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MEMORANDUM FOR DISTRIBUTION C

FROM: HQ USAF/A3

SUBJECT: AFI 11-2C-5 Volume 3, Guidance Memorandum

1. By Order of the Secretary of the Air Force this Guidance Memorandum implements changes to AFI 11-2C-5 Volume 3, *FLYING OPERATIONS*, providing stabilized approach procedures for all C-5 units on AMC-tasked and 618 AOC (TACC) flight managed missions, in addition to local missions flown by AMC units. Compliance with this memorandum is mandatory. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using AF Form 847, *Recommendation for Change of Publication*. AF Form 847s from the field will be routed through the appropriate functional chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) AFMAN 33-363, *Management of Records*, and disposed of IAW with the AF Records Disposition Schedule (RDS) located on the AF Portal at the Air Force Records Information Management System (AFRIMS) link. To the extent its directions are inconsistent with other Air Force publications, the information herein prevails, IAW AFI 33-360, *Publications and Forms Management*.

2. Change the listed paragraphs to the following:

5.12. Stabilized Approach. Unstable approaches are primary contributors to numerous military and civilian mishaps. Stabilized approaches are essential for the safe operation of aircraft and are mandatory. The following criteria define specific parameters that mitigate risk during this critical phase of flight. This philosophy requires aircrew to take immediate corrective actions to stabilize the approach when outside designated parameters. Although tactical approaches are inherently less constrained, they must still result in the aircraft arriving at a position in space in an appropriate configuration and within acceptable parameters that will permit a safe landing consistent with aircraft flight manual restrictions as well as performance manual assumptions and limitations.

5.12.1. The following stabilized approach criteria applies to **all** approaches and will be emphasized and briefed for every approach:

5.12.1.1. Aircraft is in approach configuration. Final flap configuration may be delayed but will be briefed.

5.12.1.2. Airspeed is appropriate for the configuration and conditions, or as instructed by ATC.

5.12.1.3. Sink rate is no greater than 1000 fpm. NOTE: Under certain conditions (wx, terrain, etc.) some approaches may require greater than a 1000 fpm descent rate. This increased sink rate will be briefed.

5.12.1.4. All briefings and checklists are complete unless contrary to T.O. guidance.

5.12.1.5. Aircraft is on the correct track.

5.12.1.6. Aircraft is in the correct bank angle to maintain proper approach track for instrument, circling, or visual approach.

5.12.1.7. Power is set to maintain the descent profile at approach speed.

5.12.1.8. Momentary minor corrections or deviations are acceptable and defined as:

5.12.1.8.1. Airspeed: +10/-5 kts from target

5.12.1.8.2. Bank Angle: +/- 15 degrees from target

5.12.1.8.3. Rate of Descent: +/- 300 FPM from target

5.12.2. The following criteria apply to all approaches:

5.12.2.1. At 1000 feet height above touchdown (HAT), the stable criteria in paragraph 5.12.1 apply.

5.12.2.1.1. If these criteria are not met at 1000 feet HAT, the PM will announce the deviation and the PF will take immediate corrective action. PM will state “1000, xxxx,” where “xxxx” equates to a concise description of the unstable characteristic(s) which clearly relay to the PF what actions are required to return the aircraft to a stable platform. Example: “1000, 15 fast”. If criteria are met, PM will state “1000, stable.”

5.12.2.2. Between 1000 feet and 500 feet HAT:

5.12.2.2.1. Parameters are the same as those in paragraph 5.12.1.

5.12.2.2.2. If these criteria are not maintained, the PM will announce the deviation using the “xxxx” format (Example: “15 fast”) and the PF will take immediate corrective action.

5.12.2.3. At 500 feet HAT:

5.12.2.3.1. Parameters are the same as those in paragraph 5.12.1.

5.12.2.3.2. If criteria are met, PM will state “500, stable.”

5.12.2.3.3. If unstable or not in final flap configuration at 500 feet HAT, the PM will call "Go-Around" and the PF will execute a go-around.

5.12.2.4. From 500 feet HAT to the runway, if these parameters are exceeded the PM or any other crewmember will announce "Go-Around" and the PF will execute a go-around.

5.12.3. **NOT USED.**

5.12.4. Descent Planning and Energy Management. Awareness of maneuver entry parameters and energy management is crucial to meeting the stabilized approach criteria on every approach. Aircrews will ensure the aircraft is following the planned descent profile. All non-tactical descents should follow a normal descent profile IAW AFMAN 11-217 procedures and techniques in the absence of ATC or FLIP guidance. All tactical descents should follow published tactical procedures/profiles. When unforeseen interruptions alter the planned descent, immediately correct any deviations. It may be necessary to hold, request vectors, or take alternate actions in order to comply with the planned descent profile.

5.12.5. Visual Transition. It is imperative for aircrews to review the airfield environment. Identify key features such as approach light type, airfield lighting, geographic layout/configuration of runways, taxiways, ramps, etc. To the max extent possible, this study will take place during the crew mission briefing and reviewed again prior to descent.

5.12.6. Missed Approach/Go-Around. Aircrews will conduct a thorough briefing for anticipated missed approach/go-around scenarios. This briefing will include a discussion of specific crewmember duties. NOTE: Execute missed approach/go-around IAW -1 and AFMAN 11-217 procedures.

