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Flying Operations

C-141 OPERATIONS PROCEDURES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This volume implements AFPD 11-2, *Aircraft Rules and Procedures*. It establishes policy for the operation of the C-141 aircraft to safe and successfully accomplish their worldwide mobility missions. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force. This instruction applies to Air National Guard (ANG) and Air Force Reserve (AFRC) units.

The Privacy Act of 1974 applies to certain information gathered pursuant to this instruction. The Privacy Act System Number F011 AF XO A, Air Force Operations Resource Management System (AFORMS) covers required information. The Paperwork Reduction Act of 1974 as amended in 1996 affects this instruction. Maintain and dispose of records created as a result of processes prescribed in this publication in accordance with AFMAN 37-139, *Records Disposition Schedule*.

This document is new and must be completely reviewed. This instruction contains references to the following field (subordinate level) publications and forms which, until converted to departmental level publications and forms, may be obtained from the respective MAJCOM publication office:

Publications: AMCI 11-208, 11-301, AMCR 3-2V2 (S), and AMCPAM 11-1 (AMC).

Forms: AMC Form 41, 43, 54, 97, 181, 196, and 423 (AMC).

SUPPORTING INSTRUCTIONS

AFI 11-2C141V3, A-A, *C-141 Aircraft Configuration And Mission Planning*

AFI 11-2C141V3, A-B, *C-141 Special Operations Low Level (SOLL) II*

AFI 11-2C-141V3 CL-1, *Formation Air Refueling Procedures*

AFI 11-2C-141V3 CL-2, *Loadmaster Procedures and Passenger Briefings*

AFI 11-2C-141V3 CL-3, *Combat Operations Checklists - Cockpit Crew*

AFI 11-2C-141V3 CL-4, *Combat Operations Checklists - Loadmaster*

Chapter 1

GENERAL INFORMATION

1.1. General.

1.1.1. This AFI applies to Air Force C-141 aircrews and all management levels concerned with operation of the C-141B and C model MDS aircraft. It is a compilation of information from aircraft flight manuals, FLIP publications, and Air Force directives, as well as an original source document for many mobility areas. When specified as the reference, the source directive has precedence in the case of any conflicts, revisions, and matters of interpretation. For those areas where this AFI is the source document, waiver authority will be in accordance with paragraph **1.4.**. For those areas where this AFI repeats information contained in other source documents, waiver authority will be in accordance with these source documents.

1.1.2. All units and agencies involved in or supporting C-141 operations will use this AFI. Copies will be current and available to planning staffs from headquarters to aircrew level. Maintain a copy of this AFI at mobility transportation and base operations passenger manifesting agencies.

1.2. Applicability. This AFI is applicable to all individuals and units operating the C-141 aircraft. Copies should be available to all aircrew members operating the C-141.

1.3. Key Words Explained.

1.3.1. "Will" and "Shall" indicate a mandatory requirement.

1.3.2. "Should" is normally used to indicate a preferred, but not mandatory, method of accomplishment.

1.3.3. "May" indicates an acceptable or suggested means of accomplishment.

1.3.4. "***NOTE***" indicates operating procedures, techniques, etc., that are considered essential to emphasize.

1.3.5. "***CAUTION***" indicates operating procedures, techniques, etc., which could result in damage to equipment if not carefully followed.

1.3.6. "***WARNING***" indicates operating procedures, techniques, etc. which could result in personal injury or loss of life if not carefully followed.

1.4. Deviations and Waivers. Do not deviate from the policies and guidance in this AFI, except for safety, or when necessary to protect the crew or aircraft from a situation not covered by this AFI and immediate action is required. The aircraft commander is ultimate authority and responsible for the course-of-action to be taken. Report deviations or exceptions without waiver through channels to MAJCOM Stan/Eval function who, in turn, notifies the OPR (lead command) for follow-on action, if necessary.

1.4.1. Unless otherwise directed in this AFI, waiver authority for the contents of this document is MAJCOM/DO. MAJCOM/DO staff should forward a copy of approved waivers to the OPR (lead command). Request for a long-term (permanent) waiver must be approved by MAJCOM/DO and listed in MAJCOM Supplement (see paragraph **1.5.**).

1.4.2. Short-notice waiver request for missions (including missions under TACC operational control) use **Chapter 4**, Waiver Protocol.

1.5. Supplements. This document is a basic directive. Each user MAJCOM or operational theater may supplement this AFI according to AFPD 11-2, *Aircraft Rules and Procedures*. These supplements will not duplicate, alter, amend, or be less restrictive than the provisions of this AFI or the appropriate C-141 flight manual. MAJCOM/DO may initiate a long-term waiver to basic document. When approved, specify long-term waiver approval authority, date, and expiration date in the appropriate MAJCOM supplement.

1.5.1. Combined Operations. Use only the basic AFI for planning or operations involving forces from lead and user commands. Commanders may use approved MAJCOM supplement procedures with assigned and/or chopped forces provided these forces receive appropriate training and duration is specified. Commanders should not assume or expect aircrews from another command to perform MAJCOM-specific procedures in their supplements unless these provisions are met. Questions by aircrew, planners, and staff contact OPR 24-hours via TACC waiver and technical support services (see **Chapter 4**).

1.5.2. Coordination Process. Forward MAJCOM approved supplements (with attached Air Force Form 673, **Request to Issue Publications**) to HQ AMC/DOV, 402 Scott Dr, Unit 3A1, Scott AFB IL, 62225-5302. HQ AMC/DOV will provide a recommendation to HQ AMC/DO and who forwards to HQ AFFSA/XOF for approval.

1.5.3. Local Procedures Coordination Process. Units will send one copy of **Chapter 10** (local procedures) to the appropriate NAF (if applicable) for coordination and approval. The NAF will then forward the copy to the parent MAJCOM Stan/Eval function for validation.

1.6. Requisition and Distribution Procedures. Unit commanders provide copies for all aircrew members and associated support personnel.

1.7. Improvement Recommendations. Send comments and suggested improvements to this instruction on AF Form 847, **Recommendation for Change of Publication**, through channels to HQ AMC/DOV, 402 Scott Drive Unit 3A1, Scott AFB IL, 62225-5302, according to AFI 11-215, *Flight Manual Procedures* and the appropriate MAJCOM Supplement.

1.8. Definitions. The explanation or definition of terms and abbreviations commonly used in the aviation community can be found in FAR Part 1; DOD Flip General Planning, Chapter 2; and Joint Pub 1-02, *The DOD Dictionary of Military and Associated Terms.* See **Attachment 1** for common terms.

1.9. Aircrew Operational Reports. The reporting requirements in this instruction are exempt from licensing in accordance with paragraph 2.11.10 of AFI 37-124, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information Collections.*

Chapter 2

COMMAND AND CONTROL

2.1. General. Command and control of tanker and airlift forces is exercised through a network of command and control (C2) centers. C2 centers are executive agents for commanders exercising operational control over mobility forces. The C2 network consists of the AMC TACC, or respective MAJCOM C3 agency for MAJCOM (other than AMC) directed missions, theater Air Operations Centers (AOC), Air Mobility Elements (AME), unit C2s, Air Mobility Control Centers (AMCC), Tanker Airlift Control Elements (TALCE), Special Tactics Teams (STT), the Pacific Air Force (PACAF) and the United States Air Forces Europe (USAFE) Air Mobility Operations Control Center (AMOCC), Air National Guard Readiness Center (ANGRC) Command Center, and the Air Force Reserve Command (AFRC) Command Center.

2.2. Execution Authority. Execution approval will be received through the local command post or command element. The operations group commander will be the executing authority for local training missions. Missions operating outside communications channels will be executed by the aircraft commander (AC).

2.2.1. Supplemental Training Mission (STM). Opportune airlift of cargo and mission personnel may be accomplished as a by-product of crew training missions. STMs may be authorized when minor adjustments can be made to a scheduled training mission or when a productive aircrew training mission can be generated for the airlift. The training mission will not be degraded in any manner to accomplish the STM. Use of STMs for logistical support will be authorized only when normal military or commercial transportation modes are unable to provide required support. STMs may be approved by the operations group commander with wing commander coordination. On STMs aircraft commanders will release maximum number of space available seats commensurate with mission requirements and safety.

2.2.2. Off Station Training Flights. Wing Commanders are the approval authority for off station trainers. Prior to approval, commanders will carefully review each proposed trainer's itinerary to ensure it justifies and represents the best avenue for meeting training requirements. Commanders approving off station trainers will forward a copy of the planned itinerary to the appropriate NAF/DO, MAJCOM/DOT or ANG/DOO, and TACC/XOB. Approval authority for AFRC UE off-station trainers is HQ AFRC/DOOM.

2.3. Aircraft Commander Responsibility and Authority. An aircraft commander is designated for all flights on the flight authorizations in accordance with AFI 11-401, *Flight Management*, and applicable command supplement. Aircraft commanders are:

2.3.1. In command of all persons aboard the aircraft.

2.3.2. Responsible for the welfare of the crew and the safe accomplishment of the mission.

2.3.3. Vested with the authority necessary to manage crew resources and accomplish the mission.

2.3.4. The final mission authority and will make decisions not specifically assigned to higher authority.

2.3.5. The final authority for requesting or accepting any waivers affecting the crew or mission.

2.3.6. Charged with keeping the applicable C2 or executing agencies informed concerning mission progress.

2.3.7. Responsible for ensuring that only activity authorized by the executing authority is accomplished, unless emergency conditions dictate otherwise (for example, unscheduled air refueling or transition training is not authorized without the approval of the executing authority).

2.4. Mission Clearance Decision. The final decision to delay a mission may be made either by the executing agency or the aircraft commander when conditions are not correct to start or continue a mission. Final responsibility for the safe conduct of the mission rests with the aircraft commander. If the aircraft commander refuses a mission, the mission will not depart until the conditions have been corrected or improved so that the mission can operate safely. Another aircraft commander and aircrew will not be asked to take the same mission under the same conditions.

2.4.1. Rerouting or Diverting a Mission. Must be authorized by the execution authority, except in an emergency or when required by en route or terminal weather conditions.

2.4.1.1. The controlling agency directing the rerouting or diversion is responsible for ensuring the aircraft is compatible with departure, en route, and destination requirement and facilities.

2.4.1.2. The aircraft commander will notify the appropriate command center of any aircraft or aircrew limitation that may preclude diverting or rerouting the mission.

2.4.2. When directing an aircraft to an alternate airfield, the C2 agency will ensure the aircraft commander is provided existing and forecast weather for the alternate, notice to airmen (NOTAM), and appropriate airfield information from the Airfield Suitability and Restriction Report (ASRR). If the planned alternate becomes unsuitable while en route, the aircraft commander will coordinate with the C2 agency for other suitable alternates. The C2 agency will coordinate with customs and ground service agencies to prepare for arrival. The aircraft commander is final authority on selecting a suitable alternate.

2.5. Aircrew Responsibilities. The aircraft commander is the focal point for interaction between aircrew and mission support personnel. The local C2 agency is the focal point for all mission support activities. Aircraft commanders must inform C2 of any factor that may affect mission accomplishment. When transiting a stop without a C2 agency, it is the responsibility of the aircraft commander to ensure necessary mission information is placed into the C2 system by the most expeditious means available. The aircraft commander will establish a point of contact with the appropriate C2 agency prior to entering crew rest.

2.6. Operational C2 Reporting. AMC C2 facilities will normally transmit arrival, departure, and advisory messages to the TACC as appropriate. Aircrews on AMC TACC controlled missions are responsible for transmitting these messages via L-Band SATCOM, HF, DSN, etc., when transiting stations without an AMC C2 (fixed or mobile) presence. Crews on missions not controlled by the AMC TACC will report to their appropriate controlling agency.

2.6.1. High Frequency (HF) Communications. HF is the primary means of worldwide C2 communications.

2.6.1.1. During operational missions, one HF radio shall be operated in automatic link establishment (ALE) mode to support voice contacts between the aircrew and TACC operations controllers. The radios are pre-programmed with ground station ALE addresses loaded in alphabetical

order (by ground station ICAO identifier). TACC phone numbers are also programmed; M3 calls the TACC East cell and M4 calls the TACC West cell.

2.6.1.2. During transoceanic flights, the second HF radio shall be operated in manual mode and set to the appropriate ATC frequency. Place the radio in SELCAL, if available.

2.6.2. L-Band SATCOM. The L-Band SATCOM supplements HF communications by providing a worldwide communications capability suitable for *unclassified* C2 transmissions. Currently, messages can only be sent between aircraft and ground stations.

2.6.2.1. Employment. The L-Band SATCOM equipment aboard aircraft will be used as necessary except on local training missions and missions operating under Emission Control (EMCON) restrictions prohibiting its use. Limit SATCOM communications to operational traffic. The transceiver will be turned on during preflight and remain configured to receive messages at all times until aircraft power down at destination. Approved laptop computers will be on and software running during all phases of flight (i.e. NEC VERSA V75, CF-25, future approved models) to take advantage of full range of capabilities. For missions operating through sensitive or classified locations, disable GPS position reporting in the normal message software and, when available, the automatic position reporting function.

2.6.2.2. Responsibility for equipment and supplies. Aircraft laptop computers are high theft items and will not be left unsecured on the aircraft.

2.6.2.3. Home station. Operations groups will be responsible for storing, maintaining day-to-day control, and administrative accountability of computers. Laptops will be issued via hand receipt to aircrews prior to departure from home base.

2.6.2.4. En route. When storing computers at en route locations, care must be taken to maintain original aircraft tail number and laptop computer match. Laptops may be secured aboard aircraft which have been modified with a suitable secure container (e.g., new gun box capable of holding weapons and computers), provided they will not be exposed to extreme temperatures (below -40 or above 149 degrees Fahrenheit). On aircraft lacking a suitable secure container or when temperature extremes cannot be avoided, computers will be stored in the command post or other suitable AMC C2 facility. At locations without an AMC C2 presence, crews should use their best judgment and store computers in the most secure facility or location available.

2.6.2.5. Staging operations. Aircrews and AMC C2 organizations will establish procedures to store and control the laptop computers. Control procedures should maintain original aircraft tail number and laptop computer match. Hand-to-hand crew transfer of the computer is the preferred method. If crew transfer is not possible, inbound crews will store the computer on the aircraft, if secure, and turn in the key to AMC C2 before entering crew rest. If the aircraft lacks a secure container or if the temperature extremes (see paragraph **2.6.2.4.**) cannot be avoided, the computer will be stored by AMC C2. AMC C2 will issue the key or computer, as applicable, to outbound crews ensuring the aircraft/computer match is maintained.

2.6.2.6. L-Band SATCOM Messages and Advisories. The aircrew can send messages by either choosing a pre-formatted template from a menu or composing a free-text message. The following L-Band SATCOM transmissions are required as indicated:

2.6.2.6.1. On station message. At the beginning of each crew duty day, transmit an on station message during the initial preflight to verify system operation and update TACC with esti-

mated aircraft takeoff times and other mission data. Further on station messages during the same crew duty day are not required.

2.6.2.6.2. Inbound 3-hour out messages. At locations with a mobile TALCE presence, the inbound aircrew will send a 3-hour out report to the TALCE.

2.6.2.6.3. Advisories. Transmit (free-text messages) mission delay, in-flight refuel, off/on-load reports as required or directed.

2.6.2.6.4. Arrival weather TAWXWEST@scott.af.mil

NOTE: The L-Band software acknowledged (A) status code indicates the message was received by the Land Earth Station (LES) and forwarded to TACC. The acknowledged code does not indicate the addressee received the message. If a confirmation is required, specifically request a reply message in the REMARKS field.

2.6.3. Stations Without C2 Agencies. Report movement information (actual time of departure [ATD], estimated time of departure [ETD], actual time of arrival [ATA], departure load data, delay information, etc.) directly to the AMC TACC (as appropriate) as soon as possible, by any means available. After takeoff, relay pertinent data to the appropriate C2 agency by any means available. L-Band SATCOM, when available, will be the preferred method for passing routine mission movement reports followed by HF, DSN, etc. The following L-Band SATCOM messages will be transmitted to fulfill mission reporting requirements:

2.6.3.1. Block out.

2.6.3.2. Departure message (Aircraft call sign, time of departure, mission status).

2.6.3.3. Arrival/Shutdown. This is currently a free text message. The arrival portion should contain arrival time and any other information the aircrew deems necessary to pass to the TACC. If the L-Band SATCOM system is to be shutdown (crew rest, refueling, mission complete, etc.), inform the TACC that the aircraft can no longer receive messages.

NOTE: For critical C2 communications, i.e. aircraft waiver request, voice communications (HF, DSN, etc.) are still the primary method with L-Band SATCOM as a back up.

2.6.4. Report movement information (departure, arrival, or diversion) and airlift mission recapitulation (recap) reports (number of passengers, pallets, tons of cargo, and special category information) to the appropriate C2 agencies via SATCOM or global high frequency (HF) stations. Provide relay instructions for global HF stations to pass reports to appropriate agencies.

NOTE: All HF transmissions will be restricted to operational traffic, i.e. movement reporting, itinerary revisions, maintenance status, flight plan information, etc.

2.6.5. En Route Reporting. Full time connectivity between C-141 aircrews and the TACC is desired on AMC directed missions. Adhere to the following procedures:

2.6.5.1. CONUS. C2 agencies may advise aircrews via the controlling ATC agency to establish contact when communication is needed. Refer to the Flight Information Publication (FLIP) concerning global HF station procedures in contacting MAINSAIL. Periodic "ops normal" calls or continuous monitoring of L-Band SATCOM or global HF station frequencies are normally not required. TACC may specify increased reporting procedures.

2.6.5.2. OCONUS. TACC will specify increased reporting procedures (if needed) through a communications plan in the OPLAN, OPORD, FRAG, or Mission Directive. Aircrews will transmit L-Band messages or relay calls to global HF stations for relay to the controlling C2 agency as specified in the communications plan. Maintain listening watch on L-Band or US Global HF system as specified in the communications plan.

2.6.6. Receiver Air Refueling Report (N/A local training missions which depart and arrive at home station). Report the air refueling information (in the standard format indicated below) to the destination AMC command and control element (if available) after landing. If a local AMC command post is not available, contact TACC/XOC (Hilda control) via HF radio or via land line (1-800-AIR-MOBL). AMC C2 will enter the information in the GDSS system for immediate retrieval. Include all scheduled air refuelings not accomplished. Use the following format:

2.6.6.1. Call Sign

2.6.6.2. A/R Track

2.6.6.3. Scheduled On-load

2.6.6.4. Actual On-load

2.6.6.5. Reason Code

2.6.6.6. Additional Comments

2.6.6.7. Reason Codes. Reason codes indicate the outcome of air refueling activity. Use reason codes when a problem or situation affects the successful accomplishment of the air refueling. Crew should be prepared to provide a short synopsis of the factors impacting the air refueling.

2.6.6.7.1. RO - Receiver Operations

2.6.6.7.2. RM - Receiver Maintenance

2.6.6.7.3. RW - Receiver Weather

2.6.6.7.4. TO - Tanker Operations

2.6.6.7.5. TM - Tanker Maintenance

2.6.6.7.6. TW - Tanker Weather

2.6.6.7.7. AT - Air Traffic Control

2.6.6.7.8. WEATHER - Air Refueling Track Adverse Weather

2.6.6.7.9. AC - Air Refueling Complete

NOTE: Use reason code "AC" when air refueling was completed without delay or mission impact. Additional comments are mandatory for all reason codes except AT, WEATHER, and AC.

2.6.7. Arrival Advisory. Aircrews on operational missions transmit HF arrival advisory to the destination C2 agency or, in the absence of a local C2 agency, to TACC or MAJCOM C2 with operational control, when approximately 2-3-hours from destination. Furnish the following information:

2.6.7.1. Call sign

2.6.7.2. Mission number

2.6.7.3. ETB (estimated time in block)

2.6.7.4. Maintenance status (See the definitions for a list of maintenance status codes in **Chapter 1** of this volume.). Aircrews on AMC missions transmit maintenance discrepancies (via VHF, UHF, HF, or L-Band SATCOM) to destination C2 Center or, in the absence of a local C2 Center, to the TACC as soon as possible. Crews should not wait until accomplishing the arrival message to call in this information.

2.6.7.5. Distinguished visitor (DV) status and honors codes (Transmit the DV code of each DV on board.). Do not pass the name of the DV on board without the consent of the DV. Outside the continental limits of the United States, the name of the DV will not be passed over unsecure radios.

2.6.7.6. Aircrews transmit a UHF or VHF arrival advisory as soon as contact can be established with the destination C2 agency and should include the following:

2.6.7.6.1. Aircraft call sign

2.6.7.6.2. Mission number

2.6.7.6.3. ETB

2.6.7.6.4. Maintenance status.

2.6.7.6.5. DV code and requirements

2.6.7.6.6. Number of passengers

2.6.7.6.7. Hazardous cargo and remote parking requirements

2.6.7.6.8. Additional service required

2.6.7.6.9. Number of pallets to be downloaded and number that are through manifested

2.6.7.6.10. Passenger and pallet space and weight available for the next mission segment

2.6.7.6.11. Fuel Requirements

2.6.8. DV Messages. Airborne unclassified messages originated by DV passengers may be transmitted at the discretion of the aircraft commander.

2.7. Mission Commanders.

2.7.1. A mission commander will be required when more than two aircraft are assembled as a formation or when directed by an operations order or concept of operations to perform missions away from home station. With two aircraft, the tasked unit may designate an aircraft commander for overall mission responsibility, crew duties and crew rest permitting. When conflicts with crew responsibilities exist, a separate mission commander (pilot or navigator) should be appointed to ensure mission coordination is accomplished.

2.7.1.1. For AMC-tasked missions, TACC/XOO will coordinate and designate a lead planning agency when more than one airlift unit is involved in an airdrop operation. This planning agency is responsible for coordinating the entire mission with all involved tanker (if applicable), airlift, user, and planning agencies. The lead planning agency will designate the mission commander. The mission commander will be a rated (normally field grade) officer qualified in the type of mission being employed. For formation airdrop/air refueling missions of greater than five aircraft, the mission commander will be a tactically qualified field grade officer (pilot or navigator).

2.7.1.2. For all multi-ship formation operations, tasked units will ensure an appropriate level of ground and flight supervision is provided for the entire mission. Emphasis should be placed on who is the overall airborne commander and subordinate commanders for each type aircraft in the operation.

2.7.1.3. When non-collocated, tankers and receivers aircrews will contact each other prior to flight. If operating in an austere or communications sensitive environment, the mission commander (in conjunction with the lead planning agency) will ensure all applicable information, to include rendezvous, formation, abort, and recovery procedures, is relayed to non-collocated aircrews. The mission commander will ensure the controlling agency and all non-collocated tankers and receivers are informed of all anticipated delays or mission changes.

2.8. C2 Agency Telephone Numbers. Units should publish a listing of telephone numbers to assist crews in coordinating mission requirements through appropriate C2 agencies. It should be made readily available to crews by publishing it in the FCB, Read File, or other appropriate publication.

2.9. Close Watch Missions. Close Watch missions are designated missions *(e.g. CSAR; Medevac, PHOENIX BANNER)* which receive C2 special attention. Close Watch procedures are initiated so that all possible actions are taken to ensure on-time accomplishment and notification to the user when delays occur or are anticipated. Promptly notify the appropriate C2 channels of delays, aborts, or other events that affect on-time departure and advise them of the ETIC, new ETD, and ETA. Notify the C2 within 10 minutes of event and confirm that the user and OPR have been advised.

2.10. Posse Comitatus. It is the policy of the Department of Defense to cooperate with civilian law enforcement officials to the maximum extent practical. AFI 10-801, *Assistance to Civilian Law Enforcement Agencies*, provides uniform policies and procedures to support federal, state, and local civilian law enforcement agencies. It establishes specific limitations and restrictions on the use of Air Force personnel, equipment, facilities, and services by civilian law enforcement organizations. Report all requests for assistance and coordinate all requests from civilian law enforcement authorities through the appropriate command and control channels.

Chapter 3

CREW MANAGEMENT

3.1. Aircrew Qualification. Primary crew members are those occupying a primary position during flight must be qualified or in training for qualification in that crew position. If non-current, or in training for a particular event, the crew member must be under the supervision of an instructor while accomplishing that event (direct supervision for takeoff, departure, air refueling, approach, landings, airdrops and low levels below the MSA).

EXCEPTION: Senior staff members who have completed a Senior Staff course may occupy either pilot seat under direct IP supervision. These individuals will log "FP" for Flight Authorization Duty Code on the AFTO Form 781, **AFORMS Aircrew Flight/Mission Flight Data Document**. They may not perform airdrop or SOLL II events.

NOTE: Flight qualification training does not commence until the crew member has successfully completed both academic and simulator training prescribed for each course.

3.1.1. Pilots:

3.1.1.1. Missions With Passengers. With passengers onboard, takeoff, climb-out, flight under actual instrument conditions, approach, and landing may be made by either the pilot, first pilot, or the copilot. Only a pilot that is qualified (current and valid AF Form 8, **Certificate of Aircrew Qualification**) will occupy a pilot's seat with passengers onboard the aircraft. One of the following conditions must be met:

3.1.1.1.1. Two qualified and current pilots must be at the controls.

3.1.1.1.2. A pilot regaining currency and an IP/EP providing direct instructor supervision must be at the controls.

3.1.1.2. Touch-and-Go landings with passengers or hazardous cargo are prohibited (***Exception***: MAJCOM approved maintenance personnel).

3.1.1.3. Left Seat Training. Experienced copilots current and qualified in the right seat, may be allowed to fly in the left seat under direct IP supervision. No passengers may be onboard.

3.1.2. Navigators, Flight Engineers and Loadmasters. Non-current or unqualified navigators, flight engineers or loadmasters may perform in their primary crew position on any mission when supervised by a qualified instructor or flight examiner of like specialty (direct supervision for critical phases of flight).

3.2. Crew Complement. Minimum crew complement for basic and augmented Flight Duty Period (FDP) are **Table 3.1.**.

3.2.1. Minimum crew members for local proficiency flights are the pilot, copilot, flight engineer and scanner. See paragraph **3.2.**, ***NOTE*** 8 for loadmaster requirements.

3.2.2. Augmented crews are required when a mission cannot be safely completed within a basic FDP. Augmentees must be current and qualified in the aircraft and mission ready in accordance with AFI 11-2C-141 Volume 1. In those situations requiring augmentation, the crew must be augmented from the start of the duty period. MAJCOM/DO approval is required for additional crew members to join

the mission en route for augmentation. If augmentees are added to the crew, the crew's FDP will be computed based on the FDP of the most limited person.

3.2.3. A formation lead crew consists of a lead qualified aircraft commander and navigator. Formation lead crews are required in the lead and deputy lead position of the first element only. Subsequent elements require only the element lead position to be filled by a lead crew. Exceptions: If the formation consists of only 1 element, a deputy lead crew is desired but not required. During unilateral training, the deputy lead position in the first element may be flown by any formation qualified aircrew. During unilateral training in VMC, any formation qualified crew may fly in the formation or element lead position provided a formation lead qualified crew is in the formation.

Table 3.1. Crew Complement.

Crew Position	Basic (11)	Augmented (11)	Airdrop (AD)/ Tactical/ Boat-drop	Augmented A/R AD / Tactical	SOLL II (9)
Aircraft Commander	1	1	1 (1)	2 (2)	1
Copilot	1	2 (3)	1	1	2
Navigator			1-2 (1,4)	2 (2)	2
Flight Engineer	2 (5)	2 (6)	2 (5)	2 (6)	2
Loadmaster (8, 10)	1-2 (7)	1-2 (7)	1-2 (1)	1-2	2

1.For boat drop, AC and navigator must be CDS certified and 2 CDS qualified loadmasters are required.

2.Both ACs and navigators must be qualified in the appropriate mission to be accomplished (to accommodate work/rest cycle). If A/R or AD events (to include formation recovery) are to occur past 18-hours, (e.g., lead crew, scheduled for A/R and/or AD event past 18-hours) requires 2 lead, FAR/AD qualified ACs and navigators. If no A/R or AD events are accomplished after 18-hours, pilot portion of crew may be composed of those listed in "Augmented" column. If no A/R or AD events are accomplished after 18-hours, only one navigator must be lead qualified (for lead crew). Transfer of pilot-in-command (PIC) duties between qualified ACs will be briefed to crew.

3.One copilot must be first pilot qualified or above.

4.Two navigators may be required, at the unit commander's discretion, depending on the complexity and demands of the mission.

5.One may be second engineer qualified. Second engineers who have completed the applicable sections of the First Flight Engineer training guide and received a local engineer evaluation may perform flight engineer or scanner duties while part of a basic crew compliment on local airland, air refueling training flights, and airdrop missions.

6.Two first engineers (or above) required. First engineers (or above) who are not airdrop qualified will not be part of a basic tactical crew compliment.

7.On missions requiring two loadmasters, one may be second loadmaster qualified (FL); on single loadmaster missions, the loadmaster must be mission qualified (ML).

8. Loadmaster requirements:

8.A. One loadmaster for all airlift missions including passenger loads of one to 40, AE missions, missile missions, and tactical/boat drop/SOLL missions (where only Standard Airdrop Training Bundles (SATBs are dropped.)

8B. Two loadmasters for missions with 41 or more passengers or if any passengers/patients are carried on augmented missions beyond 16-hours of the FDP. ACs may designate an additional crewmember to assist the loadmaster during those exceptional cases where more than 40 passengers but no more than 50 passengers must be moved (except for home station departures). Movement priority, length of the mission leg, whether early or late in the FDP, number of additional passengers, etc., must be considered before using this option. The additional crewmember must be a fully qualified mission ready C-141 crewmember and cannot have any other duties (e.g., if three pilots are on the crew, the scanner or additional pilot may be used for forward observer duties to assist the loadmaster.). ***EXCEPTIONS:*** HQ AMC/DOV or DIRMOBFOR may waive the requirement to one loadmaster (HQ AFRC/DO, ANG/DO, or HQ AETC/DO for those MAJCOM internally directed missions).

8C. Loadmasters are not required if all passengers are seated on the flight deck, and it can be positively determined that no cargo or passengers will be airlifted in the cargo compartment on any mission segment.

8D. Two loadmasters required on PNAF/ENAF missions to satisfy the two-person (no-lone-zone) requirement.

9.Aircraft commander and radar navigator will be instructor and lead airdrop qualified. Copilot will be aircraft commander, wing airdrop qualified. Jumpseat pilot may be copilot qualified. Map navigator must be single-ship airdrop qualified. Primary flight engineer and primary loadmaster must be highly qualified. The aircraft commander, copilot, radar navigator, primary flight engineer, and primary loadmaster will be integral to the maximum extent possible. The crew must meet augmented air refueling qualification. Both loadmasters must be CDS qualified. The operations group commander will scrutinize the selection process to ensure the best qualified people are picked for each crew position.

10. On PNAF missions, both loadmasters must be mission qualified.

11. The Aircraft Commander and one flight engineer will be certified to operate SOFI aircraft.

3.3. Scheduling Restrictions. Crew members will not be scheduled to fly nor will they perform crew duties:

3.3.1. When the maximum flying time limitations of AFI 11-202 Volume 3, *General Flight Rules*, will be exceeded.

3.3.2. After consuming alcoholic beverages within 12-hours of takeoff or when under the influence of alcohol.

3.3.3. Do not takeoff early (prior to scheduled departure time) if the early takeoff time would violate these restrictions.

3.3.4. After consuming alcoholic beverages within the 12-hour period prior to assuming ALFA/ BRAVO/J Alert standby force duty.

3.3.5. Within 72-hours of donating blood. The flying unit commander must approve the donation of blood by crew members in a mobility assignment or who are subject to flying duties within this 72-hour period. Crew members should normally not donate blood.

3.3.6. When taking oral or injected medication unless individual medical waiver has been granted by the Command Surgeon. Crew members may not self medicate except IAW AFI 48-123, *Medical Examinations and Standards.* The following is a partial list of medications which may be used without medical consultation:

3.3.6.1. Skin antiseptics, topical anti-fungal, 1 percent Hydrocortisone cream, or benzoyl peroxide for minor wounds and skin diseases which do not interfere with the performance of flying duties or wear of personal equipment.

3.3.6.2. Single doses of over-the-counter aspirin, acetaminophen or ibuprofen to provide analgesia for minor self-limiting conditions.

3.3.6.3. Antacids for mild isolated episodes of indigestion.

3.3.6.4. Hemorrhoidal suppositories.

3.3.6.5. Bismuth subsalicylate for mild cases of diarrhea.

3.3.6.6. Oxymetazoline or phenylephrine nasal sprays may be used by aircrew as "get me downs" should unexpected ear or sinus block occur during flight. These should not be used to treat symptoms of head congestion existing prior to flight.

3.3.7. Within 24-hours of compressed gas diving (including scuba); surface supplied diving, or hyperbaric (compression) chamber exposure and aircraft pressurization checks that exceed 10 minutes duration.

3.3.8. Within 12-hours after completion of a hypobaric (altitude) chamber flight above 25,000 feet. Personnel may fly as passengers in aircraft during this period, provided the planned mission will maintain a cabin altitude of 10,000 feet MSL or less. For altitude chamber flights to a maximum altitude of 25,000 feet or below, aircrew members may fly without delay as crew members or passengers if their cabin altitude does not exceed 15,000 feet.

3.4. Alerting Procedures.

3.4.1. Crew alerts will normally be 3+15-hours before scheduled takeoff time to allow 1-hour for reporting and 2+15-hours for mission preparation. ***EXCEPTION***: Crews will normally alert at 4+15 before scheduled takeoff for tactical missions (i.e., formation A/R, low level, boat drop, airdrop, or Special Operations Low Level (SOLL) II mission).

3.4.1.1. Self alerting may be requested by the aircraft commander, but is normally not recommended to avoid potential crew duty limitations resulting from mission changes. Early alerting to provide additional reporting or mission preparation time is authorized when absolutely essential

for mission accomplishment. Late alerting is also authorized; however, all requests for changes to standard alerting times must be coordinated through the appropriate C2 agency.

3.4.1.2. If no controlling C2 agency or other control agency is available, crews will self-alert. Self-alert procedures may also be used by any aircrew or aircrew member for normal local training missions.

3.4.1.3. With aircraft commander approval, loadmasters may be alerted early when loading requirements (i.e., outsized cargo and dash 9 section VI cargo) dictate a need for early alerting but no more than 2-hours prior to the crew alert. If early alerting will be required, the loadmaster must be notified of that intent prior to entering crew rest. In no case should the loadmaster be alerted more than 1-hour prior to the commencement of actual cargo loading operations. Aircraft commander and C2 must consider that when the loadmaster reports early, the available flight duty period for the crew will be limited by the loadmaster's show time.

3.4.2. A crew will not be alerted until the aircraft is in commission or there is reasonable assurance that the Estimated Time In Commission (ETIC) will meet the proposed takeoff time.

3.4.3. The aircraft commander may request Crew Enhancement Crew Rest (CECR) when they desire a later legal for alert time to normalize the crew work-rest cycle or enhance messing options immediately prior to crew alert. To minimize adverse effects on established schedules, aircraft flow, and capability, CECR requests should be of minimum duration and normally be limited to de-positioning legs. Send requests through C2 Center channels for approval decision. When requests are disapproved, the controlling C2 Center will notify the aircraft commander through C2 channels of the reason for disapproval. CECR is not an alternative to a ësafety of flight' delay and should not be used as such. If the AC deems extra crew rest is necessary for continued safe flight and mission accomplishment, the AC has the responsibility to declare safety of flight when the situation warrants, not after CECR is disapproved.

3.4.4. Aircrew release policy is as follows:

3.4.4.1. On the aircrew's initial entry or reentry into crew rest, the controlling C2 agency (or aircraft commander in coordination with the C2 agency for self alerts) will establish an expected alert time. The crew will not be alerted or otherwise disturbed before this time except for emergencies.

3.4.4.2. The latest allowable alert time will be 6 -hours after the expected alert time for all missions. If circumstances warrant, the aircraft commander may extend the window to a maximum of 8-hours. (When advised the crew will be deadheading, the aircraft commander may extend the window to 12-hours). Air Reserve Component (ARC) crew members may extend the window as necessary to allow deadhead return to home station within Firm Scheduled Return Time (FSRT). The controlling C2 agency will not request the aircrew accept more than a 6-hour window.

3.4.4.3. If the controlling C2 agency determines a crew will not be alerted in the allowable time span, then at the time of determination (but no earlier than the crew's expected alert time) the controlling C2 agency will reenter the crew into crew rest of not less than 12-hours and establish a new expected alert time.

3.4.4.4. When the latest allowable alert time expires without being alerted, then:

3.4.4.4.1. The crew reenters crew rest of not less than 12-hours.

3.4.4.4.2. The aircraft commander will contact the controlling C2 agency to determine the new expected alert time and establish a new latest-allowable alert time.

3.5. Stage Management.

NOTE: C-141B and C-141C aircrews will be staged only for those models they are qualified in (i.e., C-141B qualified aircrews will only be staged for missions where C-141B aircraft are scheduled). However, the loadmaster (for any mission) and navigator (for airland only missions) crew positions may participate in either stage.

3.5.1. Stage Posture. Stages operate on a directional basis. Alert sequence is as follows:

3.5.1.1. Crews requiring an emergency return to home station.

3.5.1.2. By the crew's SRD. Returning stage crews will be prioritized by their SRDs.

3.5.1.3. Crews in stage over 48-hours.

3.5.1.4. Crews in sequence of arrival time.

NOTE: If a stage crew is forced to return to crew rest because of a mission delay or abort, that crew becomes first out when legal for alert.

3.5.2. Mechanical Stage. Mechanical stages may be established by the C2 where no crews are staged. The stage is created when a mission is delayed or aborted and the crew goes into crew rest. Mechanically staged crews become first out in the same direction when legal for alert. An inbound crew may be bumped from the mission even though they have sufficient duty time remaining to complete that mission. ***EXCEPTION***: ARC crews flying unit-equipped aircraft or C-141C aircraft should not be mechanically stage with other C-141B aircrew unless approved by owning unit operations group commander.

3.6. Crew Duty Time (CDT) and Flight Duty Period (FDP). CDT is the amount of time an aircrew may perform combined flight and ground duties. FDP is the time period between mission reporting and final aircraft engine shutdown. For planning purposes, CDT normally consists of FDP plus 45 minutes, not to exceed the maximum CDT. When post flight duties exceed 45 minutes, CDT is FDP plus the time required to complete the post-flight related duties.

NOTE: CDT/FDP includes both military duty and civilian work. It begins when the individual reports for his or her first duty period (military or civilian) and ends at engine shutdown at the end of the mission or series of missions.

3.6.1. CDT and FDP both begin 1-hour after alert. ***EXCEPTIONS***:

3.6.1.1. Self-alerts: CDT and FDP begin at scheduled or established mission reporting time.

3.6.1.2. ALFA and J Alert standby: CDT and FDP begin when the crew is told to launch.

3.6.1.3. BRAVO standby: CDT and FDP begin when the crew shows for duty.

3.6.1.4. Crew members performing other duties prior to flight related duties: CDT and FDP begin when reporting for other duties.

3.6.1.5. Crew members alerted early to perform mission-related duties: CDT and FDP begin when reporting for these duties.

3.6.2. The length of FDP will be established by the mission directive or controlling C2 when the crew shows for duty and is briefed for the mission. FDP will not be extended to an augmented day after a basic FDP has begun regardless of crew composition. FDP will not be based on crew composition, but rather on mission requirements.

3.6.3. FDP ends at engine shut down following completion of the final mission segment.

3.6.4. Normally, CDT ends 45 minutes after engine shutdown at the end of the mission. If any crew member must perform mission-related duties past 45 minutes, CDT does not end until that crew member completes these duties. These duties include up or down loading, servicing, debriefing, mission planning, etc. After mission completion, except when authorized by unit commanders at home station or deployed locations, crew members will not be used for mission related duties supporting other missions; i.e., flight engineers/loadmasters will not be used to service/ load other aircraft. Post mission duties will not be performed after the maximum CDT has expired.

3.6.5. Basic Crew FDP:

3.6.5.1. Maximum FDP for a basic crew is 16-hours. The basic FDP is 12-hours without an operative autopilot pitch axis. All formation tactical events (airdrop, low level, formation air refueling and formation threat avoidance approaches and departures) must be completed within 12-hours of the start of the FDP. On single-ship tactical missions (Airdrop and Airland), air refueling and tactical events must be completed within 14-hours of the start of FDP.

3.6.5.2. Maximum CDT for a basic crew is 18-hours. ***NOTE***: In no case, when in the opinion of the aircraft commander, will the crew continue their crew duties (flight or ground) when doing so would jeopardize mission safety. Aircrew members of different specialties should aid others in completing post flight duties, when appropriate, prior to the end of available CDT (i.e., downloading cargo, refueling, etc.).

3.6.6. Augmented Crew FDP:

3.6.6.1. Maximum FDP for an augmented crew (operational, non-tactical missions only) is 24-hours. FDP is 16-hours without an operative autopilot pitch axis. Only the pilot portion of the crew need be augmented when the autopilot is inoperative.

3.6.6.2. Basic crews will not be augmented after FDP has started.

3.6.6.3. Maximum CDT for augmented crews is 24+45-hours.

3.6.6.4. Authorized only for a maximum of four intermediate stops and when one of the following criteria is met:

3.6.6.4.1. At least two legs of 4-hours each.

3.6.6.4.2. At least one leg of 6-hours.

NOTE: No more than two intermediate stops are authorized past 16-hours. If air refueling is scheduled, mission planners must ensure the opportunity for in-flight rest is not significantly altered by the timing of the air refueling activity.

3.6.6.5. The maximum augmented tactical FDP is 24-hours provided no tactical events (i.e., airdrop, low level, formation, formation air refueling, and formation threat avoidance approaches and departures) or single receiver air refueling events are accomplished after 18-hours. If the autopilot is not operational, limit the crew duty day to 16-hours.

3.6.7. Training FDP:

3.6.7.1. Maximum FDP for training missions is 16-hours. The training FDP is 12-hours without an operative autopilot pitch axis.

3.6.7.2. Training events (transition, air refueling, airdrop, low level, formation, formation air refueling and multiple threat avoidance approaches and departures) must be completed during the first 12-hours of the training FDP. This does not prevent missions from continuing to home station or deployed staging base single ship (for a full stop landing) once training events are accomplished (not to exceed 16-hours with an operative autopilot pitch axis). Training duty day begins at the start of CDT.

EXCEPTION: For augmented tactical training missions, use provisions in paragraph **3.2.** and paragraph **3.6.6.5.**

NOTE: ARC crews may perform transition on C-141 training missions provided time from start duty does not exceed 16-hours and actual flight duty does not exceed 12-hours.

3.6.8. If autopilot fails after departure, consider mission requirements and determine best course of action to preclude further mission delays due to reduced FDP. Best course of action may include divert to an airfield with maintenance capability. Contact C2, coordinate intentions, and comply with the preceding limitations.

3.6.9. Deadhead Time. Duty time for crew members positioning or de-positioning for a mission or mission support function while not performing crew duties.

3.6.9.1. Crew members may perform primary crew duties after deadheading if they will not exceed a basic FDP for the mission to be flown beginning at reporting time for the deadhead flight.

3.6.9.2. Crew members may deadhead following primary crew duties if they will not exceed an augmented FDP beginning at reporting time for primary crew duties.

3.6.10. CDT/FDP Extensions. See AFI 11-202 Volume 3 and the following: MAJCOM/DO (AMC/DO for AMC directed missions through the TACC) is the waiver authority for all CDT/FDP extensions. Waivers are not normally authorized for missions under the operational control of the home unit (locals). If a waiver is required on a local mission due to urgent situational factors, the OG/CC is the waiver authority.

3.6.11. Flight examiners administering evaluations will not exceed an augmented FDP.

3.7. Crew Rest. See AFI 11-202 Volume 3 and the following: Crew members will enter crew rest a minimum of 12-hours prior to alert time or, when self alerting, 12-hours prior to reporting time. MAJCOM/DO may waive all or part of a crew rest period with provisions in AFI 11-202 Volume 3.

3.7.1. Home-Station Pre-departure Crew Rest. All primary and deadhead crewmembers should enter crew rest 24 hours prior to alert time for missions scheduled away from home station for more than 16 hours. Crewmembers may perform limited non-flying duties, including mission planning, during the first 12 hours of this period (***EXCEPTION***: ANG and AFRC according to AFI 11-202V3). OG/CC is waiver authority for the first 12 hours of pre-departure crew rest. Deadhead crewmembers will not be manifested as passengers to reduce or eliminate crew rest requirements. MAJCOM/DO is waiver authority for minimum 12-hour deadhead crewmember crew rest requirement.

3.7.2. En route Crew Rest and Ground Time:

3.7.2.1. Crew rest begins at the end of CDT, normally 45 minutes after final engine shutdown. The 45-minute time period provides crews with time to complete normal post-flight duties. These duties include, but are not limited to, refueling, up and down loading of cargo, performing maintenance, or completing mission debriefings.

3.7.2.2. If any crew member must stay at the aircraft past the 45-minute period, crew rest does not begin until post-flight duties are completed.

3.7.2.3. Minimum crew rest period is 12-hours. This period provides the crew a minimum of 8-hours of uninterrupted rest plus time for transportation, free time, and meals. The crew will not be disturbed during this period, except during emergencies. Should the 12-hour crew rest period be infringed upon by official duties, the crew will enter crew rest for an additional 12-hours on completion of the official duties.

3.7.2.4. A minimum 16-hour (17-hours for nuclear airlift missions) ground time between engine shutdown and mission takeoff should normally be planned unless extended post flight duties are anticipated.

3.7.2.5. The aircraft commander may modify normal ground time, in coordination with C2:

3.7.2.5.1. In the interest of safety.

3.7.2.5.2. To no less than 12-hours from the start of crew rest until mission reporting. Before reducing normal ground time consider mission preparation time, time to load cargo, and other factors peculiar to the mission. The controlling C2 agency will not ask the aircraft commander to accept less than a normal ground time. Waivers for exercises and contingencies are according to AFI 11-202 Volume 3.

3.7.2.5.3. To a maximum of 36-hours, when the crew has completed three consecutive near maximum FDPs.

NOTE: Flight crews should be afforded crew rest times in excess of the minimum at en route stations, when possible, to give crews the opportunity to overcome the cumulative affects of fatigue while flying for several consecutive days or transiting several time zones.

3.7.3. Post Mission Crew Rest (PMCR). ***NOTE:*** PMCR is not applicable AFRC/ANG crews.

3.7.3.1. Crew members returning to their home station will be given sufficient time to recover from the cumulative effects of their deployed mission and tend to personal needs. PMCR begins immediately upon mission termination.

3.7.3.2. Provide one-hour of PMCR time (up to a maximum of 96-hours) for each 3-hours TDY when the duty exceeds 16-hours away from home station. This time is in addition to and will not run concurrently with pre-departure crew rest. (Not applicable to continuing missions.)

3.7.3.3. The OG/CC or acting representative is the designated PMCR waiver authority and will not delegate this authority below the OG/CC level. Limit PMCR waivers to extraordinary circumstances only. Do not use for day to day operations.

3.7.4. Crews will reenter crew rest if their aircraft or mission (training or operational) is not capable of departure within 4-hours from scheduled takeoff time. Exceptions will be granted only with the concurrence of the AC.

3.7.5. Flying Crew Chief Work and Rest Plan. The crew chief is responsible to the aircraft commander. The aircraft commander, in conjunction with the en route station chief of maintenance, will determine how long the crew chief can safely perform aircraft recovery actions. The crew chief must have the opportunity for 8-hours sleep in each 24-hour period. See AFI 21-101, *Maintenance Operations and Management Policy*, for detailed guidance.

3.7.6. Crew rest waivers approved for exercises and contingencies will be published in the OPORD or OPLAN or CONOPS.

3.7.7. MAJCOM/DO, IAW AFI 11-202 Volume 3, may waive all or any part of a standby force crew rest period. This waiver will normally accompany high priority air refueling and airlift tasks or a change in unit readiness.

3.8. Standby Force Duty.

3.8.1. Types of Standby Forces:

3.8.1.1. ALFA Standby Force. An aircraft and aircrew capable of launching in 1-hour. Crew members are given 12-hours of pre-standby crew rest before or after aircraft preflight. Aircrews must complete all preflight duties within 6-hours of crew show time. An additional 12-hour pre-standby crew rest is required when preflight time exceeds 6-hours and crew rest was given before the preflight. Once an ALFA force is formed, additional pre-flights may be necessary to maintain the ALFA aircraft. Additional pre-flights done during normal waking hours do not interrupt crew rest. A crew will not stay on ALFA standby duty for more than 48-hours. After 48-hours, the crew must be launched, released, or entered into pre-departure crew rest. CDT begins when the crew is told to launch.

3.8.1.2. BRAVO Standby Force. An aircraft or aircrew capable of launching in 3-hours (from the time the crew is told to launch). Crew members are given 12-hours of pre-standby crew rest. Crews are legal for alert after pre-standby crew rest. Preflight duties, if required, interrupt crew rest. A crew will not stay on BRAVO standby duty for more than 48-hours. After 48-hours, the crew must be launched, released, or entered into pre-departure crew rest. CDT begins when the crew shows for duty. If a crew is pre-flighting an aircraft when the unit is tasked to launch the mission, CDT will begin when the crew first reported for that duty.

3.8.1.3. CHARLIE Standby Force. An identified aircrew capable of entering crew rest within 2-hours (after their controlling unit is notified). This aircrew would become legal for alert 12-hours after entering crew rest. Charlie alert will not exceed 72-hours. If retained for a 72-hour period, crew members will be released for 12-hours before resuming CHARLIE Standby Force duty, entering crew rest for mission, or entering pre-standby crew rest for ALFA or BRAVO Standby Force duty.

3.8.1.4. Wing Standby Forces. Standby forces are established by unit commanders. Crew members are given normal pre-departure crew rest. Standby duty time is limited to 12-hours. Crews will receive at least 12-hours of crew rest prior to another 12-hours of standby duty.

3.8.1.5. J Alert Standby Force (JCS-Directed Alert Force): An aircraft or aircrew capable of launching in IAW JCS parameters. Alert aircrew will be provided 12-hours crew rest prior to alert duty. Alert crew may be considered in crew rest upon termination of a flight, even though remaining on alert. If a crew completes a mission within their alert cycle, they are legal for alert again

after 12-hours of crew rest. The length of a J-Alert tour will be determined by the OG/CC but will not exceed 192-hours/8 days.

3.8.1.5.1. J-Alert crews will not be used as preflight crews for aircraft other than their own alert aircraft or its replacement.

3.8.1.5.2. J-Alert crew members may complete ground currency events and limited office duties at their leisure while on alert; however, they will not accomplish those items that result in DNIF status.

3.8.1.5.3. Flying during alert is authorized with the following restrictions:

3.8.1.5.3.1. At the discretion of the individual, not to exceed a flight duty period of 6-hours.

3.8.1.5.3.2. Crew members fly for individual currency or SOLL II/Boat Drop training. They are not an instructor/ examiner pool.

3.8.1.5.3.3. The alert aircraft and crew integrity are not required if recovery and re-launch can be accomplished within 1.5-hours of real world alert launch notification. If this timing cannot be met, the integral alert crew and aircraft must be used to allow airborne diversion.

3.8.1.5.3.4. SOLL II training may be accomplished provided the crew members are allowed to adjust their work/rest cycle.

3.8.1.5.4. CDT/FDP for real world crisis response will begin when the crew shows for the real world mission.

3.8.2. Standby Force Crew Management:

3.8.2.1. Commanders will not use a standby crew to preflight other than their standby aircraft, or to do any non-mission duties while on standby.

3.8.3. Post-Standby Missions. On completion of standby duty, aircrew members may be dispatched on a mission.

3.8.3.1. Standby duty and pre-departure crew rest may be concurrent if notification is provided at least 12-hours prior to alert.

3.8.3.2. If started, post-standby crew rest must be completed before the start of pre-departure crew rest.

3.8.3.3. If an aircrew member is dispatched on a mission, compute the post-mission crew rest time on standby time plus mission time.

3.8.4. Post-Standby Crew Rest. Aircrew members not dispatched on a mission following standby duty will receive post-mission standby crew rest as follows:

3.8.4.1. If standby duty is performed away from normal quarters, crew rest time is computed from this standby time on the same basis as for mission time.

3.8.4.2. If standby duty was performed in normal quarters, no crew rest time is authorized.

3.8.5. ALFA Standby and J-Alert Aircraft Security. Each unit will complete a maintenance and aircrew preflight inspection when they put an aircraft on ALFA standby status. The aircraft commander will ensure the aircraft is secure before entering crew rest. Secure all side hatches and doors to show

unauthorized entry. Seal the crew entrance door with a box car seal and record the seal number. This will show unauthorized entry into the aircraft. The command post must grant permission prior to persons entering an aircraft once the plane is sealed. Ensure standby aircraft is resealed any time the aircraft has been opened. The aircraft commander or designated representative must be present if access to his or her assigned aircraft is required. A crew member will verify seal integrity of all doors and hatches when opening the aircraft, unless other prior arrangements were made with the crew.

3.9. Orientation Flights and Incentive Flights. Refer to DoD 4515.13-R, *Air Transportation*, AFI 11-401, *Flight Management*, and MAJCOM supplement.

3.10. Interfly.

3.10.1. Interfly is the exchange and/or substitution of aircrew members and/or aircraft between mobility units to accomplish flying missions. OG/CC, or as specified in the appropriate MAJCOM supplement (ANG use ANG/DO approval-level and AFRC use AFRC/DO approval-level) may authorize the interfly of assigned aircrews and/or aircraft. Normally, interfly should be limited to specific operations, exercises, or special circumstances but, may be used to relieve short-term qualified manpower shortfalls. During contingencies, exercises, or designated “interfly” missions, interfly operations will be conducted under the following conditions or as specified in the OPLAN or CONOPS.

3.10.2. When approved, interfly during normal day-to-day operations under the following conditions:

3.10.2.1. Aircraft ownership will not be transferred.

3.10.2.2. As a minimum, crews will be qualified in the MDS and model as well as systems or configuration required to fly the aircraft and/or mission.

3.10.2.3. During interfly, crew member (s) will follow "basic" operational procedures (see Combined Operations, paragraph **1.5.1.** and must thoroughly brief MAJCOM-Specific items.

3.10.2.4. Initiate interfly approval request by the unit or agency requesting the agreement my memo or message format to the OG/CC controlling the resource. Each commander involving resources (personnel or aircraft) (or MAJCOM, if appropriate) must concur with interfly proposal. Request must include details of the deployment or mission including; aircrew name(s), duration, or special circumstances.

3.10.2.5. Flight Mishap accountability is MAJCOM designated by PEID code for mishap aircraft.

3.10.2.6. Ground Mishap accountability in accordance with AFI 91-204, *Safety Investigations and Reports*.

Chapter 4

AIRCRAFT OPERATING RESTRICTIONS

Section 4A—C-141 Minimum Equipment List (MEL)--Policy

4.1. Objective. The ultimate objective of the aircraft maintenance team is to provide an aircraft for launch with all equipment operational (Fully Mission Capable, FMC). Manpower limitations, skills, and spare part availability have a negative and direct impact on accomplishment. However, some redundant systems allow safe operation with less than all equipment operational for certain missions under specific circumstances. The aircraft commander, using the following policies, determines an aircraft's overall status. Use the following maintenance identifiers to effectively communicate an aircraft's status:

4.1.1. Mission Essential (ME). An item, system, or subsystem component essential for safe aircraft operation or mission completion will be designated Mission-Essential (ME) by the aircraft commander in AFTO Form 781A, **Maintenance Discrepancy and Work Document**. Include a brief explanation of the reason for ME status in the AFTO Form 781A discrepancy block. An aircraft commander accepting an aircraft (one mission or mission segment) without an item or system does not commit that aircraft commander (or a different aircraft commander) to subsequent operations with the same item or system inoperative.

4.1.2. Mission Contributing (MC). Any discrepancies that are not currently ME, but may become ME (if circumstances change), are designated as MC in the AFTO Form 781A discrepancy block. Every effort will be made to clear the MC discrepancies at the earliest opportunity to the extent that maintenance skills, ground time, and spare part availability permit. If subsequently, in the AC's judgment, mission safety would be compromised by the lack of any component, he may re-designate the said component as ME. However, do not delay a mission to correct an MC discrepancy.

4.1.3. Open Item. Discrepancies not expected to adversely impact the current mission or any subsequent mission are not designated MC or ME. These items receive low priority and are normally worked at home station. Do not accept an aircraft from factories, modification centers, or depots unless all instruments are installed and operative.

4.1.4. Engine performance, aircraft attitude, vertical velocity indications, altitude, speed, and heading instruments should be operative in both pilot positions IAW AFI 11-202, Volume 3. For instruments with both analog and digital displays, as a minimum the analog must be operational (***Exception***: the radar altimeter may have either analog or digital operational).

4.2. Policy. It would be impractical to prepare a list that would anticipate all possible combinations of equipment malfunction and contingent circumstances. This chapter lists the minimum equipment and systems considered essential for routine as well as contingency operations. The list does not necessarily include all equipment or systems essential to airworthiness (e.g. rudder, ailerons, elevators, flaps, tires, etc.). Those items which state a minimum requirement and have no listed exceptions are grounding items. In addition, for all items that must be operative the indicators for that item must also be operative.

4.2.1. The aircraft commander is responsible for exercising the necessary judgment to ensure no aircraft is dispatched with multiple items inoperative that may result in an unsafe degradation and/or an undue increase in crew workload. The possibility of additional failures during continued operation with inoperative systems or components shall also be considered. This chapter is not intended to

allow for continued operation of the aircraft for an indefinite period with systems/subsystems inoperative. The Minimum Equipment List (MEL) shall not direct deviation from the aircraft flight manual limitations, emergency procedures, or USAF/MAJCOM directives. The diversity of the C-141 operating on various worldwide missions complicates the task of balancing operational reliability with safe mission completion. Safety-of-flight is paramount.

4.2.2. If, after exploring all options, an aircraft commander determines a safe launch is possible with an item inoperable (beyond a particular restriction) the aircraft commander shall request a waiver. Use C2 channels to notify the appropriate execution agency of intentions. Plan a minimum 1-hour response to the waiver request.

4.3. Waiver Protocol. Waiver to operate with degraded equipment or waiver to USAF policy exceeding this chapter may be granted on a case-by-case basis and only in exceptional circumstances. Waiver authority is based on "who" has operational control and execution of the aircraft performing a specific mission. The aircraft commander determines the need for a waiver. If waiver process, authority, or protocol is in doubt--contact the TACC (appropriate cell).

4.3.1. Local Missions (executed by unit OG/CC or equivalent). Waiver authority for active duty and Associate Reserve units flying local missions is the active duty OG/CC or equivalent. Unit Equipped ARC units waiver authority is the OG/CC or equivalent.

4.3.2. AMC-Directed Missions. Waiver authority for active duty and ARC units flying AMC or AMC-directed missions controlled by the AMC/TACC (and HQ AMC Operational Readiness Inspections) is HQ AMC/DO. HQ AMC/DOV personnel are the authorized agent and maintain 24-hour watch through the appropriate TACC cell (East or West).

4.3.3. Other Missions (Contingencies). Waiver authority is listed in the OPORD/Tasking Order, etc., or is the DIRMOBFOR (or equivalent) for the agency with C2 of the aircraft. Crew members may request additional assistance or confirmation from their home units or AMC/DO through the TACC.

4.3.4. ARC-Directed Missions (executed by the ANG or HQ AFRC). The appropriate ARC headquarters maintains C2 and waiver authority for ARC crews performing any ARC-directed mission prior to mobilization (except associate ARC units); waivers must be obtained from ANG/DO or HQ AFRC/DO, as appropriate.

4.3.5. Non-AMC Missions. For aircraft identified as belonging to user-commands according to Air Force Policy Directive (AFPD) 10-9, (e.g., AETC, AFRC, ANG) waiver authority is the appropriate MAJCOM/DO, or as specified in MAJCOM supplement.

4.4. Technical Assistance Service. The aircraft commander may request (at anytime in the decision process) technical support and additional assistance from their home unit, MAJCOM staff, and maintenance representatives.

4.4.1. Aircraft commanders electing to operate with degraded equipment or aircraft systems (with appropriate waiver) must coordinate mission requirements (i.e., revised departure times, fuel requirements, maintenance requirements, etc.) with the controlling C2 agency prior to flight.

4.4.2. When it is necessary to protect the crew or aircraft from a situation not covered by this AFI and immediate action is required, the aircraft commander may deviate from the MEL and this chapter. Report deviations (without waiver through channels to appropriate MAJCOM/DO within 48-hours.

Units must be prepared to collect background information and submit a follow-up written report upon request.

4.5. Supplements. Each MAJCOM may supplement the MEL (see Supplements in **Chapter 1**).

4.6. Common Phrases.

4.6.1. Home Station. Home bases of assignment for C-141 aircraft. Aircraft will not depart their home stations unless MEL home station requirements are met. ***EXCEPTION***: During wartime, en route criteria will apply to all aircraft departures.

4.6.2. En route. En route locations where C-141 maintenance repair capability exists. An en route station has the necessary skilled USAF, or USAF-contract maintenance personnel, support equipment, and technical data available to accomplish most repairs.

4.6.3. Local Training. A mission that departs home station to perform home station transition training, outbased transition training, air refueling training, or airdrop training and returns in the same day.

4.6.4. Off Station Training. A mission that departs home station to perform training, as directed by the wing commander, without returning the same day. These missions will be supported by deployed home station logistics.

NOTE: Off Station Trainer are considered local training for the purposes of this chapter.

Section 4B—C-141 Minimum Equipment List (MEL)--Tables

4.7. Policy. This section lists the minimum equipment and systems to launch the aircraft under normal conditions. The MEL represents MAJCOM restrictions only and does not include all equipment or systems essential to airworthiness, e.g., rudder, elevator, flaps, ailerons, tires, etc.

4.7.1. The aircraft commander is responsible to exercise the necessary judgment to ensure **no aircraft is dispatched with multiple items inoperative** that may result in an unsafe degradation and/or an undue increase in crew workload. The exposure to additional failure during continued operation with inoperative systems or components must also be considered. This volume is not intended to promote continued operation of the aircraft for an indefinite period with systems/subsystems inoperative.

4.7.2. For instruments with both analog and digital displays, the analog must be operational (***Exception***: the radar altimeter may be operational with either analog or digital display).

4.7.3. System components required to complete emergency procedures as specified by the flight manual (i.e. fire handles, emergency generator, aileron tabs, etc.) and associated warning systems will be operational. All emergency equipment (i.e., portable oxygen bottles, first aid kits, etc.) will be installed unless specifically exempted by mission requirements/directives (e.g., depot inputs with minimum survival kits).

4.8. Spoiler System.

4.8.1. Aircraft will not depart from home station with any quadrant/panel inoperative. At en route stations, if no more than two spoiler panels on one side of the system are affected by a malfunction, the mission may continue. If spoiler problems occur at a CONUS base, the aircraft will be flown to a facility having repair capability prior to departure for an off-shore station.

4.8.2. Procedures for continuing a mission or recovery to a CONUS base follow:

4.8.2.1. When securing a panel, the symmetrical panel on the opposite wing will be secured. At en route stations, where AMC maintenance capability is not available, flight engineers will supervise required deactivation of the spoiler system. Spoiler panel deactivation will be accomplished in accordance with procedures contained in TO 1C-141B-2-27JG-00-1.

4.8.2.2. Blow down characteristics are affected. For this reason, with any spoiler panels deactivated, do not exceed the adjusted maximum spoiler operating speed Mach 0.75-250 KCAS.

4.8.2.3. Do not exceed the maximum crosswind component of 20 knots when any spoiler panels have been deactivated.

4.8.2.4. If more than two spoiler panels on one side fail or any malfunction renders the complete system inoperative, including hydraulic actuator leakage in excess of limits, the aircraft will be repaired or flown directly to the nearest repair facility by the shortest available routing.

4.8.3. Procedures for continuing a mission or recovery with complete system inoperative:

4.8.3.1. Spoiler control lever will be kept in "CLOSED" position, disarmed, and EREO switch will be in the "EMERGENCY OFF" position.

4.8.3.2. Do not carry passengers above FL250.

4.8.3.3. Do not take off on wet or icy runway with spoilers deactivated due to unsafe rejected takeoff situations.

4.8.3.4. Do not land or take off from airfields with less than 7,000 ft of runway due to increased stopping distance.

4.9. Doors and Ramp System.

4.9.1. Do not fly the aircraft pressurized unless all locking and safety devices are properly installed.

4.9.2. Malfunction in the pressure, ramp and petal door locking system (not the indicating system)--Do not attempt takeoff:

4.9.2.1. With a ramp or petal door lock malfunction.

4.9.2.2. And pressurize with a pressure door lock malfunction.

NOTE: Aircraft with a pressure door lock malfunction may be flown on local training flights, unpressurized (with the pressure door up and locked), pending receipt of parts for repair of the pressure door locking mechanism. These flights may be scheduled only after the specific malfunction in the pressure door locking mechanism has been identified, and it is determined unpressurized flight will not jeopardize safety of flight.

4.9.2.3. From home station when the use of hydraulic override feature is required to lock/unlock the pressure door, ramp or petal doors.

EXCEPTION: Aircraft may depart stations where maintenance capability is not available, when the use of override is required to lock the pressure door, ramp or petal doors. Make a positive visual check of all locks in this case. Additionally, aircraft may depart stations where maintenance capability is not available, when the use of override is required to unlock the pressure door, ramp, or petal doors provided a cargo jettison capability is not required.

4.9.3. Failure of the pressure door, ramp, and petal doors to open (or close) electrically during in-flight operations.

4.9.3.1. In the event the pressure door will not unlock during airdrop operations the following procedure may be attempted:

4.9.3.1.1. Verify the aircraft is depressurized.

4.9.3.1.2. De-arm the doors.

4.9.3.1.3. Actuate the pressure door manual control valve to closed and hold.

4.9.3.1.4. Actuate the pressure door locks manual control valve to unlock

4.9.3.1.5. Actuate the pressure door manual control valve to open and hold until the door has opened approximately six inches and release.

4.9.3.1.6. Rearm the doors.

4.9.3.1.7. Continue door operations using normal electrical procedures.

4.9.3.1.8. Do not unlock and open cargo doors and ramp using manual override in-flight unless emergency jettisoning of cargo is required.

4.9.3.1.9. In-flight closing and locking of cargo doors and ramp using manual override procedures after they have been opened electrically is authorized.

4.9.3.1.10. Subsequent in-flight unlocking and opening of the cargo doors ramp using normal electrical procedures and in-flight closing and locking using manual override procedures is authorized.

4.9.3.2. Malfunction in the pressure, ramp, and petal door indication system:

4.9.3.2.1. Do not fly aircraft pressurized from home station when the use of bypass is required to extinguish the annunciator lights for the pressure door or ramp.

4.9.3.2.2. Aircraft may depart en route stations pressurized with a malfunction in the indicating system when maintenance capability is not available and it is determined the pressure door, ramp, and petal doors are locked.

4.9.3.2.3. Aircraft may be scheduled for local flights unpressurized with a malfunction in the indicating system if it is determined that the ramp and petal doors are locked.

4.9.3.3. Do not perform aeromedical evacuation missions when non-ambulatory patients are carried unless both troop doors are fully operational.

Table 4.1. Engines/Auxiliary Power Unit (APU).

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Engines	4	4	Do not take off unless all four engines will achieve takeoff power settings. ***NOTE***: Refer to Flight Manual, Section III for non- standard takeoffs.
Thrust Reversers--Home Station	4	4	If a malfunction occurs requiring thrust reverser deactivation, the affected thrust reverser and its symmetrical counterpart on the opposite wing will be deactivated IAW T.O. 1C-141B-2-78JG-00-1. No exceptions.
Thrust Reversers--En route	4	0	If malfunctions require deactivation of all four thrust reversers, the mission may continue to a station where repair capability exists. If all 4 thrust reversers must be deactivated and less than 8 brakes are operational, ensure adequate aircraft performance (corrected for partial braking capability) is available during takeoffs and landing at each stop/alternate airfield as appropriate.
Thrust Reversers--Local Training	4	2	If a malfunction occurs requiring thrust reverser deactivation, the affected thrust reverser and its symmetrical counterpart on the opposite wing will be deactivated IAW T.O. 1C-141B-2-78JG-00-1. No exceptions.
APU	1	0	Will be operational if the APU is required per the mission tasking or FRAG order. If required, all associated equipment (accumulators, EGT gauge, etc.) will be operational.
EPR Gauge	4	0	May be inoperative provided respective N1 RPM indicator is operative.
N1 RPM Indicator	4	0	May be inoperative provided respective EPR Gauge is operative.
N2 RPM Indicator	4		See Notes 1 and 2.
Fuel Flow Indicator	4		See Notes 1 and 2.
EGT Indicators	4		See Notes 1 and 2.
Low Oil Quantity Lights	4	0	If inoperative, associated oil tank will be fully serviced prior to takeoff. Closely monitor oil pressure and temperature throughout flight.
Engine Vibration Indicators	4	0	
Oil Temperature Indicator	4	4	Must be functional on all operational engines.
Oil Pressure Indicator	4	4	Must be functional on all operational engines.

NOTE 1 (Home Station): All indicators will be operational.

NOTE 2 (En route and Local Training): The fuel flow indicator at flight engineer's panel may be inoperative provided the corresponding indicator on the pilots' center instrument panel is operative. N2 RPM and EGT indicators may be inoperative on the pilots'/flight engineers's panel provided no more than one of these instruments (fuel flow, N2 RPM, or EGT) for each engine is inoperative, and the corresponding indicator on the flight engineer's/pilots' panel is operative. If an EGT channel is operative with only one of its two indicators operating, a lower reading will result. The amount of error will be approximately 8 percent of the actual correct readings for the channel. Use/observe 510×C as the maximum allowable EGT when operating with one indicator.

Table 4.2. Fuel Systems.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Fuel Quantity Indicators--Home Station	10	10	
Fuel Quantity Indicators--En route	10	8	If en route repair capability does not exist, the aircraft may depart with one inoperative fuel quantity indicator for each wing, provided: a. The tank with the inoperative indicator is dipped IAW TO 1C-141B-2-00GE-00-1 and b. The same indicator on the other wing is operative.
Main Tank Fuel Boost Pumps--Home Station	8	8	
Main Tank Fuel Boost Pumps--En route	8	7	If en route repair capability does not exist, the aircraft may depart with one main tank fuel boost pump inoperative.
			If one main tank boost pump is inoperative, all auxiliary and extended range tank boost pumps will be operational in all fuel tanks required (fueled) for flight.
			If one main tank boost pump is inoperative, suction feeding will be necessary should the second boost pump fail in-flight.
Auxiliary/Extended Range Tank Fuel Boost Pumps--Home Station	12	12	
Auxiliary/Extended Range Tank Fuel Boost Pumps--En route	12	11	If en route repair capability does not exist, the aircraft may depart with one auxiliary tank or inboard extended range tank fuel boost pump inoperative.
			If one auxiliary or extended range tank boost pump is inoperative in any fuel tanks required (fueled) for flight, all main tank boost pumps will be operational.
			If one auxiliary tank boost pump is inoperative, fuel within that tank will be trapped should the second boost pump fail. Fuel balancing with the opposite wing tank will then be necessary resulting in a reduction of usable fuel.
Fuel Dip Stick	1	1	
Fuel Inlet Temperature System	1	1	
Fuel Enrichment System	1	1	All system sub-components will be operative.
Fuel Heat System	1	1	All system sub-components will be operative.

Table 4.3. Electrical System.

Item/System	Installed	Required	Remarks/Limitations/Eeceptions
Generators, Engine-Driven	4	3	Four generators will be operational on all missions departing the CONUS. CONUS mission aircraft and overseas en route aircraft may have one generator inoperative provided the bus tie system for the inoperative generator is operable and the associated CSD is disconnected. See Note.
Constant Speed Drives	4	3	See Note.
Transformer Rectifiers	2	2	
Constant Speed Drive Overheat Warning Light	4	3	See Note.
Generator Fail Lights	4	3	See Note.
AC Loadmeter	4	3	See Note.

NOTE: All associated equipment and indicators will be operational for each operative engine-driven generator (i.e., generator control panel, voltage regulator, CSD, CSD overheat warning light, generator fail light, AC loadmeter, etc.)

Table 4.4. Hydraulics.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Engine-driven Hydraulic Pumps	4	4	
Engine-driven Hydraulic Pump Pressure Low Lights	4	4	
System No. 1 & 2 Hydraulic System Pressure Indicators	2	2	Direct reading gauge in cargo compartment may be inoperative.
System No. 1 Hydraulic Suction Boost Pump	1	1	
System No. 2 Hydraulic Suction Boost Pump	2	1	Electrically-driven suction boost pump may be inoperative provided failure is electrical and hydraulic suction boost pump is operational. One time flight to repair facility.
System No. 1 & 2 Suction Boost Pump Pressure Low Lights	2	2	
System No. 3 Electrically-driven Hydraulic Pumps	2	2	
System No. 3 Hydraulic System Pressure Indicator	1	1	Direct reading gauge in cargo compartment may be inoperative.
System No. 3 Pressure ON Light	1	0	May be inoperative provided System No. 3 Hydraulic Pressure Indicator is operative.

Table 4.5. Air Conditioning, Pressurization and Bleed Air.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Air Conditioning Pack	2	2	Both air conditioning packs shall be operational for special weapons missions.
			Left air conditioning pack will be operational for all flights.
			Right pack may be inoperative for pressurized flight. If passengers/patients are carried, the flight will be limited to FL 250. Lower altitude may be required to maintain a specific cabin altitude.
Cargo Compartment Temperature Control System	2	1	Automatic system may be inoperative provided manual temperature control for the cargo compartment is operable.
			Manual system may be inoperative provided automatic temperature control is operable.
Flight Station Temperature Control System	1	1	Automatic system may be inoperative provided manual temperature control for the flight station is operable.
			Manual system may be inoperative provided automatic temperature control is operable.
Floor Heat System	1	1	May be inoperative provided both air conditioning packs are operational, regulation of cargo compartment temperature is not a mission requirement, and passengers/patients are not carried.
Cabin Pressure Controllers	2	1	Automatic controller may be inoperative for pressurized flight provided the manual controller is operative.
			Manual controller may be inoperative for unpressurized flight.
Cabin Altimeter and Differential Pressure Indicator	2	1	Flight engineer's indicator must be operative for pressurized flight.
Cabin Rate of Climb Indicator	1	0	May be inoperative except when passengers/patients are carried.
Cabin Altitude Override Limit Switch	1	1	May be inoperative for unpressurized flight.
Emergency Pressurization Switch	2	1	Right emergency pressurization switch may be inoperative if the right air conditioning pack is inoperative.
Cabin Pressure Low Light	2	1	
Wing Isolation Valve	1	1	If wing isolation valve fails in the open position, a one-time flight to a location where maintenance can be performed is authorized provided the valve is manually closed prior to takeoff.

Table 4.6. Anti-Ice/De-Ice and Rain Removal.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Ice Detection System	1	1	May be inoperative for flights in VMC; avoid all areas of known or forecast icing. This will require periodic visual inspection of aircraft surfaces to ensure they remain clear of ice (even in clear air).
Pitot-Static Tube Anti-Icing System	2	1	One system may be inoperative for flights in VMC. Both must be operational for IMC and for flight in RVSM airspace.
Engine RAM Pressure Probe Anti-Ice System	4	0	May be inoperative provided corresponding N1 RPM indicator is operational.
Wing Anti-Icing System	1	1	
Wing Anti-Icing Overheat Indicating System	1	1	
Engine Anti-Icing System	4	4	
Windshield Heat System	3	3	
Windshield Rain Removal System	1	1	May be inoperative for VFR flights.

Table 4.7. Brake Systems.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Wheel Brakes-- Home Station	8	8	
Wheel Brakes--En route	8	6	In an emergency situation or when a MLG brake leak occurs where brake change capability does not exist, it is permissible to "cap off" up to one brake for each landing gear for flight to where brake change capability exists. See Note.
			Several en route stops may be necessary and accomplished to position the aircraft for repair.
			Ensure landing distance (corrected for partial braking capability) is less than runway available for each stop/alternate airfield.
Wheel Brakes--Local Training	8	7	If local supply sources cannot provide a replacement brake assembly, it is permissible to “cap off” one brake for local training flights. See Note.
			Ensure landing distance (corrected for partial braking capability) is less than runway available.
			Zero flap landings are not authorized when flying a local training mission with brakes capped.
Anti-skid--Home Station	1	1	
Anti-skid--En route	1	0	Anti-skid may be inoperative for a one time flight to an airfield with repair capability.
			All wheel brakes shall be operative.
			Add 2,000 feet to the uncorrected landing distance.
Brake Released Light	1	1	May be inoperative with antiskid inoperative
Parking Brake	1	1	

NOTE: Anti-skid will be fully operational anytime a brake is capped (i.e., No DET OUT lights or anti-skid OFF lights).

Table 4.8. Flight Recorder/Locating Systems.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Flight Data Recorder	1	1	Mandatory for passenger/troop flights
Cockpit Voice Recorder	1	1	Mandatory for passenger/troop flights
Emergency Locator Transmitter	1	1	Mandatory for passenger/troop flights
IFF/SIF	1	0	Comply with ATC and mission requirements.

Table 4.9. Fire Protection.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Engine Fire Extinguisher System	2	2	Both bottles will be serviceable for each system.
Engine/Pylon Fire and Overheat Warning Systems	4	4	
Engine Fire Extinguisher Overboard Discharge Indicator	2	2	May be missing provided engine fire bottle gauges are checked for adequate pressure and associated annunciator light is operative.
APU Fire Extinguisher	1	1	May be inoperative provided APU is not required per mission FRAG/directive.
APU Fire Warning System	1	1	May be inoperative provided APU is not required per mission FRAG/directive.
Smoke Detector System	1	1	Smoke detectors in the cargo compartment may be inoperative provided an adequate number of personnel are positioned in the cargo compartment to monitor for the presence of smoke.

Table 4.10. Landing Gear.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Landing Gear--General	1	1	If any landing gear malfunction was encountered, make only a full stop landing. Clear the discrepancy before further flight. ***Exception***: If repair capability does not exist and a positive determination is made that further flight can be accomplished with the gear down, locked and pinned, the aircraft may be flown to a facility where repair capability exists.
Landing Gear Position Indicators	3	3	
Landing Gear Warning Light	1	1	
Bogie Position Indicator.	2	0	Full stop landing only. ***Exception***: A bogie position indicator may be inoperative provided the landing gear is inspected and no broken or damaged components exist.
Landing Gear Pry Bar (with ledge protector).	1	1	
Nose Landing Emergency Hydraulic Extension System.	1	1	Ensure hand pump handle is aboard for all flights.

Table 4.11. Flight Instruments.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Mach-Airspeed Indicator	2	2	Mach indication may be inoperative on 1 indicator.
Altitude-Vertical Velocity Indicator	2	2	Vertical velocity portion of one indicator may be inoperative except for flights in RVSM airspace.
Flight Director Systems	2	1	Copilot's may be inoperative.
Navigation Selector Panels	2	2	
Attitude Director Indicator (ADI)	2	2	
Horizontal Situation Indicators	2	2	
BDHI	3	2	Both pilots' BDHIs will be operational. On missions requiring a navigator, the nav station BDHI will be operative.
Standby ADI/MFSI (C-141C)	1	1	
Radar Altimeter	1	1	Mandatory for all passenger/troop carrying flights, and 300 ft. modified contour.
True Airspeed Indicator	1	1	
Barometric Altimeters	2	1	The engineer's is always required. Missions that require navigator support must have an operative altimeter at the nav station.
Stall Prevention Systems	2	2	
Standard Central Air Data Computers (SCADC)	2	2	Switching capability between SCADC's (for transponder readout) is required for flight in RVSM airspace. See Note.
Display Processor Unit (DPU) C-141C	2	2	If en route capability does not exist a one time flight to a repair station may be made.
CDS Brightness Control (CBC) C-141C	2	2	
Display Unit (DU) C-141C	4	3	All four must be operational for SKE formation/ airdrop/air refueling missions.
Display Avionics Management Unit (DAMU) C-141C	2	2	
Reference Set Panel (RSP) C-141C	2	2	
CDS Cooling Fans C-141C	2	2	
Ground Proximity Warning System (GPWS) / Ground Collision Avoidance System (GCAS)/Terrain Awareness Warning System (TAWS) C-141C	1 1	0 1	GPWS Mandatory for all passenger/troop carrying flights.

NOTES:

SCADC Replacement Actions. The following procedure is approved for a SCADC replacement when test equipment is not available, providing only one computer has been replaced and the pitot static system has not been disturbed beyond the computer connection (this procedure is not authorized for flight in RVSM airspace):

1.The copilot will call out 80 knots during the takeoff roll;

2. The pilot will cross-check the indicated airspeed to ensure the difference does not exceed five knots;
3. Normal abort procedures will apply for differences exceeding five knots;
4. No further attempts will be made to take off following an abort due to excessive airspeed differences.

Table 4.12. Navigation Systems.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Magnetic Compass	1	1	
AHRS	1	1	
INS .	2	1	Do not fly Category I routes without INS 1, INS 2, AHRS, pilot and copilot navigation selector panels fully operational.
			If repair capability does not exist, and one INS, AHRS, pilot and copilot navigation selector panels are fully operational, the flight may continue on Category I routing provided the aircraft will remain within update range of ground based navaids and specific airspace requirements allow RNAV operations on a single INS.
			If repair capability does not exist, and flight can continue along a Category II route under radar control, the mission may operate with one INS' INOP provided the attitude function of the one remaining INS (as a minimum function), AHRS, and both nav selector panels are operational.
			1 Req for passenger/troop carrying flights
FSAS	1	0	FSAS/INS CDU, DICU, and altitude alert functions are required for flights in RVSM airspace. The FSAS/INS CDU is the recommended (preferred) control head for tactical missions. ***CAUTION***: Do not use the C-141 FSAS Auto-Throttles. Aircrews will set the throttles manually or use the basic Auto-Throttle System (ATS), using procedures outlined in T.O. 1C-141B-1.
FSAS Windshear Warning	1	0	Mandatory for all passenger/troop carrying flights.
INS CDU WARN Light	2	2	
INS 10 NM DIFFERENCE Light	1	0	
NAV SELECTOR Panel	2	2	
Multi-Function Control Display Unit (MFCDU) C-141C	3	1	Operational MFCDU must be on center console. Airdrop and Formation Air Refueling require two MFCDU's one on the center console and one at the navigator station.
Navigation Processor (NP) C-141C	2	2	
VOR	2	0	As required for navigation or approach. Both mandatory for all passenger/troop carrying flights and necessary for mission accomplishment. VHF 1 will be operational on C-141C aircraft.
ILS	2	0	As required for approach. Both mandatory for all passenger/troop carrying flights and necessary for mission accomplishment.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
TACAN	2	0	As required for navigation, approach, or rendezvous. 1 mandatory for all passenger/troop carrying flights and necessary for mission accomplishment.
AN/APS-133 Radar	1	0	Required if flying at night or if thunderstorms are known or forecasted along route of flight. Mandatory for all passenger/troop carrying flights.
ADF	2	0	1 mandatory for all passenger/troop carrying flights and necessary for mission accomplishment.
Weather Radar Repeater Scope at Navigator Station	1	0	
Station Keeping Equipment (SKE)			Required for formation airdrop and formation air refueling missions. Note: Not required if mission is scheduled for VFR formation flight and will not encounter areas of known or forecasted IMC.

Table 4.13. Autopilot/AFCS.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
AFCP/C-141C	2	2	
AFCS/C-141C	2	0	A pitch axis required for flight in RVSM airspace.
Autopilot	1	0	Pitch axis required for flights in RVSM airspace.
Yaw Damper	1	0	Comply with Dash 1 restrictions. Mandatory for PNAF air refueling flights.

Table 4.14. Aircraft Lighting.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Landing Lights	2	1	One may be inoperative provided the taxi light on same side is operational
Taxi Lights	2	1	One may be inoperative providing the landing light on the same side is operational
Formation Lights	9	0	Not required for daylight in-flight operations. Two lights per wing will be operational for night formation flights.
Navigation Lights	3	3	One bulb per assembly may be inoperative while “en route” and for local training missions.
Anti-Collision/Strobe Lights	3	2	Lower fuselage strobe and one bulb in horizontal stabilizer anti-collision light or upper center wing strobe will be operative.
Wing Leading Edge Lights	2	0	May be inoperative for daylight conditions.
Emergency Exit Lights Home Station	11	7	4 of the 7 lights will be located at the No. 1 escape hatch, crew entrance door, left troop door, and right troop door.
Emergency Exit Lights En route	11	4	Lights will be located at the No. 1 escape hatch, crew entrance door, left troop door, and right troop door.
Wheel Well Lights	3	0	Required for night operations.

Chapter 5

OPERATIONAL PROCEDURES

5.1. Checklists. A checklist is not complete until all items have been accomplished. Momentary hesitations for coordination items, ATC interruptions, and deviations specified in the flight manual, etc., are authorized. Notes amplifying checklist procedures or limitations may be added to the checklists (in pencil). Currency of notes is the crew members responsibility.

5.1.1. Checklist Inserts. Units may supplement T.O. guidance (for example Secure Communications) with HQ AMC/DOV approved checklist inserts. These inserts may be placed at the end of the appropriate checklist or in an in-flight guide. All checklist inserts must have a POC. If any crew member has recommendations or changes they should contact the POC. The POC will consolidate inputs and submit changes to HQ AMC/DOV for approval. Local in-flight guides and inserts not affecting T.O. guidance and procedures may be locally approved by OGV.

5.2. Duty Station. A qualified pilot will be in control of the aircraft at all times during flight. (***EXCEPTION***: Unqualified pilots undergoing qualification training and senior staff members who have completed the senior staff course under the direct supervision of an instructor pilot). The aircraft commander, copilot, navigator, flight engineer, and loadmaster will be at their duty stations during all takeoffs, departures, A/R, low-levels (below the MSA), airdrop, approaches, and landings. During other phases of flight, crew members may leave their duty station to meet physiological needs and to perform normal crew duties. During cruise flight, loadmasters may leave their duty station for longer periods with aircraft commander approval. Only one pilot, or the flight engineer, may be absent from their duty station at a time. Notify the aircraft commander prior to departing assigned primary duty station.

EXCEPTION: On augmented A/R missions when two or more air refuelings are scheduled and the crew contains more than one air refueling qualified aircraft commander, an aircraft commander (not necessarily the "A" coded aircraft commander on the MAJCOM approved flight orders form) must be in the seat during refueling operations.

5.3. Flight Station Entry. Aircraft commanders may authorize passengers, and observers access to the flight station during all phases of flight. In all cases, sufficient oxygen sources must be available to meet the requirements of AFI 11-202, Volume 3. Passengers and observers will not be permitted access to the pilot, copilot, or flight engineer position regardless of its availability.

5.4. Takeoff and Landing Policy. After thoroughly evaluating all conditions, the aircraft commander will determine who accomplishes the takeoff and landing and occupy either the left or the right seat during all takeoffs and landings. Comply with the Airfield Suitability and Restrictions Report (ASRR). For flights with passengers, see paragraph **3.1.1.1.**.

5.4.1. A qualified aircraft commander will accomplish all approaches and landings under actual emergency conditions unless specific conditions dictate otherwise.

5.4.2. Aircraft commanders (exceeding 100-hours in command) will accomplish all CAT II ILS approaches and landings (under weather conditions less than CAT I minimums) from the left seat.

5.4.3. Aircraft commanders who possess less than 100 hours in command since certification in the C-141 will perform all takeoffs and landings from the left seat. ***EXCEPTION*:** They may allow air-

craft commanders (with more than 100-hours in command), or higher to perform takeoffs and landings when required for currency.

5.4.4. Aircraft commanders with more than 100 hours in command may allow first pilots to perform takeoffs and landings from either seat.

5.4.5. Instructor or flight examiner pilots may takeoff or land from either seat (except for actual Category II ILS approaches) and allow copilots to takeoff and land from either seat.

5.4.6. First pilots on line training missions may make takeoffs and landings at all airfields at the discretion of the instructor pilot.

5.5. Right Seat Procedures. Landing gear will be operated by the pilot in the right seat. All flap operations will be commanded by the pilot flying the aircraft and activated by the pilot not flying the aircraft. ***EXCEPTION:*** With aircraft on the ground during touch-and-go maneuvers, the instructor/evaluator will reset the flaps from either seat.

5.6. Outside Observer. When available, use a crew member to assist in outside clearing during all taxi operations and any time the aircraft is below 10,000 feet MSL.

5.7. Seat Belts.

5.7.1. All occupants will have a designated seat with a seat belt. Use of seat belts will be as directed by the aircraft commander, the flight manual and **Chapter 13** of this Volume. When children under the age of two are accepted as passengers, their sponsor must provide their own approved Infant Car Seat (ICS). Passengers may hand-carry infant car seats. These seats will be secured to a seat using the seat belt. Adults will not hold infant seats during any phase of flight.

5.7.2. Crew members occupying the pilot, copilot, navigator, flight engineer, or loadmaster positions will have seat belts fastened at all times in-flight, unless crew duties dictate otherwise.

5.7.3. All crew members will be seated with seat belts and shoulder harnesses fastened during taxi, takeoff, receiver A/R, and landing, unless crew duties dictate otherwise. For A/R, aircrew members will ensure all passengers are seated with seat belts fastened and equipment is properly secured (unless specifically authorized by the aircraft commander to observe air refueling operations or crew duties dictate otherwise). Crew members performing instructor or flight examiner duties are exempt from seat belt requirements if not occupying a primary crew position; however, a seat with an operable seat belt will be assigned.

5.8. Aircraft Lighting. Comply with **Chapter 4** of this volume, AFI 11-202, Volume 3 and applicable T.O.s.

5.8.1. Use formation lights while conducting tactical operations in formation (unless threat considerations prohibit use). During low-level, airdrop, and other tactical operations, aircraft will turn off landing lights and other exterior lights commensurate with the tactical situation. Formation lights must be used and other lighting as necessary to ensure positive visual identification of formation aircraft.

5.9. Portable Electronic Devices. Comply with AFI 11-202, Volume 3.

5.9.1. Unauthorized equipment (e.g., Walkman-type radios/tape players, CD players, etc.) will not be connected to the aircraft intercom, PA or radio systems.

5.10. Smoking Restrictions. Smoking is prohibited on board the aircraft.

5.11. Advisory Calls. The pilot flying will periodically announce intentions during departures, arrivals, approaches, and when circumstances require deviating from normal procedures. The following calls are required by the Pilot-Not-Flying (PNF):

5.11.1. Non-precision Approaches:

5.11.1.1. 1,000-feet above IAF (or holding) altitude.

5.11.1.2. 100-feet above FAF altitude.

5.11.1.3. 100-feet above Minimum Descent Altitude (MDA).

5.11.1.4. "Minimums" at MDA.

5.11.1.5. "Runway in sight" (Call when the runway environment is in sight).

5.11.1.6. "Go-around" (Call at missed approach point if the runway environment is not in sight or if the aircraft is not in a position for a safe landing).

5.11.2. Precision Approaches:

5.11.2.1. 1,000-feet above IAF (or holding) altitude.

5.11.2.2. 100-feet above FAF altitude.

5.11.2.3. 100-feet above Decision Height (DH).

5.11.2.4. "Land" (Call at DH if the runway environment is in sight and the aircraft is in a position for a safe landing.)

5.11.2.5. "Go-around" (Call at DH if the runway environment is not in sight or if the aircraft is not in a position for a normal landing)

5.11.3. Climb Out:

5.11.3.1. Transition altitude.

5.11.3.2. 1000 feet below assigned altitude.

5.11.4. Descent:

5.11.4.1. Transition level.

5.11.4.2. 1000 feet above assigned altitude.

5.11.5. Deviations:

5.11.5.1. Any crew member noting an apparent error in aircraft attitude, altitude, heading or airspeed, or any condition which may impact safety of flight, will immediately notify the pilot flying the aircraft.

5.11.5.2. Deviations from prescribed procedures for the approach being flown will also be announced.

5.12. Communications Policy. The Air Force does not give a promise of confidentiality to aircrews regarding their recorded aircraft crew communications. Crew members are expected to maintain a high degree of professionalism and crew coordination at all times.

5.12.1. Sterile Cockpit. Limit conversation to that essential for crew coordination and mission accomplishment during taxi, takeoff, air refueling, approach, landing, and any time below 10,000 feet MSL (except cruise).

5.12.2. Aircraft Interphone:

5.12.2.1. Do not discuss classified information on interphone unless necessary for mission accomplishment.

5.12.2.2. Primary crewmembers will monitor interphone and advise the aircraft commander prior to checking off interphone.

5.12.3. Command Radios:

5.12.3.1. The pilot not flying the aircraft normally makes all ATC radio calls.

5.12.3.2. In terminal areas the pilot, copilot, navigator, flight engineer, and scanner/jumpseat will monitor the primary command radio unless directed otherwise. The jumpseat, navigator or designated crewmember should monitor C2 frequencies (if applicable) on the inbound and outbound leg, unless otherwise directed.

5.12.3.3. The pilot operating the command radios will inform the crew when the primary radio is changed.

5.12.3.4. One pilot should record and will acknowledge all ATC clearances. The navigator and/or flight engineer will monitor the pilots read back to ensure compliance with all clearances.

5.12.3.5. Both pilots will monitor UHF guard (or VHF guard when appropriate) emergency frequency regardless of primary radio.

5.12.3.6. From engine start until engine shutdown, the pilot and copilot should normally monitor only the primary command radio and appropriate guard frequency (except at cruise) to minimize distractions from primary flight duties. Designate another crewmember to monitor other necessary frequencies (i.e. Command Post). In addition, the navigator and flight engineer will normally monitor primary command radios at all times.

EXCEPTION: Only one pilot or navigator crewmember is required to monitor guard frequencies during A/R rendezvous and A/R. During A/R, the PNF or navigator normally monitors guard.

5.12.4. Crew Resource Management (CRM) Assertive Statement “Time Out":

5.12.4.1. "Time Out" is the common assertive statement for use by all crewmembers. The use of "Time Out" will:

5.12.4.1.1. Provide a clear warning sign of a deviation or loss of situational awareness.

5.12.4.1.2. Provide an opportunity to break the error chain before a mishap occurs.

5.12.4.1.3. Notify all crewmembers that someone sees the aircraft or crew departing from established guidelines, the briefed scenario, or that someone is simply uncomfortable with the developing conditions.

5.12.4.2. As soon as possible after a "Time Out" has been called, the aircrew will take the following actions:

5.12.4.2.1. Safety permitting, stabilize the aircraft.

5.12.4.2.2. The initiating crewmember will voice his or her concerns to the crew.

5.12.4.2.3. The aircraft commander will provide all other crewmembers with the opportunity to voice inputs relative to the stated concerns.

5.12.4.2.4. After considering all inputs, the aircraft commander will direct the aircrew to continue the current course of action or direct a new course of action.

NOTE: The aircraft commander is the final decision authority.

5.13. Transportation of Pets. Transporting pets (dogs and cats) on aircraft operated by or under the control of AMC in conjunction with the sponsors permanent change of station is authorized. Other pets or animals are normally prohibited, but may be moved according to DODR 4515.13R, *Air Transportation*.

5.14. Alcoholic Beverages. MAJCOM/DO or ANG/DO may authorize the dispensing of alcoholic beverages.

5.15. Runway, Taxiway, and Airfield Requirements; Wind Restrictions; RCR and RSC Limitations:

Minimum Runway Length	**Minimum Runway Width**	**Minimum Taxiway Width**
6,000-feet/1830 meters*	98-feet/30 meters*	50-feet (stressed)/15 meters*

****NOTE:*** Runway length waiverable to 5,000-feet/1524 meters (MAJCOM/DO); minimum runway width to accomplish a 180 degree turn is 137-feet/42 meters; taxiing from one 50 feet/15 meter wide taxiway onto another 50-feet/ 15 meter wide taxiway without fillets is not recommended.

5.15.1. If approach end overruns are available and stressed or authorized for normal operations, they may be used to increase the runway available for takeoff. Departure end overruns (if stressed and authorized) may also be used for landing if needed.

5.15.2. Aircrews and planning agencies will contact HQ AMC/DOVS (Airfield Analysis Branch) for all questions pertaining to airfield weight bearing capability and will review the ASRR prior to all off-station operations. HQ AMC/DOV is the waiver authority for all airfield restrictions on AMC-directed missions. Waivers must be obtained prior to mission execution. Once a mission is executed the aircraft commander is responsible for determining airfield suitability based upon operational need. See the ASRR for airfield certification requirements.

5.15.3. Runway Length for Takeoff and Intersection Takeoffs. Normally, takeoffs will be initiated from the beginning of the approved usable portion of the runway. The decision to make intersection takeoffs rests solely with the aircraft commander.

5.15.3.1. Minimum Length for Takeoff - Critical Field Length.

5.15.3.2. Intersection takeoffs may be accomplished provided the operating environment (i.e., gross weight, obstructions, climb criteria, weather, etc.) will allow a safe takeoff and departure.

5.15.3.3. When less than the entire runway is used, AF Form 4071, **Performance Data Worksheet,** computations will be based on the actual runway remaining from the point at which the takeoff is initiated.

5.15.4. Runway length for landing. Compute minimum required runway length for normal landings based on landing distance from 50-feet over threshold.

5.15.4.1. Compute landing distance with no reverse thrust. ***EXCEPTION:*** When operational necessity dictates, landing distance may be computed using 2-engine reverse.

5.15.5. Arresting Cables (does not include recessed cables). When conditions permit (aircraft gross weight, runway length, weather, winds, TOLD, etc.) and the aircraft commander has considered the potential for damaging the aircraft, make takeoffs and landings beyond raised cable barriers. If aircraft commanders determine they need the entire length of runway, use it. Be aware that operations over arresting gear barriers at speeds in excess of taxi speed may result in damage to the aircraft.

5.15.5.1. Do not land on (touchdown on) approach end arresting cables. If the aircraft lands before the cable, the crew should contact the tower to have the cable inspected.

5.15.5.2. Do not takeoff or land over an approach end cable that has been reported as slack, loose, or improperly rigged by NOTAM, ATIS, or ATC.

5.15.6. RCR Limitations. The minimum RCR for takeoff or landing is the lowest RCR depicted in the C-141 performance manual. Normally, RCR values are not reported for taxiways and ramps. During periods of reported low RCR, the taxiways and ramps may have an even lower RCR than reported for the runway.

5.15.7. Wind Restrictions. A 20 knot maximum crosswind component limit exists when rudder pedal steering or spoilers are inoperative. An airfield will be considered out of limits for takeoff and landing on a dry runway when winds (including gusts) are greater than the following:

Max Wind	Tailwind Component	Crosswind Component
50 Knots	10 Knots	25 Knots

5.15.8. For actual category II ILS approaches, the maximum crosswind component is 10 knots or as specified in the performance manual, whichever is lower.

5.15.9. During operations on runways partially covered with snow or ice, takeoff computations will be based on the reported RSC or RCR for the cleared portion of the runway. A minimum of 50-feet either side of centerline should be cleared. If 50-feet either side of centerline is not cleared, then compute data based on the uncleared portion up to 50-feet either side of centerline.

5.16. Aircraft Taxi Obstruction Clearance Criteria and Foreign Object Damage (FOD) Avoidance.

5.16.1. Without wing walkers, avoid taxi obstructions by at least 25-feet. With wing walkers, avoid taxi obstructions by at least 10-feet.

EXCEPTION: IAW AFI 11-218, *Aircraft Operation and Movement on the Ground*, aircraft may taxi without marshalers/wing walkers at home station along locally established taxi lines which have been measured to ensure a minimum of 10-feet clearance from any obstruction.

5.16.2. When taxi clearance is doubtful, use one or more wing walkers. If wing walkers are unavailable, deplane one or more crewmembers to maintain obstruction clearance and provide marshaling. Use AFI 11-218 signals. The aircraft commander should use wing walkers, deplaned crewmembers, or a crewmember on interphone positioned at a door to act as an observer while maneuvering on narrow taxiways. During night taxi operations, marshalers will have an illuminated wand in each hand. Observers should be in a position to see wing walkers at all times (through door or windows) and communicate to the pilot.

5.16.3. FOD Avoidance. Make every effort to minimize the potential for engine FOD. Crews should:

5.16.3.1. Carefully review airfield layout during mission planning. Be familiar with taxi routes, turn requirements, and areas for potential FOD.

5.16.3.2. Ensure compliance with ASRR restrictions and weight bearing capacities.

5.16.3.3. Minimize power settings during all taxi operations.

5.16.3.4. Avoid (when possible) 180-degree turns.

5.16.3.5. Avoid (when possible) taxi operations which would position an engine over an unprepared or unswept surface.

5.16.3.5.1. If it becomes absolutely necessary to position an engine over an unprepared or unswept surface, the engine should be left in idle (to the maximum extent possible) until the engine is back over an improved surface.

5.16.3.5.2. Consider increasing power on remaining engines.

5.16.3.6. If it becomes absolutely necessary to accomplish a 180-degree turn on a narrow runway, the turn should be accomplished at an intersection of a link taxiway or at a designated turn around pad.

5.17. Fuel Requirements. (AFI 11-202, Volume 3) This paragraph implements standard minimum fuel requirements.

5.17.1. Required ramp fuel (IAW AMCPAM 11-1, *C-141 Fuel Planning*) will consist of all fuel required for engine start, taxi, warm-up, APU operation, takeoff, climb, cruise, alternate/missed approach (if required), descent, approach, transition, landing, and fuel reserve.

5.17.2. Alternate fuel (IAW AMCPAM 11-1). Fuel for flight from intended destination to alternate aerodrome at optimum altitude and long range cruise speed. Compute fuel, time, and altitude from AMCPAM 11-1. When holding is required in lieu of an alternate at a remote or island destination, compute holding for 1 + 15-hours using planned destination gross weight at FL 200. A remote or island destination is defined as any aerodrome which, due to its unique geographic location, offers no suitable alternate (civil or military) within 2-hours flying time. The forecast weather at the remote or island destination must meet the criteria listed in **Chapter 6** of this volume.

5.17.3. Fuel reserve. Fuel reserve is the minimum planned final landing fuel at destination or alternate. Fuel planned IAW AMCPAM 11-1 (holding Fuel) satisfies the AFI 11-202, Volume 3 reserve fuel requirement of 10% (which may be limited to 45 minutes) or 20 minutes, which ever is greater.

NOTES:

Plan initial arrival overhead destination with fuel for approach/landing, alternate/missed approach (if required) and fuel reserve. Additional fuel may be added to allow crews some flexibility when dealing with unplanned contingencies (e.g., unreliable NAVAIDs, weather avoidance, ATC delays, etc.). "Unidentified extra" fuel should normally not exceed 5,000 pounds. When dealing with unplanned contingencies, crews will still plan to touchdown with fuel reserve (minimum). Units may develop standard alternate fuel requirements for local training missions; however, these fuel requirements will not be less than those specified in this chapter.

When deemed financially prudent by the aircrew or mission planners, aircrews may carry through-flight fuel loads (i.e., tanker fuel) when transiting airfields without DoD or DoD contract fuel. The decision to tanker fuel should be based on careful analysis of mission requirements and limiting factors. To aid in the decision process a list of contract fuel locations is available on the world wide web at http://www.dfsc.dla.mil/main/dfschome.htm.

5.18. Fuel Jettison Procedures. Fuel jettison is limited to the minimum necessary for safe and effective flight operations. Except in the case of an emergency, prior to jettisoning fuel, crews will notify the appropriate ATC or flight service facility of intentions, altitude, and location. Inform the appropriate ATC or flight service facility when the operation is complete.

5.18.1. In addition to procedures in the T.O. 1C-141B-1, jettison fuel only under the following circumstances:

5.18.1.1. Aircraft emergency. Immediate reduction of gross weight is critical to safe recovery of the aircraft.

5.18.1.2. Urgent operational requirements. Immediate reduction of gross weight is necessary to meet urgent operational mission tasking.

5.18.2. Jettison areas should be off published airways and avoid urban areas, agricultural regions, and water supply sources.

5.18.3. Use jettison altitudes above 20,000-feet AGL to the maximum extent possible.

5.18.4. Use designated jettison areas to the maximum extent possible, except when safety of flight would be compromised.

5.18.5. If jettison is accomplished, record all pertinent data to include flight conditions, altitude, airspeed, air temperature, wind direction and velocity, type and amount of fuel, aircraft type and position at time of jettison, time and duration of jettison activity, and reason jettison was accomplished. Retain this information for 6 months as documentation in the event of claim against the government resulting from the fuel jettison.

5.19. Airspeed. In accordance with applicable tech order and AFI 11-202, Volume 3, aircraft may exceed 250 KIAS or in-flight minimum maneuver speed below 10,000 feet.

5.20. BASH Programs. BASH programs are centralized unit efforts that provide information cross-feed, hazard identification, and a consolidated course of action. As a minimum, units must implement the following procedures:

5.20.1. Ensure compliance with the following Bird Watch condition restrictions:

5.20.1.1. **Bird Watch Condition Low -** No operating restrictions.

5.20.1.2. **Bird Watch Condition Moderate -** Initial takeoffs and final landings allowed only when departure and arrival routes will avoid bird activity. Local IFR/VFR traffic pattern activity is prohibited.

5.20.1.3. **Bird Watch Condition Severe -** All takeoffs and landings are prohibited. Waiver authority is local operations group commander or equivalent. Parent MAJCOM/DO waiver is required to operate at airfields not controlled by the MAF.

5.20.2. Make every effort to not schedule takeoffs, landings, and low-levels from one-hour before to one-hour after sunrise and sunset during the phase II period. Also, significant bird hazards will be published in FLIP GP and the IFR Supplement along with the associated airfield operating-hour restrictions and avoidance instructions.

5.20.3. When operating at airfields where no BASH program exists, aircraft commander's have the authority to delay takeoffs and arrivals due to bird condition. Coordinate actions through appropriate command and control authority.

5.20.4. Enroute. The aircrew should consider bird migratory patterns during enroute portion of the mission to minimize the potential of an in-flight bird strike. The Bird Avoidance Model (BAM) on HQ AFSC/SEF www site (http://www-afsc.saia.af.mil/AFSC/Bash/home.htm) provides BASH information, including regionalized CONUS bird migration, PFPS software overlay, and latest news. See AFPAM 91-212, *Bird Aircraft Strike Hazard (BASH) Management Techniques*, for additional information.

5.21. Functional Check Flights (FCF) and Acceptance Check Flights (ACF). FCFs and ACFs will be performed according to T.O. 1-1-300 and applicable MAJCOM instruction (i.e., 21-series). See T.O.s 00-20-6, 1C-141B-6CF-1, and 1C-141B-1 for more information.

5.21.1. Terms and Abbreviations:

5.21.1.1. FCF--FCFs are performed after accomplishing inspections or maintenance to assure the aircraft is airworthy and capable of mission accomplishment.

5.21.1.2. ACF--ACFs specify guidelines for accepting depot aircraft and to determine compliance with contractual requirements (e.g., C checks).

5.21.2. FCF Restrictions:

5.21.2.1. Conditions requiring an FCF according to T.O. 1C-141B-6CF-1 include (but are not limited to) major retrofit modifications, removal or replacement of moveable flight control surfaces, major repairs that would affect the flying characteristics of the aircraft, adjustment, removal or replacement of major components of the flight control system for which airworthiness cannot be verified by maintenance operational checks, or removal or replacement of any three engines.

5.21.2.2. The OG/CC is responsible for the wing FCF program. The OG/CC may waive a complete FCF and authorize an FCF to check only systems disturbed by maintenance, inspection or modification. Additional guidance should be published in the local chapter of these instructions.

5.21.2.3. Check flight will be conducted within the designated check flight airspace of the base from which the flight was launched except when the flight must be conducted under specific conditions, not compatible with local conditions and area restrictions.

5.21.2.4. The decision to approve a combined FCF and ferry flight is the responsibility of the MAJCOM/DO (ANG/DO for ANG mission).

5.21.2.5. FCFs will be accomplished by the best qualified instructor Stan/Eval aircrews which will be designated FCF qualified to their assigned aircrew position by the OG/CC in a letter.

5.21.2.6. FCFs will normally be conducted in daylight, VMC conditions. However, the OG/CC may authorize a flight under a combination of VFR, IFR, and "VFR on Top" conditions. The flight will begin in VFR conditions. If the aircraft and all systems are operating properly, it may proceed IFR to penetrate cloud cover to VFR on top to continue the altitude phase of the flight.

5.21.2.7. FCF aborts--If a malfunction occurs during an FCF and is not related to the condition generating the FCF, and the original condition operationally checks good, the aircraft may be released for flight.

5.21.2.8. OG/CC and deployed mission commander may authorized temporary waivers to these FCF procedures for aircrew qualification when operationally necessary. Permanent waivers require MAJCOM approval.

5.22. Participation in Aerial Events. See AFI 11-209, *Air Force Participation in Aerial Events*, and the appropriate MAJCOM Supplement. Aerial events must be sanctioned and individually approved by the appropriate military authority and dated with the FAA. AFI 11-209 identifies events sanctioned for support and the approving authority for each type of event. In addition, AFI 11-209 stipulates that units participating in aerial events will ensure aerial activities are coordinated with the FAA through the regional Air Force representative.

5.23. Hand-held GPS (For aircraft not equipped with Global Positioning System/Enhanced Navigation System (GPSENS). Carry a Hand-held GPS on every mission, including local and off-station training missions (***Exception***: A Hand-held GPS is not required for a local mission without passengers). The Hand-held GPS, when operating properly, can provide useful information; however, it must never be used as the primary IFR navigation source. Use of any Hand-held GPS receiver that has not been EMI certified is restricted to operations above 10,000 ft AGL only (***NOTE***: MAJCOMs maintain a list of HH GPSs certified for operations below 10,000 feet AGL). Any type of Hand-held GPS may be used above 10,000 feet unless interference is noted with any aircraft system. The actual use of the Hand-held GPS rests with the aircrew. Its usage must never jeopardize safety. When aircrews deploy with or without an aircraft (stage crews), each crew will deploy with a Hand-held GPS. This would include KLX-100s, PLGRs, Garmins and Magellans.

