 and AH-64 Task 1064, Perform terrain flight navigation: P will focus his attention primarily inside the cockpit; however, as workload permits, he will assist in clearing the aircraft and provide adequate warning of traffic and obstacles.

Superior Rating (7)

Virtually all distractions are avoided. Each crewmember understands precisely what information is relevant to the mission and what information is simply a distraction. If a crewmember becomes mildly distracted, other crewmembers remind him to focus on the mission task. Noncritical duties are prioritized and delayed until low workload periods or post-flight periods. Crewmembers are aware of workload build ups on others and readjust workload by assuming emerging, unassigned tasks appropriate for their duty station. Overloads do not occur. The crew's planning horizon is always "ahead of the aircraft."

Acceptable Rating (4)

Most distractions are avoided. The crew performs well in deciding what information and activities are essential to the mission. Most non-essential information is discarded or ignored. Noncritical duties are prioritized and delayed until low workload periods or post-flight periods. Crewmembers are aware of individual crewmember workloads during each phase of the mission. When an individual crewmember appears to be overloaded, other crewmembers take on part of the workload. The crew is always "in sync with the aircraft."

Very Poor Rating (1)

The crew is easily distracted. The crew is unable or unwilling to decide what is important and relevant to the immediate mission. There is little prioritizing of duties or actions. Time and energy may be wasted on low priority tasks. Risks to crew safety may occur as the crew focuses on minor tasks while critical tasks requiring immediate attention go unattended, (e.g., setting a radio frequency when attention should be focused on clearing an obstacle.). Neither the overloaded party nor other crewmembers takes voluntary actions to eliminate an overload condition. The crew makes little or no effort to redistribute task responsibilities as mission changes occur and new tasks arise. Individual crewmembers experience workload overloads. The crew's planning horizon is sometimes "behind the aircraft."

BASIC QUALITY 5. Management of unexpected events (Unexp Events)

Explanation:

This rating evaluates the crew's performance under unusual circumstances that may involve high levels of stress. This judgement includes the integration of technical and managerial aspects of contending with the situation. Note: Enter the abnormal or emergency situation in the Aircrew Coordination Training Grade Slip (some emergency procedure ATM tasks are preprinted) and grade it the same as any task.

Examples:

- AH-64 and UH-60 Task 2008, Perform evasive maneuvers: The most important consideration in an emergency is aircraft control–first assess aircraft controllability, check systems indicators, take evasive action.

- UH-60 Task 1068, Perform or describe emergency procedures: CE will keep communications to a minimum to allow the P* or P to attempt communications outside the aircraft.

Superior Rating (7)

The crew remains calm during the situation. Each crewmember seeks to understand the problem and provides the pilot-in-command with essential information. Each crewmember immediately takes on particular workload responsibilities based on prior discussions and rehearsal of potential problems and contingencies. The crew effectively communicates its actions and results to others and provides feedback to ensure complete coordination of efforts. Each crewmember handles his own responsibilities and seeks to support the crewmember with the greatest workload. The crew rapidly imposes the maximum amount of control possible over the situation given the available time and internal and external resources. A high level of situation awareness is maintained throughout the event.

Acceptable Rating (4)

The crew responds to the problem and the pilot-in-command's requests for information but does not overreact. The pilot-in-command's requests for information are met by feedback from the crew. The crew takes actions to reduce the pilot-in-command's work overload and provides information even if it is not specifically requested. The pilot and crew make good use of available resources. The crew is intense but not flustered by the situation. Adequate situation awareness is maintained throughout the event.

Very Poor Rating (1)

The crew becomes disorganized and flustered. The pilot-in- command's requests for information elicit inadequate responses. Crewmembers may focus on the wrong issues, thus delaying correct diagnosis of the problem. The crew focuses on only one solution to an event, does not consider other plausible alternatives, or chooses an inappropriate solution. Lack of coordinated actions adds to the confusion. The pilot and crewmembers make poor use of available resources to resolve the problem. Situation awareness appears to decay during the situation.

BASIC QUALITY 6. Statements and directives clear, timely, relevant, complete, and verified (Info Xfer)

Explanation:

Rate the completeness, timeliness, and quality of information transfer. Carefully consider the crew's feedback techniques to verify information transfer. In particular, evaluate the quality of instructions and statements associated with navigation activities, obstacle clearing activities, and instrument readouts.

