

2

AD-A181 996

DTIC FILE COPY



**AIR COMMAND
AND
STAFF COLLEGE**

STUDENT REPORT

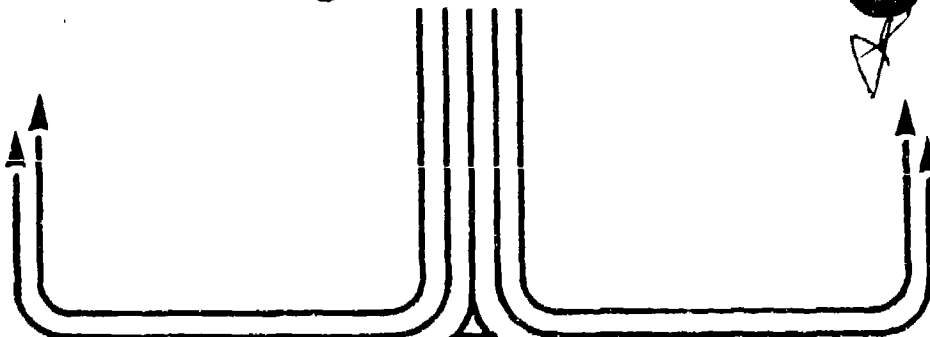
THE HERK AND JA/ATT

MAJOR JEFFREY A. NORTHGRAVES 87-1890

"insights into tomorrow"

**DTIC
ELECTE
JUL 09 1987**

**S
E**



This document has been approved for public release and sale; its distribution is unlimited.

87 7 3 20

DISCLAIMER

The views and conclusions expressed in this document are those of the author. They are not intended and should not be thought to represent official ideas, attitudes, or policies of any agency of the United States Government. The author has not had special access to official information or ideas and has employed only open-source material available to any writer on this subject.

This document is the property of the United States Government. It is available for distribution to the general public. A loan copy of the document may be obtained from the Air University Interlibrary Loan Service (AUL/LDEX, Maxwell AFB, Alabama, 36112) or the Defense Technical Information Center. Request must include the author's name and complete title of the study.

This document may be reproduced for use in other research reports or educational pursuits contingent upon the following stipulations:

-- Reproduction rights do not extend to any copyrighted material that may be contained in the research report.

-- All reproduced copies must contain the following credit line: "Reprinted by permission of the Air Command and Staff College."

-- All reproduced copies must contain the name(s) of the report's author(s).

-- If format modification is necessary to better serve the user's needs, adjustments may be made to this report--this authorization does not extend to copyrighted information or material. The following statement must accompany the modified document: "Adapted from Air Command and Staff Research Report _____ (number) entitled _____ (title) by _____ (author) ."

-- This notice must be included with any reproduced or adapted portions of this document.



REPORT NUMBER 87-1890

TITLE THE HERK AND JA/ATT

AUTHOR(S) MAJOR JEFFREY A. NORTHGRAVES, USAF

FACULTY ADVISOR MAJOR RONALD A. NEWTON, ACSC/EDCJ

SPONSOR LT COL JAMES W. KAHLER, HQ MAC/DOOMT

Submitted to the faculty in partial fulfillment of
requirements for graduation.

AIR COMMAND AND STAFF COLLEGE
AIR UNIVERSITY
MAXWELL AFB, AL 36112

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

DD FORM 1473 APR 73

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS			
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION/AVAILABILITY OF REPORT STATEMENT "A" Approved for public release; Distribution is unlimited.			
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) 87-1890		5. MONITORING ORGANIZATION REPORT NUMBER(S)			
6a. NAME OF PERFORMING ORGANIZATION ACSC/EDCC	6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION			
6c. ADDRESS (City, State and ZIP Code) Maxwell AFB AL 36112-5542		7b. ADDRESS (City, State and ZIP Code)			
8a. NAME OF FUNDING/SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER			
8c. ADDRESS (City, State and ZIP Code)		10. SOURCE OF FUNDING NOS.			
11. TITLE (Include Security Classification) THE HERK AND JA/ATT		PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT NO.
		12. PERSONAL AUTHOR(S) Northgraves, Jeffrey A., Major, USAF			
13a. TYPE OF REPORT	13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Yr., Mo., Day) 1987 April	15. PAGE COUNT 41		
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB. GR.			
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
<p>This is a handbook for mission planners, executioners, and users who are involved in C-130 Joint Airborne/Air Transportability Training (JA/ATT). The handbook emphasizes the tactical level of responsibility of the mission commander and user coordinator. The considerations and coordination requirements to fulfill the Joint Training mission are identified, explained, and compiled.</p>					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input checked="" type="checkbox"/> DTIC USERS <input type="checkbox"/>			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a. NAME OF RESPONSIBLE INDIVIDUAL ACSC/EDCC Maxwell AFB AL 36112-5542		22b. TELEPHONE NUMBER (Include Area Code) (205) 293-2483	22c. OFFICE SYMBOL		

PREFACE

The Joint Airborne/Air Transportability Training (JA/ATT) program is a Joint Chiefs of Staff sponsored, Air Force funded, Military Airlift Command (MAC) managed program that provides vital combat readiness training for MAC aircrews and users from other services. The JA/ATT mission is an integral part of our joint training program and directly contributes to the realistic training of our military forces. Each JA/ATT mission involves extensive coordination, planning, and preparation in order to derive the maximum JOINT training benefit attainable.

This handbook provides considerations for the individuals responsible for the execution level of C-130 JA/ATT missions. The mission commander, planners and briefers, coordinators, user, and aircrew members will find communication and cooperation requirements in a JA/ATT environment. This book overviews the aircraft capabilities, coordination and training requirements, and peacetime training restrictions. Information necessary for maximizing Joint training is consolidated in this handbook.

This document will be published as a MAC or FORSCOM handbook after review and approval of content by HQ MAC/DOOMT and FORSCOM.

The author would like to personally thank Lt Col Rob Myer, Lt Col Jim Kahler, and Major Ron Newton for their invaluable inputs, advice, and guidance in the preparation of this project.



Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

ABOUT THE AUTHOR

Major Jeffrey A. Northgraves attended the US Air Force Academy and was commissioned in June 1974. After completing Undergraduate Navigator Training in April 1975, he was assigned to Little Rock Air Force Base, Arkansas, as a C-130E navigator. In November 1977, Major Northgraves was assigned to Rhein-Main Air Base, Federal Republic of Germany, as an instructor navigator on Adverse Weather Aerial Delivery (AWADS) C-130 aircraft. He returned to Little Rock AFB as an instructor and evaluator in the 62d Tactical Airlift Squadron Replacement Training Unit. While stationed at Little Rock AFB, Major Northgraves held the position of Wing Standardization/Evaluation Navigator, 314th Tactical Airlift Wing, and worked as a maintenance officer in the Volant Wrench Program. In August 1986, Major Northgraves entered the Air Command and Staff College, Maxwell AFB, Alabama.