5.23.1. Before using the Hand-held GPS in-flight, aircrew members must receive training and the aircraft must be capable of supporting the Hand-held GPS equipment.

5.23.2. The hand-held GPS will not be used to update navigation equipment (FSAS/INS) unless the hand-held GPS position can be confirmed by another aircraft source (i.e. radar, TACAN, VOR, another INS, or navigator).

WARNING: Electrical problems have been reported on KLX-100 units. It is extremely important to insert all of the batteries in the proper orientation as shown in Operators Guide, Section 1.1.2, Figures 1-11 through 1-17. The manufacturer confirms that if only one battery is inserted incorrectly, the unit will operate for 10-30 minutes. An increase in temperature may be noted followed by a crackling sound as the battery expands and ruptures. Be extremely careful as battery acid may leak from the bottom of the unit. A way to double-check proper insertion is to go to the GPS Setup page and check the bar graph showing battery power. Make sure it reflects battery strength near 100%. If a problem is detected, shut down the GPS immediately and disconnect unit from any external power source. Report the incident through proper channels. Do not attempt to remove the batteries. This action could cause injury to the individual and will impair investigation for warranty claims.

5.24. Traffic Clearance Avoidance System (TCAS).

5.24.1. It is imperative to follow resolution advisories (RA) to obtain aircraft separation computed by TCAS. Failure to follow the computed RA may increase the probability of a midair collision. Visually clear the airspace before maneuvering the aircraft in response to a TCAS advisory.

5.24.2. Advise ATC as soon as practical when a deviation becomes necessary due to a TCAS resolution advisory.

5.25. Radar Altimeter.

5.25.1. Any crewmember detecting the illumination of the radar altimeter Low Altitude warning light will immediately notify the pilot flying the aircraft. Terrain clearance and aircraft position must be verified.

5.25.2. Prior to departure set the radar altimeter for emergency return. Normally, use the HAT/HAA for IMC, or 500 feet for VMC departures.

5.25.3. The radar altimeter will be set to the HAT/HAA during instrument approaches.

5.26. Aircraft Recovery From Unprepared Surfaces. Aircrews will normally not attempt to recover an aircraft after inadvertent entry onto unprepared surfaces not suitable for taxi. Using the appropriate equipment, ground crews will accomplish aircraft recovery. Unless an emergency situation dictates otherwise, aircrews may accomplish recovery only if there is no aircraft damage, the surface will support the aircraft, and the AC has coordinated with appropriate AMC headquarters maintenance authorities through the TACC (NAF/DO for AFRC aircraft or missions and ANG/|DO for ANG aircraft or missions).

5.27. C-141 Aircraft Deployed With Armor Installed.

5.27.1. Armor kits are to accompany the aircraft back to home station unless their use will continue at the forward operating base. Transportation of the armor is high priority.

5.27.2. When deployed, it is imperative the armor kits remain with the aircraft until returned to home station. The armor kit may be removed from the installed position, however, it will remain onboard the aircraft as cargo.

Chapter 6

AIRCREW PROCEDURES

Section 6A—Pre-mission

6.1. Aircrew Uniform.

6.1.1. Wear the aircrew uniform, as outlined in AFI 36-2903, *Dress and Personal Appearance of Air Force Personnel*, and the appropriate MAJCOM supplements on all missions, unless otherwise authorized. When the Foreign Clearance Guide requires civilian attire, wear conservatively styled civilian clothing.

6.1.2. Each group commander will determine the clothing and equipment to be worn or carried aboard all flights commensurate with mission, climate, terrain involved and paragraph **6.51.**.

6.1.2.1. All crew members will have Nomex gloves in their possession.

6.1.2.2. It is recommended that primary crew members wear Nomex gloves during engine start, taxi, takeoff and landing.

6.1.2.3. Crew members will remove rings and scarves prior to performing aircrew duties (in and around the aircraft).

6.1.3. Personnel will have the appropriate items of clothing in their possession when flying in Arctic and Antarctic regions. ***EXCEPTION***: Not applicable to transoceanic flights or when staging or transiting Elmendorf AFB AK.

6.1.4. See AFI 10-403, *Deployment Planning*, for mobility requirements.

6.2. Personal Requirements.

6.2.1. Passport. Carry a valid passport on all missions outside the 48 conterminous states. ***EXCEPTION:*** Unit commanders may authorize personnel who have applied for, but not yet received, a passport to act as crew members on missions not scheduled to transit locations where passports are required.

6.2.2. Shot Record. Ensure immunization requirements are met. Carry shot record on all missions outside the 48 conterminous states. C-141 crew members must maintain worldwide shot requirements.

6.2.3. Corrective Lenses. Comply with requirements in AFI 11-202 Volume 3, *General Flight Rules*.

6.2.4. Driver's License. A valid state driver's license is required on each TDY where use of US government general purpose vehicles may be required. Contact the local airfield manager if vehicle will be operated on the flight line.

6.2.5. Identification Tags. Two required for all flights.

6.2.6. FOD Hazards. Crew members will not wear wigs, hair pieces, rings, ornaments, pins, clips, other hair fasteners, or earrings in the aircraft or on the flight line.

EXCEPTION: Crew members may wear plain elastic hair fasteners and/or barrettes. These fasteners must not interfere with the wearing of headsets or the donning of oxygen equipment and will be accounted for before and after flight.

6.2.7. Flashlights. Each crew member must carry an operable flashlight for night flights as defined in AFI 11-202 Volume 3.

6.3. Pre-mission Actions.

6.3.1. Accomplish Theater Indoctrination Training prior to transiting the following areas:

6.3.1.1. Asia, Pacific, Australia, and Indian Ocean

6.3.1.2. Africa and the Middle East

6.3.1.3. Europe, Baltic's, and Russia

6.3.1.4. Caribbean, Central America, and South America

6.3.1.5. Contents of the theater indoctrination folders should be tailored to the units' specific mission. As a minimum, the following will be included:

6.3.1.5.1. Mission/Deployment Checklist. A locally developed checklist that includes mobility, training, and personnel requirements that should be accomplished prior to departure, and personal/professional items the aircrew must take with them.

6.3.1.5.2. Airspace/Airfield Review. Flip, fir/uir/adiz procedures.

6.3.1.5.3. Airspace classifications, ASRR, and airport qualification videos (if available).

6.3.1.5.4. Theater Instrument Procedures. Required instruments and/or procedures for Non-DoD Approaches, course reversal approaches, circling, holding, NDB approaches, Host Nation/Jeppesen Approaches, and Altimeter setting procedures.

6.3.1.5.5. Organized Track Systems. Minimum Navigation Performance Specifications (MNPS) Airspace requirements; North Atlantic and Pacific Region Track Systems.

6.3.1.5.6. Communication and Emergency Procedures. Command and Control, Over-water position reporting, lost communications procedures, emergency procedures, and weather information sources.

6.3.1.5.7. Border Clearance. Foreign Clearance Guide, Customs, Immigration, Agriculture, Insect and Pest Control, and Diplomatic Clearances.

6.3.1.5.8. Flight planning. DD Form 1801, **DoD International Flight Plan**, Jeppesen Computer Flight Plan, Jeppesen Approach Plates and Charts, Theater Weather Conditions, Fuel Reserves and Alternate Requirements, Equal Time Points/Critical Wind Factors, and International NOTAMs.

6.3.1.5.9. Special Military Operations. Altitude Reservations, Due Regard, and Formation/Air Refueling Limitations.

6.3.1.5.10. Other Regulatory Requirements. General navigation procedures, life support equipment, hazardous cargo, crew rest/crew duty time, aircraft records/AFTO Form 781, **AFORMS Aircrew/Mission Flight Data Document,** procedures, mission essential ground personnel/additional crew members, passenger handling, etc.

6.3.1.5.11. Location Information. Command and control/reporting procedures, maintenance problems, aircraft security, social customs and taboos, billeting, transportation, etc.

6.3.1.6. Units may consolidate information common to all geographic areas into one folder titled "general deployment information." The remainder of the folders would contain only theater specific information.

6.3.1.7. Aircrews will review theater indoctrination folders prior to mission/deployment. This review will be tracked in AFORMS.

6.3.1.8. Upon return, the aircraft commander will compile a trip report, when necessary, detailing lessons learned. The trip report will be placed in the theater indoctrination folder, closing the loop on ensuring validity of the folder.

6.3.2. Review tasking, itinerary, and ALTRV requirements.

6.3.3. Review applicable OPORD and FLIP.

6.3.4. Review the Foreign Clearance Guide for areas of operation. Ensure necessary diplomatic clearances where required.

6.3.5. Obtain required customs forms.

6.3.6. Obtain computerized flight plans (CFP), as appropriate.

6.3.7. Coordinate with combat crew communications for worldwide FLIPs and sufficient communications security (COMSEC) materials for the duration of the mission.

6.3.8. Review anti-hijacking procedures in AFI 13-207, *Preventing and Resisting Piracy [Hijacking]*, and **Chapter 7**.

6.3.9. Ensure physiological training, annual physical, immunizations, and standardization checks will remain current throughout the TDY period.

6.3.10. Ensure visas have been received, if required.

6.3.11. Obtain terrain charts for unfamiliar destinations, if available.

6.3.12. Compile sufficient spare forms, flight orders, etc. to cover the TDY period.

6.3.13. Release available seats to passenger terminal.

6.3.14. Area Navigation (RNAV) Routings. The C-141B is approved for area navigation throughout the National Airspace System where radar monitoring by ATC is available. ATC will radar monitor each flight, however, navigation on the random RNAV route is the responsibility of the aircrew. When filing RNAV routings, use transponder code “R” on the DD Form 175, **Military Flight Plan** or DD Form 1801. Two methods are available for filing random RNAV routes, one based on navigational aids and the other based on latitude and longitude coordinates. Comply with FLIP General Planning when filing for an RNAV route.

6.4. Aircrew Publications Requirements. Primary crew members will carry the publications specified in **Table 6.1.** on all missions.

Table 6.1. Publication Requirements.

PUBLICATION	AC	CP	NAV	FE	LM
AFI 11-2C-141V3, C-141 Operations Procedures	X	X	X	X	X
AFI 11-2C-141 Vol 3, Addenda A					X
AFI 11-2c-141 Vol 3, Addenda B (If Qualified)	X		X	X	X
AFI 11-2C-141 Vol 3, Checklists (As Required)	X	X	X	X	X
AFI 11-202, Volume 3, *General Flight Rules*	X	X	X		
AFI 11-231, *CARP Procedures*			X		
AFI 13-217, *Assault Zone Procedures*			X		
AFI 11-299, *Nuclear Airlift Ops (PNAF only)*	X				
T.O. 1-1C-1-31 (A/R Qualified ACs only)	X		X	X	
T.O. 1C-141B-1				X	
T.O. 1C-141B-1-1				X	
T.O. 1C-141B-9					X
T.O. 1C-141B-16-1/2 (PNAF missions only)					X

NOTE: Units will define a list of required publications for each crew specialty in **Chapter 10**.

6.5. Airfield Certification. Pilots, navigators and mission planners will review airport qualification audiovisual slide tape programs as available before operating missions into unfamiliar airfields. In addition, aircrews will review the Airfield Suitability and Restrictions Report (ASRR) and should contact HQ AMC/DOVS for updates to airfield operability and weight bearing capability. The latest information is available through the world wide web (AMC Homepage) or through GDSS/C2IPS.

6.6. Aircrew Intelligence/Antiterrorism Briefing. Prior to leaving home station on missions departing the CONUS, crews will receive an intelligence/antiterrorism briefing that will emphasize terrorist, enemy, and friendly political and military development in the area in which they will be flying. This will include AOR specific antiterrorism information directed by geographic CINCs. Once in theater, aircrews should receive an intelligence/antiterrorism update on initial arrival at a Forward Operating Location (FOL) or en route stop and thereafter when significant developments occur. Report information of possible intelligence value to the local intelligence officers at the completion of each sortie.

6.7. Aircrew Intelligence Briefing. Prior to leaving home station on missions departing the CONUS, crews will receive an intelligence briefing that will emphasize terrorist, enemy, and friendly political and military development in the area in which they will be flying. Once in theater, aircrews should receive intelligence updates on initial arrival at a Forward Operating Location (FOL) or en route stop and thereafter when significant developments occur. Report information of possible intelligence value to the local intelligence officers at the completion of each sortie.

Section 6B—Pre-departure

6.8. Flight Crew Information File (FCIF) Procedures.

6.8.1. Review FCIF, volume 1, (index and safety-of-flight files, as a minimum) before all missions or ground aircrew duties. Update the FCIF currency record with the latest FCIF item number, date, and crew member's initials or as specified.

6.8.2. Crew members delinquent in FCIF review or joining a mission en route will receive an FCIF update from a primary aircrew member counterpart on the mission. Instructor pilots who fly with general officers are responsible for briefing appropriate FCIF items.

6.8.3. Crew members not assigned or attached to the unit operating a mission will certify FCIF review by entering the last FCIF number and their initials behind their name on the file copy of the flight authorization.

6.9. Flight Crew Bulletins (FCB) (As Applicable).

6.9.1. FCBs are issued under provisions of AFI 11-202V2, *Aircrew Standardization/ Evaluation Program*, and MAJCOM supplements. Operations group Stan/Eval will be the OPR for FCBs. Items in FCBs may also include local procedures and policies concerning equipment and personnel generally not found in any other publications.

6.9.2. All crew members shall be cognizant of FCB contents.

6.10. Airfield Security. When departing on missions destined outside the CONUS, aircraft commanders should review applicable MAJCOM security publications.

6.11. Mission Kits. Carry mission kits on all operational missions. Suggested items include:

NOTE: * Indicates mandatory for all missions away from home station.

6.11.1. Publications:

6.11.1.1. *AFI 11-401, *Flight Management*

6.11.1.2. *AFI 23-202, *Buying Petroleum Products and Other Supplies and Services Off-Station*

6.11.1.3. *AFJI 11-204, *Operating Procedures for Aircraft Carrying Hazardous Materials*

6.11.1.4. *Airfield Suitability and Restrictions Report (ASRR)

6.11.1.5. *AMC Aircrew Border Clearance Guide

6.11.1.6. *FCB

6.11.1.7. *AMCPAM 11-1, *C-141 Fuel Planning*

6.11.1.8. *AMCI 11-208, *Tanker/Airlift Operations*

6.11.1.9. *AFI 11-289, *PHOENIX BANNER, SILVER, COPPER Operations*

6.11.2. Forms:

6.11.2.1. DD Form 1351-2, **Travel Voucher or Sub voucher**

6.11.2.2. DD Form 1351-2c, **Travel Voucher or Sub voucher (Continuation Sheet)**

6.11.2.3. *DD Form 2131, **Passenger Manifest**

6.11.2.4. *Customs Form (CF) 6059B, **Customs Declaration**

6.11.2.5. *Customs Form (CF) 7507, **General Declaration Outward/Inward**

6.11.2.6. *AFTO Form 451, **C-141 Aircraft Usage Log**

6.11.2.7. *AF Form 15, **United States Air Force Invoice**

6.11.2.8. *AF Form 315, **United States Air Force AVFuels Invoice**

6.11.2.9. *AF Form 457, **USAF Hazard Report**

6.11.2.10. *AF Form 651, **Hazardous Air Traffic Report (HATR)**

6.11.2.11. *AF Form 664, **Aircraft Fuels Documentation Log**

6.11.2.12. *AF Form 1297, **Temporary Issue Receipt**

6.11.2.13. *AF Form 2282, **Statement of Adverse Effect-Use of Government Facilities**

6.11.2.14. *AF Form 4031, **CRM Skills Criteria Training/Evaluation**

6.11.2.15. *AF Form 4052, **C-141/C-130/C-5 Refueling Computations**

6.11.2.16. *AF Form 4053, **INS Flight Plan and Log (Fuel Planning Back)**

6.11.2.17. *AF Form 4071, **C-141 Performance Data Worksheet**

6.11.2.18. *AF Form 4072, **C-141 Pilot TOLD Card**

6.11.2.19. * AF Form 4075, **Aircraft Load Data Worksheet**

6.11.2.20. *AF Form 4082, **C-141/TF-33 Engine Condition Monitoring In-Flight Data Worksheet**

6.11.2.21. *AF Form 4096, **Airdrop/Tactical Airland/Air Refueling Mission Recap**

6.11.2.22. *AF Form 4096 (Reverse), **Station Keeping Equipment (SKE)/Zone Marker (ZM) Debrief**

6.11.2.23. *AMC Form 43, **AMC Transient Aircrew Comments**

6.11.2.24. *AMC Form 54, **Aircraft Commander's Report on Services/Facilities**

6.11.2.25. *AMC Form 97, **AMC Unusual Occurrence/Bird Strike Worksheet**

6.11.2.26. *AMC Form 196, **Aircraft Commander's Report on Crewmember**

6.11.2.27. *AMC Form 423, **MIJI Incident Report Worksheet**

6.11.2.28. HMS Customs Declaration

6.11.2.29. Japanese Customs Declaration

6.11.2.30. *Mission Frag (when applicable)

6.11.3. Orders:

6.11.3.1. DD Form 1610, **Request and Authorization for TDY Travel of DoD Personnel**

6.11.3.2. AF Form 1631, **NATO Travel Orders (when required)**

6.11.3.3. *AMC Form 41, **Flight Authorization (or as MAJCOM prescribed)**

6.11.4. Miscellaneous:

6.11.4.1. *Box car seals

6.11.4.2. *Masking tape

6.11.4.3. *Padlock with two keys

6.12. Route Navigation Kits.

6.12.1. A route navigation kit is issued at home station and remains with the aircraft until return. Kits contain sufficient quantities of material to cover the planned mission and global operations as required.

6.12.2. Minimum contents of route navigation kits are listed in **Table 6.2.**.

6.12.3. Local area navigation kits may be used in lieu of route navigation kits on local unit training sorties. Contents of these kits is a local unit decision.

Table 6.2. Route Navigation Kit Contents.

Item (applicable to area of operation):	Number
FLIP GP Planning (sections GP, AP/1, AP/1B, AP/2, AP/3)	1
FLIP IFR Supplement	2
FLIP Flight Information Handbook	2
FLIP En route (high and low)	*3
FLIP Instrument Approach Procedures (high and low)	*3
Standard Instrument Departures (East and West United States, volumes 1 and 2)	*3
Instrument Departures Europe and North Africa (high and low)	*3
Standard Terminal Arrival Routes (STAR)	*3
Topographical and Sectional Charts for areas of operation (GNC/OPC/JNC/TPC) (GNC/OPC/TPC/JNC/JOG/Sectionals)	as required
FLIP VFR Supplement	1
DoD Area Arrival Charts	* (3) if available

**NOTE:* Two required when a navigator is not part of the crew.

6.13. Briefing Requirements.

6.13.1. C2 Center Briefing. Contact local C2 center, when available, or TACC prior to flight to coordinate or confirm mission requirements, and from the aircraft prior to engine start. C2 centers will provide necessary information as required.

6.13.2. Aircraft Commander Briefing. Brief crew members on the specific mission details if not previously accomplished.

6.13.2.1. Time hack

6.13.2.2. Briefing classification for the mission profile

6.13.2.3. Review weather

6.13.2.4. Mission itinerary and profile

6.13.2.5. Aircraft tail number, call sign, and parking location

6.13.2.6. Aircraft gross weight and fuel load

6.13.2.7. Communications requirements and procedures

6.13.2.8. Fuel reserve

6.13.2.9. Review departure and approach to be flown

6.13.2.10. Airdrome restrictions and hazards

6.13.2.11. Emergency procedures review

6.13.2.12. Specialized briefings (formation tactics, A/R, etc.)

6.13.2.13. C2 and execution procedures

6.13.3. Specialized Briefing. Specialized briefings should be held immediately following the agency or aircraft commander's briefing as required. Specialized briefings review formation tactics and procedures, air refueling information, and technical instructions for specialized equipment operations. All crew members and appropriate staff must attend each briefing unless excused by the aircraft or mission commander to perform preflight duties. The aircraft commander will back brief these crew members on all appropriate items. Types of specialized briefings include:

6.13.3.1. Formation: See **Chapter 19**.

6.13.3.2. Air Refueling. As a minimum, the following should be briefed:

6.13.3.2.1. Rendezvous (RZ) and orbit time, RZ Point, altitude, heading, airspeed, end A/R point, and secondary plan

6.13.3.2.2. Equipment for primary and secondary RZ

6.13.3.2.3. Color codes for anti-collision lights

6.13.3.2.4. Scheduled fuel on-load

6.13.3.2.5. Communications and emission control

6.13.3.2.6. Review of emergency procedures, to include breakaway

6.13.3.2.7. Review of operating procedures (including use of manual, override, and emergency boom latching)

6.13.3.2.8. Review spare aircraft and abort procedures

6.13.3.3. Cargo and load information

6.13.3.3.1. Any special instructions

6.13.4. Weather Briefings. Request a written weather briefing on DD Form 175-1, **Flight Weather Briefing , AMC Form 181, AMC Mission Weather Briefing,** or other approved MAJCOM Form. (***EXCEPTION***: Verbal weather briefings are acceptable for local training missions). Obtain a briefing on current weather, trends, and forecast for the proposed route, destination, and alternates. All primary crew members will attend the weather briefing unless crew duties dictate otherwise. If the flight will transit non-Air Force bases, crews must make arrangements to ensure adequate weather support facilities and services are available. If adequate services are not available crews will obtain weather support through any means available to ensure required weather data is in their possession prior to mission accomplishment. When face-to-face briefings are not possible, obtain a telephone weather

briefing (precedence up to and including IMMEDIATE is authorized). The designated MAJCOM regional briefing stations provide the telephone briefing for CONUS flights.

6.13.4.1. Obtain weather information from US Military weather services, any FAA-approved weather source, or any host nation civil or military weather source.

6.13.5. Buffer Zone. Prior to operating an aircraft within or adjacent to an established buffer zone, the pilot will ensure primary crew members are briefed on current buffer zone procedures outlined in appropriate directives.

6.13.6. Peacetime and Wartime SAFE PASSAGE Procedures. Pilots must be familiar with peacetime and wartime safe passage of friendly military aircraft (if applicable).

6.14. Call Signs.

6.14.1. Training Missions. Aircraft will use the unit static call sign prefix followed by a 2-digit suffix assigned by the parent unit.

6.14.2. Operational Missions. Aircraft will use call signs assigned by OPORD, FRAG, or diplomatic clearance. If no call sign has been assigned to the mission, use unit static call signs. When flying AMC channel missions, aircraft will use the “REACH” call sign followed by the last digit of the year the aircraft was built and the last 3 digits of the aircraft tail number (or as required by diplomatic clearance). Complete flight plans as follows:

6.14.2.1. On the DD Form 1801, item 7, put the letters "RCH" followed by the last digit of the year the aircraft was built and the last 3 digits of the aircraft tail number.

6.14.2.2. On the DD Form 1801, item 18, remarks section, put “Rem / RCH designates REACH call sign.” Tail number 640164 will be Reach 4164.

6.14.2.3. On the DD Form 175, aircraft call sign block, put “RCH” followed by the last digit of the year the aircraft was built and the last 3 digits of the aircraft tail number.

6.14.2.4. On the DD Form 175, remarks block, put “RCH designates REACH call sign.”

6.14.3. During radio transmissions, crews will use "REACH" followed by the last digit of the year the aircraft was built and the last 3 digits of the aircraft tail number.

6.14.4. The REACH 01, 15, and 21 call signs will only be used by the AMC/CC, 15 AF/CC, and the 21 AF/CC respectively.

6.14.5. Aeromedical Evacuation Missions. For aeromedical evacuation missions, use call sign "E" followed by the 5-digit aircraft tail number or mission designator (as required by FLIP). Use this call sign during positioning leg and Evac portion of the mission. When the aeromedical evacuation portion of the mission is completed, normal call signs will then be used.

6.15. Instrument Flight Rules. Conduct flight operations under IFR to the maximum extent possible without unacceptable mission degradation. This does not preclude VFR training to maintain proficiency in mission essential VFR operations.

6.16. Flight Data Verification.

6.16.1. Computer Flight Plan (CFP) Use. For AMC directed missions, contracted CFPs or CFPs available from Det 1, AMC CPSS are the official performance, navigation, and climate data, including en route wind information. If stand-alone computer based plans are used, each mission segment should utilize best wind data available. Use only validated CFP for flights involving C-141 aircraft. See AMCI 11-208, *Tanker/Airlift Operations*, Chapter 8 for additional information.

6.16.2. For other than AMC directed passenger or cargo missions, flight crews may manually compute flight plans, use MAJCOM provided CFPs, or use MAJCOM approved CFP software. CFPs should be utilized to the maximum extent practical. The flight crew has final responsibility for the accuracy of the flight plan used.

6.16.3. CFPs will be verified by the flight crew for route of flight and fuel computation accuracy prior to departure. Use AMCPAM 11-1 to help determine the validity of CFP fuel burn rates. Notify TACC flight plan discrepancies to the TACC Flight Planning Office through the appropriate cell. When reporting incorrect flight plans include both the CFPI and the plan number.

6.16.4. All Takeoff and Landing Data (TOLD) computations will be reviewed by another crew member.

6.17. Departure Planning: See AFI 11-202 Volume 3, *General Flight Rules*, AFMAN 11-217, *Airman's Information Manual*, this volume and MAJCOM supplements.

6.17.1. Gross Weight (GW). Ensure that the aircraft does not exceed the maximum gross weight, zero fuel weight, or center of gravity limitations specified in the aircraft flight manual. Gross weight may be further restricted by operating conditions such as wind shear, icing, temperature, pressure altitude, runway length and slope, airdrome weight bearing capacity, departure maneuvering, required climb gradients, and obstacles.

6.17.1.1. Climb Gradient. Takeoff GW must never exceed that which would, in the event of an engine failure, would be lower than the rate of climb to less than a 2.5 percent climb gradient.

6.17.1.2. Critical Field Length (CFL). Takeoff GW must never exceed that which would require CFL in excess of the runway available. In some cases, a minimum height is required at the Departure End of Runway (DER), this is also known as a screen height. If the runway available exceeds CFL by at least 1400 feet, a climb gradient of 2.5% (152 ft/NM) will result in crossing at a screen height of at least 35 feet. Use the following as a guide to determine DER/Screen Height requirements. Required screen heights depend on the agency that developed the SID (identification in parentheses immediately to the right of the SID chart reference number). The equations in **Figure 6.1.** can be useful to calculate distance to climb in the event a value of less than 1400 feet between runway available and critical field length to determine that DER can be met.

Table 6.3. Critical Field Length Example.

Distance to Climb = DER x 6076 / Computed 3 engine Climb Gradient
Distance to Climb must be ≤ RA - CFL
where:
gradient= climb gradient in ft/NM
6076= Number of feet in a NM
DER= crossing height at Departure end of runway
RA= Runway available
CFL=worst case engine out “unstick” or lift-off point

6.17.1.3. DER height requirements.

6.17.1.3.1. Standard instrument departure (SID). OPRs for SIDs are identified on each individual SID. They are either Federal Aviation Administration (FAA), United States Army (USA), United States Navy (USN), United States Marine Corps (USMC), or United States Air Force (USAF). On non-DoD SIDs, the agency that wrote the SID will also be identified (in parentheses immediately to the right of the Chart Reference Number). For example:

6.17.1.3.1.1. SL-000.00 (USA) would indicate a DoD SID where the US Army is both the OPR and the agency that wrote the SID.

6.17.1.3.1.2. (USAF) SL-000.00 (RAF) would indicate a non-DoD SID where the USAF is the military department that requested publication and serves as the OPR, but the Royal Air Force is the agency that wrote the SID. Use the agency that wrote the SID to determine the required DER height.

6.17.1.3.2. Required DER heights depend on the agency that wrote the SID.

6.17.1.3.2.1. USAF, USN, or USMC SID: Zero feet.

6.17.1.3.2.2. US Army and FAA SID: 35-feet.

6.17.1.3.2.3. Foreign Civil SID (must be an ICAO member nation listed in FLIP GP): 16-feet.

6.17.1.3.2.4. Foreign Military SID (NATO, ICAO member nation listed in FLIP GP): 35-feet.

6.17.1.3.2.5. Foreign Military SID (Non-NATO, ICAO member nation listed in FLIP GP): 16-feet.

6.17.1.3.3. Radar Vector, Published IFR Departure Procedure or VFR Departures.

6.17.1.3.3.1. USAF, USN, or USMC Airfield: Zero-feet.

6.17.1.3.3.2. US Army and FAA Civil Airfield: 35-feet.

6.17.1.3.3.3. Joint Use Airfield within the United States: 35-feet.

6.17.1.3.3.4. Foreign Civil Airfield (must be an ICAO member nation listed in FLIP GP): 16-feet.

6.17.1.3.3.5. Foreign Military Airfield (NATO, ICAO member nation listed in FLIP GP): 35-feet.

6.17.1.3.3.6. Foreign Military Airfield (Non-NATO, ICAO member nation listed in FLIP GP): 16-feet.

NOTE: There is no standard or easy way for crews to determine DER height requirements in some cases. Therefore, when using departures other than those listed above, or when any doubt exists about which DER height to use, plan to cross the DER at 35-feet (minimum) unless you can ascertain a different DER height requirement from the appropriate authority. If aircraft performance will not allow crossing the departure end of the runway at the required height, the proposed departure route will be examined using a current aeronautical chart of appropriate scale to ensure performance is sufficient to clear all obstacles. The crew must advise the air traffic control (ATC) agency involved that they cannot meet the SID requirement.

6.17.2. Departure Routing/Climbout Performance (also see paragraph **6.18.5.** through paragraph **6.18.8.**). Appropriate terrain charts should be reviewed prior to departure. Regardless of the type of departure flown (SID, Specific ATC Departure Instructions, IFR Departure Procedure, or VFR), the aircraft must be able to achieve the published climb gradient (for the runway to be used) with all engines operating (TO 1C-141B-1-1), and be able to vertically clear all obstacles within the climbout flight path with one engine inoperative (TO 1C-141B-1-1) (***EXCEPTION***: see paragraph **6.18.6.**). If no minimum climb gradient is published, use 200 ft/NM minimum with all engines operating and 152 ft/NM minimum with one engine inoperative. If a higher required climb gradient is published or required, use that climb gradient as the minimum with all engines operating, and use that climb gradient minus 48 ft/NM as the minimum with one engine inoperative. This only works at fields having an instrument approach. If the field does not have an instrument approach, then no obstacle survey has been conducted. Therefore, you don't know if 200/152 ft/NM is sufficient. ***NOTE:*** At airfields with no instrument approach, an IFR departure is NOT AUTHORIZED.

NOTE: Standard Instrument Departures (SID) will not depict obstacles if a 2.5 percent climb gradient is sufficient to clear them (see Figure 6.2).

6.17.2.1. SIDs. Office of Primary Responsibilities for SIDs are identified on each individual SID. They are either Federal Aviation Administration (FAA), United States Army (USA), United States Navy (USN), United States Marine Corps (USMC), or United States Air Force (USAF). On non-DoD SIDs, the agency that wrote the SID will also be identified immediately to the right of the Char Reference Number. For example:

6.17.2.1.1. SL-000.00 (USA) would indicate a DoD SIDS where the US Army is both OPR and the agency that wrote the SID.

6.17.2.1.2. (USAF) SL-000.00 (RAF) would indicate a non-DoD SID where the USAF is the military department that requested publication and serves as the OPR, but the Royal Air Force is the agency that wrote the SID. Use the agency that wrote the SID to determine screen height.

6.17.2.2. Published IFR Departure Procedures. Published IFR Departure Procedures are available at some civil and military fields to assist in avoiding obstacles during climb to the Minimum En route Altitude (MEA). Airfields with Published IFR Departure Procedures will have the inverted triangle with a white "T" symbol printed on the approach plates and SIDS. When using Jeppesen publications, IFR Departure Procedures will be on the airfield diagram page which is

typically on the reverse side of the airport's first approach. A climb gradient and/or specific routing and/or alternate takeoff weather minimums will normally be specified with a Published IFR Departure Procedure. When flying a published IFR departure procedure, depicted routing and climb gradients must be flown to avoid obstacles. The alternate takeoff weather minimums allow aircraft to depart with minimum ceiling and visibility. USAF aircrews are not authorized to use these alternate takeoff weather minimums.

NOTE: If the Published IFR Departure Procedure does not include either a routing or a minimum climb gradient (i.e., it includes only alternate takeoff weather minimums) then an IFR departure from that airfield IS NOT AUTHORIZED unless a SID is flown or a departure via radar vectors is used.

6.17.2.3. Specific ATC Departure Instructions (Specific climbout instructions or "radar vectors"). Crews may depart via specific ATC departure instructions, however, the SID prescribes a safe route of flight for a climb to the en route structure, while minimizing radio communication. Even if planning to depart via specific ATC departure instructions, the crew should still have the SID on board (if published).

6.17.2.4. .Diverse Departures. The airfield has been assessed for departure by TERPS personnel and no penetration of the obstacle surfaces exist. An aircraft may depart the field, climb to 400 feet above the departure end of the runway elevation, turn in any direction, and if a minimum climb gradient of 200 ft/NM is maintained be assured of obstacle clearance. This is normally indicated on DoD/NOAA publications by the absence of any published departure procedures.

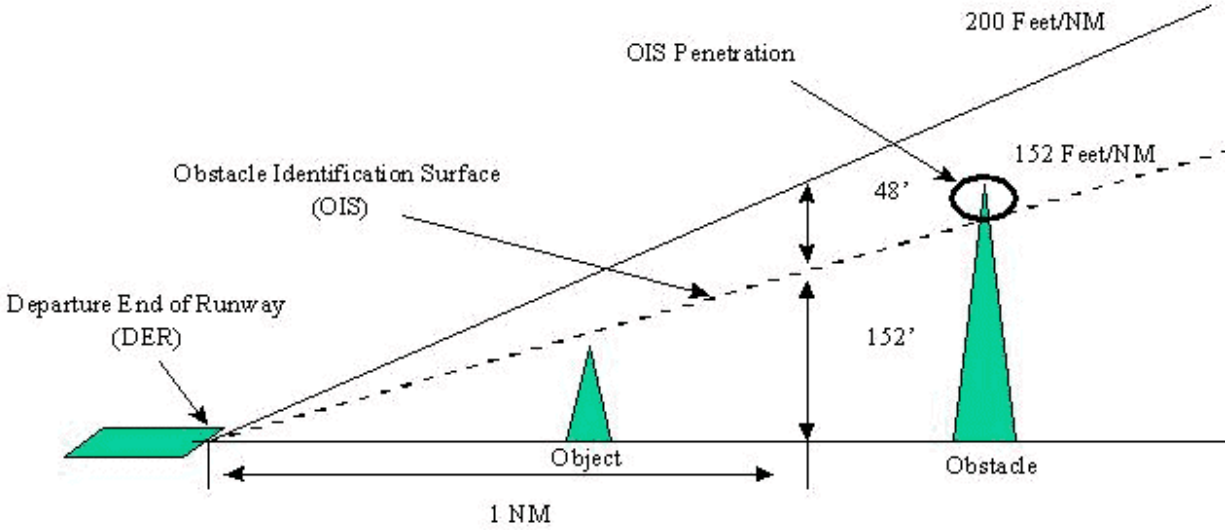
6.17.2.5. VFR Departures. VFR departures are authorized when required for mission accomplishment. The weather at takeoff must permit a VFR climb to an IFR MEA, an appropriate IFR cruising altitude, or an altitude where radar vectors can be provided.

NOTE: In no case will VFR departures be flown in lieu of obstacle clearance planning.

6.18. Obstacle Clearance Planning: IAW AFI 11-202 Volume 3, AFMAN 11-217, this volume and MAJCOM supplements.

6.18.1. Obstacle Identification Surface (OIS). Obstacle identification for SID purposes (FAA Handbook 8260.3B, AFJMAN 11-226, *US Standard for Terminal Instrument Procedures (TERPS)*, are those objects that penetrate an OIS of 40:1 (152 feet per NM). Calculation of the OIS on a SID continues until the SID reaches a MEA or until the SID terminates. Climb gradients of 200 feet per NM will provide at least 48 feet per NM clearance above all obstacles that do not penetrate the OIS. Complying with published climb gradients found on a SID or IFR departure procedure will provide at least 48 feet per NM clearance above all obstacles that do penetrate the OIS. The aircraft commander must be aware and thoroughly brief the crew on all obstacles along the departure flight path.

Figure 6.1. Obstacle Identification Surface.



6.18.1.1. The AMC Airfield Suitability and Restrictions Report (ASRR) is an excellent source for obstacle information, however, it is not a stand alone document. It is intended to supplement published climb gradients and obstacle information found on SIDs, Published IFR Departure Procedures, GDSS/C2IPS,and terrain charts

6.18.1.2. Aircrews may call HQ AMC/DOVS for additional airfield obstacle data. DSN 576-3112.

6.18.2. Objects penetrating the OIS may or may not be depicted (they definitely will not be depicted on civil procedures). Objects that do not penetrate the OIS will normally not be depicted.

6.18.3. SIDs simplify ATC procedures while providing safe routing to the en route structure; however, SIDs should not be used as the sole source of obstacle information for departure planning. If used as such, inadequate (engine out) obstacle clearance may result. SIDs, instrument approach plates, and topical sectional charts, must be used to determine the distance and height values for all significant obstacles along the flight path.

6.18.4. The controlling obstacle is defined as the obstacle requiring the greatest climb gradient within the flight path. Obstacles are normally not depicted on SIDs when climb gradients of less than 152 feet per NM are required to clear them.

6.18.5. In order to fly any IFR departure, aircrews must ensure they can meet the published/required climb gradient for the planned departure with all engines operating. In addition, aircrews will accomplish the following to ensure they can vertically clear all obstacles on or reasonably near the climbout/emergency return flight path with one engine inoperative:

6.18.5.1. Use the most restrictive of the following to determine whether engine out climb performance is sufficient to provide obstacle clearance:

6.18.5.1.1. Using applicable obstacle height and distance information from available terrain charts (JOG, TPC, sectional, etc.), the ASRR, base operations, etc. ensure engine out climb performance is sufficient to vertically clear obstacles which are on or reasonably close to the planned departure and emergency return flight path.

6.18.5.1.2. If a climb gradient is published for the planned departure, obtain an "engine out" climb gradient by subtracting 48-feet from the published climb rate (if the climb gradient is published climb rate in feet per minute, use the "60 kts" column, this is the same as feet per nautical mile). Compare this value with actual airplane climb capability using the appropriate "3-Engine Climbout Flight Path" chart or tabulated data in the margin of the chart. If actual capability is less than required "engine out" climb gradient, comply with paragraph **6.18.5.2.** below.

6.18.5.2. In the event that the "engine out" climb rate is not sufficient to clear all obstacles, the crew will consider the following:

6.18.5.2.1. Downloading cargo

6.18.5.2.2. Downloading fuel

6.18.5.2.3. Delaying the mission until climatological conditions allow for sufficient performance to clear all obstacles

6.18.5.2.4. Coordinating alternate departure procedures with the controlling agency that will provide obstacle clearance.

6.18.6. If none of the options in paragraph **6.18.5.2.** are feasible, the crew may depart on an IFR departure only if all the following conditions are met:

6.18.6.1. The aircraft is capable of achieving the minimum published/required climb gradient (200 FT/NM if none published/required) with all engines operating.

6.18.6.2. Day/VFR conditions exist on the entire departure and planned emergency return routing.

6.18.6.3. The aircraft commander has determined through a review of all applicable maps and charts that, in the event of an engine failure, the planned departure and emergency return routing will allow for obstacle avoidance.

6.18.6.4. The planned emergency route is briefed to the entire crew

NOTE: ANG aircrews require home unit OG/CC approval prior to exercising this option.

6.18.7. In the event of an engine failure, aircrews will advise ATC if they are unable to comply with the published minimum climb. Obtain radar vector or avoid all obstacles visually.

6.18.8. The following procedures apply for all departures:

6.18.8.1. The pilot will provide the obstacle height, distance, and gradient information necessary for performance computations to the flight engineer. As a minimum, review the appropriate terrain chart or sectional chart in addition to the SID (if available). The following guidelines should help eliminate obstacles that are not a factor.

6.18.8.2. All obstacles on the SID will be considered. If no distance is published, use appropriate aeronautical chart (if available) to estimate flying distance to depicted obstacles.

6.18.8.3. When utilizing other sources for obstacle information, consider all obstacles which fall within the departure, or emergency return routing.

6.18.8.4. Escape routing must always be planned to ensure obstacle clearance and emergency recovery during engine failure.

6.19. Alternate Planning.

6.19.1. Choose alternates that best meet mission requirements and conserve fuel. Those selected should not be within the same terminal area, if terminal forecasts are marginal. Select alternates that are not restricted by FLIP, Foreign Clearance Guide, or diplomatic clearances and are compatible with the mission load and performance characteristics of the aircraft.

6.19.2. The aircraft commander retains final authority in the choice of alternates; however, selection by support agencies normally should be used if they meet the above criteria and the aircraft has already been serviced.

6.19.3. Alternates selected must meet the alternate airport weather requirements according to AFI 11-202, Volume 3.

6.20. Departure Alternates.

6.20.1. A departure alternate is required if ceiling or visibility is below landing minimums for an available approach (at departure aerodrome). Do not use category II ILS minimums to determine if a departure alternate is required.

6.20.2. Suitability of Departure Alternates. When departure alternate is required, the aircraft must be capable of maintaining the MEA or MOCA, whichever is higher, to the alternate using one engine out performance criteria. To qualify as a departure alternate the airfield must meet one of the following conditions:

6.20.2.1. Existing weather at an alternate within 30 minutes flying time must be equal to or better than the published approach minimums and forecast to remain so until 1-hour after takeoff, but in no case forecast to be lower than 200-1/2 (RVR 2400), or;

6.20.2.2. The existing weather at an alternate within 2-hours flying time must be at least 500-1 above the lowest compatible published approach minimums, but in no case lower than 600-2 for a precision approach or 800-2 for a non-precision approach, and forecast to remain so for 1-hour after ETA at the alternate.

6.21. Destination Requirements (*for filing purposes*). The forecast destination weather will be according to AFI 11-202, Volume 3 and the following:

6.21.1. File two alternates when:

6.21.1.1. The forecast weather is less than required minimums for the lowest compatible approach.

6.21.1.2. The forecast surface winds (intermittent or prevailing) exceed limits corrected for RCR.

6.21.2. File an alternate, regardless of forecast weather, when the departure or destination aerodrome is outside the CONUS.

6.21.3. When filing to a remote or island destination, aircrews will use one-hour and fifteen minute (1+15) holding fuel (in lieu of an alternate and 45-minutes holding fuel). A remote or island destination is defined as any aerodrome which, due to its unique geographic location, offers no suitable alternate (civil or military) within 2-hours flying time. The forecast weather at the remote or island destination must meet the following criteria:

6.21.3.1. The prevailing surface winds, corrected for RCR, must be within limits at ETA and forecast to remain so for 2-hours thereafter, and

6.21.3.2. The prevailing ceiling and visibility must be equal to or greater than published minimums for an available non-precision approach, for ETA plus 2-hours.

NOTE: If a precision approach is available, the ceiling or visibility may be intermittently below non-precision approach minimums, but not below precision approach minimums (for ETA plus 2-hours).

6.21.4. Compute holding fuel using planned destination gross weight.

6.22. Adverse Weather. IAW Technical Orders, AFI 11-202, Volume 3, this volume and MAJCOM supplements.

6.22.1. Do not takeoff under conditions of freezing rain or freezing drizzle. Refer to flight manual for further limitations.

6.22.2. During flight, use any means available to avoid thunderstorms by at least:

6.22.2.1. 20 NMs at or above Flight Level (FL) 230.

6.22.2.2. 10 NMs below FL 230.

6.22.2.3. 5 NMs for aerial delivery (i.e., airdrop, low level, etc.) operations below FL 230 provided outside air temperature is at or above 0 degrees Celsius at flight altitude. Avoid gust fronts and winds preceding a rapidly moving thunderstorm.

NOTE: Carefully consider effect of wind on storm movement relative to aircraft track.

6.22.2.4. The use of ground-based radar as a means of thunderstorm avoidance should be used only to assist in departing an inadvertently penetrated area of significant weather. It should never be considered a normal avoidance procedure.

6.22.3. Do not fly directly above (within 2,000 feet) thunderstorms or cumulonimbus clouds. If unable to vertically clear thunderstorms or cumulonimbus clouds by at least 2,000 feet, you must avoid them using the above criteria.

NOTE: Aircraft damage may occur 20-miles or more from any thunderstorms. Aircrews must familiarize themselves with information on thunderstorm development and hazards. Refer to AFH 11-203, Weather for Aircrews.

6.22.4. In order to minimize exposure to thunderstorm hazards when approaching or departing an airport in an area where thunderstorms are occurring or are forecast:

6.22.4.1. Attempt to maintain VMC.

6.22.4.2. Maintain at least 5 NMs separation from heavy rain showers.

6.22.4.3. Avoid areas of high lightning potential, i.e. clouds within plus or minus 5,000 feet of the freezing level.

NOTE: Approaches or departures may be accomplished when thunderstorms are within 10 NMs. The thunderstorms must not be producing hazardous conditions (such as hail, lightning, strong winds, gusts fronts, heavy rain, wind shear, or microburst) at the airport, and must not be forecast or observed to be moving in the direction of the route of flight (to include the planned missed approach corridor, if applicable).

6.22.5. Aircrews performing approaches and landings at locations where temperatures are 0 degrees centigrade or below will refer to the Flight Information Handbook, section D, Temperature Correction Chart, to correct Minimum Descent Altitude (MDA), Decision Height (DH), and other altitudes inside the Final Approach Fix (FAF), if required.

6.22.6. Do not fly into an area of known or forecast moderate or greater mountain wave turbulence. Crews should use good judgment when flying into any area conducive to mountain wave turbulence, and avoid these areas of potential turbulence when possible.

6.22.6.1. Mountain wave turbulence is normally a predictable condition. Forecasters at base weather stations, using guidance products from weather centers, can advise crews of the potential for encountering mountain wave turbulence along planned routes of flight. However, weather data availability in mountainous regions and forecast model limitations prevent the prediction of all events. Crews must be familiar with the causes of mountain wave turbulence and the characteristic clouds that generally forewarn its presence.

6.22.7. In accordance with the T.O. 1C-141B-1, flight into areas of forecast or reported severe icing or severe turbulence is prohibited.

6.22.8. SIGMETs. National Weather Service in-flight weather advisories are not limiting to Air Force aircraft, but may indicate a need for the aircrew to contact a military weather facility. Crews will consider all SIGMETs valid for their aircraft until verified as not applicable with a military METRO service.

6.22.9. Volcanic Dust Precautions. Plan all missions to avoid general vicinity of volcanic activity. Aircraft operation in area of forecast or known volcanic activity or dust is prohibited.

6.23. Fuel Conservation.

6.23.1. Conservation of fuel requires everyone's active participation. For every pound of excess fuel, 3 percent of the excess will be burned each hour. Do not carry extra fuel for convenience. Unidentified extra fuel should not exceed Required Ramp Fuel Load (RRFL) by more than 5,000 pounds.

6.23.2. Extra fuel (identified extra) may be added to RRFL IAW AMCPAM 11-1 or:

6.23.2.1. When fuel availability is limited or not available at en route stops

6.23.2.2. For known holding delays in excess of standard

6.23.2.3. For anticipated off course weather avoidance

NOTE: When deemed financially prudent by the aircrew or mission planners, aircrews may carry through-flight fuel loads (i.e., tanker fuel) when transiting airfields without DoD or DoD contract fuel. The decision to tanker fuel should be based on careful analysis of mission requirements and limiting factors. To aid in the decision process a list of contract fuel locations is available on the world wide web at http://www.dfsc.dla.mil/main/dfschome.htm

6.23.3. Planning guidelines for fuel conservation:

6.23.3.1. Use optimized CFPs when possible.

6.23.3.2. Mach .74 and/or optimum altitude should be flown (when possible).

6.23.3.3. Limit the use of the APU when possible.

6.23.3.4. Delay engine start (normal engine start is 15-20 minutes before takeoff).

6.23.3.5. Cruise CG should be aft if practical.

6.23.3.6. Fly en route descents when possible.

6.23.4. Fuel loads:

6.23.4.1. C-141 units may develop standard ramp loads that meet the minimum local training mission requirements or emergency evacuation requirements (whichever is less).

6.23.4.2. De-fuel will not be required if RRFL is less than the standard ramp fuel load.

Section 6C—Pre-flight

6.24. AFTO Form 781, AFORMS Aircrew/Mission Flight Data Document. Review AFTO Form 781 before applying power to the aircraft or operating aircraft systems. The exceptional release must be signed before flight. A maintenance officer, maintenance superintendent, or authorized civilian normally signs the exceptional release. If one of these individuals is not available, the aircraft commander may sign the exceptional release. Ensure the Air Force fuel identaplate is aboard the aircraft. Ensure that the DD Form 1896, **Jet Fuel Identaplate,** and AIR card is aboard the aircraft.

6.25. Aircraft Servicing and Ground Operations.

6.25.1. Aircraft Refueling. Aircrew members qualified in ground refueling may perform refueling duties. Flight engineers acting as refueling supervisors and panel operators will comply with T.O. 00-25-172 and refueling job guide. Aircrews will only refuel in cases when maintenance support is not readily available and the mission would be delayed. Crew members may augment maintenance refueling teams at en route stops.

6.25.2. Concurrent Ground Operations. Concurrent ground operations (simultaneous refueling or de-fueling while cargo or maintenance operations are being performed) are authorized in accordance with T.O. 00-25-172 and T.O. 1C-141B-2-12JG-10-2. Aircrews performing preflight inspections or cargo loading concurrent with servicing, coordinate their activities with the Concurrent Servicing Supervisor (CSS). The CSS will remain in continuous intercom contact with fuel servicing team members during the entire servicing operation. Team members include CSS, Single Point Refueling (SPR) monitor, refueling panel monitor, and a fuel specialist. One additional person is required to monitor the passenger compartment when passengers are on board. Under normal circumstances, the CSS can monitor the opposite side fuel vents.

6.26. Aircraft Recovery Away from Main Operating Base (MOB). The aircraft commander is responsible for ensuring the aircraft is properly prepared for (turned to) subsequent mission taskings. If qualified aircraft specialists are unavailable, the aircrew is responsible for turning the aircraft.

6.26.1. Recovery items the aircrew may be responsible for include, but are not limited to, the following:

6.26.1.1. Parking

6.26.1.2. Aircraft servicing, including AGE usage

6.26.1.3. Supervision of minor maintenance within local capability

6.26.1.4. Minor configuration changes to meet mission tasking

6.26.1.5. Securing the aircraft prior to entering crew rest

6.26.1.6. Coordinating aircraft security requirements

6.26.1.7. AFTO 781-series forms maintenance

6.26.2. In all cases where aircrews turn aircraft without qualified maintenance specialist assistance, comply with the appropriate maintenance tech order.

6.26.3. Aircrews are not qualified to accomplish the required ground inspections. In those instances where maintenance personnel are not available, the aircrew will enter a red dash symbol in the AFTO Form 781H, **Aerospace Vehicle Flight Status and Maintenance Document,** updating current status and enter a red dash symbol and a discrepancy that reflects that the applicable maintenance inspection (i.e., preflight, thru-flight, basic post-flight) is overdue.

6.27. Oxygen Requirements. In addition to complying with AFI 11-202, Volume 3 requirements, the minimum quantity of oxygen aboard an aircraft before takeoff must be sufficient to accomplish the planned flight from the Equal Time Point (ETP) to recovery should oxygen be required. Calculate using the 100 percent oxygen chart in the flight manual and use 20,000 feet for the altitude when passengers are on board.

6.27.1. Oxygen quantity will not be less than 5 liters for local and stateside missions.

6.27.2. For Aeromedical Evacuation (AE) missions, 100 liters of liquid oxygen is the minimum required for originating AE missions. At en route stops, the total quantity must be sufficient to meet all anticipated patient requirements as determined by the AECC (APMRL/TPMRL)/MCD in conjunction with the pilot. AE missions originate at the point where the first patient is enplaned. Appropriate medical/nursing authority in conjunction with the Aircraft Commander may authorize deviation from this policy.

6.28. Fleet Service Equipment. Ensure required fleet service items are aboard. Fleet service items must be aboard the aircraft early enough to permit inventory 60 minutes before takeoff time.

6.29. Cargo Documentation. Proper cargo documentation must accompany each cargo load. A cargo manifest is required prior to all departures with cargo load. If a computerized cargo manifest is not available at the manifesting station, a cargo listing will accompany the load. The cargo/mail listing may be an abbreviated manifest, but will contain all required MILSTAMP data and 463L pallet information for weight and balance purposes. A Shipper's Declaration for Dangerous Goods is required for hazardous cargo. DD Form 1387-2, Special Handling Data/Certification, is required for sensitive/classified cargo/signature service.

6.30. Procedures for Airlifting Hazardous Cargo.

6.30.1. The term "hazardous cargo" as used in conjunction with airlift operations applies to the following classes and types of materials covered by AFJMAN 24-204:

6.30.1.1. Class 1 (Explosives)

6.30.1.2. Class 2 (Compressed gas)

6.30.1.3. Class 3 (Flammable liquid)

6.30.1.4. Class 4 (Flammable solid)

6.30.1.5. Class 5 (Oxidizer and organic peroxide)

6.30.1.6. Class 6 (Poison and infectious substances)

6.30.1.7. Class 7 (Radioactive material)

6.30.1.8. Class 8 (Corrosive material)

6.30.1.9. Class 9 (Miscellaneous dangerous goods)

6.30.2. Procedures in this paragraph apply when aircraft carry any quantity of the following materials:

6.30.2.1. DoD class or division 1.1, 1.2, 1.3 (explosives)

6.30.2.2. Class or division 2.3 (poison gas)

6.30.2.3. Class or division 6.1, (poison) PG I, zone A and B

6.30.2.4. Class 7 (radioactive yellow III label.)

6.30.2.5. Class 4.3 (dangerous when wet)

6.30.2.6. Nuclear weapons, nuclear components, inert devices

6.30.2.7. DoD hazard class or division 1.4 explosives that transit the United Kingdom, Italy, or Hawaii

6.30.3. Procedures also apply to nuclear related cargo, toxic chemical ammunition, highly toxic substances, hazard division 1.4 explosives, and infectious substances (including biological and etiological materials). In addition it applies to Class 7 (Radioactive materials) which require a yellow III Label, and all other hazard classes or divisions, (except class 9 and Other Regulated Material (ORM-D)) when shipped in quantities of 1,000 pounds (455 Kgs) or more aggregate gross weight.

6.30.4. The following procedures are established to satisfy the reporting requirements of AFJI 11-204, *Operational Procedures for Aircraft Carrying Hazardous Materials*. For nuclear weapons, nuclear components, and inert devices see AFI 11-299, *Nuclear Airlift Operations*.

NOTE: Quantities not covered in paragraph **6.30.2.** and paragraph **6.30.3.** are exempt from these procedures.

6.30.4.1. The aircraft commander will be briefed on the following information concerning hazardous materials placed aboard the aircraft:

6.30.4.1.1. Proper shipping name (PSN)

6.30.4.1.2. Hazard class

6.30.4.1.3. Identification numbers

6.30.4.1.4. The total quantity of hazardous cargo in gross weight or volume (except for class 9, ORM-D, and consumer commodities)

6.30.4.1.5. The location of hazardous item(s) in the aircraft

6.30.4.1.6. DoD class or division when any type explosives are involved

6.30.4.1.7. Net Explosives Weight (NEW) for all explosives aboard the aircraft

6.30.4.1.8. The requirement for escorts, couriers and protective equipment.

6.30.4.1.9. The number of passengers permitted aboard the aircraft

6.30.4.1.10. The procedures to use in an emergency

6.30.4.1.11. All cargo being carried under the terms of a DOT exemption, a DoD certification of equivalency (COE), a CAA, or a waiver

6.30.4.1.12. Written notification indicating "Prior Permission Required" (PPR), obtained from the next base to be transited

6.30.4.1.13. Smoking restrictions

6.30.4.1.14. Flight plan annotation requirements

6.30.4.1.15. Isolated parking and taxiing requirements

6.30.4.1.16. Security classification, if appropriate

6.30.4.1.17. Notification of the requirement to contact the next base to be transited at least 30 minutes prior to landing. (Such contact is not required for quantities other than those in paragraph **6.30.2.** and paragraph **6.30.3.**)

6.30.4.1.18. Placard requirements

6.30.4.1.19. Other special handling requirements

6.30.4.2. Cargo documentation. The loadmaster will ensure proper documentation, certification and identification of cargo is furnished. AFJMAN 24-204 contains detailed instructions on packaging, marking, labeling, and certification requirements associated with the airlift of hazardous materials.

6.30.4.3. Flight Planning. When briefed according to paragraph **6.30.4.1.**, the aircraft commander will:

6.30.4.3.1. Enter "Hazardous Cargo" and the mission identifier or flight number in the appropriate section of the flight plan. Refer to FCG for country specific requirements concerning over-flight when transporting HAZMAT. (Use remarks section of DD Form 175, **Military Flight Plan,** and other information section of DD Form 1801, **DoD International Flight Plan**.).

6.30.4.3.2. If possible, plan the flight to minimize over-flying heavily populated or otherwise critical areas. Approach, landing, and takeoff tracks are excluded.

6.30.4.3.3. Prepare a departure message at stations when a Command and Control Center (CCC) is not available. The remarks section of the departure message should include the following information:

6.30.4.3.3.1. Class of hazardous material aboard and the DoD class or division for explosives and NEW. Include the gross weight for the materials in paragraph **6.30.3.**.

6.30.4.3.3.2. Request for special handling; for example, isolated parking, security, technical escort teams, etc.

6.30.4.3.4. If Estimated Time En Route (ETE) is less than 1-hour, or if other circumstances preclude timely message receipt at destination, notify the base of first intended landing by priority telephone of the ETA and information listed in paragraph **6.30.4.3.3.**. Ask the C2 at the departure base to relay this information to base operations at the point of first intended landing when a C2 is available.

6.30.4.4. Before engine start. Remove placards, when used, from the aircraft. Give the controlling agency parking location, approximate engine start time, and verify the fire fighting agency has the hazardous materials information; otherwise, request the following be relayed to the fire fighting agency:

6.30.4.4.1. Class of hazardous material aboard and the DoD class or division for explosive materials aboard.

6.30.4.4.2. NEW for DoD class or division 1.1, 1.2, and 1.3 explosives.

6.30.4.4.3. Estimated time of departure.

6.30.4.5. En route. Normal procedures apply. Comply with paragraph **6.30.4.3.2.**.

6.30.4.6. Before landing. Unless specifically prohibited by the theater commander or FLIP planning, contact the agency specified in FLIP, base operations dispatcher, control tower or approach control at least 30 minutes (or as soon as practical) before ETA to announce that "hazardous materials" are aboard and to verify that the hazardous cargo message has been received. Transmit the mission number, ETA, and information in paragraph **6.30.4.3.3.**. Request the information be relayed immediately to base operations or the civil airport manager, crash and fire protection agency, and other support activities. If landing at a CONUS civil airport without a tower, give the above information to the nearest FAA flight service station.

6.30.4.7. DoD requires aircraft carrying DoD class or division 1.1, 1.2, and 1.3 explosives, hazardous class or division 2.3 or 6.1 zone A materials, and munitions to be parked in areas isolated from non-associated personnel and facilities. When such cargo is aboard, aircraft commanders are responsible for ensuring cargo is correctly identified to the tower or ground control. When aircraft are not directed to an isolated area, identify the cargo again to tower or ground control. When identification is acknowledged, the host is solely responsible for selecting the parking area. Should host procedures be questionable, submit trip reports or hazard reports as appropriate, to document such occurrences.

6.30.4.8. The military host is responsible for placarding aircraft. When missions operate on non-military bases, the briefing to the aircraft commander will include placarding requirements and, if required, placards will be furnished at the on-load base. The shipper and receiver must make prior arrangements with the airport manager for shipments of hazardous materials requiring placarding. The shipper and receiver are responsible for cargo identification, fire fighting procedures, and isolated parking requirements.

6.30.4.9. Unscheduled Landing Due to In-Flight Emergency. Transmit unclassified information to the appropriate ATC facility as follows:

6.30.4.9.1. Nature of emergency and intent to land

6.30.4.9.2. Aircraft position and ETA

6.30.4.9.3. Number of personnel onboard and location in aircraft

6.30.4.9.4. Fuel on board in minutes

6.30.4.9.5. Hazardous materials aboard, location of the cargo, and information listed in paragraph **6.30.4.3.3.**.

6.30.4.10. After Unscheduled Landing. Contact the TACC by telephone, HF radio, or message, giving arrival notice, hazardous materials information, and other pertinent information, as required.

6.31. Handling of Classified Cargo, Registered Mail, NMCS/VVIP/FSS Shipments, and Courier Material.

6.31.1. Receipts will be obtained for classified cargo, NMCS/VVIP/FSS shipments, and registered mail at the on-load and off-load station using the cargo manifest.

6.31.1.1. Defense Courier Service (DCS) couriers coordinating with the aircraft commander are authorized to designate officer or enlisted, (E-5 and above) crew members on military aircraft as couriers to escort and safeguard courier material when other qualified personnel are not available. Qualified passengers, if carried, are designated prior to designating crew members. The following restrictions apply:

6.31.1.1.1. Primary crew members will not be designated without the consent of the aircraft commander.

6.31.1.1.2. Crew members on aircraft scheduled to stop at locations where DCS couriers cannot provide en route support will not be designated as couriers. This does not relieve the aircraft commander of the responsibility for life and death urgent shipments.

6.31.2. During stops at en route locations supported by DCS stations, DCS couriers are required to meet designated couriers to protect the material.

6.31.2.1. During unscheduled stops, crew members may place courier material in temporary custody of the following agencies listed in descending order of priority:

6.31.2.1.1. DCS courier

6.31.2.1.2. TOP SECRET control officer of the US armed forces

6.31.2.1.3. US Department of State diplomatic courier

6.31.2.1.4. US Department of State activity

6.31.2.1.5. US military guards

6.31.2.1.6. US DOD civilian guards

6.31.3. If unable to follow the itinerary to the destination of the courier material, or if material is lost, stolen, or otherwise compromised, report circumstances to the nearest armed forces courier station and notify the local US military commander or US government activity.

Section 6D—Departure

6.32. On Time Takeoffs. Mission departures are on time if the aircraft is airborne within -20/+14 minutes of scheduled takeoff time.

6.32.1. A/R and Tactical Missions. Scheduled takeoff time may be adjusted to make good an ARCT, TOT or TOA. Notify controlling agency prior to takeoff to adjust the scheduled takeoff time.

6.32.2. Early Departures:

6.32.2.1. Home Station. Early departures are authorized to prevent a delay due to weather, ATC restrictions, airfield or aircraft operational limitations, to adjust mission flow during a large scale operation, or if approved through C2.

6.32.2.2. En Route Stations. Early departures at en route stations may be authorized through C2, provided the impact on local and downrange facilities and crew duty is evaluated.

6.33. Weather Minimums For Takeoff.

Mission	Visibility	Remarks
Operational	RVR 1000	When less than RVR 1600, but equal to or greater than RVR 1000, the crew may take off provided the runway has dual RVR readouts and displays (minimum RVR 1000 on both) and runway centerline lighting is operational. For any takeoff below 1600 RVR, the crew must be fully qualified.
All others	RVR 1600	For runways with more than one operating RVR readout, RVR must read 1600 minimum on all.

NOTE 1: When weather is below approach and landing minimums (ceiling or visibility) a takeoff alternate is required (See paragraph **6.20.**).

NOTE 2: If no RVR readout is available for the departure runway, visibility must be reported to be 1/2 mile (800 meters).

Section 6E—En route

6.34. Flight Progress.

6.34.1. Prior to flight, plot the oceanic portion of the flight on an appropriate chart. Annotate the chart with the mission number, preparer's name, and date. If practical, chart may be reused.

6.34.2. Anytime waypoint data is inserted into the INS/FMS, it will be verified by another pilot or navigator. Check both the coordinate information and the distances between waypoints against the flight plan.

6.34.3. In-Flight, use all available navigational aids to monitor INS performance. Immediately report malfunctions or any loss of navigation capability which degrades centerline accuracy to the controlling ARTCC. Use the following procedures for flight progress:

6.34.3.1. Obtain a coast out fix prior to, or immediately on entering the Category I Route or over-water segment.

6.34.3.2. Perform a gross error check using available NAVAIDS and annotate the position and time on the chart.

6.34.3.3. When approaching each waypoint, recheck coordinates for the next waypoint

6.34.3.4. Approximately 10-minutes after passing each oceanic waypoint, record and plot the aircraft position and time on the chart, and ensure compliance with courses and ETA tolerances.

6.34.3.5. If a revised clearance is received, record and plot the new route of flight on the chart.

6.34.4. Upon return to home station, turn in the charts (copies if reused) and applicable computer flight plans to the squadron. Squadrons will retain the charts, CFPs, and associated materials for a minimum of 3 months.

6.34.5. Operations in International/Territorial Airspace (See FLIP, FCG, AP, and MDS series instruction for further guidance). US military aircraft and DoD personnel entering another nation to conduct US government business therein must have the approval of the foreign government concerned to enter their airspace. Foreign clearances for US international air operations are obtained through US officials known as Defense Attaché Officers (DAOs). Refer to FLIP GP for discussion of international strait passage, archipelagic sea lane passage, procedures to follow if intercepted, and other foreign sovereignty issues.

6.34.5.1. There are essentially two types of airspace: international airspace and territorial airspace. International airspace includes all airspace seaward of coastal states' territorial seas. Military aircraft operate in such areas free of interference or control by the coastal state. Territorial airspace includes airspace above territorial seas, archipelagic waters, inland waters, and land territory and is sovereign airspace. Overflight may be conducted in such areas only with the consent of the sovereign country.

6.34.5.2. Consistent with international law, the US recognizes sea claims up to 12 nautical miles. Diplomatic constraints and/or a lack of diplomatic clearances usually result in missions operating in international airspace. Because of this, it is imperative sufficient information be provided far enough in advance to allow compliance with FCG requirements established by the countries concerned. The US does not normally recognize territorial claims beyond 12 nautical miles; however, specific guidance from certain US authorities may

6.34.5.3. Flight Information Region (FIR). An FIR is defined as an area of airspace within which flight information and related services are provided. An FIR does not reflect international borders or sovereign airspace. Aircraft may operate within an established FIR without approval of the adjacent country, provided the aircraft commander avoids flight in sovereign airspace.

6.34.5.4. Aircrews on a flight plan route which takes them from international airspace into territorial airspace for which approved aircraft clearances were obtained should not amend entry point(s).

6.34.5.5. Violations of foreign sovereignty result from unauthorized or improper entry or departure of aircraft. Aircrews should not enter into territorial airspace for which a clearance has not been duly requested and granted through diplomatic channels.

6.34.5.6. Air traffic control agencies are not vested with authority to grant diplomatic clearances for penetration of sovereign airspace where prior clearance is required from the respective country. Aircraft clearances are obtained through diplomatic channels only.

6.34.5.7. In the event air traffic control agencies challenge the validity of a flight routing or attempt to negate existing clearances, pilots must evaluate the circumstances. The normal response will be to attempt to advise the air traffic control agency that the aircraft will continue to planned destination as cleared in international airspace. The key phrase is "in international air-

space." Safety of flight is paramount in determining mission continuation. Under no circumstances should aircrews construe a clearance which routes their mission over sovereign airspace which was not approved through diplomatic channels prior to mission departure, as being valid authorization.

6.34.5.8. Aircrews operating missions requiring unique or specially developed routing will normally be briefed at home station, onload station, and/or by the last C2 facility transited prior to performing the critical portion of the mission.

6.34.5.9. Aircrews (except on weather reconnaissance missions) normally are not tasked to and should not fly "due regard" routing unless specifically directed in the mission FRAG or coordinated with proper authorities through TACC or AMOCC. The "due regard" or "operational" option obligates the military aircraft commander to be their own air traffic control agency and separate their aircraft from all other air traffic. If operational requirements dictate, ACs may exercise the "due regard" option to protect their aircraft. When the threat has terminated, the aircraft will return to normal Air Traffic Services. Refer to FLIP GP for guidance on due regard.

6.34.6. Altitude Reservations. Aircraft commanders will ensure ALTRV approval is received prior to mission execution. Aircrews needing to check the status of their ALTRV may contact TACC/XOC (24-hours) or XOPSA (normal duty hours).

6.34.6.1. ALTRVs usually include a 1-hour AVANA (ALTRV Approval Void if Aircraft Not Airborne) to account for delays. If a mission delays more than 1-hour, coordination with the appropriate central altitude reservation facility will be required. It may be possible to extend the AVANA time. If not, a new ALTRV will be required. Begin coordination as soon as the delay is known.

6.34.6.2. Requests for ALTRVs do not eliminate the responsibility to obtain diplomatic clearance or file flight plans. The complete route of flight must be included in DD Form 1801, **DoD International Flight Plan**, DD Form 175**, Military Flight Plan**, or other equivalent host nation flight plan.

6.35. Navigational Aid Capability.

6.35.1. North Atlantic Minimum Navigation Performance Specification (MNPS) airspace and PACOTS, NOPAC, and Hawaiian Track procedures are as follows:

6.35.1.1. Minimum navigation performance specifications standards (FLIP AP/2) are mandatory in North Atlantic MNPS airspace.

6.35.1.2. Aircraft that lose an INS prior to oceanic airspace entry will return to the nearest maintenance repair facility.

6.35.1.3. Inoperative Inertial Navigation Units:

6.35.1.3.1. One unit inoperative:

6.35.1.3.1.1. Advise ARTCC unless within range of normal radio aids.

6.35.1.3.1.2. Plot position on navigation chart every 30 minutes.

6.35.1.3.1.3. Check the accuracy of remaining INS, using all available ground navigation aids (radio bearings from

6.35.1.3.1.4. NDBs, broadcast stations, VOR/DME, consolan, and radar).

6.35.1.3.2. Two units inoperative:

6.35.1.3.2.1. Advise ARTCC.

6.35.1.3.2.2. Monitor compass heading.

6.35.1.3.2.3. Check last recorded position on navigation chart.

6.35.1.3.2.4. Use computer flight plan as guide.

NOTE: If flight plan has been in error prior to failure, request re-analysis from TACC.

6.35.1.3.2.5. Use ADF, VOR/DME, and radar to update the DR positions.

6.35.1.3.2.6. If desired and other methods fail, try to obtain an HF DF fix. This service can be requested through the regular ARTCC frequencies.

6.35.1.4. Differences between INS

6.35.1.4.1. 10-20 NM.

6.35.1.4.1.1. Plot both positions every 30 minutes.

6.35.1.4.1.2. Check groundspeed (this may be a good indication of a faulty INS).

6.35.1.4.1.3. Monitor, check position using available ground aids.

6.35.1.4.1.4. Use computer flight plan as guide.

6.35.1.4.1.5. Attempt to establish which INS is most accurate. If unable to determine which unit is in error, split the difference.

6.35.1.4.2. 20-40 NM.

6.35.1.4.2.1. Plot both positions every 30 minutes.

6.35.1.4.2.2. Check position using available ground aids.

6.35.1.4.2.3. Check groundspeed (this may be a good indication of a faulty INS).

6.35.1.4.2.4. Use computer flight plan as guide.

6.35.1.4.2.5. Attempt to establish which INS is most accurate. If unable to determine which set is in error, split the difference.

6.35.1.4.3. Over 40 NM.

6.35.1.4.3.1. If divergence has been gradual, it should have been determined which INS is accurate; follow one unit inoperative procedures.

NOTE: If divergence has been sudden, check groundspeed function, as abnormal readouts would indicate a faulty INS.

6.35.1.4.3.2. Determine which INS is correct by checking available ground navigation aids and heading with CFP.

6.35.1.4.3.3. If the computer flight plan has been in error prior to detecting divergence, update the flight plan using data found.

6.35.1.4.3.4. If unable to determine which INS unit is in error, follow two units inoperative procedure.

6.35.2. Reduced Vertical Separation Minimum (RVSM) Airspace. Airspace where RVSM is applied is considered special qualification airspace. Both the operator and the specific aircraft type must be approved for operations in these areas. The C-141 is approved for unrestricted use in the full RVSM envelope. Refer to FLIP AP/2 and the following for RVSM requirements:

6.35.2.1. Both primary altimeters, at least one autopilot (pitch axis), the altitude advisory system, and the transponder must be fully operational prior to entry into RVSM airspace. Should any of this equipment fail prior to entering RVSM airspace, request a new clearance so as to avoid this airspace.

6.35.2.2. The autopilot should be engaged during level cruise, except when circumstances such as the need to re-trim the aircraft or turbulence require disengagement.

6.35.2.3. Crosscheck the altimeters prior to or immediately upon coast out. Record readings of both altimeters and retain for use in contingency situations.

6.35.2.4. Continuously crosscheck the primary altimeters to ensure they agree ± 200 ft.

6.35.2.5. Aircrews should limit climb and descent rates to 1,000 feet per minute when operating in the vicinity of other aircraft to reduce potential effects on TCAS operations.

6.35.2.6. Should any of the required equipment fail after entry into RVSM airspace, immediately notify ATC and coordinate a plan of action. Both primary altimeters, autopilot (pitch axis), FSAS, the altitude alert system, and the transponder with SCADC switch capability must be fully operational prior to entry into RVSM airspace.

6.35.2.7. Document (in the aircraft forms) malfunctions or failures of RVSM required equipment, including the failure of this equipment to meet RVSM tolerances.

6.35.3. Required Navigation Performance (RNP) Airspace. Airspace where RNP is applied is considered special qualification airspace. Both the operator and the specific aircraft type must be approved for operations in these areas. RNP airspace is being incorporated around the world to increase air traffic capacity by decreasing separation requirements between routes. The C-141 is approved for RNP, but limited to operational time restrictions based on navigation equipment.

6.35.3.1. RNP-10. Compliance includes navigation accuracy within 10NM of actual position 95% of the time. Aircraft not possessing integrated GPS with receiver autonomous integrity monitoring (RAIM), or equivalent system, are limited in how long they may operate in RNP-10 airspace. The C-141 may operate up to 6.2-hours (after entering NAV mode) of flight in RNP-10 airspace without update. If an automatic update (TACAN mix) is made, the aircraft may continue for an additional 5.7-hours after update is complete. The following are RNP-10 requirements:

6.35.3.1.1. To increase the 6.2-hour baseline, data collection on long overwater legs must be accomplished and submitted to HQ AMC/XPY for certification.

6.35.3.1.2. Until C-141s receive integrated GPS or extend their baseline, NOPAC will require TACAN updates to be RNP-10 compliant. Shemya TACAN must be operational. When abeam Shemya a position crosscheck will be made. If inertial position is more than 3 NM from TACAN fix position, a TACAN mix must be accomplished on all inertial units exceeding this limit.

6.35.3.1.3. Flight Planning. The pilot in command will verify the aircraft is approved for RNP operation, assess mission impact when flying in RNP-10 airspace, and verify the letter "R" is annotated in block 10 of the DD Form 1801, **International Flight Plan**.

6.35.3.1.4. En route. At least two long range navigation systems certified for RNP-10 must be operational at the oceanic entry point. Periodic crosschecks will be accomplished to identify navigation errors and prevent inadvertent deviation from ATC cleared routes. Advise ATC of the deterioration or failure of navigation equipment below navigation performance requirements and coordinate appropriate actions.

6.35.3.1.5. Document (in the aircraft forms) malfunctions or failures of RNP required equipment, including the failure of this equipment to meet RNP tolerances.

6.35.4. Basic Area Navigation (BRNAV) Airspace. Airspace where BRNAV is applied is considered special qualification airspace. Both the operator and the specific aircraft type must be approved for operations in these areas. BRNAV navigation accuracy criteria is RNP-5. The C-141 is approved for BRNAV operations. Aircraft with integrated GPS have no BRNAV restrictions. Without GPS, aircraft must auto update every two hours (as required) to maintain actual centerline within +/- 5 NM of ATC cleared route.

6.35.4.1. Minimum equipment to operate in BRNAV airspace is one INS capable of updates or an FAA approved GPS with RAIM or equivalent system. Flights entering BRNAV airspace after long overwater flight must be especially aware of BRNAV tolerances and update accordingly.

6.35.4.2. Aircraft unable to maintain BRNAV tolerances must advise ATC immediately and take appropriate coordinated action.

6.35.4.3. Document (in the aircraft forms) malfunctions or failures of BRNAV required equipment, including the failure of this equipment to meet BRNAV tolerances.

6.36. CIRVIS and Other Reports. Report all vital intelligence sightings from aircraft as indicated in FLIP planning or FLIP En route Supplement.

6.36.1. In-flight harassment or hostile action against USAF C-141 aircraft. Aircraft subjected to harassment or hostile action by foreign aircraft will immediately contact the nearest US Air Force air and ground voice facility and report the encounter. Include aircraft nationality, type, insignia, or any other identifying features; note position, heading, time, speed when harassed, and the type of harassment. Request relay of the report to the nearest C2. Also attempt to contact the nearest command post when in UHF and VHF range.

6.36.2. Other incidents will be reported as indicated in JCS Pub 6, volume V and AFM 10-206, *Operational Reporting.*

6.37. In-Flight Meals. The pilot and the co-pilot should not eat meals at the same time and their meals should consist of different menu items.

6.38. Communications.

6.38.1. HF Communications. Confine message traffic to essential operational matters. Perform an HF radio ground check prior to takeoff when the use of HF radio may be required for ATC or C2 communications. Establish HF contact before going out of UHF and VHF range.

6.38.2. General. Provide ARTCC position and weather observations when required. If unable to contact an ATC agency, attempt relay through the GLOBAL HF stations.

6.38.3. OCA/FIR Boundary. For most OCA/FIR areas, address the last position report prior to crossing an OCA/FIR boundary to the control area departed and the control area entered. In some cases, reports are required only when crossing the OCA/FIR boundary (see FLIP).

6.38.4. AF Form 72, **Air Report (AIREP*)***. When directed by departing weather facility, take and record an AIREP at each position report over a Category I Route. Identify inaccurate CFP winds by special report if the average wind for a route segment exceeds either 30 degrees error in wind direction or 25 knots in wind speed. Turn in completed AF Form 72 to the destination USAF weather facility.

6.39. In-Flight Emergency Procedures. Report deviations from directives that may occur as a result of an emergency in accordance with AFI 11-202, Volume 3 and this AFI (see paragraph **1.4.**).

6.39.1. Notification of Controlling Agencies. When practical after completing the aircraft emergency action checklists and associated actions, crews should furnish the controlling agency and appropriate C2 a description of the difficulty, assistance required, intentions, and any other pertinent information.

6.39.2. A CONFERENCE SKYHOOK may be initiated when additional expertise is necessary to cope with emergencies or other conditions. Communications procedures are as follow:

6.39.2.1. Local Area. When in UHF or VHF range, initiate the conference over appropriate frequencies.

6.39.2.2. En route. When out of UHF range, use HF radios to establish a phone patch with the nearest or controlling C2 center as appropriate.

6.39.2.3. Provide the following information when time permits.

6.39.2.3.1. Narrative description of the situation to include actions taken by the crew and the intentions of the aircraft commander.

6.39.2.3.2. What assistance is being requested.

6.39.2.3.3. Fuel on board and hours of endurance.

6.39.2.3.4. Position.

6.39.2.3.5. Altitude and flight conditions.

6.39.2.3.6. Number of personnel and distinguished visitors (DV) on board.

6.39.2.3.7. Qualification of aircraft commander.

6.39.2.3.8. Planned landing base.

6.39.2.3.9. ETA at landing base.

NOTE: Comply with recommended procedures for any emergency phase as outlined in the FLIP Information Handbook.

6.39.3. Turn Around Procedures. Comply with procedures in FLIP. If not specified, maintain VFR, reverse course, climb or descend to a VFR altitude or flight level, and request ATC clearance. If unable to maintain VFR, obtain an ATC clearance before reversing course. A turn around under IFR conditions, without ATC approval, will be made only after a thorough evaluation of the seriousness of

the emergency, general traffic density, and known traffic operating in the immediate area. Normally, a climb or descent (with minimum change in altitude) to a VFR altitude or flight level would result in minimal exposure to other aircraft if a turn around is required.

6.39.4. Termination of Emergency Phases. Notify the appropriate agencies when no further assistance is required.

6.40. Need for Medical Assistance. When a person aboard the aircraft requires medical care, inform the station of intended landing in sufficient time so the aircraft may be met by medical personnel. Include the sex, approximate age, and the major complaint in the request.

6.41. Weather Forecasts.

6.41.1. It is the pilot's responsibility to obtain destination weather prior to descent.

6.41.2. The primary means is any US Air Force base weather station via Pilot-to-Meteorologist Service (PMSV) or through a US Air Force aeronautical station. Check on the latest weather prior to descent or landing.

6.41.3. For aircraft flying in EUCOM AOR (ENAME operations) contact USAFE/OWS at Sembach AB GE (DSN 314-496-6145). SOUTHCOM AOR contact 25 OWS at Davis-Monthan AFB, AZ (DSN 228-1977).

6.41.4. The ATC system can provide weather information to en route aircraft.

6.41.4.1. ARTCC have a limited capability to provide weather information to en route aircraft within CONUS.

6.41.4.2. Significant Meteorological Information (SIGMET) advisories will be transmitted from the servicing ATC unit. Crews will consider all SIGMETs valid for their aircraft until verified as not applicable with a military METRO service.

Section 6F—Arrival

6.42. Descent. Prior to descent into unfamiliar areas, appropriate terrain charts (Operational Navigation Chart (ONC), Sectional Aeronautical Chart, Tactical Pilotage Chart (TPC), or Joint Operations Graphic (JOG)) should be reviewed to increase aircrew situational awareness of obstructions. Primary crew members will not be involved in duties other than aircraft operations, descent and approach monitoring, and required checklist items from the initial descent point to landing. This requirement applies to all ground operations involving taxi, takeoff, and landing, and all other flight operations conducted below 10,000 feet, except cruise flight.

6.42.1. No flight crew member may engage in, nor may any pilot in command permit, any activity from start of descent to landing which may distract any flight crew member from the performance of their duties. This includes nonessential conversations and reading of publications not related to proper conduct of the flight which are not required for safe operation of the aircraft.

6.42.2. Attempt to accomplish descent/arrival briefings prior to entering the terminal area. The following altitudes will be included as required descent/arrival briefing items; MEA, MSA, IAF, FAF, and the VDP (if available).

6.42.3. Night and Marginal Weather Operations. Fly a precision approach, if available, at night or during marginal weather. If a precision approach is not available, fly any available approved instrument approach. During night VFR conditions, if an approved instrument approach is not available, a visual approach may be flown (only if a visual glide slope indicator (VASI, PAPI, etc.) is available). On training and evaluation flights at familiar fields, pilots may fly non-precision approaches or VFR traffic patterns to accomplish required training and evaluations. The pilot not flying the approach will monitor a precision approach when practical to enhance safety.

6.43. Instrument Approach Procedures.

6.43.1. Minimums. The C-141B is a Category D aircraft. Instrument approach visibility and, if required, ceiling minimums, will be as published. ***EXCEPTION***: Category E for no flap approaches if Vapp greater than or equal to 165 TAS.

6.43.1.1. Circling Approach. Minimum Descent Altitude (MDA) will be as published for the circling approach. If the minimums are not published by category, the minimum altitude will be as published, but in no case lower than 600 feet plus the published airport elevation and two miles visibility.

6.43.1.2. Threshold Crossing Height (TCH). TCH will be no lower than 50 feet or as published for precision approaches.

6.43.2. Prior to starting an instrument approach or beginning an en route descent, pilots will confirm that existing weather is reported to be at or above required minimums for the lowest compatible approach. Pilots shall increase the published visibility minimums of an instrument approach by ½ SM or as noted in NOTAMs, on ATIS, or on the approach plate, when the runway approach lighting system (ALS) is inoperative.

NOTE: This applies only to the ALS itself, not to VASIs, PAPIs, and other lights that are not a component of the ALS.

6.43.2.1. For a precision approach, the decision height will provide a height above touchdown of 200 ft or higher. For Category (CAT) II ILS approaches, use the lowest published radar altitude. Do not fly CAT II approaches with out published RA setting. For PAR approaches, visibility will be no lower than RVR 2400 (730 meters) or 1/2 mile visibility (800 meters) with no RVR readout available.

6.43.3. Established on a Segment of the Approach. If established on a segment of the approach or being radar vectored to final approach and the weather is reported or observed to be below approach minimums, the aircraft commander has the option of continuing the approach to the MAP/DH. If deciding to abandon the approach, level off (or descend if a lower altitude is required for the missed approach procedure). Comply with the last assigned clearance until a new or amended clearance is received.

6.43.3.1. Do not continue the approach below minimums unless the aircraft is in a position to make a safe landing and the runway environment is in sight. CAT II approaches will not be continued if weather is reported below CAT II minimums.

6.43.3.2. If the approach is continued, aircraft commanders must plan to have sufficient fuel available to complete the approach and missed approach and proceed to a suitable alternate with

normal fuel reserve. A minimum of 4000 pounds is required to descend below 10,000 feet to shoot the approach and missed approach and climb back to 10,000 feet.

6.43.3.3. The aircraft commander has final responsibility for determining when the destination is below designated minimums and for initiating proper clearance request.

6.43.4. CAT II Procedures. Maximum crosswind limitation is 10 knots or as authorized by performance manual limitations, whichever is lower. Crosswind of 15 knots may be used for training approaches (under VMC).

6.43.4.1. The following airfield and aircraft equipment must be operational (AFMAN 11-230, *Instrument Procedures* and AFI 11-202, Volume 3).

6.43.4.1.1. Approach lights.

6.43.4.1.2. Runway centerline lighting.

6.43.4.1.3. High intensity runway lights or touchdown zone lights.

6.43.4.1.4. Approach end transmissometer.

6.43.4.1.5. Minimum RVR of 1200.

6.43.4.1.6. HAT of 100 feet minimum.

6.43.4.1.7. Sequence flashers.

6.43.4.2. Aircrews will not execute an actual CAT II ILS to minimums unless both pilots have been through training, received an evaluation, been certified by the squadron commander, and are current in CAT II ILS. The aircraft commander must have logged at least 100-hours in command since the aircraft commander certification in the C-141. Do not fly Category II ILS approaches that have no RA setting for decision height.

6.43.5. Alternate Flight Publications. The following publications are authorized if acceptable DoD FLIP products are not available:

6.43.5.1. United States Department of Commerce National Oceanic and Atmospheric Administration (NOAA).

6.43.5.2. Jeppesen and Host Government Instrument Approaches. May be used if MAJCOM when approved according to AFI 11-202, Volume 3. Crews will contact the controlling agency to confirm MAJCOM approval prior to flying these approaches. If not MAJCOM approved, these approaches will not be used in IMC. They may however, be used as a backup for visual approaches in VMC only.

6.44. Classified Equipment and Material.

6.44.1. Equipment. When classified equipment is onboard, ensure the C2 or base operations office is aware of the requirement for aircraft security according to **Chapter 7**. At bases not under jurisdiction of the Air Force, ensure the aircraft and equipment are protected. AFI 31-401, *Managing the Information Security Program*, provides specific guidance concerning the security of various levels of classified equipment aboard aircraft.

6.44.1.1. IFF/SIF mode 1, 2, and 3/A codes, having once been set and transmitted, are unclassified and, therefore, may be left set in the transponder.

6.44.1.2. IFF/SIF mode 4 codes must always be zeroed before leaving the aircraft.

6.44.2. Material. Ensure Communications Security (COMSEC) and other classified materials are turned in at destination and receipts are obtained for COMSEC and classified material. The On-site C2 center will provide temporary storage for COMSEC and other classified materials during en route, turnaround, and crew rest stops. If a storage facility is not available, the aircraft gun storage box may be used for material classified up to and including SECRET. Encrypted COMSEC will only be transferred to authorized DoD personnel.

6.44.3. Aircrews will ensure that they have an operable mode 4 when required for mission accomplishment. Aircrews will conduct an operational ground test of the mode 4 (ground test assets permitting) prior to deployment overseas, or as specified in the OPORD or contingency/exercise tasking.

6.44.4. Attempt to fix an inoperable mode 4 prior to takeoff. Do not delay takeoff nor cancel a mission for an inoperable mode 4, except when the aircraft will transit an area where safe passage procedures are implemented (see **Chapter 4**).

6.44.5. Conduct an in-flight check of the mode 4 on all missions departing the CONUS for overseas locations. Aircrews can request the mode 4 interrogation check through NORAD on UHF frequency 364.2. Request an interrogation test through the appropriate Sector Operations Control Center (SOCC) as follows:

CONUS Sector	Location	Call Sign
Northeast	Griffiss Airport	Huntress
Southeast	Tyndall AFB	Oak Grove
Southwest	March AFB	Sierra Pete
Northwest	McChord AFB	Big Foot

6.44.6. Aircraft with inoperable mode 4 will continue to their intended destinations. Repairs will be accomplished at the first destination where equipment, parts, and maintenance technicians are available. In theaters where safe passage is implemented, aircraft will follow procedures for inoperable mode 4 as directed in the applicable airspace control order or ATO.

6.44.7. Ground and in-flight checks of the mode 4, when conducted, are a mandatory maintenance debrief items. Crews will annotate successful and unsuccessful interrogation of the mode 4 on all aircraft forms (AFTO Form 781A).

6.44.8. Aircrews will carry COMSEC equipment and documents required to operate the mode 4 on missions when required per paragraph **6.44.3.**. Prior to departing for any destination without COMSEC storage facilities, crews will contact their local COMSEC managers for guidance.

6.45. Unscheduled Landings. When an unscheduled landing or crew rest occurs at a base without a passenger facility, the aircraft commander should immediately advise the appropriate C2 and request assistance in arranging substitute airlift for passengers that are aboard. The following procedures apply when obtaining support for service members, in a group travel status, who are transported on AMC directed missions flying a Transportation Working Capital Fund (TWCF) mission which incur an unscheduled delay due to weather or maintenance problems, forcing the members to be lodged at that location until the aircraft can continue its mission.

6.45.1. If the delay is at a location where DoD facilities and AMC TWCF funds are available, payment for lodging (contract or on-base) will be made by the local accounting liaison/OPLOC citing TWCF funds. The appropriate TWCF fund cite may be obtained from the local financial analysis and/or accounting liaison office. Normally, a BPA contract or AF Form 616, **Fund Cite Authorization**, is already established at these locations to charge the routine lodging costs for transient or TDY individuals who are on TWCF funded travel orders.

6.45.2. If the delay is at a location where DoD facilities are available and AMC TWCF funds are not available, the aircraft commander will utilize AF Form 15, **United States Air Force Invoice**, authority to acquire the appropriate lodging accommodations. Upon return to home station, the aircraft commander will turn in the AF Form 15 to the local accounting liaison office. A copy of the service members' group travel orders along with any other pertinent supporting data must accompany the form (e.g., lodging invoice and/or receipts). When the AF Form 15 has been validated, it will be forwarded on to the servicing OPLOC for payment, citing the funds of the unit whose aircraft was delayed.

6.45.3. If the delay is at a location where both DoD facilities and TWCF funds are unavailable, the aircraft commander will utilize AF Form 15 authority to acquire the appropriate meals, quarters, and transportation to support the service members. Upon return to home station, the aircraft commander will turn in the AF Form 15 to the local accounting liaison office. A copy of the service members' group travel orders along with any other pertinent supporting data must accompany the form (e.g., lodging invoice and/or receipts). When the AF Form 15 has been validated, it will be forwarded on to the servicing OPLOC for payment, citing the funds of the unit whose aircraft was delayed.

NOTE: This policy does not apply to those passengers on delayed TWCF organic aircraft who are in a per diem or space available status except for those duty passengers on TWCF funded travel orders delayed at locations where TWCF funds are available.

6.46. Maintenance. Complete the AFTO Form 781 after each flight. After landing, crew members debrief maintenance personnel on the condition of the aircraft, engines, avionics equipment, and all installed special equipment as required. At stations where there is no maintenance, and maintenance support is required, the aircraft commander will ensure that a thorough maintenance debrief is provided to the controlling C2 and the MAJCOM Logistics Readiness Center (AMC/LGRC, DSN 575-1763) or MAJCOM equivalent is notified before entering crew rest.

6.47. Border Clearance.

6.47.1. Normal Operations:

6.47.1.1. The unit dispatching the mission is normally responsible for the border clearance of its aircraft.

6.47.1.2. When staff support is not available, border clearance is the responsibility of the aircraft commander. Duties may be assigned to ground personnel or to the loadmaster, but the aircraft commander retains ultimate responsibility. When a C-141 aircraft is on-loaded at a base without an aerial port (or equivalent) function, the aircraft commander is responsible for ensuring the following:

6.47.1.2.1. Crew members, troops, and passengers possess current passports and valid visas, when required.

6.47.1.2.2. Crew members, troops, and passengers have current certificates of immunization (shot record).

6.47.1.2.3. Cargo entry documents are in proper order.

6.47.1.2.4. Departing or entering the United States through a location where border clearance can be obtained.

6.47.1.2.5. Obtaining border clearance for aircraft cargo, passengers, crew and baggage, if required, before takeoff to a foreign area or after arrival from a foreign area.

6.47.1.2.6. Spraying the aircraft (see Foreign Clearance Guide and paragraph **6.48.** of this chapter).

6.47.1.3. When arriving at stations located in foreign countries, comply with the following guidance:

6.47.1.3.1. Unless otherwise stated in the FCG, DO NOT open any doors other than the primary entrance to the aircraft (i.e. crew entrance door).

6.47.1.3.2. Do not offload passengers, troops, or crewmembers unless necessary for safety or the preservation of life and property(scanner or other crewmember with ground safety duties excepted).

6.47.1.3.3. Do not offload any cargo, mail, or bags until approved by the appropriate local authorities.

6.47.1.3.4. Be courteous with local officials

6.47.2. Procedures for US Entry:

6.47.2.1. En route, the loadmaster will distribute personal customs declarations (when not accomplished by passenger services) to all passengers, troops, and crew members. The loadmaster will also brief passengers and crew members on customs regulations, and prepare and compile necessary border clearance forms for the aircraft commander's signature.

6.47.2.2. En route, notify the C2 agency at the base of intended landing of any change in ETA to ensure that border clearance is accomplished as soon as possible after landing.

6.47.2.3. Obtain a permit to proceed when military necessities require that an aircraft which has landed in the United States for customs clearance proceed to another base in the US to obtain border clearance. The permit to proceed delays customs inspection of cargo until arrival at the off-load station and saves intermediate off-loading and reloading normally required for customs inspection. The permit to proceed is valid only to the airport of next landing where the border clearance must be completed or a new permit to proceed issued by a customs official. Do not make intermediate stops between the issue point of the permit to proceed and destination of manifested cargo unless required by an emergency situation or directed by the controlling C2.

6.47.2.4. When an aircraft lands for a US border clearance, a US Customs representative normally will meet the aircraft to obtain the required documents. Do not deplane passengers, troops, or crew members unless necessary for safety or the preservation of life and property (scanner exempted). Do not unload until approved by customs and agriculture personnel or their designated representatives. This procedure applies to the initial landing in the US and all landings

required when operating on a permit to proceed or until all crew, passengers, and cargo complete final border clearance.

6.47.3. Inspections of US aircraft by foreign officials:

6.47.3.1. The MAF follows US Air Force policy on status of military aircraft as stated in the FCG, **General Information**, **Chapter 3**. In substance, this policy holds that US military aircraft are immune from searches, seizures, and inspections (including customs and safety inspections) by foreign officials. In addition, aircraft commanders must be aware of and adhere to any specific Foreign Clearance Guide provisions for individual countries.

6.47.3.2. If confronted with a search request by foreign authorities, aircrews should use the following procedures:

6.47.3.2.1. In most cases, search attempts may be halted simply by a statement of the aircraft commander to the foreign official that the aircraft is a sovereign instrumentality not subject to search without consent of US Air Force headquarters or the US Department of State officials in the country concerned. This should be clearly conveyed in a polite manner so as not to offend foreign authorities who may honestly, but mistakenly, believe they have authority to search US Air Force aircraft.

6.47.3.2.2. If foreign authorities insist on conducting a search, the aircraft commander should make every effort to delay the search until he or she can contact US Air Force headquarters (through AMC C2 if AMC directed mission or otherwise respective MAJCOM C2 agency) or the appropriate embassy officials. The aircraft commander should then notify these agencies of foreign request by the most expeditious means available and follow their instructions.

6.47.3.2.3. If foreign officials refuse to desist in their search request, pending notification to US Air Force headquarters or the appropriate embassy, the aircraft commander should indicate that he or she would prefer to fly the aircraft elsewhere (provided fuel, flying time, and mechanical considerations permit a safe flight) and request permission to do so.

6.47.3.2.4. If permission is refused and the foreign authorities insist on forcing their way on board an aircraft, the aircraft commander should state that he/she protests the course of action being pursued and that he intends to notify both US Air Force headquarters and the appropriate American embassy of the foreign action. The aircraft commander should not attempt physical resistance, and should thereafter report the incident to US Air Force headquarters and appropriate embassy as soon as possible. The aircraft commander should escort foreign authorities if the inspection cannot be avoided.

6.47.3.3. Other procedures may apply when carrying sensitive cargo or equipment. Follow these procedures and applicable portions of classified Foreign Clearance Guide supplements.

6.48. Insect and Pest Control.

6.48.1. Responsibility. Aircraft commanders will ensure required spraying is accomplished according to AFJI 48-104, *Medical and Agricultural Foreign and Domestic Quarantine Regulations for Vessels, Aircraft, and Other Transports of the Armed Forces (Joint)*, Department of Defense Foreign Clearance Guide, or as directed by higher headquarters. Certify the spraying on Customs Form (CF) 7507, or on forms provided by the country transited. Aircraft should never be sprayed with passengers on-board. The only exception is when the Foreign Clearance Guide mandates it.

6.48.1.1. When spraying is required, use insecticide, aerosol d-phenothrin-2 percent, National Stock Number (NSN) 6840-01-067-6674 (or equivalent), to spray the aircraft.

6.48.1.1.1. Direct the nozzle toward the ceiling of the compartment or space being sprayed.

6.48.1.1.2. Spray spaces inaccessible from within the aircraft after completely loading fuel, baggage, cargo, and passengers, including baggage compartments, wheel wells, and other similar spaces.

6.48.1.1.3. Spray the cabin, cockpit, and other spaces accessible from within the aircraft after the crew is aboard and after closing all doors, windows, hatches, and ventilation openings.

CAUTION: If the insecticide label directs disembarkation after use, spray prior to boarding crew or passengers. Close all doors and hatches for 10 minutes after dispensing and ventilate for 15 minutes before allowing anyone on board.

6.48.1.2. Spray for 3 minutes and 20 seconds unless longer periods are specified for the country being transited.

NOTE: Keep used aerosol cans separate from other trash so they may be disposed of safely.

6.48.2. Responsibility of Aircraft Commander in-flight. When seeing any insect or rodent infestation of the aircraft in-flight, notify the destination C2, base operations, or airport manager of the situation before landing so the proper authorities can meet the aircraft.

6.48.3. Procedure at Aerial Port of Disembarkation (APOD). On arrival at an APOD, do not open cargo doors or hatches except to enplane officials required to inspect the aircraft for insect or rodent infestation or to deplane the minimum number of crew members required for block-in duties. Do not on-load or off-load cargo or passengers until the inspection is satisfactorily completed. This procedure may be altered to satisfy mission or local requirements, as arranged by the base air terminal manager or the local C2 organization.

Section 6G—Miscellaneous

6.49. Dropped Object Prevention. If an externally dropped object is discovered, the flight crew will:

6.49.1. Notify TACC or the controlling agency as soon as practical; include routing, altitude, weather, etc.

6.49.2. Notify maintenance at the first MAF station transited.

6.50. Cockpit Voice Recorder (CVR). If involved in a mishap or incident, after landing and terminating the emergency, open the CVR power circuit breaker.

6.51. Life Support and Dash 21 Equipment Documentation. The aircraft commander or designated representative will:

6.51.1. Prior to departing home station or en route stations, ensure appropriate serviceable protective clothing, life support, survival, and dash 21 equipment for the entire or remainder of the mission are aboard the aircraft.

6.51.2. Prior to departing home station and following en route crew changes, review AF Form 4076, **Aircraft Dash 21 Equipment Inventory**, to ensure all required dash 21 equipment has been certified

as installed by maintenance, the initial check has been signed by maintenance, and configuration documents match mission requirements.

6.51.3. Prior to departing home station and following en route crew changes, review, sign, and date the AFTO Form 46, **Pre-positioned Life Support Equipment**, to ensure all required protective clothing and life support and survival equipment have been certified as installed by aircrew life support and that configuration documents match mission requirements. Ensure appropriate number and type of life preservers are aboard for over-water missions carrying children and infants.

6.51.4. Missing Equipment. Aircrew members discovering equipment missing will accomplish the following:

6.51.4.1. Make an AFTO Form 781 entry for equipment found missing. Additionally, ensure equipment removed from the aircraft at an en route station is documented in the AFTO Form 781.

6.51.4.2. Annotate AF Form 4076 and AFTO Form 46 in the next vacant column indicating the quantity remaining for the item. Ensure the ICAO location designator is entered above the check number of that column. Leave AF Form 4076 and AFTO Form 46 on board the aircraft in the event of an en route crew change.

6.51.4.3. Advise the aircraft commander and determine whether the missing equipment should be recovered or replaced before mission continuation.

6.51.4.4. Assist, as required, in preparing reports of survey for missing equipment.

6.51.4.5. When possible, advise HQ AMC/DOTL and TACC (or airport management) before mission continuation.

6.51.5. Additional Equipment. If more equipment is discovered during the preflight than is annotated on the AF Form 4076 and AFTO Form 46, annotate the total quantity in the next vacant column for the item. Ensure the ICAO location designator is entered above the check number of that column.

6.52. Passenger Restrictions. Use personnel limitation chart in T.O. 1C-141B-5 to determine maximum number of passengers for a given flight time based on lavatory availability.

6.53. Not Used.

6.54. No Show Passenger Baggage. When advised by CCC, Passenger Service/ATOC representatives, no-show passenger baggage or baggage of passengers removed from flight will be downloaded prior to departure.

6.55. Arresting Cables (does not include recessed cables).

6.55.1. Do not land on approach end arresting cables. If the aircraft lands before the cable, the crew should contact the tower to have the cable inspected.

6.55.2. Do not takeoff or land over an approach end cable that has been reported as slack, loose, or improperly rigged by NOTAM, ATIS, or ATC.

6.55.3. Do not takeoff or land over raised web barriers (MA-1A or similar).

6.56. Airfield Data Reports. Aircrews transiting strange airfields or airfields where conditions may adversely affect subsequent flight will:

6.56.1. Report airfield characteristics that produce illusions, such as runway length, width, slope, and lighting, as compared to standard runways, sloping approach terrain, runway contrast against surrounding terrain, haze, glare, etc.

6.56.2. Debrief the next C2 transited.

6.57. Impoundment of Aircraft. If an aircraft is involved in a serious in-flight incident, the aircraft commander should impound the aircraft immediately after landing and contact the controlling C2 for further instructions.

6.58. Cockpit Congestion and Loose Objects.

6.58.1. The maximum number of persons on the flight deck will be the minimum commensurate with the mission requirements. At no time should this exceed nine during flight (MAJCOM supplement to this AFI may further limit access to the flight deck).

6.58.2. No items (checklists, charts, etc) will be placed on the pilot/co-pilot glare shield. Remove all non-essential professional gear from the flight station and strap down either in the loft or cargo compartment prior to flight.

6.58.3. Place only soft items on the top bunk.

6.59. Wake Turbulence Avoidance. Comply with wake turbulence avoidance criteria. Acceptance of a visual or contact approach clearance or instructions to follow an aircraft is acknowledgement that the pilot will maintain a safe interval for wake turbulence avoidance.

6.60. Ordnance Procedures. Conduct the following procedures after the live firing of flares:

6.60.1. After landing, taxi to de-arm area or suitable safe location to check for hung ordnance.

6.60.2. The loadmaster or another qualified crewmember will deplane the aircraft and check all dispensers for hung ordnance.

NOTE: ALE-40/47 or flare squibs that fail to fire are NOT considered hung ordnance.

6.60.3. If hung ordnance is found, identified by a protruding or partially ejected chaff/flare cartridge, the aircraft will remain in a de-arm area until Explosive Ordnance Disposal (EOD) personnel meet the aircraft. The aircraft must remain in the designated safe area until EOD personnel can clear all hung ordnance.

6.60.4. If hung ordnance is not found, the aircraft can proceed to the parking location.

6.61. Emergency Airdrop of 20-Man Life Raft.

6.61.1. General. This paragraph contains procedures for rigging and air dropping a 20-man lift raft to a down survivor at sea. It is an emergency procedure and will only be used in life or death situations.

6.61.2. Pilot/Navigator Procedures:

6.61.2.1. Surface wind will affect the life raft and target in varying amounts. The raft will drift faster than nearly all sea-going vessels (outboards, cabin cruisers, trawlers, and heavy displacement deep-draft vessels). The 20-man raft will drift faster than a one-person raft, but slower than an occupied 6-7 or 20-Man raft. If the raft drifts faster, it should be delivered upwind, slower downwind. When the surface wind is less than 15 knots, the delivery pass will be made approximately 50-feet upwind/downwind. When the surface wind exceeds 15 knots, the upwind distance will be increased 25-feet for each 10 knots in excess of the 15 knot basic.

6.61.2.2. Altitude - 500 feet above surface minimum.

6.61.2.3. Airspeed - 150 KCAS.

WARNING: Do not fly below stall speed plus 25 KCAS (30 degree angle of bank).

6.61.2.4. Flaps - 75%

6.61.2.5. Holding: Use a holding pattern and do not attempt to orbit. If there is a large section of wreckage or an oil slick, use it to your best advantage. Determine heading and distance from it to the survivors. The oil slick can be seen up to 5 miles. Establish a holding pattern, inbound downwind, left turns, 1 minute. Flying inbound downwind will kill most of the drift; left turns will keeping the survivors in view at all times. While holding, plot the drift of the raft in miles per hour and miles per day, allowing for wind drift and water current drift effects on the raft. Steer SAR aircraft to the scene, and continue exercising control over all search aircraft until relieved by SAR agencies.

6.61.2.6. Loadmaster Procedures:

6.61.2.6.1. Carefully lower a pre-positioned life raft to the cargo deck. Use a split raft from #2 or #4 escape hatch, if possible.

6.61.2.6.2. Separate the outer accessory container (survival kit) from the life raft container (this kit will not be airdropped).

6.61.2.6.3. Unsnap the raft rip cord handle pocket and attach a tiedown strap to raft inflation D-Ring and secure other end to aircraft floor.

6.61.2.6.4. Position raft next to a troop door.

6.61.2.6.5. Personnel making the drop will wear restraint harnesses.

6.61.2.6.6. Ten minutes prior to drop:

6.61.2.6.7. “CREW 10-MINUTE ADVISORY” (P/N) - “ACKNOWLEDGED (LM, E).

6.61.2.6.8. Personnel restraint harness - “ON” (LM).

WARNING: Ensure restraint harness is properly fitted and the lifeline is adjusted.

6.61.2.6.9. Red light - “ON” (CP).

6.61.2.7. Tiedown strap - “CONNECTED” (LM).

NOTE: Ensure tiedown strap is connected to raft and aircraft.

6.61.2.8. Paratroop doors - “CLEARED TO OPEN” (P).

6.61.2.9. Paratroop doors - “OPENED” (LM).

6.61.2.10. Life raft - “POSITIONED” (LM).

NOTE: Place raft on end and at forward edge of door.

6.61.2.11. Ten minute check - “COMPLETED” (LM, E).

6.61.2.12. One minute prior to drop “CREW ONE MINUTE ADVISORY” (P/N), “ACKNOWLEDGED” (LM, E).

6.61.3. Drop time:

6.61.3.1. “FIVE, FOUR, THREE, TWO, ONE, GREEN LIGHT” (P/N) - Green light switch - “ON” (CP), “ALL CLEAR OR CONDITION” (LM).

NOTES:

Copilot will position the green light switch to on when pilot or navigator states “GREEN LIGHT.”

Loadmaster will drop the raft on green light.

6.61.3.2. Tiedown strap - “RETRIEVED” (LM).

NOTE: Retrieve or cut tiedown strap immediately to prevent damage to aircraft.

6.61.3.3. Paratroop Doors - ëCLOSED” (LM)

Chapter 7

AIRCRAFT SECURITY

7.1. General. This chapter provides guidance on aircraft security and preventing and resisting aircraft piracy (hijacking) of C-141 aircraft. AFI 13-207, *Preventing and Resisting Aircraft Piracy (Hijacking)*, AFI 31-101, Volume 1, *Air Force Physical Security Program*, and specific MAJCOM security publications contain additional guidance. Aircrews will not release information concerning hijacking attempts or identify armed aircrew members or missions to the public.

7.2. Security. The C-141 is a priority "C" resource. Aircraft security at non-United States military installations is the responsibility of the controlling agency.

7.3. Air Force Physical Security Program. The following security procedures will implement AFI 31-101, *The Air Force Physical Security Program*, requirements for C-141 aircraft:

7.3.1. The aircraft will be parked in an established restricted area and afforded protection via a roving patrol and a two-person armed response capability within 5 minutes.

7.3.2. When no permanent or established restricted area parking space is available, establish a temporary restricted area consisting of a raised rope barrier, and post with restricted area signs. Provide a one-person mobile patrol, supported by a two-person security response team capable of 5 minute response. Portable security lighting will be provided during the hours of darkness if sufficient permanent lighting is not available.