Examples:

- AH-64 Task 1015, Perform ground taxi: The P will announce "Blocking" to acknowledge the P*'s announcement "Braking".
- UH-60 Task 2079, Perform terrain flight navigation: The P* will acknowledge commands issued by the P for heading and airspeed changes.

Superior Rating (7)

Crewmembers communicate frequently. Both senders and receivers use standard terminology for nearly all communications. Senders almost always provide clear, concise information. Receivers acknowledge nearly all messages in sufficient detail so that the sender can verify that the receiver understands the message. Receivers ask for clarification when they do not understand. Senders pursue feedback when no response is forthcoming. Whenever a workload shift or task responsibility transfer occurs, the change is communicated and acknowledged by the crew. All navigation, obstacle clearing, and "inside" or "outside" the cockpit information is stated, acknowledged, and updated.

Acceptable Rating (4)

Crewmembers communicate about the mission as required. Standard terminology is usually used. Receivers acknowledge most messages. Receivers ask questions when they do not understand. Senders usually pursue feedback when no response is forthcoming. Crewmembers are appraised of changes to responsibilities during the flight. "Inside" and "outside" the cockpit duties are specified and communicated to others.

Very Poor Rating (1)

Crewmembers may fail to make statements regarding critical information. Nonstandard terminology is used or standard terminology is used inappropriately. Sender messages may be inappropriately delayed or irregular and may be confusing. Receivers usually do not verbally acknowledge the receipt of messages. Receivers do not ask questions. Senders do not pursue feedback when no response is forthcoming. Changes in responsibilities during the mission are often not communicated and may result in confusion over who has a task responsibility. Navigation instructions and obstacle location information may be incomplete or confusing. At times, "inside" or "outside" the cockpit responsibilities are not clearly communicated.

BASIC QUALITY 7. Maintenance of mission situation awareness (Sit Aware)

Explanation:

This rating assesses the extent to which crewmembers keep each other informed on the status of the aircraft and mission accomplishment. This information reporting helps maintain a high level of situation awareness among the flight crew. Information reported includes:

- Aircraft position and orientation
- Equipment status
- Personnel status
- Environment and battlefield conditions
- Changes to mission objectives

Crew-wide situation awareness is an essential element of safe flying and effective crew performance.

Examples:

- UH-60 Task 2009, Perform multi-aircraft operations: P and CE will provide adequate warning to avoid traffic or obstacles.

- AH-64 Task 2008, Perform evasive maneuvers: When engaged by the enemy, crew will announce the nature and direction of the threat.

Superior Rating (7)

Crewmembers routinely provide each other with updates on the status of the elements of situation awareness and the status of the mission. Crewmembers anticipate the situation awareness needs of others and request needed information when it is not forthcoming. Crewmembers are aware of each others' mental and physical states and are not hesitant to alert others to personal problems that could undermine effective performance. Personnel status is voluntarily shared without fear of sanctions. All changes in the elements of situation awareness are verbalized and acknowledged. Crewmembers alert other crewmembers to the presence of obstacles.

Acceptable Rating (4)

Crewmembers usually provide updates on the status of most of the elements of situation awareness and the status of the mission. Changes to the situation awareness elements are verbalized. Obvious changes in personnel status are noted and acknowledged without fear of sanctions.

Very Poor Rating (1)

Crewmembers do not routinely provide updates on the status of the aircraft or the status of the mission. Generally, updates are provided only on request; they are not made voluntarily. Personnel problems such as fatigue or lack of attention are not mentioned.

BASIC QUALITY 8. Decisions and actions communicated and acknowledged (Comm/Ack)

Explanation:

Rate the extent to which decisions and actions are actually made and announced to the crewmembers after input is solicited from them. Crewmembers should respond verbally or with the appropriate adjustment to their behaviors, actions, or control inputs to clearly indicate that they understand when a decision has been made and what it is. Failure to do so may confuse crews and lead to uncoordinated operation. Note: Due to time constraints in certain situations, there is often little or no time for crews to make inputs to a decision. In such cases, raters should focus on the extent to which decisions are acknowledged verbally or through coordinated, pre-planned action.

Examples:

- UH-60 Task 2086, Perform masking and unmasking: P* will announce his intent to unmask. The P and CE will acknowledge that they are prepared to execute the maneuver.