Major Northgraves was an Honor Graduate of Air-Ground Operations School, Hurlburt AFB, Florida. He has over ten years of experience as an aircrew member, planner and briefer, mission commander, and higher headquarters evaluator on JA/ATT missions.

Major Northgraves received his Bachelor of Science in Psychology from the USAF Academy and his Masters of Science in Operations Management from the University of Arkansas. He is a 1978 graduate of Squadron Officer School and completed Air Command and Staff College by seminar in 1983. He completed the Aircraft Maintenance Officer Course in 1984 and is a senior navigator with over 4,000 hours flying time.

TABLE OF CONTENTS

Preface.....	iii
About the Author.....	iv
List of Illustrations.....	vii
Glossary.....	viii
 CHAPTER ONE--INTRODUCTION.....	 1
 CHAPTER TWO--C-130 TACTICAL CAPABILITIES	
Delivery Methods.....	3
Employment Methods.....	4
JA/ATT Missions.....	4
 CHAPTER THREE--MISSION REQUIREMENTS	
Information Requirements.....	6
Time.....	6
Load.....	7
User Needs.....	7
The Training Mission.....	8
Continuation Training.....	8
Visual Airdrop.....	9
Low Level Visual.....	9
Lead.....	10
Coordination.....	10
 CHAPTER FOUR--RESTRICTIONS	
Aircraft.....	12
Endurance.....	12
Aircraft Weight.....	12
Cargo.....	12
Runway.....	13
Aircrew.....	13
Weather.....	14
 CHAPTER FIVE--SUMMARY.....	 15

CONTINUED

BIBLIOGRAPHY.....	17
INDEX.....	20
APPENDICES	
Appendix A--C-130E Operating Information.....	23
Appendix B--Weather Requirements.....	24
Appendix C--Prelaunch Sequence of Events.....	25
Appendix D--Minimum Size DZ.....	27
Appendix E--Airdrop Type - Number of Items - Altitudes....	29
Appendix F--Parachute - Load Weights - Altitude.....	30
Appendix G--Coordination Checksheet.....	31

LIST OF ILLUSTRATIONS

TABLES

TABLE 1--JA/ATT Missions.....	4
TABLE 2--JA/ATT Quantified.....	5
TABLE 3--Key Times.....	7
TABLE 4--Training Events.....	8

GLOSSARY

- Adverse Weather Aerial Delivery System (AWADS):** A multipurpose avionics system designed to assist aircrews in performing aerial delivery missions during conditions of low visibility or darkness.
- Airborne Station Time:** A specified time when parachutists will be seated in the aircraft with seat belts fastened. This time normally will be five minutes prior to Air Force Station Time.
- Airdrop:** Aerial delivery of personnel, supplies, and/or equipment from an aircraft in flight.
- Air Force Station Time:** A specified time at which aircrew, passengers, and material are to be in the aircraft and prepared for flight. Normally, station time will be 35 minutes prior to takeoff time for tactical formations.
- Allowable Cabin Load (ACL):** The maximum payload which can be carried on a mission. It may be limited by the maximum takeoff gross weight, landing gross weight, or zero fuel weight.
- Assault Landing:** Landing which requires use of procedures outside the parameters of normal landings due to runway length or environment--also maximum effort landing.
- Combat Offload:** Methods by which palletized cargo is offloaded without materials handling equipment.
- Computed Air Release Point (CARP):** A computed air position at which the release of personnel, equipment, containers, and bundles is initiated to land on a specified point of impact (PI). A CARP is normally computed for all airdrops (except LAPES) that do not have a free fall vector.
- Container Delivery System (CDS):** An aerial delivery system which provides for an airdrop of A-series container bundles weighing 500 to 2,200 pounds each.

CONTINUED

Employment: The tactical use of aircraft in a desired area of operation.

Engines Running On and Off Load (ERO): Loading or off-loading aircraft with engines running.

Heavy Equipment (HE): An aerial delivery system which provides for an airdrop of heavy palletized cargo weighing 2,520 to 35,000 pounds each. An extraction chute is used to pull the pallet from the aircraft.

High Altitude High Opening (HAHO): Airdrop of personnel above 3,000 feet AGL when parachutists deploy their chutes after a short delay and glide to the landing site.

High Altitude Low Opening (HALO): Airdrop of personnel or containers using a freefall or high velocity vector prior to chute opening at low altitude.

Joint Airborne/Air Transportability Training (JA/ATT): Continuation/proficiency combat airlift training conducted in support of DOD agencies. It includes airdrop, air assault, aircraft load training, and service school support.

Low Altitude Parachute Extraction System (LAPES): A self-contained delivery system capable of accurate low level delivery of heavy loads into an area where airland or conventional airdrop is not feasible.

Maximum Effort Landing: SEE Assault Landing.

Mission Commander: The individual MAC representative designated to take action to assure successful accomplishment of the mission.

Sequential Extraction: Delivery of two or more platforms during the same drop. As the first platform is extracted, it in turn deploys the second extraction chute.

Special Operations Low Level (SOLL): Special operation missions performed by selected aircrew members who receive special

CONTINUED

training. SOLL I can be conducted by any tactical airlift wing, SOLL II is performed only by designated wings by aircrews trained with night vision goggles.

Station Keeping Equipment (SKE): Airborne avionics equipment which permits maintenance of accurate spatial relationships between SKE equipped aircraft.

Tactical Airlift Liaison Officer (TALO): Airlift qualified officers assigned duties with US Army combat units.

Time Over Target (TOT): The scheduled arrival time at an objective area. The desired time of airdrop release at a drop zone.

Usable Drop Zone Time: Usable drop zone length converted to time.

Visual Meteorological Conditions (VMC): Weather conditions that permit flight operations in a visual environment.

WEDGE: Personnel/Ramp Bundle Airdrop System. A maximum of six A-7A/A-21 type bundles and 40 combat-equipped parachutists may be airdropped using the wedge.