7.3.3. At non-United States military installations, the aircraft commander determines the adequacy of local security capabilities to provide aircraft security commensurate with this chapter. If he or she determines security to be inadequate, the aircraft will depart to a station where adequate security is available.

7.3.4. The security force must be made aware of all visits to the aircraft. The security force POC must be identified to the aircraft commander.

7.3.5. Security support is a continual requirement and is not negated by the presence of aircrew or ground crew members. Security force support terminates only after the aircraft doors are closed and the aircraft taxies.

7.3.6. Locking and Sealing. Lock or seal the aircraft during all RONs on non-secure ramps (see paragraph **7.5.1.**).

7.4. En Route Security. The planning agency must coordinate with the execution agency to ensure adequate en route security is available. Aircraft commanders will receive a threat assessment and en route security capability evaluation briefing for areas of intended operation prior to home station departure and should request updates from en route C2 as required. If required, a PHOENIX RAVEN team will be assigned to the mission.

7.4.1. The PHOENIX RAVEN team will consist of two US Air Force security force members, but may include more depending on security requirements. The team's travel status is determined by MAJCOM. The team travels special passenger status and is responsible to the aircraft commander at all times. In turn, aircraft commanders are responsible for their welfare (transportation, lodging, etc.).

Aircraft commanders will ensure security team members receive a mission briefing, aircraft egress/passenger briefing (as appropriate).

7.4.2. Arrival. On arrival, the aircraft commander will assess the local situation and take the following actions as required:

7.4.2.1. Area patrol. Request area security patrols from local security forces. If local authorities request payment for this service, use AF Form 15, **USAF Invoice.**

7.4.2.2. Aircrew surveillance. During short ground times, direct armed crew members to remain with the aircraft and maintain surveillance of aircraft entrances and activities in the aircraft vicinity.

7.4.2.3. Inadequate Security. If in the aircraft commander's opinion airfield security is inadequate and the safety of the aircraft is in question, he/she may waive the AC and the crew has not been augmented with a security team, the AC may waive the flight duty period limits and crew rest requirements and depart as soon as possible for a base considered reliable. Report movement and intentions to the controlling agency as soon as practical. If departure is not possible, the aircrew must secure the aircraft to the best of their ability. In no case, will the entire crew leave the aircraft unattended. Crew rest requirements will be subordinate to aircraft security when the airframe may be at risk. The aircraft commander should rotate a security detail among the crew to provide for both aircraft protection and crew rest until relief is available. Request security assistance from the nearest DoD installation, US Embassy, local military or law enforcement agencies as appropriate.

7.4.3. Entry Control Procedures. Unescorted entry is granted to aircrew members and support personnel assigned to the mission who possess their home station AF Form 1199, **Air Force Entry Control Card**, supported by an Entry Access List (EAL) or aircrew orders. Aircrew members and assigned crew chiefs are authorized escort authority.

7.4.3.1. Normally, non-United States nationals such as cargo handlers can perform their duties under escort and should not be placed on the EAL.

7.4.3.2. Personnel not on the entry control list or aircrew orders must be escorted within the area.

7.5. Detecting Unauthorized Entry.

7.5.1. When parking on a secure ramp, the aircraft will normally be left unlocked/unsealed to allow ground personnel immediate access. If, in the aircraft commander's judgment, the aircraft needs to be locked and sealed in order to detect unauthorized entry, then:

7.5.1.1. Use available aircraft ground security locking devices.

7.5.1.2. Secure the doors in a manner that will indicate unauthorized entry (e.g., tape inside of doors to airframe so that entry pulls tape loose).

7.5.1.3. Close and seal the crew entrance door (box car seal).

7.5.1.4. Wipe the immediate area around lock and latches clean to aid in investigation of a forced entry.

7.5.1.5. Report any unauthorized entry or tampering to the OSI, security forces or local authorities, and the C2 agency. Have aircraft thoroughly inspected prior to flight.

7.5.2. Security awareness is crucial to effective mission accomplishment. Aircrews must always remain vigilant to their surroundings, especially at high threat, low security locations. During pre-flight activities, aircrews will inspect accessible areas, to include aircraft wheel wells and avionics compartments for unauthorized packages, personnel, or other unfamiliar devices. Report any suspicious items to host security forces. Aircrews will maintain a heightened security posture throughout all pre-takeoff activities.

7.6. Preventing and Resisting Hijacking.

7.6.1. The Air Transportation Act of 1974 and the Federal Aviation Act of 1958, as amended, vest the FAA Administrator with exclusive responsibility for the direction of law enforcement activity in aircraft hijacking situations involving all aircraft (civil and military) in-flight in the United States.

7.6.2. In taking action during an aircraft hijacking situation, military forces will act under military command within the scope of their duties.

7.6.3. In the event an aircraft involved in an aircraft hijacking situation is carrying documents, equipment, or material that DoD has determined to be highly sensitive, or weapons of mass destruction, DoD will provide FAA, and where appropriate, the FBI, with all pertinent information. Where possible, the FAA will consult and cooperate with DoD prior to directing any law enforcement activity.

7.6.4. An aircraft is most vulnerable to hijacking when the aircrew is aboard and the aircraft is operationally ready for flight.

7.6.5. A concerted effort must be made to prevent the hijacking of military or military contract aircraft by detecting potential hijackers before they board the aircraft.

7.6.6. Should preventive efforts fail, any actual attempt to hijack a military aircraft must be resisted in a manner appropriate to the situation.

7.6.7. Since air piracy may be committed by political terrorists or by individuals to whom the threat of death is not a deterrent but a stimulus, ordinary law enforcement procedures may be ineffective. Thus, successful conclusion of a hijacking situation and apprehension of the hijackers may require use of specialized law enforcement techniques and procedures.

7.6.8. Delaying actions have been most successful in overcoming hijackings without loss of life or property.

7.6.9. In the case of an aircraft carrying passengers, the primary concern is the safety of the passengers.

7.6.10. Assistance to hijacked civil or military contract aircraft will be rendered as requested by the pilot in command of the aircraft and the authority exercising operational control of the anti-hijacking effort.

7.6.11. Responsibilities. When tasked for surveillance operations, the crew will:

7.6.11.1. Immediately after launch, establish radio contact with the command and control element via HF.

7.6.11.2. Rendezvous with the hijacked aircraft for surveillance as soon as possible after takeoff.

7.6.11.3. During rendezvous with the hijacked aircraft, assume a trail position out of cockpit and cabin view.

7.6.11.4. Remain in an unobserved position unless otherwise directed. Safety is paramount; therefore, aircraft will maintain a 5-NM trail in United States airspace and a 10-NM trail in Canadian airspace.

7.6.12. After direction to assume surveillance mission, continue until:

7.6.12.1. Fuel state dictates aborting to arrive at alternate with fuel reserves specified in this AFI.

7.6.12.2. Recalled by the command and control agency.

7.6.12.3. The hijacked aircraft's destination is determined to be a country requiring over flight clearance for the surveillance aircraft. Contact a command center or command post for further direction. Until directed to over-fly sovereign airspace, maintain a 12-NM separation as specified in the Foreign Clearance Guide.

7.7. Preventive Measures. Commanders at all levels must ensure preventive measures are taken to minimize access to the aircraft by potential hijackers. When a C-141 is operating away from home station, the aircraft commander will ensure provisions of this chapter and AFI 13-207, as supplemented, are complied with.

7.7.1. Preventive measures include the following: The host station passenger processing or manifesting facility should conduct anti-hijacking inspections. Do not board passengers until the aircraft commander is fully satisfied with inspection results. In the absence of qualified passenger service representatives, the aircraft commander will ensure the anti-hijacking inspection of passengers and baggage is accomplished.

7.7.2. Medical facility commanders are responsible for anti-hijacking inspection of patients. When patients are delivered to the aircraft by civilian sources, the aircrew will perform required inspections prior to loading.

7.7.3. During exercises or contingencies in support of combat operations involving the movement of large groups of personnel, the unit being supported should manifest passengers and perform anti-hijacking inspections.

7.7.4. Passengers will not carry weapons or ammunition on their person or in hand-carried baggage aboard an aircraft except special agents, guards of the Secret Service or State Department, and other individuals specifically authorized to carry weapons.

7.7.4.1. Troops or deadhead crewmembers will not retain custody of ammunition on an aircraft. They will turn it in to the troop commander or aircraft commander. Troops may carry unloaded weapons and ammunition aboard the aircraft during combat operations. When the tactical situation dictates (in coordination with the aircrew), weapons may be loaded at the order of the troop commander or team leader.

7.7.4.2. Dummy clips that can be easily identified may be loaded for training at the order of the team leader in coordination with the aircrew.

7.7.5. If weapons must be cleared, ask the individual to:

7.7.5.1. Move to a safe, clear area at least 50 feet from any aircraft, equipment, or personnel before unholstering or unslinging their weapons.

7.7.5.2. Clear weapons in accordance with standard safety procedures.

7.8. Initial Response. When an act of air piracy involves an Air Force installation or aircraft within the United States, response will be according to the following guidelines until such time as FAA assumes active direction of anti-hijacking efforts. Resist all attempts to hijack a military aircraft. Resistance may vary from simple dissuasion, through deception and subterfuge, to direct physical confrontation, including the prudent use of weapons.

7.8.1. The following guidelines should be used to counter a hijacking, actual or threatened, while the aircraft is on the ground:

7.8.1.1. Delay movement of the aircraft to provide time for ground personnel and the aircrew to establish communication and execute coordinated resistance actions.

7.8.1.2. The authority for determining when ground resistance will be discontinued is vested in the highest available level of command. When adequate communication cannot be established, or when time does not permit, this authority is delegated in the following order:

7.8.1.2.1. MAJCOM commander exercising operational control of the aircraft.

7.8.1.2.2. MAJCOM commanders in whose Area Of Responsibility (AOR) the airfield lies.

7.8.1.2.3. Senior operational commander on scene.

7.8.1.2.4. Aircraft commander in compliance with MAJCOM directives.

7.8.2. A hijacked aircraft carrying weapons of mass destruction will not be allowed to takeoff. Refer to DoD 5210.41M, paragraph 9B(3), for additional guidance.

7.9. In-Flight Resistance. After airborne, success in thwarting a hijacking depends on the resourcefulness of the aircrew. Many variables of a hijacking preclude use of any specific counter-hijacking procedure. Some key factors should be evaluated before deciding a course of action to be taken, including the nature of the threat, danger to life or crippling damage to the aircraft in-flight, destination indicated by the hijacker, and the presence of sensitive material onboard. Some counter-hijacking actions the aircrew may consider are:

7.9.1. Engage the hijackers in conversation to calm him or her and to evaluate what course of action might be effective.

7.9.2. Dissuade the hijacker.

7.9.3. Use facts or subterfuge to convince the hijacker intermediate stops are necessary.

7.9.4. Propose more favorable alternatives, such as landing in a neutral, rather than a hostile, country.

7.9.5. Exploit any reasonable opportunity to incapacitate or overcome the hijacker physically, including the prudent use of firearms.

7.10. Communications Between Aircrew and Ground Agencies. Crews facing a hijacking threat will notify ground agencies by any means available as soon as practical and follow-up with situation reports as circumstances permit.

7.10.1. If possible, transmit an in-the-clear notification of hijacking to ATC. Controllers will assign IFF code 7500 (does not preclude subsequent selection of code 7700).

7.10.2. If in-the-clear transmissions are not possible, report "am being hijacked" by setting transponder to code 7500. If unable to change transponder code, or when not under radar control, transmit a radio message to include the phrase "(call sign) transponder seven five zero zero."

7.10.3. Controllers will acknowledge receipt and understanding of transponder code 7500 by transmitting "(call sign) (facility name) verify squawking 7500." An affirmative reply or lack of reply from the pilot indicates confirmation and proper authorities are notified.

7.10.4. To report "situation appears desperate; want armed intervention," after code 7500 is used, change to code 7700. If unable to change transponder code to 7700, or when not under radar control, transmit "(aircraft call sign) transponder seven seven zero zero."

7.10.4.1. When changing from code 7500 to code 7700, remain on 7500 for at least 3 minutes or until a confirmation of code 7500 is received from ATC, whichever is sooner, before changing to code 7700. ATC acknowledges code 7700 by transmitting "(call sign) (facility name) now reading you on transponder seven seven zero zero."

7.10.4.2. Aircraft squawking 7700 after squawking 7500, which are not in radio contact with ATC, are considered by ATC to have an in-flight emergency (in addition to hijacking), and the appropriate emergency procedures are followed. Notification of authorities in this case includes information that the aircraft displayed the hijack code as well as the emergency code.

7.10.5. To report "situation still desperate, want armed intervention and aircraft immobilized", leave flaps full down after landing, or select landing flaps while on the ground. To facilitate message distribution, transmit "(aircraft call sign) flaps are full down."

7.10.6. To report "leave alone, do not intervene," retract the flaps after landing. Pilots who retract flaps after squawking 7700 should return to code 7500 and remain on code 7500 for the next leg of the hijacked flight unless the situation changes. Transmit "(call sign) back on seven five zero zero" to emphasize the fact intervention is no longer desired.

7.11. Forced Penetration of Unfriendly Airspace. These procedures are designed to deter possible hostile action against the hijacked aircraft that has been forced to penetrate airspace of a nation unfriendly to the United States.

7.11.1. If instructions from the unfriendly nation are received either by radio contact or by air intercept before boundary crossing, comply with instructions received.

7.11.2. If no contact with unfriendly nation is made before approaching a boundary:

7.11.2.1. Maintain TAS not more than 400 knots.

7.11.2.2. Maintain an altitude between 10,000 and 25,000 feet if possible.

7.11.2.3. Fly a direct course toward destination announced by the hijacker, if no course is specified.

7.11.2.4. Transmit the international distress signal, MAYDAY, on any of the international distress frequencies (121.5 MHz, 243.0 MHz, or 2182 KHz) in an effort to establish communications.

7.11.2.5. Set mode 3 code 7700 on transponder.

7.11.2.6. If radio contact cannot be established, follow procedures set forth in FLIP.

7.11.3. Consider the presence of classified documents and equipment aboard the aircraft. When a landing in an unfriendly nation is imminent, attempt to dispose of or destroy the equipment or material.

7.12. Arming of Crew Members. When crews are directed to carry weapons, at least one flight engineer and one loadmaster will carry weapons. All crew members should know who is armed. The following procedures apply when arming is directed:

7.12.1. Issue. Before departing home station, obtain weapons, ammunition, box, lock and key. Crew members will be armed according to AFI 31-207, *Arming and Use of Force by Air Force Personnel* and MAJCOM publications. If an armed crew member must leave the crew en route, transfer the weapon to another authorized crew member using AF Form 1297, **Temporary Issue Receipt**.

7.12.2. Wearing of Weapons. Wear weapons in a holster, concealed at all times to prevent identifying armed crew members. Do not wear weapons off the flight line except to and from the C2, armories, and other facilities associated with aircrew activities.

7.12.3. Weapons Storage In-Flight. Crew members will be armed before beginning preflight, on-load or off-load duties and until completion of all post-flight duties. When no passengers are aboard, weapons may be stored in the gun box in-flight after a satisfactory stowaway check. Crew members will rearm before landing. Weapons need not be unloaded before placing them in a gun box.

7.12.4. Crew Rest.

7.12.4.1. Aircrews, including stage crews, will store weapons and ammunition in the most secure facility available, normally the base armory.

7.12.4.2. Non-stage aircrews may store weapons and ammunition in the aircraft gun box.

7.12.5. When storing weapons in the gun box:

7.12.5.1. Weapons should normally not be unloaded.

7.12.5.2. Advise C2 as to which crew member has the gun box key.

7.12.6. Crew members will ensure they are reissued the same weapon until mission termination at home station.

7.12.7. Loading and Transfer of Weapons. Load and unload weapons at approved clearing barrels if available. Do not use a hand-to-hand transfer of loaded weapons to another crew member; place the weapon on a flat surface.

7.13. Force Protection. Crews must be alert to possibility of terrorist activities at all times. The following considerations may help crewmembers avoid becoming victims of terrorism when operating in overseas locations:

7.13.1. Personal conduct. Crews must realize their conduct can make them a target for individuals dissatisfied with US foreign involvement in their national affairs. Local foreign nationals may or may not condone a military presence - crew conduct will be watched and judged. Therefore, utilize the following:

7.13.1.1. Maintain good military bearing both on and off duty.

7.13.1.2. Avoid dressing in clothes that highlight the fact you are an American, i.e., cowboy hats, wide belt buckles, shirts with pro-American slogans, etc.

7.13.1.3. Do not wear clothing displaying profanity.

7.13.1.4. Know where "off-limits" areas are and avoid them.

7.13.1.5. Beware of personnel offering to take you on a "personal" sightseeing tour.

7.13.1.6. Do not get involved with anyone trying to involve you in games of chance.

7.13.1.7. When possible, always travel in groups of two or more.

7.13.1.8. Avoid demonstrations for any cause.

7.13.1.9. Avoid discussion of politics.

7.13.2. Ground transportation security. When traveling to and from billeting, messing facilities, etc. consider the following to minimize drawing attention to yourself as a potential target:

7.13.2.1. Select a plain car; minimize the "rich American" look.

7.13.2.2. If possible, consider not using a car that announces Government ownership.

7.13.2.3. Keep the gas tank at least half full at all times.

7.13.2.4. Do a thorough check of the car to look for signs of tampering - look at undercarriage and wheel-wells.

7.13.2.5. Park in well-lighted areas, preferably under US control.

7.13.2.6. Always lock your car. If possible, do not leave it on the street overnight.

7.13.2.7. Only leave the ignition key with parking attendants.

7.13.2.8. Before entering vehicles, check for suspicious objects. Look underneath vehicle seats.

7.13.2.9. Guard against establishing a routine. Vary times, routes, and modes of travel. Avoid late night travel.

7.13.2.10. Travel with companions or in convoys when possible.

7.13.2.11. Avoid isolated roads and dark alleys.

7.13.2.12. Ride with seat belts buckled, doors locked, and windows closed.

7.13.2.13. Do not allow the vehicle to be boxed in. Maintain enough interval between you and the vehicle in front so that you can pass.

7.13.2.14. Circle the block for confirmation of surveillance.

7.13.2.15. Do not stop or take other actions which could lead to a confrontation.

7.13.2.16. Recognize events that could signal the start of an attack, such as:

7.13.2.17. Cyclist falling in front of your car.

7.13.2.18. Flagman or workman stopping your car.

7.13.2.19. Fake police or government checkpoints.

7.13.2.20. Disabled vehicle/accident victims on the road.

7.13.2.21. Unusual detours.

7.13.2.22. An accident in which your car is struck.

7.13.2.23. Cars or pedestrian traffic that box you in.

7.13.2.24. Sudden activity or gunfire.

7.13.2.25. Know what to do if you are under attack:

7.13.2.25.1. Consider sounding the horn.

7.13.2.25.2. Put another vehicle between you or your pursuer.

7.13.2.25.3. Execute an immediate turn and escape, jump curbs at a 30-45 degree angle, 35 mph minimum.

7.13.2.25.4. Ram a blocking vehicle only as a last resort.

7.13.2.25.5. Go to the closest safe haven.

7.13.2.25.6. Report the incident to security police.

7.13.3. Personal identification. Consider the following actions to avoid advertising the fact you are an American:

7.13.3.1. Don't discuss our military affiliation with strangers.

7.13.3.2. Avoid military style luggage such as B-4 bags & duffel bags with military logos, etc.

7.13.3.3. Consider placing your official passport and related documents such as military ID, flight orders, club card, dog tags, billeting receipts in your hand-carried luggage and not in your wallet or purse.

7.13.3.4. Wear conservative styled civilian clothing when using commercial transportation.

7.13.3.5. Remember, the key is to maintain a low profile.

7.13.4. Hotel security. When billeted in commercial hotels, be aware of the following:

7.13.4.1. If possible, obtain rooms between the second and sixth floors. These rooms are high enough to be less vulnerable to unauthorized entry from the outside and low enough to simplify evacuation if necessary.

7.13.4.2. Always lock interior locks when occupying rooms.

7.13.4.3. Always assume your room is monitored and avoid viewing or discussing classified material.

7.13.4.4. Avoid establishing a predictable routine i.e., vary eating times and locations.

7.13.4.5. Avoid traveling on foot-use a vehicle (hotel shuttle, commercial taxi, etc.)

7.13.4.6. In high threat areas, stay off the streets (use hotel dining facilities if available).

Chapter 8

OPERATIONAL REPORTS AND FORMS

8.1. General. Applicable reports and forms are contained in this chapter. Specific reports and forms applicable only to the flight engineer are in **Chapter 12**.

8.2. AF Form 457, USAF Hazard Report. (AFI 91-202, *The US Air Force Mishap Prevention Program*).

8.2.1. The Air Force hazard reporting system provides a means for Air Force personnel to alert supervisors and commanders to hazardous conditions requiring prompt corrective action.

8.2.2. Special Procedures for Hazard Reports Concerning Weather. Complete the front of an AF Form 457 and address it to the parent wing flying safety office. If a computer flight plan deficiency is involved, attach one copy of the AF Form 72, **Air Report (AIREP)**; AF Form 4115, **Flight Plan and Record**, or AF Form 4053, **INS Flight Plan and Log;** and the Computer Flight Plan (CFP) to the report. Send the report so that the parent unit receives it within 5 days.

8.3. AF Form 651, Hazardous Air Traffic Report (HATR). See AFI 91-202, Attachment 3, *Hazardous Air Traffic Report (HATR) Program* (RSC HAF-SE (AR) 7602.

8.3.1. The Air Force HATR program provides a means for personnel to report all near midair collisions (NMAC) and alleged hazardous air traffic conditions. Use information in HATR reports only for mishap prevention. AFI 91-202 list reportable incidents.

8.3.2. Procedures:

8.3.2.1. Make an airborne report of the hazardous condition to the nearest air traffic control agency (e.g. center, FSS, control tower, or aeronautical radio station), and give the following information as appropriate:

8.3.2.1.1. Identification or call sign.

8.3.2.1.2. Time and place (radial/DME of NAVAID, position relative to the airfield, etc.) of the occurrence.

8.3.2.1.3. Altitude or flight level.

8.3.2.1.4. Description of the other aircraft or vehicle.

8.3.2.1.5. Include a verbal statement as soon as possible after occurrence that a written HATR report will be filed upon landing.

NOTE: Air Traffic Control agencies (e.g., FAA, etc) must know if an official report is being filed.

8.3.2.2. File the HATR as soon as possible (within 24-hours) using any available means of communication. Normally, it should be filed at the Air Force base operations office at the landing airport. If this is impractical and if communications permit, notify the safety office of the Air Force base where the condition occurred, the safety office at the home base, or as prescribed by the overseas major command. In any case, provide the base or wing safety office with all available information needed to prepare AF Form 651. Turn in a completed copy of AF Form 651 to the wing safety office.

8.3.3. Individuals submitting HATRs are granted immunity from disciplinary action provided:

8.3.3.1. Their violation was not deliberate.

8.3.3.2. They committed no criminal offense.

8.3.3.3. No mishap occurred.

8.3.3.4. They properly reported the incident using the procedures above.

NOTE: A HATR reports are not privileged information and may be released outside the US Air Force.

8.4. AF Form 711, USAF Aircraft Mishap Report (Aircraft and Personnel Mishaps).

8.4.1. Responsibilities. Notify the appropriate authorities of any mishap involving aircraft or crew.

8.4.2. Reportable Mishaps. Report damage to the aircraft or injury to the crew or passengers. Also, any damage or injury to another organization's equipment or personnel resulting from the movements or actions of a mobility aircraft or crew. Reportable mishaps include:

8.4.2.1. Physiological mishaps.

8.4.2.2. Engine flameout, failure, or required shutdown, after engine start with intent for flight, regardless of damage.

8.4.2.2.1. Report incidents involving two or more engines immediately. Single-engine incidents may be reported upon landing.

NOTE: Intentional shutdowns for training, FCF, or other non-emergency purposes are excluded; however, report failure to restart, using the criteria above.

8.4.2.3. Loss of thrust sufficient to preclude maintaining level flight at a safe altitude.

8.4.2.4. Engine case penetration by shrapnel from internal engine component failure.

8.4.2.5. Engine case rupture or burn-through, engine bay fire, or massive fuel leakage.

8.4.2.6. Unselected thrust reversal.

8.4.2.7. Flight control malfunction (including AFCS and trim systems) resulting in an unexpected, hazardous change of flight attitude, altitude, or heading. When making the AFTO 781A, **Maintenance Discrepancy and Work Document**, entry, include the flag words "reportable flight control malfunction."

8.4.2.8. Malfunction of landing gear when difficulty is experienced using emergency system or procedures.

8.4.2.9. Cargo door or ramp malfunction when intent for flight exists which could affect the integrity of the system.

8.4.2.10. In-Flight loss of all pitot-static instrument indications or all gyro-stabilized attitude or directional indications.

8.4.2.11. Spillage or leakage of radioactive, toxic, corrosive, or flammable material from aircraft stores or cargo that, in the judgment of the reporting individual, is significant hazard to the crew, passengers, or aircraft.

8.4.2.12. Human factors related situation, e.g. misinterpretation of instruments; crew overload, i.e. tactile, aural, and visual input to the crew at a rate too fast to permit reasonable decisions based on the data received; or too many actions required in too short a period of time; or confusion of controls such as would be caused by adjacent switches where the actuation of the wrong switch could create a dangerous situation. Anonymous reports of such situations are acceptable.

8.4.2.13. All cases of departure from intended takeoff or landing onto a surface not designed to normally support takeoff or landing loads.

8.4.2.14. All in-flight fires regardless of damage.

8.4.2.15. All bird strikes regardless of damage. Following a bird strike, aircrews should land as soon as conditions permit to have the aircraft inspected by weapon system specific qualified maintenance personnel. Bird strike damage cannot be accurately assessed in flight, and undetected damage may result in a complex airborne emergency.

8.4.2.16. Any occurrence which does not meet the established criteria for a reportable mishap but, in the judgment of the reporting individual, needs to be emphasized in the interest of safety.

8.4.3. Procedures. Report mishaps as soon as possible to the following offices using the following precedence:

8.4.3.1. MAJCOM Flying Safety Officer (FSO).

8.4.3.2. Any FSO.

8.4.3.3. Nearest C2.

8.4.3.4. Base operations.

8.4.3.5. In all cases, retain a copy of all relevant information, and turn it into a home station safety officer.

8.4.4. Required Information. Complete all appropriate areas of the form. Provide as much detail as possible.

8.5. Reports of Violations. Violations identified in AFI 11-202, Volume 3, *General Flight Rules*, alleged navigation errors (including over-water position errors exceeding 24 NM, border and air traffic control violations) will be reported.

8.5.1. Use the following format and include:

8.5.1.1. Factual circumstances.

8.5.1.2. Investigation and analysis.

8.5.1.3. Findings and conclusions.

8.5.1.4. Recommendations.

8.5.1.5. Actions taken.

8.5.1.6. Include the following attachments:

8.5.1.6.1. Notification of incident.

8.5.1.6.2. Crew orders.

8.5.1.6.3. Statement of crew members (if applicable).

8.5.1.6.4. Documenting evidence (logs, charts, etc.).

8.5.2. In addition to the information listed, the historical flight plan will be turned in to the command and control facility or owning standardization and evaluation office.

8.5.3. Send the original investigation report within 45-days to the appropriate MAJCOM. AFRC units receiving alleged violations will send the original investigation through channels to arrive at HQ AFRC/IGI within 35-days. HQ AFRC/IGI will send the investigation report to the MAJCOM within 45-days.

8.5.4. The following OPREP-3 reporting procedures for all aircraft notified of navigational errors exceeding 24 NMs will be reported under AFMAN 10-206, *Operational Reporting*.

8.5.4.1. On notification of a navigational position error, the aircraft commander (or agency receiving notification) documents the circumstances surrounding the incident (report content below) and ensures submission of an OPREP-3 report through C2 channels.

8.5.4.2. Report content:

8.5.4.2.1. Name and location of unit submitting report.

8.5.4.2.2. Mission identification number.

8.5.4.2.3. Reference to related OPREPs-3.

8.5.4.2.4. Type of event. (State "Navigation position error.").

8.5.4.2.5. Date, time (Zulu), and location (i.e. ARTCC area).

8.5.4.2.6. Description of facts and circumstances. Include aircraft type and tail number, unit (wing or squadron assignment of crew), home base, route of flight, point of alleged deviation, and miles off course.

8.6. Petroleum, Oil, and Lubricants (POL)--Aviation Fuels Documentation. This section describes procedures for the aviation fuel program (AVPOL) for all USAF aircraft. Procedures are established for correct documentation, processing of forms and invoices, program oversight, and personnel responsibilities. Reference AFI 23-202, *Buying Petroleum Products, and Other Supplies and Services Off-Station*, AMC decentralization procedures, and AFM 67-1, Volume 1, Part 3. An Into-Plane contract information and Aviation Into-Plane Reimbursement (AIR) card acceptor list is also listed under the air card section on the following web page: WWW.KELLY.AF.MIL/SFWEB.

NOTE: Aviation Into-Plane Reimbursement (AIR) Card. The AIR card is a commercial credit card which allows aircrews to purchase aviation fuel, fuel related supplies, and/or ground services at commercial airports where no DoD/Canadian into-plane contracts exist. Accepted at over 4200 locations, it is intended to replace the AF Form 315, **United States Air Force AVFuels Invoice,** and AF Form 15 at locations that accept the AIR card. All Air Force aircraft will be issued an AIR card. Additional information is available at SF WEB page: (WWW.KELLY.AF.MIL/SFWEB/AIRCARD.HTM).

8.6.1. Responsibilities. All aircrew and maintenance personnel will be familiar with the procedures and documentation requirements of this chapter. Purchase of aviation fuel not complying with this instruction may become the financial responsibility of the purchaser.

8.6.2. Aircraft will be refueled or de-fueled at DoD locations unless DoD-owned fuel is not available; in which case, fuel may be procured from other sources using the following priority.

8.6.2.1. Defense Fuel Supply Center (DFSC) or Canadian into-plane contracts.

8.6.2.2. Foreign government air forces.

8.6.2.3. Open market AIR card purchase, to include Shell International Trading Company (SITCO) agreement.

NOTE: DoD FLIP en route supplements identify locations with into-plane contracts.

8.6.3. AVPOL Documentation Use and Procedures.

8.6.3.1. AF Form 664, **Aircraft Fuels Documentation Log.** To log and store all AVPOL transaction documentation. Log all off station transactions on front of AF Form 664 then insert the supporting documentation inside the envelope. Turn AF Form 664, with supporting documentation, in at maintenance debriefing (or IAW locally established procedures).

NOTE: When logging in-flight on-load transactions on the AF Form 664, place the 8-digit tail number of the tanker in the block titled "Airfield Name," and the unit number and home station in the block titled "Airfield Address."

8.6.3.2. The AIR card will be used to purchase aviation fuel, fuel related supplies, and ground services at commercial airports where DoD or Canadian Into-Plane contracts do not exist. Tickets for AIR card purchases will be recorded and placed inside the AF Form 664.

8.6.3.3. AF Form 315, **United States Air Force AVFuels Invoice**-- Use this form to purchase fuel at non-DoD and Canadian Into-Plane contract locations and when the vendor will not accept the Air card. See AFI 23-202, *Buying Petroleum and Other Supplies and Services Off-Station*. Block 4 (Send Bill To) address on the AF Form 315 must reflect the following address: SA-ALC/SFR, 1014 Billy Mitchell Blvd., STE 1, Kelly AFB TX 78241-5603. When completed, log and place inside the AF Form 664.

NOTE: Vendor must submit original copy of completed AF Form 315 with their invoice to the address indicated in Block 4 for payment. Contrary to what is printed in Block 16 of AF Form 315, the vendor will not be paid until they initiate billing to SA-ALC/SFR.

8.6.3.4. AF Form 15, **United States Air Force Invoice.** This form is used for procurement of items or services required at commercial locations where normal DOD support and supplies are not available. If the vendor will not accept the AIR card, use AF Form 15 to pay for ground fuels, oils, or services. Block 4 (Send Bill To) of the AF Form 15 must reflect the address of the home-station supporting DFAS-OPLOC. When completed, log and place inside AF Form 664. The accomplished form is returned to the aircraft's home station for payment. The responsible resource advisor must validate and certify the completed AF Form 15 and forward to the supporting DFAS-OPLOC for payment. See AFI 23-202.

8.6.3.4.1. Provide the original and one legible copy of the AF Form 315 or 15 to the vendor. The vendor must submit the original copy of the AF Form 315/15 to the address identified in Block 4 of these forms for payment. A legible copy of the AF Form 315/15 must be obtained by the aircraft commander, then logged and placed inside the AF Form 664.

8.6.3.4.2. Purchases at Canadian into-plane locations will be documented using the local vendor's invoice. AF Form 15 or 315 will not be accomplished. Hand scribe the information from the aircraft identa-plate to the vendor's invoice, and complete a separate sheet with the information listed on the Aviation Issues to DoD and Non-DoD, Aircraft Refueling Tender Sheet. See AFI 23-202. Log and place a copy inside the AF Form 664.

8.6.3.4.3. Purchases at SITCO Agreement locations require presenting the aircraft identa-plate (DD Form 1896). The invoice must include the date of transaction, grade of the product, quantity issued or de-fueled, unit of measure, and signature of the Air Force representative. If the vendor also requires completion of an AF Form 15 or AF Form 315 in addition to their invoice, annotate on the vendor's invoice "AF FORMS EXECUTED." Log and place the documentation inside the AF Form 664.

8.6.3.4.4. Purchases at non-contract (DoD/Canadian Into-Plane) commercial airports will be accomplished using the AIR card or the AF Form 315 and/or AF Form 15 when vendor does not accept the AIR card. Refer to AFI 23-202 for guidelines on completing these forms.

8.6.3.4.5. Purchases at foreign military airfields, including replacement-in-kind (RIK) locations, the host country forms are used to

8.6.3.4.6. If an embassy arranges fuel support and pays the vendor in cash, an AF Form 315 must be completed with the addition of the statement in Block 11: "paid by US Embassy". Also include in Block 11, the date, POC, and telephone number of responsible embassy employee. When completed, attach vendor ticket, then log and place inside AF Form 664.

NOTE: In this situation, do not leave a copy of the AF Form 315 with the vendor. Base wing refueling document control officers will forward AF Form 315 to SA-ALC/SFR.

8.6.4. Not used.

8.6.5. AF Form 1994, **Fuel Issue/De fuel Document** --Used for purchases at all US Air Force locations using a valid DD Form 1898, **AVFuels Into-Plane Sales Slip**. Log and place inside AF Form 664.

8.6.6. AFTO Form 781H**, Aerospace Vehicle Flight Status and Maintenance Document**. Complete form per applicable technical directives. When removed from jacket, turn in to maintenance. Maintenance will retain for 90-days after inter-fund billing to provide a secondary audit trail for fuels issue and flying hours.

8.6.7. DD Form 1898, **AVFuels Into-Plane Sales Slip**, aircraft fuel and oil charge card.

8.6.8. DD Form 1896, **Fuel Issue Receipt**, is used for purchases at other DoD locations, including DFSC into-plane contract locations. Log and place inside AF Form 664.

NOTE: If the contractor insists on completing their own invoice in addition to the DD Form 1896, the invoice must be annotated "DUPLICATE DD FORM 1896 ACCOMPLISHED."

8.6.9. Not Used.

8.6.10. Wing Scheduling. The wing scheduling office will:

8.6.10.1. Work with and provide a representative to the AVPOL advisory group.

8.6.10.2. Prepare a monthly report for the Invoice Control Officers (ICO) by the 7th of each month stating the following:

8.6.10.2.1. Organization(by squadron).

8.6.10.2.2. Mission Design and Series (MDS).

8.6.10.2.3. Programmed flying hours for previous and current month.

8.6.10.2.4. Actual flying hours for the previous month.

8.6.10.3. Provide on the weekly flying schedule the receivers MDS, command of assignment, unit or squadron, and home station name for each sortie.

8.6.10.4. Prepare and transmit classified messages for classified in-flight refuelings to HQ AMC/LGSF, according to AFM 67-1, volume 1, part 3, *Supply/Fuels Wartime Planning*, attachment 34.

8.6.10.5. Maintain a current list of receiver unit Points Of Contact (POC) and telephone numbers.

8.6.11. Aircraft Commanders. Aircraft commanders will:

8.6.11.1. For local training missions:

8.6.11.1.1. Verify that AF Form 664 and AFTO Form 781H are completely filled out prior to maintenance debriefing.

8.6.11.1.2. Turn in AFTO Form 781H and AF Form 664 to maintenance debriefing.

8.6.11.2. For off station missions:

8.6.11.2.1. Verify that AIR card receipts, AF Forms 15, 315, 664, 1994, AFTO Form 781H, DD Form 1896, and all associated fuels receipts are completely filled out and placed inside the AF Form 664. (All USAF aircraft must contain an 8-digit tail number).

8.6.11.2.2. Ensure that AF Form 664, with all refueling documentation, and the AFTO Form 781H are turned in at maintenance debriefing.

8.6.11.2.3. Ensure that all AF Form 664 information is phoned, faxed, or sent by message back to the ICO if aircraft is to be off station past the last day of the month.

NOTE: When situations arise that preclude the transmission of AF Form 664 data, the information will be relayed on arrival from the first available AMC command post.

8.6.12. Not used.

8.6.13. Flight Engineers. Flight Engineers will:

8.6.13.1. Accurately record all in-flight on-loads on the AFTO Form 781H and AF Form 664.

8.6.13.2. Record, when transmitted, receiver refueling information, i.e., tail number, unit of assignment, and home station.

8.6.14. Maintenance Personnel. Maintenance Personnel will:

8.6.14.1. Local Training Missions:

8.6.14.1.1. Ensure all in-flight refueling documentation, i.e. AF Form 664 and the AFTO Form 781H are completed and collected for each mission, if required.

8.6.14.2. Off station Missions:

8.6.14.2.1. Ensure that all ground refueling and de-fueling documents are accurately completed and placed inside AF Form 664.

8.6.14.2.2. Prior to deployment, ensure an adequate supply of fuels transaction documents are onboard the aircraft to complete the deployment.

8.7. AMC Form 54, Aircraft Commander's Report on Services/Facilities. This is an instrument for aircrews to report that services rendered or conditions encountered were unsatisfactory or detrimental to efficient air mobility operations; services rendered or procedures used are worthy of adoption for all MAJCOM organizations; or a performance rendered by a person (or persons) was commendable and deserves recognition. Attempt to solve problems by contacting appropriate supervisors including the senior commander if conditions and situation warrant. If further action is deemed necessary or the problem requires increased visibility, submit this form.

8.7.1. Submit the form to the originator's squadron commander. Time permitting, leave an information copy with the CP or senior AMC representative on station. The originator's squadron will forward an information copy to HQ AMC/DOV and AMC NAF/DO. Process IAW AMCI 11-208.

8.7.2. To accomplish the goal of obtaining an answer to all submitted forms, the individual flying squadron commanders will be the focal point for all reports submitted by their aircraft commanders. They will be responsible for tracking their status until final resolution. The success of this program will rest with the individual flying squadrons.

8.8. AMC Form 43, AMC Transient Aircrew Comments. Any crew member may submit this form. The report may be submitted whether or not an unsatisfactory item is included in the aircraft commander's trip report. Complete AMC Form 43 and send to HQ AMC/MWPS. This report is designated emergency status code C2; continue reporting during emergency conditions, normal precedence. Submit data requirements in this category as prescribed or as soon as possible after submission of priority reports. Continue electronic reporting during MINIMIZE.

8.9. AMC Form 196, Aircraft Commander's Report on Crew member. The aircraft commander will prepare an AMC Form 196 on each crew member whose performance was outstanding, below average, or unsatisfactory during a mission. Send the report to the commander of the unit to which the crew member is assigned or attached for flying. Form should fully explain outstanding, below average, and unsatisfactory performance.

8.10. AMC Form 423, MIJI (Meaconing, Intrusion, Jamming, Interference) Incident Report Worksheet.

8.10.1. Purpose. The MIJI reporting system is a program to identify, analyze, and disseminate information concerning MIJI incidents.

8.10.2. Procedures. Comply with Air Force headquarters direction by reporting all incidents through the OPREP (operations reporting) system. Complete the MIJI Incident Report Worksheet, and turn in to base operations upon landing.

8.11. DD Form 1748-2, Airdrop Malfunction Report (Personnel-Cargo). Aircrews will report any aircraft airdrop systems failures to the command post that has operational control of the mission in AFJI 13-210.

8.12. AF Form 4096, Airdrop/Tactical Airland/Air Refueling Mission Recap, and reverse, **Station Keeping Equipment (SKE)/Zone Marker (ZM) Debrief**. This form will be completed by a pilot or navigator on each aircraft following all SKE, airdrop, assault landing zone, or air refueling missions. Turn in to: 1) home station tactics office, 2) home station maintenance debrief site. If SKE problems are encountered off-station, submit form to both en route and home station maintenance.

Chapter 9

TRAINING POLICY

9.1. Qualification Training. Initial qualification, re-qualification, or upgrade training for pilots will not be conducted on missions with passengers onboard. Mission qualification training, Operational Mission Evaluations, Line Development Missions, and JA/ATTs may be conducted on missions with passengers onboard only if the individual in training is qualified (completed aircraft checkride with a valid Form 8).

9.2. Flight Maneuvers. The maneuvers listed are authorized for qualification and continuation training. Maneuvers restricted to FTU will only be performed during formal training under direct IP supervision. They are applicable to all C-141 aircraft except when prohibited or restricted by the flight manual or other current directives. The pilot or IP will alert all crew members prior to accomplishing the following:

9.2.1. Steep Turns (> 30 degrees; 45 degrees maximum).

9.2.2. Simulated Emergencies.

9.3. Touch and Go Landing Limitations.

9.3.1. Touch and go landings will only be accomplished under the direct supervision of an IP or SQ/CC certified AC.

9.3.2. An in-flight evaluation and SQ/CC certification will be accomplished prior to an AC accomplishing touch and goes without direct IP supervision. The evaluation may occur in conjunction with the initial qualification evaluation. After successful evaluation, ACs must be evaluated on recurring evaluations to maintain touch and go qualification.

9.3.3. AC touch and go certification:

9.3.3.1. ACs must have accumulated a minimum of 200-hours (not including other time) since AC certification prior to touch and go certification.

9.3.3.2. The SQ/CC determines touch and go certification requirements for ACs.

9.3.3.3. Separate SQ/CC certifications are required for ACs to:

9.3.3.3.1. Accomplish their own touch and goes.

9.3.3.3.2. Supervise other pilots' touch and goes.

9.3.3.3.3. SQ/CCs will document these certifications using the AF Form 1381, **USAF Certification of Aircrew Training**, in the individual's FEF.

9.3.4. Touch and go landings. Current and qualified Instructor Pilots (IP) and SQ/CC certified aircraft commanders are authorized to conduct/supervise touch-and-go landings under the following conditions:

9.3.4.1. Flight manual restrictions and procedures apply.

9.3.4.2. Use a runway of sufficient width and length to permit a safe, normal, full-stop landing but no less than 7000 feet.

9.3.4.3. Minimum ceiling of 1000 ft and minimum visibility of 2 miles (300 ft and RVR 40 (3/4 SM visibility with an IP in the seat).

9.3.4.4. Wet runway or RCR must be a measured 12 or higher.

9.3.4.5. Do not accomplish touch-and-go landings on slush covered runways.

9.3.4.6. Maximum crosswind component for ACs is 15 knots (flight manual limitation for IPs).

9.3.4.7. Passengers or fragile or hazardous cargo (does not include fuel tanks/batteries on vehicles) will not be carried during touch-and-go operations or multiple practice approaches.

9.3.4.8. Touch-and-go landings may be performed with MAJCOM approved maintenance personnel on board, provided the mission is a designated training flight with an instructor or evaluator pilot in command and the personnel are necessary for maintenance evaluations or inspections. Touch-and-go landings are not authorized with other passengers on board.

9.3.4.9. All wheel brakes must be operational. Anti-skid on all operational wheel brakes must be functioning normally.

9.3.5. Supervision of touch-and-go landings. Review the following:

9.3.5.1. Flight manual procedures.

9.3.5.2. The importance of smooth application of power to the touch-and-go N1 setting while maintaining symmetric thrust as the throttles are advanced.

9.3.5.3. Engine failure, including recognition and corrective action.

9.3.5.4. Proper use of spoilers, flaps, trim.

9.3.6. To provide additional training flexibility, crews may perform multiple approaches, and if qualified, touch and go landings on operational airlift (TWCF) missions provided the following requirements are met:

9.3.6.1. Normal touch and go limitations apply.

9.3.6.2. All transition training will be accomplished during the first 12-hours of the FDP only.

9.3.6.3. Pre-mission coordination requirements. As part of pre-mission planning, aircraft commanders will contact parent operations group current operations and obtain training mission number(s) for use at each en route location(s) where training events are planned. In addition, aircraft commanders will coordinate with and receive approval from the airfield(s) where training is to be accomplished. They will then coordinate with the TACC to ensure adequate ground time is available at planned training locations to allow for planned training events, clearing customs, required crew rest, etc. Once complete, current operations will coordinate with TACC to re-cut the mission and add the training mission number(s) in GDSS/C2IPS.

9.3.6.4. Upon initial arrival at the training location, close out the current line on the AFTO Form 781 and log the training time on the next line using the appropriate training mission symbol and number.

9.4. Crew Complement And Scheduling:

9.4.1. Minimum Crew Complement. Minimum Crew Complement will be sufficient for type of training mission being employed but no less than:

9.4.1.1. Two pilots.

9.4.1.2. Two flight engineers.

9.4.1.3. Loadmaster. Required if passengers or cargo are carried. ***EXCEPTION*:** Loadmaster is not required if all passengers are seated on the flight deck, and it can be positively determined that no cargo or passengers will be airlifted in the cargo compartment on any mission segment.

9.4.2. Crew Qualification. Crew must be current and qualified. If noncurrent or unqualified, crew position must include an instructor or flight examiner, except:

9.4.2.1. Evaluation flights. Student engineers are a part of the minimum crew complement.

9.4.2.2. A second engineer who has a minimum of 125-hours of C-141 engineer time, a recommendation from an instructor, and has successfully completed a local engineer evaluation by any flight examiner, may occupy the flight engineer position under the direct supervision of a first engineer or higher.

9.4.2.3. A second engineer who has not met the requirements of paragraph **9.4.2.2.** or a student engineer, may occupy the flight engineer position when under direct supervision of an instructor or flight examiner. Second engineers, who have not received a local engineer evaluation, may perform scanner duties while part of a basic crew compliment on local airland and air refueling missions.

9.4.3. Initial Transition Training Flights. Initial transition training flights for pilots normally will be conducted during daylight under VFR conditions. Exceptions to this policy are permitted where extensive periods of bad weather would delay training to an unacceptable degree. Under no circumstances will the first transition training flight be conducted at night.

9.4.4. Engine Running Crew Changes. Authorized during local training mission provided the enplaning crew does not approach the aircraft until the deplaning scanner is positioned on headset outside the aircraft.

9.5. Simulated Emergency Flight Operations:

9.5.1. Simulated emergencies may be practiced only during training, evaluation, or currency flights when an instructor or flight examiner pilot is occupying one of the pilot seats. Instructor pilot candidates who occupy a pilot seat and are under the supervision of a flight examiner pilot not in a pilot seat may practice simulated emergency procedures during initial or requalification upgrade evaluations to instructor pilot. Preface all simulated emergencies with the word "simulated" and terminate simulated emergencies if an actual emergency arises. Simulated emergency procedures are prohibited during air refueling and formation/airdrop flights. ***Exception***: Practice emergency separations may be accomplished on air refueling training flights.

9.5.2. Weather. Simulated single engine failure or approaches/landings with flaps less than 75% are authorized in IMC if weather is at or above:

9.5.2.1. Circling minimums for approach being flown during daylight hours.

9.5.2.2. 1000/2 (or circling minimums for approach being flown, whichever is higher) during night time hours.

9.5.3. Restrictions:

9.5.3.1. Copilots, with less than 500-hours C-141 time, simulated engine-out work is restricted to the simulator.

9.5.3.2. Copilots, with 500-hours or more C-141 time, squadron commanders may allow IP supervised simulated in flight engine-out approaches, missed approaches, and landings.

NOTE: The copilot will be thoroughly briefed by the IP on asymmetric thrust and proper engine-out procedures and techniques prior to accomplishing the event.

9.5.3.3. Copilots may perform circling approaches under normal configurations only.

9.5.3.4. First pilot (FP) upgrades and above may practice simulated engine-out approaches/landings/go-arounds in the aircraft. For the purpose of this chapter, first pilot upgrade is defined as an individual currently enrolled in a formal FP upgrade course.

9.5.3.5. No flap approaches/landings/go-arounds may be accomplished by Aircraft Commander (AC) candidates and above. For the purpose of this chapter, AC candidates are defined as an individual designated by the squadron commander for entry into training prior to a formal AC upgrade course. See **Table 9.1.** for approach and landing with flaps less than 75 percent.

9.5.3.6. FP upgrades and above may perform circling approaches in conjunction with a simulated engine-out approach. This combined maneuver will not be compounded with any other simulated malfunction.

9.5.3.7. AC upgrades and above may perform circling approaches in conjunction with a no-flap maneuver. This combined maneuver will not be compounded with any other simulated malfunction. For the purpose of this chapter, AC upgrades are defined as an individual currently enrolled in a formal AC upgrade course.

9.6. Copilot Air Refueling Training.

9.6.1. Copilots may practice air refueling (to include the contact position) with the following restrictions:

9.6.1.1. Accomplished under direct IP supervision.

9.6.1.2. May be accomplished from either seat.

9.6.1.3. No passengers.

9.6.1.4. Must be Copilot qualified.

9.6.1.5. Designated training mission only.

9.6.2. Contacts by non-AR qualified pilots will only be made after receiving acknowledgment from the tanker pilot and boom operator.

9.6.3. Squadron commanders will individually approve copilots entering into AR training. The academic and ARPTT portions of the formal school courseware will be completed in-unit. The ARPTT training will be taught by Air Force instructors.

9.7. Operating Limitations.

9.7.1. Policy: Unless specifically authorized elsewhere in this section, do not practice emergency procedures that degrade aircraft performance or flight control capabilities (in-flight).

9.7.1.1. In an actual emergency, terminate all training and flight maneuvers practice. Training should be resumed only when the pilot in command determines it is safe.

9.8. Landing Limitations. The following limitations apply to touch-and-go and full stop landings:

9.8.1. Flap setting--Do not practice touch and go landings with less than 75 percent flaps; zero-flap landings will only be full stop.

9.8.2. Multiple full stop landings--Compute brake energy prior to each subsequent takeoff and comply with time restrictions.

9.9. Prohibited In-Flight Maneuvers. The following maneuvers will not be practiced or demonstrated in-flight (limited to simulator):

9.9.1. Stalls and approach to stalls

9.9.2. Dutch roll demonstrations

9.9.3. Simulated engine-out takeoffs

9.9.4. Aborted takeoffs

9.9.5. Simulated two engines out

9.9.6. Simulated runaway pitch trim malfunctions

9.9.7. Tab operable

9.9.8. Jammed stabilizer

9.9.9. Landing with inoperative hydraulic system

9.9.10. Systems emergency procedures training (hydraulics, electric's, etc.)

9.9.11. Emergency descent

9.9.12. Unusual attitudes/spatial disorientation

9.9.13. Bank angles greater than 45 degrees. ***EXCEPTION:*** Steep turn demonstration (perform according to applicable training instruction) and MAJCOM approved tactical maneuvers.

9.10. Instructor Briefing. Before all training/evaluation missions, aircraft commanders or instructors/flight examiners will brief their crews using the MAJCOM approved briefing guides. As a minimum these guides will contain the following items:

9.10.1. Training/Evaluation requirements. Instructors/evaluators (for each crew position) will outline requirements and objectives for each student or examinee.

9.10.2. Planned training area and seat changes.

9.11. Debriefing. Review and evaluate overall training performed. Each student or aircrew member should understand thoroughly what training has been accomplished. Ensure all training is documented.

9.12. Simulated Instrument Flight. Artificial vision restricting devices are not authorized for any phase of flight. Simulated instrument flight may be flown and logged without the use of a vision restricting device.

Table 9.1. Training Maneuvers.

MANEUVER	ALTITUDE RESTRICTION	REMARKS
FCF Engine Shutdown	5000 feet AGL	Performed only on functional check flights.
Simulated Engine Failure	Initiate above 500 ft AGL	Simulated engine failures are not authorized at less than 3-engine approach or 3-engine minimum control airspeed (Vmca) when any actual emergency exists, or when landings are planned with a flap setting less than 75%.
Engine Out Go-Around/	Initiate above 200 ft AGL	Use all engines if below 200 ft AGL.
Low Approach/		
Missed Approach		
Other Simulated Emergencies	Initiate above 500 ft AGL	Not in conjunction with simulated engine failures or approaches/landings with flaps less than 75%.
Missed/Low Approaches		Initiate practice instrument missed approaches no lower than the minimum altitude for the type of approach executed.
Planned Low Approach	Initiate above 100 ft AGL	
Men & Equipment on Runway	Initiate above 500 ft AGL	
Steep Turns		Daylight VMC only. (***EXCEPTION***: Tactical recoveries are exempt.) Check stall speed prior to making turns.
Steep Turns Greater Than 45	5000 ft AGL	Daylight VMC only. (Restricted to degrees of bank tactical training.) Check stall speed prior to making turns.
CAT II ILS		15 knot crosswind for training.
Approach and Landing		Full stop landings only. Maximum with flaps less than 75% crosswind for training is 15 knots. May be performed on training, evaluation, or currency flights by AC candidates and above, and when an instructor or flight examiner pilot occupies one of the pilot seats.

Chapter 10

LOCAL OPERATING PROCEDURES

10.1. General. Units define local operations procedures in this chapter.

Chapter 11

NAVIGATION PROCEDURES AND FORMS

11.1. General.

11.1.1. This chapter consolidates unique navigation procedures and forms into one general location. Publish local procedures, associated correction graphs, and figures other than those in this chapter or in the unit supplement to **Chapter 10**.

11.1.2. When navigators are assigned as primary crew members, their duties include, but are not limited to, those prescribed by the T.O. 1C-141B-1, this chapter, and other appropriate chapters of this volume. Pilots assigned to a mission without a navigator will use applicable portions of this chapter and **Chapter 5**, **Chapter 6**, **Chapter 16**, and **Chapter 17** of this AFI.

11.1.3. Forms. Descriptions and instructions for completing mission planning are provided. Overprinting will consist of applicable route constants; however, use of overprinted forms is limited to those locations where accuracy can be verified. Examples of navigation forms in this chapter are provided to assist in organization and standardization.

11.1.4. Communications. Follow the communications policies contained in paragraph **5.12.**.

11.1.5. Equipment. Crews may use hand-held calculators or computers to assist in navigation. Local units may restrict or standardize at their discretion. Only MAJCOM-approved software may be used when interfacing with aircraft systems. This also applies to laptop moving map displays, which will only be used as a situational awareness tool, to highlight trend data, and to record mission information.

11.2. Mission Planning.

11.2.1. Insure all required fuel computations are accurate and complete, and the ramp fuel load is compatible with mission requirements. Formation lead pilots and navigators will compute, or verify computations if tactics planners prepare mission material, formation fuel requirements, based on the most restrictive load and flight level IAW AMCP 11-1, *C-141 Fuel Planning*.

11.2.2. Crosscheck the planned route of flight entered on the DD Form 175, 1801 or comparable ICAO flight plan. Aircrews will verify computer products and overprinted flight planning forms with current charts and FLIP publications.

11.2.3. Consult the Chart Updating Manual (CHUM) for chart updates within 10 NM of the approach and departure base for airfields without a DOD or Jeppesen approved approach plate. A copy of the flight plan will be provided to the pilot and navigator to verify routing and aid in position reporting. Crew changes (engine running offload or augmented crews) will include, as minimum, a briefing on equipment status.

11.2.4. When practical, plan the most direct routing possible or utilize wind optimized CFP routing to enhance fuel conversation.

11.2.5. For airland missions, the AF Form 4115, **Flight Plan and Record**, AF Form 70, **Flight Plan**, or AF Form 4053, **INS Flight Plan and Log**, may be used alone or in conjunction with TACC or MAJCOM approved computer flight plans. Use AF Form 4115 or AF Form 4053 to compute required fuel or verify computer flight plan fuel analysis.

11.2.6. AF Form 4051, **Low Level Flight Plan and Log**, and AF Form 274 will be used for all low-level missions. For tactical missions consisting of a high altitude portion, use AF Form 4115 or AF Form 4053 in conjunction with AF Form 4051 at the discretion of the navigator. MAJCOM approved software may be substituted for this requirement.

11.3. Flight Charts. For flight progress using flight charts, see paragraph **6.34.** and paragraph **6.35.**:

11.3.1. Airland Charts. A plotting chart showing flight progress will be maintained on all Category I routes. The Oceanic Planning Chart (OPC) series may be used under normal operating conditions, if available. Otherwise, the route of flight will be plotted on a GNC or larger scale chart. The following information is shown on the chart:

11.3.1.1. Mission number, preparer's name, and coordinated universal date in vicinity of departure/coast out point. If the chart is stripped, annotate chart number and edition on the back of a stripped chart. If practical, chart may be reused.

11.3.1.2. The flight plan course and portions of ADIZ boundaries pertinent to the route. Label all reporting points (coordinates or proper names, when available).

11.3.1.3. Consult applicable FLIP area, en route, and terminal charts when preparing mission charts.

11.3.2. Air Refueling Track Charts. A chart showing the A/R track with the ARIP, ARCP, EXIT, and any turn points will be available for Category I air refueling missions. Other information about the A/R track (i.e., block altitudes, etc.) may be added but is not required. Category I routes with the above points annotated meet this requirement.

11.3.3. Low Level Charts. Crews flying low-level missions require a chart of sufficient scale (TPC or larger) to permit accurate placement of the aircraft via map reading. Charts should be annotated with the standard symbols contained in this volume.

11.4. In-flight Navigation - Airland. See also paragraph **6.34.** and paragraph **6.35.**.

11.4.1. Deriving parking spots. Source documents for obtaining INS parking spot coordinates will be in the following priority:

11.4.1.1. Airfield diagrams or MAJCOM approved INS parking spot handouts.

11.4.1.2. DOD FLIP En Route Supplement.

11.4.1.3. JOG or TPC.

NOTE: Handheld GPS (HH GPS) may be used to backup the coordinates derived above. However, due to integrity monitoring reliability, HH GPS may not be used as the sole source of present position.

11.4.2. Preflight and En route.

11.4.2.1. Prior to flight, number the plotted oceanic waypoints on the "master document" with the corresponding INS/FSAS numbers and distance between each waypoint.

11.4.2.2. Oceanic crossing waypoint coordinates will be loaded into the INS/FSAS by one crewmember and verified by a pilot. The pilot who verifies the loaded waypoints will place a checkmark next to each oceanic waypoint (on the "master document") after verifying coordinates and

distance between each waypoint agree with the computer flight plan, ATC clearance, or any clearance changes.

11.4.2.3. Once overhead an oceanic waypoint, recheck outbound track and distance. Place an “X” over the present waypoint to indicate verification of outbound course, distance to next waypoint, and ETA tolerances agree with the computer flight plan. Record the ATA under the waypoint on the master document.

11.4.2.4. Ten minutes after passing each waypoint, record the time and INS coordinates using the plotting symbols shown in the example below.

11.4.2.5. When the aircraft is directed by headings, the time and heading assumed at each alteration are recorded in the "Remarks" on the log or directly on the chart. Altered headings, if used, may be individually plotted or averaged to obtain DR positions.

11.4.2.6. Form 26B (Optional) Use. If using position labels in lieu of a log, affix the label in the vicinity of the appropriate fix. Number the labels progressively as the flight continues to destination. The number on the fix or position arrow corresponds to the number on the position label. Place the label in a manner that will not preclude free use of the chart for possible diversions and/or reconstruction of the mission.

11.5. In-flight Navigation -- Tactical.

11.5.1. Formations Over Category I Routes. All formation crews are required to monitor all ATC clearances, aircraft position, and be prepared to assume lead or single ship navigation, if qualified. Each crew will accomplish its own flight progress and plotting.

11.5.2. Formations Over Category II Routes. Crews will backup lead and strictly adhere to airways and other cleared routing.

11.5.3. VFR/SKE Formations. Formation lead and deputy lead navigators maintain sufficient in-flight progress data to reconstruct the mission.

11.5.4. Corrected drop scores: consult AFI 11-2C-141, Volume 1, *C-141 Aircrew Training*.

11.6. Grid Procedures. (C-141B only):

11.6.1. General. Grid navigation procedures for the AHRS (INS if required) may be used in those areas where convergence of meridians and/or magnetic variation precludes the use of magnetic direction reference and/or terminal approach procedures are in grid only. The INS(S) will be placed in the grid mode when required for terminal area departures, approaches, and landings. Grid headings from the INS(S) will be used for determining the AHRS precession. Approaching the pole, a small difference in the present position of the INS will result in increasing heading differences displayed. Determine which INS is most accurate. Both pilots should then select the same INS for navigation while monitoring the other INS on the CDU. If each pilot prefers to select their own INS, insure the pilot in control of the aircraft selects the most accurate INS. An alternate method would be to select the AHRS (Grid aligned) as the heading reference and follow the GC, adjusted for drift to destination while monitoring the aircraft position in relation to course on the INS's. Operation of the AHRS in the DG mode for grid procedures does not affect the operation of the INS. Grid procedures may be practiced anywhere without degrading INS true heading or course centerline accuracy if the period the INS is de-coupled from the autopilot is kept to a minimum. As soon as grid entry/exit, heading check

or heading reference changeover procedures are completed re-engage the autopilot if utilized for course steering. The Grid Checklist is used in conjunction with the following information for accomplishment of all grid activities.

NOTE: When operating above 70^0N or 60^0S latitude, the AHRS should be placed in the DG mode and adjusted to the INS grid heading. When the AHRS is in grid, a gyro log must be maintained in accordance with procedures as outlined below.

11.6.2. Specific Definitions:

11.6.2.1. Grid North. Grid north is the direction of true north anywhere along the Greenwich meridian. Along the 180^0 meridian (Polar charts), true south is the direction of grid north.

11.6.2.2. Grid Direction. Grid direction is measured from grid north, clockwise through 360^0, using any grid line drawn parallel to the 0^0 meridian.

11.6.2.3. Grivation is the angle measured between magnetic north and grid north. It is used to obtain a magnetic heading (MH) from a grid heading (GH). Grivation is applied to GH in the same manner as variation is applied to TH.

11.6.2.4. Convergence Factor. Convergence is the constant ratio existing between the angular change between meridians as measured on the chart and the difference in degrees of longitude between them. The convergence factor is printed on each chart that uses the grid overlay.

11.6.2.5. Convergence Angle. Convergence angle is the product of the longitude times the convergence factor. A table for convergence angles at each degree of longitude is found in the margin of each navigation chart using the grid overlay.

11.6.2.6. Precession. Precession experienced during a given period of time equals the actual aircraft grid heading (GH) minus the AHRS reading (GR).

11.6.2.7. Precession Rate. Precession rate is the precession converted to an hourly rate (example: precession: 2 degrees, period: 30 minutes, rate: 4 degrees).

11.6.3. Grid Formulas:

11.6.3.1. Northern Hemisphere.

Grid direction = true direction + W
- E longitude or convergence angle.

Grivation (+W) = + W variation - W
-E -E + E longitude or convergence angle.

Mag direction = grid direction +W
-E grivation.

Grid heading = Mag heading -W
+E grivation.

11.6.3.2. Southern hemisphere: Reverse the signs of the longitude or convergence angle in the preceding formulas.

11.6.3.3. For AHRS DG steering:

11.6.3.3.1. Grid heading - AHRS reading = precession.

11.6.3.3.2. To alter heading: Initial grid heading (IGH) = desired grid heading (DGH) + 1/2 rate x time.

11.6.3.3.3. Average grid heading: Mean grid heading between any two time periods. RT/2 correction.

Hourly precession rate x DR time/2

(If precession is +, correction is -.)

11.6.4. Departure Requirements:

11.6.4.1. Grid will not be selected at takeoff unless the published approach plate indicates the polar grid courses for all maneuvers.

11.6.4.2. Polar grid courses as reflected in FLIP terminal charts are used for departures in polar areas. Prior to takeoff, the aircraft will be visually aligned with the runway heading and the polar grid course of the runway set in the AHRS.

11.6.4.3. After reaching flight altitude, determine the grid heading and reset the AHRS. The type of chart being used determines whether the heading will be polar grid or convergence grid heading. If INS grid heading is not available and a convergence grid heading is required, mathematically compute the difference and reset the AHRS.

11.6.5. En Route Requirements:

11.6.5.1. The grid entry/exit section of the AF Form 4115**, Flight Plan and Record**, or the proposed section of the AF Form 4078, **Position Label**, will be completed prior to grid entry/exit. When entering grid operation, spot Grivation/convergence applies to the magnetic/true heading to obtain desired grid heading. When exiting grid the computed magnetic heading is the target heading when the AHRS is reset.

11.6.5.2. The following procedures are used to provide the navigator with methods for gyro steering to be used in the event of INS malfunction:

11.6.5.2.1. The AHRS system is rated as gyro #1 on the AF Form 4115**, Flight Plan and Record**. False latitude is used to compensate for precession.

11.6.5.2.2. Observations are made at least every 30 minutes for the first hour and hourly thereafter. One operational INS is required to provide a grid heading reference.

11.6.5.2.3. If INS is operational and a convergence factor other than 1.0 is needed, enter the required convergence factor into each INS prior to grid entry.

11.6.5.2.4. If INS is operational, an INS grid heading readout is recorded in the GH block at the time of each observation. The heading from the other INS can be recorded in the IGH block.

11.6.5.2.5. The copilot is directed to select AHRS on the NAVIGATION SELECTOR PANEL (NSP) MAG HDG selector to allow the navigator to monitor the AHRS grid heading on the

navigator's BDHI during grid entry/exit, and heading reference changeovers. At the termination of grid entry/exit, or heading reference changeovers, INS heading reference may be reselected by the copilot in order for the aircraft to maintain course centerline.

11.6.5.2.6. The copilot's NAVIGATION SELECTOR PANEL is positioned to NAV OFF. The copilot's NSP MAG HDG push button is positioned to AHRS. The copilot then turns the HDG/PUSH to SYNC knob on the AHRS controller until the desired GH appears in the copilot's HSI window.

11.6.5.2.7. The PICU GRID mode may be turned on at the option of the crew.

11.6.5.2.8. On the CDU the INS heading readout displays GRID information only when GRID and DISP keys are simultaneously pressed and held. All other information (TK, WIND, DSRTK) continues to display in true.

11.6.5.2.9. If GRID mode is selected on the PICU the HSI will display true information if INS is selected, GRID information if TACAN, VOR/ILS, or NAV OFF are selected.

11.6.5.3. Determine the precession for the AHRS after each heading check and reset the AHRS when observed precession is greater than 1.

11.6.5.4. Precession is removed by use of false latitude whenever precession is more than one degree. To determine false latitude correction, enter the false latitude table with the desired latitude setting and the observed hourly precession rate (use cumulative precession rate if AHRS has been reset). The desired latitude is the proposed mid-latitude to the next observation, not to exceed the actual aircraft latitude by 21 at any given time.

11.6.5.5. Do not correct or reset the AHRS unnecessarily. When precession is l degree or less, do not reset the AHRS.

11.6.5.6. If a grid heading cannot be determined from the INS at the regular time interval, use the previous precession information to determine heading changes until a reading can be taken.

11.6.5.7. Grid Log:

11.6.5.7.1. "Prec."The amount of precession since the last AHRS reset (GH - GR = PREC).

11.6.5.7.2. "Rate" is the hourly precession rate based upon the precession indicated at the time of heading check. Precession rate is derived from the indicated precession and the applicable time period; that is, 2 degree precession in two hours will be 1 degree/hour precession rate. This entry required only when actual precession is greater than one degree.

11.6.5.7.3. "Lat." The proposed mid-latitude to the next proposed observation, not to exceed the actual aircraft latitude by 2 degree at any given time.

11.6.5.7.4. "False Lat. "The false latitude setting being used to eliminate precession. This entry required only when a false latitude setting is being used.

11.6.5.8. The Grid Log section on AF Form 4115, **Flight Plan and Record** is used in conjunction with AF Form 4078, **Position Label**. The IN section of the AF Form 4078 contains grid heading. Winds computed are grid winds.

11.6.5.8.1. The following GRID Log procedures will be utilized:

11.6.5.8.1.1. When entering and exiting grid circle heading reference used (that is, MH or TH).

11.6.5.8.1.2. Whenever the AHRS is reset, place a checkmark in the reset block.

11.6.5.8.1.3. The ZN graph is not used.

11.6.5.8.2. When entering GRID operation, apply spot grivation to the computed initial GRID heading (IGH).

11.6.5.9. Procedures when precession cannot be eliminated:

11.6.5.9.1. When heading changes are made at each heading check, use one-half of the precession for the past period. Apply this as a correction to the desired heading to determine the initial heading. The period for which the alteration is made must be the same as the period for which the precession was determined.

11.6.5.9.2. When heading changes are not in sequence with the heading checks: (i) determine an hourly precession rate and a time period used to DR ahead, then multiply rate X time; (ii) determine the expected grid heading for the time of alteration; (iii) determine the new desired grid heading (grid course desired, corrected for drift) and algebraically subtract one-half the value determined in step one; (iv) if all precession cannot be removed (total observed precession rate plus earth rate exceeds 15 degrees/hour), a total precession (TP) correction must be applied to the initial grid heading (IGH) determined in step 3. This TP correction converts IGH to grid compass heading and compensates for past precession.

11.6.5.10. Procedures when precession cannot be determined. Keep the desired latitude and false latitude, if required, up to date and proceed until a heading check becomes available.

11.6.6. Approach:

11.6.6.1. In polar areas, the approach plate will dictate the type of heading information to be used; that is, polar grid or magnetic. The AHRS is reset to the proper heading reference prior to descent. To determine the polar grid heading, apply longitude instead of convergence angle to the true heading for the final grid heading computation. Set the AHRS to the observed grid heading.

11.6.6.2. In a non-polar region, return the AHRS to magnetic operation before initiating the descent.

11.6.7. Miscellaneous Procedures:

11.6.7.1. Normally, when changing charts or crossing the 180th meridian, only the reference changes, not the heading of the aircraft. The change is made by comparing the grid courses and applying the difference to the gyro reading (old chart GC 35 degree; new chart GC 331 degrees, GR 353 degrees, 350-331 degrees = 019 degrees; 353 - 019 = 334; reset the gyro to read 334 degrees).

11.6.7.2. Always recheck your computations and formulas when a radical change in precession is observed.

11.6.7.3. Use of False Latitude Correction Table/Graph.

Example: 0950 ENTRY:

Proposed mid-latitude next leg: 28N.

Hourly precession rate, past period = +2.2. Find proper false latitude.

SOLUTION: Proceed from proposed mid-latitude (28'N) horizontally to corresponding earth rate value (7.00).

Add algebraically past period precession rate (7.0 degrees + 2.2 degree = 9.2 degrees).

Proceed vertically from earth rate value of 9.2 degrees to earth rate curve.

Proceed horizontally to latitude value: 38 degrees.

This equates to 38N which is set in the AHRS latitude control.

NOTE: For each period that only desired latitude changes, reenter the False Latitude Correction Graph, using the procedure above to obtain a false latitude setting. In making subsequent adjustments, the previous corrections must be considered. If there is one degree or less observed precession during the next period, disregard. Adjust for any change in mid-latitude using the accumulated precession rate of +2.2 degrees.

1010 ENTRY:

Next proposed mid-latitude 27N.

Observed precession, past period +1 (disregard).

Previous hourly precession rate +2.2 degrees.

Find next false latitude value.

SOLUTION:

Proceed from proposed mid-latitude (27N) horizontally to corresponding earth rate value (6.7 degrees).

Add algebraically previous hourly precession rate (6.7 degrees + 2.2 degrees = 8.9 degrees).

Proceed vertically from earth rate value of 8.91 to earth rate curve.

Proceed horizontally to latitude value: 37N

This equates to 37N which is set in the AHRS latitude control.

1040 ENTRY:

Next proposed mid-latitude: 26N.

Hourly precession rate, past period +1.8.

Find next false latitude value.

SOLUTION:

Proceed from mid-latitude (26N) horizontally to corresponding earth rate value (6.5 degrees).

Algebraically determine the sum of the precession rates previously determined (+2.2 + 1.8 = 4.0).

Add this accumulated value to 6.5 (6.5 + 4.0 = 10.5 degrees).

Proceed vertically from earth rate value of 10.5^0 to earth rate curve.

Proceed horizontally to latitude value: 44N.

This equates to 44 N which is set in the AHRS latitude control.

NOTE: When the adjusted earth rate precession value passes zero, the resulting value is south latitude.

NOTE: When the total observed precession rate plus earth rate exceeds 15^0/hr, you cannot completely correct it. In those cases your remaining hourly precession will be equal to the total observed precession minus 15^0 (15^0 is the rate equal to your setting of 90^0 on the AHRS latitude control). You must take 1/2 the remaining predicted precession, reverse the sign, and apply it to your desired heading to obtain an initial grid heading. Example: Total precession rate from grid entry = $+12.5^0$, mid-latitude next leg 38^0N, desired grid heading 040 degrees.

Earth Rate 38N	+9.30
Total Observed Precession Rate	+12.50
TOTAL	+21.80
False Latitude 90 N	+15.00
Remaining Predicted Precession Rate	
(This is an hourly rate)	+6.80

Assuming one hour between heading shots, predicted recession between heading checks will be +6.80.

$$IGH = DHG + \frac{1}{2} \text{ rate X time} = \frac{040 \text{ degrees } -6.8}{2} = 037 \text{ degrees}$$

(Rounding to the nearest degree)

At the next heading check, assuming the autopilot didn't wander, you would find GH = 043.8 degrees and GR 037 degrees. This would give you an average of 040.4 degrees.

11.7. AF Form 4115, Flight Plan and Record.

11.7.1. AF Form 4115 is primarily used for flights over a Category I routes. Accomplish flight planning with a computer flight plan (CFP). If not available, manually compute the flight. Microfiche which contains the track constants for the standard fixed routes in the AMC CFP library is available at most locations to assist in manual flight planning.

NOTE: Category II Route - Route on which the aircraft position can be determined accurately by crossing overhead a radio aid (NDB, VOR, TACAN) at least once each hour and positive course guidance is available between radio aids. Category I Route - Route that does not meet the requirements of a Category II route.

11.7.2. Explanation of Terms:

11.7.2.1. Flight Plan:

11.7.2.1.1. "CFP No and Profile." Computer flight plan number and profile, if applicable. Left blank on manual flight plans.

11.7.2.1.2. All entries in the fuel planning section will be computed IAW AMCPAM 11-1.

11.7.2.1.3. The "Zone or DP "column may be used to list INS waypoint numbers for each position.

11.7.2.1.4. The "To" column will have the coordinates of the position and the proper name or identifier, if applicable.

11.7.2.1.5. Distance to alternate will be the air distance from destination to alternate.

11.7.2.1.6. "Remarks." Use this section to record pertinent information related to the flight plan section and required departure and approach clearances.

11.7.2.2. Computer Flight Plan.

11.7.2.2.1. The first line of the CFP contains:

11.7.2.2.1.1. Computer flight plan.

11.7.2.2.1.2. 305DlMHDO012 - The coded CFP request.

11.7.2.2.1.3. .74 - Mach requested.

11.7.2.2.1.4. CFPI - 300185129 - The CFP identifier which indicates that this CFP was computed on Julian day 300 at 1851:29, Coordinated Universal Time (UTC).

11.7.2.2.2. The second line contains:

11.7.2.2.2.1. 305D - The track identifier.

11.7.2.2.2.2. MHD - The profile code.

11.7.2.2.2.3. KDOV - The departure station ICAO.

11.7.2.2.2.4. EDAR - The destination station ICAO.

11.7.2.2.2.5. 221CYPN55/50N AMC - The CFP routing NA221 Port Menier 55N50W Machrihanish.

11.7.2.2.2.6. H - The track altitude structure (high).

11.7.2.2.2.7. L/O 20 - The time to level off.

11.7.2.2.2.8. C-141B - Aircraft type.

11.7.2.2.2.9. 28/08Z-16Z - Covers the valid span of takeoff times for this CFP. This CFP was computed for a takeoff time on the twenty-eighth day of the month at 1200Z, the mid-time of its validity.

11.7.2.2.3. The third and fourth lines contain the departure station and columnar headings as follows:

11.7.2.2.3.1. DOVER - Departure station with its geographical coordinates on the following line.

11.7.2.2.3.2. ALT - Altitude or flight level.

11.7.2.2.3.3. TTR - Total time remaining.

11.7.2.2.3.4. WIND - From true direction and in knots.

11.7.2.2.3.5. AFLCHG - Accumulated fuel change (burn off).

11.7.2.2.3.6. TAS - True airspeed.

11.7.2.2.3.7. GS - Ground speed.

11.7.2.2.3.8. TD - Temperature deviation.

11.7.2.2.3.9. ZD - Zone distance.

11.7.2.2.3.10. ZT - Zone time.

11.7.2.2.3.11. TT - Total time.

11.7.2.2.3.12. TDR - Total distance remaining (TD - Total distance flown).

11.7.2.2.3.13. TC - True course.

11.7.2.2.3.14. MC - Magnetic course.

11.7.2.2.3.15. MH - Magnetic heading.

11.7.2.2.3.16. CAL - Collective addressee listing.

11.7.2.2.4. An asterisk (*), indicating the level off position, is found between ALT and WIND. When this level off position occurs more than one minute from a required position, a level off position is computed and displayed.

11.7.2.2.5. A plus (+) or ampersand (&) sign between the position name and ALT indicates reserve fuel computed on those legs.

11.7.2.2.6. The first line after the destination coordinates contains:

11.7.2.2.6.1. CFP ALT FWF +18 - Is the forecast wind factor computed between initial level off and destination at computer flight plan altitude.

11.7.2.2.6.2. WF1+3 - Is the first half wind factor computed between level off and the flight plan midpoint in distance.

11.7.2.2.6.3. WF2+33 - Is the second half wind factor computed between the midpoint and destination at computer flight plan altitude.

11.7.2.2.6.4. ETP 404 - Is the equal time point in hours and minutes computed from departure to destination.

11.7.2.2.6.5. PG 014 - The fuel planning page number used in AMPAM 11-1.

11.7.2.2.6.6. TOGW 300,000 - Takeoff gross weight.

11.7.2.2.6.7. Plus 0 (+0) - Is the computed weighted average temperature deviation from standard. In this case, temperature deviation is standard.

11.7.2.2.7. 4000 ABV and 4000 BLW - When shown these two lines provide wind factors and temperature deviations for altitudes 4000 feet above and 4000 feet below CFP altitude.

11.7.2.2.8. The time and fuel analysis for each alternate is included in a five-line segment.

11.7.2.2.8.1. The first and second lines contain:

11.7.2.2.8.1.1. EDAF - The first alternate displayed station ICAO is Frankfurt Main.

11.7.2.2.8.1.2. ALT - Altitude or flight level is 200.

11.7.2.2.8.1.3. TDEV - Temperature deviation is minus one.

11.7.2.2.8.1.4. WIND - True direction/knots, 265/39.

11.7.2.2.8.1.5. TAS - True air speed is 378.

11.7.2.2.8.1.6. GS - Ground Speed is 390.

11.7.2.2.8.1.7. ZD - Zone distance is 52.

11.7.2.2.8.1.8. AD - Air distance is 47, computed using TAS and ZT.

11.7.2.2.8.1.9. ZT - Zone time is eight minutes.

11.7.2.2.8.1.10. MACH - 60.

11.7.2.2.8.2. The third, fourth, and fifth lines contain the time and fuel analysis for the alternate and correspond to the fuel planning section of AF Form 4115. The numbers followed by a dash (-) are the item number. Times for each block are followed by pounds of fuel.

11.7.2.3. Optimized Computer Flight Plan (OMCFP). The OMCFP is an improved version of the AMC CFP system. It tailors the flight plan for cargo and fuel loads and automatically selects the best (optimized) track and profile combination based on airspace structure/constraints, aircraft performance, atmospheric conditions, and user inputs. OMCFP automatically assembles optimum track structures from (1) airways, (2) direct legs between NAVAIDS, (3) direct routes without regard to the NAVAID structure, or (4) a combination of the above. The following is a typical OMCFP:

11.7.2.3.1. The first line of the OMCFP contains:

11.7.2.3.1.1. AMC computer flight plan.

11.7.2.3.1.2. KBLV - requesting agency.

11.7.2.3.1.3. 37 - daily sequence number.

11.7.2.3.1.4. 111309 - OMCFP number.

11.7.2.3.1.5. .74 - mach number requested.

11.7.2.3.1.6. CFPI - 0531750.2 - CFP identifier number. CFP produced 053 Julian day at 1750.2Z.

11.7.2.3.2. The second line contains:

11.7.2.3.2.1. KSUU - departure ICAO.

11.7.2.3.2.2. PHNL - destination ICAO.

11.7.2.3.2.3. TRK R64 - via CONUS/Hawaii track R64.

11.7.2.3.2.4. H - high level route structure.

11.7.2.3.2.5. C-141B - type aircraft.

11.7.2.3.2.6. *GB* - global weather data base, (CL - climatological history, or URWX - requester input wind factor and temp dev).

11.7.2.3.2.7. 23/l0Z-18Z-the valid time span for this CFP.

11.7.2.3.3. The third and fourth lines contain the route summary used to sequentially list checkpoints of the flight track by three-letter NAVAID identifier (four letter overwater).

11.7.2.3.4. The fifth line contains: Optimized fuel plan - indicates whether the computer flight plan is optimized for fuel or time.

11.7.2.3.5. The sixth line contains:

11.7.2.3.5.1. OPNLWT - pre-stored aircraft operating weight.

11.7.2.3.5.2. PAYLOAD - total cargo/passenger weight used to compute OMCFP.

11.7.2.3.6. The seventh line contains:

11.7.2.3.6.1. ARR FUEL approach and landing fuel.

11.7.2.3.6.2. TIME BIAS approach and landing time.

11.7.2.3.7. The eighth and ninth line contain the departure station and columnar headings. The abbreviations on the OMCFP are identical to the standard AMC CFP with the following exceptions:

11.7.2.3.7.1. LAT/LONG - all figures are expressed as degrees, minutes, and tenths of minutes. The decimal point is omitted.

11.7.2.3.7.2. B/O - cumulative burn-off (hundreds of pounds).

11.7.2.3.7.3. TDEV - temperature deviation.

11.7.2.3.8. A plus (+) or ampersand (&) sign indicates the beginning and end of reserve fuel computation.

11.7.2.3.9. TOC/LEVEL-OFF - display of level-off information.

11.7.2.3.10. BEGIN DESCENT - point for beginning descent. Computed from aircraft performance manual.

11.7.2.3.11. The lines following the destination coordinates contain:

11.7.2.3.11.1. FIRS - en route time from departure to FIR crossing.

11.7.2.3.11.2. FWF -18 - mean wind factor for entire flight.

11.7.2.3.11.3. WFl -29 - mean wind factor for first half of flight.

11.7.2.3.11.4. WF2 -9 - mean wind factor for second half of flight.

11.7.2.3.11.5. ENDURANCE 0649 - total endurance at altitude (hours/minutes) based on flying to BEGIN DESCENT point and continuing at cruise altitude.

11.7.2.3.11.6. TOGW 259 - takeoff gross weight in hundreds of pounds.

11.7.2.3.11.7. -02 - average en route temperature deviation.

11.7.2.4. The time and fuel analysis for each alternate is included in a five-line segment. The first alternate listed is the primary alternate used for the OMCFP fuel computation. The columnar headings are identical to the main OMCFP heading with the following exceptions:

11.7.2.4.1. AD - air distance computed using TAS and ZT. TOGW - takeoff gross weight computed for each alternate.

11.7.2.4.2. A flight level summary line is displayed for each alternate based upon the computed OMCFP TOGW. This summary depicts any flight level adjustments necessary to the body of the OMCFP when selecting other than the primary alternate.

NOTE: Due to differences in altitude profiles, the en route times (item 1) for the secondary alternates may differ from the primary alternate times. This difference is due to changes in true airspeeds/winds associated with the altitude profile required for that particular alternate.

11.7.3. Procedures.

11.7.3.1. Flight Plan.

11.7.3.1.1. The equal time point (ETP) may be computed using adequate airfields along or near the flight plan course. Computations entered in the appropriate block. Selected en route airfields are noted on AF Form 4115, **Flight Plan and Record**, when used in lieu of departure and destination. When ETPs are computed on other than departure and destination, the pilot or navigator will compute first and second half wind factors using average TAS and GS to a point halfway between the airfields used. When computer flight plan departure and destination are used, enter time to ETP in the appropriate block.

11.7.3.1.2. The actual time of arrival (ATA) column documents time of arrival over the position identified on that line.

11.7.3.1.3. Compute actual wind factor between initial level off position and the last position prior to initiation of descent.

11.7.3.2. Fix/Flight Data.

11.7.3.2.1. Record sufficient data on the fix/flight data portion to provide full information necessary for evaluation and/or reconstruction of the mission.

11.7.3.2.2. Select one INS as the heading source, then compute deviation for the AHRS, the other INS and the standby compass. Accomplish the AHRS check using the copilot's HSI and navigator's BDHI. The deviation check is accomplished after initial level off or coast out.

11.7.3.2.3. NAVAID data will contain actual readings plus all corrections. Computer positions are required for each required fix (if available) and are desirable at all other fixes.

11.7.3.2.4. Use the "Remarks" section to record pertinent information and events along with the times of the events. Remarks include, but are not limited to, en route ATC clearances, equipment malfunctions, ETA revisions, computer updates, navigator changeover, GRID entry and exit and heading alterations.

11.8. AF Form 4078, Position Label. Use the AF Form 4078 for each required fix/computer position for flights over a Category I route. Position labels are completed in conjunction with the AF Form 4115 or 4053 and a CFP.

11.8.1. AF Form 407, **Position Label.** Procedures:

11.8.1.1. At unit discretion, position labels may be used in lieu of **AF Form 4115, Flight Plan and Record,** to record flight progress.

11.8.1.2. When using the INS to provide heading information to the autopilot for maintaining course, the OUT portion of the label need not be completed.

11.9. AF Form 4051, Low Level Flight Plan and Log.

11.9.1. General. This form should be used by all air mobility airdrop units. Air mobility units are authorized to overprint route information and may utilize the reverse to depict the route, special procedures, or additional data required. The remarks section is available to record pertinent information and additional data. Entries are self-explanatory; however, some do not apply to the C-141 or are optional.

NOTE: MAJCOM approved software may be used in lieu of this requirements, however, paragraph **11.5.2.** applies. This still requires that fuel analysis be accomplished/verified IAW AMCPAM 11-1.

11.9.1.1. A/B (Ahead/Behind) - Optional.

11.9.1.2. Doppler - Not required.

11.9.1.3. Fuel Analysis - Will be completed using the AF Form 274 IAW AMCPAM 11-1.

11.9.2. Completion:

11.9.2.1. All preflight entries, based on latest wind information, are normally completed/entered prior to the formal or serial lead briefing. The ETA block is completed based on actual takeoff time.

11.9.2.2. All navigators complete applicable in-flight entries during tactical operations which require the use of this form.

11.10. AF Form 4053, INS Flight Plan and Log/AF Form 70, Pilot's Flight Plan and Flight Log. When an AF Form 70 is used, the crew will complete the fuel analysis using the AF Form 4115 or AF Form 4053 fuel analysis format.

11.11. Controlled Orbit Departure Timing (Optional)

11.11.1. Use graph for controlled orbit departure timing according to the following example:

GIVEN		
	OUTBOUND COURSE	180^0 TRUE
	W/V	220/15 TRUE
	TOTAL TIME IN ORBIT	15 MINUTES
FIND		
TIME ADJUSTMENT FACTOR		
	(1) Figure relative W/V	040
	(2) Enter top of graph with relative wind and velocity	
	(3) Proceed vertically downward to total time in orbit	
	(4) Proceed horizontally to right and read correction factor	PLUS 23 SECONDS
USE OF GRAPH		
	(1) Divide orbit time in half	07:30
	(2) Apply correction factor	:23
	(3) Start stopwatch and turn at orbit point and time for total of (1) + (2) above (07:53) when time has elapsed, turn inbound	07:53.

***NOTE* 1:** Graph assumes that time to turn outbound equals time to turn inbound, therefore, no additional corrections need to be made for turns.

***NOTE* 2:** Distance used in computation is with full drift correction applied on outbound and inbound legs. If drift correction is not applied, additional distance traveled will increase time adjustment factor by an amount proportional to the wind velocity.

11.12. Slowdown Point Graph (Optional).

11.12.1. The slowdown point graph, when used in conjunction with the INS, will provide a quick and simple solution for accurate TOT control. Accomplish the following steps.

11.12.1.1. Preflight:

11.12.1.1.1. Enter graph on zero line, intercept appropriate wind factor line and proceed vertically to "miles to CARP. "The resultant is slowdown distance at six minutes out.

11.12.1.1.2. Select a well-defined checkpoint that can be used to determine ahead-or-behind status. Compute an ETA to this checkpoint. The checkpoint to slowdown time plus the six minutes from slowdown to green light, subtracted from scheduled TOT will give you the checkpoint estimate.

11.12.1.2. In-flight:

11.12.1.2.1. Recompute checkpoint ETA using best available in-flight data or update preflight estimate.

11.12.1.2.2. Compare actual time with computed ETA, enter graph with ahead-or-behind time, intercept expected wind factor line, and look down to "miles to CARP" for the new slow-down point.

11.12.1.2.3. Advise the pilot of the slowdown point two miles (approximately 30 seconds) prior to the actual slowdown point.

11.12.1.2.4. Provide the pilot with a five-second countdown to the actual slowdown point.

11.12.2. To reduce TOT error, the following technique designed to correct for in-flight wind factor changes from the IP to DZ may be used.

11.12.2.1. Preflight:

11.12.2.1.1. Compute preflight slowdown point and IP time.

11.12.2.1.2. Compute the IP time for various wind factors.

11.12.2.2. In-flight:

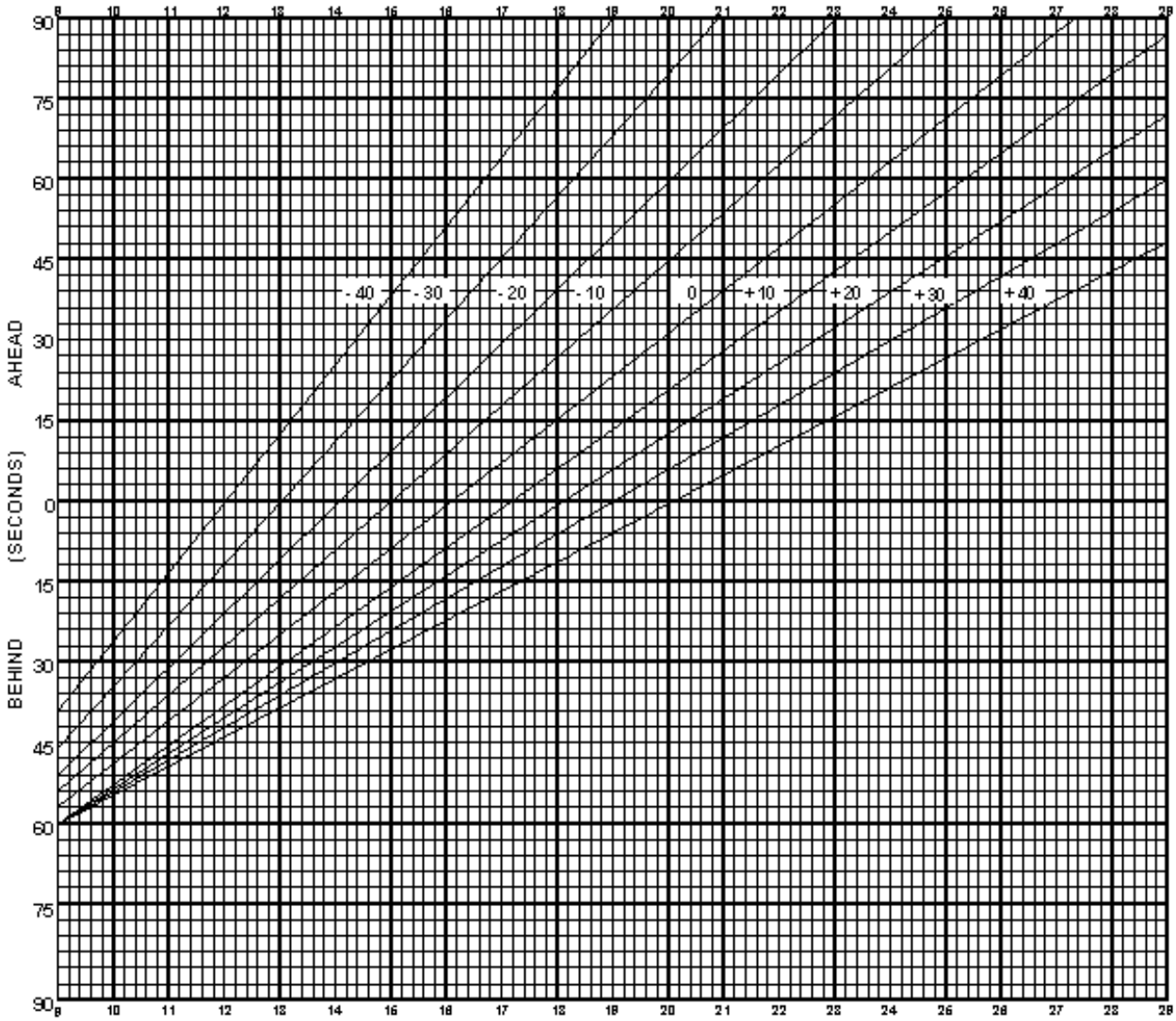
11.12.2.2.1. Confirm the wind factor inbound from the IP to DZ using pathfinder or low-level winds.

11.12.2.2.2. A change in expected wind factor of 10 knots will result in a TOT error of approximately 20 seconds.

Table 11.1. Slowdown Point Graph Example.

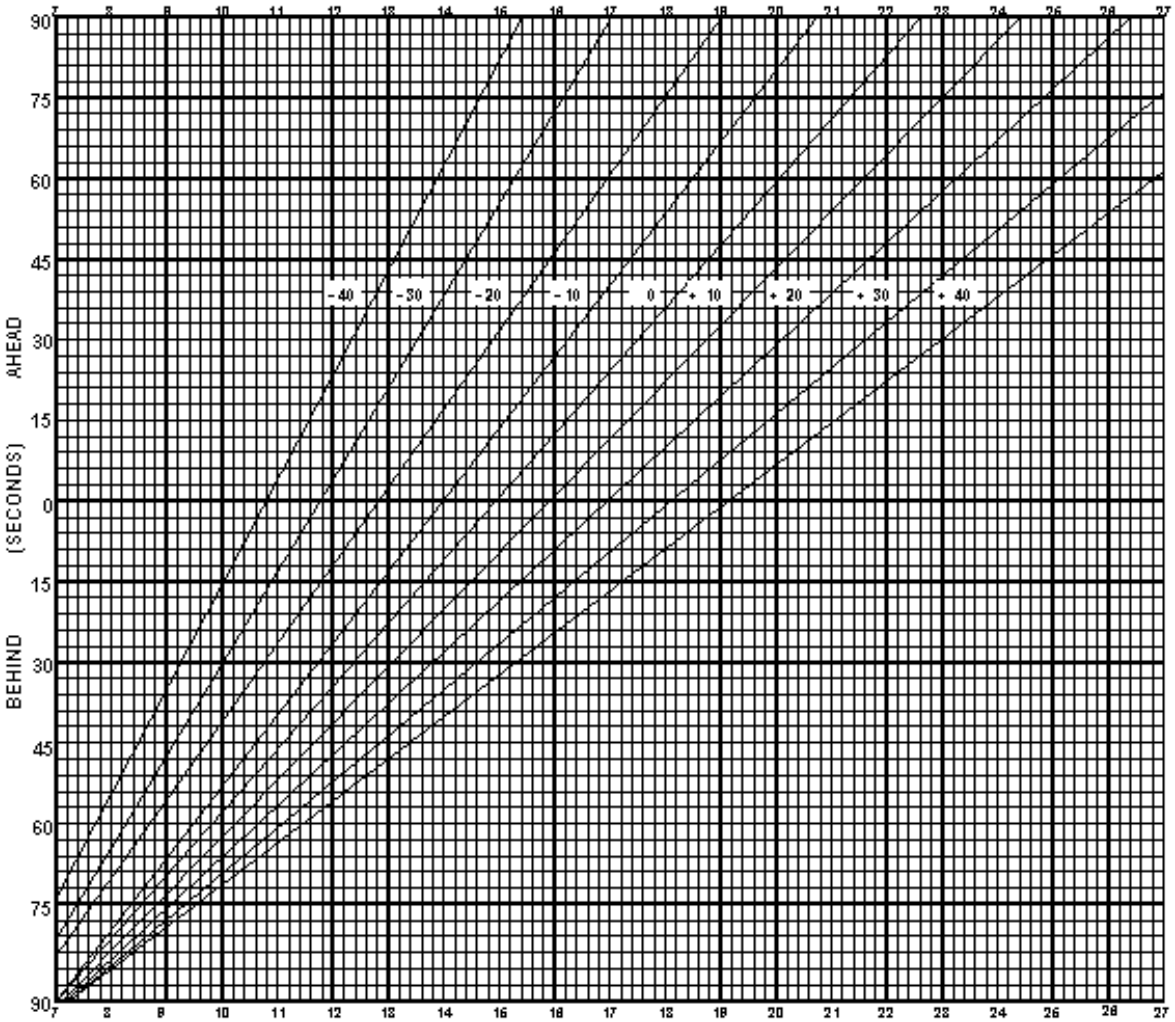
Wind Factor	GS Over IP	Slow Distance	Time +6.0	IP ETA
-30	205	11.8		1949.42
-20	215	12.8		1950.12
-10	225	13.8		1950.36
0	235	14.8		1951.00
TOT			2000Z	
IP to DZ Distance			26 NM	
Wind Factor (WF)			-18	
Personnel Slowdown Point			13.0 NM or 1954Z	
Desired IP Time			1950:18	
Actual WF			-10 (this changed desired IP time to 1950:36)	
Actual IP Time			1950:00	
Enter the slowdown point graph with -10 knots WF and 36 seconds ahead.				
Slowdown at 16.6 NM.				

Figure 11.1. Six Minute (Heavy Equipment) Slowdown Point Graph.



NOTE: Inbound 230 KCAS/Drop 150 KCAS.

Figure 11.2. Six Minute (Personnel) Slowdown Point Graph.

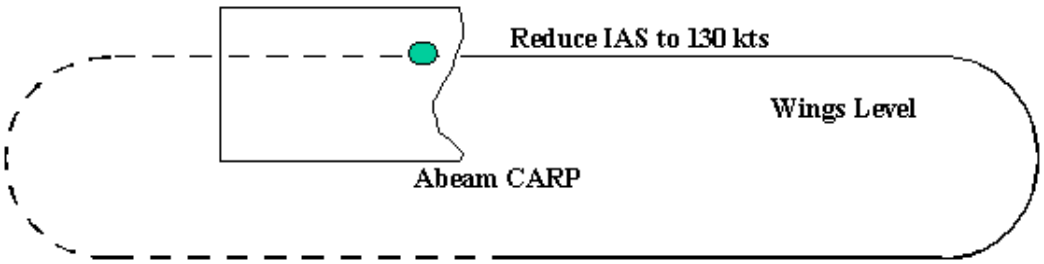


NOTE: Inbound 230 KCAS/Drop 130 KCAS

Figure 11.3. Ten Minute Orbit Data.

TOTAL TIME REMAINING ABEAM CARP	OUTBOUND GROUND SPEED												
	134	139	144	149	154	159	164	169	174	179	184	189	194
5'00"	1'46"	1'42"	1'39"	1'36"	1'33"	1'30"	1'26"	1'23"	1'20"	1'17"	1'14"	1'10"	1'07"
5'10"	1'51"	1'48"	1'45"	1'41"	1'38"	1'34"	1'31"	1'28"	1'24"	1'21"	1'18"	1'14"	1'11"
5'20"	1'57"	1'53"	1'50"	1'46"	1'43"	1'39"	1'36"	1'32"	1'29"	1'25"	1'22"	1'18"	1'15"
5'30"	2'03"	1'59"	1'55"	1'51"	1'48"	1'44"	1'40"	1'37"	1'33"	1'29"	1'25"	1'22'	1'18"
5'40"	2'08"	2'04"	2'00"	1'56"	1'52"	1'49"	1'45"	1'41"	1'37"	1'33"	1'29"	1'26"	1'22"
5'50"	2'13"	2'09"	2'05"	2'01"	1'57"	1'53"	1'49"	1'46"	1'41"	1'37"	1'33"	1'29"	1'25"
6'00"	2'19"	2'15"	2'11"	2'06"	2'02"	1'58"	1'54"	1'51"	1'46"	1'41"	1'37"	1'33"	1'29"
6'10"	2'25"	2'20"	2'16"	2'12"	2'07"	2'03"	1'59"	1'54"	1'50"	1'46"	1'41"	1'37"	1'32"
6'20"	2'30"	2'26"	2'21"	2'17"	2'12"	2'08"	2'03"	1'59"	1'54"	1'50"	1'46"	1'41"	1'36"
6'30"	2'36"	2'31"	2'26"	2'22"	2'17"	2'12"	2'08"	2'03"	1'58"	1'54"	1'49"	1'44"	1'40"
6'40"	2'41"	2'36"	2'32"	2'27"	2'22"	2'17"	2'12"	2'07"	2'03"	1'58"	1'53"	1'48"	1'43"
6'50"	2'47"	2'42"	2'37"	2'32"	2'27"	2'22"	2'17"	2'12"	2'07"	2'02"	1'57"	1'52"	1'47"
7'00"	2'52"	2'27"	2'42"	2'37"	2'32"	2'26"	2'21"	2'16"	2'11"	2'06"	2'01"	1'56"	1'51"
7'10"	2'58"	2'52"	2'47"	2'42"	2'36"	2'31"	2'26"	2'20"	2'15"	2'10"	2'05"	1'59"	1"54"
7'20"	3'03"	2'58"	2'52"	2'47"	2'41"	2'36"	2'30"	2'25"	2'19"	2'14"	2'08"	2'03"	1'57"
7'30"	3'09"	3'03"	2'57"	2'52"	2'46"	2'40"	2'35"	2'29"	2'23"	2'18"	2'12"	2'07"	2'01"
7'40"	3'14"	3'08"	3'02"	2'57"	2'51"	2'46"	2'39"	2'33"	2'28"	2'22"	2'16"	2'10"	2'05"
7'50"	3'20"	3'14"	3'08"	3'02"	2'56"	2'50"	2'44"	2'38"	2'32"	2'26"	2'20"	2'14"	2'08"
8'00"	3'25"	3'19"	3'13"	3'07"	3'01"	2'55"	2'48"	2'42"	2'36"	2'30"	2'24"	2'18"	2'12"
8'10"	3'31"	3'25"	3'18"	3'12"	3'06"	2'59"	2'53"	2'47"	2'40"	2'34"	2'28"	2'22"	2'15"
8'20"	3'36"	3'30"	3'24"	3'17"	3'10"	3'04"	2'58"	2'51"	2'44'	2'38"	2'32"	2'25"	2'19"
8'30"	3'42"	3'35"	3'28"	3'22"	3'15"	3'09"	3'02"	2'55"	2'49"	2'42"	2'36"	2'29"	2'22"
8'40"	3'47"	3'40"	3'34"	3'27"	3'20"	3'13"	3'06"	3'00"	2'53"	2'46"	2'39"	2'33"	2'26"
8'50"	3'53"	3'46"	3'39"	3'32"	3'25"	3'18"	3'11"	3'04"	2'57"	2'50"	2'43"	2'36"	2'29"
9'00"	3'58"	3'51"	3'44"	3'37"	3'30"	3'23"	3'15"	3'08"	3'10"	2'54"	2'47"	2'40"	2'33"
9'10"	4'04"	3'57"	3'50"	3'42"	3'35"	3'28"	3'20"	3'13"	3'05"	2'58"	2'51"	2'44"	2'36"
9'20"	4'10"	4'02'	3'55"	3'47"	3'39"	3'32"	3'24"	3'17"	3'10"	3'02"	2'55"	2'47"	2'40"
9'30"	4'15"	4'07"	4'00"	3'52"	3'44"	3'36"	3'29"	3'21"	3'14"	3'06"	2'58"	2'51"	2'43"

1. START STOP WATCH ABEAM CARP and note, TIME REMAINING TO NEXT DROP.
2. Enter chart with total time remaining and outbound groundspeed for TIME TO TURN.
3. Exercise extreme care in applying drift correction on the outbound leg (this rule-of-thumb is based on a symmetrical racetrack.
4. Major factor involving accurate control of T.O.T. in racetrack is control of slowdown after roll out inbound. Power MUST be decreased as soon as WINGS ARE LEVEL INBOUND.



FORMULA FOR FIGURING YOUR OWN TIME TO TURN (OPTIONAL)

$$\frac{\text{Time Remaining in Seconds - (110 sec)}}{\text{Outbound TAS + Inbound TAS}} = \frac{\text{TIME TO TURN (in Seconds)}}{\text{GS INBOUND}}$$

Figure 11.4. Ten Minute Orbit Graph.

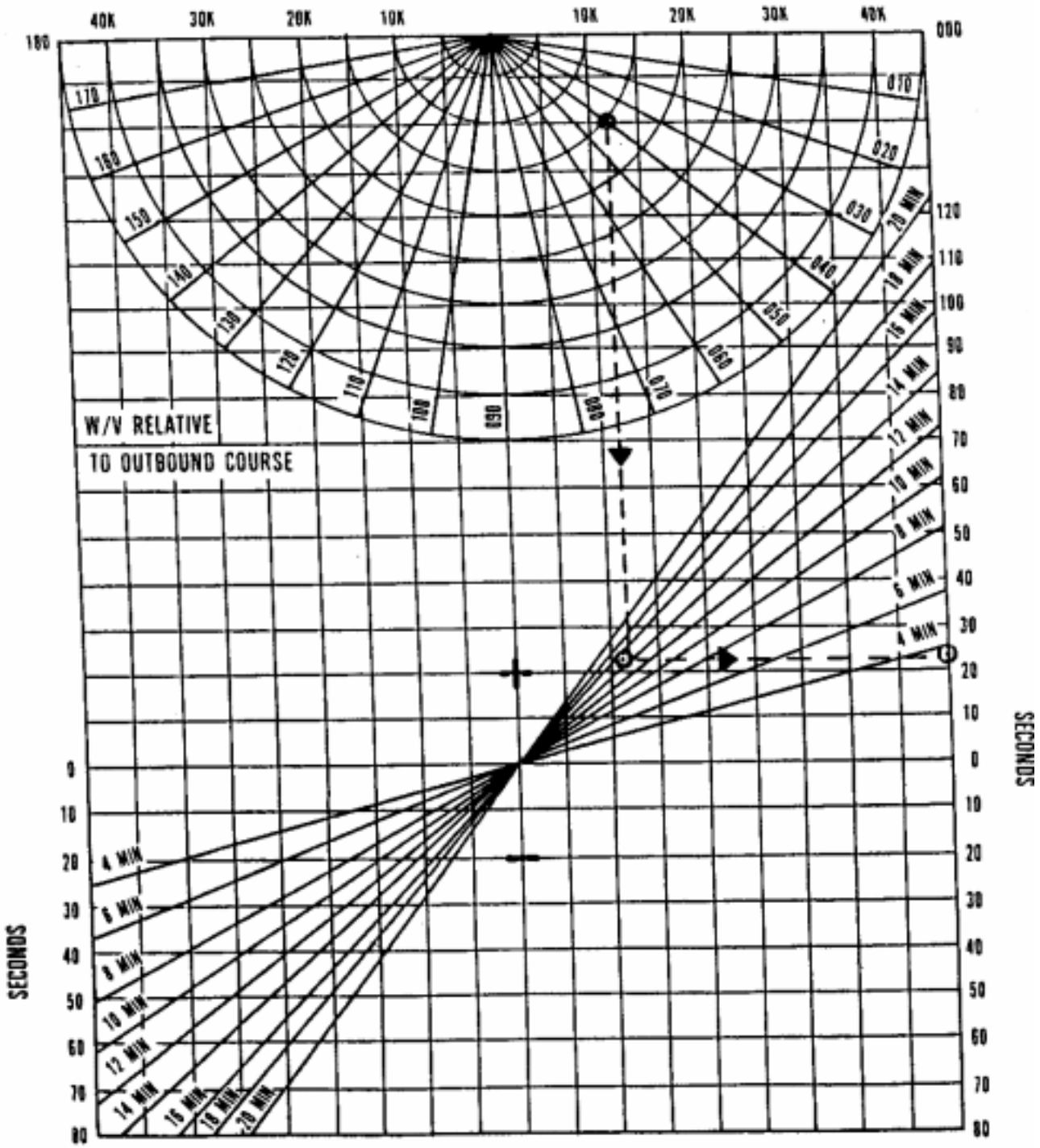


Table 11.2. Turning Radius Chart/Example.