6. This memorandum becomes void after one year from the date of the memorandum, upon publication of an Interim Change or rewrite of the affected publication, whichever is earlier.

7. AMC POC for this Guidance Memorandum is Maj Jeffrey Craig, HQ AMC/A3VK, DSN 779-3633, e-mail: jeffrey.craig@us.af.mil.

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Deputy Chief of Staff, Operations

BY ORDER OF THE SECRETARY OF THE AIR FORCE

AIR FORCE INSTRUCTION 11-2C-5 VOLUME 3

24 FEBRUARY 2012

Flying Operations

C-5 OPERATIONS PROCEDURES

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This instruction implements Air Force Policy Directive (AFPD) 11-2, *Aircraft Rules and Procedures* and references AFI 11-202, Volume 3, *General Flight Rules*, as well as Air Force Tactics Techniques and Procedures (AFTTP) 3-3.C-5. It establishes policy for the operation of the C-5 aircraft to safely and successfully accomplish worldwide mobility missions. This instruction applies to all commanders, operations supervisors, and aircrew assigned or attached to all flying activities of commands operating C-5 aircraft. This publication is applicable to Air Force Reserve Command (AFRC) and Air National Guard (ANG) units. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at **https://www.my.af.mil/afrims/afrims/afrims/rims.cfm** This publication requires the collection and or maintenance of information protected by the Privacy Act (PA) of 1974. The authorities to collect and or maintain the records prescribed in this publication are Title 10 *United States Code*, Chapter 857 and Executive Order 9397, *Numbering System for Federal Accounts Relating to Individual Persons*, 30 Nov 1943 as ammended. Forms affected by the PA have an appropriate PA statement. System of records notice F011 AF XO, *Aviation Resource Management System* (ARMS) applies. To recommend changes, conflicts, suggestions, or recommendations submit the AF Form 847, *Recommendation for Change of Publication*, to the Office of Primary Responsibility (OPR); route AF Form 847s from the field through Major Command (MAJCOM) publications/forms Managers. 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 document is for information only. No U.S. government commitment to sell, loan, lease, co-develop or co-produce defense articles or services is implied or intended. This

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SUMMARY OF CHANGES

This document is substantially revised and must be completely reviewed. Major changes include stabilized approach criteria; use of automation; Verbalized, Verify, and Monitor; critical action coordination; volcanic ash operations; Arrival/Departure Briefings; elimination of touch and go certified ACs; fuel efficiency procedures; 18-hour Augmented Duty Day; MEL list; use of non-mission related material; and VFR procedures. Major changes were a result of standardizing AFI 11-2MDSv3 across all Mobility Air Forces (MAF) platforms. This document is based on the AMC 11-2MDSv3 template. Some paragraphs were renumbered as a result.

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GENERAL INFORMATION

1.1. General.

1.1.1. This Air Force Instruction (AFI) provides policy for operating the C-5 aircraft. It is an original source document for many areas but, for efficacy, restates information found in aircraft flight manuals, flight information publications (FLIP), and other Air Force directives. When guidance in this AFI conflicts with another basic/source document, that document takes precedence. For matters where this AFI is the source document, waiver authority is In Accordance With (IAW) **paragraph 1.4** For matters where this AFI repeats information in another document, follow waiver authority outlined in the basic/source document.

1.1.2. Unit commanders and agency directors involved with or supporting C-5 operations shall make current copies of this AFI available to appropriate personnel. Transportation and Base Operations passenger manifesting agencies will maintain a current copy of this AFI.

1.2. Applicability. This AFI applies to aircrew members, support personnel, and managers involved with employing C-5 aircraft.

1.3. Key Words Explained.

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

1.3.2. "Should" indicates 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., 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 policies in this AFI except when the situation demands immediate action to ensure safety. The Pilot in Command (PIC) is vested with ultimate mission authority and responsible for each course-of-action they choose to take.

1.4.1. Deviations. The PIC shall report deviations or exceptions taken without a waiver through command channels to their Chief, Major Command (MAJCOM) Stan/Eval.

1.4.2. Waivers. Unless otherwise directed, waiver authority for the contents of this instruction is the MAJCOM/A3/DO with mission execution authority. For TRANSCOM/AMC operational missions under Operational Control (OPCON) of 18 Air Force, 18 AF/CC is the waiver authority. For aircrews that change Operational Control (CHOP) to a COCOM, the COMAFFOR is the waiver authority.

1.4.2.1. Permanent waivers affect theater unique circumstances and are enduring in nature. List MAJCOM/A3/DO approved permanent waivers in the MAJCOM supplement (see **paragraph 1.5**.)

1.4.2.2. Long-term waivers affect multiple aircraft/multiple missions but are not permanent in nature (expire at a specific date/time). MAJCOM Stan/Eval shall send AMC Stan/Eval (lead command) copies of MAJCOM/A3/DO-approved long-term waivers, as appropriate.

1.4.2.3. Short-notice waivers are for specific missions in execution. PICs shall use the Waiver Protocol procedure in **Chapter 4** to secure MAJCOM/A3/DO approval for short-notice waivers.