Chapter One

INTRODUCTION

The purpose of this handbook is to provide considerations and restrictions for C-130 tactical mission users and planners in the Joint Airborne/Air Transportability Training (JA/ATT) environment. The information will be of value to the Tactical Airlift Liaison Officers (TALO) assigned to Army units and to the Military Airlift Command (MAC) wing level airdrop mission planners, but is primarily designed to assist the executioners of JA/ATT missions, the MAC mission commander and the supported unit's coordinator. Basic Aerospace Doctrine (AFM 1-1) provides justification for JA/ATT missions: "As a combat mission, airlift projects power through airdrop, extraction, and airlanding of ground forces and supplies into combat." We find the conception of joint airborne operations even in the early years of aviation. Colonel William (Billy) Mitchell proposed an airborne assault on Metz, France in October 1918. From then until now, the capability of our tactical airlift forces to succeed in a joint arena has been critical. The US Army concept of employment echoes the Air Force commitment to joint operations:

- a. Army airborne forces may be strategically or tactically deployed, that is, moved or relocated by air, on short notice to any land area with the delivery capability of the airlift force, and employed as a deterrent or combat force.
- b. Airborne forces execute parachute or airlanded assaults to seize and hold important objectives until ground linkup or withdrawal can be accomplished or until reinforced by air or amphibious landing.

The preparation for that capability is training, which AFM 1-1 defines as ". . . a force wide, continuous process of applying education, skills, and experience to the goal of producing a credible, cohesive warfighting team." JA/ATT provides MAC and the services the opportunity to jointly develop and apply airdrop and air assault operations.

The importance of JA/ATT, to C-130 aircrew and US Army joint training, requires aggressive involvement by all participants. "In this era of fewer dollars and flight hours the value of the JA/ATT. . . can only rise as we have to make sure that the right people get the right training." The ultimate responsibility for

accomplishing the training rests with the executioners of the JA/ATT. This is also the level where breakdowns in the "joint" communication and coordination too often occur. The reasons for the breakdown are varied, but fall into two basic categories:

1. Attitude--primarily initiated by the tactical airlift aircrew, but often passed to or shared by the supported Army unit. This attitude is reflected in slogans such as: "You call, we haul," "Our job is to support the Army," and "We're mission hackers." This attitude, probably required in a true combat scenario, too often stands in the way of realistic joint training.
2. Lack of knowledge--by both participants, of the other's capabilities, requirements, and restrictions.

The following chapters and attachments are provided to assist the communication and coordination needed in a JA/ATT environment. Chapter Two details the tactical capabilities of the C-130 and the MAC method of quantifying JA/ATT mission acceptability. Chapter Three identifies the aircrew-user coordination requirements and C-130 training event requirements. Chapter Four details C-130 mission restrictions in a training environment. The information provided on C-130 tactical mission capabilities, requirements, and restrictions will help bridge the knowledge gap. This knowledge may even impact the attitudes of participants. A true "Mission Hacker" may realize that the JA/ATT mission is training, for both the C-130 aircrew and the Army.

Chapter Two

C-130 TACTICAL CAPABILITIES

The versatility of the C-130 provides a large range of tactical capabilities appropriate for Army support. The JA/ATT program permits some of these capabilities to be utilized in the joint arena. This chapter will detail the tactical airlift capabilities of the C-130 and identify those missions which may be flown as a JA/ATT.

In the simplest terms,

The mission of the airplane is to provide rapid transportation of personnel or cargo for delivery by parachute or by landing. The airplane can be used as a tactical transport carrying 92 ground troops or 64 paratroops and equipment. . . The C-130 can land and takeoff on short runways, and it can be used on landing strips such as those usually found in advance base operations.

In more specific terms, the C-130 can deliver cargo and personnel in three ways: Airland, Low Altitude Parachute Extraction System (LAPES), and Airdrop.

Delivery Methods

The airland method of delivery includes assault landings, engine running offloads (ERO), and combat offloads. The LAPES method of delivery is for loads ranging from 6,700 to 50,000 pounds. There are two basic types of airdrops, personnel and equipment. Personnel drops can deliver 1 to 64 paratroops from 800 feet Above Ground Level (AGL) to 25,000 feet above Mean Sea Level (MSL). Equipment airdrops are pulled from the aircraft by gravity or an extraction chute. The altitude and weight of equipment drops are dependent on the type of extraction. Loads that are pulled from the aircraft by gravity (Container Delivery System (CDS) or Personnel/Ramp Bundle Airdrop System (WEDGE)) can be dropped from 500 feet AGL to 25,000 feet MSL. Loads that are parachute extracted from the aircraft can be dropped from 750 feet AGL to 25,000 feet MSL. The CDS loads can weigh from 200 to 2200 pounds. The extracted load weight range is 2520 to 35,000 pounds.

Employment Methods

The airdrop mission can be employed by single aircraft or by multiple ship formations. The location of the airdrop release point (CARP) can be determined by the aircrew, ground personnel, or the jumpmaster. Tactics enroute to the objective area can utilize Special Operations Low Level (SOLL), High Altitude Low Opening (HALO), or High Altitude High Opening (HAHO) tactics. Specially equipped C-130 units can also provide an Adverse Weather Aerial Delivery (AWADS) capability.

JA/ATT Missions

The types of missions eligible for JA/ATT consideration are limited by the Army and the Air Force. The Army says it this way:

MAC airlift aircraft are allocated to support joint exercises and training. Deployment and redeployment must be conducted under simulated tactical conditions to improve the combat ready status of participating units. Missions which terminate in routine airlanding or consist of only a few airdrop sorties along with a majority of routine airland sorties are not JA/ATT missions. Point-to-point administrative airlift does not provide training for either participant with resource cost.

The Air Force is more specific:

The following missions may be flown as part of the JA/ATT programs:

1. Airdrops
2. Assault landing training
3. Static load training for units with a transportability mission
4. Joint development/certification of new equipment or procedure
5. Combat support training (flare drops, leaflet drops, spray attack, air refueling, etc.)

Table 1.

In February 1986, MAC provided a method of quantifying potential JA/ATT missions. A point value was assigned to tactical events. The total number of points for a mission is

divided by the flying time to arrive at a points per hour figure. To compete for JA/ATT support, a mission must have a point per hour total of at least 1.0. The tactical events and point values are:

<u>EVENT</u>	<u>POINTS</u>
Formation	.5
Strange DZ	.5
Personnel Drop	
(6-39 jumpers)	.5
(40-64 jumpers)	3.0
CDS Drop	
1-2 bundles	1.0
4-7 bundles	1.5
8-16 jumpers	3.0
HE Drop	
Single load	1.0
Sequential load	3.0
WEDGE	1.0
Door bundle	1.0
(without personnel)	
LAPES	3.0
Combat Rubber	2.0
Raiding Raft	
ERO	1.0
Assault landing	1.0
Small unit tactics	3.0
(Special forces, HALO/HAHO etc.)	