Ground speed	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	
200	.2	.4	.6	.8	1.0	1.2	1.5	1.8	2.1	2.5	3.1	3.7	4.3	200
225	.2	.4	.7	.9	1.1	1.3	1.7	2.0	2.3	2.8	3.4	4.1	4.8	225
250	.2	.5	.7	1.0	1.2	1.5	1.8	2.2	2.6	3.1	3.8	4.6	5.4	250
275	.3	.5	.8	1.1	1.4	1.6	2.0	2.4	2.9	3.4	4.2	5.0	5.8	275
300	.3	.5	.9	1.2	1.5	1.5	2.2	2.6	3.2	3.8	4.6	5.5	6.4	300
	10°	**20°**	**30°**	**40°**	**50°**	**60°**	**70°**	**80°**	**90°**	**100°**	**110°**	**120°**	**130°**	
	TIME BACK (ETA ADJUST TO START TIME)													
	3"	7"	10"	14"	18"	22"	27"	32"	38"	45"	55"	66"	78"	
	TIME SAVED IN TURN													
	---	---	1"	2"	3"	5"	7"	10"	16"	24"	36"	52"	72"	
	TIME REQUIRED TO COMPLETE TURN													
	7"	13"	20"	27"	33"	40"	47"	53"	60"	67"	73"	80"	88"	

NOTES:

For radius of turn, extract from 90 degrees (double for turn diameter)

INTERPOLATE BY VISUAL ESTIMATE

PROCEDURE TURNS

MINUTE TURNS (1½ DEGREES) APPROXIMATELY 20 DEGREE BANK 250 KIAS

EXAMPLE:

GS 250kts; Degrees-to-Turn: 90 degree

SOLUTION:

1. Distance short of checkpoint to start turn = 2.6NM
2. Time adjust to start turn = 38 Second
3. Time saved in turn = 16 Second

Chapter 12

FLIGHT ENGINEER PROCEDURES AND FORMS

12.1. General. This chapter contains FE procedures not contained in the flight manual, other portions of this AFI, or other publications.

12.2. Responsibilities.

12.2.1. First Engineer. An engineer fully qualified to perform all primary flight engineer duties. The primary flight engineer, designated on the flight authorization, is responsible to the aircraft commander for all inspections and procedures required by the applicable technical orders and instructions. The flight engineer is the technical advisor to the aircraft commander pertaining to all aircraft systems and procedures. When a second engineer is on the crew, the primary flight engineer will ensure the second engineer accurately completes all station duties on time.

12.2.2. Second Engineer. A second engineer is not fully qualified in all flight engineer duties. When not under the supervision of an instructor, a second engineer is responsible for the completion of all duties for which he or she is fully qualified. A second engineer is authorized to occupy the flight engineer station during takeoff and landing. Training missions will be conducted in accordance with AFI 11-2C-141 Volume 1 and this AFI.

12.3. Authority to Clear Red X Symbols. FEs are normally not authorized to clear a Red X. If a situation is encountered where the aircraft is on a Red X and qualified maintenance personnel are not available to clear it, the most qualified flight engineer on the scene may obtain authorization to clear the Red X from the aircraft's home station logistics group or operations group commander or designated representative or chief of maintenance, in accordance with T.O. 00-20-1. Other crew members are not authorized to clear a Red X.

EXCEPTION: A first engineer or above may clear Red Xs for engine covers, pitot covers, and gear pins when qualified maintenance personnel are not available, unless prohibited by the home station logistics group or operations group commander or designated representative or chief of maintenance.

12.4. Aircraft Servicing. FEs are normally not required to refuel or de-fuel aircraft; however, the FE is qualified and authorized to accomplish these duties when maintenance personnel are not available. This policy is designed for support of the aircraft and its mission while away from home station. Without exception, the applicable refueling and de-fueling checklists will be used during all refueling and de-fueling operations. If ground support personnel are not available, the aircraft commander will designate other crew members to assist the FE. An FE may assist the normal maintenance function when critical contingency tasking dictate their use, provided this action does not impact crew duty and crew rest limits specified in **Chapter 3** of this AFI.

12.4.1. Concurrent Servicing Operations. Concurrent servicing operations are potentially hazardous. The Concurrent Servicing Supervisor (CSS) is responsible for controlling and monitoring all concurrent operations. All personnel will report to the CSS prior to entering the concurrent servicing area. Personnel supervising portions of the operation will coordinate each phase of their concurrent operations with the CSS and report any condition that might jeopardize safety prior to and during concurrent servicing operations.

12.4.1.1. First engineers and above are authorized to perform concurrent servicing supervisor duties. Since flight engineers will only perform CSS duties when maintenance personnel are not available, the flight suit will suffice for identifying the flight engineer as the concurrent servicing supervisor.

12.4.1.2. Second engineers may perform CSS duties under the supervision of an instructor flight engineer.

12.4.1.3. Concurrent servicing will be performed using applicable technical guidance, observing guidance in T.O. 00-25-172.

12.4.1.4. Concurrent Servicing supervisor and refueling certifications are accomplished during periodic evaluations.

12.5. Engine Conditioning Monitoring.

12.5.1. Flight engineers will complete AF Form 4082, **C-141/TF33 Engine Conditioning Monitoring In-flight Data Worksheet**, once each flight, not to exceed two per day, with the following guidance:

12.5.1.1. Data is not required on flights with a cruise segment of less than one hour or local training/tactical flights.

12.5.1.2. Do not generate forms to track flights when data is not required.

12.5.1.3. Do not record data in turbulence.

12.5.1.4. Do not use autothrottles when recording data.

12.5.2. Record data during stabilized cruise flights. Adjust throttles so the EPR indications are the same, allow time for engine indications to stabilize, then record data.

12.5.3. Place completed AF Form 4082 in the aircraft forms (regardless of unit of assignment).

NOTE: Unit-equipped ARC flight engineers will comply with unit procedures on UE aircraft.

12.5.4. For mission aircraft returning to home station, prior to arrival, the primary flight engineer will ensure applicable AF Form 4082 have been accomplished and that all required entries have been made and are legible. All completed AF Form 4082 will be turned in to maintenance.

12.6. Aircraft Structural Integrity Program. The objectives of the C-141 Aircraft Structural Integrity Program (ASIP) include evaluating airframe strength and service life, facilitating decisions concerning aircraft inspection, maintenance, modification, and service usage and developing improved structural criteria and design methods.

12.6.1. The program is monitored using data scanned from AFTO Form 451, **C-141 Aircraft Usage Log**. Instructions for completing the AFTO Form 451 are contained in T.O. 1C-141B-102.

12.6.2. Place completed AFTO Form 451 in the aircrew mission kit (regardless of unit assignment).

NOTE: Unit-equipped ARC flight engineers will comply with unit procedures on UE aircraft.

12.6.3. For mission aircraft returning to home station, prior to arrival, the primary flight engineer will ensure an AFTO Form 451 has been accomplished for each flight segment and that all required entries

have been made and are legible. All completed AFTO Form 451 will be turned in to unit standardization.

12.6.4. Unit standardization will forward all completed AFTO Forms 451 to WR-ALC/LJLEA, Attn.: C-141 ASIP Manager.

12.7. Fault Code Reporting Procedures. The Fault Reporting Manual (FRM) and Fault Isolation Manual (FIM) are used to provide maintenance with an accurate description of system malfunctions and to isolate malfunctions with a minimum amount of troubleshooting.

12.7.1. Flight engineers will use the FRM to identify all system malfunctions.

12.7.2. The appropriate fault code and accompanying malfunction description will be recorded in the aircraft forms. Include any additional information necessary to ensure the description is accurate and clear.

12.8. Performance Data Computations. The AF Form 4071, **C-141B Performance Data Worksheet,** is intended to provide an orderly method for computing performance data for takeoff, emergency return, level off, step climb, range, landing, and local training mission computations. The flight engineer will complete this form using instructions in T.O. 1C-141B-1-1.

12.9. AF Form 4072 Pilots TOLD Card. The AF Form 4072, is to be used to transcribe data from the AF Form 4071 for missions and local training flights.

12.10. HP-41CV -- TOLD Procedures.

12.10.1. The TOLD program for the HP-41 calculator performs a majority of takeoff and landing computations. The program follows the AF Form 4072. Restrictions to takeoff gross weight and reverse limiter were omitted due to program complexity and calculator memory limitations. Aircraft speeds are within one to two knots and other numbers are similarly valid. The following ranges are represented:

Takeoff Gross Weight: 160,000 to 344,000

Temperature: -60 to +60 degrees C

Pressure Altitude: -1000 to 6000 feet MSL

If any of these parameters are exceeded or if CFL exceeds 10,000 feet, refer to T.O. 1C-141B-1-1.

12.10.2. Since no further development or changes to the TOLD program are planned, no money should be directed toward the purchase or maintenance (except batteries) of the HP-41. It may be used only until the program becomes obsolete.

12.11. Tool Kits. One flight engineer tool kit will be on board for all missions.

Chapter 13

LOADMASTER PROCEDURES

13.1. General. The loadmaster coordinates loading or offloading aircraft functions; performs preflight and postflight of aircraft and systems. Performs loadmaster aircrew functions and computes weight and balance. Provides for safety and comfort of passengers and troops, and security of cargo mail, and baggage during flight. Conducts cargo and personnel of airdrop. Supervises loadmaster activities and related functions, including aircraft loading and offloading activities, cargo handling and restraint.

13.2. Responsibilities for Aircraft Loading.

13.2.1. AMC Stations.

13.2.1.1. Air freight personnel are responsible for selecting cargo and mail for airlift, promptly completing documentation, palletizing cargo, load planning, computing load distribution, and movement of cargo to and from the aircraft to meet scheduled departure. They will brief the loadmaster of destination, size, weight, and type of cargo (classified, hazardous, etc.) before starting load operation to permit proper positioning. They will also coordinate traffic activities that may affect loading and off-loading and assign sufficient air freight personnel for cargo handling. They are responsible for safe positioning of material handling equipment to or from the aircraft cargo door, ramp, or auxiliary ground loading ramps. Under supervision of the loadmaster, air freight personnel prepare the aircraft for loading, physically load and offload the aircraft, tie down cargo, release tie-down, and stow tiedown equipment.

13.2.1.2. The loadmaster is responsible for aircraft preflight, load planning, weight and balance preparation, certifying load plans; and operating the aircraft winch. The loadmaster supervises loading operations and is responsible for safe movement of cargo and passengers into and out of the aircraft. Should cargo, aircraft equipment, or aircraft structure be damaged during loading or off-loading, or should loading personnel be injured, the loadmaster will notify the aircraft commander, command post, and the terminal operations officer. The loadmaster will brief the aircraft commander on hazardous cargo jettisonable prior to engine start.

13.2.1.3. Loads planned by qualified load planners will be accepted by the aircraft loadmaster and loaded aboard the aircraft as planned, unless the load or any portion of it will compromise flight safety or does not comply with aircraft T.O.s (e.g., Zero Fuel CG out of limits), or Air Force/MAJCOM publications. If cargo is refused or rearranged for these reasons, all applicable information, to include a copy of the load plan, will be sent to HQ AMC/DOVF, attached to an AMC Form 54, through standardization channels.

13.2.2. Non-AMC Stations.

13.2.2.1. At locations without AMC air terminal or traffic personnel, the shipper assumes responsibilities in paragraph **13.2.1.1.** and provides sufficient qualified personnel and material handling equipment for loading or off-loading. Loadmaster responsibilities and authority are the same as described in paragraph **13.2.1.2.** and paragraph **13.2.1.3.**.

13.2.3. During JA/ATT, SAAM, contingency, and US Air Force mobility missions, the loadmaster can accept DD Form 2133, **Joint Airlift Inspection Record**, as a valid pre-inspection of equipment being offered for air shipment. This form, validated by two joint inspector signatures, may be used in

place of the applicable portions of the Technical Order (TO) 1C-141B-9CL-1. This does not relieve the loadmaster from ensuring accompanying loads are secure prior to takeoff. The DD Form 2133 will not be used to document preparation of hazardous materials. This will be accomplished using the Shipper's Declaration for Dangerous Goods.

13.3. Emergency Exits and Safety Aisles. In order to provide access to emergency exits, walkways will be kept clear to the rear of the aircraft. Cargo will not extend over the edge of the walkway. Vehicle equipment such as spare tires, mirrors, etc., protruding from rolling stock may extend over the walkway. If passengers are seated in side facing seats, the loadmaster will ensure there is sufficient space between the cargo and the seats to permit passenger leg room. Palletized cargo will not extend beyond the vertical stacking line of the pallet. Exceptions are authorized for oversized cargo when pallets are used as a mobility platform. Dunnage may be required to raise the oversized cargo above the pallet to provide restraint rail clearance.

NOTE: All passenger hand-carried items shall be of a size to fit under the seat and will not obstruct the safety aisle between or along side of seats. Any items that do not meet this criteria will be secured elsewhere or stowed with checked baggage. When side facing seats are used, restraint rails and roller conveyors under seats should be stowed.

13.4. Preflight Duties.

13.4.1. Cargo Missions.

13.4.1.1. Aerial port personnel establish loading times. Loading times that differ from the normal pre-departure sequence will be established, with aircraft commander coordination, before the loadmaster enters crew rest. Loading time is governed by the type of load and complexity of loading procedures (bulk, palletized, etc.) not by port saturation or management of aerial port workload levels.

13.4.1.2. Phase II Loading Operations. Phase II is an Aerial Port aircraft loading program directly managed and supervised by air transportation personnel. It provides units the flexibility to determine the best time to load or off-load aircraft when aircrew support is not available. The intent of the program is to allow management the ability to distribute workload evenly. It will not serve as an aircrew enhancement or alleviate the loadmaster's responsibility to on/off-load aircraft.

13.4.1.2.1. Phase II on/off-load operations are not authorized for:

13.4.1.2.1.1. Intransit C-141 ground times of 3-hours and 15 minutes or less.

13.4.1.2.1.2. Wheeled equipment with pneumatic tires when gross weight exceeds 15,000 pounds.

13.4.1.2.1.3. Solid wheeled equipment with wheels exceeding 150 pounds per inch of width.

13.4.1.2.1.4. Loads requiring use of the aircraft winch.

13.4.1.2.1.5. Loads contained in T.O. 1C-141B-9, Section VI. *Exception* - loads identified with an asterisk.

13.4.1.2.1.6. Aerial Delivery missions.

13.4.1.2.2. Tactical, contingency, mobility and JA/ATT missions may be Phase II loaded provided deploying unit load plans are validated and countersigned by a qualified Phase II load planner and provisions of paragraph **13.4.1.2.1.** are complied with.

13.4.1.3. Proper cargo documentation must accompany each load. A consolidated statement (manifest) will be provided prior to departure unless one is not available due to a lack or failure of the manifest processing equipment. In this case, a cargo listing or floppy disks containing manifest information must accompany the load.

13.4.1.4. Make every effort to exchange tie-down equipment on a one-for-one basis. If this is not possible, annotate the AF Form 4069, **Tie down Equipment Checklist**. At non-AMC stations, 463L pallets will normally be exchanged on a one-for-one basis.

13.4.1.5. When the load consists of any cargo secured with nets or straps, a 30-inch space will be maintained between the cargo and the nearest forward occupied seat or nuclear cargo. The 30-inch spacing is not required for cargo secured with chains. In addition, when carrying litter patients, a minimum safety aisle of 30 inches will be maintained between litters and occupied passenger seats.

13.4.2. Passenger Missions.

13.4.2.1. Maximize seat availability on AMC aircraft. It may be necessary for crews to perform passenger service functions at stations that do not have this capability. These functions include manifesting, anti-hijacking processing, and ensuring visa/passport requirements are met. Do not hesitate to contact TACC/APCC DSN 576-1755/1758, commercial 618-256-1755/1758, for any questions regarding passenger movement. File a copy of the passenger manifest with the most responsible on-scene agency if there is no base operations or other agency responsible for filing the manifest.

13.4.2.2. Manifesting. Aircraft commanders and loadmasters are responsible to ensure that all passengers are properly manifested.

13.4.2.2.1. Passenger Service or base operations personnel manifest passengers at locations with an AMC Passenger Processing Activity.

13.4.2.2.2. At locations without an AMC Passenger Processing Activity, AMC aircrew personnel will manifest all passengers (use DD Form 2131, **Passenger Manifest**) and leave a copy of the manifest with the flight plan. If not filed with the flight plan, annotate the location of the manifest on the flight plan according to AFI 11-202V3.

13.4.2.2.3. When the aircrew accomplishes manifesting, anti-hijack-processing will also be completed by the aircrew IAW AFI 13-207, *Preventing and Resisting Aircraft Piracy (Hijacking*).

13.4.2.3. If an extended delay occurs, ensure all food items are removed from the aircraft by Fleet Service and returned to the in-flight kitchen. Ensure that a copy of AF Form 3516, **Food Service Inventory Transfer Receipt**, is received from Fleet to relieve the loadmaster of meal accountability.

13.4.2.4. Complimentary snacks and beverages are authorized on Transportation Working Capital Fund (TWCF) missions (including ANG or AFRC-operated missions) for passenger consumption only. Complimentary snacks are not authorized on JA/ATT, JCS exercises, or SAAMs. The port

operations officer will ensure snacks and beverages are placed on board when departing AMC stations. When departing from non-AMC stations and no snacks or beverages are to be placed onboard, the loadmaster may obtain required snacks and beverages from the local in-flight kitchen. Direct the in-flight kitchen to bill the accounting and finance office at the aircraft's home station. Record all unused snacks and beverages on AF Form 3516 and return to the in-flight kitchen for turn-in credit.

13.4.2.5. Ensure the auxiliary power unit is shut down before boarding passengers unless adequate ear protection is provided. A passenger service representative or crew member will assist passengers at the bottom of the steps, and the loadmaster will assist in seating passengers. Ensure that only adult, English-speaking passengers are seated next to emergency exits. Do not seat mothers with infants nor children under 15 years old in seats adjacent to emergency exits. Make every effort to seat families together. Never seat young children where they are required to distribute oxygen masks. Insure parents with young children can reach the oxygen mask container.

13.4.2.6. Only Department of Transportation (DOT) approved infant car seats (ICS) will be used when securing small children. The ICS will be secured to a seat using the seatbelt. Adults will not hold infants for takeoff and landing, nor will they hold the ICS during any phase of flight.

13.4.2.6.1. When children under the age of two are accepted as passengers, their sponsor must provide their own approved ICS. If the mission aircraft is equipped with aft facing "airline style seats" secure the seat in the same manner as in an automobile. If the aircraft is configured with side facing seats crews must ensure that the ICS is adequately secured. The design of the sidewall seatbelt makes it difficult to remove enough slack to secure the ICS. Crew members may need to reroute the seatbelt by crossing the belt, between the sidewall and the seat back webbing, routing the belt back through the webbing and through the securing point on the ICS. When removing slack from the seatbelt, insure the buckle remains on one side so that it can be easily accessed for release. The aircraft commander is the final authority for determining whether the ICS is adequately secured.

13.4.2.7. Download the baggage of no-show passengers and those removed from a flight. In the case of SAAMs or exercise missions at non-AMC locations, coordinate with the Tanker Airlift Control Elements or deploying unit commander to decide if the downloading of baggage is necessary.

13.5. Passenger Handling.

13.5.1. The loadmaster is the key crew/passenger link to ensure good passenger relations. There are certain common sense ules that should be observed:

13.5.1.1. Address passengers by proper title.

13.5.1.2. Avoid arguments and controversial subjects, national or international politics, criticism of other personnel or organizations.

13.5.1.3. Offer services or perform duties in a manner indicating a personal interest and willingness to help.

13.5.2. Comments by the loadmaster and the manner in which they are made often determine passenger attitudes about the flight. Always remember that passengers are individuals; address them collectively only when making announcements.

13.5.3. In Flight Procedures:

13.5.3.1. Passengers may move about the cabin; however, use good judgment and common sense on the number of passengers allowed out of their seats at any one time. Encourage passengers to remain seated with their seatbelts fastened. Due to concern for their safety, passengers are not allowed to sit or sleep on the cargo floor, in vehicles, or on cargo.

13.5.3.2. Make frequent checks on the following:

13.5.3.2.1. Cabin temperature.

13.5.3.2.2. Passengers with small children.

13.5.3.2.3. Cleanliness of the cabin and lavatories.

13.5.3.2.4. Wear of seatbelts.

13.5.3.3. Do not allow passengers to tamper with emergency equipment.

13.5.3.4. On long flights, particularly during hours of darkness, use all possible means to make passengers comfortable. Dim or extinguish unnecessary cargo compartment lights.

13.5.3.5. Passengers may visit the flight deck only when approved by the aircraft commander. Use good judgment when requesting this authority.

13.5.3.6. Passengers will be supervised for the entire period of flight. During aerial refueling operations, the loadmaster will ensure all passengers remain seated with seatbelts secured from completion of the "rendezvous checklist" through completion of the "POST AIR REFUELING CHECKLIST."

13.5.3.7. When passengers are carried, a loadmaster will be in the cargo compartment for all take-offs and landings. When more than 40 passengers are on board both loadmasters will be in the cargo compartment for takeoff and landing. ***Note***: Specific loadmaster requirements are contained in paragraph **3.2.**.

13.5.4. Meal Service:

13.5.4.1. Meals are served at normal hours when practical, based on the local time at point of departure. Avoid waking passengers to offer meals. Ask the aircraft commander about expected flight conditions prior to meal preparation.

13.5.4.2. Passengers are served in the following sequence. Use the Passenger Boarding Pass/ Ticket to verify meal ordered:

13.5.4.2.1. Small children requiring assistance.

13.5.4.2.2. Distinguished Visitors (DV).

13.5.4.2.3. All other passengers.

13.5.4.3. Use the following procedures for box lunches:

13.5.4.3.1. 13.4.4.3.1.Distribute box lunches after takeoff.

13.5.4.4. Do not serve liquids or hot food during turbulence.

13.5.4.5. Turn in all meals unfit for consumption to the first in-flight kitchen. If in radio contact with the issuing station, relay aircraft tail number, mission identifier, number of spoiled meals (by

menu), issuing organization, and in the case of frozen meals, the manufacturing agency, and manufacturer's lot number.

13.5.4.6. When prepared meals have not been furnished to passengers, the loadmaster will annotate the individual's Passenger/Boarding Ticket to reflect reimbursement is authorized. Inform passengers they may receive refunds at the next station or the originating or destination terminal.

13.6. Over-Packed Meal Procedures.

13.6.1. Sign for over-packed in-flight meals and supplements delivered to the aircraft. These meals have been inventoried and annotated showing the total number of meals in each container. Do not open containers for inventory.

13.6.2. Obtain sufficient blank copies of AMC Form 305, **Receipt for Transfer of Cash and Vouchers**.

13.6.3. At the on-load station, contact the troop commander or other individual responsible for the mission. The unit or user is responsible for collecting for the meals prior to the on-load and for turning the money over to the loadmaster with two separate listings. One listing will contain the names of those not on separate rations who are authorized to receive a government meal at no charge. The other list will contain names of those on separate rations that pay for their meals. The troop commander or individual responsible for the mission must certify both listings. The loadmaster will count the money to ensure the total is correct and issues a receipt (AMC Form 305) to the user.

13.6.4. Turn in the money and both listings to the in-flight kitchen at the next en route, or terminating station with an in-flight kitchen. If an in-flight kitchen refuses to accept the money or meals, have the aircraft commander report the incident on AMC Form 54, **Aircraft Commander's Report on Services/Facilities**. (See **Chapter 8** for instructions.) Retain the money or meals and turn them in to the next available AMC in-flight kitchen. When a crew change occurs and the money or meals are transferred to the outbound loadmaster, the inbound loadmaster will retain the signed receipt as proof of money or meals transfer.

13.7. En Route and Post Flight Duties.

13.7.1. At stations where a crew change is made and loading or off-loading is required, the inbound loadmaster is responsible for off-loading the aircraft. The outbound loadmaster is responsible for planning and loading the outbound load. When no crew change occurs, the inbound loadmaster is responsible for on-loading and off-loading cargo.

13.7.2. Loadmasters on intransit aircraft with ground times of more than 4-hours and 15 minutes who are required to load their aircraft due to training or evaluation must notify the ATOC upon arrival. ATOC will make every effort to accommodate the request by ensuring the ATOC ramp coordinator has communicated with the aircrew regarding the up/download requirements. However, the final decision to Phase II the aircraft will rest with the Chief of ATOC, or designated representative, in coordination with the Ramp Services supervisor.

13.7.3. At crew stage points, brief relief personnel about passenger and aircraft equipment, any missing items, the location of through cargo, mail and baggage, and any information pertinent to through passengers. Point out cargo requiring special consideration (hazardous material, perishables, etc.).

13.7.4. Assist passengers to deplane. Inform ATOC if any passenger requires special assistance.

13.8. Emergency Airlift of Personnel. The following procedures will apply to ensure a safe, efficient loading method for emergency airlift of personnel from areas faced with enemy siege, hostile fire, for humanitarian reasons, or when directed by the TACC. See **Chapter 20** for emergency airlift procedures of litter patients.

13.8.1. Emergency airlift will normally be accomplished without the use of individual seats or safety belts. Install 10,000 or 25,000-pound tiedown fittings in 20-inch increments from the crew entrance door to the aft end of the cargo ramp. Use tiedown rows A and G for 10,000 pound fittings. Attach tiedown straps in the rings provided. Load personnel in groups of 8 to 10. Position personnel facing forward and restrain them with the pre-positioned tie-down straps. If necessary, load personal effects and baggage on the ramp. This will reduce the number of available spaces by approximately 40.

13.8.2. The maximum altitude for emergency airlift will not exceed FL 250.

13.9. Rucksacks. Rucksacks may be floor loaded, placed under seats, loaded in vehicles or on pallets. Insure restraint rails and rollers are stowed when rucksacks are placed under side-facing seats. Allocate space on the aircraft load plan for floor loading rucksacks if they will not physically fit under the seats without obstructing the aisleway. In all cases, an unobstructed safety aisle must be maintained to evacuate the aircraft during emergencies.

13.10. Loaded Weapons. Weapons are considered loaded if a magazine or clip is installed in the weapon. This applies even though the clip or magazine is empty.

13.10.1. Personnel who will engage an enemy force immediately upon arrival (actual combat) may carry basic combat loads on their person. Weapons will remain clear with magazines or clips removed until immediately prior to exiting the aircraft. This applies to airborne assaults and airland missions.

13.10.2. Personnel who will not immediately engage an enemy force will store basic ammunition loads in a centralized location for redistribution on arrival at the objective. Magazines or clips will not be inserted into weapons.

13.11. Cargo Validation On-loading and Off-loading Procedures. In order to assist in the cargo validation process, use the cargo validation on-loading and off-loading format included in the paragraph below. Use this format when tasked to validate a new loading procedure or when encountering any cargo that you feel requires special or specific on-loading, off-loading or tie-down procedures which are not currently listed in T.O. 1C-141B-9. After completion, send through standardization channels to HQ AMC/DOV.

13.11.1. General Loading Data:

13.11.1.1. Nomenclature of item. Give military or civilian name, National Stock Number (NSN), and a brief description of the item, e.g. dump truck, medical van, etc.

13.11.1.2. Dimensions (in inches):

13.11.1.2.1. Length, width, and height.

13.11.1.2.2. Rough drawing or picture of the unit, pointing out critical dimensions, projections, overhangs, etc.

13.11.1.3. Weight (in pounds):

13.11.1.3.1. Gross weight.

13.11.1.3.2. Individual axle weight.

13.11.1.3.3. Data plate weight if possible.

13.11.2. Crew--number of loading crew personnel and Loadmasters required to on-load or off-load cargo and their required position to observe clearance, if required.

13.11.3. Equipment and Material Requirements--special equipment and material required to on-load and off-load cargo, i.e. cargo winch, prime mover, shoring requirements.

13.11.4. Aircraft Configuration Required.

13.11.5. Preparation of Cargo for Loading--any modifications to the cargo prior to loading.

13.11.6. Loading Procedures.

13.11.7. Tie Down Points.

13.11.8. Off-loading Procedures.

13.11.9. Comments.

13.12. Border Clearance. Customs, Immigration, and Agriculture require certain forms for border clearance. The loadmaster is the custodian of these forms and for other forms that may be required during the flight or while on the ground. Ensure all required forms are aboard the aircraft before takeoff. Distribute forms to the crew and ensure completion prior to landing. Comply with all border clearance requirements IAW the AMC Aircrew Border Clearance Guide.

NOTE: Ensure sufficient customs forms are available for each passenger. Passenger service should provide these forms with the manifest prior to departure. On aeromedical missions, a medical technician will coordinate with the loadmaster to ensure custom forms are completed for patients.

13.13. Joint Task Force/Command and Control Module. The Command and Control Module (CCM) is a 36-foot long Airstream trailer built in 3 sections. Each section is permanently mounted on 12-foot long airdrop pallets. The CCM is Department of Transportation certified, and has been approved for use in the C-141 by OC-ALC/LKR Tinker AFB, Oklahoma. The CCM is not FAA certified for occupancy for takeoff and landing, therefore it will not be occupied during takeoff or landing.

13.13.1. The CCM has the capability to carry up to 10 personnel, four in seats with seatbelts. The communications suite operator will proceed to the CCM after take-off when cleared by the aircraft commander, establish power application, and establish interphone contact with the cockpit. Once interphone contact has been established additional personnel will be cleared to the CCM. Interphone contact will be established and maintained with the CCM operator anytime the CCM is occupied.

13.13.2. In the event of a loss of cabin pressurization, occupants of the CCM will don the emergency oxygen provided. All occupants will proceed to their assigned takeoff and landing seats when directed by the flight crew.

13.14. Weight and Balance. Accomplish weight and balance for this airplane according to T.O. 1-1B-50, *Weight and Balance*, and AFI 11-2C-141, Volume 3, Addenda A, *C-141B Configuration/Mission Planning*. The unit possessing the airplane maintains the primary weight and balance handbook con-

taining the current airplane status and provides a supplemental weight and balance handbook for each airplane. Enclose the supplemental handbook in a wear-resistant binder (preferably metal), stenciled "Weight and Balance" with the airplane model and complete serial number on the cover.

13.14.1. The supplemental handbook will include the basic weight checklist manual, the loading data manual, AFI 11-2C141, Volume 3, Addenda A, sufficient copies of DD Form 365-4, **Weight and Balance Clearance Form F - Transport/Tactical,** and a certified copy of the current DD Form 365-3, **Chart C-Basic Weight and Balance Record**. Chart C will include the airplane's basic weight, basic moment, center of gravity, certification date and signature.

13.14.2. The weight and balance section of the unit possessing the airplane maintains the required documents.

13.14.3. Obtain the fuel weight from the flight engineer or read directly from each gauge and compute the sum for total fuel weight.

Chapter 14

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14.1. This chapter is not used for C-141 operations (Fuel Planning).

Chapter 15

AIR REFUELING

15.1. A/R Limitations. This chapter establishes guidelines applicable to C-141 aircraft and aircrews and is supplemental to those prescribed by the flight manual and other applicable directives.

15.1.1. Refueling During Training Missions. A/R should not be accomplished during training missions when:

15.1.1.1. Conditions are encountered that, in the opinion of the aircraft commander, result in marginal control of either aircraft or the boom.

15.1.1.2. Either the tanker or the receiver has less than the full number of engines operating.

15.1.2. Tanker Autopilot. Tanker pilots must notify receiver pilots when any axis of the autopilot is not used. If the tanker copilot is required to fly autopilot-off for training, unqualified receiver pilots will not fly the aircraft (N/A FTU formal training). Tanker pilots must notify the receiver when copilot autopilot-off training is conducted and receive confirmation that the receiver pilot flying the aircraft is qualified.

15.1.3. A/R Without Tanker Disconnect Capability. Without tanker disconnect capability means the boom operator cannot trigger an immediate disconnect. A/R will not be conducted after a known loss of tanker disconnect capability.

EXCEPTIONS: Fuel emergency situation, contingency missions, JCS alert, ORI or CORI, Prime Nuclear Airlift Force (PNAF) support missions under normal conditions when the refueling is essential for home base recovery, or for any mission when authorized in the mission directive.

NOTE: When conducting A/R without tanker automatic disconnect capability, limit contacts to the minimum number necessary to complete mission requirements. Do not accomplish boom limit demonstrations, or practice emergency separations while in the contact position.

15.1.4. Override Boom Latching. This is an emergency procedure. Tanker automatic disconnect limits and tanker normal and manual disconnect capability is inoperative. If approved, use of this procedure will be authorized in the mission directive.

NOTE: Boom operator and receiver pilot must coordinate all actions as required by applicable directives and checklists when making A/R contacts using emergency boom latching procedures.

15.1.5. Reverse A/R procedures can be accomplished for operational necessity only.

15.1.6. Practice Emergency Separations:

15.1.6.1. Prior to the actual accomplishment of a practice emergency separation, coordination between the tanker pilot, boom operator, and receiver pilot is mandatory. Coordination must include when the separation will occur and who will give the command of execution.

15.1.6.2. Prior to initiating practice emergency separations from the contact position, the receiver will ensure their A/R system is not in the override mode.

WARNING: Emergency separations are limited to at or above 500 feet below the respective tanker.

15.1.7. Receiver A/R Training for Unqualified Receiver Pilots. (This includes copilots, aircraft commander upgrade candidates and aircraft commanders refueling from the right seat). In-Flight training will be accomplished under direct IP supervision. The following procedures apply:

15.1.7.1. The receiver pilot must inform and receive acknowledgment from the tanker. The boom operator operating the boom controls must be qualified for the applicable category receiver. (This restriction does not apply during school house training provided the student boom operator is under direct instructor supervision.)

15.1.7.2. If the tanker autopilot is off, the tanker copilot will not fly the aircraft. (This restriction does not apply during school house training provided the student receiver pilot and the student tanker copilot are under direct IP supervision.)

15.1.7.3. Practice emergency separations will not be accomplished with passengers on board unless passengers are seated with seat belts fastened.

15.1.7.4. For receiver pilot initial qualification or re-qualification, the receiver instructor / examiner pilot will be in one of the pilot seats with immediate access to the controls through all phases of the refueling from pre-contact until post air refueling.

15.1.8. If a change of pilot control is made, the receiver aircraft will move back to at least the pre-contact position except for immediate assumption of control by the instructor pilot.

15.1.9. If a receiver seat change takes place, move back to at least 100 feet in trail of the tanker and to a point where the receiver pilot can maintain visual contact with the tanker until the seat change is completed.

15.1.10. When conducting AR behind a KC-135, tanker disconnect capability must be demonstrated by a boom operator initiated disconnect prior to conducting a limit demonstration or a practice emergency separation from the contact position.

15.1.11. Weather Limitations.

15.1.11.1. Turbulence: Do not launch if severe turbulence is forecast on the refueling track. Terminate refueling if moderate turbulence is encountered.

15.1.11.2. Visibility: Do not close from 1 NM range (2 NM for receiver or tanker cell formations) unless you have visual contact with the tankers. Discontinue refueling if in-flight visibility is insufficient to continue safe refueling operations.

15.1.11.3. Recovery airfield must meet the weather criteria of AFI 11-202, Volume 3 for alternate airports.

NOTE: For formation air refueling, aircraft in the awaiting air refueling position must have their respective tanker in sight. If not, air refueling operations will be terminated.

15.2. Not used.

15.3. Not used.

15.4. Not used.

15.5. Receiver Aircraft Commander Responsibilities.

15.5.1. Receiver aircraft shall squawk normal when separation from the tanker is greater than 3 miles.

15.5.2. Receiver aircraft will maintain two-way radio contact with ATC until cleared to the aerial refueling block altitude and cleared to the AR frequency by ATC.

15.6. ATC Clearance.

15.6.1. Altitude Reservations (ALTRV). Air refueling operations normally are done on tracks or anchor areas published in the DOD Flight Planning Document (FLIP). Certain missions or operational considerations may require air refueling operations in areas not published in FLIP. ALTRVs are often used for this.

15.6.1.1. ALTRVs may include all, a portion, or portions of a published route. On operational missions, ALTRVs usually are provided for the refueling portions of the route. In some cases, ALTRVs are provided from the point of departure to a specified point short of the destination.

15.6.1.2. Aircraft operating on an ALTRV must operate within the altitude, time, and areas specified. Actual fix timing will not exceed 10 minutes from ALTRV estimates; otherwise the ALTRV will be canceled by ATC.

15.6.1.3. The mission must be airborne within a certain time period. The end of this period is the assigned void time (AVANA). This ensures separation between aircraft. Unless otherwise specified, AVANA is 1-hour after ALTRV published departure time.

15.6.1.4. If a mission is delayed beyond AVANA, rescheduling normally is by 24-hour increments based on the original departure time. It may be less provided the Central Altitude Reservation Facility (CARF) and affected air traffic control agencies concur.

15.6.1.5. An ALTRV does not preclude ATC from using ALTRV airspace provided standard separation is applied between all aircraft.

15.6.2. ALTRV Format. See FAA 7610.4H, Special Military Operations.

15.6.3. Filing:

15.6.3.1. An ALTRV approval includes a complete description of the route, including altitudes to be flown. When filing a DD Form 175, you do not need to repeat this in the route of flight portion of the flight plan. When filing a DD Form 1801, this information is repeated in the route of flight portion. In either case, include the term ALTRV plus the nickname/code name of the ALTRV; e.g., ALTRV PHOENIX BOOM 2N3/6, in the remarks section of the flight plan.

15.6.3.2. If the ALTRV is to a point short of destination, the route of flight after the ALTRV must be identified on the flight plan. To complete the route of flight portion of the flight plan, identify the ALTRV as before, immediately followed by end ALTRV coordinates or fix, and a subsequent route description.

15.7. Communications Failure. Aircraft experiencing two-way communications failure during the conduct of A/R shall continue flight in accordance with the following procedures:

15.7.1. Squawk code 7600 for at least 2 minutes prior to exiting the track or anchor.

15.7.2. Aircraft that have not received altitude instructions beyond the exit point shall exit the track or anchor at the lowest altitude specified in the clearance for the refueling portion of the flight and pro-

ceed in accordance with "Procedures for Two Way Radio Failure IFR-VFR" set forth in DoD Flight Information Handbook.

15.8. MARSA Applicability for Aerial Refueling. MARSA begins between the tanker and receiver when the tanker advises ATC that it is accepting MARSA. MARSA is not an ICAO recognized term. If in doubt as to what separation is provided by ATC, or what separation the aircrew is responsible for, query the tanker and/or controlling agency.

15.8.1. If MARSA has not been accepted by the tanker prior to receiver reaching the air refueling initial point (ARIP), the receiver may be required to hold at the ARIP.

15.8.2. Once the rendezvous is completed, headings and altitude assignments may be made with the tanker concurrence with MARSA remaining in effect.

15.8.3. Upon completion of the rendezvous, receiver aircraft will remain within 3 miles of the tanker until MARSA is terminated.

15.8.4. MARSA ends when normal separation standards are established, ATC accepts control at end of refueling and ATC advises MARSA is terminated.

15.9. Fuel Planning. Use AMCPAM 11-1 for Air Refueling fuel planning guidance.

Chapter 16

COMBAT MISSION PLANNING

16.1. General. Airlift crews must be capable of employing a wide range of tactics when operating in hostile areas. This chapter provides combat mission planning guidance for planners and aircrews, standardizing procedures for planning, briefing, and reviewing all missions. Mission planning is normally conducted at least one day prior to the mission. Operations group commanders may elect to use a "same day mission plan" option. The aircrew is ultimately responsible for the accuracy of the mission materials. Unit mission planning facilities should possess essential mission planning material.

16.1.1. References. See **Attachment 1**.

16.1.2. Mission Tasking. Combined or joint task force operations, combat contingency operations, or actual combat operations require an alteration of standard peacetime mission tasking procedures. Deployed forces will require both intertheater and intratheater airlift support. A Director of Mobility Forces (DIRMOBFOR) will be assigned to the Air Force Component Commander (AFCC) to help facilitate both types of airlift. The DIRMOBFOR commands the Air Mobility Division (AMD) within the Air Operations Center (AOC) which tasks, plans, and controls all intratheater airlift missions, usually performed by units/aircraft which have been "CHOPed" (change of operational control) to the theater task force commander. An Air Mobility Element (AME), a deployed unit of the TACC, will be co-located within the AMD and functions as a liaison between the TACC and the theater. The AME coordinates and plans intertheater and direct delivery missions and mission support with theater command and control elements and provides required theater information to TACC for distribution to aircrews. For large formation operations, detailed mission planning may be delegated to participating units and aircrews. Refer to Air Force Doctrine Document (AFDD) 2-6, *Air Mobility*, AFDD 2-6.1, *Airlift Operations*, and AFTTP 3-1, Vol 1 for more specific information.

16.1.3. Concept of Operation. Joint airborne operations will be initiated by a unified or Joint Force Commander (JFC). When an airborne operation is necessary, the JFC ordering the operation furnishes participating units with an initiating directive or Operations Order (OPORD). This directive specifies the missions, outlines the command structure, identifies participating ground and air forces, lists supporting forces, and provides a schedule of events based on the ground tactical plan and available airlift capabilities.

16.1.4. Mission Feasibility Study. Prior to specific tasking and detailed mission planning, a preliminary study must be done to develop mission profiles and determine the potential for mission success. Feasibility studies are usually done at the joint command level but may be delegated as low as the individual aircrew. AFTTP 3-1, Vol 1, contains an outline of considerations to help determine if a mission can be executed as requested.

16.1.5. Mission Commander. **Chapter 2** of this instruction specifies mission commander requirements and qualification criteria. AFTTP 3-1, Vol 35, contains a mission commander's checklist that is intended to assist mission commanders with their duties and responsibilities.

16.1.6. Mission Planning Staff. The planning staff should include, as a minimum, a mission commander, pilot, navigator, loadmaster, plans, tactics, and intelligence. Other staff functions such as weather, airspace management, communications, logistics, aerial port and special tactics may also be required.

16.1.7. Mission Planning Folders (MPF). MPF contains essential operational and intelligence data required to plan, study, and execute airlift operations. MPFs should be developed and used for peacetime training and wartime tasking. They also provide a historical record for subsequent mission planning. AFTTP 3-1, Vol 35, contains a standardized MPF format that may be modified to fit specific tasking. Local forms are authorized.

16.2. Mission Planning. The first steps in planning an operation are to analyze the tasking, gather all pertinent information, and decide what additional support is required. Having this information on hand prior to developing the detailed plan will save time in the long run. Planners must thoroughly study en route threats, terrain, ingress and egress routes, target areas, operations and communications security (OPSEC and COMSEC), political and cultural characteristics, climatology, and any other factors which enhance mission success. Intelligence and meteorology and/or climatology requirements must be identified early because this information may not be readily available. Mission support requests must also be processed as soon as possible to allow coordination and planning. The level of coordination is dependent on available time and means of communication. Aircrews must be ready to operate in the joint arena with little or no face-to-face coordination.

16.2.1. Tasking Order Analysis. The theater AOC will publish an Air Tasking Order (ATO), Airspace Coordination Order (ACO), Fragmentary Order (FRAG), and/or Air Movement Table (AMT) to establish mission objectives. ATO contents are discussed in AFTTP 3-1, Vol 1.

16.2.1.1. OPORD. An OPORD usually covers overall concepts of operations and mission requirements to be flown during a future time period (such as a week or more).

16.2.1.2. ATO/ACO. An ATO will be issued by the JFACC through the AOC. An ATO will task elements of composite forces, provide mission objectives and general guidance, and indicate actions required by individual situations. The AME will normally publish an ATO or Air Movement Schedule (AMS) governing airlift missions planned for the next 24-hours. ATOs and AMSs are normally accompanied by Special Instructions (SPINS) which provide detailed instructions for composite forces. A standardized ATO format for theater assigned forces can be found in AFP 102-2, Vol 1, Joint Users Handbook - US Message Text Formats, Air Tasking Order/Confirmation (ATOCONF), and AFTTP 3-1, Vol 1. Airspace control procedures may be implemented in the ATO, SPINS, or published in a separate ACO. Planners and aircrew must understand and comply with all aspects of current airspace control procedures. The following items can be extracted from the ATO:

16.2.1.2.1. Mission number.

16.2.1.2.2. Security classification.

16.2.1.2.3. Tasking organization.

16.2.1.2.4. Concept of operations and mission description to include type of mission, assault zone description, required aircraft and aircrews, and participating forces and units.

16.2.1.2.5. Schedule of events.

16.2.1.2.6. Rules of engagement (ROE).

16.2.1.2.7. Communications & Electronic Operating Instructions (CEOI).

16.2.1.2.8. Special instructions (SPINS).

16.2.1.2.9. Command and control instructions.

16.2.1.2.10. Scheduled airlift support (JSEAD, AWACS, ABCCC, CAP, STT, etc.).

16.2.1.2.11. Airspace management procedures, to include IFF/squawks, airspace control center coordination (e.g. ALCC, TACS, AAGS, ATAF), air defense network procedures, prohibited/restricted area procedures, and route deconfliction.

16.2.1.3. Air Movement Table (AMT). The DIRMOBFOR's transportation staff should develop an AMT as an appendix to the ATO to list equipment and personnel that constitute each aircraft load. An abbreviated ATO or FRAG may be issued to subordinate units to further refine the ATO and air movement plan.

16.2.2. Schedule of Events. After receiving formal mission tasking, planners construct a schedule of events checklist to assist in keeping the mission, from planning through execution, on schedule. Some mission events (TOTs, available CAF support, etc.) will be specified in the tasking document. AFTTP 3-1, Vol 35, provides a suggested list of significant mission events.

16.2.3. Intelligence Requirements. Current intelligence is vital. Incomplete or outdated information reduces the probability of success and survivability. Intelligence personnel will be integrated into the planning cell. They can prepare a reference chart depicting current Orders of Battle (OB) and significant intelligence/threat information. They predict enemy radar detection capabilities, and obtain imagery of en route or objective area reference points (imagery must be requested early to ensure availability). Targeting specialists can provide radar predictions and target analysis when required.

16.2.4. Meteorology/Climatology Analysis. Weather information will be included in both planning and briefing functions for all missions. The impact of atmospheric and climatic factors depends on the intensity of the condition, the tactics used, and the capability of friendly and enemy forces to operate in degraded weather conditions. Pay particular attention to forecasts of low level winds/turbulence and conditions affecting visibility. AFTTP 3-1, Vol 1, contains an outline for meteorology/climatology analysis.

16.2.5. Mission Support. Planners need to identify, request, and coordinate additional mission support above that provided in the ATO/SPINS. The point of contact for coordination is the AME and DIRMOBFOR staff.

16.2.6. Mission Considerations. There is no single, best solution to any tactical situation. The most important concept in developing tactics is to remain unpredictable. Tactical planning must be ingenious and dynamic, while continuing to use sound tactical concepts developed and tested in the past.

16.2.6.1. Enemy Defenses. Avoiding enemy defenses is a key mission planning factor. The most critical intelligence factors will be the location, capabilities and limitations of the enemy's Order of Battle (OB). Detection may provide the enemy enough warning to deny the objective and direct air defense forces against friendly aircraft.

16.2.6.1.1. Detection. Visual, radar, electronic, and noise signatures can detect aircraft. Plan the mission at altitudes that deny detection.

16.2.6.1.2. Radar. Perhaps the most critical detection factor for airlift is radar; however, three vulnerabilities can be exploited: maximum theoretical detection range, degraded low-level detection (anti-clutter) capabilities, and the masking properties of obstruction between the antenna and the aircraft.

16.2.6.1.3. Threat Engagement. AFTTP 3-1, Vol 2, provides classified threat system information. If a mission is likely to encounter a hostile air defense environment, evaluate threat capabilities and limitations with intelligence personnel.

16.2.6.2. Force Requirements. Planners must provide all support elements (CAP, SEAD, etc.) with the general route, timing, and TOT. Defense suppression and counter-air forces can use this information to seek out and engage enemy defense forces that could pose a threat to the mission. Medium-altitude corridor tactics require more dedicated support, such as jamming support, chaff corridor, and extended counter-air suppression efforts.

16.2.6.3. Navigation. Accurate navigation is crucial. Aircrews must plan to use every resource at their disposal. Carefully evaluate the enemy's capability to detect electronic emissions from the aircraft; plan to minimize these emissions where feasible. On all missions, dead reckoning, map reading, and position awareness are crucial to low-level navigation.

16.2.6.4. Altitude Selection. The selection of the proper flight altitude is one of the most important decisions for a mission planner. Operations against a sophisticated air defense network usually require flights at lower altitudes to limit probability of detection and engagement. Lower altitude reduces slant range on small arms and AAA systems and may place trees and hills between the aircraft and the threats. Newer SAM systems are capable of attacking targets well below 300 feet AGL, so aircrews must be prepared to go to a Minimum Altitude Capable (MAC) or coordinate suppression resources to maximize probability of mission success. In an unsophisticated air defense network having little or no radar coverage, medium or high altitude may be used to avoid small arms, light AAA, and man portable missiles (MANPADS). Plan flight altitudes as high as the threat will allow.

NOTE: The following ranges for low, medium, and high altitudes do not correspond to AFTTP 3-1 terminology.

16.2.6.4.1. Minimum Altitude Capable (MAC). MAC is the lowest altitude an aircrew can descend to when they detect or suspect a threat. It is dependent on individual aircrew capabilities, experience level, fatigue factors, terrain clearance, etc. Since maneuvering and navigation capabilities are virtually negated at MAC, descending to this altitude is only warranted as a defensive response to an engaged threat and only for the duration of immediate threat activity.

16.2.6.4.2. Low Altitude (300 feet to 500 feet AGL). Aircraft flying at 500 feet or below may degrade or eliminate a threat system depending on terrain and distance. For airlift aircraft, this altitude range provides optimum terrain clearance for aircraft maneuverability and navigation while countering hostile air defense threat systems. When faced with known threats, every effort must be made to destroy or neutralize them before employing airlift aircraft. Ground Controlled Intercept (GCI) guided air-to-air engagements will be nearly impossible at low altitudes due to GCI radar limitations and the inability of air interceptors to locate target aircraft and engage air-to-air missiles due to terrain background clutter. Low altitude also reduces an aircraft's IR signature; the lower the altitude, the closer the IR SAM must be to detect the IR radiation. Reducing forward IR signature degrades head-on capabilities of cooled seeker heads.

16.2.6.4.3. Middle Altitude (501 feet to 5000 feet AGL). The middle altitude range is the worst threat environment for airlift aircraft because all threats are effective at these altitudes and evasive maneuvers are usually ineffective.

16.2.6.4.4. High Altitude (above 5000 feet AGL). The high altitude range may negate the small arms threat and decreases the effectiveness of most AAA; however, it dramatically increases the vulnerability to enemy fighter or radar SAM attack and places the aircraft in the worst position to begin evasive maneuvers.

16.2.6.5. Day Versus Night Operations. Night operations degrade optically sighted threat systems and increase the probability that enemy defenses may be in a lowered state of readiness. The disadvantages to night operations are that navigation may be more difficult and, if night vision goggles are not used, the aircraft may be forced up to an altitude where radar tracking is more likely. Additionally, when selecting employment options, consider moonlight that may provide sufficient light for optical threat systems and cockpit/cabin lighting that may increase the probability of acquisition by enemy night vision devices.

16.2.6.6. Rules of Engagement (ROEs). The crew must be familiar with the established ROE. CJCSI 3121.10, *Standing Rules of Engagement for US Forces*, applies and may be supplemented for the particular mission. Commanders at all levels may request changes to the ROE through the chain of command. Changes to ROE must be rapidly disseminated to all personnel. The ROE will never limit the inherent right and obligation of individual and unit self-defense. Even if there are no forces declared hostile, commanders will defend their units against a hostile act or hostile intent. The two elements of self-defense are necessity and proportionality. For necessity, a hostile act must occur or there must be a demonstrated intent to commit a hostile act. The threat posed by the hostile act or intent must be imminent. Proportionality infers that the use of force must be reasonable in intensity, duration, and magnitude and must be consistent with the threat to ensure the safety of the force. Individuals will be prepared to act in self-defense. Nothing in the ROE limits crewmembers' rights to take appropriate action to defend themselves.

16.2.6.7. Command and Control (C2). Combat or contingency missions usually follow a sequence of events that affect future missions. Completion of drops, landings, and securing airfields are but a few of the events command and control may need to track. Secure communications and anti-jam technology will be used to the maximum extent possible because radio transmissions in a combat zone can compromise the aircraft's position and the operational security of the objective. In threat areas, minimize radio communications; transmit by exception only. Normally, the user defines communications requirements by providing a communications plan or CEOI. In most cases, code words define events and are transmitted when the event occurs or does not occur (through the use of an execution checklist). Radio contact with the Drop Zone (DZ) should be limited to that required for safety and mission accomplishment (i.e., ATC directions, range clearance, unsafe surface conditions, and mission changes). DZ winds or other information may be broadcast in the blind at pre-coordinated times prior to the scheduled TOT. AFTTP 3-1, Vol 1, provides guides for C2 considerations during planning.

16.2.6.8. Tactical Deception Planning. Incorporate tactical deception in mission planning by masking mobilization assets and friendly force objectives. Integrate airlift into joint tactical deception goals early in the planning phase. Tactical surprise and deception enhances combat capability but will not be a condition for its success. Deception tactics are limited only by the

imagination of the planner, the enemy's ability to react to the deception, and available resources (Reference - AFI 11-704, *Air Force Tactical Deception*).

16.2.6.9. Formations. In-trail formation is an effective tactic for putting "mass on the DZ" in a small amount of time, a frequent requirement dictated by the ground tactical situation. This is not to say large formations must be flown en route since they are less maneuverable and more susceptible to detection and attack by enemy forces. An alternative is to fly smaller serials or single-ships en route and rejoin at a point prior to the objective area. This allows time-compressed operations at the objective area while maintaining tactical surprise and limiting detection. Specific formation procedures and other SKE operating parameters are contained in **Chapter 18** of this AFI and the flight manual. When flying multiple station keeping equipment (SKE) formations within 80 NMs, mission planners should use the information in **Table 16.1.** to aid in deconfliction.

Table 16.1. SKE Frequency Deconfliction.

SKE Frequency Combinations For Multiple Formations	Minimum Formation Separation Required
Formations on the same frequency (A-A, B-B, C-C, or D-D)	80 NMs
Formations on frequencies separated by 40 MHz (A-C or B-D)	2 NMs
Formations on frequencies separated by 80 MHz (A-D)	2500 ft
Formations on frequencies separated by 120 MHz (A-B or C-D)	300 ft
Formations on frequencies separated by 160 MHz (B-C)	0 ft

NOTE: This table is based on theoretical limits, not experimental data.

16.2.6.10. Time Control. Select control times without using either extremes of the airspeed envelope to allow maximum flexibility for gaining or losing time. This does not preclude planning high speeds as a tactic to reduce threat exposure time or low speeds to enhance terrain masking or reduce turn radius. Building one or more timing triangles or orbit areas into the route prior to the objective area is one method of time control; however, factors such as formation size, airspace management, weather, terrain, and threat location must be thoroughly evaluated. Another technique is building a route with optional "timing legs" designed to gain or lose time by cutting corners or extending legs without requiring aircraft to loiter in a defined area and increasing the probability of detection. Regardless of the technique used, the mission must have a briefed time control plan.

16.2.6.11. Airspace Management. Successful employment of airlift in a combat zone demands close coordination and integration with theater airspace managers (including allies). Airspace control requirements will vary depending upon the theater, but are most intense and critical in the combat zone. The AMD is responsible for providing this information. Essential airspace management considerations are discussed in AFTTP 3-1, Vol 26.

16.2.6.12. Evasion Plan of Action (EPA). Aircrews and/or planners with the assistance of intelligence personnel and life support/survival specialists will develop an EPA. An evasion plan may be included in the OPORD or SPINS. AFTTP 3-1, Vol 35, includes suggested EPA planning information.

16.3. Crew Mission Study and Detailed Flight Planning. After mission tasking is analyzed and intelligence, weather and mission support information is available, detailed mission planning begins. During this phase, the planning staff (or individual aircrew in some cases) will study all mission variables to develop a plan that minimizes the threat and optimizes the probability of a successful mission. Route selection should begin at the objective area. Planning should then be done in reverse from the objective to the Initial Point (IP), then to the low level or combat entry point and then to the departure base. Egress routing is then planned from the objective area to the combat exit point and recovery base. Planning routes with the most detailed scale charts available provide enhanced chart details. JOG (1:250,000) charts, if available, are recommended for planning the route to and from the objective area. Flight planning emphasis should be placed on the topographical features at least 10 NM either side of the intended flight path.

16.3.1. Objective Area Planning. The most important segment of the route is from the IP to the objective. On this segment threat avoidance, navigation, and timing are most critical. The IP should be an easily definable visual point, unique in appearance and not subject to significant alteration.

16.3.1.1. Plot the objective (target) using the most detailed scale chart available. The area should also be examined using any available imagery.

***CAUTION*:** 1:50,000 and smaller scale maps do not depict aeronautical information, may not show man-made obstructions, and are rarely updated through the CHUM.

16.3.1.2. Evaluate hostile defenses/OBs within the area of operation. Initially plot maximum effective radar/threat ranges for worst case drop altitudes without regard to terrain masking.

16.3.1.3. Select the IP and pre-initial point (pre-IP) based on the safest approach to the objective area. Plan for large formations to cross the IP inbound on extended DZ centerline course. If the run-in can not be accomplished around maximum radar and threat ranges, evaluate terrain around the objective area and determine a flight path and altitude with the least possibility of detection.

16.3.2. Assault Zone Selection. Selection and criteria are the joint responsibility of the DIRMOB-FOR and the commander of the supported forces; however, planners may be tasked to select usable sites. Detailed assault zone criteria and illustrations can be found in AFI 13-217.

16.3.3. DZ Selection. Ground force location, risk to aircraft, and target identification are key factors in DZ selection. DZs may or may not be marked, depending on the type of mission, tactical situation, or reception committee capabilities (reference AFI 13-217 and AFI 11-231).

16.3.3.1. Planners will attempt to ensure that the DZ is long enough to avoid multiple passes in a hostile environment. If multiple passes become necessary, they may be accomplished by planning a racetrack/re-attack or an abbreviated route. In any case, multiple passes will not be performed unless they have been coordinated with the user, they have been planned and briefed, and they have been annotated on navigational charts (including the racetrack/re-attack flight path).

NOTE: Units should develop and publish multiple pass procedures for established DZs used during routine joint and unilateral training. Choice of abbreviated route or racetrack procedures is at the unit's discretion.

16.3.3.2. Multiple points of impact (MPI) provide an aerial delivery employment procedure to disperse airdropped loads to predetermined locations. Locate the subsequent MPI a minimum of 500 yards from the previous point of impact (PI). If MPIs are place laterally, increase the width of the DZ accordingly. Ensure the PI distance from leading edge complies with AFI 13-217. Com-

pute minimum size DZ required for the most restrictive aircraft in each element relative to their PI to ensure it fits within the surveyed DZ boundaries. Limit the number of MPIs to three without MAJCOM approval. All aircraft within an element must drop on the same PI. The coordinates for each PI must be provided to the aircrews. Use the most accurate PI altitude available. For SKE airdrops using a zone marker, ensure aircrews are briefed on zone marker location relative to each PI. Ensure zone marker placement is within 1,500 yards of all points of impact. Thoroughly de-conflict and brief all salvo and escape procedures as well as DZ markings prior to mission execution. Only the first PI will be marked. The user accepts responsibility when employing MPI for all injury/damage to personnel/equipment.

16.3.3.3. The following types of DZs are authorized for MAF employment missions:

16.3.3.3.1. Marked DZ. Authenticated DZ that has the point-of-impact or release point marked with a pre-coordinated signal. Markings may be overt (block letter, flares, smoke, mirror, raised angle marker, etc.) or covert (IR strobe, radar beacon, zone marker, etc.). No other markings are required (e.g., timing lights or flanking lights). Unless radio communications are specifically required, any pre-coordinated marking displayed on the DZ indicates clearance to drop.

16.3.3.3.2. Unmarked DZ. Drop zone not authenticated with any type of marking. This includes both visual and electronic signals. DZ authentication, if required, is possible via radio communications. The DZ may not be supported by a reception team. Use of unmarked DZs requires OG/CC approval for unilateral training missions and MAJCOM/DO approval for all other missions.

16.3.3.3.3. Area DZ. Consists of a start point, end point, and a prearranged flight path over a series of acceptable drop sites between these points. The distance between these points should not exceed 15 NMs; changes in ground elevation along the flight path should not exceed 300 feet; and drop sites along the flight path should not exceed 1/2 NM on either side.

16.3.3.3.4. Circular/Random Approach DZ. A circular DZ with multiple run-in headings. Mission requirements and usable terrain will govern size of the DZ. Normally, the point-of-impact will be at the DZ center. The size of a circular/random approach DZ must be large enough for the prescribed minimum size rectangular DZ to fit inside.

16.3.3.3.5. Water DZ. Normally, a circular/random approach drop zone which may be marked or unmarked. CARP, GMRS, VIRS, or jumpmaster directed airdrop procedures may be used. For GMRS, the position of the recovery/safety boat usually marks the intended release point. Other options include three or more boats in formation to form an inverted "L" or a floating smoke pot to indicated the point-of-impact.

NOTE: Certain combat/contingency situations may prevent marking the DZ. Aircrews may be required to airdrop on unmarked DZs; however, supported units must be made aware that drop accuracy may be reduced. When DZs are supported by STT, consider using verbally initiated release system (VIRS) procedures to enhance drop accuracy. Planners and aircrews must thoroughly develop run-ins with good visual points for timing. Specific airdrop procedures and reception committee capabilities are in **Chapter 19** of this instruction and AFI 13-217.

16.3.4. Assault Landing Zones (ALZ) Selection. Assault landing zone operations are conducted to introduce or evacuate personnel and/or equipment to or from hostile, denied, or unsecured territory. ALZs are used to support a wide variety of unilateral and joint operations (the terms “Landing Zone”

and “LZ” are now obsolete). Consult SPINS, published approach material, and MAJCOM-approved ALZ Surveys before conducting ALZ operations. Aircraft performance limitations must be taken into account when selecting an ALZ location. ALZ size and composition criteria are contained in AFI 13-217.

16.3.4.1. Plan approaches to the ALZ IAW airfield identification procedures published in the OPORD or SPINS. Where multiple options are available, select the approach which best minimizes exposure to the threat while still allowing a high probability of landing on the first approach. Remain unpredictable. If no published approach exists, training approaches may be developed, but VFR weather is required.

16.3.5. Route Planning. Threats, terrain, and aircraft limitations dictate route selection. Evaluate all possible ingress and egress routes for features such as terrain composition and cover, relief features, contour lines, population centers, lines of communication, and other hazardous or compromising areas. Low-altitude masking tactics are essential for penetration operations in a threat environment. The following factors significantly influence route development:

16.3.5.1. In selecting navigation routing, the planner must consider safe passage corridors/procedures and the location of friendly defenses. In this regard, the aircraft must be constantly aware of the status of friendly C3 and procedures for degraded operation. When the friendly C3 structure degrades, the common denominator of friendly defenses will be their own self-preservation. When planning the route, do not assume the aircraft is safe from friendly lines of defense. Plan accordingly and use IFF, communication discipline, and approved safe passage procedures.

16.3.5.2. Threat avoidance is the best line of defense. Select high, ruggedly vegetated terrain where possible. Rough terrain decreases threat mobility, heavy vegetation restricts the field of fire, and low altitudes enhance terrain masking. Evaluate and avoid passive/acoustical detection devices; border guards, observation posts, and fire towers; road/river traffic; railroads; military maneuvers and exercises; military aircraft training; airways and airports; surveillance and patrol boats; fishing vessels; shipping LOCs; festival, holiday and vacation gathering places; satellite schedules; and radar’s. Plan routes to avoid SAMs and AAA concentrations, both of which are usually along lines of communication, intersections, populated areas, and industrial centers. Canals, roads, railroads, and rivers should be crossed at right angles to minimize detection by hostile forces.

16.3.5.3. Plan the route using maximum radar/threat detection ranges and worst case route/leg Minimum Safe Altitude (MSA) without regard to terrain masking. If routing cannot be accomplished around maximum radar/threat ranges, evaluate significant terrain between the aircraft and the threat and maximum detection free altitudes must be evaluated to determine a flight path and altitude with the least possibility of detection.

16.3.5.4. Flights should be planned at the highest altitude that precludes detection. If detection is probable, select flight altitudes that degrade threat engagement effectiveness.

16.3.5.5. Dead Reckoning (DR) navigation is enhanced by prominent landmarks with good vertical development. Natural terrain features are preferable to man-made features that may no longer exist, may be indistinct, or may be newly erected and not portrayed. Use of features that could be masked by intervening terrain should not be used.

16.3.5.6. Do not plan direct flight over built-up areas.

16.3.5.7. When unable to avoid hostile areas, select specific tactics, such as terrain masking, night operations, random approaches, or use of support aircraft, which can best counter anticipated threats.

16.3.5.8. Avoid large bodies of water and dry lake beds except in known friendly areas. Camouflage is less effective, sound travels farther and radar detection is more likely.

16.3.5.9. Coastal Penetration. The tactics used to penetrate a coastline depend on the locations and elevations of coastal radar sites. Passive detection is usually enhanced over water. Minimize use of aircraft radar and other emitters.

16.3.5.10. Remain unpredictable. The route of flight will consist of relatively short legs between waypoints that are easily identifiable, either visually or by airborne radar. Select waypoints that minimize detection and maximize threat avoidance and terrain masking. Numerous course changes protect the aircraft and also the objective area by delaying enemy attempts to predict the flight path. The time and distance of each leg should vary and not exceed 10 minutes in the threat environment.

16.3.5.11. Avoid being skylighted. Go around hills rather than over them. If a ridge must be crossed, do so at a low point and, ideally, at a 45-degree angle.

16.3.5.12. Plan to fly in shadows whenever possible and place the aircraft's shadow in terrain shadows. Missions operating in or near a threat environment should be planned to transit that environment during early morning or late afternoon. The low sun angles will separate the aircraft and its shadow, improving masking. Hide the aircraft's shadow in a ridgeline, ridge shadow, cloud shadows or dark vegetation if possible. Missions flown at night or in the clouds can significantly degrade certain threat systems. Knowledge of enemy threat system shift changes and scheduled preventive maintenance times may prove invaluable when considering these options.

16.3.5.13. Turns should not be made into significantly higher terrain or other hazards without thorough analysis of aircraft engine-out climb performance.

16.3.5.14. Transit areas defended by small arms at their narrowest or least defended point.

16.3.5.15. If detection is unavoidable, compute the first possible point at which fighters could attack the aircraft. Intelligence personnel should have information on command and control time (from acquisition to launch), aircraft speed and capabilities, and Ground Control Intercept (GCI) limitations.

16.3.5.16. If flight over or near threat sites is unavoidable, attack aircraft should be part of the employment support package.

16.3.5.17. Vertical and horizontal depiction inaccuracies will exist in virtually all chart products. Many charts list the probable errors in their legend.

16.3.5.18. Define abort corridors for the ingress route. Depending on threats and other aircraft following the same ingress route, the planned route over the objective and egress may be the safest abort route.

16.3.6. Target Detection and Radar Coverage Prediction Guide**.** Flights should be planned through areas that preclude radar detection. Radars have three vulnerabilities that can be exploited during mission planning; limits on maximum detection range, degraded low-level detection capabilities because

of curvature of the earth (radar horizon distance), and the masking properties of obstructions between the antenna and the aircraft.

16.3.6.1. Maximum Range. The theoretical maximum range (MTR) of radar is dependent on the radar's pulse repetition frequency (PRF). The higher the PRF, the shorter the range. Use the radar's lowest PRF in the following formula to compute the MTR in nautical miles: MTR = 80,000/PRF

16.3.6.2. Radar Horizon Distance (RHD). A radar may have the theoretical range to detect an aircraft, but will be limited by the horizon (curvature of the earth) for a given aircraft altitude. Based on the line of sight limitation, flying at a distance greater than the RHD will prevent aircraft detection under normal atmospheric conditions. The following formula is primarily use to determine low altitude coverage of a radar over water or flat terrain; however, planning a route which exceeds RHD in any type of terrain should prevent detection. Use **Table 16.2.** as an aid in quickly determining RHD. Enter the table with the aircraft's planned MSL altitude at the table and move down to the radar antenna's MSL altitude to determine RHD in NMs: RHD = 1.06 (square root of RA + square root of AA). Where RA = radar antenna elevation (AGL) and AA = aircraft altitude (AGL) RHD will be expressed in NMs. To express RHD in statute miles, use 1.23 instead of 1.06.

NOTE: This computation assumes a smooth earth. Masking effects from obstructions between the radar and the aircraft are not considered. Atmospheric ducting can greatly increase the RHD at some altitudes. Always check with weather personnel for the presence or potential of ducting in the area of operations. Passive detection of aircraft emissions may occur far beyond the RHD regardless of ducting.

Table 16.2. Radar Horizon Distance (RHD)--Nautical Miles (NM).

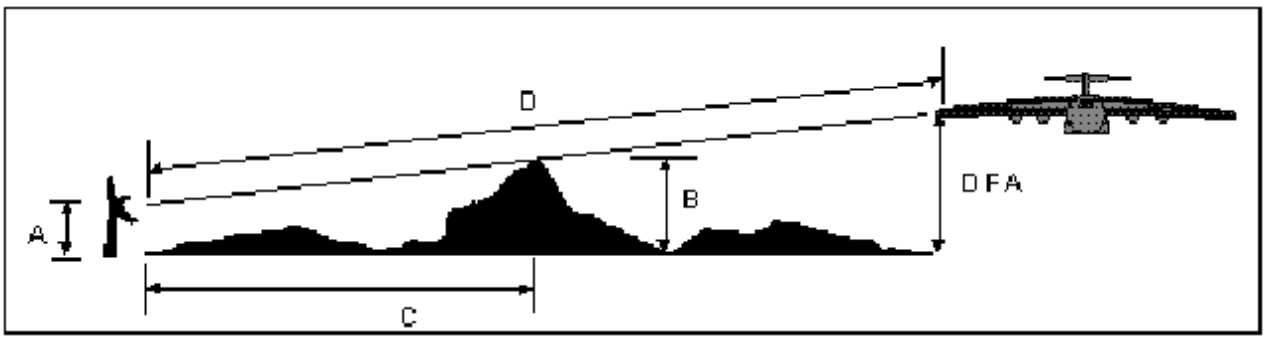
		AIRCRAFT ALTITUDE (ft)																	
		200	**300**	**500**	**750**	**1000**	**2000**	**3000**	**4000**	**5000**	**6000**	**7000**	**8000**	**9000**	**10000**	**15000**	**20000**	**25000**	**30000**
R	**50**	22	26	31	37	41	55	66	75	82	90	96	102	106	113	137	157	175	191
A	**100**	26	29	34	40	44	58	69	78	86	93	99	105	111	117	140	161	178	194
D	**150**	28	31	37	42	47	60	71	80	88	95	102	108	114	119	143	163	181	197
A	**200**	30	33	39	44	49	62	73	82	90	97	104	110	116	121	145	165	183	199
R	**250**	32	35	41	46	50	64	75	84	92	99	105	112	117	123	147	167	184	200
	300	33	37	42	47	52	66	76	85	93	100	107	113	119	124	148	168	186	202
A	**350**	35	38	44	49	53	67	78	87	95	102	109	115	120	126	150	170	187	203
N	**400**	36	40	45	50	55	69	79	88	96	103	110	116	122	127	151	171	189	205
T	**450**	37	41	46	52	56	70	81	90	97	105	111	117	123	128	152	172	190	206
E	**500**	39	42	47	53	57	71	82	91	99	106	112	119	124	130	154	174	191	207
N	**550**	40	43	49	54	58	72	83	92	100	107	114	120	125	131	155	175	192	208
N	**600**	41	44	50	55	59	73	84	93	101	108	115	121	127	132	156	176	194	210
A	**650**	42	45	51	56	61	74	85	94	102	109	116	122	128	133	157	177	195	211
	700	43	46	52	57	62	75	86	95	103	110	117	123	129	134	158	178	196	212
H	**750**	44	47	53	58	63	76	87	96	104	111	118	124	130	135	159	179	197	213
E	**800**	45	48	54	59	64	77	88	97	105	112	119	125	131	136	160	180	198	214
I	**850**	46	49	55	60	64	78	89	98	106	113	120	126	131	137	161	181	199	215
G	**900**	47	50	56	61	65	79	90	99	107	114	121	127	132	138	162	182	199	215
H	**950**	48	51	56	62	66	80	91	100	108	115	121	127	133	139	163	183	200	216
T	**1000**	49	52	57	63	67	81	92	101	109	116	122	128	134	140	163	183	201	217
	2000	62	66	71	76	81	95	105	114	122	130	136	142	148	153	177	197	215	231

16.3.6.3. Detection Free Altitude (DFA). Radar detection is degraded or denied by terrain and obstacle between the radar antenna and the target aircraft. The following formula is used to deter-

mine the highest altitude an aircraft can transit a point and remain below a radar's coverage. It is based on the line of sight limitation when obstacles or terrain lie between the radar and the aircraft. See **Figure 16.1.** Formula: DFA = [(B - A) / C + (D - C) / 15] x D + A. Where DFA = Detection Free Altitude (feet MSL); A = Antenna elevation (feet MSL); B = Terrain elevation (feet MSL); C = Terrain distance from antenna (NM); D = Aircraft distance from antenna (NM).

NOTE: Flying below the DFA will deny detection by that radar only at the point for which the calculation is made. Passive detection of aircraft emissions may occur even when the aircraft is terrain masked.

Figure 16.1. Detection Free Altitude



16.3.6.4. Range Planning. For planning purposes, mission aircraft should be routed outside the maximum theoretical radar range. If this is not possible, plan the route outside the RHD or below the DFA.

16.3.7. Low Level Altitude Restrictions. Low level altitudes will depend upon conditions such as terrain, threat, the necessity to avoid detection, and equipment limitations. The following minimum altitudes are established for MAF airlift operations. FLIP/ICAO procedures, training considerations, terrain, or operational directives may dictate higher altitudes.

WARNING: Aeronautical charts do not depict man-made obstacles--less than 200 feet AGL or a change in terrain until it exceeds the chart contour interval. The worst situation would occur if a 199-foot tower sat on terrain with an elevation just below the next higher contour. For a TPC (1:500,000) with a contour interval of 500 feet, this results in an uncharted obstacle existing 698 feet above charted terrain. Additionally, the highest spot elevation on any given leg may not be the highest terrain as in the case of gradually rising elevations. Planners must ensure accurate terrain analysis by evaluating both spot elevations and the highest contour level. **Figure 16.2.**, Inherent Chart Errors, illustrates uncharted obstacles and terrain elevations not depicted above the highest charted contour.

CAUTION: Some charts may depict terrain and obstacle altitudes in meters versus feet (e.g., JOG and TLM charts in some areas of the world).

NOTE: Airland-only qualified crews are restricted to no lower than the Minimum Safe Altitude (MSA) for the route (night or day VMC).

16.3.7.1. Night VMC En route. Plan en route legs at an indicated altitude of 500 feet above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation), or 400 feet plus one basic chart contour interval above the highest depicted terrain contour, whichever is highest, within 5 NMs of route centerline to include the aircraft turn radius over each turnpoint. If the altitude for the next leg is higher than the current leg altitude, climbs will be completed prior to the

turnpoint. Legs may be segmented for night altitude computations, depending on terrain differential or threats in order to allow flight closer to the ground. Once the obstruction (man-made obstacle, terrain feature, or spot elevation) is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segmented altitude, if lower. See **Figure 16.3.**.

NOTE: Planning a route on a JOG chart, if available, significantly reduces night en route altitudes. If the route has been planned on a JOG and night altitudes have been verified, the route may be flown with the lower altitudes when flying with reference to a TPC.

16.3.7.2. Minimum Safe Altitude (MSA). MSA is an initial VFR altitude that provides additional terrain clearance while the aircrew analyzes situations that require interruption of low-level operations (route disorientation and equipment malfunctions or when either pilot must leave the seat during low-level operations, etc.) An MSA will be computed for each leg, route segment, or entire low level route. The MSA is 500 feet above the night VMC en route altitude. If outside US compute using 10 NM either side of centerline.

16.3.7.3. Minimum IFR En route Altitude. Compute Minimum IFR En route Altitude by adding 1000 feet (2,000 feet in mountainous terrain) above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation) within 5 NMs of route centerline (10 NMs outside the US). The altitude should be rounded to the next 100-ft increment.

16.3.7.3.1. Minimum altitudes for IFR operations within published Military Training Routes (MTRs) in US sovereign airspace will be the computed leg's MSA unless a higher altitude is required by FLIP AP/1B.

16.3.7.4. Emergency Safe Altitude (ESA). ESA is designed to provide positive IMC terrain clearance during emergency situations that require leaving the low-level structure. Several ESAs may be computed for route segments transiting significant terrain differentials or a single ESA may be computed for the entire low level route. To compute ESA, add 1,000 feet (2,000 feet in mountainous terrain as defined in FLIP) to the elevation of the highest obstruction to flight within 22 NMs of planned route centerline.

NOTE: Climbing to ESA may put the aircraft or formation in a controlled (i.e., IFR) altitude structure requiring coordination with Air Traffic Control agencies.

NOTE: Pressure altimeters are calibrated to indicate true altitudes under international standard atmospheric (ISA) conditions. Any deviation from these standard conditions will result in erroneous readings on the altimeter. This error becomes important when considering obstacle clearances in temperatures lower than standard since the aircraft's altitude is below the figure indicated by the altimeter. Refer to the flight information handbook to determine correction.

Figure 16.2. Inherent Chart Error.

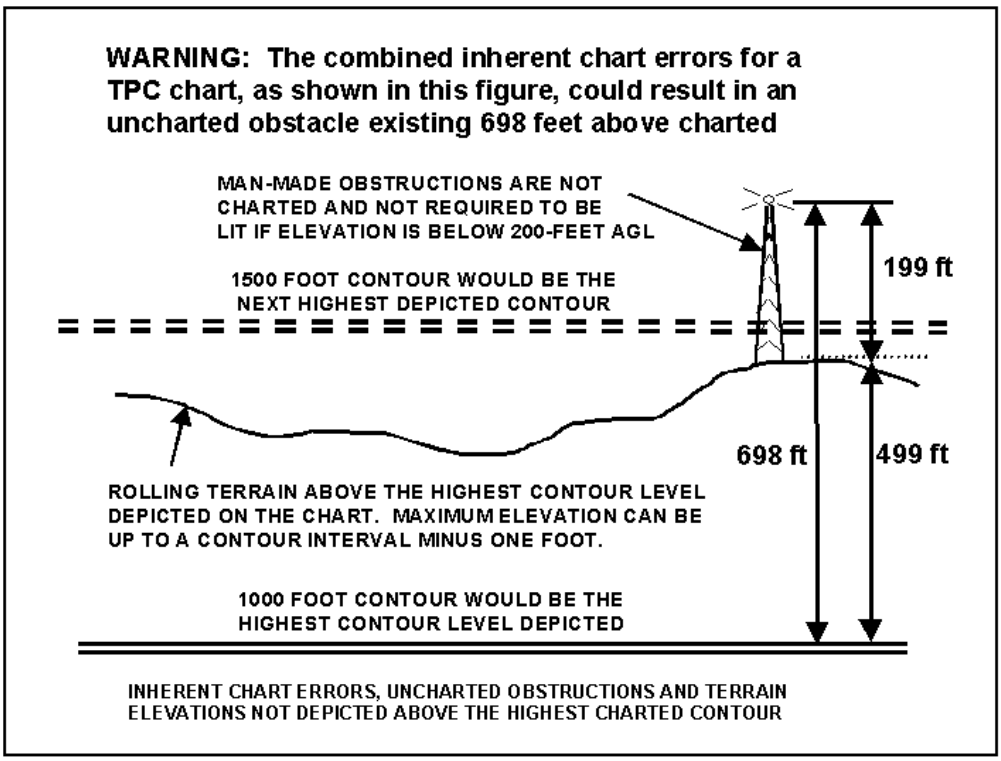
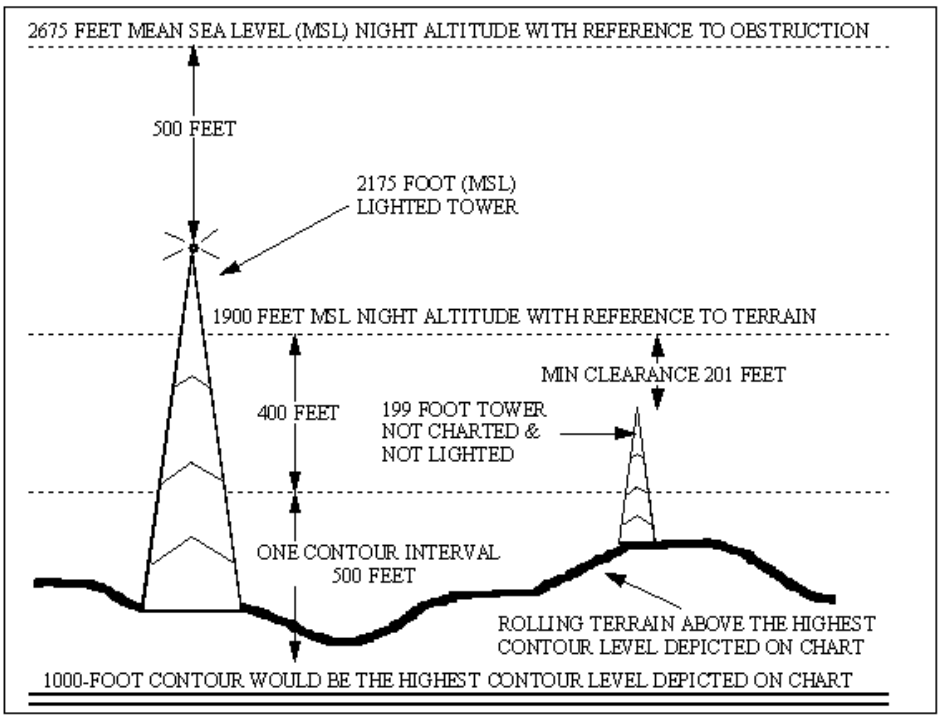


Figure 16.3. Night VMC En route Altitude.



16.3.8. Airdrop Altitudes and Airspeeds. Minimum airdrop altitudes and airspeeds for specific loads and parachutes are defined in AFI 11-231. If minimum terrain clearance cannot be satisfied during descent to drop altitude, change the run-in course, delay descent, step down to drop altitude, or airdrop at a higher altitude. The pressure altimeter should be crosschecked with the radar altimeter during the run-in to the DZ to help ensure the aircraft is at or above the minimum drop altitude. Airdrops will not be conducted below the following altitudes:

WARNING: Drop zone surveys do not assure terrain and obstruction clearance. Planners and aircrews are responsible for ensuring clearance through thorough mission planning and chart preparation.

NOTE: Altitudes on DZ run-in may be segmented to allow for lowest possible run-in/drop altitude. Once the limiting obstruction (man-made obstacle, terrain feature, or spot elevation) is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segmented altitude, if lower.

16.3.8.1. Day VMC Drop Altitude. Plan minimum day VMC airdrop altitudes as specified in AFI 11-231, visually avoiding high terrain and obstacles in the vicinity of the drop zone.

16.3.8.2. Night VMC Drop Altitude. Plan minimum night VMC airdrop altitudes, from slow-down through escape, at an indicated altitude of 500 feet above the highest obstruction to flight (manmade obstacle, terrain feature, or spot elevation), or 400 feet plus one contour interval above the highest depicted terrain contour, whichever is higher, within 3 NMs of run-in centerline or as specified in AFI 11-231, whichever is higher.

NOTE: During visual airdrops, altitudes on DZ run-in may be segmented to allow for lowest possible run-in/drop altitude. Once the limiting obstruction (man-made obstacle or terrain feature) is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segment altitude, if lower.

16.3.8.3. IMC Drop Altitude. Plan minimum IMC drop altitudes at 500 feet above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation), or 400 feet plus one contour interval above the highest depicted terrain contour, whichever is highest, within 3 NMs either side of the run-in centerline from DZ entry point to DZ exit point centerline or as specified in AFI 11-231, whichever is higher.

16.3.8.4. IMC Drop Profile. See **Figure 16.4.**and **Table 16.3.**.

16.3.8.4.1. IFR Drop Corridor. As defined in FAR Exemption 4371, the corridor where aircraft may operate below IFR en route altitude. The beginning of the drop corridor, the IFR Drop Corridor Ingress Point, is a maximum of 40 NMs from the IFR Drop Corridor Egress Point (co-located with the DZ Exit Point). If required, plan segmented corridor altitudes not lower than 500 feet above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation), or 400 feet plus one contour interval above the highest depicted terrain contour, whichever is highest, within 3 NMs either side of centerline.

16.3.8.4.2. DZ Entry Point. A fixed point in the IFR Drop Corridor where an aircraft or formation of aircraft may safely begin descent from IFR en route altitude or segmented altitude to IMC drop altitude. In addition to terrain/obstacle considerations, DZ Entry Point is also based on airspace restrictions and threat avoidance. Formation descent will not begin until the last aircraft in formation is at or past the DZ entry point.

16.3.8.4.3. Earliest Descent Point (EDP). Earliest point in the IFR Drop Corridor where formation lead may descend the entire formation to IMC drop altitude and be assured of terrain

clearance. Computed by subtracting formation length (e.g., a 4-ship is 2 NMs long) from the computed DZ Entry Point. The EDP should provide, as a minimum, a 6 NM IMC Stabilization Point.

16.3.8.4.4. IMC Stabilization Point. The point after the DZ Entry Point where the formation lead aircraft will **plan** to be stabilized at IMC drop altitude and airspeed.

16.3.8.4.5. Latest Descent Point (LDP). Latest possible point in the IFR Drop Corridor where the formation lead aircraft may begin descent to drop altitude and be assured terrain clearance for the entire formation. This is the latest point that ensures all aircraft in the formation are stabilized on altitude and airspeed as required according to **Chapter 18** and **Chapter 19**.

NOTE: Descending at the LDP does not provide a 6 NM IMC Stabilization Point.

16.3.8.4.6. DZ Exit Point. A fixed point on the DZ escape flight path centerline where each aircraft will be at the minimum IFR en route altitude. Calculate the exit point based upon three-engine performance at airdrop gross weight. This point will be a minimum of 4 NMs track distance from the DZ trailing edge. Also referred to as IFR Drop Corridor Egress Point.

Figure 16.4. IMC Drop Profile.

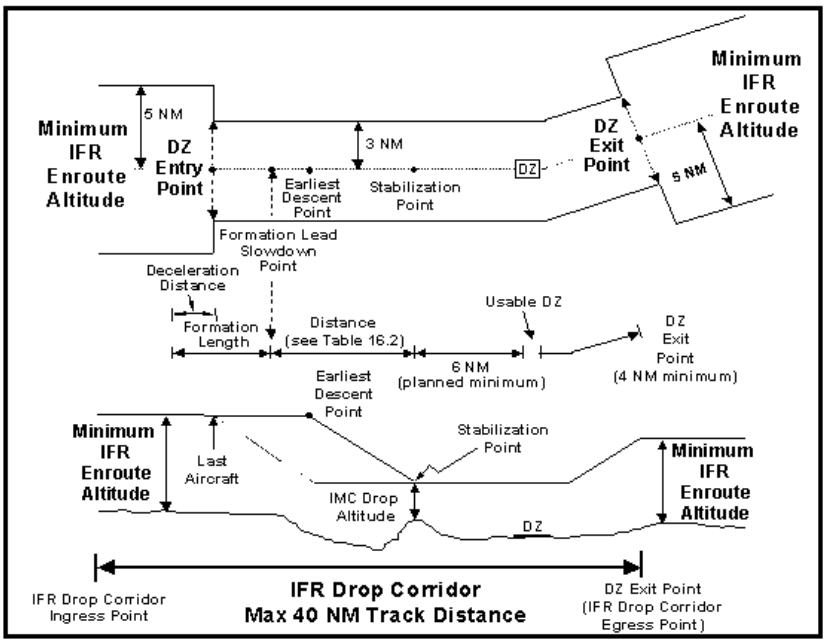


Table 16.3. IMC Drop Profile Calculation.

A	**DZ Exit Point.** Using the Trailing Edge as the start point, add the following: 1. The distance it takes to fly 1 minute at Drop Airspeed (150 KCAS or 130-135 KCAS converted to TAS) plus (+) 2. The distance it takes to accelerate from Drop Airspeed to 160 KCAS (calculate using average acceleration TAS and .2 minute for HE or .5 minute for PER) plus (+) 3. The distance it takes to climb to IFR en route altitude using 350 ft per NM, or greater as briefed). The DZ Exit Point is the result of this calculation or 4 NM, WHICHEVER IS GREATER

B	**DZ Length** (NM) Compute by dividing the Usable DZ Length (in yards) by 2025 (2025 yards = 1 NM) Example: (1688-550)/2025 = .6 NM
C	**IFR Drop Corridor Ingress Point.** Computed by subtracting distances A and B above from 40 NM. Example: (40 NM-A - B) 40 - 4.1 - .6 = 35.3 NM
D	**Stabilization point**. Normally at least 6 NM from the PI, but may be extended based on large formation considerations, terrain features, threats. Lead must brief factor(s) in determining the Stabilization Point.
E	**Deceleration Distance from 160 KCAS to Drop Airspeed.** Use 0.4 NM for Heavy Equipment and 1.3 for Personnel.
F	**Descent from IFR en route to IFR drop altitude.** Example Descent from 2000' to 1000' MSL = 2.7 NM (@ 160 GS and descent rate of 350 feet per NM, or greater as briefed.
G	**DZ Entry Point.**. To extract this distance compute the slowdown point for the lead aircraft and subtract the initial deceleration distance, or add D + E + F above. Example (D +E+ F) 6 + .7 +2.7 = 9.4 NM. Ensure this point lies within the IFR Drop Corridor and assures a safe descent to IFR Drop Altitude.
H	**Earliest Descent Point.** Subtract formation length from DZ Entry Point (3-ship elements, no ghosts) 2-ship .7 NM 3-ship 1.3 NM 4-ship 2.0 NM 5-ship 2.6 NM 6-ship 3.3 NM
I	**Latest Descent Point.** Determine minimum distance from CARP required to safely line up formation and accomplish the crop (IAW Chap 18 and 19 of this volume). Add to this distance the number of NM s it takes lead to descend from Minimum IFR en route to Minimum IFR Drop Altitude using 350 feet per NM descent rate. The result is lead's latest possible descent point. ***NOTE***: this may put the formation inside the 6 NM stabilization point.
J	**Minimum IFR Drop Altitude**. 500 feet above the highest man made obstacle or terrain feature, or 500 feet plus one contour interval above the highest depicted terrain contour, whichever is higher, within the IFR drop corridor. Example: 716 +500 = 1216'
K	**Planned Drop Altitude.** Highest point on DZ plus AGL drop altitude. Must not be less than IFR Drop Altitude. Example: 289 + 800 = 1089' (use higher of min IFR and planned drop alt) = 1216' (Min IFR) (Not Shown)
L	**Initial Slowdown Distance.** Distance needed to slow from en route airspeed to 160 KCAS* (see attached Table) Example 240 KCAS to 160 KCAS = 4.7
M	**Slowdown Distance.** Total distance from initial slowdown to PI. Item K + Item F + Item E + Item D. Example (from 240 KCAS to drop airspeed, 2000' to 1216') 4.7 + 2.7 +.7 + 6 = 14.1 NM

16.3.9. Peacetime Route Restrictions. In addition to restrictions in AFI 11-202 Volume 3, specific country or theater of operations publications, and FLIP area planning, routes should not be planned or flown over the following:

16.3.9.1. With less than 1 NM separation (3 NMs when in excess of 250 KCAS below 2,000 feet AGL) from known sensitive environmental areas (i.e., hospitals, fish hatcheries, large poultry complexes, recreation areas, institutions, etc).

16.3.9.2. With less than 3 NMs separation from prohibited airspace.

16.3.9.3. With less than 3 NMs separation from nuclear power plants as listed in FLIP AP/1B, **Chapter 5**.

16.3.9.4. Through restricted airspace, except transition or termination in such areas where the planning unit is a primary using agency or has approval of the controlling agency.

16.3.9.5. In weather conditions less than those specified in this instruction and AFI 11-202, Volume 3.

16.3.9.6. Below 1000 feet AGL within a 2000-foot radius over cities or towns shown as magenta shaded areas on 1:500,000 (TPC) scale charts.

16.3.9.7. Over or through active live fire or impact areas that may not be specifically designated as prohibited or restricted areas.

16.3.9.8. Below 500 feet AGL unless:

16.3.9.8.1. Host nation rules specifically allow such VFR operations.

16.3.9.8.2. Routes or training areas have been environmentally assessed and surveyed for 300-foot AGL operations. This restriction does not apply to one-time-use routes. Consult FLIP AP/1B for published Military Training Route restrictions.

16.3.9.9. For IFR airdrop operations using the SKE system in uncontrolled airspace, the mission command unit must comply with Federal Aviation Administration (FAA) Exemptions 4371. A Letter of Agreement between local ATC and the military is required when operating under this exemption. Also, provide a Notice to Airmen (NOTAM) to the FAA Flight Service Station nearest the objective area at least 48-hours in advance of the intended activity, regardless of actual or forecast weather. NOTAM information will include:

16.3.9.9.1. Name of the nearest city or town and state.

16.3.9.9.2. Date and time period of intended activity.

16.3.9.9.3. Number and type of aircraft.

16.3.9.9.4. Altitudes.

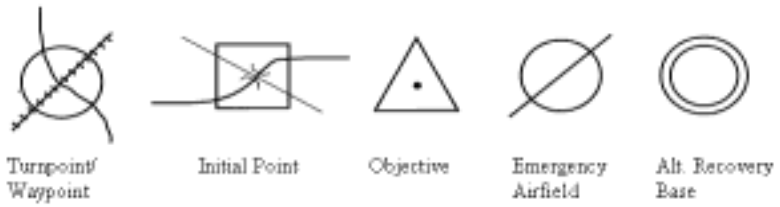
16.3.9.9.5. IFR Drop Corridor Ingress and Egress points of the route segment expressed in radial and DME from a VORTAC.

16.3.10. Navigation Chart Preparation. Mission planners will construct a master chart for mission briefings and aircrew reference. Planners may construct the chart using computerized mission planning systems if available. Sectional charts depict controlled airspace. Copilot and navigator crewmembers will use individual tactical navigation route charts for each mission. Low-level navigation charts will be annotated with any added, deleted, or changed information in the most recent CHUM or supplement. In no case will CHUM coverage be less than 22 NMs either side of the entire planned route of flight. Crews may trim charts to no less than 10 NMs after establishing the ESA. Color cop-

ies, if available, of a master chart reduce the probability of missed or misplotted data on aircrew charts.

NOTE: See Figure 16.2. for inherent chart errors.

16.3.10.1. Chart Annotation. In addition to applicable **Chapter 11** requirements, the following chart annotations and symbols will be on the master plan chart; however, an individual's chart annotations should have, as a minimum, turn points, IP and DZ, course line, course data, CHUM data, and ESA.



16.3.10.1.1. Turnpoint/Waypoint. A circle will depict both en route turnpoints and key en route navigation waypoints. Points may be lettered, numbered, or code-named to facilitate identification.

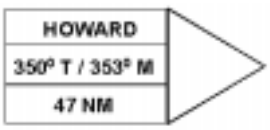
16.3.10.1.2. IP. Annotated as a square, this is normally a visually significant geographic point that marks the beginning of the course to the objective.

16.3.10.1.3. Objective. Annotated as a triangle, this point is significant as the target of the airlift mission (normally a DZ or ALZ).

16.3.10.1.4. Emergency Airfield. An airfield which is not planned as the primary or alternate recovery base but may be used for landing. A circle with a diagonal line placed along the axis of the primary landing runway identifies emergency airfields suitable to mission aircraft. Optimum emergency airfields are located within 50 NMs of intended route approximately every 100 NMs.

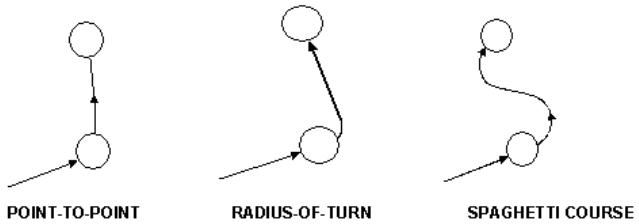
16.3.10.1.5. Alternate Recovery Base. Two concentric circles identify an airfield suitable for unit aircraft recovery should the primary recovery base be unusable due to weather, damage, or other reason. Plot a course from either a planned divert point or from the primary recovery base to the alternate.

16.3.10.1.6. Recovery Arrow Box. A horizontally divided arrow box pointing in the general direction of the alternate recovery base, providing base name, true/magnetic course, and distance to the alternate.

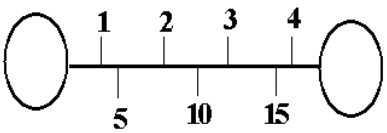


16.3.10.1.7. Course Line. The route of flight may be plotted using point-to-point, radius-of-turn, or curved path (spaghetti). Point-to-point usually assumes turning short of the waypoint, however it may be modified to overfly the waypoint and intercept the waypoint and

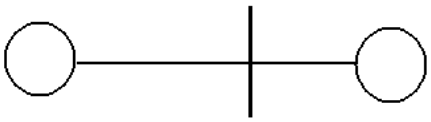
intercept the next point-to-point course. Radius-of-turn results in waypoint overflight, followed by a direct course to the next waypoint. Spaghetti routes reflect the aircrew's preplanned terrain masking/threat avoidance flight path. Course data is normally segmented along the route.



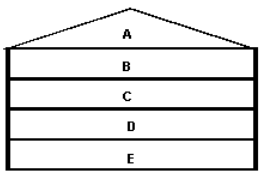
16.3.10.1.8. Time and Distance Marks. Small tick marks along each leg to show time or distance to go to the next turnpoint or checkpoint.



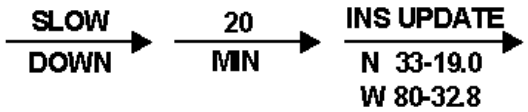
16.3.10.1.9. Combat Entry (CEP) or Exit Point. A heavy line crossing perpendicular to the course, locating the earliest or latest point at which the threat can detect or intercept the aircraft.



16.3.10.1.10. Navigation Information Block. Provides navigation information for each leg of the route. It is normally placed to the right of each turnpoint, or at the beginning of each strip chart leaf if the route leg extends beyond one leaf. As a minimum, true or magnetic course, leg distance, day or night en route altitude, and MSA will be annotated along each leg of the route. This block may be modified for mission requirements, however, the standard block contains items A through E as follows: A = true or magnetic course (after rollout) to the next waypoint/objective, B = distance (in NM or total distance to go) to the next waypoint or objective, C = day altitude (AGL), D = night altitude (MSL), and E = MSA.



16.3.10.1.11. Operational Advisory Arrows. Annotations concerning operational aspects of the mission, located where the en route maneuver should be performed. Examples of these maneuvers are start climb, or begin descent. Advisory arrows may also be used to denote locations of airdrop checklist execution. Avoid chart annotations that may compromise the mission.



16.3.10.1.12. Emergency Safe Altitude (ESA). ESA will be conspicuously annotated.

16.3.10.1.13. Multiple Passes. Depict racetracks, abbreviated routes, and re-attacks associated with multiple passes over the drop zone. For multiple passes, airspeeds, altitudes, and aircraft configuration are planned commensurate with the type of multiple pass planned. Multiple passes can be flown three different ways:

16.3.10.1.13.1. Racetrack. A racetrack is accomplished by turning 180 degrees and paralleling DZ course outbound for a set distance before turning back inbound for a second run-in to the DZ.

16.3.10.1.13.2. Abbreviated route. An abbreviated route is accomplished by executing the planned escape maneuver and entering a short, multiple leg circuit back to the IP for a second run-in to the DZ.

16.3.10.1.13.3. Re-attack. A re-attack is accomplished by extending along DZ centerline for a set distance, turning, and approaching the DZ from the opposite direction or perpendicular to course.

16.3.10.1.14. Order of Battle (OB). Denote location, type, and effective radii of enemy systems. Mark charts with appropriate classification if required and handle accordingly.

16.3.10.1.15. The location of the IFR Drop Corridor, EDP, LDP, DZ entry point, IMC Stabilization Point, and DZ Exit Point.

16.3.10.1.16. Strip Chart Booklets. These booklets of navigational charts provide a continuous depiction of a route and are normally prepared in one of two formats. Units may standardize the exact format and information required.

16.3.10.1.16.1. Format 1 consists of a booklet with a hinge at the bottom. The chart segments are stripped and glued to present a continuous route of flight.

16.3.10.1.16.2. Format 2 is constructed with a vertical hinge on the left side as in a normal book. Preferably, pages are enclosed in suitable vinyl envelopes. Normally, when the booklet is opened, the right hand page displays a segment of the strip chart and the left-hand page displays navigation leg information.

16.3.11. Mission Forms and Logs. Local overprint of the following forms is authorized.

16.3.11.1. AF Form 4093, **Pilot's Information Formation Card**. The planning staff will complete the Pilot's Information sheet.

16.3.11.2. AF Form 4051, **Low Level Flight Plan and Log**. A MAJCOM-approved computer generated flight plan may be used in lieu of the AF Form 4051.

16.3.11.3. AF Form 4135, **Pilot's Low Level and Airdrop Plan**. Pilot's will complete and use AF Form 4135 for all low-level airdrop missions. A log or stick diagram containing the same information or an aircrew flimsy page containing this information may be substituted for the AF Form 4135.

16.3.12. Aircrew Flimsy. Aircrew flimsies are a standardized collection of essential operational information required by aircrews to complete mission planning, conduct route study, fly the mission, and comply with post-mission ground procedures and debriefing requirements.

16.3.13. Route Study. Crew route study is mandatory before accomplishing flight in the low level environment. An intensive review of the ingress, objective area, and egress routing by the entire crew leads to superior crew coordination and safe mission execution. Aircraft turns planned into higher terrain, critical obstacles which do not meet three engine climb performance, terrain analysis, threat locations, terrain masking and tactics must be discussed. Special emphasis should be placed on the run-in and objective area for the locations of visual and radar features that will assist in proper identification. The importance of route study cannot be overemphasized.

16.3.14. Tactical Aircrew Coordination. Effective crew coordination is crucial to the success of any flight, especially during combat aerial delivery operations, and will be discussed prior to executing the mission. A convenient time for the entire aircrew to discuss who is going to do or say what during each phase of the mission is during route study and/or the mission briefing. Assigning specific in-flight duties, such as who is going to fly the drop and what threat lookout calls are expected, will reduce confusion at the wrong time. While there is no clear cut definition of crew coordination, the concept deals with the ability of the aircrew to handle a rapidly changing environment and successfully perform the task at hand. This requires maintaining a high level of situational awareness through the crossflow of information between various crew positions. Information should be relative, accurate, complete, timely, and concise, particularly for the objective area and threat reaction maneuvers. Crew coordination discussions should also encompass individual technique, limitations, emergency procedures, and previous lessons learned.

16.3.15. Final Review. As both a final and on-going step, planners and aircrews should conduct "what if" sessions to detect and solve potential problem areas (e.g. aircraft aborts, recall procedures, weather deterioration, breakdown in various parts of the plan, unscheduled resistance, secondary mission objectives, etc.). "What ifs" must be planned and briefed as thoroughly as the primary scenario. Additionally, limiting factors which impact mission accomplishment and aircrew survivability should be addressed and briefed to the appropriate chain of command. Document "what ifs," limiting factors, planning and aircrew concerns in Section J (Miscellaneous) of the mission planning folder.

16.4. Airlift Support Forces Coordination. Ensure airlift and supporting forces have coordinated the following information and that the information is presented in the briefings outlined in 16.5. below:

16.4.1. Airlift and support forces takeoff times.

16.4.2. Rendezvous location, altitude, and times.

16.4.3. Courses of action if airlift is late.

16.4.4. Course of action if support elements are late.

16.4.5. Airlift ingress and egress routes.

16.4.6. TOT/TOA and DZ /ALZ (including alternates).

16.4.7. Call signs.

16.4.8. Radio frequencies, radio silence procedures, chattermark procedures, and authentication procedures.

16.4.9. Airlift formation geometry.

16.4.10. Method(s) support aircraft will use to transmit threat warnings.

16.4.11. Areas of ground CAPS and EW support coverage (including times of coverage).

16.4.12. Communication with AWACS.

16.4.13. Electronic warfare support procedures (if any).

16.5. Briefings.

16.5.1. Mission Planning Pre-Brief. The purpose of the mission planning pre-brief is to familiarize all crewmembers with general aspects of the mission. The group or squadron commander, combat support group staff specialists, all crew members of each participating crew, and other personnel concerned with the mission should attend. The mission planning pre-brief may include all information pertinent to the mission and eliminate the need for later specialized briefings. In cases where highly specialized information or techniques require additional explanation or review (such as formation procedures), schedule a specialized briefing. During the briefing, indicate what preparation has been accomplished and what is yet to be accomplished. Use the following as a guide in conducting the pre-brief:

16.5.1.1. Security classification and roll call for the briefing and mission.

16.5.1.2. Purpose of the mission, forces required (including number of aircraft) and a statement of mission requirements in sufficient detail to ensure all crewmembers understand all the information.

16.5.1.2.1. Operations plan.

16.5.1.2.2. Ground objectives.

16.5.1.2.3. Supported forces requirements: in-flight rigging, SATCOM, FM radio, alibi decision matrix (who decides to re-attack and when), secondary objectives, etc.

16.5.1.3. Mission Requirements:

16.5.1.3.1. Crew composition.

16.5.1.3.2. Crew alerting and reporting.

16.5.1.3.3. Minimum ground times.

16.5.1.3.4. Crew duty times.

16.5.1.3.5. Command waivers.

16.5.1.3.6. Rules of Engagement (ROE).

16.5.1.3.7. EMCON level directed for each phase of flight.

16.5.1.4. Intelligence information. (AF and Joint Services).

16.5.1.5. Weather information.

16.5.1.6. Timing and control times to include:

16.5.1.6.1. Stations, start times, taxi, and takeoff.

16.5.1.6.2. Force Rejoin, ARCT, TOT, and TOA.

16.5.1.6.3. Landing time.

16.5.1.7. Review taxi, takeoff, and departure plans to include communications requirements and frequencies.

16.5.1.8. Navigation and altitude reservation flight plan.

16.5.1.9. Air refueling information and procedures.

16.5.1.10. Threat, special mission tactics.

16.5.1.11. Cargo load information.

16.5.1.12. Recall and diversion procedures.

16.5.1.13. Recovery and alternate base.

16.5.1.14. Announcements to include technical order status and changes, flying safety, specialized briefing times and locations, debriefing and interrogation location and procedures, messing, transportation, personal equipment, radio, and communications procedures and crew questions.

16.5.2. Pre-Deployment Briefing. Prior to deployments, the operations officer, mission commander, or designated representative should assemble the crew and brief description and purpose of the mission, tentative itinerary, aircraft configuration, special equipment, fuel load, clothing required, anticipated housing and messing facilities, sufficient money to defray individual's anticipated expenses, personal equipment/field equipment requirements, special clearance requirements, and flying safety.

16.5.3. Joint Mission Briefing or Mission Briefing. Joint representation is desirable when more than one service is participating. Briefings should be clear, concise and provide only mission essential information. Requirements of particular missions will determine sequence and content of individual briefings. AFFTP 3-1, Vol 35, provides a recommended outline. Planners should adjust the format and extract (or add) items to conform to specific mission profiles. Conduct after each individual crewmember has completed their mission preparation. All crewmembers will be present unless excused by the mission commander. Crewmembers not present must be briefed by the aircraft commander prior to takeoff. The mission commander, or mission planning staff, must re-brief the mission when the time interval from initial aircrew briefing to mission takeoff exceeds 72-hours.

16.5.4. Tactical Mission Briefing. Required if applicable items are not briefed in the Joint Mission Briefing/Mission Briefing. A mission briefing for participating pilots, navigators, and other personnel as directed by the mission commander, is required prior to all low-level and formation missions. Brief applicable items in sufficient detail to ensure clear understanding of mission objectives and procedures. The aircraft commander is responsible for ensuring all crewmembers are briefed on applicable mission items.

16.5.5. Specialist Briefing. Conduct specialist briefings to detail operating procedures or special interest items. The mission commander determines the requirement for this briefing. When appropri-

ate, hold specialist briefings at the completion of the Tactical Mission Briefing for ACs, navigators, loadmasters, aeromedical personnel, jumpmasters, assault zone control officers, STT, and DZST personnel.

16.5.6. Serial Lead Briefing. The serial leader will assemble all pilots and navigators participating in the serial briefing to cover any changes or additions arising after the formal mission briefing. Only applicable items need be briefed. Conduct this briefing as appropriate, to allow sufficient time to complete necessary aircraft inspections and jumpmaster, loadmaster, or parachutist briefings before station time. **Chapter 19**, Annex A, contains specific briefing items.

16.5.7. Other Briefings. In addition to the briefings above, mission participants will also conduct briefings as required in Section 6.12. of this AFI. These include C2 Center Briefing, Aircraft Commander Briefing, Specialized Briefings (Airdrop, Air Refueling, Load Briefing, etc.), Weather Briefing, Intelligence Briefing and Hazardous Materials Briefing.

16.6. Mission Debriefings. Hold immediately after the mission if practical. Include the following:

16.6.1. Aircrews should attend the operations and maintenance debriefings as directed by unit or mission commander. Maintenance debrief should be conducted ASAP after flight.

16.6.2. Intelligence debriefings must be accomplished as soon as practical after mission recovery, normally within 30 minutes. Debriefings will be as prescribed in USTRANSCOMR 200-3, *Intelligence Debriefing and Reporting*.

16.6.3. Aircrew Debrief. Mission critiques and debriefings are perhaps the most important learning tool available to aircrews and will be done after each mission. All crewmembers should attend. Use this time to review the entire mission. This is the time to learn. Undue concern about crewmembers' feelings may prevent them from learning something that may save future missions. The critique must be done objectively. Bring out the positive as well as the negative. Review techniques, offer suggestions for improvement, and correct mistakes.