1.5. Supplemental Procedures. This AFI is a basic directive. Each user MAJCOM or operational theater may supplement this AFI according to AFPD 11-2, *Aircraft Rules and Procedures*, and AFI 33-360, *Publications and Forms Management*. Stipulate unique MAJCOM procedures (shall not be less restrictive than this basic document) and publish MAJCOM/A3/DO approved permanent waivers in the MAJCOM supplement.

1.5.1. Combined Command Operations. Plan and conduct all operations that include forces from multiple MAJCOMs using provisions in this AFI. Do not assume or expect aircrews to perform MAJCOM theater unique procedures without owning MAJCOM/A3/DO approval and advance training.

1.5.2. Coordination Process. Forward MAJCOM proposed supplements (attach AF Form 673, *Request To Issue Publication*) to AMC/A3V for mandatory coordination prior to approval.

1.6. Local Supplement Coordination Process. Operations Group commanders (OG/CCs) shall define local operating procedures to this instruction in a unit supplement. OG/CCs shall obtain MAJCOM approval prior to releasing their supplement. Send an electronic copy of the approved version to AMC/A3V.

1.7. Improvement Recommendations. Send comments and suggested improvements to this instruction on an AF Form 847, *Recommendation for Change of Publication*, through appropriate channels to AMC/A3V. Status of active AF Forms 847 is available on the AMC 847 Program SharePoint at **https://cs.eis.af.mil/aircrewpubs/AMC%20847%20Program/default.aspx**.

1.8. Definitions. Find explanations or definitions of terms and abbreviations commonly used in the aviation community in Code of Federal Regulations (CFR) Title 14, Part 1; *DoD FLIP General Planning*, Chapter 2; and Joint Pub 102, *The DoD Dictionary of Military and Associated Terms*. See **Attachment 1** for common terms used herein.

1.9. Aircrew Operational Reports. The reporting requirements in this instruction are exempt from licensing IAW paragraph 2.11.10 of AFI 33-324, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information Collections.*

Chapter 2

COMMAND AND CONTROL

2.1. General. The Mobility Air Forces (MAF) command and control (C2) network consists of the following C2 centers: 618 Air and Operations Center (AOC)(Tanker Airlift Control Center [TACC]), Pacific Air Forces (PACAF) or United States Air Forces Europe (USAFE) Air and Space Operations Centers (AOCs), Air National Guard (ANG) Readiness Center, Air Force Reserve Command (AFRC) Command Center, theater Air and Space Operations Centers (AOC), Air Mobility Division (AMD), Joint Operational Support Airlift Center (JOSAC), Special Air Missions Division, Office of Assistant Vice Chief of Staff, USAF (CVAM), Unit Command Posts, Air Mobility Control Centers (AMCC), Contingency Response Groups (CRG), Contingency Response Elements (CRE), and Special Tactics Teams (STT). C2 centers are action agents for the MAF commander with execution authority (operational control) over mobility missions/forces.

2.2. Execution Authority. Headquarters commanders with command authority over MAF resources hold execution authority for directed missions. Commanders with execution authority formulate plans, allocate assets, and approve missions through a local command post or C2 element. OG/CCs serve as execution authority for local training missions. The pilot in command will execute missions operating outside normal communication channels (use last known mission orders or best course of action).

2.2.1. Off-Station Trainer (OST). Refer to MAJCOM instruction, for procedures and requirements.

2.2.1.1. AFRC Current Operations (AFRC/A3OO) is approval authority for AFRC Unit Equipped (UE) OSTs.

2.3. Pilot in Command (PIC) Responsibility and Authority. SQ/CCs shall designate an aircraft commander (AC), instructor pilot (IP), or evaluator pilot (EP) as the PIC for all flights, on a flight authorization form, IAW AFI 11-401, *Aviation Management*, and applicable supplements. PICs are:

2.3.1. In command of all persons aboard the aircraft.

2.3.2. Vested with authority to accomplish the assigned mission. The PIC shall only fly events authorized in the mission tasking unless, in the PIC's judgment, an emergency condition demands otherwise. Fly unscheduled training events (e.g., air to air refueling (AAR) or transition training) only after obtaining approval of the execution authority.

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

2.3.4. The final authority for requesting or accepting aircrew or mission waivers.

2.3.5. Responsible for passing mission progress reports (at least daily) to C2 agents.

2.3.6. Responsible for interaction between aircrew members and mission support personnel and will establish a point-of-contact (POC) with the appropriate C2 agent prior to entering crew rest. Local C2 agents are responsible for coordinating mission support requirements on the PIC's behalf.

2.3.7. Responsible for the welfare of aircrew members, Mission Essential Personnel (MEP), passengers, and the safe accomplishment of the mission.

2.4. Mission Clearance Decision. The execution authority and PIC shall make the mission clearance decision. In all cases, final responsibility for the safe conduct of the mission rests with the PIC. If a PIC elects to delay a mission, that mission will not depart until the conditions that generated the decision to delay improve or are resolved. Further, no execution authority may task another PIC to take the same mission under the same conditions.

2.4.1. Only re-route or divert a mission when authorized by the execution authority, to resolve an emergency, or if required due to insufficient fuel or en route or terminal weather conditions.

2.4.2. The agent that directed the re-route or divert shall ensure the aircraft is capable of executing departure, en route, and destination arrival procedures.