- AH-64 Task 1038, Perform terrain flight approach: P* will announce intention of a go-around . . . whether approach will terminate to a hover or to the ground. P will acknowledge use of manual stabilator or any intent to deviate from the approach.

Superior Rating (7)

The pilot-in-command states decisions and actions and, time permitting, explains the reasons and intent. Crewmembers acknowledge the decisions with a clear verbal response and ask questions to clarify any confusion. The pilot-in-command answers all questions in a positive, straight-forward manner. Crewmembers keep the pilot-in-command informed of the results of their activities and changing responsibilities--especially visual area of responsibility or task focus. The crew clearly acknowledges results of actions, or changes, and then states its intended adjustments based on the information provided. If crewmembers do not acknowledge or adjust, the pilot-in-command requests acknowledgement. Crewmembers are particularly attentive to the communication of workload responsibilities. When assuming control of the aircraft or making control inputs, notification is always given and acknowledgement received.

Acceptable Rating (4)

The pilot-in-command states decisions and actions along with, time permitting, a brief explanation of the reasons and informs the crew of the adjustments they are expected to make. The crew acknowledges its awareness of the decisions and directions. Crewmembers may ask questions to clarify confusion. The pilot answers questions clearly and quickly and the crew adjusts to the new situation. When assuming control of the aircraft or making control inputs, notification is given and acknowledged.

Very Poor Rating (1)

Decisions and actions of a crewmember are often not passed on to the crew. The pilot-in-command takes unilateral action and does not explain or inform the crew of his intended purpose. The crew is often not aware that a decision has been made. The crew infrequently asks questions for clarification. The pilot-in-command may not acknowledge or respond to questions. The crew may not know how to react to changed circumstances. Crewmembers are often unsure what responsibilities have been assigned to them. Crewmembers may take uncoordinated actions without stating intentions or results. Two pilots may attempt to simultaneously take control of the aircraft when flight control authority is unclear.

BASIC QUALITY 9. Supporting information and actions sought from crew (Info Sought)

Explanation:

This is a rating of the extent to which crewmembers, usually the pilot-in-command, seek support information and support actions from the crew. Evaluate the degree to which crewmembers raise questions during the flight regarding plans, revisions to plans, actions to be taken, and the status of key mission information. Note: The extent to which crewmembers maintain situational awareness and contribute to decision making should be observed here but evaluated on Basic Qualities 7 and 4 respectively.

Examples:

- UH-60 Task 1032, Perform slope operations: P* will request assistance in setting the brakes.
- AH-64 Task 2044, Perform actions on contact: The crew will discuss options for developing the situation.

Superior Rating (7)

During the flight, crewmembers raise questions on plans or changes to plans and actions. Virtually all of these inquiries surface information that contributes to the mission decision making process. When the pilot-in-command realizes that a decision must be made during the flight, for which there is no clear standardized answer, he immediately alerts the crew to the situation and seeks suggestions on possible solutions and important information to consider. The pilot-in-command is open to all suggestions. Crewmembers respond to these inquiries with sound, task-focused discussions and clear answers that are provided in a timely manner. Crewmembers' inquiries are never ignored. All crewmembers encourage such questioning. When the pilot-in-command asks for assistance with actions he clearly states what assistance is required. He provides quick, clear feedback if the crewmember response is not what he expects. He asks for assistance before becoming overloaded.

Acceptable Rating (4)

During the flight, crewmembers occasionally raise questions on plans or actions when they are unclear on decisions being made. Most of these inquiries provide information that is relevant to the mission decision making process. The pilot alerts the crew to the need for decision input. Crewmembers usually respond to these inquiries with brief but reasonable answers. Crewmembers' inquiries are encouraged by other crewmembers most of the time. The pilot-in-command listens to suggestions without interruption or

criticism. He asks for clarification as necessary. He only asks for assistance when he becomes overloaded.

Very Poor Rating (1)

During the flight, crewmembers almost never raise questions about plans, actions, or changes to plans. The pilot-in-command makes mission decisions without seeking inputs from other crewmembers. The pilot-in-command does not alert the crew that a decision is required or is being made. Decision making and planning are done by one individual with little or no discussion--an observer will have difficulty noting this quality for "very poor" crews since it is hard to detect individual decision making. The few inquiries that are made are generally ignored or abruptly answered. Crewmembers may discourage others from asking questions by the tone of voice they use or by failing to respond. The pilot-in-command may not ask for crew assistance with tasks even when he is overloaded to the point of nearly failing to properly execute tasks.