16.6.4. For formation flights, a post-mission debrief should be conducted by the mission commander or formation leader.

Chapter 17

EMPLOYMENT

Section 17A—General Procedures

17.1. General. Tactical airland operations play an important role in moving and re-supplying ground forces. Airland is the preferred method of delivering troops, equipment, and supplies into objective areas. Airland operations minimize risk of equipment damage or personnel injury, maximize aircraft capacity, reduce load rigging requirements, and provide equipment that cannot be airdropped.

NOTE: Certain technical information was intentionally omitted or generalized to keep this chapter unclassified. Users should be aware that written additions to any portion of this document could cause the manual to become classified.

17.1.1. Tactics and intelligence staff should join forces in this area to ensure success. Each unit's tactics program may be different because of the differences between unit mission taskings; however, the overall objectives should be the same.

17.1.2. Crews should operate in accordance with this volume when operating into tactical Landing Zones (LZ) or when operating into locations with hostile threat environments. LZ operations are described in AFI 13-217.

17.1.3. Aircraft can use air refueling to increase flexibility, optimize cargo capacity, reduce dependence on en route airfield availability, extend range, reduce intra-theater cycle times, and reduce demands on theater fuel supplies.

17.1.4. Crews should be prepared to adjust their mission plan based on en route mission updates. In a potential threat situation, crewmembers must understand their limitations and those of their equipment. Since the procedures contained in this chapter are not all encompassing, aircrews are expected to use good judgment, innovation, and sound airmanship to successfully accomplish the mission.

17.2. Passengers on Tactical Flights: Personnel tasked for JA/AT airdrop and/or airland operations (i.e., crew chiefs) are allowed on airdrop missions. Passengers are allowed, including Space-A passengers, on any flight, single ship or formation that:

17.2.1. Is not airdropping, or conducting NVG operations on that sortie.

17.2.2. Meets the provisions of AFJMAN 24-204 concerning passengers with hazardous cargo.

17.2.3. Is not prohibited by international agreement.

17.2.4. If on a SAAM, the user does not object to Space-A passengers.

NOTE: Passengers will be advised of any planned tactical events and may refuse transportation these missions due to potential roughness of the flight, at no loss to their order of priority for movement.

17.3. Restrictions. Non-airdrop qualified crews are limited to single-ship operations. Refer to **Chapter 18** of this instruction for guidance on formation procedures.

17.4. Communications. The ability to smoothly transition through the various echelons of the C^3I systems is essential for successful mission accomplishment. Use secure and jam resistant communications to

the maximum extent possible. In a threat environment, limit radio transmissions with the objective area to those required for safety of flight or factors affecting force employment.

17.5. Airfield and ALZ Requirements. Markings required for landing zone operations are depicted in AFI 13-217. These markings are desirable for tactical airland operations; however, full markings are not mandatory on hard-surfaced runways that are permanently marked (or lighted) so as to make the touchdown zone and runway distances readily identifiable, or if the tactical situation does not permit full markings. Communication and navigation aids provided by Special Tactics Teams are based on operational requirements, capability, and the specific threat environment.

17.6. Tactical Checklists. Amplified tactical checklists are included. Abbreviated checklists (attached as checklist to this volume) will be carried by individual crewmembers. The pilot calls for the specific checklist to be accomplished and the flight engineer reads all checklists. Combat Entry and Combat Exit checklists will be executed at the appropriate times/locations for airdrop and tactical airland missions. Combat offload checklists are used when dictated by the mission requirements or directed by C2 agency or OPORD.

17.6.1. All primary crewmembers should be on interphone from the Combat Entry checklist until completion of the Combat Exit checklist (unless operations require otherwise). If a pilot must leave the seat or go off interphone, climb to either MSA for that leg or ESA for the route. All crew members will wear helmets, if issued, from initiation of the Combat Entry checklist until completion of the Combat Exit checklist when mobile in the cargo compartment. ***NOTE***: Transition from the flight deck to crew lavatory and immediate return is exempted.

17.7. Safety Equipment. See **Chapter 19**.

17.8. Energy Management. Performance data must be carefully considered and prior planning of energy management is essential when planning low level operations. This is particularly necessary in mountainous terrain, at heavy gross weights, or with less than full engine power capability. Aggressive maneuvering, even at relatively high airspeeds, can place the aircraft into an approach-to-stall condition or require a go-around. Abrupt control inputs and/or uncoordinated flight should be avoided. These inputs are particularly hard on the airframe; and, in some instances, may increase airframe structural loading beyond design limits, possibly resulting in structural failure.

WARNING: Uncoordinated flight reduces stall margins and can cause an abrupt departure from controlled flight. Abrupt control inputs and/or uncoordinated flight are particularly hard on the airframe, and in some instances, may increase airframe structural loading beyond design limits, possibly causing structural failure.

Section 17B—En Route Procedures

17.9. Planning. Threat analysis, planning, and flexibility are key factors in combat airland operations. Normally, plan your route as far from the threat as possible. Refer to **Chapter 16** of this instruction and AFTTP 3-1, Volume 35 for specific mission planning procedures.

17.9.1. Any given approach into an objective area offers advantages and disadvantages. If it is not possible to select an approach that avoids the threat, attempt to minimize aircraft exposure time as much as possible. When more than one aircraft is involved, using multiple routes, altitudes, and traf-

fic patterns may hamper enemy targeting efforts. The entry, slowdown, and traffic pattern must ensure a successful landing on the first attempt, but still leave adequate margins for the unexpected.

17.9.2. Planning cannot be overemphasized. Analyze factors such as visibility, weather conditions, altitude and surface winds, and take full advantage of the terrain. Consult applicable LZ surveys, AMC ASRR, VFR/IFR Supplements, NOTAMS, airfield surveys, and flight information publications. Consider decision points, emergency escape plans, and alternate approaches. Decision points are times, positions, or events which should commit you to one course of action. An emergency escape plan and a plan for alternate courses of action will enhance survival.

17.10. Low Level Navigation. Threat and emission control requirements permitting, use all available aids (e.g., map reading, inertial navigation computer data, navigational aid fixes) to remain position oriented.

17.10.1. While aircraft systems provide a self-contained adverse weather, day/night, worldwide navigation capability, the entire aircrew is responsible for en route navigation, terrain avoidance, and time control. During low level operations, attention should be focused outside the aircraft, emphasizing threat detection and situational awareness. Limit duties which distract attention from outside the aircraft to mission essential items only.

17.10.2. Maximize use of navigation display information on the flight-station MFD to increase situational awareness.

17.10.3. Time of Arrival (TOA) control is primarily accomplished by airspeed adjustments. If necessary and appropriate to the situation, you can use planned alternate legs to gain or lose time, use timing triangles, fly inside or outside course line (within mission route parameters), or use time control holding patterns.

17.10.4. Means of Navigation.

17.10.4.1. Map reading, backed-up with onboard navigation equipment, is the primary means of navigation on VFR low level routes. If conditions or crew complement permit, Hand-held GPS and ground-based navigational aids can be used as additional information sources.

17.10.4.2. The INSs are the primary means of route navigation in IMC. If conditions permit, onboard radar, ground-based radar, and/or bearing/distance fixes will be used.

17.10.5. Flight at low altitude can be an effective defensive tactic; however, never fly lower than the altitude dictated by the threat or mission. Navigation and objective area identification become increasingly difficult when threat avoidance requires low ingress/egress altitudes, operations at night, or operations during marginal weather conditions.

17.10.6. Low level modified contour flight is flown with momentary deviations above and below the base altitude for smoothness of flight. The radar altimeter used by the pilot flying must be operational and the radar altimeter altitude reference marker will be set to 50 feet below base contour altitude.

17.10.7. During IMC or night operations, maintain en route altitude by using the best available barometric altimeter setting and radar altimeter information. When the next leg (or segment) altitude is higher than the leg (or segment) being flown, cross the waypoint at the highest altitude. If the next leg (or segment) altitude is lower than the leg (or segment) being flown, descend when past the waypoint.

Section 17C—Threat Avoidance Arrival/Departure (TAA/D) Procedures

17.11. General. Factors such as hostile activity, weather (winds or visibility), aircraft weight, or terrain may require modifications to normal traffic patterns. This chapter provides some examples and techniques; however, proper planning, pilot ingenuity, proficiency and judgment are keys in determining the type of pattern flown. Normal habit patterns should be used as much as possible when flying these approaches. Regardless of the type of approach, you should be aligned with runway centerline and established on approach glide path no less than a ½ NM from the touchdown zone. For visual depictions of TAA/D VFR Overhead Pattern, Random Steep Approach, Steep (Curvilinear) Approach, and Spiral-Up Departure, see **Figure 17.1.**, **Figure 17.2.**, **Figure 17.3.**, and **Figure 17.4.**.

17.11.1. Threat Avoidance Arrival/Departure Procedures (TAA/D). VFR Overhead Pattern, Random Steep Approach, Curvilinear Approach, and Spiral-Up Departure (see **Figure 17.1.**,**Figure 17.2.**, **Figure 17.3.**, and **Figure 17.4.**). Squadron commander certified aircraft commanders and above may accomplish TAA/D maneuvers. Accomplish TAA/D maneuver initial certification training on any sortie without passengers aboard. Once certified, TAA/D maneuvers may be flown on continuation training and operational missions with passengers aboard.

17.12. Tactical Descents. Tactical descents are always flown single ship.

17.13. Low Altitude Approaches. A variety of tactics can be used when a low altitude ingress is necessary to minimize the probability of hostile detection near the destination airfield. If the threat situation dictates, terrain masking procedures may be required until very close to the airfield. All maneuvering may need to be accomplished at low altitudes (typically at or below 1,000 ft AGL). Low altitude approaches can be entered from any direction at en route altitude and airspeed. If the situation permits, plan to slow and configure for landing prior to arrival at the field. Generally, on missions without navigators, the INS or ground-based navigational aids provide primary navigation guidance to the field, then the pilot performs the final portion of the maneuver using circling approach techniques.

17.13.1. The Straight-In. This approach appears to be the simplest, but is one of the most difficult to execute consistently. Accurate navigation is critical since the field is usually small and the runway environment is often sparsely populated and poorly defined. The lack of turns means energy dissipation is one dimensional, making slowdown timing critical.

17.13.1.1. The key to a successful approach is ensuring the slowdown maneuver provides adequate time to obtain proper landing configuration.

17.13.1.2. Delaying slowdown reduces the time an aircraft is at approach airspeed and altitude. Tailwinds or heavy gross weights will require earlier slowdowns. You can vary the approach with an angling final (offset straight-in), dog leg, or even a base turn entry using straight-in techniques. However, slowdown maneuver timing and actions should be designed to meet specific mission requirements.

17.13.2. Teardrop. This approach allows you to convert from a straight-in to land in the opposite direction using a circling approach maneuver. Enter at en route airspeed, and dissipate airspeed throughout the approach. Start slowing about one NM from the departure end, and offset to the side of the runway. Another variation to this approach is a 90/270 maneuver. The key reference for the approach is maintaining airspeed no lower than V_{APP} + 20 with 75% flaps and landing gear down before the base turn. Initiate the base turn and complete the circling maneuver.

17.13.2.1. Advantages. This pattern allows adjustments to manage your energy while staying close to the airfield. Runway acquisition is about the same as a straight-in, but less precision is needed due to the more flexible pattern.

17.13.2.2. Disadvantages. Like a circling approach, low altitude maneuvering may create an unusual picture and result in a tight pattern and overshoot. Maneuvering at low altitude and airspeed allows little margin for error.

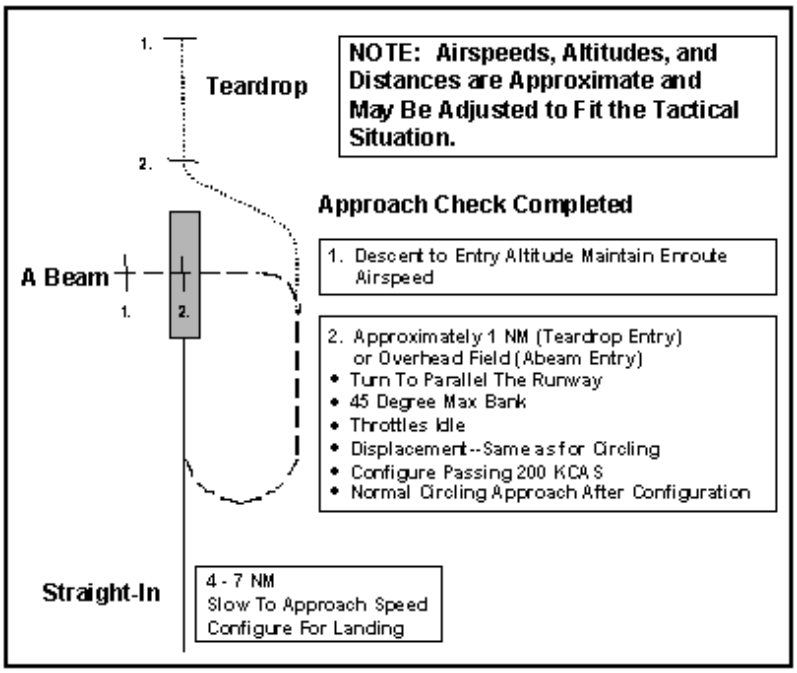
17.13.3. Downwind Approach. Entering a high-speed downwind will allow use of the same base turn used on the teardrop approach. Normally enter downwind at 1,000 feet AGL, maintaining 230 KCAS. No later than mid-field downwind, retard throttles to idle, extend 75% flaps then landing gear in sequence when below 200 KCAS, and slow to no lower than V_{APP} + 20. On the base turn, attempt to adjust for winds and make a continuous turn to final. After commencing the turn from downwind to final, extend flaps to the landing configuration (3/4 or full) and accomplish the Before Landing Checklist. Once on final, confirm final flaps (3/4 or full) and slow to final approach airspeed.

17.13.4. The Beam (Crosswind Entry) Approach. This approach offers the flexibility to land in either direction and allows reconnaissance of the field as the aircraft fly's overhead. Cross the airfield at no lower than V_{APP} + 20, 75% flaps, landing gear extended, and complete the circling maneuver.

17.13.4.1. Advantages. Maintains ingress airspeed until near the airfield. Constant turning degrades acquisition of the aircraft by enemy systems. The precision required for navigation is reduced by approaching from the beam, and ALZ acquisition is easier. It allows for landing in either direction.

17.13.4.2. Disadvantage. Considerable maneuvering in close proximity to the ground, with changing configuration and airspeed requires extreme vigilance.

Figure 17.1. Low Altitude Approaches.



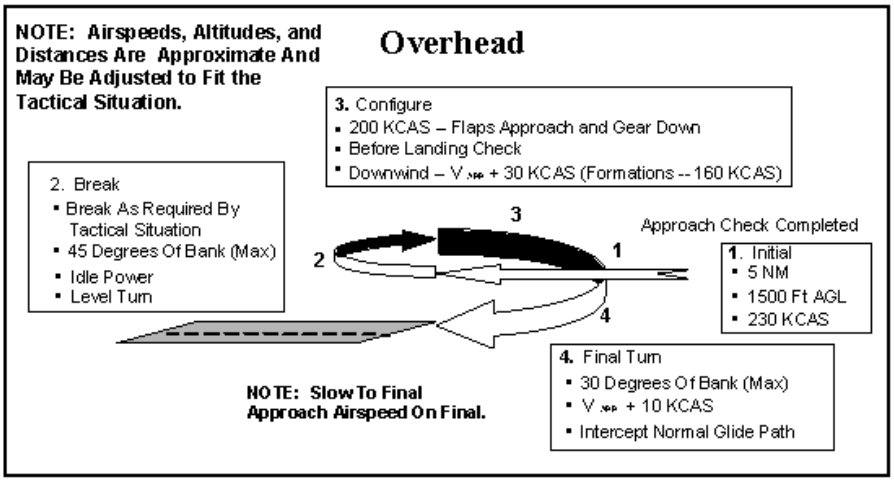
17.14. High Altitude Approaches. These are used primarily when a high or medium altitude ingress is required. The objective may include a small arms environment and a permissive high or medium altitude threat environment which allows some reconnaissance of the field when the aircraft fly's overhead. Initial altitude, airspeed, and heading are based on the threat. VFR weather is required and traffic patterns are above 1,000 ft AGL.

17.14.1. Overhead Approach. Normally maintain 230 KCAS, at 1500 feet AGL until over the landing threshold (or as briefed). Make a level pitchout using 40-45 degrees of bank and retard power to idle. Once bank is established, extend flaps to 75% and landing gear in sequence. On downwind, establish approach + 30 KCAS (a minimum of 160 KCAS for formation operations). On the base turn, adjust for winds (using no more than 30 degrees of bank) to make a continuous turn to final. After commencing the turn from downwind to final, extend flaps to the landing configuration (75% or full) and accomplish the Before Landing Checklist. Once on final, and when intercepting a normal glidepath, slow to final approach airspeed. See **Figure 17.2.**. Variations to this pattern include a low altitude ingress with a pitch-up maneuver; or an offset overhead.

17.14.1.1. Advantages. Expedites arrival and keeps airspeed high until overhead the airfield.

17.14.1.2. Disadvantage. Aircraft is more easily observed at higher altitudes.

Figure 17.2. Overhead Approach.



17.14.2. Random Steep Approach. This maneuver can be entered from any direction at an altitude based on the threat, pilot judgment, and aircraft performance. A common entry is accomplished from a spiral descent. Extend 75% flaps, and landing gear; when below 185, select landing flaps and maneuver with a minimum of V_{APP} + 20 until final turn (or 1.3 V_{stall} for angle of bank [45 degrees maximum]) to intercept final. When on final, confirm final flaps (approach (75%) or full) and slow to final approach airspeed. See **Figure 17.3.**.

17.14.2.1. Advantages. This approach is effective when the primary threat is small arms. It requires unpredictability, maneuvering within protected territory, and allows adjustments for energy management. The high altitude makes it easier to establish and maintain visual contact with the runway and the turning descent degrades targeting of the aircraft by enemy systems.

17.14.2.2. Disadvantages. The aircraft is relatively slow throughout the approach and is easily observed. There is the possibility of high sink rates close to the ground with relatively low power settings.

17.15. Steep (Curvilinear) Approaches. A steep approach is accomplished with full flaps and an approach glide path in excess of 3 degrees. A steep approach may help avoid small arms fire, reduce touchdown speed and landing distance, minimize touchdown point dispersion, and afford the crew a better view of the runway and touchdown point.

Figure 17.3. Random Steep Approach.

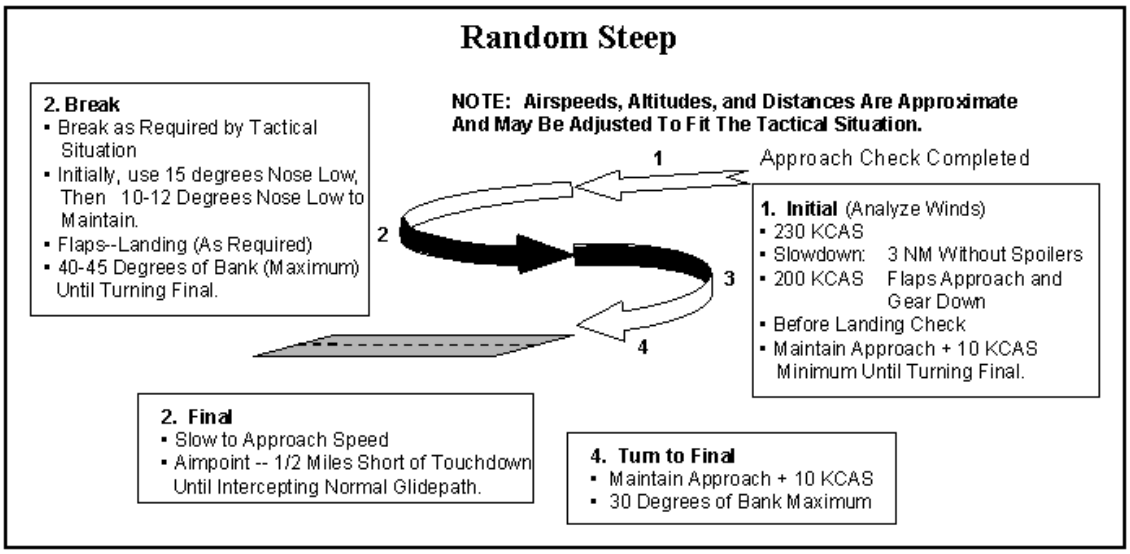
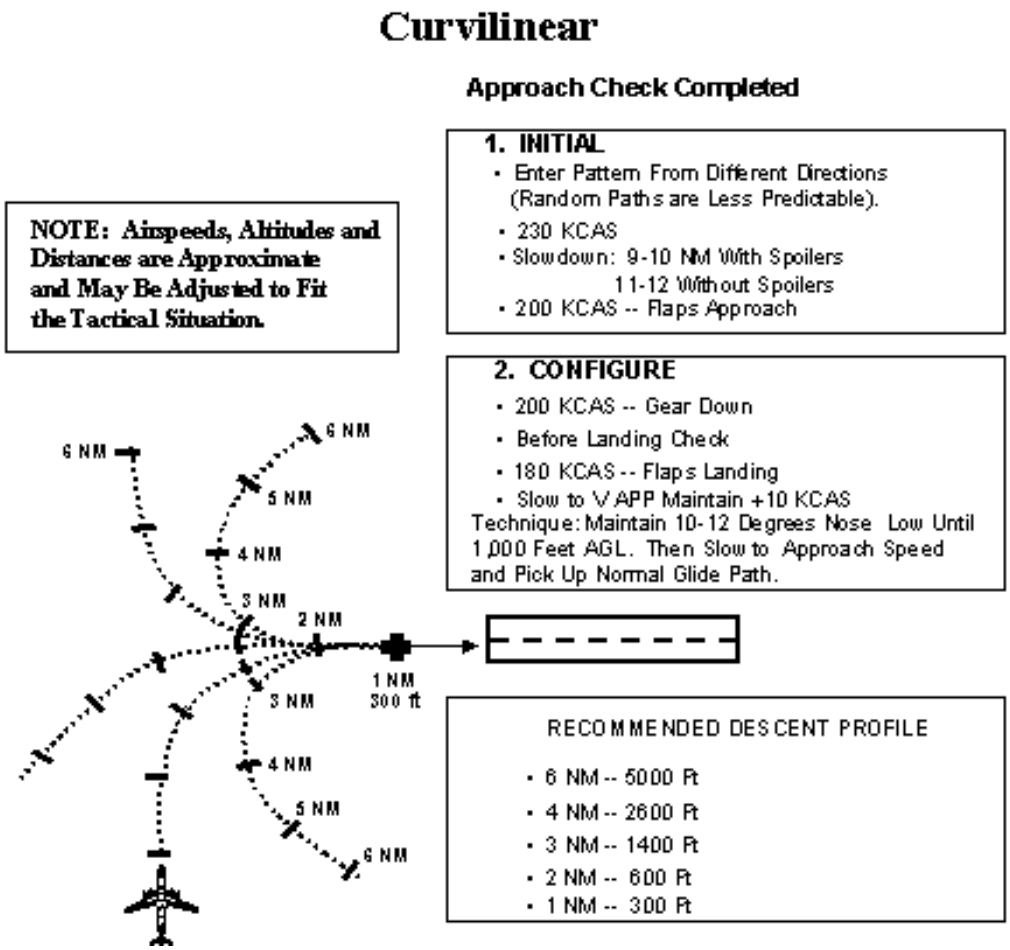


Figure 17.4. Steep (Curvilinear) Approaches.

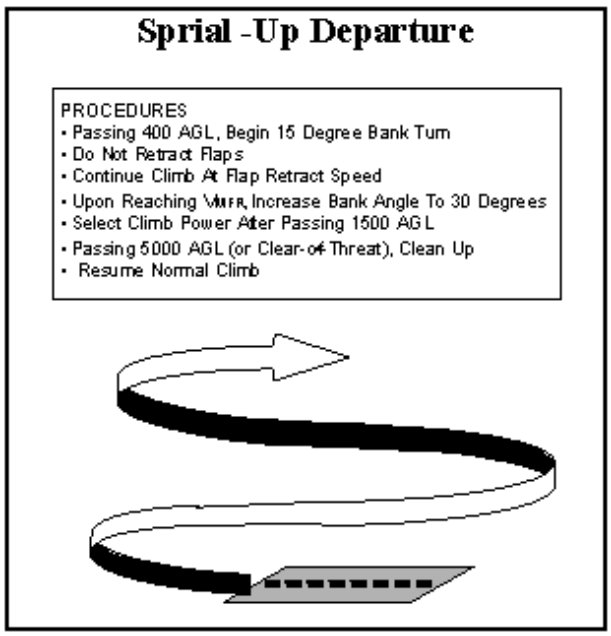


17.16. Tactical Departures - General. When departing consider the same factors used for arrival planning. Plan your departure to minimize the time spent within the threat environment, either egressing at low level or spiraling up to altitude.

17.16.1. Low Departure. Low level departures are used when low altitude is necessary to avoid early warning coverage or SAMs. A typical low escape profile is a maximum EPR takeoff to a high speed, 300-500 feet AGL egress segment. Some threats may require low altitude/low airspeed maneuvering.

17.16.2. Spiral-Up Departure (**Figure 17.5.**). This departure is used when a high or medium altitude escape is necessary (i.e., a small arms environment and a permissive high or medium altitude threat environment exists). Fly a climbing spiral at V_{MFR} with 75% flaps. Upon reaching a safe altitude, accelerate, retract flaps, and continue climb at technical order climb speeds. Since actual time to climb will increase proportionally with bank angle, use the minimum bank required to remain within the confines of protected airspace.

Figure 17.5. Spiral-Up Departure.



Section 17D—Ground Operations

17.17. General. This section outlines procedures to follow when conducting specific ground operations at forward operating locations. Maneuvering in confined areas, reverse taxi operations, performing engine running onloads and offloads, and combat offloads all require a high degree of crew coordination. A thorough briefing and prior preparation are essential to quick and safe operations. Appropriate ground personnel and subsequent aircrews should be briefed on any hazards encountered during takeoff or landing (e.g., dust, winds, hostile activity).

17.18. Loading of Rucksacks. The following procedures apply to loading of rucksacks.

17.18.1. In all cases, rucksacks will be loaded on the same aircraft as the individual.

17.18.2. Transported units must ensure that adequate space is provided on the load plan and aircraft to ensure all personnel have an unobstructed path to evacuate the aircraft during an emergency.

17.18.3. During administrative deployments, rucksacks may be loaded on deploying vehicles, palletized, or floor loaded. Placing rucksacks on the aircraft floor may increase loading and offloading times. Also, this method may require more space and reduce the number of personnel or equipment airlifted.

17.18.4. During tactical deployments into a FOB/OB, rucksacks not loaded on vehicles will be carried by the individual onto the aircraft. Normally, floor space will be allocated on the aircraft load plan for floor loading rucksacks.

17.18.4.1. When a flight is planned for a short duration, the following procedures apply:

17.18.4.1.1. All troops must have quick release straps on their rucksacks.

17.18.4.1.2. Troops will be briefed to leave their rucksacks on the seat if an emergency evacuation is necessary.

17.18.4.2. The following procedures apply to transporting hazardous materials in rucksacks.

17.18.4.2.1. Personnel will only be permitted to carry their basic combat load or individual issue of hazardous material when they will engage an enemy force immediately upon arrival. Personnel may retain small arms ammunition (cartridge for weapons, DOT 1.4) and nuclear, biological, and chemical equipment as long as it is retained in a carrier (i.e., bandoleers, pouches, bags). Weapons will remain clear until the aircraft has landed or as directed by the loadmaster.

17.18.4.2.2. Munitions and other hazardous materials placed in rucksacks, field packs, or other authorized containers, removed from their shipping container, must be adequately protected from accidental functioning. For airland troops and airdrop troops who are not rigged prior to takeoff, all carriers will be consolidated in one central location on the aircraft (as directed by the loadmaster) and distributed to personnel after landing. Paratroopers rigged prior to takeoff may retain individual carriers containing hazardous materials.

17.18.4.2.3. The troop commander or load team chief will brief the loadmaster concerning the individual issue of hazardous materials.

17.18.4.2.4. Hazardous materials identified for sustainment must be prepared and certified according to AFJMAN 24-204.

17.19. Engine Running Onload and Offload (ERO) Procedures. Use ERO procedures when necessary to expedite aircraft movement or meet time requirements of unit moves, joint training exercises, and contingencies or enhance crew duty day. With the exception of small arms ammunition (Hazardous Class/Division 1.4), do not use ERO procedures when explosive cargo is involved unless authorized in the JA/ATT, exercise operation or contingency ATO. These ERO procedures may be used for any mix of personnel or cargo. Material handling equipment should be used if palletized cargo is to be onloaded or offloaded. Aircraft commanders must assess prevailing weather, lighting and parking location to ensure safe operations. General procedures follow.

17.19.1. T.O. 1C-141B-1 After Landing and Before Takeoff checklists will be accomplished when performing ERO procedures.

17.19.2. Unless threat conditions dictate otherwise, use wing leading edge, and taxi lights to enhance safety at night.

17.19.3. The aircraft commander will brief the crew on all aspects of intended ERO operation, emphasizing specific crewmember duties.

WARNING: Do not onload or offload through the crew entrance door and cargo ramp and door at the same time. Paratroop doors will not be used.

17.19.4. Prior to the loadmaster directing offload/onload operations, aircraft parking brake will be set and at least one pilot will monitor brakes, engines, interphone, and radios.

17.19.5. The loadmaster will direct all onload/offload operations. Prior to onload/offload operations, personnel in the cargo compartment will be briefed regarding their location, duties, and responsibilities during the ERO. No doors will be opened without coordinating with the loadmaster. As per load configuration, the briefing will include:

17.19.5.1. Exact offload procedures and applicable signals for vehicle drivers.

17.19.5.2. Drivers will be told to assume their positions during taxi-in. They will actuate brake pedals sufficiently to ensure vehicle brakes are operational, and they will not start engines until directed by the loadmaster. The loadmaster will not direct engine starts until the aircraft comes to a complete stop, and the door and ramp are open and positioned for offload.

WARNING: If a combat offload is to be accomplished before offloading vehicles, do not remove restraint until after the combat offload is completed.

17.19.5.3. Vehicle parking brakes will not be released until all restraint is removed and cleared by the loadmaster.

17.19.5.4. Personnel to be offloaded will be briefed to secure baggage aboard vehicles (if applicable).

17.19.5.5. Vehicles and all personnel exiting via the ramp will proceed directly aft of the aircraft at least 25 feet before turning and at least 200 feet before stopping.

17.19.6. After the aircraft is slowed to taxi speed, the loadmaster may remove all tiedowns except one forward and one aft. After ensuring the ramp toes are in the appropriate position, open the cargo door, and lower the ramp to an approximate horizontal position.

17.19.7. Position the scanner, on interphone, in the cargo compartment to act as safety observer and cargo compartment liaison to ensure safety of ERO operations.

17.19.8. After clearance from the pilot to start offload/onload operations, the loadmaster positions the ramp, extends the stabilizer struts (if required) and directs the offload/onload.

WARNING: Engines will be placed in reverse idle prior to the pilot giving clearance for off/onload operations. If a thrust reverser will not extend, consideration should be given to shutting down the affected engine.

NOTE: If both No. 1 and No. 2 engine thrust reversers fail to extend, terminate the ERO. Accomplish the Engine Shutdown and Before Leaving Aircraft Checklists.

NOTE: When accomplishing offload/onload operations, comply with T.O. 1C-141B-1 and T.O. 1C-141B-9 procedures.

17.19.9. The loadmaster will direct all onload and offload operations using briefed signals. Other qualified loadmasters (TALCE, aerial port) may perform these duties; however, the crew loadmaster retains overall responsibility for the operation. Passengers will be escorted by a crewmember, TALCE, Aerial Port, or airfield control (e.g., CCT, A/DACG) personnel when enplaning or deplaning. Deplane passengers before removing cargo and enplane after loading cargo unless cargo size and location dictate otherwise.

17.19.10. Load Data. If cargo/passenger onload information can be obtained prior to landing/onload, complete the DD Form 365-4 for the subsequent sortie. The loadmaster may use the load plan total weight and load Center of Balance (CB) for entry on the DD Form 365-4 provided these procedures are followed:

17.19.10.1. The load plan data must be checked by a qualified load plan validator (i.e., aircraft loadmaster, TALCE loadmaster, aerial port specialist, or any individual who has completed the AMC Affiliation Program Airlift Planners Course).

17.19.10.2. The load plan validator will legibly sign the signature block on the load plan with name, rank, and organization.

17.19.10.3. The load must be placed on the aircraft exactly to load plan.

17.19.10.4. Prior to flight, if there is any doubt as to the accuracy of the load plan weight or CB, the loadmaster must accomplish the DD Form 365-4 by station loading each individual item.

NOTE: If downloading to an empty aircraft, a DD Form 365-4 is not required for the subsequent sortie.

17.19.11. After offload/onload is completed, resume taxi after coordination with the loadmaster.

CAUTION: The stabilizer struts will be stowed and the ramp raised to at least the horizontal position prior to taxi.

17.19.12. The copilot will ensure that the next flight plan leg is available and take-off data has been updated (to include operating weight and CG). The copilot is also responsible for updating ATC clearances (as required).

17.19.13. Crew Entrance Door ERO Procedures. The aircraft commander may approve the offload or onload of personnel and small cargo through the crew entrance door. In this instance, the throttles may be positioned to idle, open only the crew entrance door, and deplane the loadmaster/scanner to assure safety of deplaning/ enplaning of personnel. For ERO Aeromedical Evacuation (AE) operations with patients, see **Chapter 20**.

CAUTION: Ensure personnel use hearing protection and all loose articles are secured.

17.19.13.1. Crew changes during local training missions are authorized provided the enplaning crew does not approach the aircraft until a deplaning crewmember is positioned on headset outside the aircraft.

17.19.13.2. After the offload/onload operation, ensure the crew entrance door is closed and the cargo compartment is secured prior to resuming taxi.

17.20. Combat Offload Procedures. Combat offload procedures are used to rapidly offload CDS containers, airdrop platforms, or single, multiple, or married pallets when Material Handling Equipment (MHE) is not available or the situation dictates. This can involve either of the cargo rail systems (logistic

or ADS). The controlling AMC NAF/DO or the DIRMOBFOR may authorize combat offload when conditions warrant.

WARNING: Many explosive items have a specific "drop" criteria that, if exceeded, render the item useless or dangerous to the user. With the exception of small arms ammunition (Hazard Class/Division 1.4), explosives and munitions shall not be combat offloaded without approval of HQ AMC/DO.

EXCEPTION: Explosives and munitions rigged for airdrop may be combat offloaded without MAJCOM/DO approval.

CAUTION: Excessively rough, sharply undulating or battle damaged surfaces may cause damage to the aircraft ramp during combat offload operations. Reducing forward taxi speed on these surfaces will reduce aircraft oscillation. The aircraft commander must ensure the offload area will permit the offload operation to be conducted without damage to the aircraft.

17.20.1. Prior to commencing combat offload operations, the aircraft commander will brief each crewmember on the procedures to be used. If possible, these procedures should be briefed during mission planning since some checklist items may be accomplished prior to arrival at the offload location. Ensure the offload area will not block other aircraft.

17.20.2. All crewmembers participating in the combat offload will refer to the Combat Offload checklist (Annexes A and B to this chapter). Report any problem to the aircraft commander immediately. Expanded Combat Offload Checklist information is contained in Attachments 3 and 4 to this chapter.

17.20.3. Ensure other individuals assisting the crew receive a thorough safety and procedures briefing for the entire offload sequence.

17.20.4. If space is limited and the offload environment permits, normal aircraft backing procedures may be used to provide maximum offload space.

CAUTION: To combat offload, a surface of at least 1,000 feet is required; however, 1,500 feet is desired to provide a margin of safety.

17.20.5. A crewmember other than the loadmasters (normally the scanner) will be on interphone in the cargo compartment to act as a safety observer.

17.20.6. The loadmaster/scanner will be on interphone with hot mike selected and maintain constant contact with both pilots during combat offload operations.

17.20.7. Set interior lighting to the minimum required to perform the mission. Red lighting may be turned on (per mission requirements) at the discretion of the Jumpmaster/troop commander if troops are on board. If red lights are turned on early, ensure all lights are at the proper setting.

WARNING: During the entire offload operation, personnel are not permitted aft of the load unless the loadmaster ensures all locks are engaged in the pallet detents.

17.20.8. The copilot will update the mission computer (as necessary) to ensure the next flight plan leg is available and TOLD has been updated (to include new operating weight and CG). The copilot is also responsible for updating ATC clearances (as required).

NOTE: If combat offloading to an empty aircraft, a DD Form 365-4 is not required for the subsequent sortie.

17.21. Emergency Airlift of Personnel. Use these procedures for emergency airlift of personnel from areas faced with enemy siege or hostile fire; or use these when directed by the controlling MAJCOM DO or DIRMOBFOR. Airlift will normally be accomplished without the use of individual seats, seat belts, or litter stanchions. The number of personnel seated on the cargo floor will vary. Personnel may be loaded in groups of 12 to 16 (depending on size). The following procedures apply.

17.21.1. Rails and roller conveyors will be stowed.

17.21.2. When available, mattresses or other cushioning material may be used for seating.

17.21.3. Troops, passengers, and ambulatory patients may be seated facing forward on the cargo floor, sidewall seats, or ramp.

17.21.3.1. Attach the hook end of tiedown straps to left and right outboard tiedown rings. Position personnel laterally between attached straps.

17.21.3.2. After personnel are seated, route straps laterally across their legs and secure ratchet end of straps to the tiedown ring in D row. Ensure ratchet has at least 1 1/2 turns to guard against slippage, but is loose enough to provide for proper blood circulation. This will provide forward restraint and body stability for each row of personnel.

17.21.3.3. Number of personnel carried may be limited by the amount of tiedown equipment carried.

17.21.3.4. Secure baggage on the ramp when excess baggage and cargo secured on the cargo floor (or a pallet) may decrease the number of troops, passengers, and patients proportionately.

17.21.3.5. Floor loading of patients. See **Chapter 20**.

NOTE: Aircrews should be ready for aeromedical evacuation taskings at any time, especially when in a combat area. If time and conditions permit, the loadmaster may rig litter stanchions but should use caution when rigging en route in the event of turbulence or threat evasive maneuvers.

Section 17E—Combat Operations Checklists

17.22. Combat Entry Checklist.

17.22.1. Complete the combat Entry checklist at **Table 17.1.** prior to entering the threat environment. Prior to the Combat Entry point, the pilot initiates this checklist by stating “Crew, Combat Entry Checklist.” * Indicates items to be accomplished when Airlift Defensive Systems (DS-1) (AAR-47/ALE-40), DS-2) (AAR-47/ALE-47) or (DS-3) (AAR-44/ALE-40) are required.

Table 17.1. Combat Entry Checklist.

COCKPIT CREW	LOADMASTER
1. "CREW, COMBAT ENTRY CHECKLIST" (P)- "ACKNOWLEDGED" (CP, N, E, S, LM)	1. "CREW, COMBAT ENTRY CHECKLIST" (P) - "ACKNOWLEDGED" (P, CP, N, E, S, LM)
2. Altimeters - "STATE SETTING" (CP, P, N, E)	
3. Crew Briefing - "AS REQUIRED" (P) Review intentions, altitudes, airspeeds, threat locations, aircraft configuration, and approach requirements.	
4. No Smoking Switch - "ON" (P)	
5. Pressurization - "AS REQUIRED"(P, E)	
6. Engine Bleed Air Valves - "AS REQUIRED"(E) ***NOTE:*** *Conditions permitting, close bleed air valves after depressurizing.*	
7. Command Markers - "SET" (CP, P) Both pilots set command markers to the altitude/airspeed required for the mission.	
8. Survival Equipment - "SECURED" (CP, P, N, E, S, LM) Ensure the following equipment is immediately available (As Required) Parachute Survival Vest Flak Vest/Body Armor Chemical Defense Ensemble Helmet/Oxygen Mask ***WARNING*** All personnel required to be mobile in the cargo compartment will don helmets, if available, at this time.	2. Survival Equipment - "SECURED" (CP, P, N, E, S, LM) Ensure the following equipment is immediately available (As Required) Parachute Survival Vest Flak Vest/Body Armor Chemical Defense Ensemble Helmet/Oxygen Mask ***WARNING*** All personnel required to be mobile in the cargo compartment will don helmets, if available, at this time
9. Continuous Ignition - "ON" (P)	

COCKPIT CREW	LOADMASTER
10. Internal and External Lights - “SET” (CP, P, N, E, LM) Set interior lighting to the minimum required. In a threat environment turn exterior lights off if safety permits.	3. Internal and External Lights - “SET” (CP, P, N, E, LM) Set interior lighting to the minimum required (night only). Ensure cargo compartment bright/dim switch, located on the forward crew interphone and PA panel is placed in the “BRIGHT” position. For night airdrop and contingency operations use red lights in the cargo compartment.
11. IFF - “SET” (AS REQUIRED) (CP)	
12. Nav and Comm Radios - “AS REQUIRED” (CP) Brief essential radios to the crew. To reduce emissions, turn off all non-essential radios and equipment.	
13. Radar Altimeter - “ON AND SET, STATE SETTING” (P) If threat dictates, radar altimeter may be turned off to reduce emissions.	
14. Radar - “AS REQUIRED” (P, N) To reduce emissions, turn radar off if not required for flight or if threat dictates.	
15. Fuel Panel - “SET” (E) All main tank boost pumps-ON Crossfeeds-CLOSED Burn fuel from the AUX/EXTENDED RANGE tanks through the main tank refuel valves. Closely monitor fuel quantity indicators for abnormal loss of fuel.	
16. Loose Items - “SECURED” (LM, S)	4. Loose Items - “SECURED” (LM, S)
17. Observers - “IN POSITION” (LM, S)	5. Observers - “IN POSITION” (LM, S)
*18. Defensive System - “ARMED” (P, CP, N, E, S, LM)	*6. Defensive System - “ARMED” (P, CP, N, E, S, LM)
*18.1. DS-1 - SET a. ALE-40 Programmer Controls -“SET” (N/S) Settings will be received from intelligence, spins, or mission briefing prior to flight. b. CCU Controls - “SET” (N/S) (1) CCU ARM/SAFE/TEST Switch - ARMED (2) CCU Flare MAN/PROG Switch - PROG	
c. CCU Remote Dispense Switch - “ON” (N/S) d. EMI Filter Pins (3) and EMI Filter Switches (3) - “REMOVED AND OPERATE” (LM) ***NOTE*** After the first pin is removed the CCU JTSN/ ARMED indicator should show an ARMED indication. e. MWS Power Button - “ON” (P) f. AUTO DISPENSE CONTROL Switch - “AUTO” (P) ***NOTE*** When below the threat envelope (as directed in the mission brief), return the switch to MANUAL.	*6.1. EMI Filter Pins (3) and EMI Filter Switches (3) - “REMOVED AND OPERATE” (LM) ***NOTE*** When the filter pins are removed, the EMI filter switches should automatically trip to “OPERATE”. If they do not trip automatically, place the switches to “OPERATE”.

COCKPIT CREW	LOADMASTER
*18.2. DS-2 - SET a. MWS CI Power Button - “ON” (P) b. CMDS CDU - “SET” (N/S) 1. JETT Switch - OFF 2. FL Switch - ON 3. Mode control Knob - MAN c. INDICATOR/ARM/CONTROL, ARM/SAFE Switch - “ARMED” (N/S) d. Remote Dispense Control - “ENABLED” (N/S) e. EMI Filter Pins (5) - “REMOVED” (LM/S) f. Auto Dispense Control Switch - “AUTO” (P)	*6.2. EMI Filter Pins (5) - “REMOVED” (LM/S)
*18.3. DS-3 - SET a. ALE-40 Programmer Controls - “SET” (N/S) Settings will be received from intelligence, spins, or mission briefing prior to flight. b. CCU Controls - “SET” (N/S) (1) CCU ARM/SAFE/TEST Switch - ARM (2) CCU MAN/PROG Switch - PROG c. REMOTE DISPENSE Switches - “SET” (N/S)	
1. COCKPIT DISP Switch - AS REQUIRED IF only the navigator will be dispensing countermeasures select “OFF” with the switch.	
2. CARGO DISP Switch - AS REQUIRED If only the navigator will be dispensing countermeasures select “OFF” with the switch.	
d. EMI Filter Pins (6) & EMI Filter Switches (6) - “REMOVED AND OPERATE” (LM/S) ***NOTE*** After the first pin is removed the CCU JTSN/ARMED indicator should show an ARMED indication.	*6.3 EMI Filter Pins (6) & EMI Filter Switches (6) - “REMOVED AND OPERATE” (LM/S) ***NOTE*** When the filter pins are removed, the EMI filter switches should automatically trip to “OPERATE”. If they do not trip automatically, place the switches to “OPERATE”.
e. AAR-44 Controls - “SET” (N/S) 1. AAR-44 STBY/OPER Switch - OPER 2. AAR-44 CM INHIBIT/CM INPUT Switch - CM INPUT **NOTE** Running in the CM INPUT mode, countermeasures will be automatically dispensed if an IR threat is sensed by the AAR-44 system. f. AAR-44 DISP CHAFF INHIBIT/ENABLE Switch - “INHIBIT” (N/S) g. AAR-44 DISP FLARE INHIBIT/ENABLE Switch - “ENABLE” (N/S)	
19. Combat Entry Checklist-“COMPLETED” (LM, E)	7. Combat Entry Checklist - “COMPLETED” (LM, E)

17.23. Combat Exit Checklist.

17.23.1. Use the Checklist in **Table 17.2.** to return the aircraft to normal cruise configuration upon departing the combat environment. The pilot initiates this checklist by stating, "CREW, COMBAT EXIT CHECKLIST." *Indicates items to be accomplished when Airlift Defensive Systems (DS-1) (AAR-47/ALE-40), (DS-2) (AAR-47/ALE-47), or (DS-3) (AAR-44/ALE-40) have been used.

Table 17.2. Combat Exit Checklist.

COCKPIT CREW	LOADMASTER
1. "CREW, COMBAT EXIT CHECKLIST" (P) "ACKNOWLEDGED" (CP, N, E, S, LM)	1. "CREW, COMBAT EXIT CHECKLIST" (P) "ACKNOWLEDGED" (CP, N, E, S, LM)
2. Observers - "CLEARED TO REPOSITION" (P)	2. Observers - "CLEARED TO REPOSITION" (P)
3. Battle Damage Assessment - "COMPLETE" (CP, P, N, E, S, LM)	3. Battle Damage Assessment - "COMPLETE" (CP, P, N, E, S, LM)
4. Survival Equipment - "AS REQUIRED" (CP, P, N, E, S, LM)	4. Survival Equipment - "AS REQUIRED" (CP, P, N, E, S, LM)
5. Fuel Panel - Set (E) Return to normal fuel sequence.	
6. Pressurization - "AS REQUIRED" (P, E)	
7. IFF - "SET" (CP)	
8. NAV and COMM Radios - "SET" (CP)	
9. Radar Altimeter - "AS REQUIRED" (P, N)	
10. Radar - "AS REQUIRED" (P, N)	
11. Internal and External Lights - "SET" (CP, P, N, E, LM)	5. Internal and External Lights - "SET" (CP, P, N, E, LM)
12. Continuous Ignition - "AS REQUIRED" (P)	
*13. Defensive System - "SAFE" (P, CP, N, E, S, LM)	
*13.1. DS-1 - SET a. CCU ARM/SAFE/TEST Switch - "SAFE" (P) b. CCU REMOTE DISPENSE Switch - "OFF" (P) c. AUTO DISPENSE CONTROL Switch - "MANUAL" d. EMI Filter Pins (3) - "INSTALLED" (LM) ***WARNING*** Do not place the EMI filter switches to "RESET". This resets the system back to the first counter-measures. e. MWS CI Power Button - "OFF" (P)	*6.1. EMI Filter Pins (3) - "INSTALLED" (LM)

COCKPIT CREW	LOADMASTER
*13.2. DS-2 - SET a. CMDS CDU - “SET” (N/S) 1. FL Quantity - CHECKED 2. Mode Control Knob - OFF 3. FL Switch - OFF 4. JETT Switch - OFF b. INDICATOR/ARM CONTROL, ARM/SAFE Switch - “SAFE” (N/S) c. REMOTE DISPENSE CONTROL Switch - “DISABLE” (N/S) d. AUTO DISPENSE CONTROL Switch - “MANUAL” (P) e. EMI Filter Pins (5) - “INSTALLED” (LM) f. MWS CI Power Button - “OFF” (P)	*6.2. EMI Filter Pins (5) - “INSTALLED” (LM)
13.3. DS-3 - SET a. CCU ARM/SAFE/TEST Switch - “SAFE” (N/S) b. AAR-44 DISP CHAFF/FLARE INHIBIT/ ENABLE Switches - “INHIBIT” (N/S) c. AAR-44 CM INHIB/CM INPUT Switch - “CM INHIB” (N/S) d. AAR-44 STBY/OPER Switch - “AS REQUIRED” (N/S) e. EMI Filter Pins (6) - “INSTALLED” (LM) ***WARNING*** Don’t place the EMI filter switches to “RESET”. This resets the system back to the first countermeasure.	*6.3. EMI Filter Pins (6) - “INSTALLED” (LM)
14. Combat Exit Checklist - “COMPLETED” (E)	7. Combat Exit Checklist - “COMPLETED” (E)

17.24. Combat Offload Checklist (Single/Multiple Pallets/Platforms).

17.24.1. Complete the checklists at **Table 17.3.** as required.

CAUTION: To combat offload, a taxiway/ramp of at least 1000 feet is required; however, 1500 feet is desired to provide a margin of safety.

NOTE: Complete the After Landing and Before Takeoff checklist as appropriate according to T.O. 1C-141B-1.

Table 17.3. Combat Offload Checklist (Single/Multiple Pallets/Platforms).

PREPARATION CHECKLIST	
COCKPIT CREW	**LOADMASTER**
1. "COMBAT OFFLOAD PREPARATION CHECKLIST" (P) - "ACKNOWLEDGED" (E, S, LM)	1. "COMBAT OFFLOAD PREPARATION CHECKLIST" (P) - "ACKNOWLEDGED" (E, S, LM)
2. Crew Briefing - "COMPLETED" (P) ***NOTE:*** The loadmaster may clear off interphone following the crew briefing to perform preparation duties.	2. Extraction System(s)/CDS System - Derigged/Secured to the load.
	3. Hinged Walkways - Stowed Vertical
	4. Vertical Restraint - Retracted/Removed
NOTE: The scanner will maintain constant interphone contact with the pilot during the offload. Ensure interphone/PA system is operational.	5. Rail Locks Forward of Load - Extended Ensure all rail locks forward of Pallets/Platforms to be offloaded are engaged. ***NOTE:*** Restraint for rolling stock during a combat offload is the same as that for flight.
3. Preparation Checklist - "COMPLETED" (CP, P, N, E, S, LM)	6. Preparation Checklist - "COMPLETED" (CP, P, N, E, S, LM)
OFFLOAD CHECKLIST	
1. "OFFLOAD CHECKLIST" (P) - "ACKNOWLEDGED" (S, E)	
2. Petal Doors and Ramp - "CLEARED TO OPEN" (P) "OPEN" (LM) ***CAUTION*** Before opening or closing the petal doors while taxiing, the pilot must evaluate the taxi conditions. If the taxi surface grade varies excessively, the petal doors may contact the ground. Do not taxi with the ramp below the horizontal position. The petal doors will be in the 80 degree position. The cargo ramp will be in the horizontal position with the ADS links connected for the combat offload.	1. Petal Doors and Ramp - "OPEN" (LM)
3. Brakes - "SET" (P)	2. Aircraft - Stopped ***NOTE:*** If offloading CDS, remove release gates as required and skip steps 3 through 5. Remove locks only from cargo to be offloaded on that offload.
	3. Left Rail Locks - Retracted Retract Left Locks of the Pallets/Platforms to be offloaded.

OFFLOAD CHECKLIST	
COCKPIT CREW	**LOADMASTER**
4. Scanners Report - "READY TO OFFLOAD" (S) ***WARNING*** Scanner will ensure the loadmaster is ready to offload before giving this response. ***WARNING*** The loadmaster and scanner will assume a position forward of the cargo after all other personnel are clear and forward of all cargo. Maintain visual surveillance of the load during the offload sequence.	4. Right Rail Locks on Ramp - Retracted ***NOTE:*** If load includes a ramp pallet, omit step 4. 5. Right Rail Locks - Untabbed Untab locks of Pallets/Platforms to be offloaded. 6. Loadmaster (s) - Positioned Assume position forward of cargo to be offloaded. ***WARNING*** The loadmaster and scanner will assume a position forward of the cargo after all other personnel are clear forward of all cargo. Maintain visual surveillance of the load during the offload sequence.
5. Power - "SET, 1.3 EPR" (P) ***NOTE:*** The pilot will set power at 1.3 EPR while holding the brakes.	
6. Brakes - "READY, READY, RELEASED" (P) ***WARNING*** The nose of the aircraft will pitch up due to shifting center of gravity. **DO NOT** retard throttles. **DO NOT** apply brakes except in an emergency. Apply brakes evenly if used for an emergency. **CAUTION** Ensure brakes are not released until 1.3 EPR is reached and maintained. Ensure brakes are released evenly and cleanly.	
7. Load Status - "ALL CLEAR" (S) ***NOTE:*** The scanner will advise the pilot when all Pallets/Platforms have been offloaded.	7. Aircraft - Stopped ***NOTE:*** Repeat items 3, 4, 5, 6, 7, and 8 for every offload to be accomplished
8. Brakes - "SET" (P) ***NOTE***: Repeat items 3, 4, 5, 6, 7, and 8 for every offload to be accomplished.	
9. Pilots PA Switch - "INTERPHONE" (P)	8. Petal Doors and Ramp - "AS REQUIRED" (S) ***NOTE:*** Petals doors may be closed while taxiing.
10. Petal Doors and Ramp - "AS REQUIRED" (S) ***NOTE:*** Petals doors may be closed while taxiing.	
11. Pressure Door - "AS REQUIRED" (S)	
12. Offload Checklist - "COMPLETED" (P, E, S, LM)	9. Offload Checklist - "COMPLETED" (P, E, S, LM)

17.25. Combat Offload Matrix.

17.25.1. Use **Table 17.4.**, **Table 17.5.** and **Table 17.6.**. The Combat Offload Matrix was developed to determine the number of offloads required for any given aircraft load in order to control CG shift. As the CG approaches station 990, the weight on the nose gear decreases and causes the rear of the air-

craft to lower. The worst possible CG is created as the last seven pallets move aft of the main gear. The notes and tables below are to be used to minimize the potential for tipping the aircraft during combat offload operations. These limitations are based on the following situations:

17.25.1.1. All 13 pallets offloaded in one offload

17.25.1.2. One pallet remains locked in pallet position (PP) 1

17.25.1.3. two pallets remain locked in PP1 and PP2.

NOTE: The above limitations only apply to aircraft loads of seven or more pallets/platforms.

17.25.2. Additional Notes.

17.25.2.1. When offloading 13 pallets, the individual weight of each of the last seven pallets shall not exceed 4,500 pounds.

17.25.2.2. The 4,500 pound limit, in 1 above, can be increased by leaving one pallet locked in PP1. Table 1 is used to determine the weight increase allowable per each 1,000 pounds remaining in PP1.

17.25.2.3. The 4,500 pound limit, in 1 above, can be further increased by leaving a pallet locked in both PP1 and PP2. Table 2 is used to determine the weight increase per 1,000 pounds remaining in PP1 and PP2.

17.25.2.4. When combat offloading less than seven pallets, use Table 3 to determine the allowable weight per pallet.

17.25.2.5. When offloading a single item weighing in excess of 17,000 pounds, an additional 1,000 pounds of counterweight is required in PP1 and PP2 for every 1,000 pounds over 17,000 pounds.

17.25.2.6. A single airdrop platform, up to 32 feet in length, weighing up to 17,000 pounds may be offloaded. Heavier platforms may be offloaded, provided a ballast weight equal to the difference between 17,000 pounds and the rigged weight of the offload platform remains forward of station 605.

Table 17.4. Pallet Weight Increase With One Pallet In PP1.

WEIGHT (LBS) IN PP1	ALLOWABLE WEIGHT PER PALLET
1,000	5,000
2,000	5,285
3,000	5,428
4,000	5,857
5,000	6,357
6,000	6,857
7,000	7,142
8,000	7,428
9,000	7,714
10,000	8,000

NOTE: Use the lowest thousand pounds when using this table. Example: If the pallet in PP1 weighed 5,845 pounds, use the 5,000 pound line in the **Table 17.4.**.

Table 17.5. Pallet Weight Increase With Two Pallets In PP1 and PP2.

WEIGHT (LBS) IN PP1 + PP2	ALLOWABLE WEIGHT PER PALLET
3,000	5,428
4,000	5,714
5,000	6,000
6,000	6,258
7,000	6,571
8,000	6,857
9,000	7,142
10,000	7,428
11,000	7,714
12,000	8,000
13,000	8,285
14,000	8,571
15,000	8,857
16,000	9,142

NOTE: Use the lowest thousand pounds when using this table. Example: If the combined weight of pallets in PP1 and PP2 is 6,895 pounds, use the 6,000 pound line in the table.

Table 17.6. Individual Pallet Offload Weights With Less Than 7 Pallets.

Number of Pallets	WEIGHT PER PALLET
1	17,000
2	9,000
3	6,666
4	5,500
5	5,000
6	4,666

Chapter 18

AIRCRAFT FORMATION

Section 18A—General Procedures

18.1. General. This chapter describes basic formation procedures. Consider safety, aircrew capability, proficiency, survivability and user needs when planning any formation tactic.

***WARNING*:** Vortices generated during departure, airdrop, and recovery are significant in terms of size, duration, and velocity. Due to the potential hazards involved with wake turbulence, aircrews should be aware of their existence and attempt to avoid them.

18.2. Specified Times. The mission commander determines the sequence of events and mission times based on staff input, fuel requirements, parachutist/passenger comfort, taxi distances, briefing requirements, etc. AFTTP 3-1, Vol 35 provides a suggested list of significant mission events.

18.3. Weather Minimums.

18.3.1. Formation takeoff and landing minimums are the published minimums for the airport navigation aid used, but no lower than 200 feet and one half mile visibility (RVR 24). If the departure ceiling or visibility is below published approach minimums, the formation aircraft may depart single ship if it meets the departure alternate requirements in **Chapter 6** of this AFI.

NOTE: Station Keeping Equipment (SKE) must be operative for takeoff and join-up for actual or forecast instrument conditions.

18.3.2. Orbit area weather minima will be no lower than 2,500 feet and 5 Nautical Miles (NMs) visibility for joining sections. AFI 11-202 Volume 3 VFR weather minima applies and will vary, depending on class of airspace, when orbit is used for time control purposes.

18.3.3. Formation air refueling operations require 2 SMs visibility during rendezvous closure with tanker(s).

18.4. Ground Operations.

18.4.1. Standard taxi interval is one aircraft length. Formation lead may increase taxi intervals if circumstances dictate.

18.4.2. Accomplish a SKE Flight Command Indicator (FCI) check prior to all takeoffs (SKE and VFR).

18.5. Takeoff.

18.5.1. Using the feed on method, follower aircraft move forward to the "start takeoff roll" position after the preceding aircraft starts its takeoff roll. The minimum takeoff interval is 20 seconds and may be increased as required (wet runway, wind shear, heavy aircraft, etc.).

18.5.2. Timing for departure maneuvers begins when formation lead begins takeoff roll. Begin timing for takeoff interval when the preceding aircraft starts its roll.

18.5.3. Do not advance power above 70 percent N1 RPM until beginning the takeoff roll.

18.5.4. For aborts during takeoff roll, the navigator immediately transmits position number aborting three times on interplane frequency (i.e., "Number two aborting, number two aborting, number two aborting."). The pilot not at the controls transmits the same abort call on the primary Air Traffic Control (ATC) frequency after completing immediate-action emergency procedures. Aborting aircraft should clear the runway as quickly as safety permits. Any other aircraft on takeoff roll will abort, and aircraft not yet on takeoff roll will hold until the runway is clear.

NOTE: Use of HAVEQUICK or secure interplane may inhibit reception of abort call. Consider using “in the clear” communications for takeoff in case an abort call is necessary.

18.6. Altimeter Setting. All formation aircraft will use the current altimeter setting. Formation lead will pass changes throughout the mission.

18.7. Airspeed and Ascent or Descent Rates. Formation leaders fly the appropriate airspeeds depicted in **Figure 18.3.** (or as briefed). Ascent and descent rates depicted in this figure should be the maximum used by Formation leaders.

18.8. Radio Discipline. Limit transmissions to those required for safety or control of the formation. HAVE QUICK and secure radios should be used when available. For vertical IFR (also useful for SKE and VFR), the Table of Commands provides required interplane calls.

18.9. Airborne Aborts.

18.9.1. Departure. Aircraft aborting during assembly will execute the prebriefed emergency procedures and hold clear of departing traffic unless an immediate landing is necessary. Maintain VMC if possible, notify lead, and contact the appropriate controlling agency. If able, aborting aircraft will remain clear until a landing can be made without interfering with the remainder of the departing formation.

18.9.2. En Route. Aircraft aborting after assembly will notify lead. When directed, turn 30 degrees away from the formation in a safe direction based on terrain, ATC restrictions, etc. Aircraft within an element normally reposition to maintain a one-two relationship. Element lead will maintain position and announce intentions prior to leaving the formation. Lead may direct the aborting aircraft to rejoin at the end, or contact ATC and proceed to the recovery base.

18.9.3. Element lead aborts. If an element lead aircraft aborts from the second, third, etc., element, the number two (element deputy lead) wingmen, if lead qualified for joint service training (any wing or lead qualified crew for unilateral training) will assume the lead position and accomplish all FCI/SKE/ZM procedures normally accomplished by the element lead. After the new element lead is established in position, the number three aircraft will assume the number two position.

18.10. Parachute and Wake Vortices Interaction. C-141B vortices generated in the airdrop configuration are significant in terms of size, velocity, and duration. Interaction between these vortices and personnel or equipment parachutes can result in potentially hazardous conditions, including: collapse or partial deflation of canopy for 1 to 3 seconds, significant oscillation, loss of planned parachute descent time and altitude, collision or entanglement resulting from changes in parachute descent rate, hard landing, and dragging of loads on the surface. The C-141 wake vortices are especially hazardous when the interaction occurs below 360 feet Above Ground Level (AGL) for personnel parachutes and 270 feet AGL for equip-

ment parachutes. Parachutes encountering C-141 wake vortices below these altitudes may not have enough vertical distance remaining to re-inflate before hitting the ground. This phenomenon occurs in visual in-trail formations of seven or more aircraft when the drop altitude is 800 feet AGL or lower. Therefore, extreme care should be exercised when planning any airdrops at or below 800 feet AGL and with formations of six aircraft or more.

WARNING: Aircrews will not fly lower than the preceding aircraft from slowdown through escape. Air-dropped loads or parachutes may impact follower aircraft.

18.11. No-Drop Decision.

18.11.1. Formation "No-Drop". Lead calls formation "no-drop" over interplane and transmits "no-drop" on FCI. All aircraft acknowledge the call over the interplane. (Use only the signal when radio silence is mandatory.)

18.11.2. Individual Element “No Drop.” Element lead will call element “no-drop” over interplane for VFR formations and will not transmit element FCI commands for IFR formations.

18.11.3. Individual Aircraft "No-Drop". Do not transmit individual aircraft (other than element lead) "no-drop" decisions outside the aircraft until the formation has departed the drop zone.

18.11.4. Documentation. After landing, record any “No-Drop” decisions, discrepancies, or other pertinent airdrop mission information in the remarks section of AF Form 4096, **Airdrop/ Tactical Airland/Air Refueling Mission Recap** and AF Form 4096 (Reverse), **Station Keeping Equipment (SKE)/Zone Marker Debrief.** A pilot or navigator on each aircraft following all airdrop, SKE, or air refueling missions will complete this form. Turn the completed form in to 1) home station tactics office. 2) home station maintenance debrief site. If SKE problems are encountered off-station, submit form to both en route and home station maintenance. DZ ground party (STS, DZST, or DZO) will also fill out this form for each SKE/ZM airdrop mission (to include zone marker serial number) and turn in the form to maintenance or relay the information as soon as possible.

Section 18B—Visual Procedures

18.12. General. Visual formation geometry will be based upon the threat environment, terrain, mission requirements, and other factors. Choose the geometry that gives the best tactical advantage for each segment of the route, changing as required during the mission. Flight leadership is critical to the success of these tactics. If SKE is briefed (for backup purposes), inform lead of any SKE malfunctions that occur during the mission.

18.13. Departure and Assembly. When turning to the departure heading, Lead uses 20 degrees of bank and maintains assembly airspeed until the briefed acceleration time.

18.14. Acceleration. Acceleration time is normally the same number of minutes after lead’s brake release as there are aircraft in the formation. Lead accelerates to en route airspeed and climbs or descends to departure altitude at the expiration of prebriefed time. Other methods may be used (e.g., acceleration at a geographical point, DME, radio aid, etc.).

Figure 18.1. VFR In-Trail Formation.

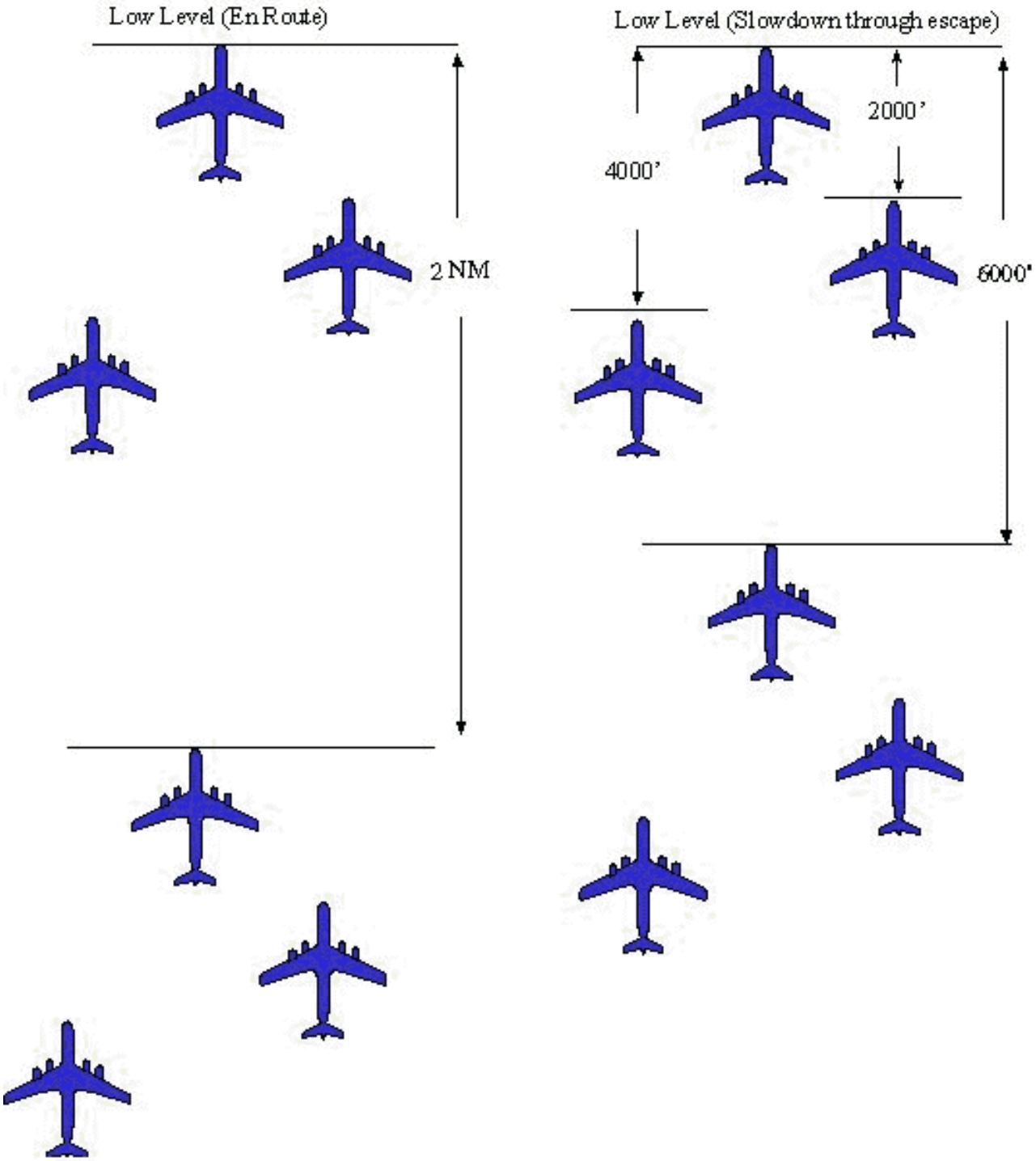
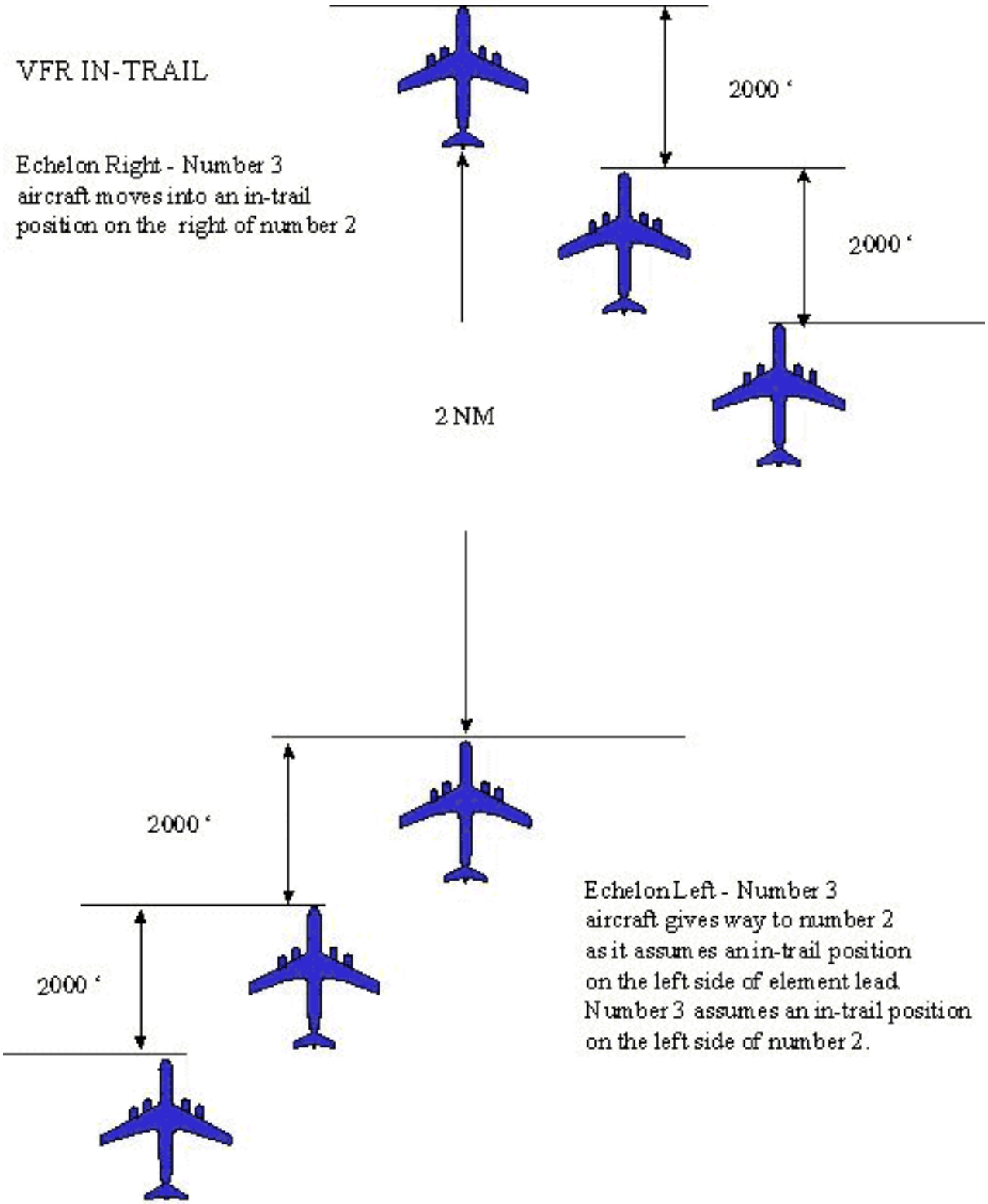


Figure 18.2. VFR Echelon Formation.



18.15. Late Takeoff. Aircraft departing late will contact lead and rejoin as directed or proceed single

ship. The rejoining aircraft will establish a minimum of 1,000 feet altitude separation until the formation is in sight and clearance to rejoin is granted.

18.16. En Route Procedures.

18.16.1. Altitude:

18.16.1.1. Day VFR Low Level. Element leads maintain altitude by visual reference to the terrain, backed-up by the radar altimeter (if available). Wingmen maintain position relative to element lead while referencing the radar altimeter and terrain.

NOTE: In-trail elements may stack up slightly en route (not to exceed 50 feet).

18.16.1.2. Night VFR Low Level. Element leads maintain altitude by referencing the pressure altimeter. Wingmen maintain position relative to element lead and also monitor pressure altitude. An altimeter check comparing the radar altimeter to the expected altitude at well-defined checkpoints should be accomplished periodically during the route.

NOTE: In-trail elements may stack up slightly en route (not to exceed 50 feet).

18.16.2. Airspeed Changes. Lead announces airspeed changes of 10 knots or greater.

18.16.3. Aircraft Interval. Formation lead will select the formation interval based on threats, support aircraft, and other environmental factors.

18.16.4. Weather Penetration (see **Figure 18.14.** and **Figure 18.15.**).

18.16.4.1. Prior to inadvertently entering IMC, conditions permitting, establish the formation into SKE spacing (using procedures at 18.58) and obtain an IFR clearance. Avoid IMC. If ATC coordination is not obtained prior to inadvertently entering IMC, lead will set IFF to emergency, and climb to a VFR hemispherical altitude at or above the ESA.

18.16.4.2. Comply with the following procedures if time or equipment does not allow transition to SKE procedures, or in other situations when immediate separation from the ground or formation aircraft is necessary. Lead will direct the emergency weather penetration, announcing base heading (either current heading or planned rollout heading during turns) and execution order (i.e., Hunt 10 flight, Emergency Weather Penetration, base heading 180 T/M, execute now, acknowledge). Maintain current airspeed, any change will be announced and acknowledged. Lead will announce a base altitude as soon as possible. The lead element will occupy the base altitude. All other elements will stack down in multiples of 1,000 feet. Formation lead will ensure the selected base altitude keeps the last element above the ESA and should be a VFR hemispheric altitude to minimize possible conflict with IFR traffic.

18.16.4.2.1. At lead's execution command, all aircraft commence an immediate climb of 2,000 FPM, and wingmen simultaneously turn out using the base heading as a reference. Element leads maintain base heading, while wingmen turn 30 degrees away from base heading using 20 degrees of bank. After 30 seconds, wings level, return to base heading, and station-keep with radar for two miles lateral separation and no more than one and one-half mile longitudinal spacing. If the Emergency Weather Penetration is required, lead will turn IFF to emergency, declare an emergency, and obtain necessary block airspace. Coordinate with ATC for routing or recovery as necessary. Modify these procedures as needed for formation geometry, terrain, airspace restrictions, etc.

NOTE: Lead may level the formation below the ESA for the route provided sustained VMC is encountered and terrain clearance is assured.

NOTE: Attempt to avoid IFR cruise altitudes by 500 feet to minimize possible conflict with IFR traffic.

18.16.5. Five NMs prior to each turnpoint, the navigator will brief the course and altitude for the following leg.

18.17. Slowdown Procedures.

18.17.1. The formation leader establishes a "slowdown time" and initiates a slowdown from low-level to drop airspeed. This is normally accomplished on interplane frequency. Just prior to announcing slowdown, the formation leader gives a preparatory command, i.e., "LIFTER 10 FLIGHT, PREPARE TO SLOWDOWN." At slowdown time, the formation leader signals the slowdown by transmitting, "LIFTER 10 FLIGHT, SLOWDOWN TIME IS NOW," and executes the slowdown maneuver. Normally aircraft within an element slowdown simultaneously. Succeeding element leaders call for and execute their own element's slowdown in 20 second intervals, based on formation lead's call (i.e., second element 20 seconds after first element, etc.). Succeeding element leaders will close to 6,000 feet in trail of preceding element lead. (**Figure 18.1.**).

18.17.2. Execute the slowdown maneuver by retarding all throttles to idle start and decelerating to 160 KCAS. At 190 KCAS, element leaders lower the flaps to the drop setting. Wingmen lower flaps as necessary to maintain position (not above maximum flap extension speed. During the slowdown, the pilot states "FLAPS (state computed setting)," the copilot repeats the command, extends the flaps to the computed setting, and calls "SLOWDOWN CHECKLIST," over interphone once the flaps are at the computed setting. Upon reaching 160 KCAS, element leads may climb or descend to drop altitude. If the tactical situation or terrain obstructions dictate, lead may maintain level flight until closer to the drop zone, then climb or descend to drop altitude at 160 KCAS. Upon reaching drop altitude, continue decelerating to drop airspeed. Aircraft should be configured for the drop, on altitude and airspeed NLT 30 seconds prior to the airdrop.

NOTE: Plan slowdown during personnel drops to allow jumpmaster access to paratroop doors NLT 1 minute prior to the TOT during navigator-directed airdrops (2 minutes for jumpmaster directed airdrops.)

18.18. Airdrop Procedures.

18.18.1. Once stabilized on drop altitude and drop airspeed, each element lead flies an independent approach to the drop zone (DZ) until the end of the usable DZ time (Red Light).

18.18.2. Wingmen will compute their own computed air release point (CARP) for timing purposes only and release visually, while maintaining the appropriate formation position. To avoid vortices and wake turbulence, with no crosswind, wingmen maintain normal formation position. Normal formation position includes maintaining the correct lateral and longitudinal spacing, and altitude with respect to lead.

WARNING: Dropping at a lower altitude may cause loads or personnel from the preceding aircraft to impact the lower aircraft, causing damage or fatalities. To avoid wake turbulence and properly align in a crosswind condition (greater than 3 degrees of drift), lead will direct wingmen to adjust their lateral formation position to maintain the same ground track as the element lead over the DZ.

WARNING: Wake turbulence may be encountered after slowdown.

18.18.3. Formation drop altitude is determined by the load requiring the highest drop altitude and is measured from the highest point on the drop zone. ***NOTE:*** Large heavy equipment formations with variations in load weight and number of chutes may stack up. In no case will any aircraft drop below that required by AFI 11-231 or IFR drop altitude (if applicable) whichever is higher.

18.19. Drop Zone (DZ) Escape. At individual aircraft red light, begin timing (if required) and perform the briefed escape. Retrieve static lines (in a hostile environment these may have to be cut), close all doors (pressure door may be left open if pressurization is not required), and defer the remaining non-critical items on the post-drop checklist to a more convenient time.

18.19.1. Each element independently accelerates to 160 KCAS, begins descent or climb to re-assembly altitude (1,000 fpm or as briefed), and turns to DZ departure heading. Wingmen re-attain en route position as quickly as possible.

18.19.2. To accelerate, element lead advances throttles to approximately 80 percent N1 (90 percent if climbing). Succeeding element leads delay acceleration as necessary to obtain briefed separation.

CAUTION: Do not increase airspeed above 160 KCAS until static lines are retrieved or cut.

18.19.2.1. Aircraft experiencing difficulty retrieving static lines, closing doors or air deflectors will notify lead. The formation will not exceed 160 KCAS until the problem has been corrected. If static lines cannot be retrieved or air deflectors cannot be retracted, the affected aircraft should leave the formation following en route abort procedures. Lead may delay formation acceleration to allow the aircraft time to correct the problem.

18.20. Recovery. Lead determines the type of visual recovery based upon formation geometry threat, traffic pattern, traffic flow, etc. The following are two possible methods-the overhead and the downwind. Other recovery methods can be flown if briefed. Minimum interval between sections arriving at the airfield should be five minutes. Attain traffic pattern altitude, airspeed, and separation prior to arriving at the recovery field.

18.20.1. Overhead Recovery:

NOTE: **Figure 18.3.** addresses specific parameters for this maneuver.

Figure 18.3. Formation Lead Airspeed and Rates of Ascent/Descent.

PHASE	SKE/VERTICAL IFR	VFR
Assembly	200 KCAS/2000 FPM	200 KCAS/2000 FPM
Climb *	250 KCAS/.70M	230 KCAS
Rate of climb	surface to 15,000 ft - 2000 FPM	
	15,000 ft to FL 200 - 1500 FPM	
	FL200 to FL250 - 1000 FPM	
	Above FL250 - 500 FPM	
En Route:		
Below 10,000 ft	230 KCAS +/- 20 KCAS	230 KCAS +/- 20 KCAS
At or above 10,000 ft	250 KCAS/.74M	250 KCAS/.74M
Descent	250 KCAS	230 KCAS +/- 20 KCAS
	(Normally 1000 FPM)3000 FPM max	As required
Recovery:		
Overhead: Initial	230 KCAS	230 KCAS
Downwind	160 KCAS	160 KCAS
Downwind Entry	230 KCAS	---
Abeam end of runway	200 KCAS	---
SKE		160 KCAS (base leg)

NOTE: * If cruise altitude is below 10,000 ft, climb at 230 KCAS.

18.20.1.1. Element wingmen echelon on formation lead's command (**Figure 18.2.**). On command to echelon left or right, number two or number three aircraft, respectively, in each element will cross under preceding aircraft and assume the new position. The desired position after echelon is wingtip-to-wingtip lateral separation and no closer than 1,000 feet longitudinal separation.

18.20.1.2. Lead breaks as required. The interval between breaks for follower aircraft may vary depending on formation size, runway length, etc. The purpose of this interval is to provide additional spacing between aircraft on downwind to preclude long finals. On downwind maintain 160 KCAS minimum pattern altitude and initiate before-landing checklist.

18.20.1.3. Wingmen assume spacing for a 45-second minimum landing interval while flying a position slightly above the preceding aircraft's flight path and crossing the threshold at approach speed. Be alert for wake turbulence from preceding aircraft.

18.20.2. Downwind Recovery:

18.20.2.1. Entering downwind, slow the formation to 200 KCAS at traffic pattern altitude. Wingmen echelon on lead's call and stack slightly to avoid wake turbulence (in threat situations the formation may initiate spacing on downwind to preclude long finals).

18.20.2.2. Lead continues beyond the approach end of the runway for approximately one-half mile, retards all throttles to idle start, and begins turn to base leg with approximately 40-45 degrees of bank. Wingmen turn base with sufficient spacing to provide a 45-second minimum landing interval. Extend approach flaps, initiate the before-landing checklist, and complete the landing as described above for overhead recovery procedures.

18.21. Landing. Wingmen should cross the runway threshold at approach airspeed. All aircraft land on centerline. After touchdown, deploy the spoilers and retard the throttles to reverse idle (use additional reverse thrust only as necessary). Continue to the end of the runway (or briefed turn off) and clear the runway as rapidly as safety permits.

NOTE: The landing interval should be extended during adverse conditions.

18.22. Lead VFR Position Changes:

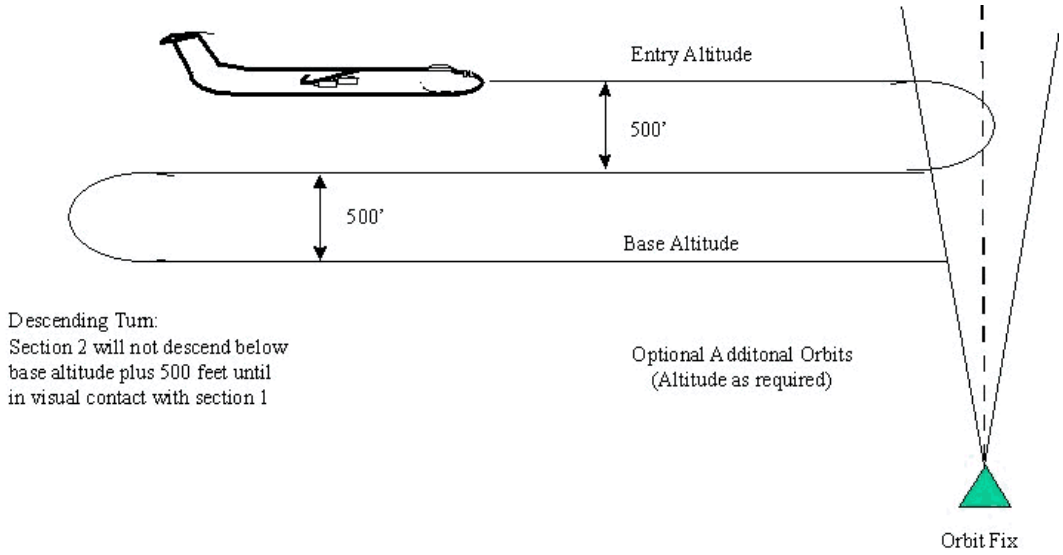
18.22.1. To accomplish a visual lead change, the leader signals or commands the lead change if it does not occur at prebriefed point. The new leader pulls abeam the aborting leader then the aborting leader moves in the safest direction to complete the lead change.

NOTE: Position changes between numbers two and three positions in an element may be accomplished during training missions only.

18.22.2. Position change between number two and three aircraft is accomplished at lead's discretion. Element lead will call his element into echelon right. Number three advises lead when element is established in right echelon. After established in right echelon, lead clears number two to echelon left. Number two advises when established in left echelon. After number two is established in left echelon, element lead clears number two to move aft to assume the number three position, and number three to move forward to the number two position.

18.23. Orbit For VFR Rejoin (Figure 18.4.). The VFR orbit is a pattern of sufficient length for serial assembly and time control. Prior to reaching the orbit fix, descend to the briefed entry altitude. Aircraft must be VMC no later than the orbit point. (If not VMC, follow the briefed IMC procedures.) Each section may descend 500 feet in each turn until reaching base altitude. Section two will not descend below base altitude plus 500 feet until in visual contact with section one and cleared to join by formation lead. Section two descends and joins VFR in-trail. Airspeed is 230 KCAS, or as briefed. Once the formation is established, lead adjusts the orbit length and completes additional circuits as needed for time control. The tactical situation may require modification of these procedures and must be briefed thoroughly. No more than two sections will be joined using these procedures. For three or more sections, devise and brief a method using long, straight rejoin legs and airspeed differences.

Figure 18.4. VFR Orbit Assembly.



Section 18C—Visual Geometries

18.24. General. The most survivable formation geometry will depend on the tactical situation. Transition from one geometry to another (or a combination) may be required as the terrain or threat changes. Optimum flexibility and maneuverability are best obtained with 2-ship elements. Although not required, SKE can assist in flying visual formations, threat permitting. Regardless of the geometry selected, wingmen must be in a position for the airdrop not later than 30 seconds prior to the Time-Over-Target (TOT).

18.25. Mutual Support. Element lead is primarily responsible for clearing the flight's 12 o'clock. Lead's secondary priorities are the right and left quadrants toward the wingmen. Wingmen lookout priorities change depending on their position. The wingmen to the right of the lead is primarily responsible for the left quadrant toward and beyond the flight. The secondary responsibility (if flying 2-ship elements, this becomes primary) is the right quadrant away from the flight and tertiary responsibility is the right front quadrant. The wingmen to the left of lead is primarily responsible for the right quadrant toward and beyond the flight. The secondary responsibility (primary if flying 2-ship elements) is the left quadrant away from the flight and tertiary responsibility is the front quadrant. Wingmen, flying 3-ship elements, should strive to avoid being on the same side of the lead since this degrades visual coverage. Lead identifies clearing responsibilities, including the flight's 6 o'clock position, during the briefing.

18.26. Fluid Trail (Figure 18.5. and Figure 18.6.). This tactic provides element wingmen with maximum flexibility, maintains formation integrity, optimizes terrain masking, provides more freedom for evasive maneuvers, and breaks the symmetrical visual pattern of the "standard in-trail" formation. Wingmen may maneuver in a designated arc from the 3 o'clock to the 9 o'clock position with respect to lead. (Tactically, the 6 o'clock position should be avoided if possible.) Leaders should periodically perform clearing turns to clear for their wingmen. Spacing between aircraft will be prebriefed.

Figure 18.5. C-141 Fluid Trail.

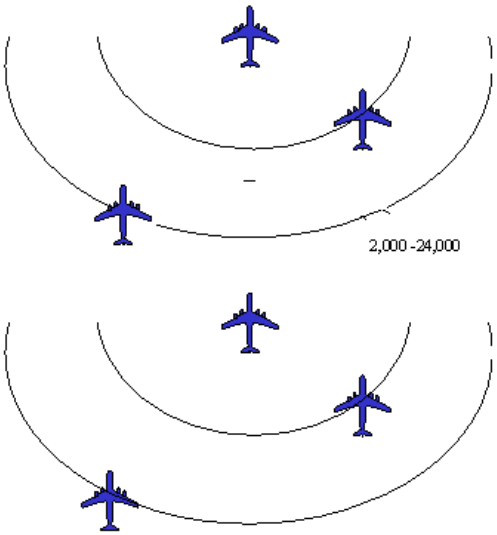
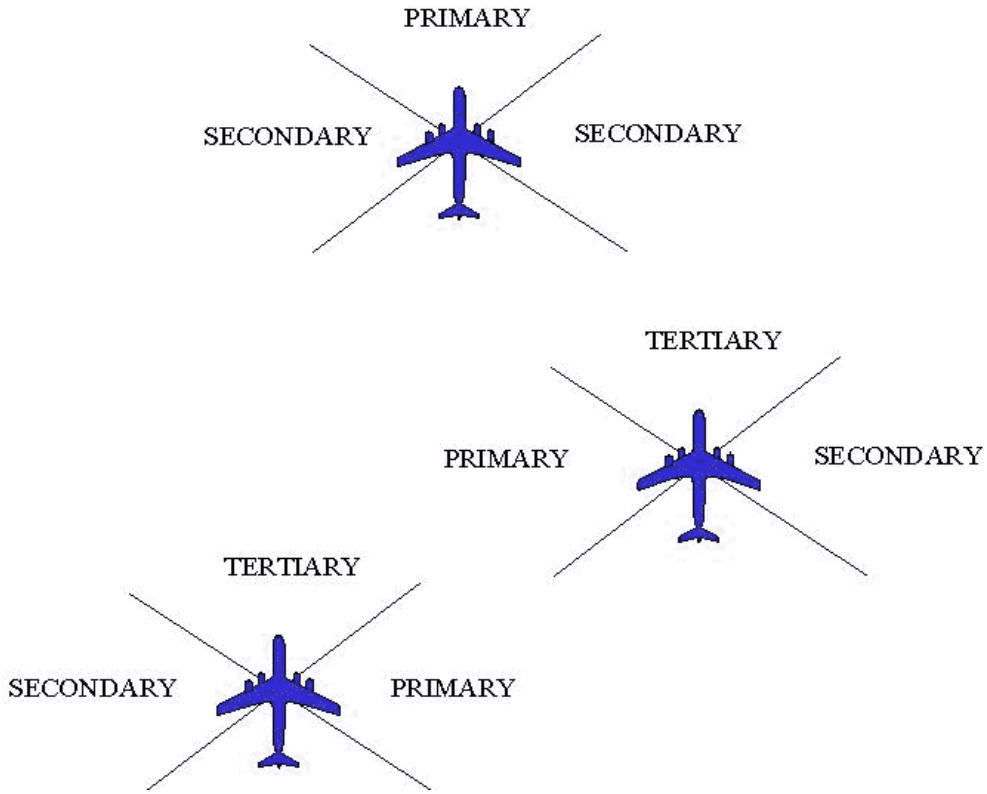


Figure 18.6. C-141 Fluid Trail Mutual Support Responsibilities.



18.27. Modified "V" (**Figure 18.7.**, **Figure 18.8.** and **Figure 18.9.**). This geometry improves fighter escort coverage, while retaining the advantages of a dispersed, flexible formation. It's normally flown as a 6-ship, consisting of three 2-ship elements. Aircraft within each element maintain a 2,000 to 4,000 feet interval. Number two element flies approximately 9,000 feet behind and to the right of the lead element, and number three element flies approximately 18,000 feet behind and to the left of the lead. element wing-

men maintain a fixed position on element lead, but each follower element is free to maneuver on an arc behind the lead element. Although this tactic is normally used for wide lateral dispersion (almost 5 miles), the formation can rapidly transition to a modified fluid trail formation for narrow corridors.

Figure 18.7. C-141 Modified "V".

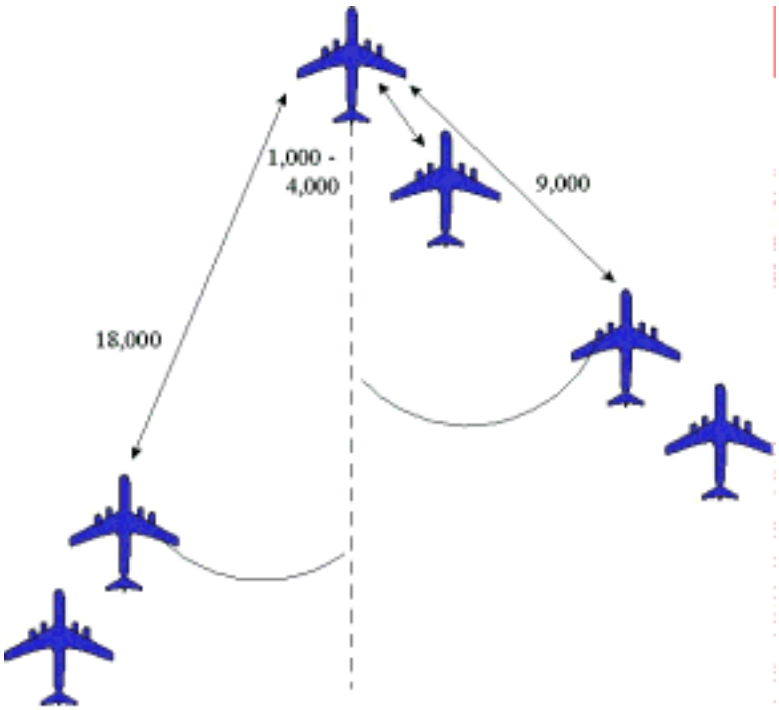
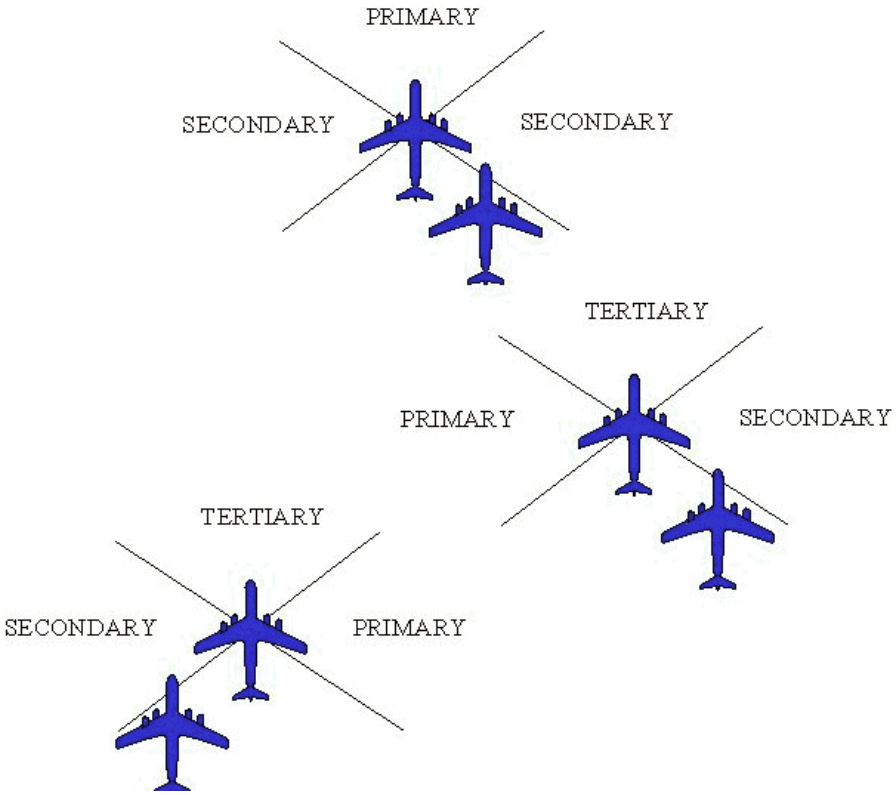


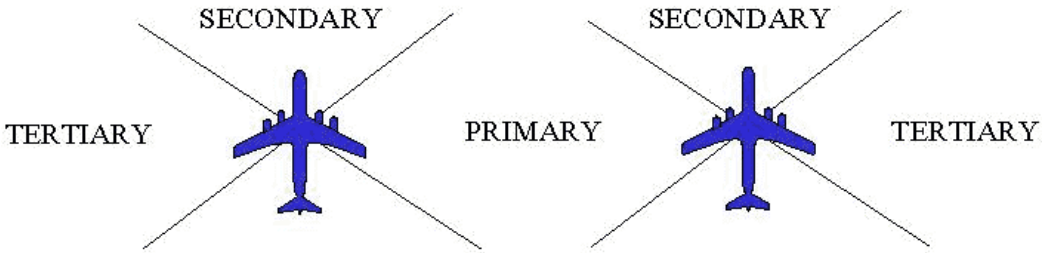
Figure 18.8. C-141 Modified "V" Mutual Support Responsibilities.



18.28. Line Abreast Formation (**Figure 18.10.** and **Figure 18.11.**). This geometry is useful over areas that provide minimal terrain masking such as a desert area or a coastal penetration from over water, and in situations where aircraft are flying to laterally spaced Initial Points (IP's). It is also useful where a large valley or a line of communications must be crossed or the formation is dropping on a wide drop zone. Planning turn points at the entry and exit of the line abreast leg allows for easy transition to and from in-trail formation. Line abreast is ideally flown in single or multiple 2-ship elements. The wingman (or element leads) can fly abeam lead with 4,000 to 12,000 feet lateral spacing or drop back into a box geometry. One disadvantage of the line abreast is that it allows little flexibility during turns, especially turns into the wingman. Tactical turns may be an option, or have the wingman move toward the in-trail position approaching the turn point and assume the line abreast position after the turn. See Air Force Tactics, Techniques, and Procedures (AFTTP) 3-1(S), Volume 35, for other turning methods.

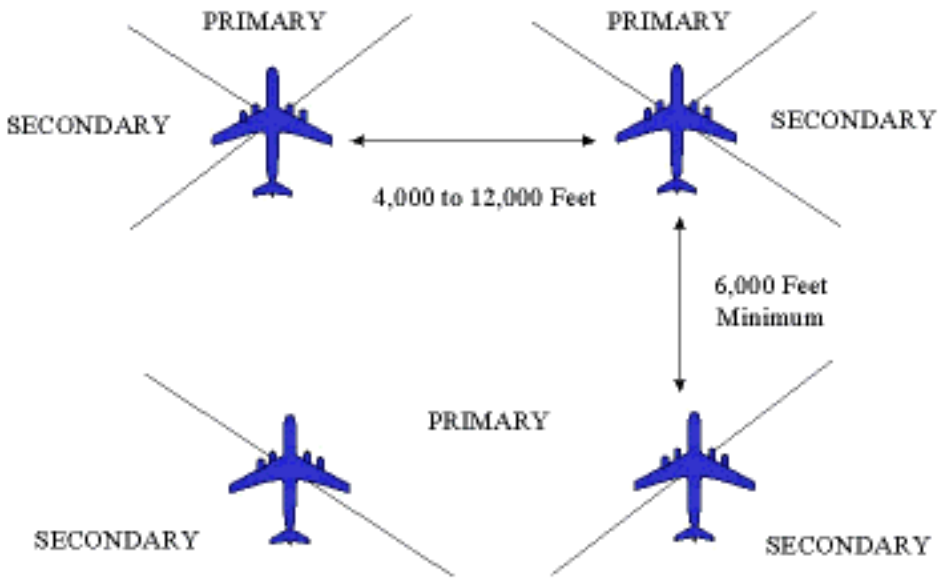
Figure 18.9. C-141 Line Abreast Formation.

Figure 18.10. C-141 Line Abreast Mutual Responsibilities.



18.29. Box (**Figure 18.12.**). Box formation is essentially a line abreast formation consisting of two 2-ship elements. Spacing between elements should be at least 6,000 feet. Greater spacing decreases the likelihood threat aircraft will detect both elements at once. Advantages, disadvantages, and turn techniques are the same as those described for line abreast. Element leads will slowdown simultaneously.

Figure 18.11. C-141 Box and Mutual Support Responsibilities.



18.30. Not Used.

18.31. Extended Trail. Extended trail is a modification of fluid trail in which separation between individual aircraft is significantly increased. Reduced visibility and terrain may not permit followers to navigate with visual or electronic reference to lead; therefore, followers must rely upon their own navigation.

18.32. VFR In-Trail (**Figure 18.1.**). Two and three ship element geometries may be flown VFR in-trail. All aircraft maintain the same altitude while element wingmen maintain a wingtip-to-wingtip lateral separation out of wake turbulence to the right and left of the leader, respectively. The primary method of maintaining separation is visual; however, SKE, radar, and air-to-air TACAN may be used.

Section 18D—C-141 Station Keeping Equipment (SKE) and Zone Marker (ZM) Operating Procedures

18.33. General. This section contains information and procedures necessary to employ SKE. When missions require more than six aircraft, consideration should be given to reassemble the six ship sections after departure as close to the objective area as possible. SKE procedures can be used for all phases of airdrop operations to minimize radio transmissions and ensure separation between aircraft in IMC or VMC. Monitor horizontal, longitudinal, and vertical position using the Multi-Function Display (MFD), Relative Range Indicator (RRI), flight director steering bar, Vertical Deviation Indicator (VDI), and altimeter. Supplementary procedures/information are contained in AMCP 55-34.

18.34. Operating Procedures:

18.34.1. When two or more formations are within 80 NMs, do not operate co-frequency (even while using slot enable). Use slot enable and do not enable common slot numbers. SKE formations operating on the same SKE frequency within 80 NMs may cause mutual SKE interference. This may produce false targets on the MFD and other erroneous information such as blanking and ZM countdown

errors. Use of slot enable will mitigate stray targets in unused slots. SKE interference in used slots is still possible (including slots 01 and 02).

18.34.2. Formation members enable all slot numbers to be used on the flight to include slots 01 and 02 for the ZM.

WARNING: The slot enable switch can inadvertently be switched from the “all" to the "slot enable" position. If slots of formation aircraft and ZM are not selected, loss of Track While Scan (TWS) and ZM will occur.

18.34.3. All formation aircraft must be within 10 NMs of the master aircraft for the SKE to synchronize and within 4 NMs of the selected leader for the TWS to function properly.

18.34.4. If all aircraft are synchronized when changing masters, the aborted master switches to "FOLLOWER" after the deputy master selects "MASTER." If the aircraft are not synchronized (i.e., section rejoin) and a master change is required, the deputy selects master while the follower aircraft switch to STBY and back to XMIT. Thoroughly prebrief or verbally coordinate this procedure.

18.34.5. Aircraft SKE frequency changes may be accomplished with no time delay. AN/TPN 27A Zone Marker changes require a minimum of 90 seconds. For the AN/TPN 27B, frequency change is immediate.

NOTE: When changing SKE frequency, a caution advisory appears for 4 -seconds and a low power fault (35) appears on the secondary control panel for approximately 14 seconds.

18.34.6. The master aircraft is normally the lead aircraft. This allows maximum range ZM reception without master changes. However, master placement may be dictated by other factors such as formation size, departure and arrival requirements, or equipment degradation. For departures, placing the master in the middle of large formations (five aircraft or more) will help ensure the best signal reception during this phase of flight.

NOTE: ZM reception is dependent on the master aircraft being within 20 NMs of ZM position and within line of sight of the transmitter; therefore, the formation receives ZM information at the maximum range possible if the lead aircraft is master.

WARNING: Operation of the SKE system over water may result in varying degrees of presentation degredation. Between 5,000 and 1,000 feet over water, SKE display blanking, ghosting, and negative TWS may render the system unusable. Performance improves at approximately 1,000 feet and gets progressively better the lower you fly. This problem is further aggravated in long stretched-out formations that are maneuvering at rates of more than 10 degrees of bank or in climbs and descents greater than 2,000 FPM.

18.35. Mission Forms. AF Form 4096, **Airdrop/Tactical Airland/Air Refueling mission Recap.** The pilot or navigator will complete this form on each aircraft following all SKE, airdrop, or air refueling missions. Turn in form to 1) home station tactics office, 2) home station maintenance debrief site. If SKE problems are encountered off-station, submit form to both en route and home station maintenance. DZ ground party (STS, DZST, or DZO) will also fill out this form for each SKE/ZM airdrop mission (to include zone marker serial number) and turn in the form to maintenance or relay the information as soon as possible.

18.36. Not Used.

18.37. Use of Navigator Flight Command Indicator (FCI) and Pilot Flight Command Repeater (FCR). Use the FCI to signal maneuvers after turn to departure heading. Send true airspeed, present true or magnetic heading, and new true or magnetic heading prior to each turn if time permits. Element leads immediately relay acceleration, deceleration, climb and descent FCI commands. When directed by ATC to immediately change altitude or heading, lead depresses the appropriate preparatory FCI signal and after a short pause depresses the "E" before beginning the commanded maneuver. When established in the maneuver, signal the new heading or altitude. Priority of signals are altitude, heading, and airspeed. Lead signals turns of 10 degrees or more and airspeed changes of 10 KCAS/.02M or more with the FCI. Element leads select preceding element lead as leader and relay commands.

18.38. Departure and Assembly.

18.38.1. Maintain a rate of climb of approximately 1,000 FPM while accelerating to 200 KCAS and then establish a 2,000 FPM climb (or as briefed). After takeoff each aircraft will fly an independent departure, i.e., climbout instructions or SID, while maintaining formation integrity using SKE, until all aircraft attain formation position or the departure is accomplished, whichever occurs first. At this point, begin SKE formation turns. When on departure heading, and after positive identification of preceding aircraft, wingmen accelerate from 200 KCAS to 250 KCAS to close to en route spacing.

NOTES:

If IMC and unable to establish positive SKE identification of preceding aircraft within one minute from rollout on departure heading, notify lead.

Assembly altitude under IFR will be at or above the MEA or MOCA on published airways. On direct flights or where no MEA or MOCA is published, assembly altitude will be 1,000 feet (2,000 feet in mountainous terrain) above the highest obstacle within a radius of 5 NMs (10 NMs outside the U.S.) of the intended route. When under positive radar control, the controlling agency assigns the assembly altitude. Under all conditions, aircrews ensure assembly altitude provides terrain and obstacle clearance for the formation.

CAUTION: Due to the location of the SKE antenna, signal blanking and momentary loss of SKE displays may occur during turns, climbs, and descents. Turns greater than 90 degrees may compound the blanking and should not be planned.

18.38.2. Pilots monitor other aircraft positions on the MFD. The navigator cross-checks preceding aircraft relative position on radar.

18.38.3. Once all aircraft are in position at the assembly altitude, accelerate to required airspeed.

18.39. Not Used.

18.40. Late Take-Off. Delayed aircraft may rejoin the formation in IMC, using the following procedures:

NOTE: These procedures will be used by a single aircraft joining an established formation; however, this does not preclude other aircraft from joining at different times. This maneuver must be thoroughly briefed prior to takeoff and approved by the mission commander. Ensure ATC is aware of formation intentions prior to initiating the rejoin of aircraft.

18.40.1. Set appropriate leader number as required to join at the end of the formation and enable all formation slot numbers.

NOTE: If VMC, flight lead may direct rejoin in a position other than the end.

18.40.2. Hold at the briefed holding point maintaining 1,000 feet altitude separation from formation.

18.40.3. Contact lead to confirm changes to briefed items (i.e., SKE frequency, element leader's slot number, and the number and positions of aircraft in the formation).

18.40.4. Set MFD range to 16,000 feet (maximum range). When the formation appears on the MFD, ensure the master lost indicator has extinguished.

18.40.5. Both the appropriate element leader and the rejoining aircraft will identify each other by momentarily selecting each other as leader on the secondary control panel. After positive identification, lead completes an FCI check with the rejoining wingman.

18.40.6. When the formation passes, advise ATC of your intentions and notify lead. Turn to join at the end of the formation while maintaining 1,000 feet altitude separation. When stabilized in position and the last formation aircraft is positively identified, request rejoin clearance and climb or descend to formation altitude.

18.40.7. The rejoining aircraft must be stabilized in position at formation altitude by the IP if IMC or by 30 seconds prior to TOT if VMC. Otherwise, abort the rejoin.

18.41. En Route Procedures.

18.41.1. During the climb or descent, follower aircraft monitor relative altitude by reference to the VDI. Set the SKE secondary control panel as required.

18.41.2. When possible, en route turns will be less than 90 degrees. The navigator calls 5 miles prior to turn points by reference to the Inertial Navigation System (INS) or Fuel Savings Advisory System (FSAS). When a turn signal is received and follower turn computers have been armed with the proper turn information, follower aircraft fly TWS information through the turn. After rollout on the assigned heading, adjust airspeed and heading as necessary to attain proper formation position. If the turn computer has not been armed, time an appropriate delay off of lead's turn signal to aid in maintaining proper position throughout the turn.

NOTE: An airspeed adjustment of 5 to 10 knots may be necessary to maintain proper position in turns. Monitor relative aircraft position on the SKE scope.

18.41.3. For en route acceleration or deceleration, move the throttles to 1,000 PPH fuel flow above or below normal cruise setting until the new airspeed is attained.