2.4.3. The PIC will notify the appropriate C2 agent of any aircraft or aircrew limitation that may preclude re-route or divert.

2.4.4. When a C2 agent directs a PIC to fly to an alternate airfield, the agent will ensure existing and forecast weather for the alternate, Notices to Airmen (NOTAMs), and airfield information from the Global Decision Support System (GDSS)/GDSS2/Airfield Suitability and Restrictions Report (ASRR), are suitable. If the alternate becomes unsuitable while en route, coordinate with the C2 agent for other suitable alternates. The PIC is final authority for accepting a suitable alternate. A C2 agent will alert customs and all appropriate ground service agencies to prepare for arrival.

2.5. Operational C2 Reporting.

2.5.1. Stations With MAF C2 Agency. Local MAF C2 agents will enter mission data (arrival, departure, and advisory messages) in the MAF C2 system.

2.5.2. Stations Without MAF C2 Agency. Transmit mission data (arrival, departure, and advisory messages) to the controlling C2 agency by any means available (preference in the following order, DSN, Airline Operational Control (AOC), HF, Iridium Phone, AERO-I). For critical C2 communications, i.e. aircraft waiver request, maintenance delay, etc., voice communications are the primary method.

2.5.3. En route Reporting.

2.5.3.1. Make the following en route calls to 618 AOC (TACC):

2.5.3.1.1. Airborne call when departing from a location without an AMC presence.

2.5.3.1.2. Maintenance call whenever aircraft maintenance status changes to code A-3.

2.5.3.1.3. On aeromedical evacuation missions, no later than 1 hour prior to landing, to update arrival time and provide AF Form 3858, C-130/C-141 *Aeromedical Evacuation Off-load Message* information.

2.5.3.1.4. Uncoordinated aircraft interceptions via the most expeditious means available, after complying with guidance in the flight information handbook. When

an airborne report is not accomplished, PICs must directly notify 618 AOC (TACC) upon landing. In all cases ensure local C2 and Intel agencies are informed.

2.5.3.2. CONUS. Periodic "ops normal" calls/transmissions are not required; however, the controlling C2 agency may increase reporting requirements.

2.5.3.3. OCONUS. MAJCOM C2 agencies will specify increased reporting procedures through a communications plan in the OPLAN, OPORD, FRAG, Mission Directive, or FLIP. Aircrews will maintain listening watch in accordance with the communications plan within aircraft equipment capabilities (e.g. UHF/VHF, HF, SATCOM, AOC).

2.5.4. Aircraft Status/Maintenance Discrepancy Reporting. PICs shall report aircraft system malfunctions that traditionally require extensive trouble shooting as soon as feasible. Contact arrival C2 agency if available, otherwise contact MAJCOM C2 for relay.

2.5.5. Aerial Refueling Mission Reports.

2.5.5.1. Receiver AAR Report. On operational missions, PICs shall report the AAR information to the destination C2 agency after landing, if unable to relay information inflight. C2 agencies will enter the information in the MAF C2 system for missions under their control. The MAJCOM C2 agency will enter the data for all missions. Include all scheduled ARs not accomplished. Use the following format:

2.5.5.1.1. AAR track.

2.5.5.1.2. Scheduled On-load.

2.5.5.1.3. Actual Onload.

2.5.5.1.4. Reason Code.

2.5.5.1.5. Additional Comments.

2.5.5.2. Reason Codes. Reason codes indicate the outcome of aerial refueling activity. Codes are normally used when a problem or situation affects the successful accomplishment of the aerial refueling. The Reason Code "AC" will be used when aerial refueling was complete without delay or mission impact. Additional comments are mandatory for all reason codes except AT, WX, and AC.

2.5.5.2.1. RO-Receiver Operations.

2.5.5.2.2. RM-Receiver Maintenance.

2.5.5.2.3. RW-Receiver Weather.

2.5.5.2.4. TO-Tanker Operations.

2.5.5.2.5. TM-Tanker Maintenance.

2.5.5.2.6. TW-Tanker Weather.

2.5.5.2.7. AT-Air Traffic Control.

2.5.5.2.8. WX-Aerial Refueling Track Adverse Weather.

2.5.5.2.9. AC-Aerial Refueling Complete.

2.5.6. "Thirty Minute" Out Call. Transmit a UHF or VHF arrival advisory to the destination C2 agency approximately 30 minutes prior to arrival. Provide Estimated Time in Blocks (ETB).

2.5.7. Integrated Flight Management (IFM) Sorties. On IFM sorties, the flight managers (FM) will be the C2 conduit for aircrews. For critical C2 communications, voice communications are the primary method. ***EXCEPTION***: For AFRC/ANG missions using IFM, AFRC/ANG will provide C2.

2.5.7.1. Position Reporting on IFM Missions. IFM missions transiting oceanic flight information regions (FIRs) need to add the phrase "Pass to Hilda" to ATC position reports (N/A for datalink sorties). Crews may also use the ARINC frequencies listed in the aircrew flimsy for C2 phone patch requirements. Use ARINC phone patch only after exhausting normal communication methods.

2.5.8. C-5M and AMP modified aircraft communications:

2.5.8.1. AOC. For 618 AOC (TACC) flight managed missions, AOC is the primary means of communication with the flight manager. If AOC is inoperative, use AERO-I or HF as alternates.