Table 2.

This new system helps to eliminate JA/ATT missions that do not provide adequate joint training prior to the planning and implementation phases. The missions that are allocated to JA/ATT become precious. The participants in this joint arena should keep the C-130 capabilities in mind, specifically those missions which are critical to a JA/ATT, during the execution phase.

The capabilities of the C-130 provide a broad range of tactical support for the Army. The Army can use the C-130 to perform employment and resupply missions from airland to airdrop. The success of these missions are resource limited, and must provide specific training potential to meet allocation criteria. Once allocated, the participants must ensure the potential is developed.

Chapter Three

MISSION REQUIREMENTS

The successful accomplishment of a JA/ATT mission requires communication and coordination between the Air Force and user participants. This chapter will describe the information required to meet the basic tactical objective and the requirements unique to the training mission. The detailed planning inherent in C-130 tactical scenarios is the responsibility of the direct participants. This is true in combat and training.

Information Requirements

The user has raw data and information critical to the aircrew planners. This information can be as simple as the type, weight, and sequence of the load or as complicated as parachute types, drop altitudes, delivery method, drop zone specifics, and communication requirements. Participants who do not coordinate this information in a timely manner may find mission accomplishment impossible or unnecessarily complicated. The user coordinator or point of contact who has a feel for what information the aircrew needs, when he needs it, and why he needs it, can enhance the chances of a successful mission. The aircrew member who recognizes and anticipates his own needs, can ask the right questions to ensure required information is acquired--before it's too late.

Time. The most basic and pivotal data is "time." The mission tasking may provide some key times, such as departure, arrival, and time over target (TOT) times; but often the participants must coordinate these times on their own. At the least, the times must be confirmed. For airland or assault landing missions, takeoff and arrival times are required. The aircrew must ensure the time between takeoff and arrival is appropriate; but more important, the takeoff time is the starting point for calculating all other mission times. When the mission is airdrop, the TOT is the critical time, and takeoff is calculated from TOT. The complete prelaunch sequence of events is

provided as an attachment, but times below require specific aircrew-user coordination:

1. Weather decision time
2. Loading time
3. Briefing time
4. Airborne station time (the time when parachutists will be seated in the aircraft with seat belts fastened. Normally 35 to 40 minutes prior to takeoff)
5. Takeoff time
6. TOT

Table 3.

Load. The next piece of critical data is the load information. It must be coordinated for all tactical missions. For airland or assault missions, the aircrew will compute aircraft performance, loading requirements, and fuel restrictions based on this information. The calculations require basic data such as weights, measurements, sequencing requirements, and type of load (e.g. wheeled vehicle, palletized, or floor loaded). For airdrop missions, the aircrew requires more detailed information. The airdrop parameters and calculations are based on this information. Early user-aircrew coordination of this information will be the difference between smooth efficient mission accomplishment and hasty, risky performance. The aircrew will need:

1. The load type (personnel, CDS, HE, WEDGE, or LAPES),
2. The number of airdrop items on each aircraft,
3. The load weight (including the weight of the parachute(s)),
4. The type of parachute,
5. The number of parachutes on each load, and
6. The number and type of extraction chute(s).

The aircrews must have this information in sufficient time to perform detailed calculations prior to the aircrew briefing. This data will also affect other mission parameters, such as, drop altitude, usable drop zone time, and inflight checklist requirements.

User Needs. The user's needs, requirements, and desires will also affect the mission parameters. The user should coordinate these as early as possible. The drop altitude is restricted by the type of drop and parachute, but the user can request higher

altitudes. If higher altitudes are needed, they must be communicated at the same time the load information is coordinated. The aircrew and user should also coordinate the type of drop release to be used. The actual combat scenario will usually determine whether the crew, the jumpmaster, or ground personnel should determine the release point, but in training, it should be equitably negotiated and coordinated.

The Training Mission

The negotiation of the type of airdrop release is only one complication of the training side of the JA/ATT mission. The aircrew-user responsibility to the training mission is three fold: aircrew tactical mission training, user mission training, and training in the joint environment. The JA/ATT missions permit MAC aircrews the opportunity to hone their abilities in a realistic joint arena. These skills and techniques begin during unilateral training, but the JA/ATT is an ever increasing source of continuation training events necessary for maintaining mission ready status. These training events must meet specific requirements criteria for accreditation.

Continuation Training. The JA/ATT quantification system discussed in Chapter Two insures a mission has the potential to provide aircrew continuation training. Aircrew-user coordination is required to insure the training is credible. Specific training events that need aircrew-user cooperation and their requirements are listed below:

Visual Airdrop: The airdrop is made using visual ground references for release.

Low Level Visual Tactics: The enroute low level segment will be flown in visual conditions for a minimum of 30 minutes before arriving at an objective area.

SKE/AWADS formation: It will be flown for a minimum of 30 minutes before arriving at an objective area.

Lead: This event may only be credited when flown single ship or in formation lead position.

Table 4.

Visual Airdrop. The aircrew needs to determine the release point to credit a "Visual Airdrop." The user has a requirement to determine the release point when using jumpmaster directed airdrops or ground marked release points. The jumpmaster directed airdrop requires the user to determine the precise release point, direct the aircraft to that point, and to exit on his command. Normally, the jumpmaster will take over 1 minute from the drop zone. This is the usual technique for HALO and HAHO personnel drops. The ground marked airdrop requires the ground personnel to determine and mark the precise release point. The aircrew must then acquire the ground mark, fly to it, and initiate the exit command.

The User determined releases require greater aircrew-user coordination and cooperation. The terminology used by the jumpmaster must be recognized by the aircrew. They need to talk the same language. Similarly, the aircrew must recognize the ground marked release point as just that, and prior coordination is required to communicate the type of ground marking to be used. The problem encountered using ground marked release points can be overcome with detailed aircrew-user communication. Often, the user will say, "The DZ will be marked with an inverted 'L'." The inverted "L" is a standard ground marked release point, and the aircrew will expect to release on the "L," but the user meant, "The desired point of impact will be marked with an inverted "L," we expect an aircrew visual airdrop." The reason for the miscommunication is that the desired point of impact should be marked by the letters A, C, J, R, S, O, or H; not an inverted "L." The other problem is the location of the ground marked release point. The aircrew will calculate an approximate release point to assist in acquiring the ground mark. Too often, the ground personnel do not calculate a release point (CARP), but place the mark in a standard or convenient location. This will make acquisition of the release point more difficult for the aircrew, and may even result in a no drop on the first run across the drop zone. If the ground mark is to be placed without regard to the CARP, the aircrew should be provided the approximate location during pre-takeoff coordination. The coordination and standardization complications of these user determined release methods make them ideal for JA/ATT missions. They enhance all three training objectives discussed earlier. When multiple drops are planned, the release method should be varied to include aircrew, ground marked, and jumpmaster releases.