18.42. Spacing.

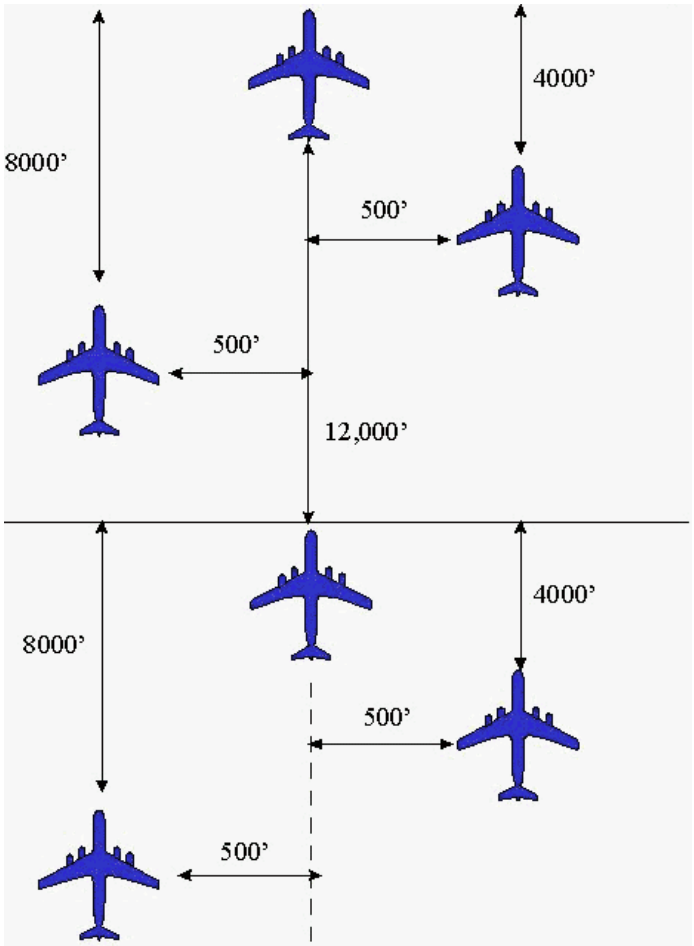
18.42.1. The second and third aircraft of each element maintain 4,000 and 8,000 feet spacing, respectively, from their element leader. The offset distance for en route navigation is 500 feet right for the number 2 aircraft and 500 feet left for the number 3 aircraft (**Figure 18.13.**).

18.42.2. Element leads maintain 12,000 feet in-track separation, 00 crosstrack separation and stack up 100 feet from the preceding element lead.

18.42.3. During lengthy missions, the mission commander may extend en route spacing, including crosstrack, to reduce fatigue.

18.42.4. Follower aircraft maintain position with respect to the selected leader by reference to the SKE using the bank steering bar and relative range indicator. The primary altitude reference is the pilot's pressure altimeter. Use the vertical deviation indicator to monitor relative altitude separation from the selected leader. Use the pilot's MFD to monitor the position of all aircraft in the formation and as a general reference for spacing. Formation aircraft detecting a gros position error will notify the offending aircraft. The subject aircraft will confirm or establish position immediately.

Figure 18.12. SKE Formation.



NOTE: Succeeding elements stack up 100 feet.

18.43. Loss of SKE-Individual Aircraft. Notify lead and maintain position visually, if possible. If unable, break out 30 degrees from the base heading, using 20 degrees of bank. After 30 seconds (wings level), return to base heading/parallel the formation, and attempt radar skin paint.

WARNING: If the loss of SKE occurs, and the formation is not established on a steady course (i.e., in a turn), climb 500 feet to establish altitude separation prior to initiating breakout procedures.

NOTES:

If the loss of displayed SKE information occurs on the MFD and all other indications (e.g., TWS, RRI, etc.) are normal, check or reset the Auxiliary Interface Unit (AIU) circuit breaker.

If abnormal SKE indications are present without associated BITE codes, consider the following: Check the leader's slot number, check your own slot number, check for proper SKE frequency, check that you are in transmit, check all formation aircraft SLEN switches, and check that appropriate slots are enabled.

18.43.1. IMC. If not capable of radar skin-paint, obtain a separate IFR clearance and proceed as briefed. If the aircraft is capable of radar skin-paint station keeping, with lead's permission, decrease airspeed 20 KCAS to drift back and rejoin at the rear of the formation. Consider the wingman's experience level, current and forecast weather, mission, airspace, communications, A/R requirements, and the threat environment. The following restrictions apply:

18.43.1.1. SKE-lost wingman position in IMC must be 1.5 NMs in- trail and stacked a minimum of 100 feet. This aircraft can't drop IMC without a suitable INS/ ZM mix or beacon.

18.43.2. VMC. With lead's permission, SKE-lost wingman in VMC will decrease airspeed, drift back, and rejoin VFR in-trail (4,000 feet back) stacking level with the SKE formation. This allows maximum flexibility for the SKE-lost wingman if IMC conditions are encountered.

18.43.3. Aircraft Separation. After SKE-lost wingman has rejoined at the rear of the formation, remaining aircraft within an element move up (if required). Element leaders will maintain 12,000 feet (or briefed) separation from the preceding element lead.

NOTES:

Formation leaders must ensure all formation maneuvers and procedures are thoroughly understood and passed on interplane since the SKE-lost wingman may not be receiving any SKE information.

Only one aircraft may fly these procedures at a time.

18.44. Overrun Procedures. When executing an overrun, keep in mind the goal is to establish safe separation between aircraft and to re-attain formation position. Overly aggressive maneuvers by element leads will adversely affect following elements.

18.44.1. Element Overrun. If crosstrack is set, element lead turns toward the direction of the set crosstrack, unless safety dictates otherwise. Element lead sets an additional 1,300 feet crosstrack and monitors position. If crosstrack is zero, element lead turns in the safest direction based on airspace restrictions, flight path, terrain obstructions, etc., sets 1,300 feet crosstrack, and monitors position. Element lead announces his overrun giving element number, base heading, and base airspeed. Wingmen maintain normal SKE position on element lead as he executes the element overrun procedure. Reestablish formation position after the correct spacing has been attained. If the correct position cannot be attained by 30 seconds prior to TOT, the DZ run-in is aborted by the affected aircraft (if IMC, the entire element must abort the drop).

18.44.2. Wingman Overrun. Turn toward the direction of the set crosstrack (unless safety dictates otherwise), and set an additional 500 feet crosstrack, announce overrun by formation position. Reestablish formation position after the correct spacing has been attained. If the correct position cannot be attained by 30 seconds prior to TOT, abort the drop.

NOTE: Overruns are normally called over interplane radio. Should operations demand radio silence, the element leader overrunning will press "OR," left or right turn prep, and "E." Once established in a turn away from the formation and time permitting, signal required data.

18.45. Lead SKE Position Change. Lead changes with deputy lead may be accomplished if briefed or if announced on interplane.

18.45.1. If VMC and anticipating these conditions to the objective area, relinquish lead to deputy lead by maintaining SKE spacing and using normal formation position or element lead change procedures as discussed in paragraph **18.22.**.

18.45.2. If IMC or deteriorating VMC, relinquish lead to deputy lead, execute loss of SKE--individual aircraft procedures.

18.45.3. New lead performs an FCI check.

18.46. SKE Slowdown and Run-In:

18.46.1. SKE and ZM Operations. Follow procedures in this instruction unless otherwise noted.

18.46.2. Pre-Slowdown Procedures. Prior to slowdown, the lead navigator calculates the estimated drift and altimeter setting for the drop. Signal drift and altimeter setting to the formation with the FCI prior to the slowdown point. All aircraft will use the drift and altimeter data relayed by lead. Follower navigators, including element leads, determine the appropriate crosstrack information obtained from the drift offset chart at the end of this chapter. Set this crosstrack after initiation of the slowdown maneuver. The navigator will brief the pilot on the crosstrack setting.

18.46.3. Echelon Turns. Echelon turns should be performed by the formation (all aircraft turn at the same time) between the IP and DZ escape. The turn commences on lead's command (prior to slowdown use maximum 20 degrees of bank; after slowdown use 10 degrees of bank maximum). If time permits, formation or element lead signals the turn and the roll out heading on the FCI. Normal timed turns commence with the DZ escape maneuver.

18.46.4. Slowdown Procedures. The entire formation slows at a predetermined time based on the Slowdown Point Graphs IAW in this instruction. Lead should plan to be stabilized at drop altitude and airspeed by the stabilization point. Lead transmits "SD" 30 seconds prior to slowdown, a "-" preparation 5 seconds prior and then an "E" for the actual slowdown. Element leaders relay these signals. Retard the throttles to idle start and decelerate to 160 KCAS. At 190 KCAS, element leads lower their flaps to the computed drop setting. Wingmen lower flaps as necessary to maintain position (not above maximum flap extension speed). During slowdown, the pilot states, "FLAPS (state computed setting)," the copilot repeats the command, extends the flaps to the proper setting, and once the flaps are set, calls "SLOWDOWN CHECKLIST" over interphone. The SKE secondary control panel will be set after the navigator calls slowdown. Upon reaching 160 KCAS, element leads may descend to drop altitude if required (planned at 1,000 FPM). Lead signals the maneuver, using a 5-second "descent" prep and "E."

18.46.5. Formation Integrity During the Run-in and Drop:

18.46.5.1. The formation slows to drop airspeed upon reaching drop altitude.

NOTES:

The SKE Secondary Control Panel will be set after the navigator calls slowdown.

Follower elements stack up 100 feet from the preceding element.

18.46.5.2. Wingmen maintain formation position with reference to the TWS and maintain the same drop altitude as their element lead. Maintain drop altitude by using both the VDI and pressure altimeter; however, the pressure altimeter is the primary reference.

18.46.5.3. After stabilizing at drop altitude and airspeed, the lead navigator will confirm previous drift information, and relay updated drift data to the formation as needed. All aircraft will use the same drift calculation for computing drift offset. However, wingmen are still responsible for confirming lead's data as appropriate.

CAUTION: Crosstrack information should not be entered in the secondary control panel while making a TWS turn. Such entries will invalidate TWS turn computations**.**

18.46.5.4. Element leads maintain position with reference to the TWS until the formation lead begins descent to drop altitude, at which time they fly an independent approach to their CARP. During the run-in, element leader's angle of bank is limited to 10 degrees.

18.47. Drop Clearance. Lead normally confirms clearance to drop at least 2 minutes prior to TOT by radio, zone marker, radar beacon, visual or electronic device, or other briefed signal. All aircraft monitor the DZ primary frequency in the event conditions on the DZ require a "no drop" after receiving initial clearance. Call formation no drops over interplane and signal "no drop" on the FCI (Use only the FCI signal if radio silence is mandatory).

18.48. Mixed Loads. Mixed loads will not be dropped within a formation (i.e., do not mix personnel and equipment). Loads with different types or quantities of parachutes may be dropped from the same element. The element requiring the highest drop altitude will be last in formation. Compute CARP data as required to ensure all loads land on the drop zone.

18.49. ZM Reception or Mix Problems. If reception of the ZM is not attained by the formation, follow the procedures in this volume. If a visual drop is elected, wingmen should follow normal SKE procedures and drop off their element lead's FCI signals. This release timing from lead's "E" is based on ground speed and in-track distance. An "execute" command may be given verbally if a wingman is not receiving FCI signals and the tactical situation permits. If IMC and formation lead is the only aircraft not receiving a mix, consider relinquishing the lead. All anticipated contingencies must be thoroughly briefed.

18.50. Drop Execution.

18.50.1. Lead or element lead. The element lead navigator will signal one minute prior to drop by depressing the down prep on the FCI. At five seconds, the element lead navigator depresses the down prep, and at "GREEN LIGHT," depresses the FCI "E." The pilot not flying the aircraft simultaneously activates the green light switch and the chute release switch, if required.

18.50.2. Wingmen. Release on INS timing for drop release if a valid SKE and ZM mix is obtained. If a valid SKE and ZM mix cannot be obtained, wingmen will use respective element lead's "E" and the appropriate time delay as the secondary method of airdrop release.

NOTE: Once follower aircraft begin timing off of lead's "E", drop airspeed must be maintained to permit accurate drop timing. Monitor the TWS range indicator to preclude overrun.

18.51. Drop Zone Escape. Escape from the DZ begins one minute after each element lead passes the end of the usable DZ time (red light). The element lead signals with FCI "+" followed by "E" to indicate execution of the briefed DZ departure procedure, wingmen reset crosstrack at this time. Follower element leads disregard this signal.

18.51.1. Each element independently accelerates to 160 KCAS, begins climb to re-assembly altitude (1,000 fpm or as briefed), and turns to DZ departure heading. Plan escape heading changes to be as small as possible (not to exceed 90 degrees). Elements should re-attain formation position as soon as possible. The formation lead maintains 160 KCAS at re-assembly altitude until all aircraft are in position, then accelerates or climbs to prebriefed recovery route profile by signaling "+" or "climb prep" and "E" on the FCI.

18.51.2. Any aircraft experiencing difficulty retrieving static lines, closing doors, or retracting air deflectors will notify the formation lead. The formation will not exceed 160 KCAS until the aircraft experiencing difficulty has corrected the problem or departs the formation. Aircraft leaving the formation contact the appropriate controlling agency and follow en route abort procedures.

18.52. SKE In-Line Formation. This geometry is flown with 00 crosstrack in-trail, 4,000 feet in-track separation and stacked up out-of-wake turbulence. It may be used for visual maneuvers, overhead or downwind recoveries and both VMC and IMC holding. Formations can transition easily from a normal SKE geometry to SKE in-line and vice versa. Lead gives the command to assume SKE in-line. Continue to send FCI's if IMC; FCI's are optional if VMC.

18.53. Holding Patterns. Entry will be within 70 degrees of the published inbound course on the non-maneuvering side, 20 degrees on the maneuvering side, or a teardrop if conveniently aligned at 200 KCAS. Entry from a quadrant requiring a turn to the non-maneuvering side is not recommended. A Two-minute holding pattern is required for more than three aircraft. Coordinate holding with ATC and conduct it at the holding or initial approach fix whenever possible.

18.54. Formation Recoveries. Ensure minimum recovery delays by prior coordination with ATC facilities. Fly recovery routes to a pre-coordinated fix or IAF to begin the recovery procedures. If the preplanned recovery cannot be flown, request individual radar vectors, or fly a briefed alternative.

NOTE: If recovering a large vertical IFR formation and the planned approach is not a straight-in, obtain a minimum of 5 minutes separation between sections prior to reaching the recovery base. The airspace must be available for each section to hold upon arrival at the recovery base if immediate landing is not possible.

18.54.1. Approach Separation. Most instrument recoveries require the formation to attain approach separation, typically 16,000 feet but not less than 12,000 feet. ATC may require greater separation for individual approaches. Formation lead plans a deceleration point which allows the formation to attain desired spacing prior to the IAF or, for straight-in approaches, the FAF. At the deceleration point, lead directs the formation to establish approach separation while maintaining base airspeed. Wingmen will decelerate 30 KCAS from base airspeed, or maintain Vmfr + 20 whichever is higher, until attaining

briefed spacing, and then resume base airspeed. Other methods, e.g., attaining separation during the turn from an IFR downwind to base leg, may be used.

NOTE: Element leads may lose TWS and have to fly off the MFD. Lead ensures the formation remains within 10 NMs of master. This may require a master change. Consider moving the master to the middle of the formation prior to large formation recoveries. This master aircraft must continue to transmit until all formation aircraft have landed.

18.54.2. Overhead and Downwind Recovery. At a predetermined point, if VMC and will remain VMC, the formation lead clears the flight to assume SKE in-line and maneuvers the formation for the recovery. Accomplish the pattern and landing as specified in paragraph **18.20.**.

18.54.3. Individual IFR Approach Recovery. An IFR recovery route which allows the formation to attain approach separation terminating in individual radar or instrument approaches may be required. Lead coordinates the briefed IFR recovery with ATC or obtains an amended IFR recovery clearance. All aircraft will use SKE to monitor safe separation from other aircraft in the formation.

18.54.4. International Civil Aviation Organization (ICAO) Approaches. There are no formation procedures to execute the ICAO 45/180 and 80/260 procedure turn approaches.

18.55. Emergency Dispersal Procedure. If formation SKE capability is lost in IMC (e.g., equipment malfunction, electronic jamming, or associated weaponry), the formation will disperse using the emergency weather penetration procedures in paragraph **18.16.4.2.**. In IMC, navigators will use the radar to back-up SKE positioning on preceding aircraft.

Figure 18.13. Emergency Weather Penetration Procedures.

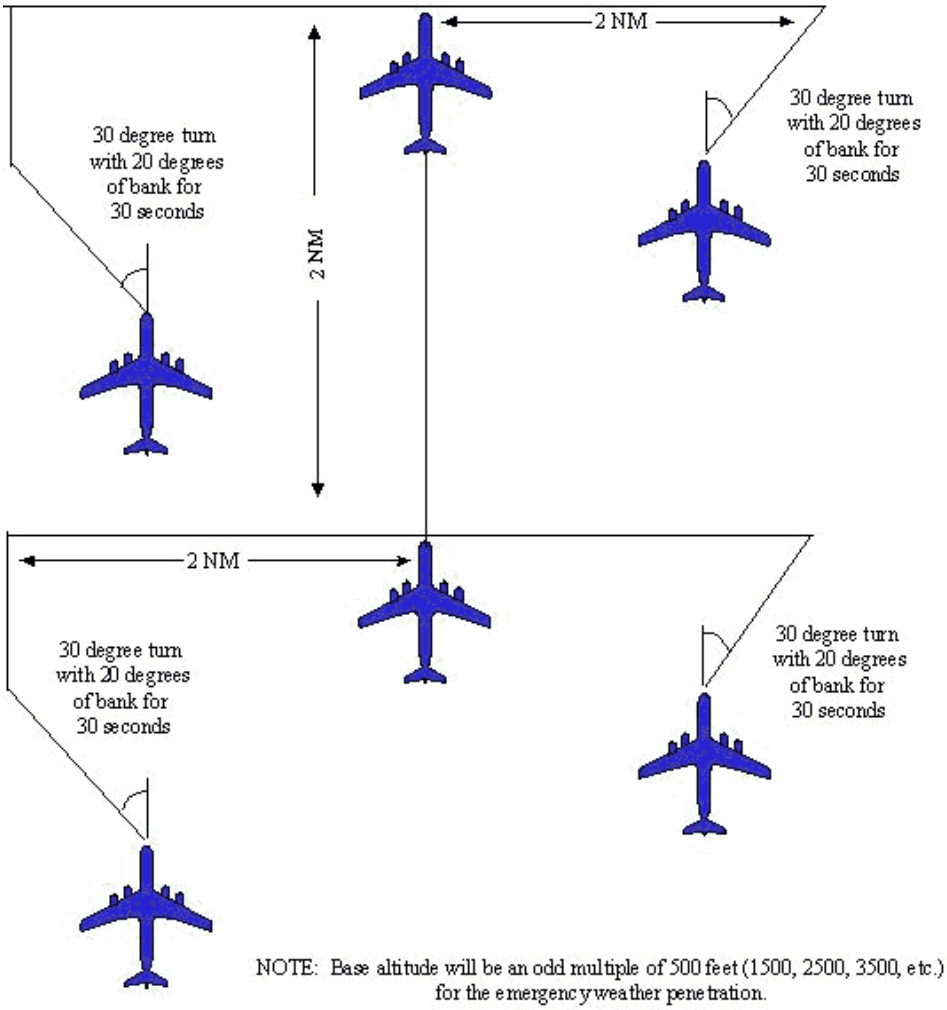
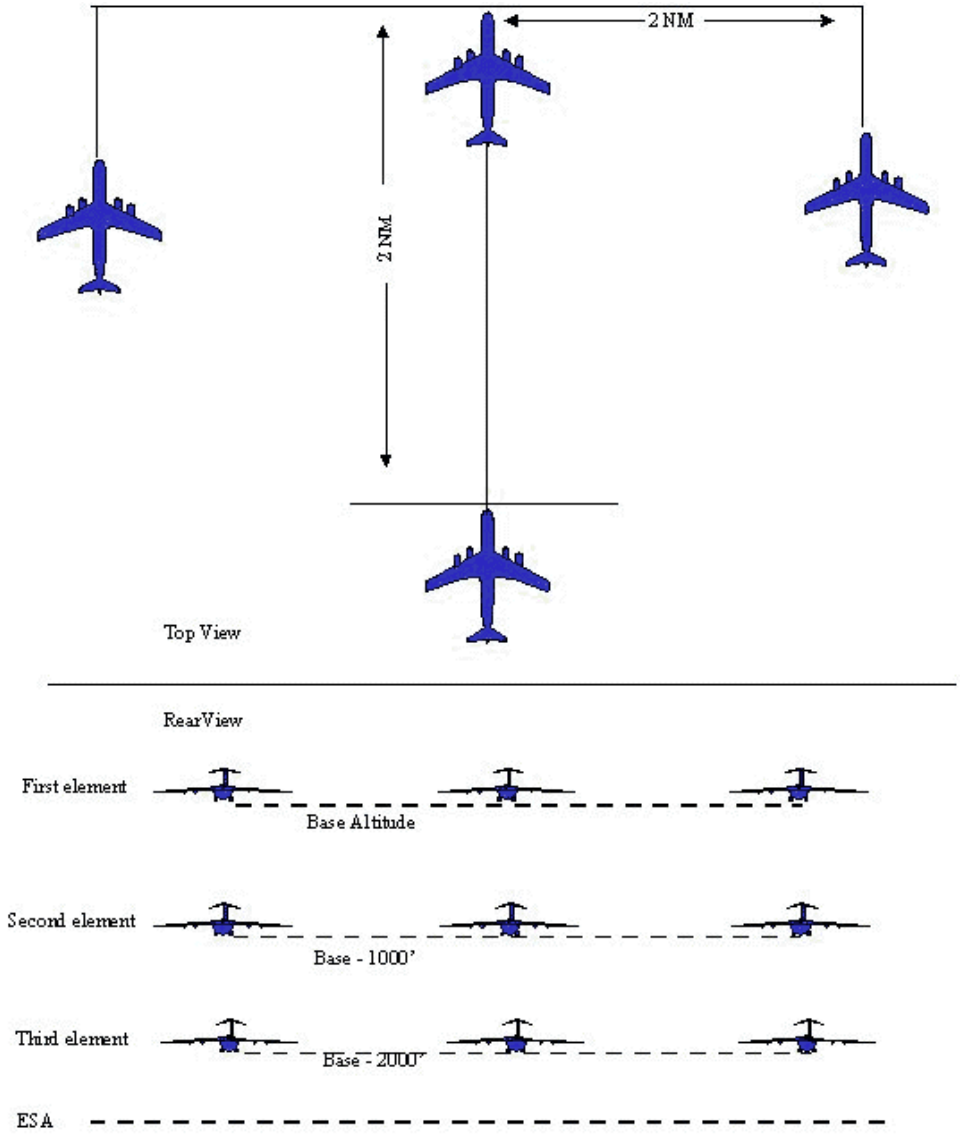


Figure 18.14. Emergency Weather Penetration Procedures Part 2.



18.56. Airlift Formation Rendezvous. These procedures are intended for use if multiple sections or elements join into one formation (not required if formation departs en mass from the same operating base). Each section or element converges on a prebriefed geographic point or radio fix which is referred to as the Start Rendezvous Point (SRP). Each section must use a different SKE frequency until actual time of join, with no common slots enabled. The time of arrival for the second section will be 1 minute later than that of the first, or as briefed. Maintain a minimum altitude separation of 1,000 feet between sections inbound to the SRP. The rendezvous track should be at least 150 NMs long for two sections.

18.56.1. Aircrew Procedures:

18.56.1.1. The last aircraft in the first and second section is master for the rendezvous.

18.56.1.2. The first section decreases airspeed to base airspeed minus 20 KCAS 2 minutes past the rendezvous point.

18.56.1.3. The second section continues to fly en route airspeed. Upon reaching the rendezvous point, fly the same briefed track as the first section. This should position the second section into a chase type rendezvous.

18.56.1.4. Aircraft in the second section will enable the slot numbers of the first section on command, after passing the rendezvous point and once within 10 NMs of first section master. The second section leader will set MFD to 16,000 feet (maximum range). When the first section appears on the MFD, the master aircraft of the second section switches to "Follower" and instructs (verbally or FCI) all members of his formation to switch to the first section's frequency. After positive identification, first section lead will accomplish an FCI check with the second section lead.

18.56.1.5. When all SKE systems are re-synchronized, the second section lead positively identifies the last aircraft of the preceding section and continues to close to en route spacing. The joining section slows to base airspeed minus 20 KCAS as necessary to stabilize in position. Once established in the proper position, the second section climbs or descends to the formation altitude on section lead's FCI signal.

18.56.1.6. The first section lead will accelerate his section to base airspeed upon a verbal command by the second section lead. The FCI "+" will be used as a backup.

18.56.1.6.1. Exercise caution to ensure duplicate slot numbers are not used. Only two sections can be joined at any one time. This procedure must be repeated if more than two sections are required to rendezvous.

18.57. Enhanced Station Keeping Procedures.

18.57.1. Planning.

18.57.1.1. Airdrop. When using the ZM, it is essential that mission planners, mission commanders, aircrews and ground party members (STT, DZST, or DZO) are briefed and aware of the assigned ZM and SKE frequency to be used for the drop.

18.57.1.2. Route to Flight, Altitude, and Formation. Route planners will consider route of flight, altitude and formation position of the "master" aircraft from the IP to the DZ for optimum ZM operation. Plan run-in course to maintain line-of-sight with pre-briefed ZM placement on the DZ.

18.57.1.3. Use of Multiple ZMs and Formations:

18.57.1.3.1. One ZM on the DZ:

18.57.1.3.1.1. Formations should not be co-frequency within 80 NMs. Similarly, no more than one "Master" should be within 80 NM of the ZM when operating co-frequency. The relative distances of separate formation masters on different frequencies to the ZM should be 2-to-1 (e.g., Master #1 has departed the ZM area and is 40 NMs out; Master #2 is ingressing the ZM area and is 20 NMs out. A minimum of 10 minutes separation is required between formations on different frequencies (more time may be required if ZM is unattended). This will ensure that no more than one master is within 25 NMs of the ZM on any frequency at the same time.

18.57.1.3.1.2. Sufficient spacing between formations is required to allow for the 90-second warm-up time when frequencies are switched on the TPN 27A Zone Marker. Frequency change is immediate for the TPN 27B.

18.57.1.3.2. Two ZMs on the DZ:

18.57.1.3.2.1. Preferred frequency pairings are B & C; A & B; or C & D. Other pairings may lead to no ZM mix prior to the drop. Planners should consult **Table 16.1.** and paragraph **16.2.6.9.** for more information on appropriate pairings.

NOTE: ZMs should be physically located at least 20 yards apart.

WARNING: Do not operate two or more ZMs simultaneously on the same frequency.

18.57.1.3.2.2. Multiple formations on different frequencies: formation spacing is limited by operational requirements and restrictions.

NOTE: Follower formations may momentarily lose the ZM when a preceding formation is very close to the ZM, e.g., less than 2 NMs.

18.57.1.3.2.3. Three ZMs on the DZ. Preferred frequency sequences to be selected by successive formations are: A, B, & C; or B, C & D; or C, B & A; or D, C & B. Other pairings may lead to no ZM mix prior to the drop.

18.57.1.3.2.4. Four ZMs on the DZ. Preferred frequency sequences to be selected by successive formations are: A, B, C & D; or D, C, B & A. Other pairings may lead to no ZM mix prior to the drop.

18.57.2. Loss of SKE, ZM Mix In-flight.

18.57.2.1. En Route. If a loss of displayed SKE information occurs on the MFD and all other indications (e.g., TWS, RRI, etc.) are normal, check the AIU circuit breaker. If abnormal SKE Indications exist without BITE codes then:

18.57.2.1.1. Check Leader slot number.

18.57.2.1.2. Check your own slot number.

18.57.2.1.3. Check your control panel for proper frequency.

18.57.2.1.4. Check to ensure you are in transmit XMIT.

18.57.2.1.5. Check the ALL and SLEN switch.

18.57.2.1.6. Check for appropriate slots enabled.

18.57.2.2. ZM reception and mix problems. Distances used for the following decisions are dependent upon topography, ZM location, run-in profile to the DZ, and weather conditions.

18.57.2.2.1. Situation I (All aircraft). This situation accounts for two problems: either the ZM is inoperative or the master aircraft has a SKE problem in which the ZM is not being triggered to respond.

18.57.2.2.1.1. If by 15 NMs all aircraft still have received no ZM signal and mix, Lead confirms ZM frequency with CCT. Pilots check air delivery (AIR DEL) switch in the ZM position and INS in the airdrop mode.

NOTE: If the AIR DEL switch is left in the off position, the ZM will not appear until 10 NMs and will then appear as a follower aircraft symbol.

18.57.2.2.1.1.1. If all aircraft still have no ZM signal and mix- execute a master change and continue profile.

18.57.2.2.1.1.2. If all aircraft still have no ZM signal and mix- switch to backup ZM frequency if able and available.

WARNING: Do not switch to backup frequency unless de-conflicted with other aircraft according to the above parameters (i.e., 80 NM separation if co-frequency, 25 NM for formations on different frequencies, etc.).

NOTE: If a ZM frequency change is required, a 1.5 to 2 minute time delay will occur before the TPN 27A ZM transmits. For TPN 27B, there is no time delay.

18.57.2.2.1.1.3. If all aircraft still have no ZM signal and mix- continue on course; if no ZM mix is received in time for the formation to descend and be stabilized IAW **Chapter 18** and **Chapter 19** of this AFI, a "no-drop" will be signaled/announced.

18.57.2.2.2. Situation II (Individual aircraft). Individual aircraft doesn't have a mix, rest of formation does- check air delivery switch. Check INS in air drop mode. If still receiving no mix, followers maintain formation position- and drop using Leader's timing. If Lead aircraft has no mix, relinquish Lead position and depart the formation.

NOTES:

This situation occurs when an aircraft has a weak SKE receiver and therefore may not receive a mix until close to the ZM (if at all).

Because the directional antenna is located on the bottom of the aircraft, loss of ZM signal may occur during descent, especially in a steep nose-down attitude.

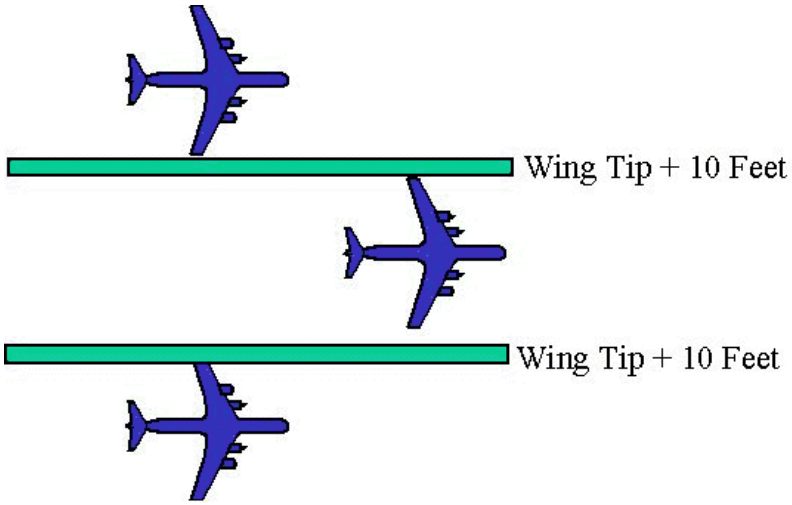
Section 18E—Combination SKE and VISUAL Procedures

18.58. General. Transition between visual and SKE procedures may be advantageous or necessary. The following procedures are designed to transition between visual in-trail and SKE; other visual geometries will require alterations.

18.58.1. From visual formations, lead directs the formation to assume SKE procedures on interplane. All aircraft should acknowledge this call. Element leads maintain 12,000 feet (or as briefed) interval behind the preceding element lead. Wingmen decrease airspeed 20 KCAS (or as briefed) to drift back into SKE spacing. Ensure lateral spacing is properly set prior to drift- back. Aircraft may climb while transitioning to this geometry (use briefed rates or those found in **Figure 18.3.**).

18.58.2. From SKE formation, lead directs the formation to assume visual procedures on interplane. Each aircraft then assumes the briefed visual tactic.

Figure 18.15. VFR Formation.



Section 18F—Aerial Demonstrations (Figure 18.9.):

18.59. General. V-formation is authorized for demonstration flyovers with approval from NAF/DO. Aerial deliveries will not be performed from V- formation. The wing commander must specifically approve the details of all rehearsals. V-formation flyovers are limited to three aircraft. (Reference AFI 11-209 *Air Force Participation in Aerial Events.*).

18.59.1. Departure:

18.59.1.1. Use normal procedures for pre-takeoff, takeoff, and abort. Formation departure procedures, as outlined in this paragraph, will be used where practical. They may be adapted to conform with local traffic pattern restrictions, terrain features, and operational considerations. The commander with operational control will prescribe the specific assembly to be employed.

18.59.1.2. Lead aircraft will proceed on the takeoff heading for 1 minute and 30 seconds plus the takeoff interval for each succeeding aircraft in the formation. At the expiration of this time, an initial turn of 180 degrees will be made in the direction of traffic. Lead should not exceed 15 degrees of bank when flying in V-formation.

18.59.1.3. Wingmen will always join from beneath using the interception in turn method, at assembly airspeed whenever possible.

18.59.2. En Route. In the event of an abort, the element lead position will be filled by the right wingman. The left wingman will cross under to fill the right wing position. Power changes by lead should be made gradually to minimize affect on wingmen. Time will be adjusted by cutting corners or extending legs prior to reaching the initial point, or by using alternate control time routes. Limit airspeed changes en route if at all possible.

18.59.3. Slowdown. Descend from cruise altitude in sufficient time to allow the formation to be stabilized at altitude prior to initiating slowdown. Plan the slowdown to be at or below 150 KCAS six minutes prior to the desired TOT. Power reductions during the slowdown maneuver must be accomplished gradually. Lead should lower flaps to the takeoff or approach position at 190 KCAS. Wingmen should try to match lead's actions to maintain position.

18.59.4. Two methods of formation recovery are the downwind and the overhead.

18.59.4.1. Right Echelon. On command of the section leader, "Echelon Right, Acknowledge," the number 3 aircraft (left wingman) crosses under and slightly to the rear of the element, repositioning at normal formation interval on the right wing of the number 2 aircraft. The order of break from a right echelon is: number 1 aircraft (Lead), number 2 aircraft (original right wingman), number 3 aircraft (original left wingman).

18.59.4.2. Left Echelon. On command of the section leader, "Echelon Left, Acknowledge," the number 2 aircraft (right wingman) will move under and slightly to the rear of the element repositioning at normal formation interval on the left wing of the number 3 aircraft. The order of break from a left echelon is number 1 aircraft (Lead), number 3 aircraft (original left wingman), number 2 aircraft (original right wingman).

18.59.5. The downwind and overhead recovery should be accomplished in accordance with normal formation procedures with the following ***exception***; the overhead break is accomplished at 4- second intervals.

Section 18G—Formation Air Refueling Procedures

NOTE: The tanker lead is responsible for the entire formation (both tanker and receiver aircraft) from rendezvous through the end of air refueling operations. They must ensure coordination with ARTCC facilities, tanker and receiver aircraft, is accomplished prior to taking any actions. Additionally, the tanker leader must be prepared to make timely decisions and direct actions should any unplanned or emergency situations arise.

18.60. General. The procedures contained in this section cover only the most common receiver or tanker formations and do not cover all possible situations. Only formation qualified aircrew may use these procedures. The procedures contained in this section do not relieve the mission commander and formation lead pilot and navigator of the responsibility to thoroughly plan and brief these procedures and cover all possible combinations.

18.61. Briefing. The lead pilot briefs all pilots and navigators within the receiver cell. This briefing will be in sufficient detail to cover all phases of cell operations. The briefing includes, but is not limited to, the following:

18.61.1. Communication:

18.61.1.1. ATC Frequency

18.61.1.2. Interplane Frequency (if required)

18.61.1.3. A/R Frequency

18.61.1.4. Reporting

18.61.1.5. Early or Late Arrivals of Tankers or Receivers

18.61.1.6. Type of Rendezvous and Use of Navigation Aids

18.61.1.7. Radar or Station Keeping Equipment (SKE) Procedures

18.61.1.8. A/R Formation Procedures:

18.61.1.9. Tanker Formation

18.61.1.10. Receiver Formation

18.61.1.11. Transition to A/R Formation

18.61.1.12. Maneuvering During Refueling

18.61.1.13. Recovery From A/R Formations

18.61.1.14. Box Pattern/180 Degree Turnaround Procedures if used

18.61.1.15. Breakaway or Emergency Procedures

18.62. Specialized Terms. The following terms are unique to air refueling formations:

18.62.1. Air Refueling (A/R) Echelon. A 60 degree right echelon on formation lead with 1 NM separation nose-to-nose.

18.62.2. Post Air Refueling Position. The position a receiver proceeds to after completing refueling with the tanker.

18.62.2.1. Receiver one's (R1) post air refueling position is a 60 degree left echelon with the respect to the lead tanker (measured from the lead tanker's longitudinal axis) with 2 NM nose-to-nose separation, stacked 1,000 feet below the tanker, refer to the Formation Air Refueling (FAR) checklist.

18.62.2.2. The post air refueling positions for element wingmen are depicted in FAR checklist.

18.62.3. Refueling Element. Receivers which share a common tanker(s).

18.62.4. Refueling Element Base Altitude. An altitude 1000 feet below the element's lead tanker (T1).

18.62.5. Awaiting Air Refueling Position. A 60 degree right echelon position from the respective tanker with 1 NM nose-to-nose separation, stacked 500 feet above. ***Exception:*** In a three receivers on one tanker (3-on-1) formation, receiver 3 will maintain SKE inline (or normal SKE) position stacked out of wake turbulence but no higher than 50 feet.

18.62.6. Receiver Rejoin Altitude. An altitude the wingman maintains while rejoining on the receiver element after air refueling is complete. SKE: 500 feet above element or section lead until established in proper horizontal formation position, then stack level with element or section lead.

18.63. Prior to Flight (To the maximum extent, NLT the ARIP).

18.63.1. Confirm the following information with the tanker crew:

18.63.1.1. Tanker vertical stack and horizontal separation

18.63.1.2. Refueling airspeed

18.63.1.3. Tanker operating beacon and A/A TACAN

18.63.1.4. Tanker announce heading changes after rendezvous, receiver offload amount from each tanker, and post AR 180 degree in-line turn (if applicable)

18.63.2. Aircraft will have operable SKE and radar systems for formation air refueling flights. It is the intent of this volume that these systems be fully operational during FAR operations. However, operational necessity dictates, this decision will be left to the mission commander.

18.64. Prior to Air Refueling Initial Point (ARIP).

18.64.1. Normally the formation will descend to cross the ARIP at Rendezvous (RZ) altitude. Descent or ascent rates will be as briefed by section lead. RZ base altitude will ensure a minimum of 1000 feet vertical separation between receivers and the lowest tanker.

18.64.2. During refueling, receivers will address themselves as “Receiver 1 (R1)”, Receiver 2 (R2)”, and “Receiver 3 (R3).”

18.64.3. R1 will confirm any changes to the following with T1 (if required):

18.64.3.1. The tanker vertical stack and lateral separation.

18.64.3.2. Which tanker will have Beacon (BCN) and Air-to-Air (A/A) TACAN operating during the RZ.

18.64.3.3. Base refueling airspeed.

18.64.3.4. That the lead tanker will announce new base headings after the RZ.

18.64.4. When possible, receiver lead will use an interplane frequency other than A/R primary to lead the formation to an in-trail position prior to 3 NMs.

18.65. Rendezvous Procedures.

18.65.1. Accomplish the RZ according to T.O. 1-1C-31. Consideration should be given to using an en route RZ for large receiver or tanker formations.

18.65.2. After the ARIP, the receiver lead will pass all heading and airspeed changes via the FCI. If the FCI is not possible, announce all heading and airspeed changes with no acknowledgments or FCIs required; e.g., "LIFTR ONE-FIVE FLIGHT, NEW BASE HEADING _____, TRUE/MAG TURN NOW." "HUNT TWO-ZER0 FLIGHT, NEW BASE AIRSPEED _____, ACCELERATE/ DECELERATE NOW."

EXCEPTION: Planned radio silent rendezvous.

18.65.3. To expedite the RZ, lead will normally use Normal Rated Thrust (NRT) for accelerations; normally two engines at idle and two engines at 2000 pph fuel flow for decelerations. Receiver lead (R1) may request the tanker lead (T1) to reduce airspeed to increase closure rate during the RZ.

18.65.4. Formation lead (R1) is responsible for weather avoidance. R2 may assist in monitoring track weather.

18.65.5. Only R1 or T1 calls an RZ overrun.

18.65.6. Normally the formation should transition to A/R echelon when established in a position from which a closure can be directed with minor heading changes. Normally, this transition will be initiated no later than 2 NMs from the tankers. Do not continue the rendezvous closure inside of 2 NMs unless visual contact is established with the tanker.

18.66. Transition to Air Refueling (A/R) Echelon.

18.66.1. To initiate the transition to A/R echelon, the lead pilot states: "AMOUR TWO-ZERO FLIGHT, PREPARE TO TRANSITION TO A/R ECHELON, BASE AIRSPEED _____, BASE HEADING _____, TRUE/MAG, BASE ALTITUDE, ACKNOWLEDGE." Follower aircraft should check INS crosstrack for use as an aid in determining target crosstrack. "AMOUR TWO-ZERO FLIGHT, EXECUTE A/R ECHELON NOW." Following the command of execution:

18.66.1.1. All aircraft transitioning to echelon positions turn right 10 degrees from base heading. All aircraft that will remain in the in-trail position should station keep off the preceding aircraft.

NOTE: Lead should keep heading and airspeed changes to a minimum while transitioning to or from A/R echelon.

18.66.1.2. Set NRT and accelerate as required. Do not exceed base airspeed plus 50 knots or 330 KCAS/.80 Mach, whichever is lower.

18.66.1.3. Approaching target crosstrack, aircraft in echelon position roll out on lead's base heading. Aircraft in the in-trail position should continue to station keep off the preceding aircraft.

18.66.1.4. Approaching the 60 degree echelon line, slow to base airspeed and move laterally to obtain desired nose-to-nose separation if appropriate.

18.66.1.5. When the formation is in A/R echelon, R1 adjusts the formation airspeed to complete the rendezvous.

18.66.2. During the closure, receiver formation lead (R1) will transition the formation to A/R primary frequency and check wingmen in. When tankers are positively identified in front of the formation, R1 may direct a climb to refueling element base altitude to expedite closure. After climb to refueling element base altitude, R1 will clear the formation to conduct air refueling when appropriate. During refueling, receivers will address themselves as "Receiver 1 (R1)," "Receiver 2 (R2)," "Receiver 3 (R3)."

18.67. Refueling Operations.

18.67.1. The first receiver per tanker will always proceed directly to a position 1 NM in-trail of the tanker. Close and refuel according to T.O. 1-1C-1-31.

18.67.2. In cases where receivers have no respective tanker, they will proceed to the awaiting air refueling.

18.67.3. In a 3-on-1 formation, R3 will maintain an in-line position from the preceding receiver (R2). This position is 4000 feet in-line and stacked level. Once established in the awaiting A/R position, R3 may transition to a co-altitude, 500 yard right position with respect to R2.

18.67.4. SKE will be left on throughout refueling.

18.67.5. The navigator or jump seat occupant will monitor UHF guard, ATC, A/R primary and formation interplane. Keep the transmissions on A/R primary brief and to an absolute minimum.

18.67.6. A 180 degree turn on track with multiple tankers and/or receivers must be accomplished with all receivers established in a single in-line formation with 1000 feet vertical separation between the receivers and the lowest tanker and at least two nautical miles in-trail of the lead tanker.

NOTE: Transitioning to an in-line formation behind T1 must be initiated with all receivers in their respective post A/R positions.

EXCEPTION: For 2-on-1 only, with prior permission from the tanker, a receiver in contact may remain in the contact position during the turn. Other receiver will move from either awaiting A/R or post A/R to the in-trail position for the duration of the 180 degree turn. In trail aircraft will return to either awaiting-A/R or post A/R, whichever is appropriate, when established on track after the turn. Before maneuvering, the receiver in the contact/pre-contact position will remain in the contact/pre-contact position until the other receiver is reestablished in the awaiting A/R or post A/R position.

18.68. Refueling Complete. After receiving scheduled offload and established in the post A/R position each receiver will announce "(Receiver Number) ESTABLISHED IN POST A/R" when it is clear for the subsequent receiver to close on that tanker and refuel. If receivers must transit from one tanker to another (i.e., 3-on-2), once the respective receiver has maneuvered behind the new tanker, 500' below and in-line, they will announce "(Receiver Number) CLEAR." At this point it is clear for the subsequent receiver to close on their respective tanker and refuel.

WARNING: It is imperative all aircraft (including tankers) are in their procedural correct positions when receivers are proceeding to their post air refueling positions.

WARNING: When maintaining altitude and moving directly aft of the tanker, use caution for wake turbulence.

WARNING: When transiting to the post A/R position, you must attain positive radar/visual identification on the respective tanker and radar, SKE, and visual identification on all other element aircraft in the post A/R position. Do not descend to rejoin altitude until aft of abeam the last receiver in the post A/R position (i.e., SKE formation position). Attempt to square off the rejoin as depicted in the FAR checklist.
EXCEPTION: The first receiver in each element may proceed directly to their post air refueling position once they have obtained 500 foot altitude separation below T1.

18.69. Large Formation Re-assembly Procedures.

18.69.1. Prior to the A/R exit point, the formation will be stabilized in a SKE formation, at assigned altitude, and with ATC clearance. Formation lead must take all factors into account (i.e., weather, airspace limitations, formation size, aircraft positions, aircrew experience) when determining when to start large formation re-assembly procedures with other refueling elements after completion of refueling operations.

18.70. Emergency Action.

18.70.1. Breakaway. Follow procedures in T.O. 1-1C-1-31. When separation between receiver and tanker has been effected, the receiver pilot advises the respective tanker "WELL CLEAR" and states altitude passing. When the situation has stabilized, coordinate clearance back to pre-contact.

18.70.2. Lost Wingman Procedures. These procedures are to be used when visual, radar, SKE, or radio contact cannot be maintained and altitude separation can not be ensured. In any lost wingman situation, immediate separation of aircraft is essential to ensure safety. Upon losing all contact with the tanker lead or the respective tanker, or if unable to maintain formation due to disorientation, the wingman will simultaneously execute the applicable lost wingman procedure while transitioning to instruments. When tanker lead is notified of a lost wingman, tanker lead will take appropriate action, as the situation dictates, until positive separation is assured.

18.70.2.1. Loss of Visual Meteorological Conditions (VMC) after rendezvous. In the event any aircraft momentarily and inadvertently enters into Instrument Meteorological Conditions (IMC), loses sight of other receivers or their respective tanker in the formation, it is imperative the lead tanker be informed immediately. If continuous station-keeping ability, radar skin paint off of the respective tanker and SKE position off of all other receivers, can be maintained, all aircraft will maintain their current position (awaiting A/R, Pre-contact, post A/R, etc.) until the formation reenters VMC. If visual conditions do not return sufficiently to safely complete the formation A/R procedures, the lead tanker, in coordination with the lead receiver, will take action to ensure both altitude and lateral separation from all receivers and tankers. Climbs, descents, and turns should be made in the safest direction in all cases at the direction of the lead tanker in coordination with the lead receiver. Tanker lead will obtain separate clearances from ATC if VMC cannot be maintained. Subsequent receiver rendezvous may be coordinated with ATC after obtaining proper separation from the tanker formation (i.e. minimum of 2 NM and 1000 feet between the lowest tanker and highest receiver).

18.70.2.2. Loss of Station Keeping Ability in Instrument Meteorological Conditions (IMC). The loss of SKE or radar in IMC conditions after beginning the transition to A/R echelon until completion of formation A/R procedures will require immediate action by R1 and T1. R1, with prior coordination with T1, should brief possibilities in the mission brief, but must always thoroughly analyze each situation as they occur.

18.70.2.2.1. Lead receiver, with the approval of the lead tanker, will direct the appropriate action for the affected receiver to ensure both lateral and vertical separation from all other receivers and tankers. This action may involve a climb, descent, or turn, depending on the location of the affected receiver and all other aircraft in the formation. Climbs, descents, and turns should be made in the safest direction in all cases at the direction of the lead receiver and lead tanker.

18.70.2.2.2. All other receiver aircraft with station keeping ability will maintain their current position (awaiting A/R, post A/R, etc.) until reentering VMC and subsequently cleared by R1 and T1.

18.70.2.3. Lost Wingman Procedures During Receiver A/R. Depending on the makeup of the A/R formation, it is possible that in the event of a breakaway, receiver aircraft may find themselves co-altitude with another aircraft in the formation. If, during a breakaway, the receiver aircraft loses sight of the tanker aircraft, the receiver aircraft is required to descend to an altitude 500 feet below their respective tanker. In the event this places the receiver aircraft co-altitude with another aircraft in the formation, immediately coordinate a de-conflicted altitude with tanker lead. Immediately contact tanker lead and establish visual, A/A TACAN, radar, SKE, or radio contact with the co-altitude aircraft. If visual, A/A TACAN, radar, SKE, or radio contact cannot be established or maintained, coordinate a de-conflicted altitude with tanker lead.

Section 18H— Vertical IFR Formation Procedures (Non-SKE). Use these procedures with specific MAJCOM/DO approval.

18.71. General. Vertical IFR formation provides both vertical and longitudinal separation between aircraft. Vertical IFR formation procedures are designed for takeoff, climb, cruise, and descent through IFR conditions, followed by a VFR rejoin and low-level operations. When using these procedures, give con-

sideration to overall mission design, route to be flown, and strict adherence to briefed, written, and announced in-flight procedures. Radar is required for vertical IFR join-ups.

18.72. Separation. Specified longitudinal and vertical separation ensures an adequate margin of safety during IFR weather conditions. Longitudinal spacing between aircraft is 1.5 NMs. Use radar to maintain separation. Element lead aircraft maintain 4.5 NMs separation on the preceding element lead. Vertical separation between section aircraft is 500 feet.

NOTE: Any altimeter changes required en route will be accomplished (on command) simultaneously by all aircraft in the section and will be repeated by each succeeding section lead.

18.73. Takeoff and Assembly. The takeoff interval is normally 30 seconds between aircraft. Aircraft maintain runway heading for 1 minute after brake release, then turn to the departure heading using 20 degrees of bank (terrain and airspace restrictions permitting). The navigator will time from brake release. Maintain 1,000 fpm while accelerating to climb airspeed. Lead is limited to 200 KCAS and 2,000 fpm. Wingmen will maintain 200 KCAS until on departure heading and positive radar identification and separation from preceding aircraft is ensured. They will then accelerate to 250 KCAS to close to en route spacing. Lead maintains assembly airspeed (200 KCAS) until the last aircraft calls in position. Once all aircraft are in position, lead may accelerate and climb the formation.

NOTE: If IMC and unable to establish positive radar identification of all preceding aircraft, abort using prebriefed emergency procedures.

WARNING: All aircraft execute turns over the same geographical point. Maintain prescribed airspeeds, rate of turn, and rate of climb since these are the primary means of providing separation between aircraft if precipitation degrades radar station keeping. If weather conditions preclude radar station keeping, aircraft will depart individually and proceed to a VFR orbit fix for formation join-up.

18.74. En Route.

18.74.1. Any aircraft unable to maintain formation position will notify the formation lead of the nature of the emergency and intentions. If you must depart the formation, break out in the safest direction 30 degrees from the base heading. After 30 seconds (wings level) return to the base heading and comply with separate IFR clearance or proceed as required to a safe recovery.

18.74.1.1. If formation position can be maintained until receiving an individual ATC clearance, continue in position until clearance is received.

WARNING: After departing the formation, the aborting aircraft will climb or descend out of the formation block altitude prior to maneuvering across the flight path of the formation.

18.74.1.2. In the event an element lead aborts, the second aircraft of that element assumes the element lead position.

18.74.1.3. When an aircraft aborts, other aircraft within the section continue to maintain their position and level off at their original altitude; e.g., descending to a base altitude of 2,000 feet and number 2 aircraft aborts, the number 3 aircraft maintains a 3-mile position aft of the formation leader and levels off at 3,000 feet.

18.74.1.4. Loss of radar after join-up:

18.74.1.4.1. If IMC, the aircraft aborts.

18.74.1.4.2. If VMC, the formation lead may permit the aircraft to remain in the formation. In this case, maintain position by visual reference, briefed airspeeds, and verbal assistance from succeeding aircraft.

18.74.2. Level off to maintain 500 feet vertical separation with all aircraft using the same altimeter setting.

Figure 18.16. Vertical IFR Formation (intermediate level off).

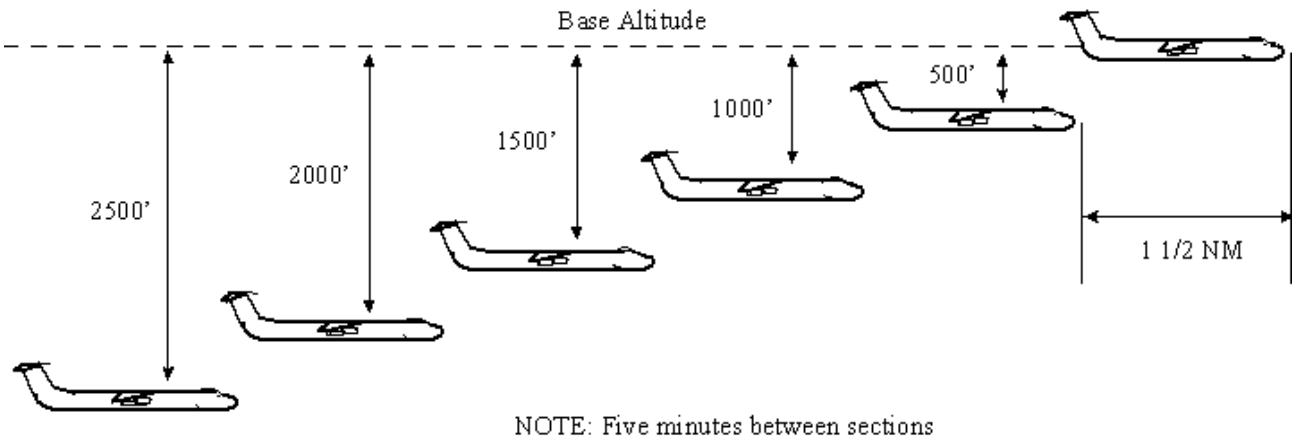
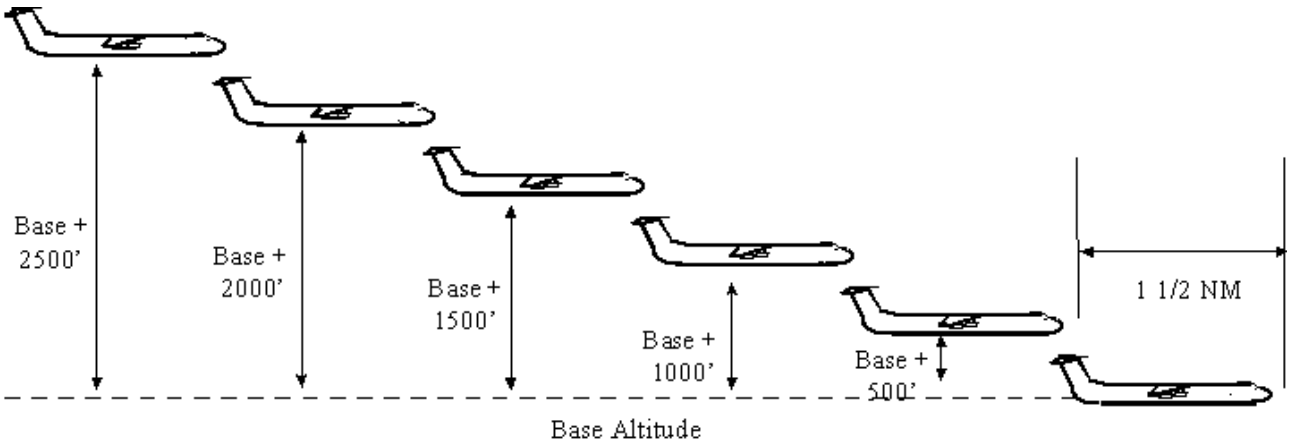


Figure 18.17. Vertical IFR Formation.



NOTE: Five Minutes between Sections.

18.74.2.1. Intermediate Level Off During Climb (**Figure 18.16.**). Section lead levels off at the highest altitude in the assigned block (base altitude). The number 2 aircraft levels off at base altitude minus 500 feet, number 3 aircraft at base altitude minus 1,000 feet, etc. Last aircraft in the section reports level at his assigned altitude. When the formation is cleared to continue climb, the section leader announces it IAW the Table of Commands.

WARNING: Serial and section leads will not accept an intermediate level off that places follower aircraft below MEA. When ATC directs an intermediate level off, serial or section leads immediately will advise the controller of the block altitude requirement, and confirm that it is available.

18.74.2.2. Level Off for Cruise (**Figure 18.17.**). Section lead levels off at the lowest altitude in the assigned block (base altitude). Number 2 aircraft levels off at base altitude plus 500 feet; number 3, base altitude plus 1,000 feet, etc. Last aircraft in the section or serial calls entering the block and level at assigned altitude.

18.74.3. Cruise:

18.74.3.1. Plan the mission to ensure the last aircraft in the section is below cruise ceiling.

18.74.3.2. Evaluate weight, temperature, weather, altitude, and distance prior to establishing a cruise airspeed. Section leads announce increase to cruise airspeed (if applicable) after the last aircraft in the section has reported level at assigned altitude.

18.74.3.3. Section leads may turn over or lead the turn for en route checkpoints. Succeeding aircraft turn to maintain formation position.

18.74.3.4. When formations consist of more than one section, section leaders report once in the blind over each checkpoint on UHF and VHF assigned interplane frequencies using corridor reporting procedures. Plan reporting points no more than 30 minutes apart to allow sections to maintain planned spacing.

18.75. IFR. Descent and Level Off:

18.75.1. Slow aircraft to descent airspeed (if applicable) prior to descent. Each section begins descent at the same predetermined point. Section leads give a preparatory command and a command of execution. On the section lead's command, all section aircraft retard two throttles to idle start and two throttles to 1,500 PPH and deploy spoilers as required to maintain the required descent rate. Lead aircraft levels off at base altitude and maintains 250 KCAS. The number 2 aircraft levels off at base altitude plus 500 feet, number 3 aircraft at base altitude plus 1,000 feet, etc.

WARNING: Do not accept circling turns during descent in instrument conditions. Maintain briefed airspeed, rate of turn, and rate of descent as these are primary means of providing separation between aircraft if radar station keeping is degraded.

18.75.2. One thousand feet above level-off altitude, reduce the rate of descent to one-half the briefed rate or 500 fpm, whichever is greater, and maintain 250 KCAS. Section lead announces instructions to continue descent, join VFR in-trail, etc. On command to join VFR, section leaders slow to briefed low-level airspeed.

18.76. VFR Recovery From IFR Formations. If en route weather is IMC and terminal weather is VMC, aircraft may descend as a formation using the IFR descent procedures in paragraph **18.75.** (terrain and air traffic control permitting). Maintain positive radar station keeping separation until VMC. Lead, with ATC coordination, will advise the formation of the expected recovery procedure.

18.77. IFR Recovery from Vertical IFR Formations. If terminal weather is forecast to be IMC, coordinate individual instrument approaches with ATC. Radar vectors to final work best. If they are not available, section leaders will obtain clearance to an initial approach fix, holding clearance with necessary altitude block, and clearance for individual approaches.

18.78. Transition Procedures.

18.78.1. Forming VFR in-trail from IFR conditions:

18.78.1.1. If lead enters VMC while descending to base altitude, he announces the base of the clouds and clears the formation to continue descent to base altitude; e.g., "LIFTR 10 Flight, base of clouds 2,500 feet, continue descent to 1,000 feet, and report VMC, acknowledge." Formation aircraft will acknowledge and continue descent to the announced base altitude at briefed rate and advise the flight leader as they become VMC. After all aircraft report VMC, the formation leader clears the flight to join VFR in-trail, simultaneously reducing to 230 KCAS or briefed low-level airspeed.

18.78.1.2. VFR rejoin during other phases of flight may be accomplished at the formation lead's discretion. VFR rejoin is accomplished as a formation maneuver.

18.78.2. VFR to IFR transition (Post Drop IFR Vertical Assembly):

18.78.2.1. Transition from VFR in-trail to vertical IFR formation is accomplished as follows from a series of pre-planned ascent points. These ascent points are planned to afford 5-minute separation between sections.

18.78.2.1.1. Prior to reaching the ascent point, section leaders give the preparatory command (see Table of Commands).

18.78.2.2. Upon reaching their ascent point, each section:

18.78.2.2.1. Lead--simultaneously gives the command of execution, turns (using 20 degrees of bank) to intercept the preplanned course, accelerates to 250 KCAS or briefed airspeed and begins climb schedule (see Table of Commands).

18.78.2.2.2. Succeeding aircraft--Initiate turn, accelerate, and begin climb schedule at 20-second intervals.

WARNING: The course interception angle will not be less than 30 degrees or more than 45 degrees to the preplanned course**.**

EXCEPTION: Section lead may use less than 30 degrees of intercept, if required by mission profile.

18.78.2.3. Attain 1 1/2 NMs radar separation during climb.

18.78.2.4. Level off in accordance with paragraph **18.74.2.** (**Figure 18.18.** or **Figure 18.19.**, as applicable).

NOTE: Plan a large enough angle between inbound course to ascent points and inbound course to en route departure point to allow section aircraft to attain 1 1/2 miles separation. Space ascent points to provide 5-minute separation between section leaders.

Figure 18.18. Post Drop IFR Vertical Assembly.

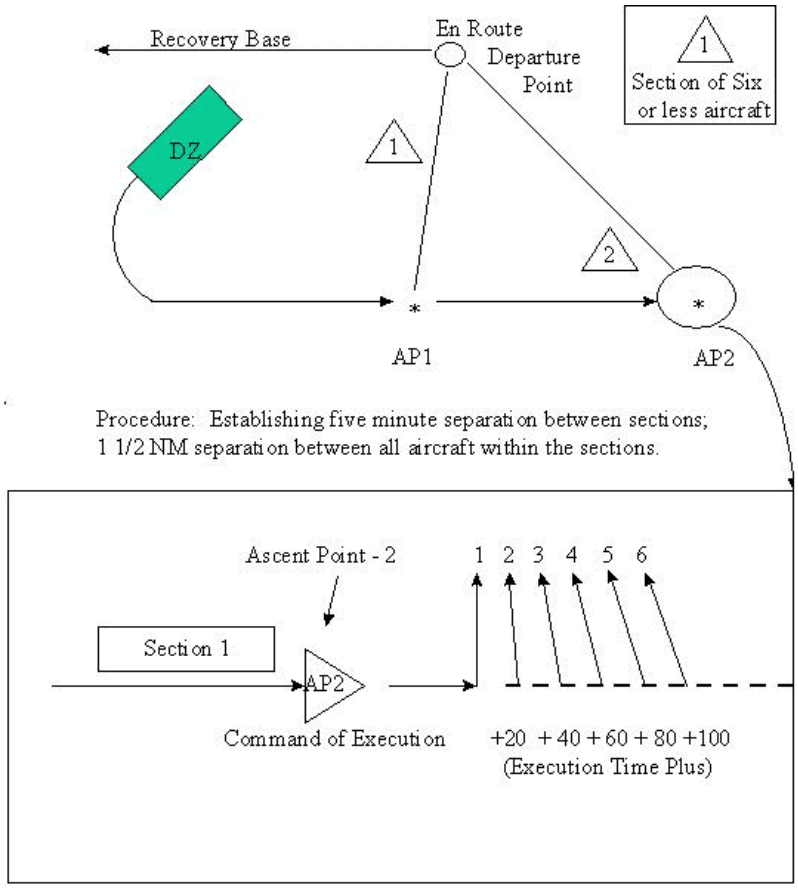


Figure 18.19. SKE Turn Information and Drift Settings.

A. Timing for <u>En route Turns</u> (Wingman):			
	<u>TAS (Corrected)</u>		<u>In-Track Distance (feet)</u>
Set	59.6 (Rate Index)	Read	X (***NOTE***: X equals time in seconds to turn. Subtract two seconds for reaction time).
B. Airdrop Timing (Wingmen):			
	<u>Ground Speed</u>		<u>In-Track Distance (feet)</u>
Set	59.6 (Rate Index)	Read	X (***NOTE***: X equals time in seconds to turn. (Subtract two seconds for reaction time.)

Table 18.1. Drop timing.(Right Wingman)

GS	3000	3250	3500	3750	4000	4250	4500	4750	5000
100	15.8	17.2	18.7	20.2	21.6	23.1	24.6	26.1	27.6
102	15.5	16.8	18.3	19.7	21.2	22.6	24.1	25.5	27.0
104	15.1	16.5	17.9	19.3	20.7	22.2	23.6	25.0	26.4
106	14.7	16.1	17.5	18.9	20.3	21.7	23.1	24.6	25.9
108	14.4	15.8	17.1	18.5	19.9	21.3	22.6	24.0	25.4
110	14.1	15.5	16.8	18.1	19.5	20.8	22.2	23.5	24.9
112	13.8	15.1	16.5	17.8	19.1	20.4	21.7	23.1	24.4
114	13.5	14.8	16.1	17.4	18.7	20.0	21.3	22.6	23.9
116	13.3	14.5	15.8	17.1	18.4	19.6	20.9	22.2	23.5
118	13.0	14.3	15.5	16.8	18.0	19.3	20.5	21.8	23.0
120	12.8	14.0	15.2	16.5	17.7	18.9	20.2	21.4	22.6
122	12.5	13.7	14.9	16.2	17.4	18.6	19.8	21.0	22.2
124	12.3	13.5	14.7	15.9	17.1	18.2	19.4	20.6	21.8
126	12.0	13.2	14.4	15.6	16.7	17.9	19.1	20.3	21.4
128	11.8	13.0	14.1	15.3	16.5	17.6	18.8	19.9	21.1
130	11.6	12.8	13.9	15.0	16.2	17.3	18.5	19.6	20.7
132	11.4	12.5	13.7	14.8	15.9	17.0	18.0	19.3	20.4
134	11.2	12.3	13.4	14.5	15.6	16.7	17.8	18.9	20.0
136	11.0	12.1	13.2	14.3	15.4	16.5	17.5	18.6	19.7
138	10.8	11.9	13.0	14.0	15.1	16.2	17.3	18.3	19.4
140	10.6	11.7	12.8	13.8	14.9	15.9	17.0	18.0	19.1
142	10.5	11.5	12.5	13.6	14.6	15.7	16.7	17.8	18.8
144	10.3	11.3	12.3	13.4	14.4	15.4	16.5	17.5	18.5
146	10.1	11.1	12.1	13.2	14.2	15.2	16.2	17.2	18.2
148	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0
150	9.8	10.8	11.8	12.8	13.7	14.7	15.7	16.7	17.7
152	9.6	10.6	11.6	12.6	13.5	14.5	15.5	16.5	17.4
154	9.5	10.4	11.4	12.4	13.3	14.3	15.3	16.2	17.2
156	9.3	10.3	11.2	12.2	13.1	14.1	15.0	16.0	16.9
158	9.2	10.1	11.1	12.0	12.9	13.9	14.8	15.8	16.7
160	9.1	10.0	10.9	11.8	12.8	13.7	14.6	15.5	16.5
162	8.9	9.8	10.7	11.7	12.6	13.5	14.4	15.3	16.2
164	8.8	9.7	10.6	11.5	12.4	13.3	14.2	15.1	16.0
166	8.7	9.5	10.4	11.3	12.2	13.1	14.0	14.9	15.8
168	8.5	9.4	10.3	11.2	12.0	12.9	13.8	14.7	15.6
170	8.4	9.3	10.1	11.0	11.9	12.8	13.6	14.5	15.4
172	8.3	9.2	10.0	10.9	11.7	12.6	13.4	14.3	15.2
174	8.2	9.0	9.9	10.7	11.6	12.4	13.3	14.1	14.9
176	8.0	8.9	9.7	10.6	11.4	12.2	13.1	13.9	14.8
178	7.9	8.8	9.6	10.4	11.3	12.1	12.9	13.7	14.6
180	7.8	8.6	9.5	10.3	11.1	11.9	12.8	13.6	14.4
182	7.7	8.5	9.3	10.2	11.0	11.8	12.6	13.4	14.2
184	7.6	8.4	9.2	10.0	10.8	11.6	12.4	13.2	14.0
186	7.5	8.3	9.1	9.9	10.7	11.5	12.3	13.0	13.9
188	7.4	8.2	9.0	9.8	10.5	11.3	12.1	12.9	13.7
190	7.3	8.1	8.9	9.6	10.4	11.2	12.0	12.8	13.5
192	7.2	8.0	8.7	9.5	10.3	11.0	11.8	12.6	13.4
194	7.1	7.9	8.6	9.4	10.2	10.9	11.7	12.4	13.2
196	7.0	7.8	8.5	9.3	10.0	10.8	11.5	12.3	13.0
198	6.9	7.7	8.4	9.2	9.9	10.7	11.4	12.1	12.9
200	6.9	7.6	8.3	9.1	9.8	10.5	11.2	12.0	12.8

NOTE: A minus two second reaction time applied to each value.

Table 18.2. Drop timing. (Left Wingman)

GS	7000	7250	7500	7750	8000	8250	8500	8750	9000
100	39.4	40.9	42.4	43.8	45.3	46.8	48.3	49.8	51.2
102	38.6	40.1	41.5	43.0	44.4	45.9	47.3	48.8	50.2
104	37.8	39.2	40.7	42.1	43.5	44.9	46.4	47.8	49.2
106	37.1	38.5	39.8	41.2	42.6	44.0	45.4	46.8	48.2
108	36.3	37.7	39.1	40.4	41.8	43.2	44.6	45.9	47.3
110	35.6	37.0	38.3	39.7	41.0	42.4	43.7	45.1	46.4
112	35.0	36.3	37.6	38.9	40.3	41.6	42.9	44.2	45.5
114	34.3	35.6	36.9	38.2	39.5	40.8	42.1	43.3	44.7
116	33.7	35.0	36.2	37.5	38.8	40.1	41.3	42.6	43.9
118	33.1	34.3	35.6	36.8	38.1	39.3	40.6	41.9	43.1
120	32.5	33.7	35.0	36.2	37.4	38.7	39.9	41.1	42.4
122	31.9	33.1	34.4	35.6	36.8	38.0	39.2	40.4	41.6
124	31.4	32.6	33.8	35.0	36.2	37.3	38.5	39.7	40.9
126	30.8	32.0	33.2	34.4	35.5	36.7	37.9	39.1	40.2
128	30.3	31.5	32.7	33.8	35.0	36.1	37.3	38.4	39.6
130	29.8	31.0	32.1	33.3	34.4	35.5	36.7	37.8	39.0
132	29.4	30.5	31.6	32.7	33.8	35.0	36.1	37.2	38.3
134	29.0	30.1	31.2	32.3	33.4	34.5	35.6	36.7	37.9
136	28.5	29.6	30.7	31.8	32.9	34.0	35.1	36.2	37.3
138	28.1	29.2	30.2	31.3	32.4	33.5	34.5	35.6	36.7
140	27.7	28.7	29.8	30.8	31.9	33.0	34.0	35.1	36.1
142	27.2	28.3	29.3	30.4	31.4	32.5	33.5	34.6	35.6
144	26.8	27.9	28.9	29.9	31.0	32.0	33.0	34.1	35.1
146	26.4	27.5	28.5	29.5	30.5	31.5	32.5	33.6	34.6
148	26.1	27.1	28.1	29.1	30.1	31.1	32.1	33.1	34.1
150	25.7	26.7	27.7	28.7	29.6	30.6	31.6	32.6	33.6
152	25.3	26.3	27.3	28.3	29.2	30.2	31.2	32.2	33.1
154	25.0	25.9	26.9	27.9	28.8	29.8	30.7	31.7	32.7
156	24.6	25.6	26.5	27.5	28.4	29.4	30.3	31.3	32.2
158	24.3	25.2	26.2	27.1	28.0	29.0	29.9	30.9	31.8
160	24.0	24.9	25.8	26.7	27.7	28.6	29.5	30.4	31.4
162	23.6	24.6	25.5	26.4	27.3	28.2	29.1	30.0	31.0
164	23.3	24.2	25.1	26.0	26.9	27.8	28.8	29.7	30.6
166	23.0	23.9	24.8	25.7	26.6	27.5	28.4	29.3	30.2
168	22.7	23.6	24.5	25.4	26.3	27.1	28.0	28.9	29.8
170	22.4	23.3	24.2	25.0	25.9	26.8	27.7	28.5	29.4
172	22.1	23.0	23.9	24.7	25.6	26.5	27.3	28.2	29.0
174	21.9	22.7	23.6	24.4	25.3	26.1	27.0	27.8	28.7
176	21.6	22.4	23.3	24.1	25.0	25.8	26.7	27.5	28.3
178	21.3	22.2	23.0	23.8	24.7	25.5	26.3	27.2	28.0
180	21.1	21.9	22.7	23.5	24.4	25.2	26.0	26.8	27.7
182	20.8	21.6	22.5	23.3	24.1	24.9	25.7	26.5	27.3
184	20.6	21.4	22.2	23.0	23.8	24.6	25.4	26.2	27.0
186	20.3	21.1	21.9	22.7	23.5	24.3	25.1	25.9	26.7
188	20.1	20.9	21.7	22.5	23.2	24.0	24.8	25.6	26.4
190	19.9	20.6	21.4	22.2	23.0	23.8	24.5	25.3	26.1
192	19.6	20.4	21.2	21.9	22.7	23.5	24.3	25.0	25.8
194	19.4	20.2	20.9	21.7	22.5	23.2	24.0	24.8	25.5
196	19.2	19.9	20.7	21.5	22.2	23.0	23.7	24.5	25.2
198	19.0	19.7	20.5	21.2	22.0	22.7	23.5	24.2	25.0
200	18.8	19.5	20.3	21.0	21.7	22.5	23.2	24.0	24.7

NOTE: A minus two second reaction time applied to each value.

Table 18.3. SKE Data. (Left Drift)

Left Drift	Element Leads	Right Wingman	Left Wingman
0	0	300R	300L
1	200R	300R	200L
2	400R	300R	100L
3	600R	200R	400R
4	800R	300R	600R
5	1000R	300R	700R
6	1300R	400R	800R
7	1500R	500R	1000R
8	1700R	600R	1100R
9	1900R	600R	1300R
10	2100R	700R	1400R
11	2300R	800R	1600R
12	2600R	800R	1700R
13	2800R	900R	1800R
14	3000R	1000R	2000R
15	3200R	1100R	2100R
16	3400R	1100R	2300R
17	3700R	1200R	2400R
18	3900R	1300R	2600R
19	4100R	1400R	2800R
20	4400R	1500R	2900R

NOTE: Section Lead will always set "0".

Table 18.4. SKE Data. (Right Drift)

Right Drift	Element Leads	Right Wingman	Left Wingman
0	0	300R	300L
1	200L	300L	200R
2	400L	300L	100R
3	600L	200L	400L
4	800L	300L	600L
5	1000L	300L	700L
6	1300L	400L	800L
7	1500L	500L	1000L
8	1700L	600L	1100L
9	1900L	600L	1300L
10	2100L	700L	1400L
11	2300L	800L	1600L
12	2600L	800L	1700L
13	2800L	900L	1800L
14	3000L	1000L	2000L
15	3200L	1100L	2100L
16	3400L	1100L	2300L
17	3700L	1200L	2400L
18	3900L	1300L	2600L
19	4100L	1400L	2800L
20	4400L	1500L	2900L

NOTE: Section Lead will always set "0".

Chapter 19

AIRDROP

Section 19A—General Procedures

19.1. General. This chapter describes C-141 weapon system employment during single-ship airdrop operations. However, these procedures will be used in conjunction with **Chapter 18** information when formation airdrop is flown. (Procedures in **Chapter 18** will take precedence when flying formation).

19.2. Identification of Airdrop Items.

19.2.1. The ground party may require identification for items that are not dropped or land off the DZ in unsecured areas. Identify supplies or equipment, when requested by the ground party, by the following class numbering system:

19.2.1.1. Class I - Subsistence.

19.2.1.2. Class II - Individual equipment.

19.2.1.3. Class III - POL.

19.2.1.4. Class IV - Construction materials.

19.2.1.5. Class V - Ammunition (include the type):

19.2.1.5.1. Type "A" - Small arms.

19.2.1.5.2. Type "B" - Mortars.

19.2.1.5.3. Type "C" - Artillery.

19.2.1.6. Class VI - Personal demand items.

19.2.1.7. Class VII - Major end items (vehicles, howitzers, etc.).

19.2.1.8. Class VIII - Medical supplies.

19.2.1.9. Class IX - Repair parts.

19.2.1.10. Class X - Non-military programs (i.e. agricultural supplies).

19.2.2. Airdrop loads may also be identified by the following internationally recognized color coding system for combined operations:

19.2.2.1. Red - Ammunition and weapons.

19.2.2.2. Blue - Fuel and lubricants.

19.2.2.3. Green - Rations and water.

19.2.2.4. Yellow - Communications equipment.

19.2.2.5. White (or Red Cross on white background) - Medical supplies.

19.2.2.6. Black and white stripes - Mail.

19.3. Airdrop Kits. These kits include sufficient equipment to satisfy load or mission requirements. Minimum contents of airdrop kits include cloth-backed pressure sensitive tape, masking tape and an assortment of required nylon, cotton cord and webbing.

19.4. Joint Airdrop Inspection. The DD Form 1748-2, **Airdrop Malfunction Report (Personnel-Cargo)** or DD Form 1748-3, **Monthly Airdrop Summary Report** will be accomplished prior to take-off (see AFJI 13-210 for specifics). The loadmaster will verify accuracy of cargo and troop documentation, accomplish the joint after-loading inspection, and reject loads not rigged IAW specific rigging manuals or inaccurate/unavailable weights.

NOTE: Equipment not rigged in accordance with 13C-series T.O.s or Joint Special Operations Command (JSOC) 350 series manuals require a waiver from HQ AMC/DOK.

19.5. Verification of Load Information. The navigator will verify the actual number/type of parachutes, load weight, sequence of extraction and position of loads in the aircraft. The drop altitude flown is based on the load/parachute requiring the highest drop altitude.

19.6. Marking Loads. For training missions (e.g. unilateral, exercise, or JA/ATT) the navigator will mark all equipment and standard airdrop training bundles with the aircraft call sign and date. If more than one load is dropped on the same pass, mark loads with order of exit from aircraft. Markings will be placed on the extracted end of the load, and also between the extraction parachute and attachment to the floor. (***EXCEPTION***: If more than one CDS bundle is dropped on the same pass, mark only the first container out).

19.7. Drop Zone Markings. Plan and coordinate drop zone markings IAW AFI 13-217.

19.8. Night Vision Goggles (NVG). NVGs may be used by certified airdrop aircrew members for en route navigation and visually acquiring the drop/landing zones. Unless otherwise trained crews will not attempt approaches, landings, and airdrops using NVGs. NVG cockpit lighting must be operational during NVG use.

WARNING: Only the navigator and the pilot not flying the aircraft will use NVGs en route.

CAUTION: Glare from the ambient cockpit diminishes NVG effectiveness; however, cockpit lighting will not be lowered so as to impair crew member use of instrumentation without NVGs.

19.9. Safety Equipment.

19.9.1. Personnel required to be mobile in the cargo compartment during low-level phases will wear protective headgear (except personnel performing water jumps). All other personnel will be seated with their seatbelt fastened. A properly fitted flight helmet will be worn with the chin strap fastened prior to receipt of the Combat Entry Checklist until completion of the Combat Exit checklist. Helmet visors will be lowered when working near an open exit.

19.9.2. Parachute/restraint harness will be worn from the pre-slowdown checklist until doors are closed. Loadmasters will wear a restraint harness when performing duties near an open door below 800 feet AGL. On airdrop missions with only one loadmaster, the scanner will don a helmet and parachute/restraint harness at the pre-slow-down checklist and monitor the safety of the loadmaster until paratroop doors are closed.

WARNING: During the aircrew briefing, the aircraft commander will brief the loadmaster(s) when the mission profile is to be below 800 feet AGL with door(s) open.

19.9.3. Restraint harness will be attached to a rail tiedown ring or to a pair of tiedown rings installed in the seat track with one ring on the yellow dot. For airdrops other than personnel, the attachment point will be at or forward of F.S.1313. For personnel airdrops, the attachment point will be that location that allows operation of the appropriate door.

WARNING: Except for an actual contingency, hung trooper, or emergency that threatens the survivability of the aircraft and crew, the restraint harness will not be disconnected or lengthened to a point that would allow the loadmaster to fall outside the aircraft.

NOTE: The restraint harness lifeline must have a usable length of 18.5 feet.

19.9.4. Static lines will be connected to the anchor cable before troop doors are opened.

EXCEPTION: Jumpers exiting on subsequent passes may stand and hook up with doors open if they are forward of F.S. 1200. Control of the troop door will not be given to the jumpmaster until all jumpers on that pass are hooked up.

19.10. Secure En route Communications Package (SECOMP). SECOMP is a dedicated secure communications system provided by and in support of the user while en route to the objective. Use of SEACOMP will cease at the discretion of the aircraft commander if it interferes with aircraft equipment or an aircraft emergency condition.

19.11. Airdrop Weather Minimums. For unilateral operations, IMC drop zone weather minimums are a 300 foot ceiling, 1/2 SM visibility. During joint operations, weather minimums are at the discretion of the user agency.

NOTE: Airdrops in heavy precipitation are not recommended.

Section 19B—Flight Procedures

19.12. General. The tactical or threat situation determines tactics needed for DZ ingress and egress. Crew coordination is essential to accurately position the aircraft over the release point. Plan IAW **Chapter 16** of this instruction.

19.13. Tactical Checklists.

19.13.1. Amplified tactical checklists are at the end of this chapter. The combat entry/exit checklist is an attachment to this instruction. The combat entry checklist will be accomplished prior to entering the tactical environment, the combat exit checklist is accomplished when leaving the tactical environment. These checklists are not re-accomplished while remaining in the environment.

19.13.2. During the aircraft commander's crew briefing, the pilot, navigator, and loadmaster will coordinate appropriate times for execution of all tactical checklists. The type of load and crew experience level will be considered in determining these times.

NOTE: Avoid the use of the word "GREEN" after the combat entry checklist and until completion of the post drop checklist. "GREEN LIGHT" must be seen or heard by the loadmaster for all drops. For person-

nel airdrops, the loadmaster will coordinate the visual green light requirement of the jumpmaster during the pilot, loadmaster, jumpmaster briefing.

19.13.3. The "TWENTY MINUTE", "TEN MINUTE", "ONE MINUTE", and "TEN SECOND" advisories are required for all personnel airdrops. Only the "ONE MINUTE" and "TEN SECOND" advisories are required for equipment and CDS airdrops.

NOTE: The navigator provides accurate time advisories regardless of the tactical checklist in progress.

19.13.4. The loadmaster will advise the pilot when an emergency condition exists in the cargo compartment, complete the required emergency checklist, and report completion of the malfunction checklist or status. Normal tactical checklists are resumed, if possible.

NOTE: Both loadmasters may be off headset while completing malfunction checklists.

19.14. En route.

19.14.1. The entire aircrew shares the responsibility for low level navigation and checkpoint identification.

NOTE 1: The radar altimeter will be on/set to 50 feet below the lowest planned altitude for low level flight.

NOTE 2: A completed airdrop information card will be provided by the engineer no later than the pre-slowdown checklist.

19.14.2. Time control to the objective area should be accomplished primarily by varying airspeed. This may also be accomplished by establishing orbits, flying alternate legs, cutting corners or extending legs.

19.14.3. For large formations, depart the IP on course, using a drift corrected heading to the CARP.

19.14.4. Slowdown (for formation procedures, see **Chapter 18**). The navigator calls for the slowdown at the appropriate time to ensure arrival at the TOT on time. In-flight changes to planned slowdown time or distance (for TOT, threats, etc.) must be coordinated with all crew members; however, it is essential to accomplish the slowdown early enough to ensure safe performance of the airdrop sequence. All TOT and major course adjustments should be made no later than 30 seconds before the actual drop.

WARNING: Extreme care must be exercised if spoilers are used in conjunction with personnel drops: sudden deceleration may lead to a no-drop situation.

19.14.4.1. Accomplish the slowdown maneuver by retarding all throttles to idle start and decelerating to 160 KCAS at the navigator's slowdown call. The pilot will state "FLAPS (state setting)", the copilot will set the flaps at the required setting and call for the slowdown checklist. Upon reaching 160 KCAS, climb/descend to drop altitude, continue decelerating to drop airspeed as appropriate. Drop altitude, drop airspeed, and deck angle should be established no later than thirty seconds prior to the actual TOT.

NOTE: Slowdowns performed during personnel drops will be executed so as to allow the jumpmaster access to paratroop door NLT 1 minute prior to TOT.

19.14.4.2. During drops conducted under Instrument Flight Rules, descent minimum IFR en route altitude (as specified for the airspace transiting) requires an operational Zone Marker (ZM) at the Drop Zone (DZ).

NOTE 1: An operational ZM at the DZ is indicated on the MFD by the appearance of the ZM symbol. To display the ZM at 20 NM, 16,000 foot rings must be selected on the MFD. The ZM symbol will remain at the top of the MFD until 10 NM, when it will begin tracking toward the bottom of the MFD.

NOTE 2: Descent below en route altitude will not be accomplished until inside DZ entry point. Minimum altitude will be no lower than 500 feet above the highest obstacle within 3 NM of course centerline, from DZ entry to DZ exit (based on FAR Exemption 4371C).

19.15. Drop Altitude. Drop altitudes will be planned IAW AFI 11-231 or ***NOTE*** 2 above, whichever is higher.

19.16. Drop Zone Communications.

19.16.1. Airdrop communication procedures should operate with minimum radio transmissions/calls and be made by exception or for safety of flight only.

19.16.1.1. Drop clearance in VFR is confirmed by observation of the briefed DZ markings. In IFR, radio transmission, ZM reception, radar beacon or other briefed electronic device is clearance to drop.

19.16.1.2. No-drop or mission cancellation is communicated by the absence of pre-briefed markings (visual or electronic), observation of the block letter "X", red smoke/flare, or by an authenticated radio transmission from the ground party.

19.16.1.3. Radio calls to determine load information, drop scores, and administrative details will not be made unless required for training, evaluation, or off DZ drops.

19.16.1.4. During joint airborne operations, the Army ground commander must be able to determine the number of personnel (alibis) who did not jump. When required, the aircraft commander or mission commander will only report the total number of alibis to the Drop Zone Support Team (DZST) or Special Tactics Team (STT) at the completion of the final pass over the DZ. If relay of this information conflicts with formation procedures or in any way jeopardizes safety, delay the report as necessary. This guidance is for peacetime exercises only and not intended for contingencies or when the OPORD, SPINS, etc., directs radio silence.

19.17. Navigation to the Release Point. Run-in sequence:

19.17.1. The navigator updates and briefs planned aircraft position for the Computed Air Release Point (CARP) and provides parameters to ensure the load impacts on the DZ. The pilot is responsible for maintaining desired track across the DZ.

19.17.2. Ten seconds prior to release, the navigator gives a preparatory "TEN SECOND ADVISORY" call. At five seconds prior to release, the navigator will begin counting for the drop by stating: “FIVE, FOUR, THREE, TWO, ONE.”

WARNING: If below minimum drop altitude, a no-drop will be called.

19.17.3. At the release point: The navigator states "GREEN LIGHT"; the pilot not flying the aircraft turns on the green light and simultaneously activates the chute release switch, if required. The navigator will call "RED LIGHT" at the end of the usable DZ. The loadmaster states "ALL CLEAR" or reports any delay or malfunction. For personnel drops, the loadmaster will advise the pilot of any paratroop delay immediately after the drop.

19.18. No-Drop Decisions.

19.18.1. Any crewmember observing a condition that could jeopardize an airdrop or safe extraction will notify the aircraft commander. After the one minute advisory, any crewmember observing a condition that could jeopardize a safe drop or extraction will call "NO-DROP" on interphone. The copilot and loadmaster will acknowledge the no-drop call. No airdrop will be accomplished on that pass.

NOTE: Checklist may still be in progress after the one minute advisory. A no-drop will be called if checklist items are not complete prior to the ten second advisory.

19.18.2. DZ Surface Conditions. For personnel airdrops where surface winds are unknown, the jumpmaster/Army airborne mission commander (if designated) will be advised when drop altitude winds exceed 30 knots. The decision to drop is at user discretion.

19.18.2.1. During joint training operations, the Drop Zone Control Officer (DZCO) will determine suitability of DZ surface conditions prior to TOT.

19.18.2.2. For Air Force unilateral jumps, the Air Force Special Tactics Team (STT).or Drop Zone Control Officer (DZCO), if CCT is unavailable, is responsible for determining surface conditions.

19.18.3. When a no-drop is called:

19.18.3.1. Personnel: complete the post drop checklist.

19.18.3.2. CDS/Equipment: Loadmaster accomplishes applicable malfunction checklist. This is followed by the applicable post drop checklist.

19.19. Drop Zone Escape Procedures. The escape maneuver begins at the "ALL CLEAR" or "RED LIGHT" call, whichever is later. The pilot not flying the aircraft initiates the post drop checklist. Climb/descend to en route altitude, turn to departure heading, and increase airspeed to 160 KIAS (Do not exceed 160 KIAS until all doors are closed).

19.20. Drop Zone Racetrack/Re-attack Procedures. Racetracks/re-attacks during peace time training missions are authorized for personnel airdrops only. If a racetrack/re-attack must be flown, accomplish appropriate checklists beginning with the post drop checklist and followed by the slowdown checklist in sequence. The one-minute advisory will not be compressed.

NOTE: The aircraft commander will ensure the loadmaster has adequate time to reconfigure for the next drop.

19.20.1. The crew must be briefed on racetrack/re-attack intentions prior to takeoff. Additionally:

19.20.1.1. Personnel dropped on subsequent passes after equipment drops (SOLL II and Boat Drop Crews only) or CDS, are dropped at personnel altitudes.

19.20.1.2. Fly racetracks/re-attacks at 160 KCAS with flaps remaining at drop setting, from "RED LIGHT" until wings level on the run-in for the next pass. When manually retrieving static lines (see paragraph **19.33.6.1.** ***NOTE***), the troop doors may be left open with spoiler doors and jump platforms extended, provided all troops aft of F.S. 1200 are hooked to anchor cables or seated with seatbelts fastened.

WARNING: Close troop doors prior to re-rigging static line retriever winch cables in-flight.

19.20.1.3. Retrieve static lines until they are inside the aircraft and forward of the air deflectors. On multiple passes the static lines will be manually pulled forward to allow jumpers to hook up.

CAUTION: During all troop drops, a loop of Type III nylon will be tied to the overhead litter strap bracket/ beam to catch the winch cable, preventing entanglement with troops. The retriever cable clips will be utilized in addition to the loops.

Section 19C—Methods of Aerial Delivery

19.21. General: AFI 11-231 shows computation methods in performing the following types of aerial delivery:

19.21.1. CARP/HARP: The CARP is a computation based on parachute ballistics and dead reckoning to determine the release point for low altitude airdrops. The HARP is for high altitude airdrops.

19.21.2. Methods of visual airdrop include: visual/sight angle, Ground Marked Release System (GMRS), Verbally Initiated Release System (VIRS) and jumpmaster directed.

19.21.3. IFR airdrop methods are: zone marker, radar beacon and Ground Radar Aerial Delivery System (GRADS).

19.22. Ground Marked Release System (GMRS). Supported ground forces are responsible for computing and placing the release point on the DZ. This airdrop is made abeam a flanker marker (see AFI 11-231). Aircrew procedures are the same as those employed during a standard drop. The navigator computes a CARP or sight angle position to project the approximate location of the release point and to facilitate line-up during the run-in.

NOTE: User assumes responsibility for drop accuracy.

19.23. Verbally Initiated Release System (VIRS):

19.23.1. During VIRS, ground personnel provide verbal steering guidance to aircraft and call the release when the aircraft arrives over a predetermined release point by using the following terminology:

NOTE: VIRS is performed by qualified CCT or Tactical Airlift Liaison Officer (TALO) only.

19.23.1.1. "TURN LEFT/RIGHT"-use a half standard rate turn unless otherwise specified.

19.23.1.2. "STOP TURN"-self explanatory.

19.23.1.3. "STANDBY"-indicates approximately ten seconds prior to the release.

19.23.1.4. "EXECUTE, EXECUTE, EXECUTE"-directs release of the load.

19.23.2. Upon hearing the term "STANDBY", the navigator states "TEN SECONDS" on interphone. On the first "EXECUTE", the navigator calls "GREEN LIGHT", and the copilot activates the green light switch and activates the ADS switch, as required.

19.23.3. The ground party maintains positive visual contact with the aircraft during the inbound approach.

NOTE: The ground party accepts responsibility for drop accuracy.

19.24. Jumpmaster-Directed Airdrop. JMD procedures are authorized only during Military Free Fall (MFF) operations and approved static line operations.

19.24.1. MAJCOM approved static line JMD drops for CCT, (including special tactics teams) para-rescue or special operations forces are limited to jumpmaster training. Conduct JMD static line training in preparation for insertion of a mobile training team requiring the use of allied aircraft without a navigator or computer/GPS CARP capability.

19.24.2. Army special forces require their headquarters' approval on a case-by-case basis for JMD procedures involving special high altitude static line jumps or for low altitude JMD static line training in preparation for a mobile training team requiring the use of allied aircraft without a navigator or computer/GPS with CARP capability.

19.24.3. In all cases, MAJCOM approval is required for all static line JMD operations. Units will receive approval notice through the mission tasking directive from HQ AMC TACC/XOOMJ (i.e., JA/ATT form 612R, tasking order, etc.). That jumpmaster procedures are authorized for that particular mission. This approval should be passed on to the aircrews via the unit AMT or FRAG order.

19.24.4. If JMD procedures are authorized, crews will compute release points to back up the computations and in-flight directions given by the jumpmaster. Crews will turn the green light on at one minute advisory signaling the jumpmaster to provide instructions to maneuver the aircraft to the release point. The jumpmaster then makes the final decision as to when jumpers will exit the aircraft. The aircrew will turn on the red light based on normal CARP parameters.

19.24.5. JMD drops will not be mixed with any other type of release method (i.e., GMRS, VIRS, or standard CARP drops). If JMD drop procedures are called for, the crew will follow the jumpmaster's instructions, consistent with normal operational safety considerations. Should the crew believe the drop will occur outside of safe parameters, they will call "No Drop" and ensure the red light is illuminated. The jumpmaster may call no drop within the 1-minute advisory. These drops are performed single ship, by qualified Army or Air Force jumpmasters (or trainees under the supervision of qualified personnel); however, procedures are further restricted to CCT/pararescue forces or Special Operations Forces (SOF) training only, in preparation for jumps from allied aircraft not equipped with navigator or computer/GPS CARP capabilities.

NOTE: These procedures for Army operations are intended for high altitude airdrops. The following conditions apply.

19.24.6. Personnel will not exit the aircraft until green light is illuminated.

19.24.7. Navigator calculates a CARP/HARP for each drop.

19.24.8. In-flight visual signals, verbal signals and interphone procedures between the jumpmaster, loadmaster, navigator, and pilot are coordinated prior to the drop.

19.24.8.1. After the slowdown check is completed, the loadmaster permits the jumpmaster to begin "spotting procedures". The jumpmaster visually relays steering signals to the loadmaster, who verbally relay these signals to the pilot. The jumpmaster may spot from the aircraft ramp or a paratroop door. At the “ONE MINUTE ADVISORY” call, based on the navigator's release point, the copilot turns on the "GREEN LIGHT" to indicate clearance for the jumpmaster to determine the exact exit point. When further exit of jumpers becomes unsafe (aircraft emergency or similar circumstances), the aircrew turns on the "RED LIGHT".

WARNING: The aircraft ramp and paratroop doors are not to be open simultaneously for spotting.

NOTE: The jumpmaster's parent service accepts responsibility for drop accuracy.

19.25. Zone Marker Airdrop: SKE equipped units are authorized to make INS/SKE/ZM drops provided: the ZM is physically located on the drop zone and compliance with the following procedures.

19.25.1. The navigator will verify the accuracy of each INS no later than 30 minutes prior to the drop. The navigator will select and control the most accurate INS for the drop.

NOTE: TACAN aided mode will not be used within 10 minutes of the drop. If TACAN updates have been accomplished, ensure Mode 5 is entered for a minimum of 30 seconds prior to entering airdrop mode (Mode 3) to clear the TACAN update process from the INS.

19.25.2. Prior to the Initial Point (IP), the INS not selected by the navigator will be placed into airdrop mode.

19.25.3. The pilot not flying the aircraft will verify entry into airdrop mode and proper display by comparing INSs and/or other NAVAIDS.

19.25.4. Descent below the minimum IFR en route altitude requires confirmation of aircraft position (on course and at or past the earliest descent point) and reception of a ZM.

NOTES:

An Operational ZM at the drop zone is indicated on the MFD by the appearance of the ZM symbol. To display the ZM at 20 NM, 16,000 ft rings must be selected on the MFD. The ZM symbol will remain at the top of the display until 10 NM, when it will then begin tracking toward the bottom of the MFD.

If reception of the ZM is not attained with sufficient time to allow for descent and stabilization for the drop in IMC, a “NO-DROP” will be called. (Aircrews may plan an IFR step down profile to obtain the lowest altitude possible on the run in to the drop zone). A visual drop may be accomplished if visual meteorological conditions exist at the DZ and the DZ point of impact is visible (If a descent in VMC conditions is elected, clearance from ATC or cancellation of IFR clearance is required).

Backup airdrop methods applicable to the mission must be thoroughly briefed during the mission pre-brief. If a backup method was not briefed or is not possible, a no drop will be called when the primary method is unreliable.

19.25.5. Prior to entering both INSs into airdrop mode, cross-check INSs for actual distance to go and crosstrack. After verification of a valid SKE mix (i.e. 45 seconds of INS/SKE/ZM mixing), the navigator enters the other INS into airdrop mode.

19.25.6. A valid mix is required to drop in IMC conditions.

NOTE: If the autopilot was coupled to the INS for the drop, uncouple the autopilot from the INS, assuming post-drop navigation, by the DZ exit point. Do not exit airdrop mode until at the minimum IFR en route altitude.

Section 19D—High Altitude Airdrop Procedures

19.26. General. High Altitude Low Opening (HALO) and High Altitude High Opening (HAHO) procedures are employed for drops above 3,000 feet AGL, 10,000 feet MSL respectively. For drops above 10,000 feet MSL, only essential personnel who have accomplished appropriate physiological training are permitted on mission aircraft.

19.27. Oxygen Requirements.

19.27.1. A continuous supply of one hundred percent oxygen will be used by all personnel during unpressurized operations above 10,000 feet MSL.

EXCEPTION: Jumpers may operate without supplemental oxygen during unpressurized flights up to 13,000 feet MSL provided time above 10,000 feet MSL does not exceed 30 minutes, each sortie. Jumpmasters may operate without supplemental oxygen for an additional 60 minutes within the 10,000 to 13,000 foot envelope, provided their duties during this period do not include jumping. A continuous supply of supplemental oxygen must be used in all instances for unpressurized flights above 13,000 feet MSL. When dropping from 18,000 feet MSL or higher, pre-breathing procedures will be used. Sufficient oxygen regulators must be provided for all personnel onboard. If the aircraft oxygen system will not provide adequate regulators, preflight and install an approved portable oxygen console(s) in the aircraft. The crew oxygen converter will be full for the first sortie and refilled as required for subsequent sorties.

19.27.2. For operations above 10,000 feet MSL, an MA-1 portable oxygen bottle will be provided for each person aboard the aircraft. (***EXCEPTION***: Jumpers are excluded).

19.27.3. All airdrops above 25,000 feet MSL require a waiver to AFI 11-202 Volume 3 for unpressurized flight, from HQ AFFSA/XO through HQ AMC/DOK.

19.27.4. Crews participating in high altitude airdrops will comply with the oxygen mask requirements in AMCI 11-301, *Aircrew Life Support Program*.

19.27.5. All personnel will prebreathe 100 percent oxygen at or below 10,000 feet MSL on any mission scheduled to drop at or above 18,000 feet MSL. Prebreathing will be completed before cabin altitude ascends through 10,000 feet. All personnel will remain on 100 percent oxygen until cabin altitude is below 10,000 feet. A break in pre-breathing requires the pre-breathing period to be restarted. When pre-breathing on the ground is required, a launch crew may assist the primary crew as needed. Plan pre-breathing start time based on the following chart:

NOTE: Quick-don oxygen masks are not approved for pre-breathing or for use during high altitude operations (at or above 18,000 feet).

Table 19.1. Uninterrupted Prebreathing and Exposure Limitation Times.

DROP ALT (MSL)	PREBREATHING TIME	EXP.TIME	SORTIES
	CREW/JUMPERS		
FL180 to/not including	30 min/30 min	2-hours	1
FL250			
FL250 to/not including	45 min/30 min HALO	1-hour	1
FL300	45 min/45 min HAHO		
FL300 to/not including	60 min/60 min	30 min	1
FL350			
FL350 or above	75 min/75 min	30 min	1

WARNING: No personnel will be exposed to 30,000 feet MSL or above more than three times each seven days and must have a minimum of 24-hours between exposures.

19.27.6. The jumpmaster may dictate the use of supplemental oxygen by any or all jumpers at altitudes less than those listed. Transfer from the aircraft oxygen system or portable oxygen console(s) to a personal system for deployment will be accomplished one minute prior to the "GREEN LIGHT".

19.27.7. Pressurization Scheduling. Maintain cabin pressure at or below 10,000 feet until the pre-slowdown checklist (time for check may have to be adjusted) and/or pre-breathing is complete. Depressurization will not exceed 3,000 feet per minute. Slower rates are recommended if time allows. Assure zero differential ten minutes prior to scheduled TOT.

19.28. Physiological Technician (PT) Requirements. PTs will provide high altitude airdrop mission support when requested by the mission FRAG, the aircrew, or the user. A minimum of two PTs will be on all airdrops conducted at 18,000 feet MSL or above. Additional PTs will be required when PTs need training, a waiver is granted to exceed exposure limitations, or if the number of jumpers exceeds 16. One PT is required per 16 jumpers, up to a maximum of 3 PTs.

NOTES:

The Command Coordinator Aerospace Physiology, HQ AMC/SGPT, 89th Medical Group, Andrews AFB MD (DSN 858-4654) may authorize variations to the PT-to-jumper ratio.

A security briefing for PTs may be required while supporting special, designated missions.

19.29. PT Duties. PTs will fly as crewmembers as stated on aeronautical orders. A PT will be on interphone at all times. Duty station in flight is as required to monitor crew, jumpers and oxygen equipment. The PTs will act as an advisor to the pilot, preflight, as practical, (aircraft and supplemental oxygen equipment), and advise/aid the loadmaster in positioning and securing oxygen equipment.

19.29.1. Prior to the first sortie, the PT will brief the aircrew and jumpers on physiological problems that may be encountered, the importance of proper pre-breathing, effects of wind blast and cold air exposed tissue, and any special requirements.

19.29.2. Additionally the PT will monitor personnel, aircraft, and supplemental oxygen/lift support equipment in flight. The AMC Coordinator, Aerospace Physiology, will provide the PT with a list of

equipment and supplies to be carried on board each flight, records to be kept, and the briefing to be given by the PT to the jumpers and aircrew.

NOTE: HQ USAF/SGPA (DSN 297-1858) and HQ AMC/SGPA (DSN 576-2303) will be notified by the most expeditious manner of any physiological incident.

19.30. Conduct of Operations. All HALO/HAHO operations will be conducted IAW the amplified checklist in this chapter. Maintain interphone contact between the cockpit and cargo compartment (pilot and loadmaster) from takeoff until completion of the post-drop checklist and the cabin altitude is below 10,000 feet. The flight engineer provides drop speed, minimum spoiler speed, shaker speed (30 degrees bank) MRT and flap retract speed.

19.30.1. Briefing requirements. In addition to the PT and pilot-jumpmaster briefing, the pilot will brief the jumpmaster on the pre-breathing start time, emergency descent procedures and time to descend to 10,000 feet, and the pressurization schedule. The pilot will also brief expected DZ markings, the HARP and prominent terrain and cultural features, and "GREEN LIGHT" duration.

19.30.2. DZ requirements and markings are determined by the user. However, drop zones must be established to ensure accurate navigation to the HARP. Positive visual or electronic (radar, TACAN, VOR/DME, ZM, etc.) identification of the HARP is required for high altitude drops.

19.30.3. There are no altitude wind restrictions for personnel HALO/HAHO operations. Surface wind restrictions are contained in AFI 13-217 and AFI 11-231.

19.30.4. Drop altitude is based on mission requirements, terrain features, weather conditions and threats.

19.30.5. Drop airspeed will be 1.3Vs for 75 percent flaps--130 KCAS minimum; 180 KCAS maximum.

CAUTION: 1.3 Vs for zero flaps must not exceed 200 KCAS/.48M.

19.30.6. Complete the slowdown and configure not later than three minutes prior to the scheduled drop time. Use 75 percent flaps.

19.30.7. Troop door exit: Paratroop doors open, deflectors and jump platforms extended.

19.30.8. Ramp exit: Pressure and petal doors open, ramp extended.

WARNING: No static line jumps will be made over the cargo ramp.

19.31. High Altitude Personnel Procedures. Drops may be performed using either HARP or jumpmaster-directed procedures.

19.31.1. At the pre-slowdown checklist, the navigator should provide updated winds and weather conditions to the jumpmaster. Notify the jumpmaster of any deviations from the brief, such as altitude, run-in track or release point. Depressurize the cabin to 10,000 feet so that jumpers can arm parachutes. Repressurization after the drop will be consistent with mission requirements. Normally, the cabin altitude should return below 10,000 feet as soon as practical.

CAUTION: Ensure any paratroopers remaining on board de-arm their chutes before cabin altitude descends below set activation altitude. Activation altitude will be coordinated between the pilot, loadmaster, and jumpmaster prior to takeoff.

19.31.2. Interphone and hand signals will be the primary methods of communication. The loadmaster will coordinate and use hand signals with the jumpmaster. Time warnings will be given to jumpmasters by the loadmasters pointing to their watch and indicating the correct warning with their fingers. Wind velocity on the DZ will be indicated by cupping one hand in front of the oxygen mask/mouth then indicating with upturned fingers the speed of the wind. Indicate a no-drop by passing the forefinger across the throat. Each loadmaster will carry pencil and paper to write out messages that cannot be understood with hand signals. Write out messages from the jumpmaster for relay to the pilot.

19.31.3. For jumpmaster-directed HALO drops, the green light may be turned on one minute prior to the release point. The navigator will provide a standard "GREEN LIGHT" call at the jointly agreed upon release point.

19.32. High Altitude CDS Procedures.

19.32.1. Confined Ballistic System (CBS). This consists of a standard A-22 container rigged with a 22 or 28 foot ring slot parachute or a G-12 cargo parachute. The drop altitude for CBS is determined by the specific burn time of the de-reefing device. Prior to takeoff, the aircraft commander determines the total number of CBS de-reefing devices installed on the loads. At the pre-slowdown checklist, the loadmaster arms the CBS devices by removing the safety pins and reports the number of pins pulled to the pilot.

Section 19E—Airdrop Load Procedures

19.33. Personnel Drops.

19.33.1. Low altitude personnel drops are accomplished from the paratroop doors; however, jumpers may follow their equipment out of the aircraft using the 90/270 maneuver airdrop procedures (CDS/personnel troop door exit checklist).

WARNING: Static line jumps will not be made over the ramp.

NOTE: If a troop door, air deflector or jump platform malfunctions, the door on the affected side will not be opened. Troops may be safely dropped from the operational side of the aircraft with the concurrence of the jumpmaster. If repairs cannot be accomplished, subsequent drop sorties are at the discretion of each jumpmaster.

19.33.2. Aircraft commander, navigator, loadmaster and jumpmaster will accomplish associated briefing prior to takeoff.

19.33.3. Jumpmaster/loadmaster paratroop door procedures are as follows:

19.33.3.1. The primary loadmaster allows the jumpmaster access to the paratroop doors no later than the "ONE MINUTE" advisory. The loadmasters then take a position so as to provide maximum maneuverability for jumpmasters and safety NCOs to perform their duties.

19.33.3.2. At "RED LIGHT", the primary loadmaster notifies the jumpmaster(s) or safety personnel of the red light condition which should halt the drop. If jumpers continue to exit the aircraft after "RED LIGHT," the loadmaster will take no further actions other than to count the number of jumpers that exited after "RED LIGHT."

WARNING: Do not attempt to physically stop or hinder jumpers from exiting the aircraft if jumpers continue to exit after "RED LIGHT".

19.33.3.3. Control of the paratroop door reverts to the loadmaster(s) after all jumpers have exited or remaining jumpers have been stopped by the jumpmaster or safety NCO and cleared from the paratroop door area.

NOTE: For racetracks, the loadmaster retains control of the paratroop doors until completing the next slowdown check.

19.33.4. For mass paratroop airdrops, use the following procedures:

19.33.4.1. Coordinate loadmaster/jumpmaster in-flight procedures during the pilot/navigator/loadmaster/jumpmaster briefing.

19.33.4.2. Troops in outboard seats will be dropped prior to troops in inboard seats. The jumpmaster gives the command for those personnel scheduled to be dropped on the upcoming pass to stand, raise and secure seats, and move aft. Ensure all static lines are connected to the appropriate anchor cable. If required additional seats may be raised using the above procedures.