BASIC QUALITY 10. Crewmember actions mutually cross monitored (Cross Monitor)

Explanation:

This rating captures the extent to which a crew uses cross monitoring as a mechanism to avoid errors and improve future performance. Crewmembers are able to catch each other's errors. Such redundancy is particularly important when crews are fatigued or overly focused on critical task elements, and thus more prone to make errors. Included in this rating is the crew's use of aircraft technical manual checklists to perform required procedure checks and procedures (i.e., engine-start, run-up, before-takeoff, before- and after-landing, shutdown checks; HIT and emergency procedures). Note: This quality does not imply that task responsibilities are not clearly defined. It asks the question "To what extent do crewmembers help an individual assigned primary responsibility for a task or action by reviewing the quality of that individual's task execution and alerting him to any mistake noted?"

Examples:

- AH-64 Task 1094, Identify major US or allied equipment and major threat equipment: P* or P will announce the type and direction of the equipment detected. The other crewmember will confirm the type and direction of the equipment.

- UH-60 task 1023, Perform fuel management procedures: PC will confirm the results of the fuel check.

Superior Rating (7)

Each crewmember is concerned that all tasks are properly executed and checks both his tasks and those of others. When mistakes are noted, the crewmember making the error is quickly informed in a concise manner without excessive formality. The mistake maker accepts this review and feedback as a normal part of crew operations.

Acceptable Rating (4)

Crewmembers often check each other's task performance for errors. Mistake makers are informed and make the needed corrections. Only occasionally are mistake makers annoyed at being checked and corrected.

Very Poor Rating (1)

Crewmembers seldom, if ever, check each other's task execution. Crewmembers are insulted if they are corrected by another crewmember.

BASIC QUALITY 11. Supporting information and actions offered by crew (Info Offered)

Explanation:

This is a rating of the extent to which crewmembers anticipate and offer support information and support actions to the decision maker, usually the pilot-in-command, when it becomes apparent that a decision must be made or an action taken.

Examples:

- UH-60 Task 2016, Perform external load operations: All crewmembers will assist in clearing the aircraft and will provide adequate warning of obstacles, unusual drift, or altitude changes.

- UH-60 and AH-64 Task 1081, Perform nonprecision approach: P will call out the approach procedure to the P*.

Superior Rating (7)

The crew recognizes that a decision must be made and offers suggestions and information to the pilot-in-command. The crew checks for responses that indicate understanding. The information is repeated, as necessary, to ensure that the pilot-in-command understands the input. Pilot-in-command responses can be verbal or non-verbal actions. The crew seeks information and provides it to support decisions and actions. The crew frequently offers task execution support. The support offered always reflects the pilot-in-command's task needs. Crews are quick to offer support during particularly difficult tasks such as obstacle clearing.

Acceptable Rating (4)

The crew recognizes that a decision or action must be made and offers suggestions and information to the pilot-in-command. The crew sometimes offers task execution support. Crewmembers usually offer obstacle clearing support.

Very Poor Rating (1)

The crew does not offer suggestions and inputs to support decision making or actions. Moreover, it often appears that the crew does not even realize that a decision is being made. The crew generally does not offer its services to support task execution for other crewmembers. Crewmembers may fail to offer obstacle clearing support.

BASIC QUALITY 12. Advocacy and assertion practiced (Advoc/Assert)

Explanation:

This rating evaluates the extent to which crewmembers advocate a course of action they consider best, even when it may differ with the one being followed or proposed. Note: Except under extreme emergency conditions where time is absolutely critical, it is usually in the crew's best interest to hear the full range of viewpoints available.

Examples:

- UH-60 and AH-64 Task 2083, Negotiate wire obstacles: Crew will discuss the characteristics of the wires . . . to determine the method of crossing.
- AH-64 Task 2044, Perform actions on contact: Crew will discuss options for developing the situation.

Superior Rating (7)

Crewmembers state to the rest of the crew a course of action that they consider best. They clearly explain their reasons for believing this to be the best course. Other crewmembers listen to the argument before presenting any criticism or proposing alternate courses. Discussions focus on the strengths and weaknesses of the proposed course of action, not on the personality of the crewmember who proposed the action. Crewmembers call the crew's attention to changes in the situation and provide information that is essential to the proper execution of another crewmember's task. Crewmembers pursue feedback to ensure that their views are heard and understood. Other crewmembers expect such open comments and view them as positive contributions to mission performance.