Low Level Visual. The Low Level visual tactics and SKE/AWADS formation requirement to be flown, for a minimum of 30 minutes before arriving at an objective area, must be built into the mission profiles. This 30 minutes is a minimum time. The mission should provide approximately one hour between takeoff and TOT. Too often, during training missions, the objective area is located very close to the takeoff point. The urge to compress planned en route times occurs for various reasons, but the

sacrifice of precious training should be carefully weighed before taking this alternative. In no case can the enroute time be less than 25 minutes (unless approved by the operational order).

Lead. The "Lead" requirement is mentioned only to highlight that missions should provide an opportunity for the mission commander to use different aircrews or aircraft in the lead position. This can be accomplished on the ground, if recoveries are planned between airdrops or inflight. User-aircrew coordination is required to ensure the user load sequencing needs are accomplished.

The employment of single ship operations is normally inherent in the mission profile, pre-execution planning, and tasking. Special Operations Low Level (SOLL), HALO, HAHO, and LAPES missions are usually single ship operations. They require specially trained aircrews and cannot be introduced after the aircrews are in place. Any airdrop can be performed single ship, but aircrew formation training requirements and user tactics usually dictate formation employment for personnel and equipment airdrops. The exception is CDS airdrops. There is no formal requirement to perform CDS airdrops single ship, but current aircrew training guidance prefers single ship CDS training missions.

Coordination

There are other mission requirements that are assumed or provided by other agencies or systems in a combat scenario that require specific aircrew-user coordination during training missions. The point of impact marking and ground marked release point standardization has already been addressed, but additional Drop Zone (DZ) and Landing Zone (LZ) markings must also be coordinated. The specific DZ/LZ marking configuration should be appropriate to the mission and coordinated between the aircrews and the user. The inflight communication requirements must be specifically addressed. The radio frequencies for communication between the aircrew and DZ/LZ ground personnel should be coordinated. The typical problem is radio type. The user relies on FM radios, while very few C-130s are equipped with FM. The aircraft are equipped with HF, VHF, and UHF radios. This communication problem can be solved if addressed early.

Most requirement conflicts can be resolved if addressed early. The aircrew-user coordination and communication process is necessary in all joint operations, combat, or training. The need to transfer raw data and information between participants is critical to permit accomplishment of the tactical objective. The confirmation and coordination of time, load, and mission parameter information are required in combat and becomes more complicated in training. The JA/ATT mission is more than accomplishment of tactical objectives; it requires a dedication

to the mutual training facet of the mission as well. The participants are responsible for coordinating and communicating training needs, to ensure credible training is not only planned but executed.

Chapter Four

RESTRICTIONS

The employment of the C-130 in the JA/ATT arena is accompanied by performance and mission restrictions. The aircrews and the user are obliged to consider these restrictions in planning and must execute the mission within these bounds. This chapter will outline the restrictions imposed on the participants during C-130 tactical JA/ATT missions. The aircraft, aircrew, and weather, each carry specific restrictions which the participants are not at liberty to violate.

Aircraft

The aircraft itself, its capabilities and limitations, restrict JA/ATT employment missions. The endurance capabilities and tradeoffs, the weight restrictions, the cargo carrying capacity, and the runway requirements each limit its role in any situation, but especially in a peacetime tactical training environment. The most basic limitation is endurance.

Endurance. The endurance or range of the C-130 does not normally confine the JA/ATT employment. The aircraft can carry 63,000 pounds of fuel. This permits nine hours of tactical, low altitude flying or up to 13 hours high altitude flight. The normal flight time from Homestead AFB in Florida to McChord AFB in Washington is nine hours. The endurance impact is important when other limitations are considered. This maximum fuel load brings the total aircraft weight up to 145,000 pounds.

Aircraft Weight. The maximum weight, during peacetime, is restricted to 155,000 pounds for takeoff. Assault landings cannot be planned in excess of 130,000 pounds. These weight limits force fuel load and cargo load tradeoffs. In the cited example, from Florida to Washington, the aircraft could only carry 10,000 pounds of cargo. As the cargo requirement goes up, the endurance goes down, pound for pound. The 130,000 pound landing limitation can impact the mission scenario. The mission profile and participants must recognize that the unrefueled endurance is restricted after an assault landing. Even if the assault landing is at or near the end of the profile, the cargo weight is limited by the 130,000 pound landing restriction.

Cargo. The cargo capacity of the aircraft also restricts tactical employment. The maximum load that may be extracted over

the cargo ramp during airdrop is 35,000 pounds. This limitation applies to the total load package of each drop. The aircraft can carry a maximum of 16 CDS bundles, 4 extracted equipment loads and 64 paratroops.

Runway. The final restriction associated with the aircraft capability is the landing zone (LZ) dimensions. For tactical assault training missions, the LZ must be at least 3000 feet long and 60 feet wide. This is a relatively small runway, but it does present a limitation to the JA/ATT mission, as did the other aircraft restrictions. The aircrew is another factor that can restrict operations.

Aircrew

The restrictions imposed on the JA/ATT mission by the crewmembers include: crew compliment, aircrew qualification, and crew rest and duty day requirements. The normal crew complement is five: two pilots, one engineer, one navigator, and one loadmaster. One additional loadmaster is added for airdrop missions and another navigator is added for SOLL missions. The requirement for these additional crewmembers restricts the participants from changing missions at the last minute. A planned airland mission cannot become a SOLL mission. This limit on mission profiles is also complicated by the aircrew qualifications. Certain missions require specially trained aircrew members. These special missions are supported by a handful of trained crews in each tactical squadron, or by specific units. The employment of these special qualifications requires the user to identify them prior to allocation. Once the crews are in place, the special missions cannot be introduced to the execution phase. The LAPES mission requires specific pilots and loadmasters. The Night Attack (flare drop) mission needs trained pilots, navigators, and loadmasters. SOLL tactics are performed by special qualification pilots and navigators. The HALO/HAHO equipment drops require AWADS crews. The AWADS mission is supported only by the 317TAW at Pope AFB, North Carolina and 435TAW Rhein-Main AB, Federal Republic of Germany. The coordination for special mission crewmembers occurs prior to execution, but insuring crew duty day and crew rest requirements are met is incumbent upon the participants.