2.5.8.2. AERO-I. AERO-I may be used for routine communication (secondary to AOC). AERO-I voice is a backup for the Controller to Pilot Datalink Communication (CPDLC) and C2 communications (datalink and VHF/HF voice). ***NOTE*:** The AERO-I communications logs onto a specific ground earth station (GES) based on aircraft location. Manually selecting a different GES using constrained log-on procedures will result in connection through a non-contract carrier and should only be used when all other avenues of communication have failed.

2.5.8.3. HF radios may be operated in Datalink mode for AOC messaging only. Due to certification issues, HF radios will not be placed in the Datalink mode while any ATC messaging is utilized. This includes the entire period from initiating CPDLC and logon to ATC through disconnect of CPDLC.

2.5.8.4. ADS. On C-5M and AMP modified C-5 aircraft, Automatic Dependent Surveillance (ADS) automatically reports aircraft position. This feature should be turned off for missions operating through sensitive or classified locations.

2.5.8.5. EDS. On C-5M aircraft, the Embedded Diagnostic System (EDS) is equipped with position recording. This feature should be turned off for missions operating through sensitive or classified locations. The EDS help menu contains directions on disabling the Sensitive Recording feature.

2.5.9. Legacy aircraft communications:

2.5.9.1. HF is the primary means of access to the worldwide C2 network. The secondary HF radio should be operated in Automatic Link Establishment (ALE) mode to support voice contacts between the PIC and MAJCOM C2. ***NOTE***: Run the ALE system in the silent mode during flights where pilots use the HF radio system for communication with ATC.

2.5.10. Not used.

2.5.11. DV Messages. Airborne unclassified messages originated by DV passengers may be transmitted at the discretion of the PIC.

2.5.12. Iridium Phone. Iridium phones may be used for communications between aircrews and command and control agencies when beyond-line of sight C2 is required and other line of sight communications, HF or SAT-2000 do not provide proper security or timeliness. For more information, refer to AMC Iridium Satellite Phone CONOPS for Aircrews, **https://www.my.af.mil/gcss-af/USAF/AFP40/d/1075662991/Files/editorial/AMC%20INMARSATConops.pdf?channelPageId=s6925EC1341A60FB5E044080020E329A9&programId=t6925EC2D96790FB5E044080020E329A9**

2.5.12.1. Turn off Iridium phones within 25 feet of ground refueling operations.

2.5.12.2. Turn off Iridium phones during takeoff, receiver air refueling, approach, and landing.

2.6. Mission Commander (MC).

2.6.1. Unit commanders shall designate a MC when more than two aircraft are assembled to perform missions away from home station. Unit commanders should consider appointing a MC for special, high-visibility missions (i.e. CAPSTONE, DV2, etc.). The MC has overall responsibility and is the final authority for decisions that impact mission execution. The MC shall properly coordinate mission details. For flight-managed sorties, MC shall coordinate any special mission planning requirements with the IFM mission allocator not later than 24 hours prior to mission execution.

2.6.1.1. For MAJCOM-tasked missions, MAJCOM/A3 will coordinate and designate a lead planning agency when more than one unit is involved in an AAR, airdrop, or tactical airland operation. For AMC-tasked missions the planning agency is 618 AOC (TACC). For theater airlift missions with more than one airlift unit involved, the theater AOC shall designate a central planning agency responsible for coordinating the entire mission with all involved agencies. The OG/CC for the lead planning agency will designate a MC. The MC will be a rated (normally field grade) officer qualified in the type mission.

2.6.1.2. The MC will ensure all collocated aircrew members attend required briefings.

2.6.1.3. When non-collocated, the MC (in conjunction with the lead planning agency) will ensure non-collocated aircrew members receive applicable information, to include rendezvous, formation, abort, and recovery procedures. The MC will provide controlling agency and all non-collocated PICs anticipated delays or mission changes.

2.7. C2 Agency Telephone Numbers. Crewmembers may use the 618 AOC (TACC) toll-free number, 1-800-AIR-MOBL or DSN 312-779-0320 to contact other offices within the 618 AOC (TACC), including flight managers.

2.8. Close Watch Missions. Close Watch missions (e.g., Combat Search and Rescue (CSAR), Aeromedical Evacuation (AE) and PHOENIX BANNERs) receive special C2 attention. PICs will promptly notify appropriate C2 agency of delays, aborts, or other events that affect on-time departure. Provide the C2 agent the estimated time in commission (ETIC), planned ETD, and estimated time of arrival (ETA) within 10 minutes of the event or as soon as safety allows.

2.9. Law Enforcement Support. It is the policy of the Department of Defense (DoD) to cooperate with civilian law enforcement officials to the maximum extent practicable. AFI 10-801, *Assistance to Civilian Law Enforcement Agencies*, provides the policies and procedures service members must follow when supporting federal, state, and local civilian law enforcement agencies. Coordinate all civilian law enforcement authorities' requests for assistance through appropriate C2 channels.

2.10. En route Maintenance Support. 618 AOC/XOCL will support all mobility aircraft requests for parts and/or maintenance assistance on TRANSCOM/AMC missions.