Acceptable Rating (4)

Crewmembers state their support for a course of action or suggest improvements to other proposed actions. Each crewmember makes an effort to explain his position and convince others to concur with him on the course of action to be taken. Other crewmembers may interrupt with their views and alternatives. Crewmembers usually speak out when they recognize a departure from the mission plan or standard procedures or when they have a piece of information that is important to another's task execution. Crewmembers seek assurances that presented information has been received. Other crewmembers view such comments as constructive and not as a challenge to authority.

Very Poor Rating (1)

The crew almost never suggests a course of action. Crewmembers attempting to propose a course of action may be cut-off before they can propose the action or explain the rationale for that action. Crewmembers proposing courses of action may receive personal attacks. The crew raises few, if any concerns. Crewmembers may even fail to intervene when risks such as obstacles or poor visibility arise.

BASIC QUALITY 13. Crew-level after-action reviews accomplished (AAR)

Explanation:

This rating evaluates the extent to which the crew reviews and critiques its decisions and actions during or following a mission segment, during low workload periods, or during the post flight debrief. Evaluate the crew on their discussion of strengths and weaknesses (for example, what was done wrong, what might be done better, how improvements can be made, and what was done very well) in flight skills and aircrew coordination.

Superior Rating (7)

The entire crew reviews and critiques its decisions and actions throughout the mission, including the pre-mission planning and rehearsal process. Crewmembers review factors considered in making their decisions, identify additional options or factors, including ways to "buy time," that should have been considered, and discuss different methods of weighting information in the decision process. All discussions focus on behaviors and information and carefully avoid any "finger-pointing" tones. The focus is clearly on education and understanding to improve individual and collective performance.

Acceptable Rating (4)

Senior crewmember(s) review and critique the crew's decisions and actions during problematic segments of the mission. They determine the major mistakes in the crew's actions or decisions and identify remedial actions or alternative options for future missions. Although the critiques are intended to educate the crew and to improve their performance during future missions, they may include some accountability for unsatisfactory performance.

Very Poor Rating (1)

The crew either fails to review and critique its mission performance or if a critique is performed, it is punitive or accusatory. That is, the critique is conducted primarily to assign blame for unsatisfactory performance. Little effort is made to identify lessons learned or to suggest constructive ways to improve future performance.

..... Evaluator Worksheet .....

The addition of crew coordination actions to ATM task standards places an increased demand on the individual evaluator's full attention. This section provides a technique for evaluators to make rapid and accurate entries (for example, grades and ratings) without excessively diverting their attention from evaluating crew performance.

The evaluator worksheet is used by evaluators to record information during all phases of the mission (that is, premission planning and rehearsal, mission execution in a simulator or aircraft, and after-action review). The worksheet provides a kneeboard-sized format to sequence crew tasks and record notes for preparing continuation training grade slips. Evaluators make circle or fill-in type entries for grades and Basic Qualities and take notes on crew task performance.

Evaluator worksheets are scenario specific. A set of worksheets must be prepared for each evaluation scenario. Instructions for tailoring the basic worksheet format (see Figure 6-3) to unit unique missions, conditions, and crew tasks are given below:

- Organize the evaluator worksheets by mission segments in accordance with each scenario outline. Figure 6-3 represents one segment of a multiple-segment scenario. A box is drawn around the information for each topic on the worksheet to help scan and locate desired information quickly. Arrange the information boxes in scenario outline sequence.

- **Segment number.** This information box includes the segment title and a description of the events that begin and end the segment including crew task and mission performance related events.

- **Crew task number.** The crew task number and title is from the commander's list of METL-based crew tasks for continuation training evaluation. Although crew tasks may be executed more than once within a mission segment, it is not necessary to repeat them in the worksheet segment.

- **Grade.** The pre-printed crew task performance grades include the expanded grading system (S+, S, S-, U) used to evaluate initial crew coordination training. The expanded grading system is used to provide more precise evaluation of crew coordination strengths and weaknesses for input to the Battle-Rostered Crew Evaluation/Training Grade Slip grades and written comments.