19.33.5. Racetracks are authorized if directed by mission tasking or mutually agreed to by unit commanders. Procedures are contained at paragraph **19.20.**.

19.33.6. Static line retrieval:

19.33.6.1. Do not increase airspeed above 160 KCAS until all static lines are retrieved, jump platforms and air deflectors are stowed, and troop doors are closed. Retrieve static lines as soon as possible after the drop. The primary method of retrieval is the static line retriever winch. Use the cargo winch only as an emergency backup and do not preposition the cable. During training, if static lines cannot be retrieved, cut them over government property. During contingency operations, cut them immediately if they can't be retrieved.

NOTE: Manual static line retrieval may be used to retrieve no more than 10 static lines per door, per pass with one loadmaster, or up to 20 static lines per door, per pass with two people (combination of loadmasters, jumpmasters or safety personnel). Jump platforms may be left extended during manual retrieval of static-lines. However, if the retrieval winch is used, the jump platforms must be retracted.

19.34. Alternate Multiple Pass Procedures. The jumpmaster determines order of exit. The aircraft may then be divided into sections according to the required number of passes, for example, if three passes are to be made, jumpers may be divided into 3 sections: aft, center and forward. The aft section stands, raises their seats and jumps, outboard first, followed by inboard jumpers. On subsequent passes, the next section stands, and moves aft; depending on the number of jumpers, more seats may have to be raised. Remaining section(s) remain seated, standing only when it's their turn to jump. The loadmaster must ensure aircraft forward flight CG limits are not exceeded. If forward flight CG limits are exceeded, adjust fuel, number of jumpers or comply with preceding procedures. When using the ADP-2 configuration, sidewall and centerline seats forward of F.S. 438 (15 seats total) will be raised and secured and not be used for seating or cargo. When using alternate drop method on armor-equipped aircraft, sidewall seats forward of FS 486 and centerline seats forward of FS 498 will not be used. This configuration limits the total number of seats to 132, with 130 seats offered to the user.

19.35. Combination Drops. Combination drops occur when jumpers exit from the aircraft immediately after the extraction or gravity release of equipment. For loads not rigged with breakaway static lines, retrieve deployment bags prior to jumpers exiting over the ramp.

19.35.1. Restrictions. Aircraft drop altitude and airspeed are determined by the item (equipment/personnel) requiring the highest drop altitude and airspeed. Jumpers exiting over the ramp will free fall.

19.35.2. Procedures. The navigator computes a CDS or platform CARP and a personnel CARP (for ten seconds after the equipment release point) using the same airspeed and altitude. Inform the jumpmaster if the PI falls within 150 yards of the DZ boundary; the jumpmaster is the final approving authority in this situation.

19.36. 90/270 Maneuver Airdrop. These airdrops provide a method for personnel to follow an extracted or gravity release of equipment at low altitude. This maneuver consists of a 90 degree turn initiated after the airdrop load clears the ramp, followed by a 270 degree opposite direction turn that positions the aircraft over the original drop point, headed in the opposite direction. Although primarily developed for static line personnel airdrops following watercraft drops (boats rigged for heavy equipment and CRRC), the maneuver may also be used for free fall jumpers and CDS.

19.36.1. Restrictions:

19.36.1.1. Heavy equipment extractions are restricted to SOLL II and Boat Drop qualified crews, using EFTC extraction systems only.

19.36.1.2. Gravity release drops are restricted to CRRC, single stick CDS without CVR, or single stick CDS from the right side when employed with CVR. Drops may be accomplished by any CDS qualified crew. When performing the 90/270 maneuver, loadmasters may choose to utilize the static line retriever winch control pendant. This will be coordinated with the aircraft commander and crew during the aircraft commander's crew briefing.

19.36.1.3. Single-ship operations only.

19.36.1.4. Drop altitude is determined by the item (personnel or equipment) requiring the highest drop altitude.

19.36.2. Procedures. While approaching the drop zone, the aircraft is configured as required for the drop. At the pre-slowdown call, the jumpers stand up and hook up to the left anchor cable forward of the equipment. The equipment is extracted or released on the "GREEN LIGHT" call. Upon hearing "ALL CLEAR," the copilot turns the red light on. Simultaneously:

19.36.2.1. The pilot turns 90 degrees.

19.36.2.2. The loadmaster retrieves the deployment bags, closes the ramp and petal doors, and then prepares the left troop door for personnel drop. The jumpmaster then moves the jumpers to the troop door.

19.36.2.3. The pilot then performs a 270 degree opposite direction turn to reposition the aircraft over the DZ. A second "GREEN LIGHT" indicates to the jumpmaster clearance to drop.

19.36.2.4. Jumpers exit the aircraft on jumpmaster command. The initial pass should be made downwind if operational constraints allow; however, if the initial pass is made into a headwind, the 90 degree turn should be delayed one second for each knot of headwind to ensure the turn back

to the target area provides time to configure the troop door and acquire the DZ. The time from load exit to paratroop exit is two to three minutes, depending on the type of equipment dropped.

19.37. Door Bundles.

19.37.1. A-7 or A-21 containers weighing up to 500 pounds (excluding the weight of the parachute) are referred to as door bundles and will be dropped from the aircraft through the paratroop door using the personnel airdrop checklist. Door bundles may be dropped independently or in conjunction with personnel; bundle airdrops are limited to one bundle per paratroop door used. When dropped with personnel, the bundle will be the first object to exit the aircraft. Remove restraints and position the bundle in the paratroop door prior to completion of the slowdown checklist. ***EXCEPTION***: If the jumpmaster needs the paratroop door for spotting, place the door bundle as close as possible to the paratroop door. If jumpers are to follow the door bundle, the user is responsible for ejecting the bundle out of the troop door(s).

19.37.2. During unilateral training, no door bundle will exit an aircraft after a paratrooper has jumped.

19.37.3. During joint training, contingency or emergency operations, the using agency determines the requirement to airdrop door bundles from any or all aircraft.

19.37.4. When door bundles are dropped with personnel, compute the CARP for the first paratrooper exiting after the bundle and an additional CARP for the door bundle to ensure that it will impact within DZ boundaries. Release the bundle at the personnel CARP, followed by the jumpers when the door is clear.

19.37.5. Restrictions. The maximum weight for a door bundle is 500 pounds, excluding the weight of the parachute. However, if the load weighs more than 350 pounds, three trained and designated pushers must be present to eject or assist in ejecting the load from the aircraft. The dimensions, including the parachute, must not exceed 48 by 30 by 66 inches unless specified in specific rigging manual. The largest dimension will be placed in the upright position. Door loads must not be rigged with breakaway static lines. When containers are being dropped, the aircraft must be configured for personnel.

19.38. Equipment Drops.

19.38.1. Only equipment rigged in accordance with 13-C series T.O.s or JSOC 350 series may be airdropped. Aircraft are limited to a maximum of 38,500 pounds for a single platform. For contingency (wartime) operations, maximum platform weight may be increased to 42,000 pounds (requires MAJCOM/DO approval).

19.38.2. For unit load weights of more than 25,000 pounds:

19.38.2.1. Install the ramp end cover (alternate mission kit No 11) using the fittings at BL 40 left and right.

NOTE: The ramp end cover (alternate mission kit No.11) cannot be installed until the pressure door is open for airdrop.

19.38.2.2. Install the two skid blocks (alternate mission kit No 12) using the four fittings supplied with the kit. Install skid blocks at BL20 left and right with wide ends of blocks aft.

19.38.2.3. For sequential platform drops of platforms weighing less than 25,000 pounds each, the ramp end cover or three layers of pressure sensitive cloth backed tape BL40 left and right will be used.

19.39. Container Delivery System (CDS). CDS is designed to airdrop 40 or less individual A-22 containers at low velocity, high velocity or high altitude low opening (HALO), and double A-22 containers at low velocity. The system can be rigged for single or multiple container airdrops. The weight of each container will be IAW TO 13 C7-1-11/FM 10-501.

NOTE: If any cargo is onboard tie a loop of Type III nylon (no more than three locations)to the overhead letter strap brackets/beams to prevent entanglement of retriever cable with cargo. Ensure these loops do not interfere with winch IN and OUT operations.

19.39.1. The Centerline Vertical Restraint (CVR) system allows drops of up to 20 containers on 48 by 48-inch skid boards or 18 containers on 53 1/2 by 48-inch skid boards from each side of the aircraft. Containers may be rigged and airdropped singularly or in any combination of up to 20/18 from either side or in any even number combination up to 40/36 from both sides in a single pass. Also, double A-22 containers may be dropped using a 48 inch wide by 96 inch long skid board from either side of the aircraft.

19.39.2. Without the CVR system, up to six containers can be rigged for low velocity airdrop in a single or double-stick configuration on a single pass. For high velocity and HALO-CDS, up to twenty containers can be airdropped in a single-stick, or up to 40 containers (any even number) may be dropped in a double stick on a single pass (skid boards must be 53 1/2 inches wide for double stick) When dropping Double A-22 containers in a double stick, skid board must be 53 1/2 inches wide.

19.39.3. Standard Parachute Configurations.

19.39.3.1. Low Velocity - G-12, G-13, or G-14 parachutes.

19.39.3.2. High Velocity - 22 foot or 26 foot ring slot parachute rigged for breakaway.

19.39.4. The CVR provides all necessary vertical and lateral restraint if the container is secured to the skid board for 2 "Gs." Tiedown straps must be placed over the containers for vertical restraint if the CVR is not used or if the container is not secured to the skid board for 2 "Gs."

19.39.5. Final aft restraint is provided by the Type XXVI release gate(s). The number of plies of release gate(s) and supplemental aft restraint, if required, is based on the combined rigged weight of the container to be dropped on a single pass, IAW TO 1C-141B-9.

NOTE: Refer to section VII, TO 1C-141B-9 for number of plies required.

19.39.6. Normal Procedures:

19.39.6.1. As the aircraft slows below 200 KCAS, set the wing flaps to computed drop setting (based on a 5 degree deck angle) and continue deceleration to 160 KCAS. The pilot may use more flaps than the computed setting to modify the slowdown. Ensure proper flaps are set prior to the drop. Climb or descend to drop altitude when clear of obstacles and slow to 150 KCAS.

CAUTION: As the flaps are lowered, smoothly add power to maintain 150 KCAS. Abrupt power inputs may cause load to shift.

19.39.6.2. At "GREEN LIGHT," the loadmaster actuates the static line retriever winch to the retract position and holds the control switch to "RETRACT" until the knife is visible and the load is rolling. Simultaneously, the pilot smoothly adds a small amount of power (approximately 0.1 EPR).

NOTE: Higher density altitudes may require slightly more power to provide a slight impetus to the load.

CAUTION: During load exit, avoid aircraft turns. Failure to maintain wings level may cause improper exit of bundles, jamming of bundles and/or damage to the aft end of the aircraft.

WARNING: With the CVR, loadmasters will not position themselves in the direct line of travel of the retriever cable and guillotine knife (knives) to preclude being struck in the event of recoil at the gate release on CDS drops.

CAUTION: The aircraft may pitch up as the load exits the aircraft. Anticipate pitch and counter without overreacting to prevent excessive nose-up attitudes. Do not apply negative "G" forces while the load is exiting the aircraft. It is normal for the aircraft to climb a small amount (up to 100 feet) during a CDS drop.

CAUTION: Do not use altitude hold mode on the autopilot.

19.39.6.3. At loadmaster's "ALL CLEAR" or "RED LIGHT," whichever is later, the pilot accelerates to 160 KCAS and continues normal acceleration/escape procedures.

19.40. Combat Rubber Raiding Craft (CRRC):

19.40.1. The CRRC is normally employed for a variety of missions: unconventional warfare, special warfare and amphibious operations. For the first pass, the aircraft is configured for a CDS drop while the second pass is configured for personnel. CRRCs are rigged IAW FM 10-542/TO 13 C7-51-21 on a special operations expendable platform. Static line parachutist may be airdropped on a second pass out the left paratroop door after retrieving the T-10 deployment bags and closing the ramp and petal doors. The second pass is not required if all jumpers use ramp exit, free fall method.

WARNING: Jumpers will not exit until the CRRC(s) has cleared the aircraft and T-10 deployment bag(s) has been retrieved.

NOTE: A 5000 pound strap will be installed around the forward edge of the forward platform to serve as a restraint barrier in lieu of the buffer stop assembly or alternate chain gate system.

Table 19.2. Wind/Sea State Limitation.

Wind/Sea State	Personnel	Cargo
Surface Wind	17kts	17kts
Sea State	3-ft High Chop 4-ft High Swell	No Restriction

NOTE: If DZ support is not available for reception, sea state will be determined by the jumpmaster.

19.40.2. Normal Procedures. The jump-pilot checklist will be used for all CRRC airdrops.

NOTE: When dropping CRRCs only, or CRRCs followed by non-static line jumpers, the left troop door is not required to be rigged for paratroop airdrop nor is the 90/270 maneuver required.

19.41. Free Fall Delivery System. Depending on user desires, certain supplies, equipment containers, or weapons can be airdropped without parachutes. The pallet, skid boards or containers used will depend on the load composition. Normally, skid boards are rigged for standard CDS delivery with the exception that parachutes are not used. Loads that do not exceed door bundle dimensions may be dropped from the troop doors provided air deflector(s) and jump platform(s) are installed. Drop altitude is determined by terrain, wind, load being dropped and tactical situation. Use normal CDS airdrop checklists and emergency procedures for ramp and door airdrops and personnel airdrop checklist for door bundles.

19.42. Standard Airdrop Training Bundle (SATB).

19.42.1. The 15-pound SATB may be dropped to simulate personnel or heavy equipment. Operate SATB missions at the altitude and airspeed specified for the drop being simulated. SATBs will be assembled and identification tag attached IAW TO 13 C7-1-11, Chapter 17. SATBs will be rigged with breakaway static lines. Specific rigging and inspection procedures are contained in **Chapter 13**.

19.42.2. Anchor cables are not required when simulating personnel or equipment drops. Jump platforms are not required when simulating personnel drops.

Section 19F—Emergency Procedures

19.43. General. If a malfunction occurs, the loadmaster notifies the pilot and immediately takes the appropriate action. All crewmembers should review the applicable emergency procedures for the airdrop to be performed prior to takeoff. Detailed emergency briefings will be conducted between the loadmasters prior to initiation of the combat entry checklist.

19.44. Emergency Airborne Bail Out Procedures.

19.44.1. Acceptable Conditions. If an aircraft emergency occurs and jumpers are standing, hooked to the anchor cable (and conditions permit) then:

19.44.1.1. Maintain a minimum of 400 feet AGL to allow jumpers to evacuate the aircraft. If the jump must be made in excess of 150 KCAS, advise the jumpmaster of both airspeed and altitude.

19.44.1.2. Evacuate the aircraft by giving the signal for bail out.

NOTE: If the aircraft commander determines there is enough time to get jumpers standing and hooked up, this also constitutes acceptable conditions.

19.44.2. Unacceptable Conditions. If conditions are not acceptable for aircraft evacuation and/or the drop is aborted for other reasons then:

19.44.2.1. Turn on the red light until the exit door(s) is closed.

19.44.2.2. The pilot advises the loadmaster, who in turn advises the jumpmaster to have jumpers unhook, take seats and strap in.

19.45. Fouled/Towed Parachutist.

19.45.1. The jumpmaster will stop remaining jumpers from exiting the aircraft and the loadmaster notifies the pilot of a towed parachutist.

19.45.2. The copilot turns on the red light which is confirmed by the pilot.

WARNING: When towing a jumper, avoid any unnecessary turns. If a turn is necessary, ensure it is coordinated and use a shallow bank angle (approximately 10 degrees). Turning into or away from the jumper does not matter providing the turn is coordinated. Maintain at least the minimum drop altitude (AGL) for the type parachute being used. Avoid flying over/upwind of water or build-up areas. Do not exceed 135 KCAS.

19.45.3. The loadmaster allows the jumpmaster access to the door to identify how the jumper is being towed. If towed by anything other than the static line, the jumpmaster will attempt to free the parachutist. If all jumpers have exited the aircraft and there is no safety on board, this responsibility rests with the loadmaster. The jumper will indicate consciousness and a ready reserve chute by staying in a tight body position, keeping both hands on the reserve chute. This indicates the jumper is prepared to be cut away. The loadmaster relays this to the pilot, who makes the actual decision. On the pilot's command, the loadmaster cuts the jumper's static line. Priority is to retrieve the jumper versus cutting static lines.

19.45.4. If the jumper is to be retrieved, the loadmaster installs the retrieval bar, retracts the jump platform(s) and initiates retrieval while ensuring personnel stay clear of the door and static line retrieval cable. When the jumper has been retrieved to the door, the jumpmaster and safety (or both loadmasters when jumpmaster or safety are not on board) gain physical control of the jumper. The loadmaster relives tension from the static line retriever so that the jumper can be brought inside the aircraft.

WARNING: During retrieval, do not allow the jumper to slip back into the air stream.

19.46. 90/270 Maneuver Emergency Procedures. In the event of a malfunction, follow the appropriate emergency checklist (equipment/CDS/towed jumpers).

19.47. Heavy Equipment.

19.47.1. When notified of a malfunction, the pilot maintains drop airspeed and altitude, avoids populated areas, and also avoids yawing the aircraft until the load is restrained. These emergency procedures apply to the platform(s) being dropped on that pass and do not pertain to the whole load, i.e., when the emergency procedure requires restraint devices on the forward platform, it means the forward platform being dropped on that pass. Do not consider platforms aboard the aircraft for subsequent drops in the primary emergency action unless they are a cause of the emergency.

WARNING: Emergency aft restraint will be applied IAW TO 1C-141B-9, section VII. If extraction force is applied to the load, connect emergency restraint to the load. If extraction force is applied to the platform, connect restraint to the platform. Apply required restraint simultaneously.

WARNING: Do not proceed aft of the load until it is secured (chains and devices will be tight).

19.47.2. When any of the following occur, the Equipment Malfunction Checklist will be completed (Annex B):

19.47.2.1. LOOSE PLATFORM - A loose platform occurs when the right detents release the platform prior to "GREEN LIGHT." If this condition exists, call a no-drop and complete the Equipment Malfunction Checklist. Do not attempt further airdrops.

19.47.2.2. NO-DROP - If a no-drop is called after completing the slowdown checklist, complete the platform emergency procedures checklist. Further drops may be attempted, but appropriate

checklist items must be re-accomplished (operate the left-hand remote control handle until the indicator is set at least one number lower than the lock selected for the next platform to be unlocked).

19.47.2.3. EXTRACTION PARACHUTE HOLDER FAILS TO RELEASE - If the parachute fails to release electrically, use the manual release. If the manual release fails, complete the equipment malfunction checklist and do not attempt further drops.

19.47.2.4. EXTRACTION PARACHUTE FALLS ON THE RAMP - If the extraction parachute falls on the ramp, complete the equipment malfunction checklist. Further drops may be attempted only if the cause of the malfunction can be isolated and corrected.

19.47.2.5. PENDULUM LINE FAILS TO RELEASE - If the pendulum line fails to release, complete the equipment malfunction checklist. Further drops will not be attempted.

19.47.2.6. EXTRACTION PARACHUTE FAILS TO RELEASE THE LOAD:

19.47.2.6.1. If on a single platform, actuate the right rail emergency release. If the platform still does not release, complete the equipment malfunction checklist and do not attempt further drops.

19.47.2.6.2. If on a sequential drop, complete the Equipment Malfunction Checklist.

CAUTION: Do not actuate the right rail emergency release.

NOTE: If the extraction parachute fails to extract the last platform of a sequential drop, use emergency procedures specified above. Do not attempt further drops.

19.48. CDS Emergency Procedures. If the load does not move or fails to exit, the loadmaster announces "MALFUNCTION." When dropping a double stick from CVR and one gate fails to cut, the loadmaster delays notifying the pilot of a malfunction until the containers of the released stick have exited the aircraft. If the containers of the released stick fail to exit, notify the pilot immediately. The pilot directs the copilot to place the flaps to 75 percent position and maintains level flight. When the aircraft is stabilized, the pilot clears the loadmaster to secure the load. When aft restraint is in place, the doors are then closed.

19.49. Combat Rubber Raiding Craft (CRRC) Emergency Procedures. In the event of a malfunction, follow the appropriate emergency procedure for the type airdrop under which the emergency occurred (CDS for CRRC malfunctions and towed jumper for personnel malfunctions).

19.50. SATB Emergency Procedures.

19.50.1. SATB (Personnel). If the SATB fails to separate form the static line after deployment outside the aircraft:

19.50.1.1. Loadmaster cuts the static line on the pilot's command.

19.50.1.2. Notify pilot when malfunction checklist is completed.

19.50.2. SATB (Equipment):

19.50.2.1. If the extraction parachute holder fails to release SATB electrically and manually. The loadmaster:

19.50.2.1.1. Returns extraction parachute manual control handle to "Safe."

19.50.2.1.2. Returns ADS arming switch to "De-ARM."

19.50.2.1.3. Notifies the pilot that the malfunction checklist is complete.

NOTE: Further drops may be attempted if the cause of the malfunction is isolated and corrected.

19.50.2.2. SATB falls on the ramp. Loadmaster retrieves bundle and notifies the pilot that the malfunction checklist is complete.

NOTE: Further drops may be attempted if the cause of the malfunction is isolated and corrected.

19.50.2.3. SATB towed or hung:

19.50.2.3.1. The loadmaster cuts the static line on the pilot's command. Do not attempt to retrieve the STAB.

19.50.2.3.2. Loadmaster will advise the pilot when the malfunction checklist is completed.

NOTE: Further drops may be attempted if cause of malfunction can be isolated and corrected.

19.51. High Altitude Emergency Procedures.

19.51.1. If a physiological incident occurs, the aircraft commander will:

19.51.1.1. Abort the mission.

19.51.1.2. Begin descent (pressurization and descent are determined by the type and degree of sickness or pain.

19.51.1.3. Ensure the affected person remains on 100 percent oxygen until a medical doctor determines the required treatment.

19.51.1.4. Proceed to the nearest base with qualified medical assistance available.

19.51.1.5. Advise the control tower of the emergency and request an ambulance to meet the aircraft.

19.51.1.6. Advise medical attendant to notify Brooks AFB Hyperbaric medicine (DSN 240-3281/3278, commercial 512-536-3281/3278).

19.51.2. Parachute/Safety Harness. Crewmembers engaged in airdrop activity will wear parachutes or restraining harnesses in the cargo compartment any time the doors are open. Safety harnesses will be worn on airdrops conducted above 14,000 feet MSL ***(EXCEPTION***: PTs may wear a parachute on drops above 14,000 feet MSL).

Section 19G—AirdropChecklist

19.52. Airdrop Crewmember Amplified Checklist.

19.52.1. Prior to initiating the Pre-slowdown checklist, the flight engineer will provide pilots with a completed MAJCOM approved airdrop form. The flight engineer reads all checklists, reading applicable items for type drop performed.

19.52.2. The Combat Entry/Exit Checklist is included in this instruction, and is performed for all tactical missions, prior to initiating the Pre-slowdown Checklist.

NOTE: Navigator calls all time advisories at the appropriate time, regardless of the checklist being run. Loadmaster will advise the jumpmaster at the twenty, ten, one minute and ten second advisories on the navigator's call.

19.53. Amplified Personnel Checklist - Personnel Pre-Slowdown Checklist.

19.53.1. Complete the checklist at **Table 19.3.**. prior to slowdown. The navigator will initiate the checklist by stating "PRE-SLOWDOWN CHECKLIST". Coordination between the pilot, navigator and loadmaster will determine the time required to prepare the load for airdrop and the initiation time of the pre-slowdown checklist by the navigator.

19.54. Personnel Slowdown Checklist.

19.54.1. The pilot not flying (PNF) the aircraft will initiate the checklist at **Table 19.4.** after flaps have been extended during the slowdown maneuver, by stating "SLOWDOWN CHECKLIST." For formation SKE drops, each navigator will compute estimated drift and ground speed prior to calling for the Slowdown maneuver. The SKE secondary control panel will be set (if required) after the navigator calls slowdown.

19.55. Personnel One Minute Advisory Checklist.

19.55.1. Complete the checklist at **Table 19.4.** one minute prior to "GREEN LIGHT." The navigator will announce "CREW, ONE MINUTE ADVISORY." ***NOTE:*** The advisory will be given on time.

Table 19.3. Personnel Pre-Slowdown Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E)	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E)	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E)
		2. Depressurization - COMPLETED	2. Chem Light(s) - ON (For night drops only, as required).
1. Air Deflectors - "ARMED" (P)		3. Air Deflectors - "ARMED" (P)	3. Parachutes/Safety Harness/ Seat Belts - ON/FASTENED
2. Air Delivery Switch - "ZM" (P)(SKE drops only)		4. Air Delivery Switch - "ZM" (P)(SKE drops only)	***WARNING***
3. Altimeter -"STATE SETTING" (CP, P, N, E)	2. Altimeter -"STATE SETTING" (CP, P, N, E)	5. Number Three Hydraulic System - ON	Ensure all personnel in the cargo compartment don parachute/safety harness/ seatbelts as applicable (and flotation gear, if required). Below 800 feet AGL, safety harnesses will be worn.
NOTE: Pilot not flying the aircraft should crosscheck pressure and radar altimeters to ensure best data is flown.		6. Altimeter - "STATE SETTING" (CP, P, N, E)	4. Jump Platform Lights - ON (Night only)
4. Red Light - "ON"(CP)		7. Red Light - "ON" (CP)	5. Red Light - "ON" (CP)
5. Command Markers - "SET" (CP, P)		8. Command Markers - "SET" (CP, P)	
		9. Pre-Slowdown Checklist - "COMPLETED" (LM, E)	6. Pre-Slowdown Checklist - "COMPLETED" (LM, E)

Table 19.4. Personnel Slowdown Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "SLOWDOWN CHECK-LIST" (CP) - "ACKNOWL-EDGED (LM) 2. Paratroop Door(s) - "CLEARED TO OPEN" (P) ***NOTE*:** Aircraft commander must ensure aircraft is at least 800 feet AGL prior to clearing loadmaster(s) to open the paratroop doors if the load-master is wearing a parachute.	1. SKE Secondary Control Panel (SKE only)- "SET" (N) ***NOTE*:** For formation drops, lead navigator will send updated drift and altimeter information after slowdown is complete and established on run-in altitude and airspeed.	1. "SLOWDOWN CHECKLIST" (CP) - "ACKNOWLEDGED (LM) 2. Floor Heat & Air Condit-ion-ing Master Switches - OFF 3. Paratroop Door(s) - "CLEARED TO OPEN" (P) 4. SKE Secondary Control Panel (SKE only) - "SET" (N) 5. Floor Heat & Air Conditioning Master Switches - As Required ***NOTE*:** Heating and Air Condi-tioning as required for environ-mental control. 6. Slowdown Checklist -"COM-PLETED" (LM, E)	1. "SLOWDOWN CHECKLIST" (CP) - "ACKNOWLEDGED" (LM) 2. Troop Door By-Pass Switches - NORMAL 3. Helmet Visor - Down 4. Jump Platform(s) - Secured 5. Paratroop Door(s) - CLEARED TO OPEN (P) OPEN AND LOCKED ***WARNING*** Door(s) will not be opened until directed to do so by the pilot. Ensure static lines are attached to the anchor cables before doors are opened (***EXCEPTION***: See 19.9.4.). 6. Air Deflector(s)-EXTENDED ***NOTE*:** If air deflectors fail to extend after pressing extend switch, ensure that the troop door(s) are fully opened and then actuate the by-pass switch (left or right, as required). If air deflectors fail to extend electrically, manual extension may be accomplished (see Air Deflector Extension Check-list). 7. Jump Platform(s) - LOCKED IN PLACE 8. Slowdown Checklist - "COMPLETED" (LM, E)

Table 19.5. Personnel One Minute Advisory.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "CREW, ONE MINUTE ADVISORY" (N)		1. "CREW, ONE MINUTE ADVISORY" (N) -"ACKNOWLEDGED"-(LM) 2. Jumpmaster-Advised. ***NOTE*:** Cleared exits will be turned over to the jumpmaster as soon as possible but, no later than the one minute advisory.

CAUTION: If, after the one minute advisory, conditions exist that could result in an unsatisfactory drop, a “no-drop” will be called.

19.56. Personnel CARP Checklist.

19.56.1. Navigator initiates the CARP checklist at **Table 19.6.**. by stating, "TEN SECOND ADVISORY", followed by a five second countdown to "GREEN LIGHT" at the release point. "GREEN LIGHT" must be seen (visually) or heard (verbally) for the drop.

19.57. Personnel Post Drop Checklist.

19.57.1. After completion of the airdrop, the pilot not flying the aircraft initiates the post drop checklist by stating, "POST DROP CHECK." The Post Drop checklist will be followed by the Slowdown checklist for racetracks.

NOTE: If racetracks are planned, asterisk (*) items will be re-accomplished.

19.58. Amplified Heavy Equipment - Pre-Slowdown Checklist.

19.58.1. Complete the checklist at **Table 19.8.** prior to slowdown. The navigator will initiate the checklist by stating, "PRE-SLOWDOWN CHECKLIST." Coordination between the pilot, navigator and loadmaster will determine the time required to prepare the load for airdrop and the initiation of the pre-slowdown checklist.

19.59. Heavy Equipment Slowdown Checklist.

19.59.1. The pilot not flying (PNF) the aircraft will initiated and use the checklist at **Table 19.9.**, after flaps have been extended during the slow down maneuver, by stating "SLOWDOWN CHECKLIST. For formation SKE drops, each navigator will compute estimated drift and ground speed prior to calling for the Slowdown maneuver. The SKE secondary control panel will be set after the navigator calls slowdown.

19.60. Heavy Equipment One Minute Advisory Checklist.

19.60.1. Use the checklist at **Table 19.10.** for heavy equipment One minute Advisory. One minute prior to drop time, the navigator announces "CREW, ONE MINUTE ADVISORY". Advisory will be given on time.

Table 19.6. Personnel CARP Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "TEN SECOND ADVISORY" (N) ***NOTE*:** For SKE only, the element lead navigator sends an FCI "Down Prep" at five seconds prior to the drop.		1 "TEN SECOND ADVISORY" (N) Jumpmaster Advised
1. "GREEN LIGHT" (N) Green Light Switch - ON (CP) - "ALL CLEAR" or "MALFUNCTION" (LM)	2. "GREEN LIGHT" (N) Green Light Switch - ON (CP) - "ALL CLEAR" or "MALFUNCTION" (LM) ***NOTE*:** The element lead navigator depresses the FCI "Execute" at INS drop time. This is not required for single-ship SKE.		2. "GREEN LIGHT" (N) (CP) - "ALL CLEAR" or "MALFUNCTION" (LM)
2. "RED LIGHT" (N) Green Light Switch - OFF (CP) 3. “RED LIGHT IS ON” (CP)	Navigator will state "RED LIGHT" at end of usable DZ. 3. "RED LIGHT" (N) Green Light Switch - OFF (CP) 4. “RED LIGHT IS ON” (CP)		3. Jumpmaster/Safety - **WARNED** (Upon seeing or hearing **RED LIGHT**)

Table 19.7. Personnel Post Drop Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1.* "POST DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM, E)		1.* "POST DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM, E)	1.* "POST DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM, E)
			2.* Jump Platform(s) - AS REQUIRED
			3. *Static Lines - RETRIEVED
			4. *Air Deflector(s) - AS REQUIRED ***NOTE*:** If air deflectors fail to retract electrically, manual retraction may be accomplished (see Air Deflector Retraction Checklist).
		2. *Floor Heat & Air Conditioning Master Switches - OFF	
		3. *Paratroop Doors - "AS REQUIRED" (LM)	5.* Paratroop Door(s) - " AS REQUIRED" (LM)
		4.*Floor Heat & Air Conditioning Master Switches - AS REQUIRED ***NOTE*:** Heating and Air Conditioning as required for environmental control.	6. * Troop Door by-pass switches - NORMAL
		5. SKE Secondary Control Panel (SKE only) - "SET" (N)	7.* Static Line Retriever Cables - CHECKED/ SECURED
2. Air Delivery Switch - "OFF" (P) (SKE only) ***NOTE*:** Formation aircraft will be at minimum IFR altitude prior to placing Aerial Delivery Switch to OFF.	1. SKE Secondary Control Panel (SKE only) "SET" (N)	6. Air Delivery Switch - "OFF" (P) (SKE only)	***WARNING*** For multiple passes, re-rig Static Line Retriever Cables. If door(s) remain open, the load master will keep parachute on/ safety harness on with lifeline attached.
		7. Flaps - "FLAPS UP" (P) "FLAPS ARE UP" (CP)	8. Parachutes/Safety Harnesses/Seat Belts - AS REQUIRED
3. Flaps - "FLAPS UP" (P) "FLAPS ARE UP" (CP) ***NOTE*:** Pilot will state "FLAPS UP." Copilot will acknowledge and raise the flaps. When the flaps are retracted, the copilot will state "FLAPS ARE UP."		8.* Loadmasters Post Drop Checklist - "COMPLETED" (LM)	9. Cargo Compartment Lights - AS REQUIRED
		9. Number Three Hydraulic System - OFF	10. Jump Platform Lights - AS REQUIRED
		10. Air Deflector Arm Switch - "OFF" (P)	11.* Loadmasters Post Drop Checklist - "COMPLETED (LM)
4. Air Deflector Arm Switch - "OFF" (P)		11. Red Light Switch - "OFF" (CP)	***NOTE*:** Loadmaster will not call checklist complete on a racetrack until doors are rigged and ready to drop.
5. Red Light Switch - "OFF" (CP)		12. Pressurization - "AS REQUIRED" (P)	
6. Pressurization - "AS REQUIRED" (P).		13.* Airdrop Data - REVISED (for subsequent phases)	
		14.* Post Drop Checklist "COMPLETED" (E)	

Table 19.8. Heavy Equipment Pre-Slowdown Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. Air Delivery Switch - "ZM" (P) (Only read for SKE drop) 2. Door Arming Switch - ARMED" (P)	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E)	1. "PRE-SLOWDOWN CHECK-LIST"(N) "ACKNOWLEDGED" (LM, E) 2. Depressurization -COMPLETED 3. Air Delivery Switch - "ZM" (P) (Only read for SKE drop) 4. Door Arming Switch - "ARMED" (P) 5. Floor Heat and Air Conditioning Master Switches - OFF 6. Number Three Hydraulic System - ON	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E) 2. Cargo Compartment Lights - AS REQUIRED 3. Remote Control Mechanisms Check for proper setting -CHECKED a. Left hand remote control mechanism (1) Lock/unlock pawl - UNLOCKED (2) Ensure indicator index is set at least one number lower than lock setting for the next platform to be remotely unlocked b. Right hand remote control mechanism (1) Lock/unlock pawl - UNLOCKED (2) Ensure the scribe mark on the push-pull rod is aligned with the stationary mark on the rail section 4. Aft Emergency Restraint Chains - CHECKED a. Ensure chains are positioned properly, readily available and not obstructing platform or locks. 5. Inspection of Load and Extraction System - COMPLETE ***NOTE*:** A visual inspection of each extraction system, to include the security of recovery parachutes, will be accomplished. 6. Check aft of load for obstructions and remove (if any are found) - CHECKED

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			7. Inspect locks on both rails aft of load for retraction of detents - RETRACTED ***CAUTION*** Inspect locks on both rails aft of load for retraction of detents. The unused right hand locks adjacent to the platforms will be retracted. 8. Retractable Lips - RETRACTED AND SECURED 9. Auxiliary Door Locks and Cam Jacks - REMOVED AND STOWED ***WARNING*** Step 9 will not be accomplished until aircraft is depressurized.
3. Pressure Door -"CLEARED TO OPEN" (P) "OPEN (LM)		7. Pressure Door -"CLEARED TO OPEN" (P) "OPEN" (LM) 8. Floor Heat and Air Conditioning Master Switches - AS REQUIREDN ***NOTE:*** Heating and Air Conditioning as required for environmental control.	10. Pressure Door - "CLEARED TO OPEN" (P) - "OPEN (LM) ***NOTE*:** Open pressure door by aft control. ***CAUTION*** When the static line/ connector strap extraction system is being utilized, aft anchor cable supports must extend to the airdrop position and anchor cables must be taut and dislodged from recesses in the pressure bulkhead.
4. Altimeter-"STATE SETTING" (CP, P, N, E) ***NOTE*:** Pilot not flying the aircraft should crosscheck pressure and radar altimeters to ensure best data is flown.	2. Altimeter -"STATE SETTING" (CP, P, N, E)	9. Altimeter -"STATE SETTING" (CP, P, N, E)	11. Aft End of Ramp - TAPED/INSTALLED ***NOTE*:** Tape or install Ramp End Covers on sequential platform airdrop. Ramp end cover and skid blocks required for platform weights above 25,000 lbs. 12 Chem Light (s) - ON (night drops only) 13. Ramp Manual Safety Pins - Removed and Stowed. 14. Ramp Loading Lights -OFF (For night drops only) 15. Parachutes/Safety Harness/Seat Belts - ON/ FASTENED ***WARNING*** Ensure all personnel in the cargo compartment don parachute/safety harness/ seat belts as applicable (and flotation gear, if required). Below 8OO feet AGL, safety harnesses will be worn.
5. Red Light - "ON" (CP)		10. Red Light - "ON" (CP)	16. Red Light - ON
6. Command Markers - SET" (CP, P)		11. Command Markers - SET" (CP, P) 12. Pre-Slowdown Checklist "COMPLETED" (LM, E)	17. Pre-Slowdown Checklist "COMPLETED" (LM, E)

Table 19.9. Heavy Equipment Slowdown Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "SLOWDOWN CHECKLIST" (CP) - "ACKNOWLEDGED" (LM) 2. All Doors Switch - "OPEN" (P) ***NOTE*:** Copilot will actuate ail doors switch when commanded by pilot. ***NOTE*:** After door OPEN call from loadmaster, copilot will visually check door position light on ADS panel to confirm OPEN.	1. SKE Secondary Control Panel (SKE only) - "SET" (N) ***NOTE*:** For formation drops, lead navigator will send updated drift and altimeter information after slowdown is complete and established on run-in altitude and airspeed.	1. "SLOWDOWN CHECKLIST" (CP) - "ACKNOWLEDGED" (LM) 2. Doors - "CLEAR" (LM) 3. All Doors Switch - "OPEN" (P) 4. SKE Secondary Control Panel (SKE only) - "SET" (N) 5. Doors - "OPEN" (LM) 6. Slowdown Checklist - "COMPLETED" (LM, E)	1. "SLOWDOWN CHECKLIST" (CP) - "ACKNOWLEDGED" (LM) 2. Right Hand Locks - CHECKED ***CAUTION*** Ensure yellow tab(s) are locked in place on mechanism(s) being used for aft restraint. Visually check to ensure that the detent(s) are engaged in the platform. 3. ADS Armed Switch - DEARMED 4. Doors - "CLEAR" (LM) ***CAUTION*** LM will ensure the ramp, pressure, and petal doors are clear. 5. Doors- "OPEN" (LM) 6. Left Hand Locks - UNLOCKED AS REQUIRED ***CAUTION*** Do not unlock Left Hand locks until doors are opened to airdrop position. The assistant loadmaster, moving forward as platform(s) are sequentially unlocked, will visually check to ensure each lock is disengaged. After locks are unlocked, stow remote control handle. 7. Slowdown Checklist - "COMPLETED" (LM, E)

Table 19.10. Heavy Equipment One Minute Advisory.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "ONE MINUTE ADVISORY (N) "ACKNOWLEDGED" (LM)		1. "ONE MINUTE ADVISORY" (N) "ACKNOWLEDGED" (LM) 2. Assistant Loadmaster - Standby Right Rail Remote Control ***WARNING*** Emergency release applicable to single platform drops and last platform in a sequential.

CAUTION: If, after the one minute advisory, conditions exist that could result in an unsatisfactory drop, a no-drop will be called.

19.61. Heavy Equipment CARP Checklist.

19.61.1. Navigator initiates the CARP checklist by stating, "TEN SECOND ADVISORY," followed by a five second countdown to "GREEN LIGHT" at the release point. "GREEN LIGHT" must be seen (visually) or heard (verbally) for the drop.

19.62. Heavy Equipment Post Drop Checklist.

19.62.1. After completion of the airdrop, the pilot not flying (PNF) the aircraft will initiate the post drop checklist at **Table 19.12.** by stating, "POST DROP CHECKLIST."

Table 19.11. Heavy Equipment CARP Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "GREEN LIGHT" (N) - Green Light Switch and Chute Release switch ON - (CP) "ALL CLEAR" or "MALFUNCTION" (LM) 2. "RED LIGHT" (N) - Green Light Switch - OFF (P) - “RED LIGHT IS ON” (CP)	1. "TEN SECOND ADVISORY" (N) ***NOTE*:** For SKE only, the lead and element lead navigator sends an FCI "Down Prep" at five seconds prior to the drop. Not required for single-ship. 2."GREENLIGHT" (N)-Green Light Switch and Chute Release switch ON - (CP) "ALL CLEAR" or "MALFUNCTION" (LM) ***NOTE*:** For SKE only, the lead and element lead navigator depresses "Execute" at INS drop time. Not required for single-ship. Navigator will state "RED LIGHT" at end of usable DZ. 3. "RED LIGHT" (N) -Green Light Switch - OFF (CP) - “RED LIGHT IS ON” (CP)		1. "TEN SECOND ADVISORY" (N) ***NOTE*:** At navigator's call of ten, position the ADS arming switch to the ARMED position and standby with hand adjacent to the manual control handle. Do not place hand on manual control handle. 2. "GREEN LIGHT'. (N) a. Manual Control Handle -Release Position (if required) ***NOTE*:** If extraction parachute is not visible or fails to release electrically, immediately pull manual control handle to release position. Pull handle only after hearing or seeing GREEN LIGHT. b. Right Rail Remote Control Handle - Emergency Release Position (if required) 3. Status of Load - "ALL CLEAR" or "MALFUNCTION" (LM)

Table 19.12. Heavy Equipment Post Drop Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "POST DROP CHECKLIST" (CP) "ACKNOWLEDGED - (LM, E)		1. "POST DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM, E)	1. "POST DROP CHECK-LIST" (CP) "ACKNOWLEDGED" (LM, E)
		2. Floor Heat and Air Conditioning Master Switches - OFF	2. Manual Control - Safe Position ***NOTE*:** If manual control was used, ensure it is returned to "SAFE" position.
			3. ADS Arming Switch - DEARMED
			4. All Doors Switch - CLOSED ***CAUTION*** Ensure doors are clear prior to closing doors. LM will close the Petal Doors and ramp utilizing the All Doors Switch on Ramp Control Panel.
		3. Petal Doors and Ramp - CLOSED"(LM)	5. Petal Doors and Ramp - "CLOSED" (LM)
		4. Floor Heat and Air Conditioning Master Switches - AS REQUIRED ***NOTE*:** Heating and Air Conditioning as required for environmental control.	***NOTE*:** If aircraft is to be pressurized, stow anchor cables. Remove tape/end covers from ramp, close pressure door, install door locks, cam jacks, and manual safety pins. Advise pilot on completion.
	1. SKE Secondary Control Panel (SKE only) - "SET" (N)	5. SKE Secondary Control Panel (SKE only) - "SET" (N)	
2. Air Delivery Switch - "OFF" (P) (Only read for SKE drops) ***NOTE*:** Formation Aircraft will be at minimum IFR altitude prior to placing Aerial Delivery Switch to OFF.		6. Air Delivery Switch - "OFF" (P) (SKE only)	6. Parachutes/Safety Harnesses/ Seat Belts - AS REQUIRED 7. Cargo Compartment Lights - AS REQUIRED

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
3. Flaps - "FLAPS UP" (P) FLAPS ARE UP" (CP) ***NOTE*:** Pilot will state "FLAPS UP." Copilot will acknowledge and raise the flaps. When the flaps are retracted, the copilot will state " FLAPS ARE UP." 4. Door Arming Switch - "AS REQUIRED" (P) (ON for multiple passes) 5. Red Light Switch - "OFF" (CP) 6. Pressurization - "AS REQUIRED" (P)		7. Flaps -"FLAPS UP" (P) "FLAPS ARE UP" (CP) 8. Loadmasters Post Drop Checklist - "COMPLETED" (LM) 9. Number Three Hydraulic System - OFF 10. Door Arming Switch - "AS REQUIRED" (P) (ON for multiple passes) 11. Red Light Switch - "OFF" (CP) 12. Pressurization -"AS REQUIRED" (P) ***CAUTION*** Prior to re-pressurizing, the engineer will direct the scanner to check the doors and ramp IAW T.O. 1C-141B-1. 13. Airdrop Data - REVISED (for subsequent phases) 14. Post Drop Checklist - "COMPLETED" (E)	8. Left Rail Locks - AS REQUIRED ***CAUTION*** If more platforms are to be dropped, ensure locks used on the previous drop are retracted and return to a setting of "9." 9. Right Rail Locks -AS REQUIRED ***CAUTION*** If more platforms are to be dropped, ensure locks used on previous drop are retracted, lock the tab, then rotate the adjustment knob until the catch handle releases the slide link tab. Check the tab to insure it will not lock. 10. Emergency Restraint Chains - AS REQUIRED ***CAUTION*** If more platforms are to be dropped, ensure chains positioned for previous drops are removed. 11. Loadmaster's Post Drop Checklist - "COMPLETED" (LM)

19.63. Amplified Container Delivery System (CDS) - CDS Pre-Slowdown Checklist

19.63.1. Complete the checklist at **Table 19.13.** before slowdown. The navigator will initiate the checklist by stating, "PRE-SLOWDOWN CHECKLIST." Coordination between the pilot, navigator, and loadmaster will determine the time required to prepare the load for airdrop and the initiation of the pre-slowdown checklist.

**Step need not be accomplished if indicated drop altitude is below 10,000 feet. (HIGH ALTITUDE CDS).

19.64. CDS Slowdown Checklist.

19.64.1. The pilot Not Flying (PNF) will use the checklist at **Table 19.14.** after flaps have been extended during the slowdown maneuver, by stating "SLOWDOWN CHECKLIST".

NOTE: **Step not accomplished if indicated drop altitude is below 10,000 feet. (HIGH ALTITUDE CDS).

19.65. CDS One Minute Advisory.

19.65.1. Use the CDS One-Minute Advisory checklist at **Table 19.15.**, one minute prior to drop time. The navigator will announce "CREW, ONE MINUTE ADVISORY." Advisory will be given on time.

19.66. CDS CARP Checklist.

19.66.1. Navigator initiates the CARP checklist at **Table 19.16.** by stating, "TEN SECOND ADVISORY," followed by a five second countdown to "GREEN LIGHT" at the release point. "GREEN LIGHT" must be seen (visually) or heard (verbally) for the drop.

19.67. CDS Post Drop Checklist.

19.67.1. After completion of the airdrop, the pilot not flying (PNF) the aircraft, will initiate the CDS post drop checklist at **Table 19.17.** by stating, "POST DROP CHECKLIST."

Table 19.13. CDS Pre-Slowdown Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1.** Oxygen - "CHECKED" (E, CP, P, N, 5, LM) ***NOTE*:** Primary crew members will ensure additional crew members have complied prior to responding. 2. Door Arming Switch - "ARMED" (P)	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E) 2.** Oxygen - "CHECKED" (E, CP, P, N, S, LM) ***NOTE*:** Primary crew members will ensure additional crew members have complied prior to responding.	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E) 2.** Oxygen - "CHECKED" (E, CP, P, N, S, LM) ***NOTE*:** Primary crew members will ensure additional crew members have complied prior to responding. 3. De-pressurization - COMPLETED 4. Door Arming Switch - "ARMED (P) 5. Floor Heat and Air Conditioning Master Switches - OFF 6. Number Three Hydraulic System - ON	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E) 2.** Oxygen - "CHECKED" (E, CP, P, N, S, LM) ***NOTE*:** Primary crew members will ensure additional crew members have complied prior to responding. 3. Forward Restraint Barrier - CHECKED a. Ensure locks are engaged, bundles are against the barrier and any additional restraint is taut.4. Rail Locks and Vertical Lips - RETRACTED/ SECURED ***CAUTION*** Ensure that all locks are retracted and unused vertical lips are pinned out. 5. Release Gate Tiedown Attachments - CHECKED ***NOTE*:** Ensure the gate is properly attached. 6. Retriever Cable and Knife Assembly - CHECKED AND SAFETIED ***NOTE*:** Ensure the cable is properly positioned and attached to the knife. Check knife for proper position and that the safety tie is in position. 7. Auxiliary Door Locks and Cam Jacks - REMOVED AND STOWED ***NOTE*:** Step 7 will not be accomplished until aircraft is de-pressurized.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			8. Anchor Cable Restraint Hooks - REMOVED
3. Pressure Door -"CLEARED TO OPEN" (P) "OPEN (LM)		7. Pressure Door -"CLEARED TO OPEN" (P) "OPEN" (LM) 8. Floor Heat and Air Conditioning Master Switches -AS REQUIRED ***NOTE*:** Heating and Air Conditioning as required for environmental control.	9. Pressure Door - " CLEARED TO OPEN" (P) - "OPEN' (LM) ***NOTE*:** Open pressure door by aft control. 10. Aft Anchor Cable Supports - EXTENDED/ CHECKED ***CAUTION*** Anchor cable support(s) must extend to airdrop position and anchor cables must be taut and dislodged from the recesses in the pressure bulkhead
4. Altimeter - "STATE SETTING" (CP, P, N, E) ***NOTE*:** Pilot not flying the aircraft should crosscheck pressure and radar altimeters to ensure best data is flown.	3. Altimeter - "STATE SETTING" (CP, P, N, E)	9. Altimeter - "STATE SETTING" (CP, P, N, E)	11. Chem Light (s) - ON (For night drops only) 12. Check aft of load for obstructions and remove - COMPLETE 13. Ramp Manual Safety Pins - Removed and Stowed. 14. Ramp Loading Lights - OFF (for night drops only) 15. Load vertical and aft restraint - REMOVED (As Required) 16. Final Load Inspection - COMPLETE ***NOTE*:** Loadmasters perform final visual inspection of load, rails, parachutes, etc., ensuring the load is ready to drop. 17. Retriever Remote Control Box a. Arming Switch - DEARMED b. Selector Switch - SET c. Directional Control Switch-SET ***NOTE:*** For High Altitude CDS, remove safety pins on all timer elements for loads on this pass. Report number of pins removed to pilot. ***NOTE:*** When performing CDS drop in conjunction with 90/270 maneuver, the loadmaster may plan to use the SLRW control pendant. In this case place the arming switch to aft control. 18. Parachutes/Safety Harness/Seat Belts - ON/ FASTENED
5. Red Light - "ON" (CP) 6. Command Markers - "SET" (CP,P)		10. Red Light - "ON" (CP) 11. Command Markers - "SET" (CP,P) 12. Pre-Slowdown Checklist - "COMPLETED" (LM, E)	19. Red Light - ON 20. Pre-Slowdown Checklist - "COMPLETED" (LM, E)

Table 19.14. CDS Slowdown Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "SLOWDOWN CHECKLIST" (CP) -"ACKNOW-LEDGED" (LM) 2.**Oxygen - CHECKED___LITERS" - (CP) "CHECKED"(LM) 3. All Doors Switch - "OPEN" (P) ***NOTE*:** Copilot will actuate all doors switch when commanded by pilot. 4. Doors -"OPEN" (LM) ***NOTE*:** After door OPEN call from loadmaster, copilot will visually check door position light on ADS panel to confirm OPEN.		1. "SLOWDOWN CHECK-LIST" (CP) - "ACKNOWL-EDGED" (LM) 2.**Oxygen - "CHECKED___LITERS" - (CP) "CHECKED" (LM) 3. Doors - "CLEAR" (LM) 4. All Doors Switch - "OPEN" (P) 5. Doors- "OPEN" (LM) 6. Slowdown Checklist - "COMPLETED" (LM, E)	1. "SLOWDOWN CHECK-LIST" (CP) - "ACKNOWL-EDGED" (LM) 2.**Oxygen - "CHECKED___LITERS" - (CP) "CHECKED; (LM) ***NOTE*:** Loadmaster will check the quantity in his walk-around bottle(s). 3. Doors -"CLEAR" (LM) ***CAUTION*** LM will ensure the ramp, pressure, and petal doors are clear. 4. Doors -"OPEN" (LM) 5. Slowdown Checklist - "COMPLETED" (LM, E)

Table 19.15. CDS One Minute Advisory.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "CREW, ONE MINUTE ADVISORY" (N) "ACKNOWLEDGED (LM)		1. "CREW, ONE MINUTE ADVISORY" (N) "ACKNOWLEDGED" (LM) (JUMPMASTER ALERTED if performing the 90/270 Maneuver or Combination drops)

CAUTION: If, after the one minute advisory, conditions exist that could result in an unsatisfactory drop, a no-drop will be called.

Table 19.16. CDS CARP Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "TEN SECOND ADVISORY" (N)		1. "TEN SECOND ADVISORY" (N) ***WARNING*** Loadmasters will not position themselves in the direct line of travel of the retriever cable and guillotine knife (knives) to preclude being struck in the event of recoil at gate release on CDS drops. ***NOTE:*** At navigator's 10 second call, place retriever arm switch to the armed position and stand by with hand adjacent to retriever activate switch.
1. "GREEN LIGHT" (N) - Green Light Switch ON - (CP) "ALL CLEAR" or "MAL-FUNCTION"(LM) 2. "RED LIGHT" (N) - Green Light Switch - OFF (CP) - “RED LIGHT IS ON” (CP)	2. "GREEN LIGHT" (N) - Green Light Switch ON - (CP) "ALL CLEAR" or "MAL-FUNCTION" (LM) Navigator will state "RED LIGHT" at end of usable DZ. 3 "RED LIGHT" (N) - Green Light Switch -OFF.(CP) - “RED LIGHT IS ON” (CP)		***NOTE:*** 90/270 maneuver only, when utilizing the SLRW control pendant, the primary loadmaster positions himself forward of FS 1277 and as far outboard as possible. Prior to navigators CARP count down, the loadmaster visually identifies the correct switches on the control pendant. 2. "GREEN LIGHT"(N) - Retriever Switch - ACTIVATED "ALL CLEAR" or "MALFUNCTION" (LM) ***NOTE:*** Hold the winch activate switch until the knife is visible.

NOTE: For Combination Drops off the ramp, jumpers follow CDS exit. If jumpers exit through the troop doors, 90/270 Maneuver must be accomplished. Carp checklist is immediately followed by the 90/270 Maneuver checklist.

Table 19.17. CDS Post Drop Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "POST DROP CHECK-LIST" (CP) "ACKNOWL-EDGED" (LM, E) 2. Flaps - "FLAPS UP" (P) "FLAPS ARE UP" (CP) ***NOTE*:** Pilot will state "FLAPS UP." Copilot will acknowledge and raise the flaps. When the flaps are retracted, the copilot will state FLAPS ARE UP." 3. Door Arming Switch - "AS REQUIRED" (P) 4. Red Light Switch -"OFF" (CP) 5. Pressurization - "AS REQUIRED" (P)		1. "POST DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM, E) 2. Floor Heat and Air Conditioning Master Switches - OFF 3. Petal Doors and Ramp - "CLOSED" (LM) 4. Floor Heat and Air Conditioning Master Switches - AS REQUIRED ***NOTE*:** Heating and Air Condition-ing as required for environmental control. 5. Flaps - "FLAPS UP" (P) "FLAPS ARE UP" (CP) 6. Loadmasters Post Drop Check-list - "COMPLETED" (LM) 7. Number Three Hydraulic System - OFF 8. Door Arming Switch - "AS REQUIRED (P) 9. Red Light Switch - "OFF" (CP) 10. Pressurization - "AS REQUIRED" (P) ***CAUTION*** Prior to re-pressurizing, the engi-neer will direct the scanner to check the doors and ramp IAW T.O. 1C-141B-1. 11. Airdrop Data - REVISED (for subsequent phases) 12. Post Drop Checklist - "COMPLETED" (E)	1. "POST DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM, E) 2. Retriever Arming switch - AS REQUIRED (DEARMED if no further drops are planned, or AFT POSITION if multiple passes are planned) 3. Static Line(s) -RETRIEVED 4. All Doors Switch -CLOSED ***CAUTION*** Ensure doors are clear prior to clos-ing doors. LM will close the Petal Doors and ramp utilizing the All Doors Switch on the Ramp Control Panel. 5. Petal Doors and Ramp - "CLOSED" (LM) ***NOTE*:** If aircraft is to be pressur-ized, stow anchor cables. Close pressure door, install door locks, cam jacks, and manual safety pins. Advise pilot on completion. 6. Parachute/Safety Harness/Seat Belts - AS REQUIRED 7. Cargo Compartment Lights - AS REQUIRED 8. Loadmaster Post Drop Checklist - "COMPLETED" (LM)

NOTES:

Engineer will advise when cabin altitude is below l0,000 feet when performing High Altitude drops. Pilot will clear all occupants off oxygen and receive acknowledgment.

For High Altitude drops, Post Drop checklist cannot be completed until cabin pressure returns to below 10,000 feet and all occupants are checked for hypoxia.

19.68. 90/270 to the Drop Zone (DZ) Maneuver Checklist.

19.68.1. The following items will be accomplished for personnel drops from the troop doors, upon completion of the CDS Carp checklist. This checklist will be initiated by the pilot by stating, "90/270 MANEUVER CHECKLIST". After jumpers have exited the aircraft, continue with the Personnel Post Drop checklist.

Table 19.18. 90/270 to the DZ Maneuver Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. " 90/270 TO THE DROP ZONE (DZ) MANEUVER " (P) "ACKNOWLEDGED" (LM, E) 2. Command Markers - RESET" (CP, P) 3. FLAPS - "FLAPS, STATE SETTING" (P) ***NOTE*:** Reset flaps to computed position for personnel airdrop. 4. Air Deflector Armed Switch - "ARMED" (P)		1. " 90/270 TO THE DROP ZONE (DZ) MANEUVER " (P) "ACKNOWLEDGED" (LM, E) 2. Command Markers - "RESET" (CP, P) 3. FLAPS - " FLAPS, STATE SETTING" (P) ***NOTE*:** Reset flaps to compute position for personnel airdrop. 4. Air Deflector Armed Switch - "ARMED" (P)	1. " 90/270 TO THE DROP ZONE (DZ) MANEUVER " (P) "ACKNOWLEDGED" (LM, E) 2. Retriever Arming Switch - AFT POSITION 3. Static Line(s) - RETRIEVED 4. All Doors Switch - CLOSED ***CAUTION*** Ensure doors are clear prior to closing doors. Loadmaster will close the petal doors and ramp utilizing the All Doors Switch on the Ramp Control Panel. 5. Petal Doors and Ramp - CLOSED (LM) 6. Jumpers - Moved aft to left paratroop door

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			7. Dual Rail adjacent to left troop door - REMOVED AND SECURED 8. Jump Platform(s)- INSTALLED and Checked 9. Intermediate Anchor Cable Support - CONNECTED 10. Personnel Static Line Retriever Cable - CHECKED/SAFETIED 11. Helmet Visor - DOWN 12. Jump Platform(s) - SECURED. 13. Paratroop Door(s) - "CLEARED TO OPEN" (P) OPEN AND LOCKED
5. Paratroop Door(s) - "CLEARED TO OPEN" (P)		5. Paratroop Door(s) - CLEARED TO OPEN (P) 6. Reconfiguration - "COMPLETED" (LM) 7. Jump-Pilot Maneuver Checklist - "COMPLETED" (E)	***WARNING*** Doors will not be opened until directed to do so by the pilot. Ensure static lines are attached to the anchor cables before doors are opened **(EXCEPTION:** See 19.33.6.1.) 14. Air Defector(s) - EXTENDED ***NOTE*:** If air deflectors fail to extend after press-ing extend switch, ensure that the troop door(s) are fully opened and then actuate the by-pass switch (left or right, as required). If air deflectors fail to extend electrically, manual extension may be accomplished (see Air Deflector Extension Checklist). 15. Jump Platform(s) - LOCKED IN PLACE 16. Reconfiguration - "COMPLETED" (LM)

19.69. 90/270 to the Drop Zone (DZ) Maneuver One Minute Advisory.

19.69.1. One minute prior to "GREEN LIGHT," the navigator announces "CREW, ONE MINUTE ADVISORY". Advisory will be given on time.

Table 19.19. 90/270 to the DZ Manuever One Minute Advisory.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "CREW, ONE MINUTE ADVISORY" (N)		1. "CREW, ONE MINUTE ADVISORY" (N) - "ACKNOWLEDGED" (LM) Jumpmaster Alerted ***NOTE*:** Cleared exits will be turned over to the jump-master as soon as possible but no later than the one minute advisory.

CAUTION: If, after the one minute advisory, conditions exist that could result in an unsatisfactory drop, a no-drop will be called.

NOTE: For jumpmaster directed drops, GREENLIGHT may be turned ON at the One Minute Advisory.

19.70. 90/270 to the Drop Zone (DZ) Maneuver CARP Checklist.

19.70.1. Navigator initiates the CARP checklist by stating, "TEN SECOND ADVISORY," followed by a five second countdown to "GREEN LIGHT" at the release point. "GREEN LIGHT" must be seen (visually) or heard (verbally) for the drop.

Table 19.20. 90/270 to the DZ Manuever CARP Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "TEN SECOND ADVISORY" (N)		1. "TEN SECOND ADVI-SORY" (N) Jumpmaster Advised
1. "GREEN LIGHT" (N) Green Light Switch - ON (CP) - "ALL CLEAR" or "MALFUNCTION" (LM)	2. "GREEN LIGHT" (N) Green Light Switch - ON (CP) - "ALL CLEAR" or "MAL-FUNCTION" (LM) Navigator will state "RED LIGHT" at end of usable DZ.		2. "GREEN LIGHT" (N) (CP) - "ALL CLEAR" or "MALFUNCTION" (LM)

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
2. "RED LIGHT" (N) Green Light Switch - OFF (CP) - “RED LIGHT IS ON” (CP) ***NOTE*:** Resume check-list with the Personnel Post Drop Checklist.	3. "RED LIGHT" (N) Green Light Switch - OFF (CP) - “RED LIGHT IS ON” (CP) ***NOTE*:** Resume check-list with the Personnel Post Drop Checklist.	***NOTE*:** Resume check-list with the Personnel Post Drop Checklist.	3. Jumpmaster/Safety - **WARNED** (Upon seeing or hearing **RED LIGHT)** ***NOTE*:** Resume checklist with the Personnel Post Drop Checklist.

19.71. High Altitude Airdrop Checklist.

19.71.1. This checklist prepares the crew and aircraft for High Altitude operations. It will be called prior to **ALL** High Altitude drops (personnel and/or CDS) in time to ensure completion prior to initiation of the APPLICABLE PRE-SLOWDOWN CHECKLIST (High Altitude Personnel or normal CDS). Navigator initiates this checklist by stating " HIGH ALTITUDE AIRDROP CHECKLIST."

NOTE: The copilot announces and the engineer and loadmaster acknowledge each 5,000 foot change in cabin pressure (5,000, 10,000, 15,000, etc.). Engineer monitors cabin altitude and advises copilot if altitude calls are not made. The loadmaster will advise the jumpmaster of each 5000 foot change.

19.71.2. **This step not accomplished when drop altitude/cabin altitude is below 10,000 feet MSL.

Table 19.21. High Altitude Airdrop Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "HIGH ALTITUDE AIRDROP CHECK-LIST" - (N) -"ACKNOWLEDGED" - (P,CP, E, S, LM) **2. Oxygen Mask - " ON- 100 PERCENT" (P, CP, N, E, S, LM)	1. "HIGH ALTITUDE AIRDROP CHECK-LIST" - (N) -"ACKNOWLEDGED" - (P,CP, E, S, LM) **2. Oxygen Mask - " ON - 100 PERCENT" (P, CP, N, E, S, LM)	1. "HIGH ALTITUDE AIRDROP CHECK-LIST" - (N) -"ACKNOWLEDGED" - (P,CP, E, S, LM) **2. Oxygen Mask - "ON -100 PERCENT" (P, CP, N, E, S, LM)	1. "HIGH ALTITUDE AIRDROP CHECK-LIST" - (N) -"ACKNOWLEDGED" - (P,CP, E, S, LM) **2. Oxygen Mask - " ON - 100 PERCENT" (P, CP, N, E, S, LM)

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	NOTE: Primary navigator ensures secondary navigator has checked his oxygen equipment prior to responding. 3.Radar-"A5 REQUIRED" (N) (STBY or OFF to prevent arc-over)	3.Radar-"AS REQUIRED" (N) 4. De-pressurization -IN PROGRESS (E) ***NOTE*:** De-pressurize so as to have a zero pressure differential by the Pre-Slowdown checklist. 5. High Altitude Checklist - "COMPLETED" (LM, E)	***NOTE:*** Loadmaster ensures all aircrew members in the cargo compartment have checked their oxygen equipment; that masks not to be used are removed from the troop oxygen system; that walk-around bottles are fully serviced; and that jump-master has completed troop oxygen check. Loadmaster will ensure all personnel in the cargo compartment have oxygen immediately available or on if drop altitude is above 10,000 feet. 3.Jumpmaster-ADVISED 4. Cargo Compartment Dome Lights Circuit Breakers - PULLED (Night only) 5.WarningHorn-SILENCED (Silenced as cabin altitude passes 12,000 feet, if applicable) 6. Jump Platform Lights - AS REQUIRED (Night only, door exit) 7. High Altitude Checklist - "COMPLETED" (LM, E)

NOTE: For High Altitude CDS, return to Amplified CDS Checklist; for personnel, continue with Amplified High Altitude Personnel Checklist.

19.72. Amplified High Altitude Personnel Checklist - High Altitude Personnel Pre-Slowdown Checklist.

19.72.1. Complete this checklist prior to slowdown. The navigator will initiate the checklist by stating "PRE-SLOWDOWN CHECKLIST." Coordination between the pilot, navigator and loadmaster will determine the time required to prepare the load for airdrop and the initiation of the Pre-Slowdown checklist.

19.72.2. **Step need not be accomplished if indicated drop altitude is below 10,000 feet.

Table 19.22. High Altitude Personnel Pre-Slowdown Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1.** Oxygen - "CHECKED" (E CP, P, N, S, LM)	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E)	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E)	1. "PRE-SLOWDOWN CHECKLIST" (N) "ACKNOWLEDGED" (LM, E)
	2.** Oxygen - "CHECKED" (E, CP, P, N, S, LM)	2.** Oxygen - "CHECKED" (E, CP, P, N, S, LM)	2.** Oxygen - "CHECKED" (E, CP, P, N, S, LM)
***NOTE*:** Primary crew members will ensure additional crew members have complied prior to responding.	***NOTE*:** Primary crew members will ensure additional crew members have complied prior to responding.	***NOTE:*** Primary crew members will ensure additional crew members have complied prior to responding.	***NOTE*:** Primary crew members will ensure additional crew members have complied prior to responding.
2. For ramp exit, accomplish step (a) only.		3. Depressurization - COMPLETED	***NOTE*:** Loadmaster will ensure all personnel in the cargo compartment have oxygen masks on if cabin altitude is above 10,000 feet, prior to responding.
a. Door Arming Switch - "ARMED" (P)		4. For ramp exit, accomplish steps (a) through (e)	
		a. Door Arming Switch - "ARMED" (P)	3. Auxiliary Door Locks and Cam - REMOVED and STOWED (Ramp exit only)
		b. Floor Heat and Air Conditioning Master Switches - OFF	
		c. Number Three Hydraulic System - ON	

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
b. Pressure Door - "CLEARED TO OPEN" (P) "OPEN" (LM)		d. Pressure Door - "CLEARED TO OPEN" (P) "OPEN" (LM)	4. Pressure Door - "CLEARED TO OPEN" (P) "OPEN" (LM) (ramp exit only)
		e. Floor Heat & Air Conditioning Master Switches - AS REQUIRED ***NOTE*:** Heating and Air Conditioning as required for environmental control.	5. Ramp Manual Safety Pins - Removed and Stowed (ramp exit only) 6. Parachutes/Safety Harness/Seat Belts - ON/ FASTENED
3. Air Deflectors - "ARMED" (P) (For troop door exit only)		5. Air Deflectors - "ARMED" (P) (For troop door exit only)	***WARNING*** Ensure all personnel in the cargo compartment don parachute/safety harness/seat belts as applicable (and flotation gear, if required).
4. Altimeter - "STATE SETTING" (CP,P,N,E) ***NOTE*:** Pilot not flying the aircraft should cross-check pressure and radar altimeters to ensure best data is flown.	3. Altimeter - "STATE SETTING" (CP,P,N,E)	6. Altimeter - "STATE SETTING" (CP,P,N,E)	7. Warning Horn - SILENCED (Silence as cabin altitude passes 12,000 feet, if applicable)
5. Red Light - "ON" (CP)		7. Red Light - "ON" (CP)	8. Red Light - ON
6. Command Markers - "SET" (CP, P)		8. Command Markers - "SET" (CP, P)	
		9. Pre-Slowdown Check-list "COMPLETED" (LM, E)	9. Pre-Slowdown Check-list "COMPLETED" (LM, E)

19.73. High Altitude Personnel Slowdown Checklist.

19.73.1. This checklist will be initiated by the pilot not flying the aircraft, after flaps have been extended during the slowdown maneuver, by stating "SLOWDOWN CHECKLIST."

19.73.2. ** Step not accomplished if indicated drop altitude is below 10,000 feet.

Table 19.23. High Altitude Personnel Slowdown Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. SLOWDOWN CHECK-LIST" (CP) - "ACKNOWLEDGED"(LM)		1. SLOWDOWN CHECK-LIST" (CP) - "ACKNOWLEDGED"(LM)	1. SLOWDOWN CHECK-LIST" (CP) - "ACKNOWLEDGED"(LM)
2. **Oxygen "CHECKED _____ LITERS" (CP) "CHECKED" (LM) ***NOTE*: For troop door exit, proceed to item 5. 3. For High Altitude Drops over the ramp, accomplish step (a). Item 4 is not accomplished for ramp exit. b. All Doors Switch - "OPEN" (P)		2. **Oxygen "CHECKED _____ LITERS" (CP) "CHECKED" (LM) 3. Floor Heat & Air Conditioning Master Switches - OFF ***NOTE*: For troop door exit, proceed to item 5. 4. For High Altitude Drops over the ramp, accomplish steps (a) through (c). Item 5 is not accomplished for ramp exit. ***NOTE*: The engineer will visually check flight deck occupants for signs of hypoxia. a. Doors "CLEAR" (LM) b. All Doors Switch - "OPEN" (P) c. Doors - "OPEN" (LM) 5. Paratroop Door(s) - "CLEARED TO OPEN" (P) 6. Floor Heat and Air conditioning Master Switches - AS REQUIRED. ***NOTE*: Heating and Air Conditioning as required for environmental control.	2. **Oxygen "CHECKED _____ LITERS" (CP) "CHECKED" (LM) ***NOTE*: Loadmaster will check the quantity in his walk-around bottle(s). ***NOTE*: For troop door exit, proceed to item 4. 3. For High Altitude Drops over the ramp, accomplish steps (a) and (b) and then proceed to item 10. Items 4-9 are not accomplished for ramp exit a. Doors "CLEAR" (LM) ***NOTE*: Loadmaster ensures that the ramp, pressure door, and petal doors are clear. c. Doors - "OPEN" (LM) 4. Troop Door By-Pass Switches - NORMAL 5. Helmet Visor - Down 6. Jump Platforms - Secured. 7. Paratroop Door(s) - "CLEARED TO OPEN" (P) OPEN AND LOCKED ***WARNING*** Door(s) will not be opened until directed to do so by the pilot.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
		7. Slowdown Checklist - "COMPLETED" (LM, E)	8. Air Deflector(s) - EXTENDED **NOTE:** If air deflectors fail to extend after press-ing extend switch, ensure that the troop door(s) are fully opened and then actuate the by-pass switch (left or right, as required). If air deflectors fail to extend electrically, manual extension may be accom-plished (see Air Deflector Extension Checklist). 9. Jump Platform(s) - LOCKED IN PLACE 10. Slowdown Checklist - "COMPLETED" (LM, E)

19.74. High Altitude Personnel - One Minute Advisory.

19.74.1. One minute prior to drop time, the navigator announces "CREW, ONE MINUTE ADVISORY." Advisory will be given on time.

NOTE: Cleared exits will be turned over to the jumpmaster no later than the One Minute Advisory.

Table 19.24. High Altitude Personnel - One Minute Advisory.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "CREW, ONE MINUTE ADVISORY" (N) "ACKNOWLEDGED" (LM)		1. "CREW, ONE MINUTE ADVI-SORY" (N) "ACKNOWLEDGED" (LM) 2. Jumpmaster - ADVISED

CAUTION: If, after the one minute advisory, conditions exist that could result in an unsatisfactory drop, a no-drop will be called.

NOTE: For jumpmaster directed drops, GREEN LIGHT may be turned on at the one minute advisory.

19.75. High Altitude Personnel CARP Checklist.

19.75.1. Navigator initiates the CARP checklist by stating, "TEN SECOND ADVISORY," followed by a five second countdown to "GREEN LIGHT" at the release point. "GREEN LIGHT" must be seen (visually) or heard (verbally) for the drop.

Table 19.25. High Altitude Personnel CARP Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. TEN SECOND ADVISORY (N)		1. TEN SECOND ADVISORY (N) JUMPMASTER ADVISED
1. "GREEN LIGHT" (N) - Green Light Switch - (CP), "ALL CLEAR" or "MALFUNCTION" (LM)	2. "GREEN LIGHT" (N) - Green Light Switch - (CP), "ALL CLEAR" or "MALFUNCTION" (LM) Navigator will state "RED LIGHT" at end of usable DZ.		2. "GREEN LIGHT" (N) - "ALL CLEAR" or "MALFUNCTION" (LM)
2. "RED LIGHT" (N) - Green Light Switch - OFF (CP) - “RED LIGHT IS ON” (CP).	3. "RED LIGHT" (N) - Green Light Switch - OFF (CP) - “RED LIGHT IS ON” (CP).		3. Jumpmaster/Safety - **WARNED** (Upon seeing or hearing **RED LIGHT**)

19.76. High Altitude Personnel Post Drop Checklist.

19.76.1. After completion of the airdrop, the pilot not flying the aircraft initiates the post drop checklist by stating, "POST DROP CHECKLIST."

19.76.2. (*) Asterisk items are re-accomplished for multiple drops.

Table 19.26. High Altitude Personnel Post Drop Checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1.* "POST DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM, E) 2.* For High Altitude drops over the ramp, accomplish step a: a. Door Arming Switch ""OFF" (P)		1.* "POST DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM, E) 2.* Floor Heat And Air Conditioning Master Switches - OFF 3. For High Altitude drops over the ramp, accomplish steps a and b, for troop door exit, accomplish step c. a. Petal Doors and Ramp - "CLOSED" (LM) b. Door Arming Switch "OFF" (P)	1.* "POST DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM, E) 2. For High Altitude drops over the ramp, accomplish steps a and b: a. All Doors Switch - CLOSED ***NOTE*:** Ensure doors are clear prior to closing doors. Loadmaster will close the Petal Doors and Ramp utilizing the All Doors Switch on the Ramp Control Panel. ***NOTE*:** If aircraft is to be pressurized, close pressure door, install door locks, cam jacks and manual safety pins. Advise pilot on completion. b. Petal Doors and Ramp - "CLOSED" (LM) 3.* Jump Platform(s) - RETRACTED 4.* Static Lines - RETRIEVED 5.* Air Deflector(s) - RETRACTED

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
		c.* Paratroop Doors "AS Required" (LM) 4.* Floor Heat and Air Conditioning Master Switches - AS REQUIRED ***NOTE*:** Heating and Air Conditioning as required for environmental control. 5. Flaps - "FLAPS UP" (P) "FLAPS ARE UP" (CP)	***NOTE*:** If air deflectors fail to retract electrically, manual retraction may be accomplished (see air deflector retraction checklist). 6.* Paratroop Door(s) - "AS required" (LM) 7.* Troop Door by-pass switches - NORMAL 8. Static Line Retriever Cables - CHECKED/ SECURED ***WARNING*** For multiple passes, re-rig Static Line Retriever Cables. If door(s) remain open, the loadmaster will keep para-chute on/safety harness on with lifeline attached. 9. Parachutes/Safety Harnesses/Seat Belts - AS REQUIRED 10. Cargo Compartment Dome Light Circuit Breakers - RESET (Night only, if required for High Altitude drops) 11. Cargo Compartment Lights (AS REQUIRED (White) 12. Jump Platform Lights - AS REQUIRED
3. Flaps - "FLAPS UP" (P) "FLAPS ARE UP" (CP) ***NOTE*:** Pilot will state "FLAPS UP." Copilot will acknowledge and raise the flaps. When the flaps are retracted, the copilot will state "FLAPS ARE UP." 4. Air Deflector Arm Switch - "OFF" (P) 5. Red Light Switch - "OFF" (CP)		6. * Loadmasters Post Drop Checklist - "COMPLETED" (LM) 7. Number Three Hydraulic System - OFF 8. Air Deflector Arm Switch - "OFF" (P) 9. Red Light Switch - "OFF" (CP)	13. * Loadmasters Post Drop Checklist - "COMPLETED" (LM)

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
6. Pressurization - "AS REQUIRED" (P) ***NOTE*:** Direct flight engineer to pressurize, if necessary.		10. Pressurization - "AS REQUIRED" (P) ***CAUTION*** Prior to repressurizing, the engineer will direct the scanner to check the doors and ramp IAW TO 1C-141B-1. 11.* Airdrop Data - REVISED (for subsequent phases) 12.* Post Drop Checklist "COMPLETED" (E)	

NOTE: Engineer will advise when cabin altitude is below 10,000 feet when performing High Altitude drops. Pilot will clear all occupants off oxygen and receive acknowledgment.

NOTE: For High Altitude drops, Post Drop checklist cannot be complete until cabin pressure returns to below 10,000 feet and all occupants are checked for hypoxia.

19.77. Amplified Crew Member Airdrop Checklist - Air Deflector Extension Checklist

NOTE: Air deflector may be extended utilizing steps at paragraph **19.77.3.** through Pragraph **19.77.6.** below; however, more time will be used to extend air deflector.

19.77.1. Turn brake release knob counterclockwise until brake is released.

19.77.2. Extend the air deflect door manually as far as possible.

19.77.3. Turn brake release knob clockwise until snug.

CAUTION: Damage to the brake and no-back assembly will result if the brake release knob is turned too tight.

19.77.4. Release hand crank from stowage brackets.

19.77.5. Engage hand crank by pressing in with 5 to 10 pounds of pressure. While maintaining this pressure, crank counter-clockwise until air deflector door is fully extended.

19.77.6. Stow handle.

19.77.7. Air deflector extension checklist-Complete.

19.78. Air Deflector Retraction Checklist.

CAUTION: Damage to the brake and no-back assembly will result if the hand crank is engaged and stowed when the brake is released.

19.78.1. Turn brake release knob counterclockwise very slowly until the air deflector door retracts.

WARNING: Never exceed more than five turns counterclockwise when using the brake release knob as failure of the brake and no-back assembly may occur.

19.78.2. Pull air deflector door to the fully retracted position.

19.78.3. Retighten brake release knob until snug.

NOTE: Retraction may also be accomplished as follows; however, more time will be used to retract the air deflector.

19.78.4. Turn brake release knob clockwise until snug.

CAUTION: Damage to the brake and no-back assembly will result if the brake release knob is turned too tight.

19.78.5. Release hand crank from stowage brackets.

19.78.6. Engage hand crank by pressing in with 5 to 10 pounds of pressure. While maintaining this pressure, crank clockwise until air deflector door is fully retracted.

19.78.7. Stow handle.

19.78.8. Air deflector retraction check-Completed.

19.79. C-141 Aircraft Load Planning For Airdrop/Airland Mission.

19.79.1. When planning a heavy equipment, CDS, or personnel airdrop while airlifting airland/passengers and cargo, primary consideration will be given to the safety of the troops, the crew, and personnel on the ground in the event of a malfunction during the airdrop. To ensure safety, aircraft configuration, seating arrangement, and cargo load must be evaluated.

19.79.2. Restrictions (***Note*** 1):

19.79.2.1. When dropping heavy equipment using EFTC, ensure that the bolts in the link adapter, the latch assembly and the bolts through the left spacers in the link assembly are in a straight line with the longitudinal axis of the aircraft.

19.79.2.2. Anchor cable height from aircraft floor is 81-inches.

19.79.2.3. Retriever winch/pulley from aircraft floor is 80-inches.

19.79.2.4. Distance between anchor cables:

19.79.2.4.1. CDS or heavy equipment-123-inches.

19.79.2.4.2. Personnel (***NOTE*** 2)-11 inches inboard/63 inches outboard at the forward bulkhead; 79 inches inboard/88 inches outboard at the intermediate supports.

19.79.2.5. Airland cargo height:

19.79.2.5.1. Heavy equipment and personnel-rolling stock/palletized cargo will not interfere with overhead rigging equipment. Palletized cargo on personnel aircraft will not exceed the 80 inches height limitation; however, it must not interfere with overhead rigging equipment.

19.79.2.6. Cargo location on personnel airdrops (static fine or HALO/HAHO). Cargo may be loaded off centerline if required.

19.79.2.7. Troop Door Exit. No cargo win be located between FS 1281-1412. Due to roller conveyor location, palletized cargo will not be located aft of FS 1237. Cargo may be loaded on the ramp provided the restrictions in the Dash Nine are complied with.

19.79.2.8. Ramp exit. No cargo will be aft of FS 1358.

WARNING: Static line personnel airdrop over the ramp is prohibited.

19.79.3. Airland cargo pallets. When carrying airland cargo pallets forward of airdrop platforms, the right locks being utilized in the cargo pallets will be dialed out to maximum AFT restraint settings. All other locks will be set according to Dash Nine and checklist.

19.79.4. Personnel distance forward of airdrop rigging equipment is 60 inches minimum.

19.79.5. Safety aisle to rear of aircraft is required on all missions and is also required along side of cargo (Notes 3 and 4).

19.79.6. Access to dual rail control handles. Canvas seats 1L, 1R, 2R, and 3R will not be used to ensure access.

19.79.7. Access to operate CDS equipment. Canvas seats 1R, 2R, and 3R will not be used.

NOTES:

1. Restrictions will not be exceeded.
2. Personnel airdrops may be performed with only one troop door configured for airdrop.
3. CDS/Heavy Equipment Configuration. A maximum of three rows of canvas seats can be used. The remaining vacant row serves as a safety aisle.
4. Floor Loading of Soldier Rucksacks. Rucksacks will not be positioned under outboard sidewall seats during heavy equipment drops. See paragraph **17.17.** for additional guidance.

Chapter 20

AEROMEDICAL EVACUATION (AE)

Section 20A—General Information

20.1. Mission:

20.1.1. The primary function of the C-141 aircraft for AE is transport of ill or injured DoD members and their dependents requiring medical support. These AE missions may be directed at any time. The C-141 aircraft will be used with the concurrence of the appropriate medical validating authority.

20.1.2. AE personnel will utilize the procedures in applicable AFI/H 11-2 and 41-series directives and this AFI to accomplish the AE mission.

20.2. Not Used.

20.3. Waivers and Revisions.

20.3.1. Waivers. Use **Chapter 4** waiver protocol for AE related questions or waivers.

20.3.2. Revisions. Use **Chapter 1** protocol for improvement recommendations.

20.4. Aeromedical Evacuation Forms. Forms required will be per applicable AFI/H 11-2 and 41-series publications.

Section 20B—Aeromedical Evacuation Command and Control.

20.5. Operational Control and Reporting of Aeromedical Evacuation Forces:

20.5.1. HQ AMC is the lead command for AE. The aircraft commander is responsible for ensuring the safety of the flight crew, AE crew, and all patients and passengers. The MCD is responsible for providing medical care to the patients. In matters concerning flight safety, decisions of the aircraft commander are final; in matters of patient care, decisions of the MCD are final.

20.5.2. Operational control of AE missions is the same as for other airlift missions.

20.5.3. The AMC Command Surgeon (HQ AMC/SG) is responsible for providing standards and procedures concerning the treatment of patients in-flight, and for approval of any medical equipment used on AE missions.

20.5.4. The MCD will advise the aircraft commander when a patient's condition or use of medical equipment may affect aircraft operations.

20.5.5. The AEOO, if available, is responsible for supervising flight line execution of AE missions. The MCD is directly responsible for the safety and medical well being of patients on the aircraft and coordinates enplaning and deplaning procedures with the AEOO and supporting agencies.

20.6. Aircraft Commander Responsibilities.

20.6.1. Assist the MCD in obtaining patient support requirements based on local availability. The MCD will coordinate with the aircraft commander for integration of the flight and Aeromedical Evac-

uation Crew Members (AECM) for continuing missions in which no crew changes take place including en route transportation, dining, billeting, etc.

20.6.2. Brief the AE crew on the mission, flight plan, flight profile, and current threat (if applicable).

20.6.3. Maintain cabin altitude at the level requested by the GPMRC/TPMRC, tasking AE command element, or MCD.

20.6.4. Coordinate with the MCD to determine if any flight restrictions are necessary due to patient conditions and if passengers and cargo may be carried.

20.6.5. Coordinate with the MCD to insure mission required equipment is available/installed as necessary.

20.6.6. Advise the AECMs of intentions to start engines, taxi, itinerary changes, in-flight difficulties, etc.

20.6.7. Brief the MCD on additional responsibilities of the flight crew.

20.6.8. During Aeromedical Readiness Missions (ARM), coordinate with the Mission Clinical Coordinator (MCC) on planned simulated emergencies and training activities.

20.6.9. Patients or passengers may visit the flight crew compartment per **Chapter 5** of this instruction. The control of patients rests with the MCD, while control of the passengers is the responsibility of the flight crew, in conjunction with the MCD.

20.6.10. Transmit load messages and radio transmissions to GPMRC/TPMRC or tasking AE command element/ground personnel as requested by the MCD.

20.6.11. Coordinate Crash/Fire/Rescue (CFR) vehicle requirements when transiting airfields that are unfamiliar with AE requirements. CFR vehicle will stand by per AFI 32-2001, *The Fire Protection Operations and Fire Prevention Program*, and T.O. 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*.

20.7. Flight Crew Responsibilities.

20.7.1. Assist the AE crew with aircraft systems.

20.7.2. Provide AECMs who are not qualified in the C-141 with information identified in paragraph **20.10.1.**.

20.7.3. Coordinate an emergency evacuation plan with the MCD.

20.7.4. Operate aircraft systems, i.e., doors, ramps, emergency exits, etc.

20.7.5. Assist the AE crew as necessary, providing such assistance does not interfere with primary duties.

20.7.6. Operate galley and prepare food and beverages for food service provided to patients by AECMs.

20.7.7. Assist with aircraft configuration for AE operations.

20.7.8. Complete pre-flight/emergency briefings.

20.7.9. Assist with and perform applicable roles during engine running onload (ERO) procedures according to AFI 41-312, Volume 1, and paragraph **20.24.**.

20.8. Aeromedical Evacuation Crew Responsibilities.

20.8.1. Primarily responsible for patient activities.

20.8.2. Assist flight crew/maintenance with aircraft configuration for AE operations.

20.8.3. Install and remove medical equipment/supplies.

20.8.4. Assist the loadmaster with observation and care of passengers when it doesn't interfere with primary duties.

20.8.5. The MCD or designated AECM should be on aircraft inter-phone (headset) for all phases of flight, and will be on aircraft inter-phone during critical phases of flight to include takeoff and landing.

20.8.6. If C-141 qualified/certified, provide AECMs who are not qualified/certified in the C-141 with information identified in paragraph **20.10.1.**.

20.9. Patient Death InFlight. When a suspected death occurs inflight, the planned itinerary will not be interrupted if the next scheduled stop is a US military airfield. If the next stop is a civilian airfield that does not service a US military medical facility, or a foreign military airfield, that stop will be over flown (mission requirements allowing). Coordination with command and control agencies is essential. The GPMRC/TPMRC or tasking AE command element must ensure that the MTF anticipating the aircraft's arrival at the civilian/foreign military airfield is informed of the cancellation.

Section 20C—Aeromedical Evacuation Crew Complement and Management

20.10. Aeromedical Evacuation Crew Complement:

20.10.1. Aircrew Qualification. AECMs must be fully qualified on at least one of the following aircraft; the C-9, C-17, C-130, or C-141, and are authorized to log primary flight time while performing duties on AE missions. Prior to being utilized as a certified AECM on C-141 aircraft, AECMs must receive training as directed in AFI 11-2AE, Volume 1, *AE Aircrew Training*. A flight crewmember is ultimately responsible for emergency egress and cabin safety.

20.10.2. Crew Complement. A basic AE crew consists of two FNs and three AETs. An alert crew consists of one FN and two AETs. An augmented AE crew consists of one additional FN and AET. The group/squadron chief nurse can adjust the crew complement. The group/squadron chief nurse is the final authority for increasing or decreasing the number of AECMs assigned to AE missions. Physicians, nurses, medical technicians, or other personnel designated as medical attendants (i.e., Critical Care Air Transport Team (CCATT) members) to specific patients does not constitute an augmented crew and does not extend crew duty time. Basic crews will not be augmented after crew duty has started.

20.10.3. The appropriate GPMRC/TPMRC or tasking AE command element will notify the command and control agencies or flying organization operations officer of the AE crew complement for each AE mission on C-141 aircraft.

20.11. Aeromedical Evacuation Crew Management. AECMs will be managed according to **Chapter 3** of this instruction.

Section 20D—Aeromedical Evacuation Aircrew Procedures

20.12. Checklists:

20.12.1. General. This instruction and AFI 11-215, *Flight Manual Program (FMP)*, set policy and provide guidance for the standardization of contents and maintenance of flight crew checklists. Checklists will be maintained per AFI 11-215 and applicable MAJCOM supplement.

20.12.2. Applicability. This instruction applies to all AECMs assigned to AMC and AMC-gained AE units. It also applies to theater assigned AECMs performing AE duties on the C-141 aircraft.

20.12.3. During all aircraft operations, AECMs will carry and use the guidance contained in their current abbreviated flight crew checklist.

20.12.4. Only MAJCOM/DO and SG approved inserts/briefings pertaining to crew positions will be kept in the abbreviated flight crew checklist binders.

20.12.5. Information in the AECM checklists will not be changed except by published revisions or changes.

Section 20E—Aeromedical Evacuation Airlift Operations

20.13. General:

20.13.1. Determining Factors. Consider the following factors when transporting patients on the C-141 aircraft; patient's diagnosis, condition, equipment, oxygen requirements, in-flight time, in-flight patient care requirements, and the number of medical personnel required. Emphasis must always be on providing quality and appropriate care while minimizing potential risks during transport.

20.13.2. Patient Load Planning Factors. The GPMRC/TPMRC or tasking AE command element determines the size/composition of the patient load on AE missions. AE mission planning factors will be per applicable AFI/H 11-2 and 41-series directives.

20.13.3. Patient Preparation. A flight surgeon, if available, will determine the patient's suitability for AE on the C-141 aircraft. Medical authorities requesting the patient's evacuation must be informed of the in-flight physical stress on the patient. If the MCD determines the patient's medical condition is beyond the capability of the AE crew or aircraft, they will contact the GPMRC/TPMRC or tasking AE command element for further guidance. The MCD, in coordination with the appropriate theater medical validating authority, may refuse to accept any patient whose medical condition is beyond their capability. The MCD will advise the aircraft commander when a patient's condition or use of medical equipment may affect aircraft operation.

20.13.4. Equipment for AE Missions. Prior to use onboard AE missions, all medical equipment must be tested and deemed air worthy, and then approved for use by HQ AMC/SGX. For those unique patient moves requiring equipment that has not met the above criteria, contact GPMRC/TPMRC or tasking AE command element. GPMRC/TPMRC or tasking AE command element will obtain approval prior to use onboard the aircraft (applies to that specific mission only). AECMs are responsible for all medical supplies and equipment.

20.13.5. Aircraft Security. See **Chapter 7**.

20.14. En Route Diversions:

20.14.1. The MCD is the medical authority onboard all AE missions and has the responsibility to determine what is beneficial or detrimental to the patient(s). If a physician is onboard, as an attendant to a patient, they will make decisions involving that specific patient's care and may be consulted for advice as appropriate. Specific guidelines are contained in applicable AFI/H 41-series.

20.14.2. Should a diversion become necessary due to a change in patient's condition, the aircraft commander will make every effort to comply with the requests of the MCD. Establish communications with the responsible command and control agencies, who will relay the information to the appropriate GPMRC/TPMRC or tasking AE command element.

20.14.3. Should an en route diversion become necessary for reasons other than a change in patient's condition, the aircraft commander will coordinate with the MCD before deciding the point of landing. The welfare of the patients is a prime consideration in all such decisions; however, safety is the final determinant. The aircraft commander notifies the responsible command and control agencies of the diversion and requests the appropriate medical agencies be notified.

20.14.4. Normally, patients will be advised of changes in itinerary and reasons for the diversion.

20.14.5. If the MCD determines the diversion will be detrimental to a patient, or the aircraft commander determines the diversion to be unsafe, the command and control agencies will be advised and guidance requested.

20.14.6. ARMs are the primary means of preparing for AE airlift. These missions can be diverted to fulfill "real" versus "simulated" patient airlift requirements. All medical equipment/kits will be kept operationally ready at all times.

20.14.7. Opportune Airlift. Opportune airlift is preferred to launching a special airlift aircraft. The appropriate GPMRC/TPMRC or tasking AE command element and airlift agency should direct the move. Use of opportune airlift is considered an unscheduled AE mission, and managed/reported in the same manner as any other AE mission, to include the change of the mission number when patient(s) is/are onboard. AECMs on these missions will either be qualified/certified or under supervision while gaining qualification/certification in the affected aircraft.

20.15. Ground Operations. Engines should be shut down during enplaning and deplaning of patients.

20.16. Refueling Operations.

20.16.1. Refueling normally begins after deplaning patients are off the aircraft and prior to enplaning that station's patients. This minimizes the number of souls on board in case of an emergency. Servicing will be per AFI 32-2001 and T.O. 00-25-172.

20.16.2. Concurrent servicing may be accomplished with patients onboard provided:

20.16.2.1. The Chief Servicing Supervisor (CSS) coordinates with all personnel involved prior to beginning concurrent operations.

20.16.2.2. Prior to starting concurrent servicing, the total number of patients, passengers, and crew on board the aircraft will be given to the fire department.

20.16.2.3. Loading ramps/stairs are in place for immediate use and exits (excluding the overhead escape hatches) are opened for egress.

20.16.2.4. The aircraft is thoroughly ventilated.

20.16.2.5. At least two AECMs (one must be a FN) remain onboard to observe patients and assist patients in the event of an egress.

20.16.3. If cabin lights, lavatories, electrical power to operate medical equipment and aircraft inter-phone are operating prior to refueling, use may be continued during servicing operations. Only those systems, switches or electrical circuits needed to operate equipment to sustain life, may be turned on and used during refueling.

20.16.4. Patients and passengers will not enter or exit the aircraft during servicing. Crewmembers may enter or exit the aircraft only when performing essential duties associated with the concurrent servicing operation.

20.16.5. A member of the flight crew must be positioned in the passenger compartment and have intercom contact with the CSS during refueling operations.

20.16.6. Activities around the aircraft will be kept to a minimum during the refueling process. Onload/offload patient and passenger baggage prior to or after refueling.

20.17. Aircraft Pressurization. Normally altitude restrictions are passed from the GPMRC/TPMRC or tasking AE command element to command and control agencies for flight planning purposes. The MCD will advise the aircraft commander of any new cabin altitude or rate of cabin altitude change restrictions during the pre-flight briefing update.

20.18. Aircraft Configuration.

20.18.1. On dedicated AE missions, configure the aircraft during pre-flight, per T.O. 1C-141B-9.

20.18.2. Litter Support Provisions.

20.18.2.1. Roller conveyers will be stowed, unless required for comfort/baggage pallets. Rollers on the ramp will not be in place during patient onloading or offloading operations.

20.18.2.2. Litter patients will be enplaned feet first and deplaned head first due to minimal degree of ramp incline. This eliminates the need to turn litter patients around on the cargo ramp prior to placing them in the litter tier.

20.18.2.3. Litter straps (4-clamp or 3-clamp) will be secured to the aircraft floor prior to takeoff. If litters are not in the tier, loose straps will be secured in a top and bottom litter clamp on the centerline or sidewall stanchion. This will remove a free swinging strap hazard.

20.18.2.4. A four (4) high configuration using the centerline stanchions is approved for all AE related missions.

20.18.3. Available litter spaces and ambulatory seating will depend on the aircraft cabin's mission configuration.

20.18.4. Therapeutic Oxygen. Therapeutic oxygen for patient use is available on the aircraft.

20.18.5. Patient and passenger emergency oxygen is available on the aircraft. Patients and passengers will use the applicable passenger emergency oxygen system.

20.18.6. AECMs will have portable oxygen available. AECMs will use an MA-1 portable oxygen bottle, or equivalent, which will be secured near their assigned seat.

20.18.6.1. Dash 21/Alternate Mission Equipment (AME) shops ensure MA-1 portable oxygen bottles are serviceable and properly maintained, tested, and stored. Dash 21/AME personnel ensure additional MA-1 oxygen walk around bottles are available for each AE crew member flying in a primary crew position on AE missions.

20.18.7. Do not secure aircraft or medical equipment adjacent to an emergency exit in a manner that will prevent or impede egress.

20.18.8. Life Preservers. MB-1 flotation devices should be used for litter patients. If unavailable, use the Adult/Child life preserver for litter patients.

20.18.9. Patients not normally transported on the C-141 aircraft:

20.18.9.1. Floor loaded patients with external devices dependent on gravity, i.e., foley catheters or chest drainage systems.

20.18.9.2. High risk neonates without special medical supervision from a neonatal team.

20.19. Passengers and Cargo.

20.19.1. The aircraft commander, with the concurrence of the MCD, will ensure maximum aircraft utilization for passengers and cargo. Passenger restrictions based upon patient considerations will be identified when seats are released. At stations with an GPMRC/TPMRC or tasking AE command element, the AEOO/GPMRC/TPMRC or tasking AE command element will advise the appropriate command and control agencies on the number of seats available for passengers.

20.19.2. Cargo and passengers may be carried with patients unless a clear detriment to the health and well being of the patient or passengers can be demonstrated. The decision will be made by the MCD, considering the need for maximum utilization of the aircraft. Conflicts will be referred to the respective GPMRC/TPMRC or tasking AE command element for a decision. Litters will be positioned forward of cargo pallets (if possible). If cargo is in place, and the aircraft commander and MCD agree, patients may be transported aft of the cargo.

20.19.3. Cargo will not be bumped except in unusual/abnormal cases, and only after the MCD has coordinated with the aircraft commander and notified the local GPMRC/TPMRC or tasking AE command element.

20.19.4. Do not move ambulatory patients to litters in order to provide seating for additional patients or passengers.

20.19.5. When required/mission load permits, a minimum of one seat will be reserved for every three litter patients on all AE missions. A minimum of two litters will be set up for ambulatory patient use on mission legs scheduled to exceed four hours in length. In addition, an emergency litter will be set up on all AE missions.

20.19.6. Hazardous cargo will not normally be transported aboard AE missions except in extreme circumstances.

20.20. Crash/Fire/Rescue.

20.20.1. Aircraft carrying patient(s) will be provided CFR protection per T.O. 00-25-172. Stand-by CFR vehicle is not necessary during normal operations. A CFR vehicle can be available upon request. The flight crew will coordinate CFR requirements.

20.20.2. At non-AMC bases, non-U.S. military bases, and civilian airfields, the controlling agency will coordinate the CFR coverage, as necessary. The request for CFR vehicle coverage may be denied. This will not prevent refueling operations from occurring.

20.21. AE Call Sign/Use of Priority Clearance.

20.21.1. For AE missions, use the call sign "Air Evac" followed by the five digit aircraft number (i.e., Air Evac 12345) or mission designator (as required by FLIP). Revert to standard call sign when the AE portion of the mission is completed.

20.21.2. The AE "priority clearance" will be used when carrying patients classified as "urgent" or "priority," who require urgent medical attention. AE priority will only be used for that portion of the flight requiring expedited handling. Aircraft commanders will request priority handling if AE missions are experiencing long delays during takeoff or landing phases, that will affect a patient's condition.

20.21.3. This does not allow use of AE priority status simply to avoid Air Traffic Control (ATC) delays, make block/departure times, or avoid inconveniences. ATC agencies do not question the motive when an AE priority is declared. Use this status judiciously.

20.22. Load Message.

20.22.1. At military bases, the flight crew will pass inbound load messages to the proper command and control personnel. At civilian airfields, ground control will be notified.

20.22.2. The MCD will complete an AF Form 3858**, C-130/C-141 Aeromedical Evacuation Mission Offload Message**, according to the appropriate AFI 41-series instruction.

20.23. Change in Patient Status. Change in patient status will be managed according to the appropriate AFI 41-series instruction.

Section 20F—Contingency Operations

20.24. Engine Running Onload (ERO) Procedures.

20.24.1. ERO procedures are outlined in AFI 41-312, Volume 1. ERO procedures for loading patients are authorized for all contingency operations when a time critical environment exists (i.e., non-secure landing zones, etc.), and minimum ground time is essential. ERO procedures can be practiced/trained during ARMs, joint training operations, exercises, etc.

20.24.1.1. The loadmaster will be positioned on the left side, at the foot of the ramp and on headset during actual onload procedures. The loadmaster will observe for aircraft threats, and will enforce compliance with safety requirements.

20.24.1.2. Vehicle supervision is the loadmaster's responsibility.

20.24.1.3. If duties permit, loadmasters will assist AECMs in securing patients.

20.24.1.4. When litter patients are wearing personal gear (i.e., web belts, canteen, helmets, flak vests, etc.), consider loading three (3) high versus four (4) high in the centerline stanchions, to increase space between litters to accommodate gear. If situation requires/permits, remove personal gear from patients and secure on ramp or in a designated area.

20.25. Floor Loading Procedures.

20.25.1. Floor Loading Procedures. Floor loading procedures are outlined in AFI 41-312, Volume 1. Floor loading procedures for loading patients are authorized for all contingency operations when a time critical environment exists (i.e. non-secure landing zones, areas faced with enemy siege/hostile fire, humanitarian reasons, etc.), and minimum ground time is essential. Floor loading procedures can be practiced/trained during ARMs, joint training operations, exercises, etc. The cargo area floor will be configured with all rollers stowed. The onload can be accomplished with only the center two columns of rollers stowed, if time constraints become critical. Two crewmembers are required to work simultaneously in securing the opposite sides of the litters to the floor (applies when securing two or three litters together). See AFI 41-312, Volume 1, for enplaning sequence.

20.25.1.1. Ambulatory Patients: If available, any cushioning material may be used for seating, to prevent the patient from having to sit on the bare cargo area floor. Seat ambulatory patients so they face forward in the aircraft. Attach a tiedown device (cargo tiedown strap) for each row of patients, in a manner that it will provide forward restraint and body stability. See T.O. 1C-141B-9 for proper use of the tiedown device. This procedure is similar to the procedure in paragraph **17.20.**.

20.25.1.2. Litter Patients: Position litters side-by-side and longitudinally on the cargo area floor, with the patient's head toward the aft of the aircraft. A maximum 33 litters, comprised of 11 rows of three litters, can be floor loaded. Medical equipment can be secured on a litter(s) in the forward right sidewall litter tier. Secure the litters to the aircraft floor using the following procedures (see **Figure 20.1.**):

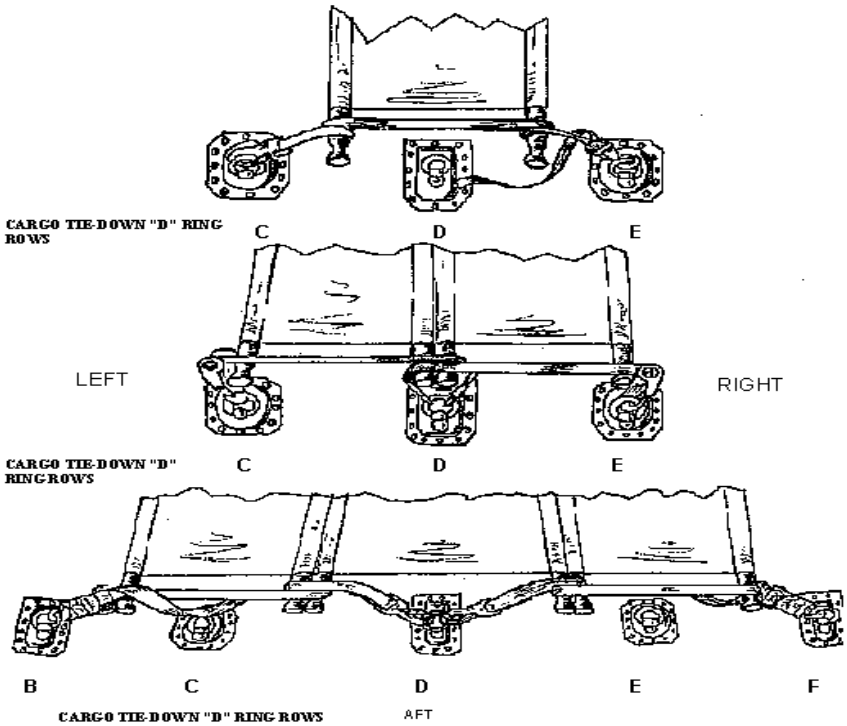
20.25.1.2.1. One litter: Center litter over "D" column. Use one tiedown device at each end of the litter. Connect clamp end of device to a tiedown ring in the "C" column, and run strap webbing over the litter handles, wrapping once around each handle. Attach the hook on the ratchet end of the tiedown device to a tiedown ring in the "E" column on the other side of the litter. Remove slack from strap webbing, and ratchet the tightening device (see T.O. 1C-141B-9 for proper use of the tiedown device). Repeat process at other end of litter.

20.25.1.2.2. Two litters: Place litters side-by-side, and align inboard litter handles over "D" column. Use two tiedown devices at each end of the litters. Connect clamp end of tiedown devices to tiedown ring in "D" column, and run strap webbing over both inboard handles, then over respective outboard handle. Do <u>not</u> wrap strap webbing around any handles. Attach the hook on the ratchet end of the tiedown devices to the tiedown ring in "C" or "E" column (as applicable). Remove slack from strap webbing, and ratchet the tightening device (see T.O. 1C-141B-9 for proper use of the tiedown device). Repeat process at other end of litter.

20.25.1.2.3. Three litters: Place litters side-by-side, and center inboard litter over "D" column. Use two tiedown devices at each end of the litters. Connect clamp end of tiedown devices to tiedown ring in "D" column, and wrap strap webbing once around applicable paired litter handles, then over respective outboard handle. Do <u>not</u> wrap strap webbing around outboard handles. Attach the hook on the ratchet end of the tiedown devices to the tiedown ring in "B" or "F" column (as applicable). Remove slack from strap webbing, and ratchet the tightening device (see T.O. 1C-141B-9 for proper use of the tiedown device). Repeat process at other end of litter.

20.26. Aerial Refueling (A/R). Aerial refueling is an option, which should be considered when planning urgent, or priority patient airlift missions. A/R is not desirable in all medical situations, and in some cases may be detrimental to patient(s). Approval of A/R must be obtained from HQ AMC/SG prior to mission set up.

Figure 20.1. Floor Loading Litters Tiedown Diagram



Chapter 21

SEARCH AND RESCUE

21.1. This chapter is not used for the C-141 aircraft.

Chapter 22

EMERGENCY NUCLEAR AIRLIFT (ENAF)

Section 22A—Mission Preparation

22.1. Introduction. Use this chapter when airlifting nuclear weapons during an emergency.

22.2. Emergency Nuclear Airlift. You may be tasked at any time to airlift nuclear weapons. You could be diverted while en route or be tasked as part of a large scale operations plan (OPLAN) to evacuate or re-supply an entire theater. The amount of preparation and assistance you receive will depend entirely on the length of time directing MAJCOM or C2 agency has to move the weapons. Use the Emergency Nuclear Airlift Operations Guide located in this chapter.

22.3. Conduct of Operations. You should be briefed on and receive detailed instructions from a specific OPLAN or mission directive. If there is a conflict between this volume and the instructions in an OPLAN or mission directive, use the OPLAN or mission directive.

22.4. Emergency Nuclear Airlift Standards. In an emergency, the objective is to move the weapons safely in a short time. You are expected to use sound judgment and common sense in what may be a turbulent or tense environment. Pay particular attention to the following areas:

22.4.1. Nuclear weapons must be handled safely. The most immediate hazard is the high explosive that can be set off by shock or heat in most nuclear weapons. Use standard aircraft dash-9 loading procedures. Keep the loading controlled and orderly at all times. Load or handle only one item or pallet at a time. You may ask shipper or receiver personnel to help, but the overall aircraft loading responsibility still belongs to the aircrew. Time permitting, you may refer to Technical Order (TO) IC-141B-16-1 or -22-2, section I, 11, 111, or IV, for specific instructions that could help you during onload or offload. Step-by-step use of the dash-16 is not necessary.

22.4.2. Load plan:

22.4.2.1. If you are required to move the maximum number of one type of weapon, section VI of the dash-16-1 is the best guide to determine where to position the weapons. Use the maximum tested figure.

22.4.2.2. For mixed loads (more than one type of weapon), base the load plan on how many weapons can be properly restrained using dash-9 criteria. Do not allow weapons to rub or touch each other when tied down.

22.4.2.3. You may use the dash-9 to compute shoring requirements or section VI of the dash-16-1, which shows parking and rolling shoring requirements for each weapon. For winching operations, the dash-16 is a good guide for positioning approach shoring.

22.4.3. Use standard dash-9 restraint criteria. You may use the tiedown patterns in the dash-16-1, which may exceed dash-9 criteria. The tiedown patterns will aid you in floor-planning a maximum tested load.