Chapter 3

AIRCFREW COMPLEMENT/MANAGEMENT

3.1. General. This chapter provides guiding principles to form/manage mobility aircrews. Commanders at all levels shall follow these policies to form aircrews and to develop aircrew-related work/rest schedules that optimize efficiency of mobility forces engaged in worldwide operations.

3.2. Aircrew Complement. SQ/CCs shall form aircrews based on fragmentation order/mission directive, Crew Duty Time (CDT) and Flight Duty Period (FDP) requirements, aircrew member qualifications, and other constraints to safely accomplish the mission tasking. **Table 3.1**. below summarizes crew position requirements for different crew types.

3.2.1. The minimum aircrew member complement for a local training flight is the same as for a basic crew. ***EXCEPTION:*** Loadmasters are only required on locals carrying passengers or cargo. ***NOTE:*** Ballast for SCM-modified aircraft is not considered cargo. When a mission requires more than one aircrew member at a position, the SQ/CC will determine whether an instructor and NMR crewmember meet mission requirements.

3.2.2. SQ/CCs shall form augmented aircrews for missions planned to take longer than a basic CDT. Augmenting aircrew members must be current, qualified, and Mission Ready (MR) IAW AFI11-2C-5V1, *C-5 Aircrew Training*. ***EXCEPTIONS:*** A NMR pilot (non-current, qualified) may be used as an augmentee provided the PIC is a fully qualified, MR instructor, and the NMR (non-current) pilot is regaining currency (e.g., overseas sortie). SQ/CC shall augment an aircrew for the full FDP. The MAJCOM/A3 may augment aircrews while the mission is in execution. (See **paragraph 3.7**., Aircrew Management, for more on CDT/FDP.)

Table 3.1. Aircrew Complement.

Crew Position	Crew Complement	
	Basic	**Augmented**
Aircraft Commander (see notes 1, 2)	1	1
Pilot (see notes 1,2)	1	2
Flight Engineer (see notes 3,4)	2	2
Loadmaster (see notes 5,6,7, 8, 9)	2	3

NOTES:

1. A basic crew requires an aircraft commander and another pilot. An augmented crew requires an aircraft commander and two pilots.

2. On AAR missions, an aircraft commander and flight engineer will be AAR-qualified. Another pilot

will be AAR-trained.

3. One first and one second engineer (or higher) are required for a basic crew (minimum)

4. Two first engineers or higher are required for an augmented crew (minimum).

5. The designated primary loadmaster should be at least a C-5 Loadmaster journeyman on career status.

6. Two loadmasters required for all basic airlift missions (schedule three when resources are available) to include passenger loads up to 73 in the troop compartment.

7. One loadmaster required for all AAR training missions with cargo or passengers on board.

8. When ten or less passengers are carried on local training missions, only one loadmaster is required.

9. Two qualified Loadmasters must be in the Troop Compartment during critical phases of flight when passengers are carried in the troop compartment. During cruise flight only one Loadmaster is required to be in the Troop Compartment with passengers.

3.3. Aircrew Member Qualification. An aircrew member will be qualified, or in qualification training to perform duties as a primary aircrew member.

3.3.1. Senior leaders who complete a Senior Staff Qualification course (restricted AF Form 8, *Certificate of Aircrew Qualification*) or orientation for a Senior Staff Familiarization flight may occupy a primary crew position when under direct instructor supervision. Refer to AFI 11-401, *Aviation Management*, for procedures and requirements governing senior leader flying.

3.3.2. Crewmembers who complete the Senior Staff Course will log "FP" for Flight Authorization Duty Code on the AFTO Form 781, *ARMS Aircrew/Mission Flight Data Document*.

3.3.3. Crewmembers who complete a Senior Staff Familiarization flight will log "OP" for Flight Authorization Duty Code on the AFTO Form 781.

3.4. Pilots. An instructor pilot (IP) must supervise non-current or unqualified pilots regaining currency or qualification (direct IP supervision during critical phases of flight).

3.4.1. SQ/CCs shall augment the PIC for missions over 16 hours Flight Duty Period (FDP) in accordance with **paragraph 3.2.2** and **Table 3.1**. Designate those additional pilots authorized to perform PIC duties, if applicable. The PIC shall brief the aircrew on the plan to transfer PIC duties.

3.4.2. Initial qualification pilots enrolled in a MAJCOM approved training course may accomplish tanker/receiver AAR under ARIP supervision.

3.4.3. Missions with passengers. Only current and qualified pilots (possessing an AF Form 8) will occupy pilot seats with passengers on board (N/A MEP).

3.4.3.1. A non-current but qualified pilot may fly with passengers on board if under direct IP supervision.

3.4.3.2. Pilots shall not fly touch-and-go landings with passengers on board. Touch-and-go and stop-and-go landings are authorized with Mission Essential Personnel (MEP) on board.

3.4.4. Pilots on duty familiarization flights will be monitored by another qualified pilot in the observer's seat.

3.5. Not Used.

3.6. Flight Engineers and Loadmasters. A non-current or unqualified flight engineer or loadmaster may serve as a primary aircrew member on any mission when supervised by a qualified instructor or flight examiner (direct supervision for critical phases of flight).

3.7. Aircrew Management. SQ/CCs and en route C2 agents shall ensure work/rest cycles permit an aircrew adequate time to safely accomplish mission duties and personal time for rest.