- **Basic Qualities.** Fill-in lines are provided for entering Basic Quality numbers from the reference table at the bottom of each worksheet. Entries indicating the Basic Quality(ies) that contribute to crew task performance are input to the ACE Checklist ratings and Battle-Rostered Crew Evaluation/Training Grade Slip written comments.

- **Notes.** Blank space is provided for evaluator notes. Entries include reminders for input to grade slips (for example, superior or poor performance) and points to emphasize in the evaluator debriefing.

- **Segment overall.** The last block in a mission segment, this topic presents criteria to evaluate the crew's performance of this segment as if it were a separate mission. Segment overall entries provide input information for the Battle-Rostered Crew Evaluation/Training Grade Slip overall grade.

- **Basic Qualities reference.** Located at the bottom of each worksheet page, this block displays the Basic Quality short titles for reference during continuation training evaluations.

SEGMENT 2: Cross-FLOT air assault

DESCRIPTION: The segment begins when the troops have been loaded on the aircraft. It involves moving troops along a prescribed route in a medium-to-high threat environment, delivering them to the LZ, and then returning to the PZ. The crew will act as flight lead for a flight of five UH-60 helicopters. The segment ends when the crew returns to the PZ.

TASK UC5 Perform FARP operations

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

TASK UC3 Perform multiaircraft operations

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

TASK UC2 Perform tactical movement along an air route

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

SEGMENT 4 OVERALL Crew's ability to navigate the prescribed course, avoid and evade the threat, and deliver the troops to the correct location at the prescribed time.

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLIMATE	2. PLAN & REHEARSE	3. DECISION TECH	4. WORK-LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS MONITOR	11. INFO OFFERED	12. ADVOC ASSERT	13. AAR

Figure 6-3. Evaluator Worksheet

7

Unit Operations

This section provides information and suggests ways to apply crew coordination evaluation results to unit training and operations. These techniques and tools are offered to communicate insights gained during the research and development phase of the Crew Coordination Program that can benefit aviation unit operations.

..... Mission Performance Measures .....

ATMs emphasize that research has shown direct, positive effects of crew coordination on flight safety and mission performance. This section provides information on mission performance measures that extend the evaluation of crew coordination from ATM tasks and crew tasks to overall mission performance. Used in the USAAVNC crew coordination research experiments, mission performance measures can help units relate crew coordination evaluation results to unit operations (for example, rounds or missiles on target, difference between planned and actual time of arrival). Suggestions for developing mission performance measures, to include example measures, are given below.

The process for developing crew tasks described in TC 1-210, "Commander's Guide to Individual and Crew Training," includes a review of unit and collective training publications (for example, ARTEP Mission Training Plan (MTP), Battle Drills). Analysis of the MTP missions (attack and utility helicopter units, etc.) is a guide to the identification of mission performance areas and specific mission performance measures for evaluation. Study of potential mission performance areas is necessary to ensure that they can be realistically included in scenario segments and evaluated in a flight simulator or aircraft.

The mission performance measurement areas listed below were selected to evaluate crew coordination in the USAAVNC crew coordination validation testbed. These types of measures were found to be highly relevant to utility helicopter missions. They will, however, have to be modified for other aircraft missions.

- **Terrain flight navigation.** Scenario mission requirements demand close compliance with specific flight routes and schedules.
- **Threat avoidance and evasion.** Enemy situation in the scenario includes different enemy anti-aircraft systems.
- **Aircraft emergencies.** Scenario-related aircraft malfunctions can be programmed to occur during the mission.

- **Unexpected event.** Visibility and weather conditions, forecast for the entire mission, can be adjusted to create inadvertent instrument meteorological conditions.

- **Instrument flight recovery.** Aircraft and landing site equipment availability can be controlled to require a non-precision instrument approach procedure.

- **Mission threatening crew error.** Potential accident and/or injury situations are present in every scenario.

Doctrinal, training, and equipment publications are guides to develop specific performance measures within each mission area. Prepare written descriptions to detail what to measure, how to collect performance data, and parameters or metrics for each performance measure. For example, in the USAAVNC research, five specific performance measures were developed for Terrain Flight Navigation (see Table 7-1).