MAC crewmembers are required to have 12 hours of crewrest prior to performing flight duties. On peacetime tactical missions, MAC limits their crew duty day to 12 hours. Initially, this 12 hours off, 12 hours on seems easy to manage. The crew rest requirement means that missions cannot be launched earlier than planned. The crew duty day limitation includes the three to four hours needed prior to takeoff for planning, briefing, loading, and preflights. Add to this the normal five hour mission times, and only three to four hours remain for slipping missions. Larger en route distances and longer mission times

decrease this margin of flexibility. The primary advantage to being able to slip mission times is the weather.

Weather

The weather requirements for C-130 operations restrict its use in JA/ATT missions. The normal airland takeoff and landing minimums are dependent on the navigation aids at the runway, but usually cannot be less than one-half-mile visibility with a ceiling of at least 200 feet. The visibility minimum increases to 1-mile for formations. These minimums apply to single aircraft or formations using Station Keeping Equipment (SKE). The SKE permits aircraft to maintain formation position electronically, in the weather. If the SKE cannot be used, or the landing field has no navigational approach aids, the weather must permit visual flight. Visual weather requirements are 3-miles visibility and 500 feet below the clouds. This means a ceiling of 1500 feet for approach and 800 feet for enroute low level missions. Non-AWADS equipped aircraft must also be visual to drop. AWADS aircraft can drop with a ceiling of 300 feet and visibility of 1-mile.

The limitations inherent in the use of C-130 aircraft and MAC aircrews, complicated by specific weather requirements, impose stringent limitations on the JA/ATT executioners. Knowledge of these restrictions can enhance the aircrew-user coordination process. Working together more effectively and efficiently is the goal of JA/ATT.

Chapter Five

SUMMARY

The concept of Joint operations is not new, the current emphasis is. We will fight our next war jointly. Our tactical airlift forces will work directly with the Army. The capability of our aircrews to support the ground force is training dependent. JA/ATT missions provide this critical training. The allocation and planning of JA/ATT has improved significantly in the past few years, but the critical link is the participants who execute the missions. The aircrew-user coordination is the last chance to ensure effective training. How well this is done rests in how well they understand the mission of JA/ATT, and how familiar they each are with the capabilities, requirements, and restrictions of C-130 aircraft in the JA/ATT arena.

The goal of JA/ATT missions is training. The C-130 aircrew force depends heavily on JA/ATT to accomplish its tactical continuation training. The user gains similar training benefits from JA/ATT. The third phase of this training is the exposure to a joint environment, the melding of techniques and procedures, the communication and coordination experience, and the testing of equipment and tactics.

The tactical C-130 brings significant equipment and tactics to the JA/ATT arena. The aircrew member and combat user who is familiar with these capabilities cannot only enhance his own training, but is better prepared to manage the joint training mission. Some of the capabilities are more critical to the allocation process and provide training potential. Aircrew-user efforts should strive to maintain these training critical events during the execution phase.

These efforts in the execution phase are information dependent. Cross communication is necessary to assure the requirements fulfill the basic tactical objective as well as the training goals. The raw data transfer concerns key "time" requirements, load information, training desires and needs, and specific procedures.

The tactical C-130 brings significant capability to the JA/ATT arena, but with it comes specific restrictions. The JA/ATT missions and profiles are limited by aircraft, aircrew, and weather constraints.

The aircrew and user participants in a JA/ATT must efficiently manage these precious missions during the execution phase. The tools of efficiency are knowledge and experience. The exercise of these tools in a joint training environment can identify and eliminate problems before we have to put our training to the real test.

BIBLIOGRAPHY

A. REFERENCES CITED

Books

1. Gavin, John R., Gen. Air Assault: The Development of Airmobile Warfare. New York: Hawthorne Publishers, 1969.

Articles and Periodicals

2. Nelson, Peter J., Maj, USAF. "JA/ATT, Joint Airborne/Air Transportability Training." Airlift Magazine, (Summer 1986), pp. 14-16.

Official Documents

3. US Department of the Air Force. Basic Aerospace Doctrine of the United States Air Force. AF Manual 1-1. Washington, DC: Government Printing Office, 16 March 1984.
4. US Department of the Air Force. C-130 Flight Manual. Technical Order 1C-130B-1. Warner Robins ALC/MMEDT, Robins AFB, Georgia, 18 March 1982.
5. US Department of the Air Force. Flight Management. AF Regulation 60-1. Washington, DC: Government Printing Office, 6 August 1982.
6. US Department of the Air Force. General Flight Rules. AF Regulation 60-16. Washington, DC: Government Printing Office, 5 December 1980.
7. US Department of the Army. US Army/US Air Force Doctrine for Airborne Operations. Field Manual 57-1. Washington, DC: Government Printing Office, 1 January 1967.

CONTINUED

8. US Department of the Army. Specialized Training in FORSCOM Active Component and Reserve Component Units. FORSCOM Regulation 350-3. Fort McPherson, Georgia, 15 October 1982.
9. US Naval Oceanographic Office. Navigation Dictionary. H O Pub. No. 220. Washington, DC, 1969.
10. US Department of the Air Force. HQ Military Airlift Command. Aircrew Standardization/Evaluation Program. MAC Regulation 60-1. Scott AFB, Illinois, 14 August 1984.
11. US Department of the Air Force. HQ Military Airlift Command. Aircrew Training. MAC Regulation 51-130. Scott AFB, Illinois, 1 March 1984.
12. US Department of the Air Force. HQ Military Airlift Command. Combat Control Team Operations and Procedures. MAC Regulation 3-3. Scott AFB, Illinois, 12 April 1983.
13. US Department of the Air Force. HQ Military Airlift Command. Computed Air Release Systems Procedures. MAC Regulation 55-40. Scott AFB, Illinois, 1 August 1985.
14. US Department of the Air Force. HQ Military Airlift Command. C-130 Tactical Airlift Operations. MAC Regulation 55-130. Scott AFB, Illinois, 29 May 1985.
15. US Department of the Air Force. HQ Military Airlift Command. Joint Airborne/Air Transportability Training. MAC Operations Order 17-76. Scott AFB, Illinois, 1 April 1982.

Unpublished Materials

16. Davis, Philip R., Maj, USAF. "The JA/ATT Program: A Handbook for C-141B Airdrop Mission Planners." Research Study prepared at the Air Command and Staff College, Air University, Maxwell AFB, Alabama, April 1986.