3.7.1. Flight Duty Period (FDP). FDP is the period of time starting at mission report time and ending immediately after the aircrew completes the final engine shutdown of the day. SQ/CCs shall form aircrews based on worst-case FDP in the mission directive. Once en route, the mission directive or C2 agent will inform the PIC of expected FDP at show time. Reduce FDP when the autopilot pitch axis fails after departure IAW information below. If the autopilot fails after departure, consider mission requirements and determine the best course of action to preclude further mission delays due to reduced FDP. The best course of action may include diverting to an airfield with maintenance capability. Contact C2, coordinate intentions, and comply with limitations.

3.7.1.1. Basic Crew FDP. The maximum FDP for a basic aircrew is 16 hours (12 hours when the autopilot pitch axis servo is inoperative or the pitch autopilot cannot be coupled to the FMS). All AAR and tactical events will be accomplished within the first 14 hours of the FDP. Once an aircrew begins a basic FDP, only MAJCOM/A3 may extend it to an augmented day regardless of aircrew composition (MAJCOM/A3 shall augment basic crew to extend FDP).

3.7.1.1.1. When extended en route ground times, non-optimum routing/winds, weather delays or other extenuating circumstances will increase a basic to an augmented FDP, a PIC with an augmented crew may accept an augmented FDP as long as:

3.7.1.1.1.1. The C2 agent or PIC discovers the extenuating circumstances before the first takeoff of the day.

3.7.1.1.1.2. The PIC verifies all augmenting aircrew members can get adequate rest en route.

3.7.1.1.2. A PIC with a basic crew may seek MAJCOM/A3 (mission execution authority) approval to extend the FDP as much as 2 hours to complete a scheduled mission. Only use this provision to recover from unscheduled/unplanned en route delays. C2 agents shall not ask PICs to exercise this option.

3.7.1.2. Augmented Crew FDP. Maximum FDP for an augmented aircrew is 24 hours (16 hours when the autopilot pitch axis is inoperative or the pitch autopilot cannot be coupled to the FMS). All AAR and tactical events will be completed within the first 18 hours of the FDP. SQ/CC need only augment the pilot portion of the aircrew when the autopilot pitch axis is inoperative since the aircrew is restricted to a basic FDP (16 hours).

3.7.1.2.1. SQ/CC will augment an aircrew when FDP exceeds 16 hours and the mission profile will allow augmenting aircrew members' adequate time to rest en route. As a minimum, the mission profile must provide the following:

3.7.1.2.1.1. No more than 2 intermediate stops after 16 hours of FDP (each receiver AAR shall count as an intermediate stop).

3.7.1.2.1.2. Actual mission profile shall include at least one 6 hour leg or two 4 hour legs. ***EXCEPTION:*** If the mission profile does not meet the leg length criteria above but includes at least one 5 hour leg or two 3 hour legs, the maximum FDP will be 18 hours. All A/R and tactical events will be accomplished within the first 14 hours of the FDP. Once an aircrew begins an 18 hour augmented day, only MAJCOM/A3/DO may extend it to a 24 hour augmented day. (All other restrictions still apply)

3.7.1.2.1.3. The PIC shall validate planned leg times based on actual conditions. PICs may swap an extended ground time (4 hours) for a mission leg when conditions afford aircrew members a chance for rest.

3.7.1.3. Not used.

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

3.7.1.5. Training, Tactical, Joint Airborne/Air Transportability Training (JA/ATT), and Functional Check Flights/Acceptance Check Flights (FCFs/ACFs) FDP:

3.7.1.5.1. 16 hours (12 hours when the autopilot pitch axis is inoperative or the autopilot cannot be coupled to the FMS). Conduct the mission as follows:

3.7.1.5.2. Complete all mission-related events (i.e., FCF/ACF checks, transition events, AAR or tactical events) during the first 12 hours of the FDP.

3.7.1.5.2.1. ANG and AFRC crews may perform all mission-related events on local training missions provided their time from start of CDT/FDP does not exceed 16 hours.

3.7.1.5.2.1.1. Crew duty time (CDT) and FDP include both military duty and civilian work. CDT and FDP begin when an individual reports for their first duty period (military or civilian).

3.7.1.5.3. Crews may fly/deposition to home station or a deployed staging base following training (do not exceed 12 hours when the pitch autopilot is inoperative).

3.7.2. Crew Duty Time (CDT). CDT is that period of time an aircrew may perform combined ground/flight duties. Plan the mission so aircrew members may complete post-mission duties within maximum CDT. An aircrew member may perform mission-related duties for other missions when approved by member's home station SQ/CC or equivalent. Maximum CDT is 18 hours for a basic aircrew and 24+45 hours for an augmented aircrew.

3.7.3. Except as outlined below, CDT/FDP begins 1 hour after aircrew alert notification. SQ/CC or equivalent may task aircrew members to perform other duties before they begin flight-related duties or MAJCOM/A3 may authorize a C2 agent to alert an aircrew member early. Begin CDT/FDP when the first aircrew member reports for those duties.

3.7.3.1. Crews may self-alert with C2 (618 AOC [TACC] for AMC and AMC gained missions) concurrence prior to entering crew rest. The PIC must coordinate (618 AOC [TACC] approval required for AMC and AMC-gained missions) the self-alert time before entering crew rest. Begin CDT/FDP when the first aircrew member reports for duty.