Table 7-1. Terrain Flight Navigation Performance Measures

What to Measure	How to Collect	Measurement Parameters
Number (N) of deviations from the corridor due to misorientation	UH-60 FS printout, page 25, "Cross Country map" (12 x 12 K or 24 x 24 K) with ground track trace; also can be verified by video tape review	Sum (N)
Distance of deviation outside corridor due to misorientation	UH-60 FS printout, page 25, "Cross Country map" (12 x 12 K or 24 x 24 K) with ground track trace; also can be verified by video tape review	Sum (N) <500m Sum (N) >500m <1500m Sum (N) >1500m Sum (N)
Deviation (seconds) from required time of arrival at landing zone	Live observation/time on tape	Actual time compared to time designated in OPORD/ FRAG
Number (N) of mission (route) segments completed	Live observation; FS printout	Sum (N)
Time (seconds) to fly each mission segment	Live observation/time on tape	Actual time compared to time designated in OPORD/ FRAG

..... Risk Management .....

TC 1-210 describes risk management as:

> "A tool leaders can use to make smart risk decisions in tactical operations. It allows leaders to execute more realistic training not otherwise practical because of the high probability of accidents. Risk management is a common sense way of accomplishing the mission with the least risk possible."

Not limited to peacetime situational training exercises, risk management is a fully integrated part of mission planning and execution during actual combat. Commanders, staff, troop leaders, and individual soldiers are responsible for the effective management of risk.

As commanders and staff apply the guidance in TC 1-210, they should make full use of crew coordination evaluation results in their SOPs and programs to manage risk. Crew risk assessment is central to Army aviation's three-tier approach to risk management: individual, crew, and collective/unit training. Current guidance includes two considerations for assessing crew risk: 1) whether the crew is battle-rostered and 2) how long since the crew has flown together.

Crew coordination evaluation results provide a rich source of reliable, objective information on crew strengths and weaknesses. Detailed information contained in the crew coordination evaluation grade slips and crew performance measures is relevant and should be included in assessing crew risk. The following examples present the types of crew evaluation results information that should be considered in risk matrices and risk analysis techniques. For a given mission complexity and difficulty, consider crew strengths and weaknesses by referring to:

1. ACE Checklist ratings for Basic Qualities

    - Crew proficiency can be determined by totaling the ratings for each Basic Quality and computing an average rating for the crew (that is, sum the rating values for all Basic Qualities and divide by 13). This provides an average rating (that is, (1) Very Poor to (7) Superior) for each crew.

2. Crew Task Grades

    - Perform tactical movement along an air route
    - Perform multiaircraft operations
    - Perform target handover/engagement

3. Mission Performance Measures

   - Deviations from air corridor
   - Threat avoidance
   - Mission segments completed

..... Crew Tracking and Unit Readiness .....

TC 1-210 requires that unit commanders maintain crew task iteration tracking sheets and crew grade slips. A Crew Training Record (DA Form 7122-R) is provided to monitor a crew's progress in completing the commander's designated tasks and required iterations (e.g., day, night, night vision device).

The ACE Checklist attached to each crew evaluation grade slip provides an additional source of information to track crew progress. Units can record and compare the rating column entries across a series of ACE Checklists to identify the crew's strengths, weaknesses, and trends with respect to Basic Qualities. This information can be used to tailor continuation training for a crew and provide focus areas for evaluators.

Evaluation results recorded on the ACE Checklist can be extended to assist commander's in determining the status of unit crew coordination training and unit readiness.

The status of crew proficiency can be determined by totaling the ratings for each Basic Quality across all crews and computing an average for each Basic Quality (that is, sum the rating values for Basic Quality 1 across all crews and divide by the number of crews; repeat the process for Basic Qualities 2-13). This provides a unit-level average rating (that is, (1) Very Poor to (7) Superior) for each Crew Coordination Basic Quality. This information can be used to identify a unit's crew coordination strengths and weaknesses and to assist in determining the number of days needed to fully train to standard on unit METL tasks.

Crew coordination evaluation results can provide supporting data for the commander's assessment of unit readiness. Total all Basic Quality ratings for all crews and compute a unit average rating (that is, sum all rating values for all Basic Qualities for all crews, divide by 13, and then divide by the number of crews). This provides a unit average crew coordination rating (that is, (1) Very Poor to (7) Superior). This information can be used to support the commander's aviator training readiness C-rating based on percent of RL-1 crews.

8

References

Department of the Army. (1984, January 20). Tactical flight procedures (TC 1-201). Washington, D.C.: Author.

Department of the Army. (1988, November 15). Training the force (FM 25-100). Washington, D.C.: Author.