CONTINUED

17. Spracher, David L., Maj, USAF. "JA/ATT for the TALO."
Research study prepared at the Air Command and Staff
College, Air University, Maxwell AFB, Alabama, April
1985.
18. US Department of the Air Force. HQ Military Airlift
Command. "Quantification of JA/ATT Training Payback."
Message. Scott AFB, Illinois, 211405Z July 1986.

B. RELATED SOURCES

Articles and Periodicals

- Canan, James W. "The Ups and Downs of Jointness." Air Force Magazine, (October 1985), pp. 46-55.
- Cuda, Daniel L., Capt, USAF. "Are We Really Practicing Emergency Airdrops?" Airlift Magazine. (Winter 1984), pp. 18-19.
- Wehner, Clement E., Maj, USAF. "Combat Readiness and the Flying Hour Program." Airlift Magazine, (Spring 1984), pp. 20-21.

Official Documents

- US Department of the Air Force. HQ Military Airlift Command.
MAC Tactical Airlift Liaison Officers. MAC Regulation
55-55. Scott AFB, Illinois, 21 May 1982.

INDEX

Aircraft Endurance, 12
Aircraft Restrictions, 12, 23
Aircrew Limitations, 13-14
Altitude Ranges for Airdrops, 3, 29
AWADS, vii, 4, 13
Cargo Restrictions, 12-13
CARP, vii, 4
CDS, vii, 3
Communications, 10, 31-32
Conception of joint operations, 1
Concept of JA/ATT
 Air Force, 1
 Army, 1
Continuation Training, 8
Crew Duty Day, 13
Delivery Methods, 3
Drop Zone Markings, 10, 28
Employment Methods, 4, 29
HAHO, viii, 4, 13
HALO, viii, 4, 13
HE, viii, 3
Importance of JA/ATT, 1
Information Requirements, 6
Inverted 'L', 9
JA/ATT
 Concept, 1
 Events, 4, 5
 Importance, 1
 Mission, viii, 4
 Quantifying, 4-5
LAPES, viii, 3, 13
Lead, 8, 10
Load Information, 7
Low Level Visual, 8, 9
Minimum Route Time, 8, 9, 10
Mission of the C-130, 3
PI markings, 9
Quantifying JA/ATT, 4-5
Runway Requirements, 13, 23
Single Ship Operations, 4, 10
SOLL, viii, 13

CONTINUED

Time Requirements, 6
Training Mission, 8
User Determined Releases, 10
User Needs, 7-8
Visual Airdrop, 8, 9
Weather Requirements, 14, 24
WEDGE, IX, 3
Weight Limits
 Aircraft, 12, 13
 Cargo, 13
Weight Ranges of Airdrop Loads, 3, 30

APPENDICES

Appendix A--C-130E Operating Information.....	23
Appendix B--Weather Requirements.....	24
Appendix C--Prelaunch Sequence of Events.....	25
Appendix D--Minimum Size DZ.....	27
Appendix E--Airdrop Type - Number of Items - Altitudes..	29
Appendix F--Parachute - Load Weights - Altitude.....	30
Appendix G--Coordination Checksheet.....	31

APPENDIX A

C-130E OPERATING INFORMATION

CHARACTERISTICS	
Length Overall	99 ft 6 in
Wingspan	122 ft 7 in
Height	38 ft 6 in
REQUIREMENTS	
Minimum Runway Length	3,000 ft
Minimum Runway Width	60 ft
Taxiway Width	30 ft
WEIGHT LIMITATIONS	
Normal	
Maximum Taxi, Takeoff, and Landing	155,000 lbs
Maximum Effort	
Maximum Taxi and Takeoff	155,000 lbs
Maximum Landing	130,000 lbs
Emergency War Planning	
Maximum Taxi, Takeoff and Landing	175,000 lbs

APPENDIX B

WEATHER REQUIREMENTS		
DEPARTURE		
Single Aircraft		Visibility greater than 1/2 mile
Formation		Visibility greater than 1 mile Ceiling greater than 200 ft
ENROUTE		
Single Aircraft or SKE equipped formation		N/A
Visual Formation		VMC
AIRDROP		
AWADS Aircraft		Visibility greater than 1 mile Ceiling greater than 300 ft
Visual Aircraft		VMC
DESTINATION		
Single Aircraft		Visibility greater than 1/2 mile Ceiling greater than 200 ft
Visual Aircraft		VMC
VISUAL METEOROLOGICAL CONDITION (VMC)		
Altitude	Visibility	Cloud
Below 10,000MSL	3 miles	500 ft below 1,000 ft above 2,000 ft horizontal
10,000MSL and Above	5 miles	1,000 ft below 1,000 ft above 1 mile horizontal
Minimum Ceilings		
Departure and Destination		1500 ft
Enroute		800 ft
Airdrop*		
CDS		1000 ft
Personnel		1300 ft
HE		1100 ft
*Dependent on drop altitude		

APPENDIX C

PRELAUNCH SEQUENCE OF EVENTS

CHECKLIST GUIDE ONLY

C-130

This checklist is to be used as a guide only, and may be modified as necessary to suit airdrop objectives.

LAUNCH MINUS

1. Loads pulled, before loading inspection complete - Aerial delivery (MAPS/CMB). _____
2. Mission commander checks weather and makes preliminary weather decision. _____
3. Mission commander verifies with OC/ALCE, aircraft numbers, maintenance status, configuration, parking spot, etc. _____
4. Loadmaster alerted for heavy equipment mission. _____
5. OC/ALCE coordinate aircraft assignments, aerial port, fleet service, and other appropriate agencies as required. _____
6. Mission commander coordinates aircraft numbers, load parking spots with CCT, ADS, and other interested agencies. _____
7. Lead pilot and navigator alerted. _____
8. Loadmaster reports for briefing. _____
9. Maintenance completes refueling, configuration, and preflight of aircraft. _____
10. Loadmaster arrive at aircraft for heavy equipment preflight of aircraft ADS (restraint rails, winches, etc.) _____
11. Crews alerted, to include remainder of lead crew. _____
12. Mission commander check WX forecast and NOTAMS. _____

13. Remainder of crew members show at the designated briefing area, receive T/O WX data, aircraft number, parking spot, etc. _____
14. Heavy equipment or CDS load arrives aircraft. _____
15. Loadmasters arrive at aircraft to begin personnel airdrop preflight. _____
16. Flight engineer report to aircraft. _____
17. Fleet begins servicing aircraft with appropriate equipment and inspects aircraft for cleanliness. _____
18. Mission briefing. _____
19. Mission briefing completed - transport ordered. _____
20. Pilots and navigators report to aircraft. _____
21. Paratroops arrive at aircraft. _____
22. Fleet service delivers flight lunches and coffee to aircraft for crew and jumpers. _____
23. Aircraft commander briefing. _____
24. Pilot - Jumpmaster/loadmaster briefing. _____
25. DD Form 365 complete. _____
26. Parachutist briefing complete - manifest checked. _____
27. Aircraft loading is completed. _____
28. Airborne station time. 35 minutes _____
29. Air Force station time. 30 minutes _____
30. Engine start. 25 minutes _____
31. Taxi. 15 minutes _____
32. Takeoff. 0 _____
33. Time Over Target (TOT). Takeoff + 1 hour _____