22.4.4. The route of flight must not violate restrictions in the classified United States Air Force Special Weapons Overflight Guide (SWOG). Overflying a foreign country with nuclear weapons is an

extremely sensitive issue, even in an emergency airlift. Comply with the SWOG at all times. If you don't have access to the SWOG, request a route of flight that complies with the SWOG through command and control center (CCC) channels. The C2 must ensure the route of flight is provided to the aircrew by the most expeditious means available. If no route of flight is provided, fly normal air traffic control (ATC) routings to the destination. Do not divulge the nature of your cargo to any en route ATC facility or country to obtain a specific clearance.

22.4.5. United States military custody of nuclear weapons is required. Normally, the copilot is the courier who has custody of the nuclear cargo for the flight. Under certain conditions, the shipper may furnish United States military couriers who will retain custody of the weapons in flight. See paragraph **22.10.** for custody procedures.

22.5. Aircrew Selection. All C-141 active duty aircrews may be used for ENAF. Time permitting, AMC will use a sliding scale of options, which may be one or more of the following:

22.5.1. Assign prime nuclear airlift force (PNAF) loadmasters (LM) and pilots so as to have one or the other on each aircraft.

22.5.2. Place PNAF pilot and LM teams at the onload bases to assist with the loads and flight plans.

22.5.3. Use non-PNAF crews in a prepared OPLAN scenario with preplanned, organized loads.

22.5.4. Use non-PNAF crews in a short notice, bare-base environment with little or no advance preparation or assistance.

22.5.5. Use associate AFRC AE crews with approval.

22.6. Aircrew Requirements.

22.6.1. Crew complement will be according to the OPLAN or specific mission directive. If not specified, use a normal crew complement (basic crew, only one LM required).

22.6.2. You may be issued side arms depending on the circumstances. If specific arming requirements are not in the OPLAN or mission directive, the airlift managers directing and controlling the airlift will determine which crew positions, if any, will be armed. (See **Chapter 7**, this volume, for arming authority and procedures). If the AMC crew must assume custody of the nuclear weapons, the courier officer should be armed.

22.6.3. If you are tasked for a mission that has a higher security classification than your personal security clearance, you will be authorized emergency access to enough information to complete the mission.

22.7. Aircrew Briefings:

22.7.1. You should be briefed on the following:

22.7.1.1. Purpose of the mission

22.7.1.2. Classification of the mission, cargo, and locations

22.7.1.3. Itinerary (including confirmation of prior coordination for hazardous material as required by instrument flight rule (IFR) supplement and alternate airfields)

22.7.1.4. Cargo (line numbers from T.O. 11N-20-llshould be included. If not, attempt to obtain them from the fire department before starting the onload.) (TO11N-20-11 is a classified TO that assigns an unclassified line number to each nuclear weapon.)

22.7.1.5. "No lone zone," two-person concept, and security requirements

22.7.1.6. Personnel authorized to sign for nuclear weapons at the destination

22.7.1.7. Current intelligence, including threat analysis

22.7.1.8. SWOG route of flight restrictions

22.7.1.9. Airborne intercept (JSWOG)

22.7.1.10. Jettisoning (SWOG)

22.7.2. The aircraft commander will ensure emergency procedures in paragraph **22.12.** are briefed.

22.8. Emergency Mission Kit.

22.8.1. The emergency mission kit is a set of unclassified T.O.s that should be a part of the aircrew ENAF trip kit.

22.8.1.1. T.0. 1C-141B-16-1, *Loading and Air Transport of Nuclear Weapon Cargo (Non-palletized).* Section VI, Emergency Logistic Movement Procedures, has tables of maximum tested loads and load plans for each item.

22.8.1.2. T.O. IC-141B-16-2, *Loading and Air Transport of Nuclear Weapon Cargo (Palletized).* Section VI has tables that list the number of items for each pallet, shoring (under wheel or under frame), maximum tested load, pallet overhang, and comments for each item. The comments will refer you to an appropriate figure if off-pallet tiedowns are required.

22.8.2. The dash-16 basically amplifies the dash-9. You may use any or all of the portions of the dash-16 and be in compliance with the dash-9.

22.8.3. The emergency mission kit may contain a nuclear weapons template kit. The template kit consists of six plastic templates (five weapon and one shoring) in a vinyl plastic pouch designed for a 2-, 3-, or 5-ring binder. It may be placed in the binder with TO 1C-141B-16-1. Templates are designed for use with AF Form 4086, **C-141 Nuclear Floor Plan Worksheet**. Five copies of AF Form 4086 should be included in the mission kit.

Section 22B—En Route Procedures.

22.9. General. Use these procedures in addition to the normal operating procedures in the rest of this regulation.

22.9.1. Flight Plans. Enter "hazardous cargo" and the mission number in the "other information" section of the flight plan. If you are carrying inert weapons, trainers, or other items that could be mistaken for real weapons by crash or rescue personnel in an emergency, enter "inert devices."

22.9.2. Radio Calls:

22.9.2.1. Departure (onload) base. Before starting the onload, tell the tower to notify the fire department the onload is commencing. Prior to start, give the controlling agency (ground or tower

the parking location and approximate engine start time and announce there is hazardous cargo aboard the aircraft. Ensure a fire truck is standing by the aircraft for engine start.

22.9.2.2. En route or offload base. At least 30 minutes prior to landing, contact one of the following: base operations, command post, or control tower. Pass your mission number and verify that the hazardous cargo information has been received. If the arrival base does not have hazardous cargo information, request the following be relayed immediately to the crash or fire protection agency and other support agencies as appropriate:

22.9.2.2.1. Aircraft call sign, type, and mission number

22.9.2.2.2. Estimated time of arrival (ETA)

22.9.2.2.3. Department of Defense (DOD) explosives hazard class or division (normally 1. 1) or Department of Transportation (DOT) class (normally, class A)

22.9.2.2.4. Net explosive weight (NEW)

22.9.2.2.5. Line numbers from TO I 1 N-20-11 if requested (If possible, obtain line numbers from the base fire department prior to starting the load at the onload location.)

22.9.2.2.6. A request for isolated parking and security forces to meet the aircraft

22.10. Custody of Nuclear Cargo. Appoint a copilot to be the courier officer. The courier officer is responsible for receipt, custody, security, safety, and delivery of nuclear weapons to authorized receivers.

22.10.1. Before accepting and loading nuclear weapons, the shipper briefs the crew (at least the AC, courier officer, and primary LM) on the nature and hazards of the cargo. If anyone on the crew does not get the briefing, give them the appropriate information before the flight. Ask the shipper to point out any specifics you may need to handle the weapon, i.e. tiedown points, forklift stirrups, command disable system (CDS procedures, etc.). The specific procedures in sections 11, 111, and IV of the dash-16 can also provide helpful information on how to load specific weapons.

22.10.2. Time permitting, the courier and LM will inspect the cargo before accepting custody. The courier should have the shipper verify the integrity of a weapons case and replace any broken seals. You may be held responsible for damage at the receiving end if you accept a damaged weapon without documentation. Document damage or broken seals on the DD Form 1911, **Materiel Courier Receipt**, prior to signing for the weapon.

22.10.3. The courier accepts custody of the weapon by signing the DD Form 1911 provided by the shipper. Use this form to transfer cargo custody to replacement couriers.

22.10.4. Release custody of the cargo only to a replacement courier or someone authorized to sign for nuclear material. Authorized receivers are identified by the shipper, by message, or through the AMC command and control system.

22.10.5. Time permitting, refer any questions to the TACC using secure lines of communication.

22.11. Security Procedures. The host base is responsible for providing security for the aircraft and the nuclear cargo. The courier officer (who has custody of the weapons) is the final authority on security matters; however, you should follow the advice and procedures of the host security force as much as possible. If the situation is serious and you must load and depart quickly, use your judgment and dispense with the

formalities. Prior to takeoff, the AC will ensure security support at all stations being transited that day through the TACC Command Center.

22.11.1. Home Station. Time permitting, conduct a thorough visual search of the aircraft for unauthorized explosives or stowaways. Use a bomb detection dog if available, If time is critical, do not delay the mission to "sanitize" the aircraft.

22.11.2. Onload Base. The host base should set up a restricted area, normally with ropes and stanchions, around the aircraft.

22.11.2.1. Entry Control. Use one entry point to maintain strict control of entry into the area. The entry controller will have a roster of all personnel allowed to enter. Use a copy of the flight orders for the aircrew. Instruct the entry controller to coordinate with the aircrew courier before allowing anyone into the area. (***EXCEPTION***: Allow the weapons convoy to enter the restricted area without delay.

22.11.2.2. "No lone zone. "Do not allow anyone to be alone in the restricted area or aircraft when nuclear weapons are present (inside either the area or the aircraft). The purpose of a "no lone zone" is to prevent any one person from tampering with a nuclear weapon. The easiest way to enforce a "no lone zone" is to always be in pairs inside the restricted area (for example, two aircrew members, two shippers, or one aircrew member and one shipper.

22.11.2.3. In-flight. Do not allow anyone to be alone in the cargo compartment.

22.11.2.4. Arrival or En Route Base. As soon as the engines are shut down, deploy sufficient crewmembers around the aircraft to control access to the aircraft. Until the host base security force is established, the only personnel authorized near the aircraft are aircrew members and those support personnel necessary to install landing gear pins, ground power, and wheel chocks. Monitor these people at all times. Keep all doors closed and be prepared for an immediate departure until the host base establishes security.

22.12. Emergency Procedures.

22.12.1. Security Emergencies. If confronted with a hostile force, you may use deadly force to protect nuclear cargo. To the fullest extent possible, you will resist any attempt by a hostile force to capture a nuclear weapon. Consider any attack on an aircraft loaded with nuclear cargo, including a hijacking attempt, as an attack against the nuclear weapons. Should hostages be used to gain access to, as cover for removal, or to thwart recovery of a nuclear weapon; the welfare and safety of the hostages should be considered in determining actions to be taken. However, the presence of hostages shall not deter the taking of decisive, prompt, and effective action that includes the use of deadly force to recover a nuclear weapon and to prevent unauthorized access to or removal of a nuclear weapon. If you are attacked, take the following actions:

22.12.1.1. Make an immediate takeoff, with the cargo if possible.

22.12.1.2. If the attack occurs during on-loading or off-loading, load the weapons as fast as possible even if improper procedures must be used. Ensure effective cargo restraint, and take off immediately.

22.12.1.3. Some weapons have a CDS that internally destroys the capability of a weapon to achieve a significant nuclear yield. The CDS will be used when capture of a weapon is imminent.

22.12.1.4. Aircrews will not use emergency destruct procedures on nuclear weapons. Emergency destruction (ED) of weapons by shaped charges requires SECDEF approval and will be accomplished by qualified personnel as a last resort. Turn the weapons over to properly identified United States military shipper or receiver personnel who have the capability to receive, authenticate, and carry out ED orders. When two properly identified shipper or receiver personnel concurrently request custody of the cargo for ED purposes, release the cargo using appropriate custody transfer procedures.

22.12.2. Jettisoning Nuclear Cargo. The LM will identify which cargo is and is not jettisonable according to the dash-1. In an emergency, the AC bears a moral obligation to jettison cargo or crash-land where the least amount of damage will result. Use the CDS, if applicable, prior to jettisoning or crash-landing. Record the coordinates of each jettisoned item. Observe the jettison restrictions in the SWOG.

22.12.3. Landing in Foreign Countries. Use a great deal of prudence and keep things very low key. If confronted with demands to board or inspect the aircraft, refer to the status of United States military aircraft in the Air Force Foreign Clearance Guide, which states: "United States military aircraft are sovereign instrumentalities. When cleared to overfly or land in foreign territory, it is United States policy to assert that military aircraft are entitled to the privileges and immunities which customarily are accorded warships. These privileges and immunities include, in the absence of stipulations to the contrary, exemption from duties and taxation; immunity from search, seizure, and inspections (including customs and safety inspections); or other exercise or jurisdiction by the host nation over the aircraft, personnel, equipment, or cargo on board. Air Force aircraft commanders will not authorize search, seizure, inspection, or similar exercises of jurisdiction enumerated above by foreign authorities except by direction of HQ USAF or the American Embassy in the country concerned. Diplomatically, but firmly, refuse any requests to board or inspect, and get help through any available United States channel. Flash priority is authorized.

22.13. Maintenance on Aircraft Loaded with Nuclear Cargo.

22.13.1. Maintenance on an aircraft loaded with nuclear weapons must not violate safety rules normally used with aircraft loaded with conventional explosives. As much as possible, have maintenance and servicing completed before loading nuclear weapons on aircraft. Do not allow maintenance, such as the following, that could increase the possibility of a fire:

22.13.1.1. Using flame or uncontrolled heat-producing items.

22.13.1.2. Repairs on the fuel system, cell, and tank or other maintenance where significant fuel spills are likely to result from disconnected lines, ruptured components, etc.

22.13.2. Aircraft will not be jacked. The temporary lifting of one set of landing gear for minor maintenance (tire change, brake change, bogie maintenance, etc., is not considered jacking.

22.13.3. Do not refuel, de-fuel, or service oxygen while loading or off-loading nuclear weapons. Have a fire truck standby at the aircraft during refueling, de-fueling, or oxygen servicing.

22.13.4. APU maintenance on the aircraft while nuclear cargo is on board will be monitored by the flight engineer or crew chief.

Section 22C—Emergency Nuclear Airlift Operations Guide

22.14. General. This guide describes recommended actions for courier and crew during emergency nuclear airlift operations. It is designed for those missions diverted en route to an on-load site where the crew does not have the opportunity to receive a formal airlift control element (ALCE), home station, or command post briefing. However, even if a formal briefing is given, this guide may be used as a refresher. Security, time, and ground support may not be sufficient to allow using this guide during emergency operations. In such cases, the courier and crew will have to assess all factors and use their judgment on the best course of action to accomplish the mission. Paramount in all decisions is the safety and security of nuclear cargo.

22.14.1. Prior to Onload (either at home station or en route to the onload site):

22.14.1.1. Review crew responsibilities and the procedures to be used during onload (loading method, security setup, cargo receipt, two-person concept). Do not discuss classified information over interphone.

22.14.1.2. If time permits, review the applicable section of the Dash-16. Using the dash-16 is not mandatory; however, it may provide useful loading information for the cargo, such as parking and rolling shoring requirements and tiedown patterns.

22.14.1.3. En route and 30 minutes prior to landing, contact the onload site and notify them of your estimated time of arrival (ETA). Make support requirements known (fuel, materials handling equipment (MHE), transportation, security, etc.) at this time.

22.14.2. Arrival and Onload:

22.14.2.1. Contact the senior security official and request the following: (If you have nuclear cargo on board, keep everyone off the aircraft and provide security until the host security forces assume responsibility.)

22.14.2.1.1. A restricted area to be established around the aircraft. Ropes and stanchions are normally used to denote the restricted area. However, depending on the situation, you may see additional guards, security vehicles, fighting vehicles, etc., rather than ropes. Be flexible. The key is whether the host base is furnishing enough security to protect the nuclear cargo.

22.14.2.1.2. A single entry control point established.

22.14.2.2. The entry controller must allow only those individuals into the restricted area who have been cleared by the courier. Tell the entry controller which individuals are authorized into the area and, time permitting, back it up in writing using crew orders, entry authorization lists (EAL), and prepared shipper lists.

22.14.2.3. While security is being established, contact the shipper and verify identification.

22.14.2.4. After security is established, accomplish the following with the shipper: (***NOTE:*** Accomplish the shipper briefing and cargo inspection if time and the security environment permit.)

22.14.2.4.1. Shipper briefing to include the following:

22.14.2.4.1.1. Nature, hazard, and safety regarding shipment of nuclear weapons cargo, including line numbers from TO 11N-20-11, DOT class, DOD explosive hazard class or division, and NEW.

22.14.2.4.1.2. Courier escort requirements.

22.14.2.4.1.3. Items requiring the two-person concept.

22.14.2.4.1.4. Items that are command disable system (CDS) equipped and if the CDS has been activated (weapon not operational).

22.14.2.4.1.5. Items exposed to an abnormal environment or not operational.

22.14.2.4.1.6. Special handling unique requirements particular to the cargo.

22.14.2.4.1.7. Which individuals required to assist during onload or offload. Pass the information to the entry controller.

22.14.2.4.1.8. Authorized recipients at the offload station. Get this information in writing.

NOTE: If the primary LM and the AC were not present for the shipper briefing, the courier must brief them on the applicable items.

22.14.2.4.2. Cargo inspection:

22.14.2.4.2.1. The primary LM, courier, and shipper will inspect the cargo for broken seals, exterior damage, security to carrier, wheel and casters, tiedown points, etc. If discrepancies are found, have the shipper annotate them on the DD Form 1911.

22.14.2.4.2.2. After the inspection, accept custody of the cargo by signing the DD Form 1911.

NOTE: Prior to accepting the cargo, ensure everything is ready for the on load.

22.14.2.5. During onload or offload; monitor the operation, assist as necessary, and ensure personnel comply with the two-person concept.

22.14.2.6. Once the onload is complete and the crew is ready to start engines, deploy the courier team to maintain security, and, when ready, tell the host base security to break down security and maintain surveillance until departure. ***NOTE:*** In some cases, crew complement and duties may preclude deployment of a complete courier team (courier and two LMs). In these cases, deploy as many personnel as possible without interfering with aircraft operations. Ensure they maintain surveillance of the immediate area during engine start (when feasible). When ready to start, have the courier, LM, or scanner direct security police to break down security and maintain surveillance of the aircraft. Monitor access to the crew entrance door during start if possible.

22.14.3. En Route to Offload:

22.14.3.1. Maintain the two-person concept.

22.14.3.2. Notify the TACC Command Center of your departure time and ETA at the offload station. Be prepared to encode this information.

22.14.3.3. If time permits, review the security and handling procedures to be used at the offload station. Do not discuss classified information over the interphone.

22.14.3.4. Contact the agency specified in flight information publications (command post, base operations, or tower) 30 minutes prior to landing; ask if they have your hazardous cargo information. If they don't, pass the following information:

22.14.3.4.1. Call sign, type aircraft, and mission number.

22.14.3.4.2. ETA

22.14.3.4.3. *Line numbers from TO IIN-20-11 and DD Form 1911.

22.14.3.4.4. If you were not provided line numbers, then provide the following:

22.14.3.4.5. *DOD explosive hazard class or division (normally, 1.1) or DOT class (normally, A)

22.14.3.4.6. *NEW

22.14.3.4.7. A request for isolated parking and for their security forces to meet the aircraft.

22.14.3.4.8. Inert devices, if applicable.

NOTE: *The shipper should give this information.

22.14.4. Offload:

22.14.4.1. Upon arrival, deploy the courier team and provide security until the host security forces assume responsibility and establish the restricted area. Ensure security is provided. Keep all doors closed and all ground personnel off the aircraft until security is established.

22.14.4.2. Maintain the two-person concept.

22.14.4.3. Brief the receiver on the cargo, and transfer custody.

22.14.4.4. Briefing includes:

22.14.4.4.1. Nature, hazard, and safety regarding shipment of the nuclear weapon cargo, including line numbers from TO IIN-20-11, DOD explosive hazard class or division, DOT class, and NEW.

22.14.4.4.2. Courier escort requirements.

22.14.4.4.3. Items requiring the two-person concept.

22.14.4.4.4. Items that are CDS-equipped and if the CDS has been activated (weapon not operational).

22.14.4.4.5. Items exposed to an abnormal environment or not operational.

22.14.4.4.6. Special handling or unique requirements applicable to the cargo.

22.14.4.4.7. Individuals required to assist during the offload. Pass this information to the entry controller.

22.14.4.4.8. The receiver and courier will conduct an inspection of the cargo for broken seals, exterior damage, etc. If discrepancies are found and they have not been previously noted, the courier will annotate them on the DD Form 1911, **Materiel Courier Receipt**.

22.14.4.4.9. Transfer custody of cargo. (Receiver signs DD Form 1911).

22.14.4.5. Offload cargo.

Chapter 23

AIRCREW CHEMICAL OPERATIONS AND PROCEDURES

23.1. Wear of Aircrew Chemical Defense Ensemble (ACDE). Wearing the ACDE will constrain normal aircraft operations. The ACDE includes the newer Aircrew Eye-Respiratory Protection System (AERPS) above the shoulder system and the CWU-66/P or -77/P Integrated Aircrew Chemical Coverall (IACC). Procedures and equipment have been tested under restricted conditions, and "business as usual" will not be possible. Individual situations dictates what can and cannot be done. To properly adapt, aircrews must understand hazards involved and the limitations of their chemical defense equipment.

23.1.1. This volume is intended to enhance other aircrew chemical defense training and provides the crew member a basic understanding of utilizing ACDE in a chemical-biological threat area (CBTA). It combines information from technical orders and unit inputs to form a single source document.

23.1.2. This volume briefly describes the nature of the chemical threat and agents that may be faced. Secondly, it discusses some of the situations and problems the aircrew may encounter in a CBTA. Preparatory actions and countermeasures are examined so the crew member can make optimal use of the ACDE and fly the mission safely. While the information presented may need to be modified, the specific objectives of this volume will help prepare the aircrew member for the unique challenges imposed by chemical weapons.

23.2. Factors Influencing the Chemical Warfare (CW) Agent Hazard:

23.2.1. The major instances in which a crew may be exposed to chemicals is through inhalation, absorption through the skin, eyes, and ingestion. Contaminated drink and food are considered harmful, but immediate concerns must be contamination avoidance to the maximum extent, limit exposure of the skin and eyes, as well as avoid breathing the contaminants. Factors affecting persistence are weather, agent physical characteristics, method of dissemination, droplet size, and the terrain.

23.2.2. Weather. Factors include temperature, wind, humidity, precipitation and atmospheric stability. For example, high winds and heavy rains reduce the contamination hazard. Conversely, lack of wind, overcast-skies, and moderate temperatures favor persistence.

23.2.3. Agent Dissemination. Disseminated as vapors, aerosols, or liquids. Solids seem unlikely, but agents may become solids at lower temperatures.

23.2.4. Agent Droplet Size. Persistence factor is determined by droplet size. Agents may be mixed with other chemicals ("thickeners"), and form large drops making removal more difficult.

23.2.5. Surface and Terrain. CW agent clouds tend to follow the terrain, flowing over countryside and down valleys. Chemicals persist in hollows, depressions, and other low areas. Rough terrain retards cloud movement. Flat countryside allows a uniform, unbroken cloud movement. Vegetated areas are more contaminated than barren terrain. Liquid agents soak into porous surfaces, making evaporation much slower than for nonporous surfaces.

23.3. Categories of Chemical Warfare Agents. CW agents having military significance may be categorized as nerve, blister, choking, and blood. Because they are produced biologically, toxins technically are not chemical agents. However, they are considered a potential CW threat.

23.4. Nerve Agents.

23.4.1. Military Significance. Nerve agents are the most lethal and fastest acting of the standard CW agents. These agents affect the nervous system and are highly toxic whether inhaled, ingested, or absorbed through the skin. Persistency ranges from hours to many days.

23.4.2. Symptoms of Exposure. Nerve agent exposure is difficult to distinguish. Normally, symptoms of nerve agent exposure appear in the following order. Initial exposure includes a runny nose, tightness of the chest, dimness of vision, and pinpointing of the pupils. These symptoms are usually followed by difficulty in breathing, drooling, involuntary defecation and urination. Finally, exposure will lead to confusion, drowsiness, convulsions, coma and death.

23.4.3. Onset of Symptoms. Lethal respiratory dosages will cause death in 1 to 10 minutes and liquid exposure to the eyes will kill almost as rapidly. Depending on factors such as the amount and type of nerve agent, absorption through the skin may cause death anywhere from 1 to 2 minutes to 1 to 2-hours. Nerve agents are retained by the body for an extended period; thus intermittent, cumulative exposure to low amounts can lead to the same ultimate effect as a single exposure to a higher amount.

23.4.4. Protection. The full protective ensemble is effective against nerve agents. When properly worn, the various chemical protective masks prevents inhalation of nerve agents. Both the aircrew coveralls and groundcrew ensemble provide limited protection to the skin. All layers of the outer garment must be protected against saturation of liquids, chemical agents, water, or petroleum.

23.4.5. Antidotes/Prophylaxis. Antidotes are effective in combating effects of nerve agent exposure. These antidotes may be effective if given to a victim having advanced symptoms, and as long as the victim is made to continue breathing. People who use the antidotes must be seen by medical personnel and may not be combat-ready for several days. Currently, nerve agents are the only agents for which there is an available field antidote. This antidote can be self-administered by the exposed individual or through self-aid buddy care. In addition, medical personnel have more specialized treatments available.

23.5. Blister Agents.

23.5.1. Military Significance. Blister agents are dispensed as vapors or liquids, and may be encountered as solids. These agents primarily affect the eyes, respiratory tract, and the skin.

23.5.2. Symptoms of Exposure. Placed on the skin, a drop the size of a pinhead can produce a blister one inch in diameter. This action is accentuated by moisture; hence, a more severe danger is present during periods of sweating. The groin and armpits, which tend to be sweaty, are especially susceptible to blister agents. Blister agents which come in contact with the eyes lead to redness, watering of the eyes, blurring of vision, sensitivity to light, and frequently, blindness. Inhalation causes serious damage due to burns and blisters to the mouth, nose, throat, and lungs. Incapacitation may last for days or weeks; aircrews will probably be unable to fly for indefinite periods. After hospitalization, complications from blister agent exposure can arise and may be fatal.

23.5.3. Onset of Symptoms. Blister agents are quickly absorbed through the skin. However, it usually takes several minutes (up to five minutes and as long as several hours) for the symptoms to appear. They act most rapidly in liquid form, but are also effective in vapor form.

23.5.4. Protection. The full protective ensemble is effective against blister agents. Exposed areas must be cleaned thoroughly immediately after exposure. Blister agents are easily transferred from contaminated surfaces, thus great care must be taken to avoid contact with any contamination.

23.6. Choking Agents.

23.6.1. Military Significance. These agents are disseminated as vapors and when inhaled affect the respiratory system by damaging the lungs. Persistence is very brief, and dissipate rapidly (within minutes) under most field conditions.

23.6.2. Symptoms of Exposure. Choking agents cause coughing, choking, tightness of the chest, nausea, headache, and watering of the eyes. Choking agents can be lethal, with death normally from the lungs filling with fluids, making breathing difficult or impossible.

23.6.3. Onset of Symptoms. Exposure to choking agents has an immediate effect. Victims experience slightly delayed effects, such as painful cough, breathing discomfort, and fatigue.

23.6.4. Protection. Both the aircrew and ground crew protective mask is extremely essential to protect against exposure; the entire protective ensemble should be used as directed.

23.7. Blood Agents.

23.7.1. Military Significance. Blood agents are usually dispensed as vapor or aerosol and inhaled. Under most field conditions they may briefly persist on target (up to 10 minutes).

23.7.2. Symptoms of Exposure. Exposure to a single breath of blood agent causes giddiness, headaches, confusion, and nausea. As dose increases, breathing becomes more difficult. The victim will have deep, uncontrollable breathing and cramps, then loss of consciousness. Death is certain if the victim receives no medical aid.

23.7.3. Protection. Blood agents are breathing hazards. The full ensemble is most effective because the mask provides the breathing protection needed.

23.7.4. Additional Threats. Blood agents will damage mask filters. All personnel must change mask filters at the earliest possible opportunity after a blood agent attack.

EXCEPTION: Filters installed in aircrew CRU-80/P filter packs will be removed and replaced by aircrew life support (ALS) personnel (AFSC 1T1X1).

23.8. Aircrew Operations. Performance of duties while wearing chemical defense equipment can be extremely physically and mentally demanding. Special preparation and crew coordination are required to operate under chemical conditions. The information presented here will enable the aircrew to successfully operate in a chemical environment by recognizing limits and exploiting the capabilities of the chemical defensive equipment.

23.8.1. Planning:

23.8.1.1. Non-flying Ground Operations. Ground operations can represent the highest threat to aircrew safety. Protection from enemy attacks and exposure to liquid chemical agents is paramount. Aircrew should be advised to limit activities to essential duties only, and to separate ground duties from air duties. The ground ensemble is designed for quick donning and heavier levels of concentrations that can be more evident during ground operations. The aircrew ensemble

is designed for the unlikely event of light concentration levels, that could be found during flying operations and transmitted to and from the aircraft. Also, ACDE requires care during donning using "buddy dressing" procedures and ALS expertise during aircrew contamination control area (ACCA) processing.

23.8.1.2. Equipment Limitations. Due to thermal stress and the degraded performance associated with wearing of the ACDE, it is highly desirable to minimize the time and number of personnel exposed to chemical agents. Aircrew members must be familiar with the limitations of the ACDE and properly plan their duties. ACDE is designed to protect against vapor agents only and the mask and hood assembly can not be donned quickly in time of attack.

23.8.1.3. Body Temperature/Fluids Control. Heat stress and dehydration are serious hazards while wearing the ACDE. Aircrew members need to control perspiration rates and limit activities to essential duties only. The need to consciously slow the work pace while performing physical labor, share workloads and monitor each other's physiological condition is essential.

23.8.1.4. Breathing Restrictions. One of the inherent characteristics of the filter assembly is moderate breathing resistance. Normally, this is most noticeable during high flow rates. For example during physical exertion, users should be aware of the possibility of hyperventilation. During flying operations resistance can be reduced by using the EMERGENCY position on the oxygen regulator. The valsalva maneuver cannot be performed while wearing the MBU-13/P mask, therefore alternate means such as yawning or chewing can be used. If these are unsuccessful, attempt to clear ears by holding the oxygen regulator in the TEST MASK position and forcefully exhale or yell against the regulator pressure. The new AERP mask/hood assembly incorporates a blower system that presents less-than-moderate breathing resistance. However, in the event of a blower system failure, aircrews will experience an increase in breathing resistance.

23.8.1.5. Limited Dexterity. Wearing three pairs of gloves restricts dexterity, therefore visual confirmation of switch selection/positioning becomes very important.

23.8.1.6. Restricted Communications. Normal communications are limited while wearing the chemical defense mask. Communications can be enhanced by using the mini-amplifier/speaker with the AERP and some of the newer ground masks may be issued with a built-in amplifier. Otherwise, visual signals and the aircraft's public address system can be used to compensate.

23.8.1.7. Peripheral Visions Limits. The aircrew chemical defense mask may reduce peripheral vision as much as 15 percent.

23.9. Limitations. Aircrews must be mentally prepared to face the dangers of chemical weapons. Flight planning must be thorough and aircraft commanders should emphasize chemical defensive operations during mission planning, hazards and countermeasures, plans for onload/offload in the event of a ground attack, and plans for the return leg in the event of a contaminated aircraft. Alternate scenario plans should also be considered in the event conditions change.

23.9.1. Fuel Requirements. Extra fuel may be needed to compensate for altitude restrictions as the result of chemical agent exposure. If the aircraft has contamination, follow procedures outlined in paragraph **23.16.**. During purge periods, the aircraft will be unpressurized. Although the aircrew can use the aircraft oxygen systems, passengers wearing the ground crew ensemble (GCE) cannot. This restricts the aircraft cruise altitude and increases fuel requirements.

23.9.2. Oxygen Requirements. Operating into a CBTA will increase oxygen requirements. The aircrew may be required to rely on the aircrew chemical defense mask and aircraft oxygen system to counter actual/suspected chemical contamination. Using the 100 percent oxygen setting offers the greatest protection in a contaminated environment. Appropriate oxygen reservoir levels must be planned to meet higher consumption rates. Use the aircraft -1 charts to calculate the required reservoir levels.

23.9.3. Mask/Filter Assembly Limitations. Wearing any of the chemical defense masks/filter assemblies imposes the following limitations:

23.9.3.1. The mask/filter assembly prevents the detection of fumes from fuel, hydraulic fluid and oil.

23.9.3.2. The filter assembly will not protect the user against ammonia fumes and carbon monoxide gas

23.9.3.3. The filter/mask assembly should not be used without an oxygen source in an oxygen deficient atmosphere.

23.10. ACDE Issue. Aircrews will be issued sized ACDE and GCE at home station. Aircrews will ensure their ACDE and GCE is available at all times while in a CBTA. During deployments, at least one ACDE and one GCE will be issued to each crew member as directed by the unit commander or HQ AMC/TACC. ALS technicians will prepare and issue mobility ACDE "D" bags for aircrew members (see AMCI 11-301, *Aircrew Life Support (ALS) Program*, (chapters 4 and 6). Mobility processing personnel will issue GCE "C" bags. Aircrew members will confirm the mobility bag contents and correct sizes.

23.11. Operations in a Chemical-Biological Threat Area (CBTA).

23.11.1. Establishing Threat Level. Aircrews should monitor command and control channels to ensure they receive the latest information concerning the destination's alert condition. Diversion of AMC aircraft to alternate "clean" locations may be required, unless operational necessity dictates. The local AMC Command and Control will direct aircrews to undergo medical pre-treatment for chemical exposure.

23.11.2. Protective Equipment Postures. Standardized USAF alert conditions and recommended ACDE requirements are listed below based on a chemical-biological threat. ***NOTE*:** These alarms may be different based on the host country requirements.

23.11.2.1. "ALL CLEAR." Attack is not probable, nor is chemical-biological contamination present. Notification--Verbal; removal of warning flags/placards. ACDE requirements--equipment is issued, prepared for flying, and kept readily available. GCE requirements--equipment is issued, prepared, and readily available.

23.11.2.2. "ALARM YELLOW." Attack is probable. Notification--Verbal; posting of yellow warning flags/placards. ACDE requirements--if en route to fly or during flying operations, all components will be worn except mask and hood, gloves, overcape, and overboots. GCE requirements--appropriate components should be worn with the mask/hood immediately available commensurate with ground duties.

23.11.2.3. "ALARM RED." Attack is imminent or in progress. Notification--Verbal; posting of red warning flags/placards; one minute warbling tone on siren (3 seconds on-1 second off).

ACDE requirements--full ACDE will be worn for flying duties. GCE requirements--full ensemble should be worn commensurate with ground duties. Personnel will take immediate cover.

23.11.2.4. "ALARM BLACK." Contamination is suspected or present. Notification--Verbal; “Gas - Gas - Gas”; posting of black warning flags/placards; warbling tone on siren (1 second on-1 second_off). ACDE requirements--full ensemble will be worn. GCE requirements--full ensemble will be worn commensurate with ground duties. Personnel will remain indoors or under liquid agent cover.

23.12. Donning Equipment. Aircrew will don ACDE based on the alarm condition. Use the "buddy dressing" procedures, and refer to AMCVA 36-2206, *ACDE Donning Checklist* (projected to be AMCVA 11-303), to ensure proper wear. When wearing the ACDE, Atropine and 2 PAM Chloride auto injectors will be kept in the upper left flight suit pocket. This standardized location will allow personnel to locate the medication should an individual be overcome by nerve agent poisoning. M-9 paper on the flight suit will facilitate detection of liquid chemical agents and ACCA processing. M-9 paper should be placed on the flight suit prior to entering a CBTA when an alarm “yellow” or higher has been declared. When inbound to CBTA, prior to descent, the aircraft commander will ensure crew and passengers don appropriate protective equipment IAW arrival destination's mission oriented protective posture (MOPP) level and brief aircrew operations in the CBTA. As a minimum, this briefing will include: flight deck isolation, oxygen requirements, air conditioning system requirements, CW clothing requirements, ground operations and MOPP levels.

23.13. Ground Operations.

23.13.1. Off/On Considerations. Extreme care must be exercised to prevent contamination of aircraft interiors during ground operations, particularly to the flight deck area. Reduce the number of personnel entering the aircraft. Shuffle boxes and troughs will be placed at the crew entrance door for maintenance and aerial port personnel who must board the aircraft. Contaminated engine covers, safety pins and chocks will not be placed in the aircraft unless sealed in clean plastic bags. Onload cargo will be protected prior to and while being transported to the aircraft. Protective covers will be removed just prior to placing the cargo on the aircraft. It is the user's responsibility to determine and decontaminate equipment in his/her charge. Once accepted by the aerial port it becomes their responsibility to decontaminate equipment in the marshalling yard. Aircrew members entering the aircraft will remove plastic overboots and overcape portions of the aircrew ensemble and ensure flight/mobility bags are free of contaminants and placed in clean plastic bags. Aircrew exiting aircraft into a chemically contaminated environment will don plastic overboots and overcape prior to leaving the aircraft.

23.13.2. Physiological Factors. Aircraft commanders must be very sensitive to the problems resulting from physical exertion while wearing ACDE. The aircraft commander should consider factors such as ground time, temperature and remaining mission requirements when determining on/offload requirements. Individuals involved should be closely monitored for adverse physiological effects.

23.13.3. Communications. Conducting on/offloading operations while wearing the complete ACDE complicates communications capability. Use the mini-amplifier/speaker or the aircraft public address system and augment with flashlight and hand signals as required.

23.13.4. Passenger/Patients. A path should be decontaminated between the aircraft and the ground transportation vehicle to reduce interior decontamination when loading/unloading passengers/

patients. If it is not possible or practical to clean a path, passengers will use a shuffle box and trough prior to boarding the aircraft.

23.14. Chemical Attack During Ground Operations. If an attack (Alarm Red) occurs during on/off-loading operations or transport to and from aircraft, take immediate cover away from the aircraft/vehicle. Follow CCE personnel guidance to ensure proper donning of ACDE prior to flight.

NOTE: Aircrews should don the ground crew protective chemical mask and protective helmet, consistent with circumstances and duties. Aircrews could be expected to forward information concerning medical aid, damage estimates, unexploded ordinance. Appropriate information may be forwarded via the aircraft radios to the controlling agencies.

23.15. Crew Rest Procedures. Operational necessity may require the aircrew to rest/fly in a contaminated CBTA. If the mission is not being staged by another aircrew or preflight crews are not available, the aircrew will normally preflight, load, and secure the aircraft prior to entering crew rest. The departing aircrew will perform necessary crew preparations and preflight briefings, then report to the ACCA for processing with assistance from ALS personnel who will assist aircrews donning ACDE prior to reassuming flying duties. If possible, aircrew transport should be provided in a covered vehicle. Aircrews should avoid preflighting aircraft prior to departure to prevent contamination to themselves and the aircraft. As aircrews proceed to fly they will require assistance from ground support personnel in removing their aircrew protective overcape and overboots prior to entering the aircraft.

23.16. Outbound with Actual/Suspected Chemical Contamination. Venting Aircraft/Removing ACDE Components: With actual/suspected vapor contamination, the aircraft must be purged for 2-hours using Smoke and Fume Elimination procedures. To ensure no liquid contamination exists, a close inspection of aircrew, passenger ensembles, and cargo will be conducted using M-8 and M-9 detection paper. M-8 and M-9 detection paper only detects certain liquid agents and will not detect vapor hazards. Above the shoulder ACDE may be removed only if the presence of vapor/liquid agents are not detected or suspected. The aircrew must take every precaution to prevent spreading of liquid contaminants, especially on the flight deck area. The best course is to identify actual/suspected contamination using M-8/M-9 detection paper/tape. Small areas of contamination found on equipment/cargo should be decontaminated using an M-258 or M-295 decontamination kit. Large areas of contamination such as puddles on the aircraft floor should be covered with vermiculite from the aircraft hazardous materials kit, taking care to avoid splashing the material. Take care to physically avoid those areas for the remainder of the flight. Keep the cargo compartment as cool as possible. If an aircrew member or passenger has been in contact with liquid contaminants, all personnel aboard the aircraft will stay in full ACDE/GCE until processed through their respective contamination control area (CCA).

23.17. Communicating Down-line Support. Pass chemical contamination information through command and control channels when inbound. This information will be used to determine if a diversion flight is required or decontamination teams are needed. Report the physical condition of any crew/passengers who are showing chemical agent symptoms and whether they are wearing chemical defense ensembles.

23.18. Contamination Control Areas (CCA) Procedures. Aircrews will proceed to the ACCA for processing. Ground personnel will report to the groundcrew contamination control area (GCCA) for processing. All personnel will remove protective clothing IAW established procedures located in respective CCA's.

NOTE: Because of the technical characteristics of life support/flying equipment and mission essential aircrew resources, an ACCA is required to ensure minimum exposure to contaminates. GCCA's are generally used to process groundcrew personnel and typically are subject to potentially higher concentration levels. The ACCA is equipped and manned by trained ALS personnel to process aircrews and decontaminate their equipment.

23.19. Work Degradation Factors. Work timetables need to be adjusted to minimize thermal stress caused by wearing the ACDE. Aircrews must weigh all factors when performing in-flight and ground duties. The following are degradation factors for wearing full GCE, and may also be used to represent the Task Time Multipliers for the ACDE. To estimate how much time it takes to perform a task or operation, (1) take the Task Time Multiplier for the appropriate Work Rate and ambient air temperature and (2) multiply it by the time it normally takes to perform the task. For example, given a heavy work rate and an air temperature of 70F, the crew member should expect a normal one hour task to take 2.1-hours while wearing ACDE. A more extensive discussion of this subject is found in AFMAN 32-4005, *Personnel Protection and Attack Actions.*

TASK TIME MULTIPLIERS

Work Rate	**Temperature**		
	20-49F	**50-84F**	**85-100F**
Light	1.2	1.4	1.5
Moderate	1.3	1.4	3.0
Heavy	1.7	2.1	5.0

Chapter 24

NIGHT VISION GOGGLE (NVG) OPERATIONS

24.1. General. This chapter is under development. Contact HQ AMC DOK for the latest NVG information.

Chapter 25

NAVAL EMERGENCY AIR CARGO DELIVERY SYSTEM (NEACDS)

25.1. General. NEACDS is designed for C-141 aircraft to airdrop emergency supplies to ships at sea.

25.2. NEACDS Operational Requirements.

25.2.1. C-141 crews will, as a minimum:

25.2.1.1. Carry Navy Numerical Code (AMCS 608 NUCO) encode and decode tables and Navy voice call sign listing (AKAI-16 VSCL). Additional terms/codes are found in Joint Command Manual 55-200, AFR 3-16, and JCS Pub 1.

25.2.1.2. Carry binoculars to aid in ship recognition.

25.2.1.3. Carry operational brevity codes contained in attachment 2 of this chapter.

25.2.2. Drop Zone (DZ). DZ selection, criteria, and markings for airdrop to land targets are not applicable for NEACDS. The target ship determines the DZ axis and point of impact (PI). Drop axis allows for downwind drop based on surface winds. The PI is determined on ship recovery capabilities but in no case will be closer than 500 yards abeam and 1,000 yards beyond target ship.

25.2.3. Restrictions:

25.2.3.1. The radar altimeter must be operational prior to departure. If the objective area altimeter setting is unreliable or unavailable and the radar altimeter fails, the mission will be aborted.

25.2.3.2. The radar must be operational prior to departure.

25.2.3.3. Minimum drop altitudes are in accordance with AFI 11-231. Do not perform airdrops more than 1500-feet above ground level (AGL).

25.2.4. Prohibited operations:

25.2.4.1. Multiple platform drops. (Airdrops of more than one platform or bundle per pass.)

25.2.4.2. Overflight of ships with doors open.

25.2.4.3. Formation drops.

25.3. Mission Planning.

25.3.1. Obtain the following information:

25.3.1.1. Load configuration (number of loads, type load, load weight, and type parachutes).

25.3.1.2. Drop altitude and airspeed.

25.3.1.3. Forecast weather en route and in the objective area (includes cloud coverage and surface winds).

25.3.1.4. Estimated drop axis.

25.3.1.5. Rendezvous time.

25.3.1.6. Minimum loiter time (loiter does not include search time).

25.3.1.6.1. Maximum loiter time.

25.3.1.6.2. Estimated ship's position at rendezvous time.

25.3.1.6.3. Ship's state at rendezvous time (stationary or underway).

25.3.1.6.4. Ship's description (call sign, type of ship, hull number, and photograph).

25.3.1.6.5. Radio frequencies available (primary and secondary).

25.3.2. Use AF Form 4081, **Tactical Mission Fuel Planning**, in lieu of the fuel planning section, blocks 1 through 13, on AF Form 4115, **Flight Plan and Record**. Attach this form to the AF Form 4115 and turn it in at the completion of the mission.

25.3.3. Fuel requirements. Compute IAW AMCPAM 11-1and this instruction except as follows:

25.3.3.1. Item 1. Time and fuel from takeoff to overhead the target ship.

25.3.3.2. Item 4. Use 20 minutes and 2,000 pounds of fuel.

25.3.3.3. Item 5 (loiter). Provide time between airdrops for ship retrieval efforts. Unless more time is specified, plan 30 minutes for the initial drop and for subsequent drops. For planning purposes, initial loiter begins 20 NM at 4,000 feet and includes the remaining descent and low-level flight, orbit, and drop. Consider the rendezvous point the departure point for the climb after red light and return to destination segment. Use 14,000 pounds per hour for all low-level operations.

25.3.3.4. Item 8. Plan the return flight at 200 knots calibrated air speed (KCAS) in the event the aircraft must return in a nonstandard configuration, i.e., petal doors will not close, etc. Plan the return at the highest cruise altitude for unpressurized light not to exceed flight level (FL) 250. Fuel charts are not available for these conditions; however, fuel flow may be approximated by using the en route time at planned cruise altitude (normally FL 240 or FL 250) and speed (200 KCAS/.48M) and fuel determined from the constant altitude chart, 37,000 feet, .74 M, AMCPAM 11-1.

25.3.3.5. Item 9. Compute the reserve using the method described for item 8.

25.3.3.6. Item 21. Plan the search using 14,000 pounds per hour.

25.4. Search Procedures

25.4.1. General. Preplan search procedures because the ship's position may be unreliable. Available fuel determines the size and type of search pattern. These procedures and patterns are recommended based upon the following:

25.4.1.1. Limited fuel is available for search.

25.4.1.2. Navigation error has caused the ship or aircraft position to be unreliable.

25.4.1.3. The ship's position is close to the preplanned or best known position and the search area is not extensive.

25.4.1.4. The probability of ship position error is equidistant around the best known position.

25.4.1.5. Airborne radar is available to augment visual sighting efforts.

25.4.2. Planning. Use common sense to determine the fuel carried for search, i.e., distance to ship, navigation aids, available radar, and navigational aids aboard the ship to assist in acquisition, side of

ship, etc. The maximum fuel allowable should be carried on long-range missions where ship acquisition may be difficult. Use the pattern best suited to the mission situation.

25.4.2.1. Determine search endurance (t) by subtracting total fuel requirements from ramp fuel. Convert this fuel to time by using 14,000 pounds per hour fuel flow (item 21 on AF Form 63).

25.4.2.2. Determine search distance (d) by using the formula.

"d=(t)(TAS)." Plan search at 230 KCAS. Use this distance in planning the search pattern.

25.4.2.3. Turns. Navigation is simplified and complete coverage of the search area is enhanced by making the turns as accurately and uniformly as possible. To ensure accurate turns to rollout on the next course on centerline, initiate the turn at given distance prior to the end of the leg. The following information shows a simple procedure to plan these turns. All turns will be 90 degrees at 20 degrees of bank.

25.4.2.3.1. TAS:

25.4.2.3.1.1. 210 KTAS - 1.9 NM/leg distance/turn.

25.4.2.3.1.2. 230 KTAS - 2.3 NM/leg distance/turn.

25.4.2.3.1.3. 250 KTAS - 2.6 NM/leg distance/turn.

25.4.2.3.2. Example: 230 KTAS.

25.4.2.3.2.1. First leg is 10 NM, start turn 10 NM - 2.3 NM = 7.7 NM on the leg.

25.4.2.3.2.2. Second leg is 10 NM, start turn 10 NM - 4.6 NM = 5.4 NM wings level on course.

25.4.2.3.2.3. Third leg is 20 NM, start turn 20 NM - 4.6 NM = 15.4 NM wings level on course.

25.4.2.3.2.4. The NM can be monitored on the inertial navigation system (INS) distance to go and crosstrack or converted to INS distance to go and crosstrack or converted to time at the discretion of the navigator.

25.4.2.4. Expanding square pattern (ss) (see **Figure 25.1.**, Expanding Square). This is the recommended pattern for a stationary target. It is a series of search legs which expand outward forming a square pattern. The first and second legs are equal in length to track spacing. Fly the legs using right angle ground tracks. Fly the initial leg on the ship's reported or best known axis. When it is known the ship is stationary, plan for upwind, downwind, and crosswind legs to minimize navigational error. Normally, all turns are to the left and standard rate.

25.4.2.5. Creeping Line Pattern (see **Figure 25.2.**, Creeping Line). This pattern is good for use if the target ship is underway. **S** is determined in the same manner as in the **ss** pattern. The navigator determines distance either side of the objectives intended track (OIT) based on the simulation of the reliability of the aircraft's and ship's estimated position.

Figure 25.1. Expanding Square.

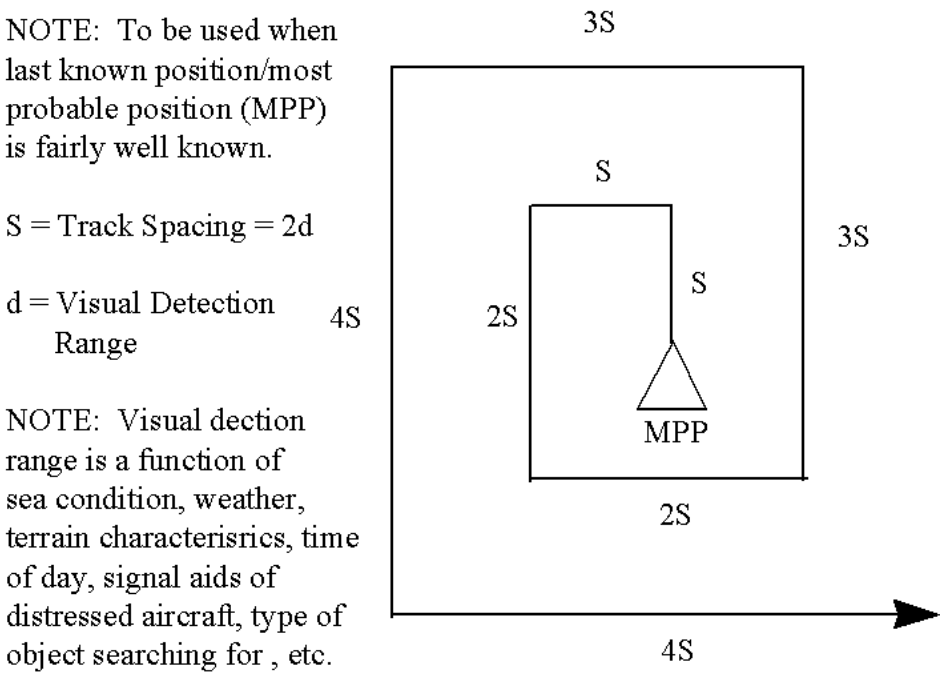
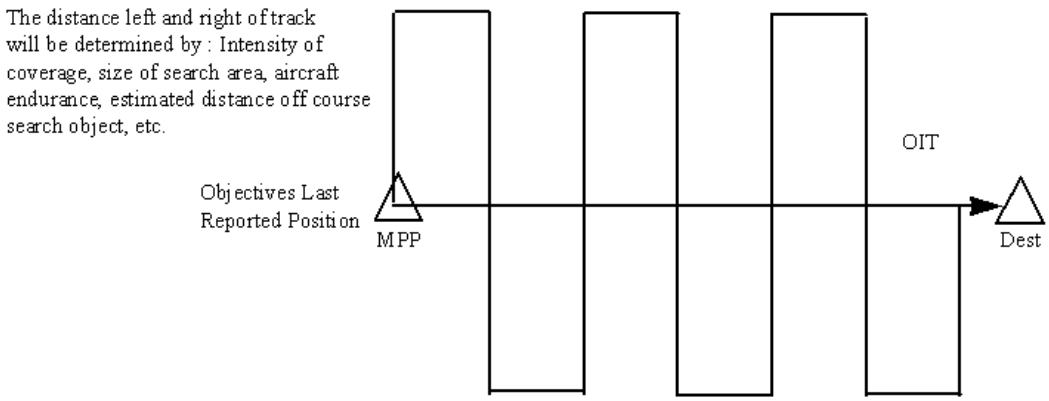


Figure 25.2. Creeping Line Pattern.



25.5. Procedures.

25.5.1. En Route. (See **Figure 25.3.**, NEACDS En Route Profile).

25.5.1.1. Fly to the objective area as planned. The planned time over target (TOT) is the actual rendezvous time plus approximately 6 minutes.

25.5.1.2. Entering the objective area, obtain an air traffic control (ATC) descent clearance, attempt radio contact with the ship, and navigate to the target ship's position using all available aids (**Figure 25.3.**).

25.5.1.3. Initiate an en route descent to be level at 4000 feet, 20 NM from the ship (**Figure 25.3.**). Establish radio contact with the ship as soon as possible and exchange airdrop data using the

NEACDS Radio Worksheet (**Attachment 1**). En route descent may be made without radio contact with the ship.

25.5.1.4. Level off at 4,000 feet and proceed inbound to the ship's position at 230 KCAS, or as briefed. If radio contact has been made, request radar vectors if available. Base descent below 4,000 feet on availability of NAVAIDs, an accurate altimeter setting, radar altimeter, visibility, and positive contact with the ship. Descent to 3,000 feet is recommended for search. Do not descend below 1500 feet without positive contact (e.g., visual, radar, or TACAN).

25.5.1.5. Plan further descent and slowdown (approximately 10 NM out) to be level at drop altitude and airspeed (150 KCAS) abeam the ship (see **Figure 25.3.**). Maneuver to pass 500 yards (or briefed lateral offset distance) right (starboard) of the ship on the downwind heading (drop axis). On the initial run-in, verify the heading required to parallel the ship's course. Complete all checklists through the 10-minute checklist prior to rendezvous; delay completion of the slowdown checklist until after rendezvous.

25.5.2. Objective Area. Use drop procedures in **Chapter 16**, **Chapter 17**, **Chapter 18**, and **Chapter 19**, with the following: (See **Figure 25.3.** and **Figure 25.4.**)

25.5.2.1. Visual meteorological conditions (VMC) procedures. Passing abeam the ship at drop altitude and airspeed, enter a 6-minute left racetrack using 20 degrees of bank and maintain visual contact with the ship (see **Figure 25.4.** and **Figure 25.5.**). If, in VMC, radio contact cannot be established, the ship signals clearance to drop with a green light from the bridge. A red light signal implies a no-drop condition and the aircraft should continue to orbit.

25.5.2.2. Instrument meteorological condition (IMC) procedures. If unable to obtain VMC, proceed to the ship's position using all available aids. The ship may provide radar vectors upon request. Cross-check all available information to positively identify the ship. If IMC, abeam the ship on the initial pass, enter an extended racetrack, and prepare for an IMC delivery. Fly the upwind leg on the reciprocal of the ship's reported track.

25.5.2.3. Station keeping equipment/zone marker (SKE/ZM). SKE aircraft use standard SKE procedures. If a zone marker is available, confirm ZM location during initial contact.

25.5.2.4. Non-SKE/ZM. Aircraft not equipped with SKE (SKE inoperative) proceed to the ship using TACAN, airborne radar with fan beam, or shipboard radar, and enter an extended racetrack that allows a 10-15 NM final approach leg. Request ship radar assistance in turning to and aligning on DZ centerline, at least 500 yards right of the ship's reported track. Use airborne radar for final DZ alignment and start timing when radar shows abeam the bow of the ship.

25.5.3. Airdrop. (See **Figure 25.6**., NEACDS Airdrop)

25.5.3.1. Determine the computer air release point (CARP} in accordance with AFI 11-231. The PI will be determined by the target ship, but no closer than 500 yards (approximately 1/4 NM abeam, and 1,000 yards forward of the ship's bow. However, on the final run-in, the aircraft will fly no closer than 500 yards abeam the ship; adjust the PI if necessary.

25.5.3.2. The aircrew receives final drop clearance and wind update 1 minute prior to drop. Navy ships cannot provide mean effective wind information. There are no altitude wind restrictions. Maximum surface winds are at the discretion of the target ship. The target ship determines acceptability of sea conditions and surface wind for load recovery. Should any factor in the surface environment present a hazard to the operation, the ship will call or signal a no-drop.

25.5.3.3. Timing to the CARP begins abeam the bow of the ship; in no case will release be made before passing the bow--adjust the PI, if necessary. Usable DZ length is 10 seconds or as briefed.

25.5.3.4. Multiple passes. The planned minimum time between heavy equipment drops is 30 minutes. Make every attempt to plan racetracks to maintain visual contact with the target ship.

25.5.3.5. Post-drop procedures are standard.

***WARNING*:** Pay close attention to fuel requirements. Depart the objective area with sufficient fuel remaining to arrive at destination with required reserves.

Figure 25.3. NEACDS En Route Profile

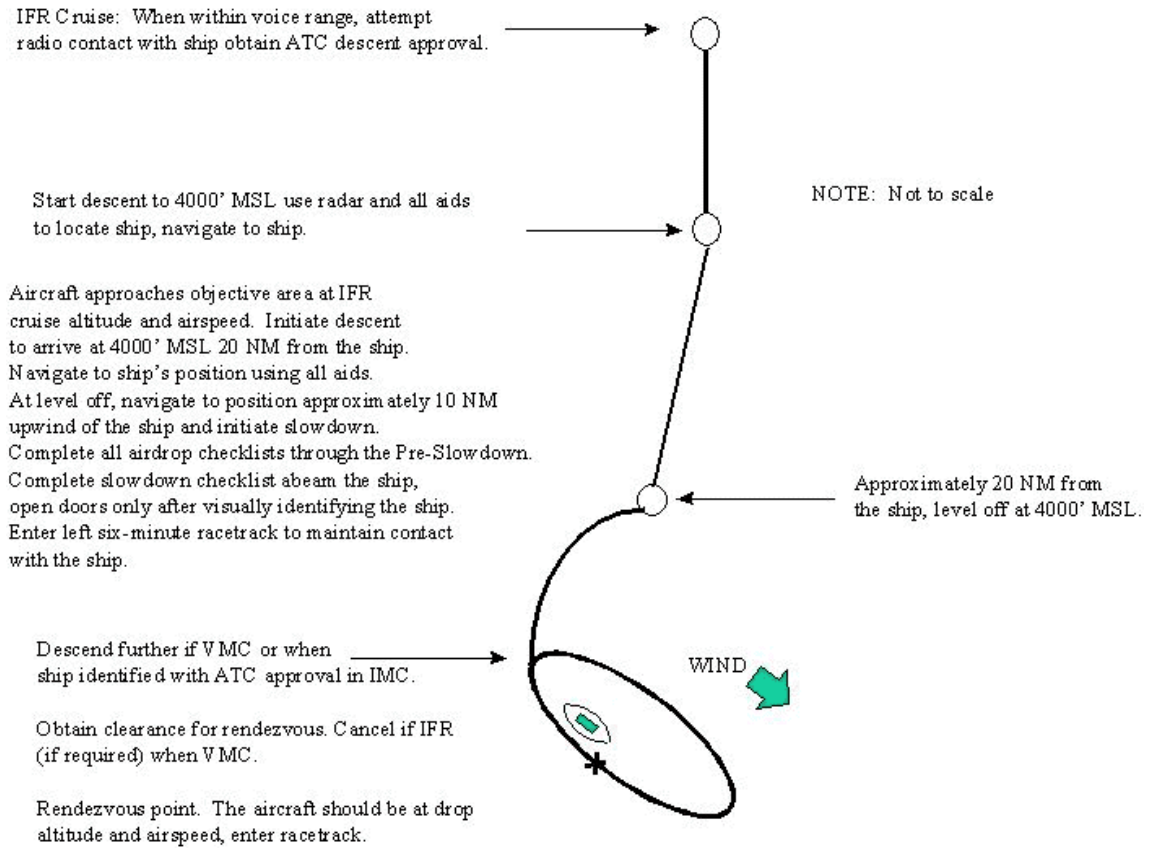


Figure 25.4. Time from Rendezvous to First Turn.

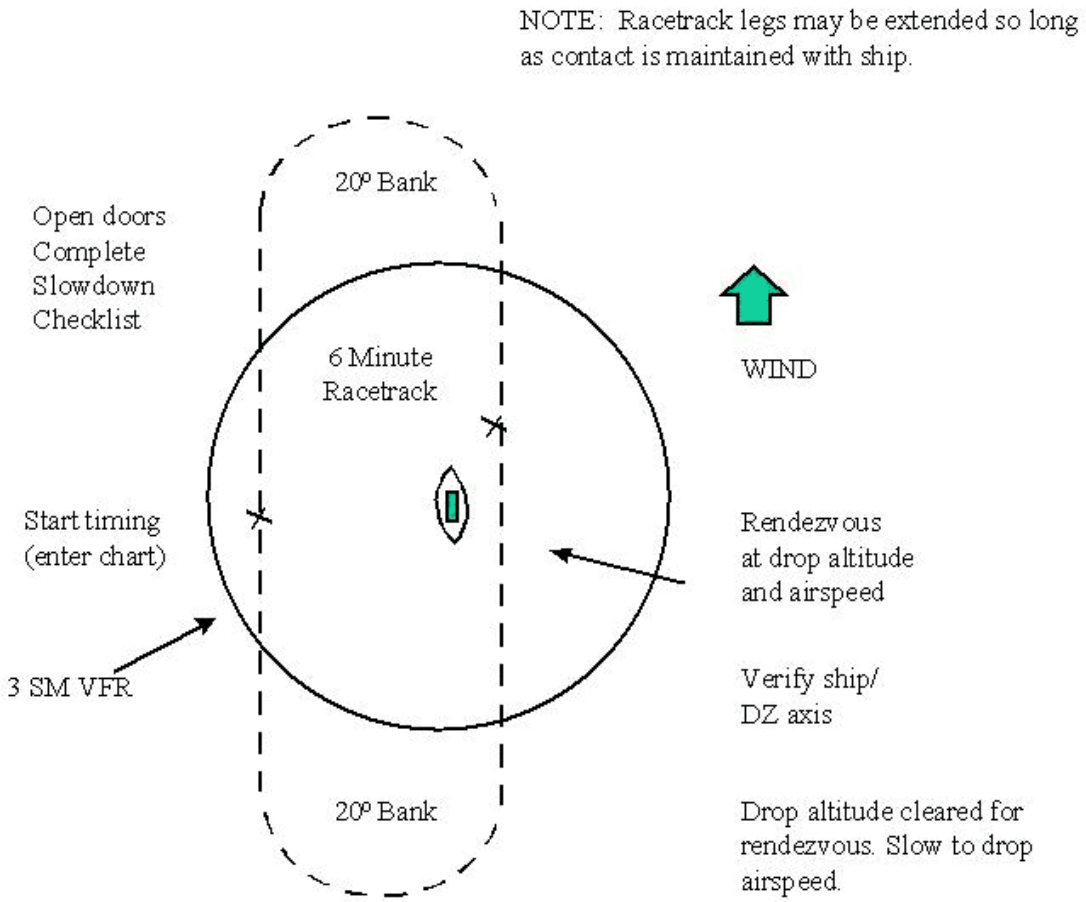


Table 25.1. Average Groundspeed - Rendezvous to First Turn.

135	140	145	150	155	160	165	170	175	180	185	190
57	55	53	51	49	48	46	45	44	43	41	40

Table 25.2. Time Abeam Ship to Turn Inbound/Outbound Groundspeed.

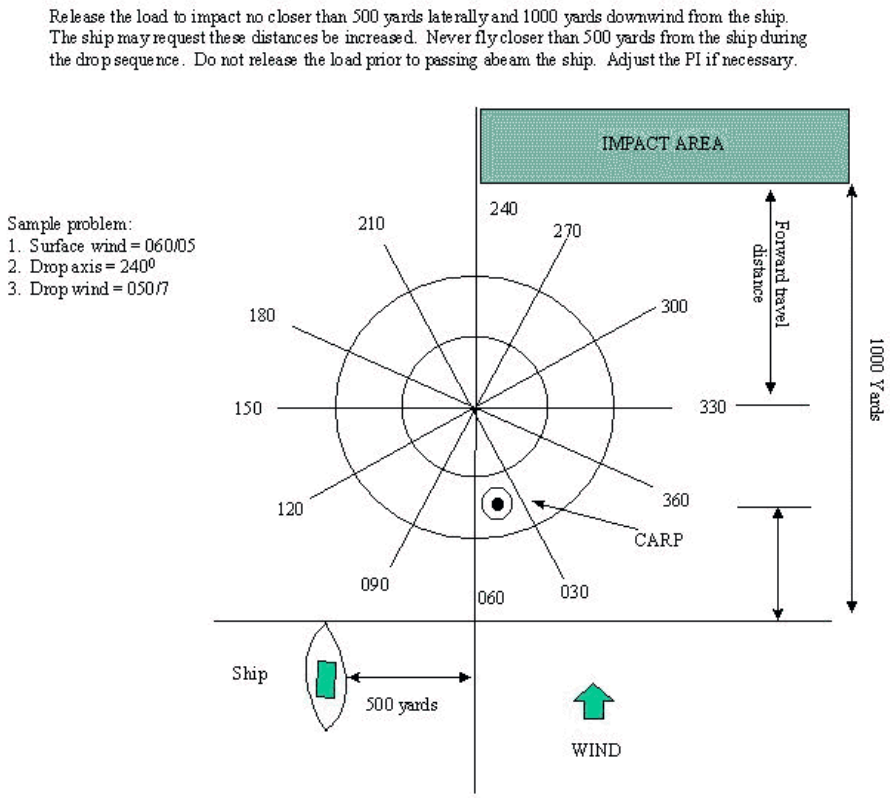
	115	120	125	130	135	140	145	150	155	160	165	170
2:00	30	29	28	28	27	26	25	24	24	23	22	21
2:10	36	35	34	33	32	31	31	30	29	28	27	26
2:20	42	41	40	39	38	37	36	35	34	32	31	30
2:30	49	47	46	45	44	42	41	40	38	37	36	35
2:40	55	53	52	51	49	48	46	45	43	42	41	39
2:50	1:01	1:00	58	56	55	53	52	50	48	47	45	44
3:00	1:07	1:06	1:04	1:02	1:00	59	57	55	53	52	50	48
3:10	1:14	1:12	1:10	1:08	1:06	1:04	1:02	1:00	58	56	54	52
3:20	1:20	1:18	1:16	1:14	1:12	1:09	1:07	1:05	1:03	1:01	59	57
3:30	1:26	1:24	1:22	1:19	1:17	1:15	1:13	1:10	1:08	1:06	1:04	1:01
3:40	1:32	1:30	1:28	1:25	1:23	1:20	1:18	1:15	1:13	1:11	1:08	1:06
3:50	1:39	1:36	1:33	1:31	1:28	1:26	1:23	1:21	1:18	1:15	1:13	1:10
4:00	1:45	1:42	1:39	1:37	1:34	1:31	1:28	1:26	1:23	1:20	1:17	1:15
4:10	1:51	1:48	1:45	1:42	1:39	1:37	1:34	1:31	1:28	1:25	1:22	1:19
4:20	1:57	1:54	1:51	1:48	1:45	1:42	1:39	1:36	1:33	1:30	1:27	1:24
4:30	2:04	2:00	1:57	1:54	1:51	1:47	1:44	1:41	1:38	1:34	1:31	1:28
4:50	2:16	2:13	2:09	2:05	2:02	1:58	1:55	1:51	1:48	1:44	1:40	1:37
5:00	2:22	2:19	2:15	2:11	2:07	2:04	2:00	1:56	1:53	1:49	1:45	1:41

NOTE 1: Charts assume ship is stationary.

NOTE 2: Abeam ship on initial pass (rendezvous), start stop watch and enter top chart with average groundspeed from rendezvous to first turn.

NOTE 3: Abeam ship on reciprocal heading, start watch and note time remaining to CARP. Enter groundspeed and time-to-CARP to determine timing to initiation of turn inbound to ship.

Figure 25.5. NEACDS CARP



25.6. NEACDS Radio Worksheet Format.

25.6.1. Contact the target ship on the briefed frequency and relay Section II data; ship replies with Section III data. Information that is classified will be controlled according to DOD 5200.1R and AFR 205-1. Users should insure appropriate classification markings and annotate proper downgrading instructions when using classified information in conjunction with the NEACDS radio worksheet.

25.6.2. Prebriefed Items (Sample data).

1. Airdrop data: **7350** pounds on **4** platforms, **4** passes.
   Drop altitude **600** feet absolute;
   Drop airspeed **150** knots (KCAS);
   Estimated drop axis **230** degrees true;
   Point of impact: **600** yards starboard, **1200** yards past ship's bow.
   Estimated barometric pressure: **30.23** inches.
   Zone marker location: **1200** yards short **600** yards left.
2. Rendezvous time **1620Z**; minimum loiter time **3.2**.
3. Rendezvous **3657.4N** ; **9120.5W**.
   Ship speed **6** Knots, direction **225** degrees true at rendezvous.

4. Ship's description: Call Sign **TUB 2**. Hull number **PT-109**.
   Type ship **battleship** (superstructure description).
5. Aircraft description: Call sign **LIFTR 61**. Type aircraft **C-17**.
6. Radio frequencies: UHF **343.1** (primary) **234.2** (secondary);
   VHF **133.75** (primary) **128.25** (secondary);
   HF **8990** (primary) **12345** (secondary);
7. Navaid frequencies:
   TACAN Channel **29**, ADF Frequency **341**.
   Status of shipboard radars, UHF/DF, IFF, etc.

25.6.3. Section II Aircraft Transmission (Sample Data)

(Target ship) **TUB 2**, this is (aircraft) **LIFTR 61** on frequency **133.75**.
(After ship acknowledges, transmit the following message).
(Target ship) **TUB 2**, this (aircraft) **LIFTR 61**.

1. Estimate rendezvous at **1619Z** .
2. Squawking IFF Mode **3/A** , Code **3470**.
3. Current **100NM** (true direction) from the rendezvous point at **180 degrees** (true direction) from the rendezvous point at **FL 140** (altitude).
4. (Revision of prebriefing data; special instructions).
   Request clearance for rendezvous.

25.6.4. Ship Transmission (Sample data)

(Aircraft) **LIFTR 61**, this is (target ship) **TUB 2**, we copy all.

1. Revision of prebriefed data. ***NOTE:*** Confirm ZM/location for IMC drop.
2. Target area data: Barometric pressure **30.22** inches; surface wind **220** degrees true at **11** knots; drop axis **225** degrees true. Temperature **23 degrees C** .
3. (Other information to include encoded position, course, and speed).
   After positive contact and confirmation of position information,
4. Steer **050** degrees true to our position.
5. Cleared for rendezvous at drop altitude.

NOTE: Do not develop a local form from this format.

25.7. Operational Brevity Codes are Table 25.3. (Extracted from ACP-65).

Table 25.3. Operational Brevity Codes.

WORD	MEANING
ANGELS _____	Height of friendly aircraft in thousands of feet or fly (am flying at) height indicated in thousands of feet, e.g., ANGELS TEN (10,000 feet). If other than whole thousands of feet are required, hundreds will be expressed as tenths of one thousand feet separated by the word POINT, e.g., ANGELS TWO POINT FIVE (2,500 feet). ANGELS POINT NINE (900 feet).
BINGO	Proceed or proceeding to alternate or specified field or carrier. (Not home field or carrier).
BINGO FIELD	Alternate airfield.
BINGO STATE	Amount of fuel plus designated reserve necessary to proceed to alternate airfield.
BOWWAVE	Long form weather report giving:
(see also VAT "B")	B - Below or Base of cloud in thousands of feet. If below one thousand feet use hundreds of feet but add the word "hundred." O - Over or Top of cloud level in thousands of feet. If unknown use the word "unknown." ***NOTE:*** If there is more than one cloud layer, report the base and top of the lower formation, followed by the base and top of progressively higher layers (e.g., "two, twelve, seventeen, twenty-five.") W - Wind (8 points, N, NE, E, SE, S, SW, W, NW) plus the velocity in knots. When wind is missing, omit or use the word "unknown." W - Weather. General description of weather in plain language; such as clear, partly cloudy, cloudy, overcast, light, moderate or heavy rain, mist, haze, thunderstorm, and distant lightning. Amplification of the weather should be made at the end of the report under "E." A - Amount of clouds in tenths. V - Visibility in miles. Use a fraction if less than one mile. E - Extra phenomena of significance such as turbulence, icing, heavy sea or swell, and description of front. This is an elaboration of the report which includes anything of interest I plain and concise language.
BUSTER	Fly at maximum continuous speed (power).
CANDLES	Night illumination devices.
CHECK PORT/LEFT ____	Alter heading ____ degrees to left momentarily for airborne radar search and then resume heading.

WORD	MEANING
CHECK STBD/RIGHT ____	Alter heading ____ degrees to right momentarily for airborne radar search and then resume heading.
COWBOY(S)	Ship(s) of Surface Attack Unit (Normally destroyer class).
EVERGREEN	Dye marker showing in water.
FAMISHED	Have you any instructions or information for me?
FREAK	Frequency in MHz.
FREDDIE	Controlling unit for aircraft.
FREELANCE	Self control of aircraft is being employed or operate under self control.
GATE	Fly at maximum speed (or power). (To be maintained for a limited time only, depending on type of aircraft. Use of afterburner, rockets, etc., in accordance with local doctrine).
GOODYEAR	Life raft. (Followed by number of survivors.)
HOMEPLATE	Home airfield or home carrier.
HOOKER	Fishing or other small craft.
IN THE DARK	Not visible on my scope and any position information is estimated.
LINER	Fly at speed giving maximum cruising range.
ORANGES SOUR	Weather is unsuitable for aircraft mission.
ORANGES SWEET	Weather is suitable for aircraft mission.
OUTHOUSE	My position in true bearing or miles from my reference point (assigned station).
PARROT	A military identification, friend or foe (IFF) transponder.
PIGEONS_____	The magnetic bearing and distance of HOMEPLATE (or unit indicated) from you is ___ degrees ___ miles.
POPEYE	In clouds or area of reduced visibility.
REDHEAD	Pulsating red light.
SAUNTER	Fly at best endurance.
SUNLAMP	Submarine Provide UHF homing signal by transmitting a steady 10-second hum on UHF once each minute. Aircraft--home on signal using UHF homing equipment.
VAT "B"	Short form weather report giving:
(see also BOWWAVE)	V - Visibility in miles. A - Amount of clouds in tenths. T - Height of cloud top, in thousands of feet. B - Height of cloud base, in thousands of feet.

25.8. Forms Prescribed. AF Form 4051, **Low Level Flight Plan and Log;** AF Form 4070, **C-141 Airdrop Data Cards**; AF Form 4071, **Performance Data Worksheet**; AF Form 4072, **Pilot TOLD Card**;

AF Form 4073, **Airborne Radar Approach Plate**; AF Form 4074**, Airborne Radar Approach/Descent Plate**; AF Form 4081, **Tactical Mission Fuel Planning**; AF Form 4082, **C-141/TF-33 Engine Condition**; AF Form 4086, **Nuclear Floor Planning**; AF Form 4129, **Aircrew Chemical Defense Ensemble Size Card**.

Marvin R. Esmond, Lt General, USAF
DCS, Air and Space Operations

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFPD 10-9, *Lead Operating Command Weapon Systems Management*

AFPD 10-21, *Air Mobility Lead Command Roles and Responsibilities*

AFPD 11-2, *Aircraft Rules and Procedures*

AFI 10-1101, *Operations Security*

AFI 10-403, *Deployment Planning*

AFI 10-801, *Assistance to Civilian Law Enforcement Agencies*

AFI 11-202V2, *Aircrew Standardization/Evaluation Program*

AFI 11-202V3, *General Flight Rules*

AFI 11-2C-130V1, *C-130 Aircrew Training*

AFI 11-209, *Air Force Participation in Aerial Events*

AFI 11-214, Aircrew and Weapons Director Procedures for Air Operations

AFI 11-215, *Flight Manuals Program (FMP)*

AFI 11-218, *Aircraft Operation and Movement on the Ground*

AFI 11-231, *Computed Air Release Point Procedures*

AFI 11-299, *Nuclear Airlift Operations*

AFI 11-301, *Aircrew Life Support (AlS) Program*

AFI 11-401, *Flight Management*

AFI 11-403, *Aerospace Physiological Training Program*

AFI 13-207, *Preventing and Resisting Piracy*

AFI 13-212V1, *Weapons Ranges*

AFI 13-12V2, *Weapons Range Management*

AFI 13-12V3, *Hazardous Methodology and Weapon Safety Footprint*

AFI 13-217, *Assault Zone Procedures*

AFI 21-101, *Maintenance Operations and Management Policy*

AFI 23-202, *Buying Petroleum Products and Other Supplies and Services Off-Station*

AFI 31-101V1, *Air Force Physical Security Program*

AFI 31-207, *Arming and Use of Force by Air Force Personnel*

AFI 31-401, *Information Security Program Management*

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AFI 36-2903, *Dress and Personal Appearance of Air Force Personnel*

AFI 37-124, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information Collections*

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AFI 91-202, *The US Air Force Mishap Prevention Program*

AFI 91-204, *Safety Investigations and Reports*

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AFM 2-50, USA/USAF Doctrine for Joint Airborne and Tactical Airlift Operations

AFM 3-4, *Tactical Air Operations Tactical Airlift*

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AFP 102-2 V1, *Joint Users Handbook - US Message Text Formats*

AFTTP 3-1V1 (S), *General Planning and Employment Considerations*

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AFTTP 3-1V25 (S), *Tactical Employment, C/HC-130*

AMCI 11-208, *Tanker/Airlift Operations*

AMCI 11-301, *Aircrew Life Support (ALS) Program*

AMCMAN 11-211 (S), *Tactical Employment*

AMCR 3-2V2 (S), *Threat Environment Concepts*

FLIP-*DoD Flight Information Publication*

FM 101-5-1, *Operational Terms and Symbols*

JCS Pub 1-02, *DoD Dictionary of Military and Associated Terms*

T.O. 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*

AFP 102-2V1, *Joint Users Handbook--US Message Text Format*

AMCP 55-25, *Airlift Tactical Operations Techniques*

AMC PAM 11-1, *C-141 Fuel Planning*

USTRANSCOMR 200-3, *Intelligence Debriefing and Reporting*

Abbreviations and Acronyms

AC—Aircraft Commander

ACM—Additional Crew Member

AD—Airdrop

ADS—Aerial Delivery System

AE—Aeromedical Evacuation

AECM—Aeromedical Evacuation Crew Member

AFCS—Automatic Flight Control System

AFRC—Air Force Reserve Component

AGL—Above Ground Level

ALC—Aircrew Laptop Computer

AMC—Air Mobility Command

AMCC—Air Mobility Control Center

AOA—Angle of Attack

AP—Auto Pilot

APU—Auxiliary Power Unit

ATA—Actual Time of Arrival

ATC—Air Traffic Control

AUX—Auxiliary

BASH—Bird Aircraft Strike Hazard

BCN—Beacon

BDHI—Bearing Distance Heading Indicator

CAT I—Category I Approach

CAT II—Category II Approach

CARP—Computed Air Release Point

CB—Circuit Breaker

CDS—Container Delivery System

CFL—Critical Field Length

COMSEC—Communications Security

CVR—Cockpit Voice Recorder

C2IPS—Command and Control Information Processing System

DH—Decision Height

DME—Distance Measuring Equipment

DZ—Drop Zone

EDP—Earliest Descent Point

ERO—Engine Running On/Offload

ETA—Estimated Time of Arrival

ETE—Estimated Time En route

ETP—Equal Time Point

FAF—Final Approach Fix

FMC—Full Mission Capable

FOD—Foreign Object Damage

FPA—Flight Path Angle

G/S—Glide Slope

GMT—Greenwich Mean Time

GPS—Global Positioning System

GPWS—Ground Proximity Warning System

GS—Ground Speed

HAHO—High Altitude High Opening

HALO—High Altitude Low Opening

HARP—High Altitude Release Point

HDG—Heading

HE—Heavy Equipment

HF—High Frequency

HQ—Have Quick

IAS—Indicated Airspeed

ICAO—International Civil Aviation Organization

IFF—Identification Friend or Foe

IFR—Instrument Flight Rules

ILS—Instrument Landing System

INOP—Inoperative

INT—Intermediate Thrust

IP—Initial Point

KCAS—Knots Calibrated Airspeed

KIAS—Knots Indicated Airspeed

LAPES—Low Altitude Parachute Extraction System

LOC—Localizer

MDA—Minimum Descent Altitude

MWS—Missile Warning System

NM—Nautical Mile

OAT—Outside Air Temperature

PPI—Plan Position Indicator

RCR—Runway Condition Reading

RSC—Runway Surface Condition

SATCOM—Satellite Communications

SKE—Station Keeping Equipment

SPR—Single Point Refueling

TOT—Time Over Target

X-FEED—Crossfeed

XFER—Transfer

XMIT—Transmit

ZFW—Zero Fuel Weight

ZM—Zone Marker

Terms

Advanced Computer flight Plan (ACFP)—An Air Force level system which is the follow on replacement for the Optimized AMC Flight Plan (formerly Jeppesen). The system brings an improved user interface to the customer, runs in Microsoft Windows, and communicates with a mainframe located at Scott AFB IL. Once the optimized flight plans are produced on the mainframe, they are transmitted back to the Window's PC.

Aeromedical Evacuation (AE)—Movement of patients under medical supervision between Medical Treatment Facilities (MTFs) by air transportation.

Aeromedical Evacuation Coordination Center (AECC)—A coordination center, within the joint air operations center's airlift coordination cell, which monitors all activities related to aeromedical evacuation (AE) operations execution. It manages the medical aspects of the AE mission and serves as the net control station for AE communications. It coordinates medical requirements with airlift capability, assigns medical missions to the appropriate AE elements, and monitors patient movement activities.

Aeromedical Evacuation Crew Member (AECM)—Qualified Flight Nurse (FN) and Aeromedical Evacuation Technician (AET) performing AE crew duties.

Aeromedical Evacuation Operations Officer (AEOO)—Medical Service Corps (MSC) officer or medical administrative specialist or technician (AFSC 4A0X1) assigned to the AE system to perform duties outlined in applicable Air Force policy directives, instructions, 41-series handbooks, and this AFI.

Aeromedical Readiness Mission (ARM)—Training missions using simulated patients to prepare for the wartime/contingency movement of patients.

Aircrew Chemical Defense Ensemble (ACDE)—Individually fitted aircrew unique chemical protective equipment for the sole purpose of protecting aircrew while flying into and out of a chemically

contaminated environment.

Aircrew Eye/Respiratory Protective System (AERPS)—New generation individually sized aircrew chemical defense protective equipment system designed to protect aircrew from toxic chemical exposure to the head, neck, face, eyes, and respiratory tract.

Airdrop—The unloading of personnel or material from aircraft in flight.

Air Force Component Commander (AFCC)—In a unified, sub-unified, or joint task force command, the Air Force commander charged with the overall conduct of Air Force air operations.

Air Force Mission Support System (AFMSS)—Provides the Air Force with common interoperable automated flight mission planning hardware and software. Consists of a ground and portable (laptop) system. Interfaces with theater, MAJCOM, and joint data bases from fixed or deployed locations worldwide. Automates previously manually accomplished tasks. Passes Air Tasking order through C2IPS or CTAPS. Threats are provided via the Combat Intel System. AFMSS is multimedia capable with modem provided on ground and portable systems. The portable has a 1553B interface bus for uploading data to the aircraft. AFMSS displays and prints full color charts, NITF imagery, perspective views, mission rehearsals, 3-D fly through, flight planning forms and logs, and Digital Aeronautical Flight Information File information. Uses industry standardized data bases and complies with open-system architecture and multilevel security requirements. Built with Commercial Off-The-Shelf (COTS) hardware, and implements nonproprietary software.

Air Force Satellite Communication (AFSATCOM)—Satellite communications system capable of 75 Bits Per Second (BPS) record message traffic.

Airlift—Aircraft is considered to be performing airlift when manifested passengers or cargo are carried.

Air Mobility Control Center (AMCC)—Provides global coordination of tanker and airlift operations for AMC and operationally reports to the AMC TACC. Functions as the AMC agency that manages and directs ground support activities and controls aircraft and aircrews operating AMC strategic missions through overseas locations.

Air Mobility Element (AME)—The Air Mobility Element is an extension of the Air Mobility Command Tanker Airlift Control Center deployed to a theater when requested by the geographic combatant commander. It coordinates strategic airlift operations with the theater airlift management system and collocates with the air operations center whenever possible.

Air Mobility Operations Control Center (AMOCC)—Operations center which controls movement of theater assigned air mobility assets.

Air Refueling Control Point (ARCP)—The planned geographic point over which the receiver(s) arrive in the observation/pre-contact position with respect to the assigned tanker.

Air Refueling Exit Point (A/R EXIT PT)—The designated geographic point at which the refueling track terminates. In a refueling anchor it is a designated point where tanker and receiver may depart the anchor area after refueling is complete.

Air Refueling Initial Point (ARIP)—A point located upstream from the ARCP at which the receiver aircraft initiates a rendezvous with the tanker.

Air Reserve Component (ARC)—Refers to Air National Guard and Air Force Reserve Command forces, both Associate and Unit Equipped.

Air Route Traffic Control Center (ARTCC)—The principal facility exercising en route control of aircraft operating under instrument flight rules within its area of jurisdiction. Approximately 26 such centers cover the United States and its possessions. Each has a communication capability to adjacent centers.

Air Traffic Control (ATC)—A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.

Allowable Cabin Load (ACL)—The maximum payload which can be carried on an individual sortie.

AMC History System (AHS)—Database that compiles and stores airlift/tanker activity input by line units.

Assault Landing Zone (ALZ)—A paved or semi-prepared (unpaved) airfield used to conduct operations in an airfield environment similar to forward operating locations. ALZ runways are typically shorter and narrower than standard runways and are primarily used by C-130s and C-17s. Aircraft performance limitations apply. Also replaces the term Landing Zone (LZ) for SOLL II.

Augmented Crew—Basic aircrew supplemented by additional qualified aircrew members to permit in-flight rest periods.

Automatic Link Establishment (ALE)—Automated process of setting up a communications link between two operating stations. Process involves periodic scanning of frequency spectrum and over-the-air "handshaking" to select and maintain highest quality and most reliable radio channels. Primarily used in the HF band.

Aviation Into-Plane Reimbursement (AIR) Card—A credit card that can be used to purchase aviation fuels, related fuel supplies and ground services at commercial airports where no DoD or Canadian Into-Plane contract exists.

Basic Crew—Minimum crew compliment required for a mission (see **Chapter 3** of this instruction).

Bird Aircraft Strike Hazard (BASH)—An Air Force program designed to reduce the risk of bird strikes.

Bird Watch Condition (BWC) Low—Normal bird activity [as a guide, fewer than 5 large birds (waterfowl, raptors, gulls, etc.) or fewer than 15 small birds (terns, swallows, etc.)] on and above the airfield with a low probability of hazard. Keep in mind a single bird in a critical location may elevate the Bird Watch Condition (BWC) to moderate or severe.

Bird Watch Condition Moderate—Increased bird population (approximately 5 to 15 large birds or 15 to 30 small birds) in locations that represent an increased potential for strike. Keep in mind a single bird in a critical location may elevate the BWC to moderate or severe.

Bird Watch Condition Severe—High bird population (as a guide, more than 15 large birds or 30 small birds) in locations that represent an increased potential for strike. Keep in mind a single bird in a critical location may cause a severe BWC

Block Time—Time determined by the scheduling agency responsible for mission accomplishment for the aircraft to arrive at (block in) or depart from (block out) the parking spot.

BLUE BARK—US military personnel, US citizen civilian employees of the Department of Defense, and the dependents of both categories who travel in connection with the death of an immediate family member. It also applies to designated escorts for dependents of deceased military members. Furthermore,

the term is used to designate the personal property shipment of a deceased member..

Boat Drop—Aircraft is considered to be performing boat drop when boats rigged for heavy equipment airdrop, often followed by a fuel blivet rigged for a container delivery airdrop, are scheduled to be released from the aircraft in flight.

Border Clearance—Those clearances and inspections required to comply with federal, state, and local agricultural, customs, immigration, and immunizations requirements.

Category I Route—Any route that does not meet the requirements of a category II route, including low level route navigation and over water routes.

Category II Route—Any route on which the position of the aircraft can be accurately determined by the overhead crossing of a radio aid (NDB, VOR, TACAN) at least once each hour with positive course guidance between such radio aids.

Chalk Number—Number given to a complete load and to the transporting carrier.

Channel—Airlift missions that support a routinely scheduled requirement (i.e. embassy or ration missions)

Charge Medical Technician (CMT)—AET responsible for ensuring completion of enlisted aeromedical crew duties.

Chart Update Manual (CHUM)—Manual issued each March and September (with monthly supplements) to update maps/charts with new information. It contains both temporary and permanent information pending the next release.

Change of Operational Control (CHOP)—The date, time, and/or point where the responsibility for operational control of force passes from one operational authority to another.

Circular Error Average (CEA)—Indicator of the accuracy of an airdrop operation. It is the radius of a circle within which half of the air-dropped personnel and items or materiel have fallen.

Close Watch Missions—Designated missions that receive C2 special attention. Examples are presidential support (PHOENIX BANNER), aeromedical, and search and rescue missions. Other operational missions such as deployment, redeployment, reconnaissance operations, Operational Readiness Inspections (ORI), AMC channel or SAAM, and JA/ATT missions may be designated "CLOSE WATCH" as necessary.

COIN ASSIST—Nickname used to designate dependent spouses accompanying dependent children and dependent parents of military personnel reported missing or captured who may travel space available on military aircraft for humanitarian purposes on approval of the Chief of Staff, United States Army; Chief of Staff, United States Air Force; Chief of Naval Operations; or the Commandant of the Marine Corps.

Command and Control (C2)—The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.

Command and Control Center (CCC) (C3)—Each CCC provides supervision, guidance, and control within its assigned area of responsibility. For the purpose of this AFI, CCCs include operations centers, command posts, air mobility elements, tanker airlift control elements (TALCE), air mobility control

centers, and tanker task forces.

Command and Control Information Processing System (C2IPS)—Computer-based information transmission and information handling for command and control functions associated with the Director of Mobility Forces (DIRMOBFOR), AME fixed units, and TALCE. Interfaces to and automatically updates the Global Decision Support System (GDSS).

CONFERENCE SKYHOOK—Communication conference available to help aircrews solve in-flight problems that require additional expertise.

Contingency Mission—Mission operated in direct support of an OPORD, OPLAN, disaster, or emergency.

Critical Phase Of Flight—Takeoff, air refueling, formation, low level, air drop, approach, and landing.

Deadhead Time—Duty time for crew members positioning or de-positioning for a mission or mission support function while not performing crew duties.

Department of Defense Activity Address Code (DoDAAC)—A six-position, alpha-numeric code assigned to identify the unit, activity, or organization within DoD that owns the aircraft.

Designated Courier—Officer or enlisted member in the grade of E-5 or above of the US Armed Forces, or a Department of State diplomatic courier, selected by the Defense Courier Service (DCS) to accept, safeguard, and deliver DCS material as directed. A primary aircrew member should be used as a courier only as a last resort.

Desolate Terrain Missions—Any mission in excess of one hour over desert, tropical, or jungle terrain (not to include flights conducted over the CONUS).

Deviation—A deviation occurs when takeoff time is not within -20/+14 minutes of scheduled takeoff time.

Digital Aeronautical Flight Information File (DAFIF)—Digitized FLIP data containing airport, runway, navigation aid, and en route data. Contains both low and high altitude structures.

Digital Features Analysis Data (DFAD)—Selected natural and man-made features collected from photographic and cartographic sources.

Digital Terrain Elevation Data (DTED)—A matrix of terrain elevation values that provide landform, slope, elevation, and/or terrain roughness information.

Direct Instructor Supervision—Supervision by an instructor of like specialty with immediate access to controls (for pilots, the instructor must occupy either the pilot or copilot seat for student to be considered under “direct instructor supervision.”).

Director of Mobility Forces (DIRMOBFOR)—Individual responsible for theater mobility force management. The Air Force component commander exercises operational control of assigned or attached mobility forces through the DIRMOBFOR. The DIRMOBFOR monitors and manages assigned mobility forces operating in theater. The DIRMOBFOR provides direction to the Air Mobility Division in the AOC to execute the air mobility mission and will normally be a senior officer familiar with the AOR.

Distinguished Visitor (DV)—Passengers, including those of friendly nations, of star or flag rank or equivalent status, to include diplomats, cabinet members, members of Congress, and other individuals designated by the DoD due to their mission or position (includes BLUE BARK and COIN ASSIST).

Diverse Departure—The airfield has been assessed for departure by TERPS personnel and no penetration of the obstacle surfaces exists. An aircraft may depart the field, climb to 400 feet above the departure end of the runway elevation, turn in any direction, and if a minimum climb gradient of 200'/NM is maintained be assured of obstacle clearance. This is normally indicated on DoD/NOAA publications by the absence of any published departure procedures.

Double Blocking—When an aircraft is required to block-in at one parking spot, then move to normal parking for final block-in. The extra time required for double blocking will be taken into account during mission planning/scheduling. To compensate for double blocking on departure, the aircrew "legal for alert time" may be adjusted to provide additional time from aircrew "show time" to departure. When double blocking is required on arrival, the aircrews entry into crew rest will be delayed until postflight duties are complete.

Drop Zone (DZ)—A specified area upon which airborne troops, equipment, or supplies are airdropped.

DZ Entry Point—A fixed point on DZ run-in course where an aircraft or formation of aircraft may safely begin descent from IFR en route altitude to IFR drop altitude. The DZ entry point is a maximum of 40 NM prior to the DZ exit point according to Federal Aviation Administration FAR exemption 4371C. Formation descent will not begin until the last aircraft in formation is at or past the DZ entry point.

DZ Exit Point—A fixed point on the DZ escape flight path centerline, established during pre-mission planning, at which the formation will be at the minimum IFR en route altitude. Calculate the exit point based upon three-engine performance at airdrop gross weight. This point will be planned no less than four NMs track distance beyond the DZ trailing edge.

Due Regard—Operational situations that do not lend themselves to International Civil Aviation Organization (ICAO) flight procedures, such as military contingencies, classified missions, politically sensitive missions, or training activities. Flight under "Due Regard" obligates the military aircraft commander to be his or her own air traffic control (ATC) agency and to separate his or her aircraft from all other air traffic. (See FLIP General Planning, section 7.)

Earliest Descent Point (EDP)—Earliest point in the DZ run-in course where the lead aircraft may begin IFR descent to IFR drop altitude and be assured of terrain clearance for the entire formation. Computed by subtracting formation length (e.g., a 4-ship is 2 NMs long) from the computed DZ entry point.

Egress—The route portion from the last objective to the planned recovery base.

Element—A subdivision of a section (maximum of three aircraft). The element is the foundation for all formation geometry

Equal Time Point—Point along a route at which an aircraft may either proceed to destination or first suitable airport or return to departure base or last suitable airport in the same amount of time based on all engines operating.

Estimated Time of Arrival (ETA)—A mission's expected touchdown time at it's destination airfield

Estimated Time in the Blocks (ETB)—The time a mission is expected to arrive at its assigned parking spot.

Estimated Time of Departure (ETD)—A mission's expected take-off time.

Estimated Time In Commission (ETIC)—Estimated time required to complete required maintenance.

Execution—Command-level approval for initiation of a mission or portion thereof after due

consideration of all pertinent factors. Execution authority is restricted to designated command authority.

Familiar Field—An airport in the local flying area at which unit assigned aircraft routinely perform transition training. Each operations group commander will designate familiar fields within their local flying area.

First Pilots—First pilots are highly experienced copilots who are qualified IAW volumes 1 and 2 of this instruction to taxi, take-off, and land the aircraft from the left seat under the supervision of a qualified aircraft commander.

Fix—A position determined from terrestrial, electronic, or astronomical data.

Force Rendezvous Point (FRP)—Navigational checkpoint over which formations of aircraft join and become part of the main force.

Fuel Reserve—Amount of usable fuel that must be carried beyond that required to complete the flight as planned.

Global Decision Support System (GDSS)—AMC's primary execution command and control system. GDSS is used to manage the execution of AMC airlift and tanker missions.

Global Patient Movement Requirements Center (GPMRC)—A joint activity reporting directly to the Commander in Chief, US Transportation Command, the Department of Defense single manager for the regulation of movement of uniformed services patients. The Global Patient Movement Requirements center authorizes transfers to medical treatment facilities of the Military Departments or the Department of Veterans Affairs and coordinates intertheater and inside continental United States patient movement requirements with the appropriate transportation component commands of US Transportation Command.

Ground Time—Interval between engine shut down (or arrival in the blocks if engine shutdown is not scheduled) and next takeoff time.

Hazardous Cargo or Materials (HAZMAT)—Articles or substances that are capable of posing significant risk to health, safety, or property when transported by air and classified as explosive (class 1), compressed gas (class 2), flammable liquid (class 3), flammable solid (class 4), oxidizer and organic peroxide (class 5), poison and infectious substances (class 6), radioactive material (class 7), corrosive material (class 8), or miscellaneous dangerous goods (class 9). Classes may be subdivided into divisions to further identify hazard, i.e., 1.1, 2.3, 6.1, etc.

IFR Drop Corridor—As defined in FAR Exemption 4371, the 40 NM long corridor where aircraft may operate below the IFR en route altitude.

IFR Drop Corridor Egress Point—See DZ Exit Point.

IFR Drop Corridor Ingress Point—That point on the route 40 NM from the DZ Exit Point IAW FAR Exemption 4371 where the formation may descend below IFR en route altitude. Actual descent requires compliance with DZ Entry Point criteria.

IMC Drop Altitude—Plan minimum IMC drop altitudes at 500 feet above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation), or 400 feet plus one contour interval above the highest depicted terrain contour, whichever is the highest, within 3 NMs either side of the run-in centerline from DZ Entry Point to DZ Exit Point. Ensure this altitude is not lower than the published altitude for the chute type and numbers being dropped.

IMC Stabilization Point—The point after the DZ Entry Point where the lead aircraft should plan to be

stabilized at IMC drop altitude and airspeed. Plan this point to be no less than 6 NMs prior to the PI.

Ingress—The portion of the route from the departure base to the first objective.

In-Place Time (IPT)—Time when an aircraft and crew are at an operating base and prepared to load for the mission.

Interfly—The exchange and/or substitution of aircrews and aircraft between Mobility Air Forces (MAF).

International Maritime Satellite (INMARSAT)—United Nations-sponsored organization with controlling authority over a commercial satellite constellation. The constellation provides near global voice/data communications coverage for land-based, maritime and aeronautical radio operations. Users of the system are required to register with the organization, abide by the charter, and pay "by the minute" usage fees.

Joint Airborne/Air Transportability Training (JA/ATT)—Continuation and proficiency combat airlift training conducted in support of DoD agencies. Includes aircraft load training and service school support. AMC headquarters publishes JA/ATT tasking in AMC OPORD 17-76, annex C, appendix 1.

Jumpmaster—The assigned airborne-qualified individual who controls parachutists from the time they enter the aircraft until they exit.

Knock-it-off—A term any crew member may call to terminate a training maneuver. Upon hearing “knock-it-off” the crew should establish a safe attitude, altitude and airspeed and return the aircraft power and flight controls to a normal configuration.

Latest Descent Point—Latest planned point on the DZ run-in course where the formation plans to initiate descent to drop altitude. This is planned to ensure all aircraft in the formation are stabilized (on altitude and airspeed) prior to the drop.

L-Band SATCOM—600 BPS Satellite Communications (SATCOM) system contracted through the International Maritime Satellite Organization (INMARSAT), used primarily for command and control. The system consists of a satellite transceiver, a laptop computer, and a printer.

Lead Crew—A crew consisting of a lead qualified aircraft commander and a lead qualified navigator.

Loading Time—In airlift operations, a specified time, established jointly by the airlift airborne commanders concerned, when aircraft loads are available and loading is to begin.

Local Training Mission—A mission scheduled to originate and terminate at home station (or an off-station training mission), generated for training or evaluation, and executed at the local level.

Maintenance Status:—

A-1; No maintenance required.

A-2 (Plus Noun); Minor maintenance required, but not serious enough to cause delay. Add nouns that identify the affected units or systems, i.e. hydraulic, ultra high frequency (UHF) radio, radar, engine, fuel control, generator, boom or drogue, etc. Attempt to describe the nature of the system malfunction to the extent that appropriate maintenance personnel will be available to meet the aircraft. When possible, identify system as Mission Essential (ME) or Mission Contributing (MC).

A-3 (Plus Noun); Major maintenance. Delay is anticipated. Affected units or systems are to be identified

as in A-2 status above.

A-4; Aircraft or system has suspected or known biological, chemical, or radiological contamination.

Medical Crew Director (MCD)—Flight Nurse (FN) responsible for supervising patient care and AEMCs assigned to AE missions. On missions where an FN is not onboard, the senior AET will function as MCD.

Minimum Altitude Capable (MAC)—The lowest altitude an aircrew can descend to when they detect or suspect a threat. It is dependent on individual aircrew capabilities, experience level, fatigue factors, terrain clearance, etc.

Minimum IFR En Route Altitude—Compute minimum IFR en route altitude by adding 1000 feet (2000 feet in mountainous terrain) above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation) within five nautical miles of route centerline. Outside the United States, the distance from centerline should be increased to 10 NMs in controlled airspace. This altitude may be rounded off to the next higher 100-foot increment.

Mission Clinical Coordinator (MCC)—A qualified MCD or CMT, in addition to the basic crew and instructors and flight examiners. Responsible for coordinating training activities on ARMs.

Mission Contributing (MC)—Any degraded component, system, or subsystem which is desired, but not essential to mission accomplishment.

Mission Essential (ME)—An degraded component, system, or subsystem which is essential for safe aircraft operation or mission completion.

Mission—1. The task, together with the purpose, that clearly indicates the action to be taken and the reason therefor. 2. In common usage, especially when applied to lower military units, a duty assigned to an individual or unit; a task. 3. The dispatching of one or more aircraft to accomplish one particular task.

Mission Advisory—Message dispatched by command and control agencies, liaison officers, or aircraft commanders advising all interested agencies of any changes in status affecting the mission.

Mobility Air Force (MAF)—Forces assigned to mobility aircraft or MAJCOMs with operational or tactical control of mobility aircraft.

Modified Contour—Flight in reference to base altitude above the terrain with momentary deviations above and below the base altitude for terrain depressions and obstructions to permit a smooth flight profile.

Off Station Training Flight—A training flight that originates or terminates at other than home station that is specifically generated to provide the aircrew experience in operating away from home station. Off station trainers will not be generated solely to transport passengers or cargo.

Operational Control (OPCON)—Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational .control is inherent in combatant command (command authority). Operational control may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally

this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions. Operational; control does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training.

Operational Missions—Missions executed at or above TACC level. Operational missions termed "CLOSE WATCH" include CORONET missions and AFI 11-221, *Air Refueling Management*, priority 1, 2, and 3 missions tasked by the TACC. Other operational missions such as deployment, re-deployment, reconnaissance operations, Operational Readiness Inspections (ORI), AMC channel or SAAM, and JA/ATT missions may be designated "CLOSE WATCH" as necessary.

Operational Risk Management (ORM)—is a logic-based, common sense approach to making calculated decisions on human, materiel, and environmental factors before, during, and after Air Force operations. It enables commanders, functional managers and supervisors to maximize operational capabilities while minimizing risks by applying a simple, systematic process appropriate for all personnel and Air Force functions

Opportune Airlift—Transportation of personnel, cargo, or both aboard aircraft with no expenditure of additional flying hours to support the airlift.

Originating Station—Base from which an aircraft starts on an assigned mission. May or may not be the home station of the aircraft.

Over water Flight—Any flight that exceeds power off gliding distance from land.

Pathfinder Aircraft—Aircraft that precedes the main force to the objective area. Its primary functions are to airdrop the CCT and provide current weather information to the main force.

Patient Movement Categories—

Urgent. Patients who must be moved immediately to save life, limb, or eyesight, or to prevent complication of a serious illness.

Priority. Patients requiring prompt medical care that must be moved within 24-hours.

Routine. Patients who should be picked up within 72-hours and moved on routine/scheduled flights.

Permit to Proceed—Aircraft not cleared at the first US port of entry may move to another US airport on a permit to proceed issued by customs officials at the first port of entry. This permit lists the requirements to be met at the next point of landing, i.e. number of crew and passengers, cargo not yet cleared. Aircraft commanders are responsible to deliver the permit to proceed to the customs inspector at the base where final clearance is performed. (Heavy monetary fines can be imposed on the aircraft commander for not complying with permit to proceed procedures.)

Point Of No Return—A point along an aircraft track beyond which its endurance will not permit return to its own or some other associated base on its own fuel supply.

Point of Safe Return—Most distant point along the planned route from which an aircraft may safely return to its point of departure or alternate airport with required fuel reserve.

Positioning and De-positioning Missions—Positioning missions are performed to relocate aircraft for

the purpose of conducting a mission. De-positioning missions are made to return aircraft from bases at which missions have terminated.

Quick Stop—Set of procedures designed to expedite the movement of selected missions by reducing ground times at en route or turnaround stations.

Ramp Coordinator—Designated representative of the C2 whose primary duty is the coordination of ground handling activities on the ramp during large scale operations.

Reduced Vertical Separation Minimums (RVSM)—See FLIP/GP Area Planning for specific definition.

Scheduled Return Date (SRD)—Scheduling tool used by air mobility units to predict when crews will return to home station. It allows force managers to plan aircrew availability and provide crews visibility over monthly flying activities. AMC and AMC-gained aircrews (except those on standby at home station) will have an SRD established on their flight orders.

Scheduled Return Time (SRT)—Scheduling tool used by home unit and TACC to predict when aircrews will return to home station after a mission. SRT for active duty and AFRC crews is 24-hours after scheduled mission completion. SRT for ANG is scheduled mission completion.

Scheduled Takeoff Time—Takeoff time is established in the schedule or OPORD. For air aborts and diversions, this will be engine shut down time (or arrival in the blocks if engine shutdown is not scheduled) plus authorized ground time. Early deviation does not apply to aborts or diversions unless the mission is formally rescheduled by current operations. Scheduled takeoff time may be adjusted to make good an ARCT, TOT, or TOA. Notify controlling agency prior to takeoff to adjust the scheduled takeoff time.

Section—Subdivision of a formation. A section normally consists of 6 aircraft (2 elements).

Serial—Normally consists of 12 aircraft (2 sections or 4 elements).

Significant Meteorological Information (SIGMET)—Area weather advisory issued by an ICAO meteorological office relayed to and broadcast by the applicable ATC agency. SIGMET advisories are issued for tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, severe and extreme turbulence, severe icing, and widespread dust or sand storms. SIGMETs frequently cover a large geographical area and vertical thickness. They are prepared for general aviation and may not consider aircraft type or capability.

Special Assignment Airlift Mission (SAAM)—Funded airlift that cannot be supported by channel missions because of the unusual nature, sensitivity, or urgency of the cargo or that requires operations to points other than the established channel structure.

Special Tactics Team (STT)—An Air Force team composed primarily of special operations combat control and pararescue personnel. The team supports joint special operations by selecting, surveying and establishing assault zones; providing assault zone terminal guidance and air traffic control; conducting direct action missions; providing medical care and evacuation; and, coordinating, planning, and conducting air, ground, and naval fire support operations.

Stations Time (Airborne)—Specified time when paratroopers will be seated in the aircraft with seat belts fastened. Normally, this time is 5 minutes prior to Air Force Stations time.

Stations Time (Air Force)—Normally, 30 minutes prior to takeoff time for the KC-10, KC-135, C-130,

C-141, and OSA aircraft (45 minutes for C-5 and C-17). Aircrews will have completed their pre-flight duties and be at their crew positions. Passengers will be seated and cargo will be secured.

Tactical Event—Airdrop, low level, formation, formation air refueling, and threat avoidance approaches and departures.

Tanker Airlift Control Center (TACC)—The Air Mobility Command direct reporting unit responsible for tasking and controlling operational missions for all activities involving forces supporting US Transportation Command's global air mobility mission. The Tanker Airlift Control Center is comprised of the following functions: current operations, command and control, logistics operations, aerial port operations, aeromedical evacuation, flight planning, diplomatic clearances, weather, and intelligence.

Tanker Airlift Control Element (TALCE)—Team of qualified Air Force personnel established to control, coordinate, and function as an Air Force tanker and airlift C2 facility at a base where normal AMC C2 facilities are not established or require augmentation. TALCEs support and control contingency operations on both a planned and no-notice basis.

Theater Patient Movement Requirements Center (TPMRC)—The TPMRC is responsible for theater wide patient movement (e.g., medical regulating and AE scheduling), and coordinates with theater MTFs to allocate the proper treatment assets required to support its role. The primary role of the TPMRC is to devise theater plans and schedules and then monitor their execution in concert with the GPMRC. The TPMRC is responsible to the Combatant Commander through the Combatant Command Surgeon. The TPMRC is also responsible for all aspect of intratheater patient movement management. A TPMRC provides command and control for patient movement management operations in its theater of operations, as directed by its Combatant Commander's operational policy, and in coordination with USTRANSCOM, acting as a supporting combatant command, responsible for intertheater and CONUS patient movement.

Time Out—Common assertive statement used to voice crew member concern when safety may be jeopardized.

Transportation Working Capital Fund (TWCF)—Formerly known as Defense Business Operations Fund-Transportation (DBOF-T). Part of the Air Force Working Capital Fund (AFWCF). Normally used to cover costs that can be recovered from an air mobility customer. Examples include TDY costs, site surveys of TALCE or airlift unit deployment bed down locations, airlift unit level mission planning expenses, and support or contract costs for deployed TWCF units/personnel.

Unilateral Training Mission—Mission confined to a single service and executed at the unit level for the sole purpose of aircrew training for upgrade or proficiency. Does not include operational missions as defined in this AFI.

Unit Move—A mission airlifting military passengers or troops who originate from the same unit and onload point, are under the control of a designated troop commander and offload at the same destination.

Zero Fuel Weight—Weight, expressed in pounds, of a loaded aircraft not including fuel. All weight in excess of the maximum zero fuel weight will consist of usable fuel.