Department of the Army. (1989, February 28). Doctrinal principles for Army aviation in combat operations (FM 1-100). Washington, D.C.: Author.

Department of the Army. (1989, May 18). Mission training plan for the attack helicopter company (ARTEP 1-187-30-MTP). Washington, D.C.: Author.

Department of the Army. (1989, August 18). Mission training plan for the assault helicopter company (ARTEP 1-103-30-MTP). Washington, D.C.: Author.

Department of the Army. (1990, May 30). Aviation flight regulations (Army Regulation 95-1). Washington, D.C.: Author.

Department of the Army. (1990, September 30). Battle focused training (FM 25-101). Washington, D.C.: Author.

Department of the Army. (1991, September 30). Helicopter gunnery (TC 1-140). Washington, D.C.: Author.

Department of the Army. (1992, March). Attack helicopter, AH-64. Aircrew Training Manual (Draft) (TC 1-214). Washington, D.C.: Author.

Department of the Army. Utility helicopter, UH-60. Aircrew Training Manual (Draft) (TC 1-212). Washington, D.C.: Author.

Department of the Army. (1992, May 20). Commander's guide to individual and crew training. Aircrew Training Program (TC 1-210). Washington, D.C.: Author.

Grubb, G. (1992, August). Crew coordination training evaluator's workbook (Draft). Wilmington, MA: Dynamics Research Corporation.

Grubb, G., & Simon, R. (1992, October). Development of crew coordination evaluation methods and materials. Wilmington, MA: Dynamics Research Corporation.

Pawlik, E., Simon, R., Grubb, G., & Zeller, J. (1992, August). Volume 1: Exportable training package. Wilmington, MA: Dynamics Research Corporation.

U.S. Army Aviation Center. (1991, June). US Army aviation battle drills (Draft). Fort Rucker, AL: Author.

9

Reproducibles

This section provides a blank ACE Checklist and a blank Evaluator Worsheet so that you can reproduce them as needed.

AIRCREW COORDINATION EVALUATION (ACE) CHECKLIST

For use of this form, see Aircrew Coordination Exportable Evaluation Package for Army Aviation.

PC _____ Date _____

PI _____

NCM _____

_____

NO	CREW COORDINATION BASIC QUALITIES	RATING
1	Establish and maintain flight team leadership and crew climate (Crew Climate)	
2	Premission planning and rehearsal accomplished (Plan & Rehearse)	
3	Application of appropriate decision making techniques (Decision Tech)	
4	Prioritize actions and distribute workload (Workload)	
5	Management of unexpected events (Unexp Events)	
6	Statements and directives clear, timely, relevant, complete, and verified (Info Xfer)	
7	Maintenance of mission situational awareness (Sit Aware)	
8	Decisions and actions communicated and acknowledged (Comm/Ack)	
9	Supporting information and actions sought from crew (Info Sought)	
10	Crewmember actions mutually cross-monitored (Cross-Monitor)	
11	Supporting information and actions offered by crew (Info Offered)	
12	Advocacy and assertion practiced (Advoc/Assert)	
13	Crew-level after-action reviews accomplished (AAR)	

Evaluator's Signature:

Notes:
Consult the behavioral anchored rating guidance. Enter a summary rating (1, 2 ... 7) in the rating block for each Basic Quality. Refer to the rating scale below.

RATING SCALE

Very Poor	Poor	Marginal	Acceptable	Good	Very Good	Superior
1	2	3	4	5	6	7

AIRCREW COORDINATION EVALUATION (ACE) CHECKLIST

SEGMENT :

DESCRIPTION:

TASK

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

TASK

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

TASK

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLIMATE	2. PLAN & REHEARSE	3. DECISION TECH	4. WORK-LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS MONITOR	11. INFO OFFERED	12. ADVOC ASSERT	13. AAR

TASK

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

TASK

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

TASK

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

SEGMENT OVERALL

GRADE: S+ S S- U Basic Qualities: ___, ___

NOTES:

AIRCREW COORDINATION BASIC QUALITIES												
1. CREW CLIMATE	2. PLAN & REHEARSE	3. DECISION TECH	4. WORK-LOAD	5. UNEXP EVENTS	6. INFO XFER	7. SIT AWARE	8. COMM ACK	9. INFO SOUGHT	10. CROSS MONITOR	11. INFO OFFERED	12. ADVOC ASSERT	13. AAR