APPENDIX D

MINIMUM SIZE DZ AND SAFETY ZONE DISTANCE

PERSONNEL			SAFETY ZONE DISTANCE (See Note 4) 1 or more jumpers 300 yds
ALTITUDE (AGL)	WIDTH (See Note 1)	LENGTH (See Note 3) 1 Man Additional 600 yds Add 75 yds/ea additional man to trailing edge of the DZ)	
To 1000 ft	600 yds		
Above 1000 ft	Add 30 yds/100 ft above each side and each end of the DZ)	Add 1000 ft (15 yds to each side and each end of the DZ)	300 yds plus 15 yds/100 ft above 1000 ft
HEAVY EQUIPMENT			
ALTITUDE (AGL)	WIDTH (See Note 1)	LENGTH (See Note 3) 1 Platform Additional 1000 yds Add 400 yds to the DZ at the trailing edge for each add' platform	SAFETY ZONE DISTANCE (See Note 4) 1 Platform 100 yds Add 400 yds for each add' l platform
To 1100 ft	600 yds		
Above 1100 ft	600 yds plus 30 yds/100 ft above 1100 ft to each side of the DZ)	1000 yds plus 30 yds/100 ft above 1100 ft (15 yds to each side of the DZ)	100 yds plus 15 yds/100 ft above 1100 ft
CDS			
ALTITUDE (AGL) (See Note 2)	WIDTH (See Note 1)	LENGTH (See Note 3) # of Containers	SAFETY ZONE DISTANCE (See Note 4) # of Containers Single Double
To 600 ft	400 yds	Single Double 1 1-2 400 yds 2 3-4 450 yds 3 5-6 500 yds 4 7-8 550 yds 5-8 9-16 700 yds	1 1-2 200 yds 2 3-4 250 yds 3 5-6 300 yds 4 7-8 350 yds 5-8 9-16 500 yds
Above 600 ft	Add 40 yds/100 ft above each side and each end of the DZ)	Add 600 ft (20 yds to each side and each end of the DZ)	1 or more containers--- add 20 yds/100 ft above 600

APPENDIX D CONTINUED

C-130 MINIMUM SIZE DZ AND SAFETY ZONE DISTANCE CONTINUED

Note 1:

- a. Visual formation -- increase width by 100 yds (50 yds each side).
- b. SKE formation -- increase width by 400 yds (200 yds each side).
- c. Official sunset to sunrise -- increase width by 100 yds for visual drops (50 yds each side).

Note 2: Altitudes above 1000 ft AGL are not recommended.

Note 3: Official sunset to sunrise -- increase length by 100 yds for visual drops (50 yds each end).

Note 4: Official sunset to sunrise -- increase safety zone distance by 50 yds for visual drops.

Note 5: For single aircraft, the point of impact should be positioned as follows:

- a. Personnel -- Spaced a minimum of 300 yds from approach end for day drops and 350 yds for night drops.
- b. Equipment -- Spaced a minimum of 500 yds from approach end for day drops and 550 yds for night drops.
- c. CDS -- Spaced a minimum of 200 yds from the approach end for day drops and 250 yds for night drops.
- d. INS/SKE/ZM -- Position the point of impact for day or night drops using day criteria listed in a, b, and c above.

APPENDIX E

AIRDROP TYPE - NUMBER - ALTITUDES

<u>Type Airdrop</u>	<u>Number of Items</u>	<u>Altitude Range (AGL)</u>
Personnel	1-64 personnel	800 ft - 25,000 ft
Personnel/ Ramp bundle Airdrop (wedge)	1-40 personnel and 1-6 bundles	800 ft - 25,000 ft
Container Delivery System (CDS)	1-16 bundles	500 ft - 25,000 ft
Platform extracted Equipment (HE)	1-4 platforms	750 ft - 25,000 ft
Low Altitude Parachute Extraction System (LAPES)	1-3 platforms	5 - 10 ft

APPENDIX F

Parachute - Load Weight - Drop Altitude

<u>Parachute</u>	<u># of Parachutes</u>	<u>Weight Range (pounds)</u>	<u>Minimum Drop Minimum (AGL)</u>
G-11A	1	*2520-4000	1100 ft
	2	*3501-6500	1100 ft
	3	*6501-10,000	1100 ft
	4	*10,001-13,000	1100 ft
	5	*13,001-17,000	1100 ft
	6	*17,001-25,000	1100 ft
	8	*25,001-35,000	1100 ft
G-11B	1	*2520-5000	750 ft
	2	*5000-10,000	750 ft
	3	*10,000-15,000	750 ft
G-12D	1	501-2200	600 ft
	2 or 3	*2520-3500	600 ft
G-13 or	1	200-500	500 ft
G-14	2	501-1000	500 ft
	3	1001-1500	500 ft
G-14	Wedge 1/bundle	-500	800 ft
	(Max 6 bundles)	-3734 (total rigged weight)	

*Note: Load weights of 2520 and greater are platform extracted loads (HE), others are container delivery loads (CDS) or wedge loads

APPENDIX G

COORDINATION CHECKLIST

	Coordinated
TIMES	
Destination Arrrival	_____
Time over Target (TOT)	_____
Takeoff	_____
Airforce Stations	_____
Airborne Stations	_____
Load Time	_____
Briefing Time	_____
Weather Decision	_____
LOAD	
Type (Rolling Stock, Palletized, Floor Loaded, HE, CDS, Personnel, Wedge, etc.)	_____
Quantity, Weight, and Sequence by Aircraft	_____
Airdrop	
Type parachutes	_____
Number of chutes (per item)	_____
Rigged Weight (first item to exit per aircraft	_____

APPENDIX G CONTINUED

DROP INFORMATION

Drop Altitude _____

Type Release _____
(Aircrew Visual or AWADS,
Ground Marked, Jumpmaster
directed, etc.)

Drop Zone (DZ)
PI marking _____
(A,C,J,R,S,H, or O)

Other DZ markings _____

DZ size and location _____

Communication _____

TRAINING NEEDS _____