3.7.3.2. CDT/FDP Extensions. See AFI 11-202V3, *General Flight Rules.*

3.7.4. Mission Essential Personnel (MEP) Time. IAW AFI 11-401, *Aviation Management*, MAF aircrew members may travel as additional crewmembers (not required for the mission being flown, but required for follow-on missions) as MEP. MEP will not be listed on the AFTO Form 781, will not log time, and will not accrue OFDA credit. Crewmembers may travel as MEP for a maximum of 24 hours. OG/CC or equivalent may approve crewmembers to travel as MEP in excess of 24 hours.

3.7.4.1. Current/qualified aircrew members may perform primary aircrew duties after traveling in MEP status, provided they do not exceed a basic FDP (FDP starts at report time for flight in MEP status).

3.7.4.2. Aircrew members may travel in MEP status after performing primary crew duties, for a maximum of 24 hours from the time the crewmember's FDP began.

3.7.5. Aircrew Member Support of Aircraft Generation Activities (Pre-flight, cargo up-/off-load, start, and taxi aircraft). Crew rest is required IAW AFI 11-202V3. The duty day begins when the aircrew member reports for official duties.

3.8. Scheduling Restrictions. IAW AFI 11-202V3. In addition, SQ/CCs shall not schedule an aircrew member to fly nor will an aircrew member perform aircrew duties:

3.8.1. When the flight will exceed maximum flying time limitations of AFI 11-202V3.

3.8.2. Within 12 hours of consuming alcoholic beverages (based on scheduled takeoff, or ALFA standby force legal for alert time, or earliest show time from BRAVO alert) or while impaired by its after effects.

3.8.3. When using nasal sprays to treat symptoms of head congestion existing before flight. An aircrew member may use oxymetazoline or phenylephrine nasal sprays as "get-me-downs" following an unexpected ear or sinus block during flight. Following use, crewmember will be considered DNIF until cleared by a flight surgeon.

3.9. Fatigue Countermeasures Management Program.

3.9.1. Aircrew may use medications with prior approval (on a voluntary basis following ground testing) that enhance natural rest during off-cycle crew rest periods. This section provides guidance for the use of no-go pills (prescription medications) that help aircrew initiate and maintain restful sleep during off-cycle (circadian desynchronosis) crew rest periods. Fliers shall not use no-go pills in flight.

3.9.2. It is USAF policy that aircrew shall never use no-go pills as a first choice counter-fatigue management (CM) tool. Proper sleep/rest cycles represent the primary fatigue CM, with 'smart' scheduling procedures and napping techniques (inflight and/or ground-based) augmenting this primary CM. Flight surgeons will educate aircrew members about these and other fatigue CM.

3.9.3. Responsibility for counter-fatigue management of aircrew medicinal products rests with the home station Flight Surgeon (FS) and with each individual aircrew member. Aircrew members may obtain no-go pills from any USAF or other authorized flight surgeon. During extended deployments, aircrew members will only obtain no-go pills from a deployed USAF flight surgeon. The deployed flight surgeon shall consult with the home unit medical team prior to dispensing no-go pills to deployed fliers.

3.9.4. Unit Operational Risk Management (ORM) programs shall include use of no-go medication with OG/CC and FS oversight. A basic counter-fatigue ORM model is available for mission planners, OG/CC, crew, and FS at the AMC/A3V website. Training materials are available at the local FS office.

3.9.5. Home station or deployed FSs trained using the AMC/SG-approved (lead command) fatigue countermeasures materials program are the point of contact for no-go prescription.

3.9.6. Aircrew members on Personnel Reliability Program (PRP) status will follow PRP notification procedures if prescribed no-go pills.

3.9.7. Aircrew will consider the following examples of missions prone to causing fatigue (may cause sleep disruptions) in their decision to use no-go medications:

3.9.7.1. Home station night launch missions (with 2000-0530L show times) greater than four hours duration.

3.9.7.2. Crew rest facilities lacking an optimal sleeping environment (quiet, air-conditioned, and darkened).

3.9.7.3. Off-station missions that are 4 or more time zones from home station.

3.9.7.4. Rotating schedules (stair-stepped flying schedules) with greater than 6-hour flight time duration.

3.9.7.5. Missions that run consistently near a 14-hour (or greater) duty day.

3.9.8. In no case will crewmembers consume a no-go pill on a timeline where they would be under the effect of the medication while they perform aircrew duties (use mission report or legal for alert time to determine latest time to take no-go medication). SQ/CC will not schedule crewmembers to fly or perform crew duties during the following minimum DNIF periods for consuming no-go pills.

3.9.8.1. Restoril (temazepam) – 12 hours minimum DNIF.

3.9.8.2. Ambien (zolpidem) – 6 hours minimum DNIF.

3.9.8.3. Sonata (zaleplon) – 4 hours minimum DNIF.

3.9.9. Accountability for this program is made challenging by the worldwide mobility mission of AMC/MAF aircrew; therefore, the following are aircrew member's responsibilities:

3.9.9.1. Aircrew members will complete ground testing for each no-go pill and receive flight surgeon clearance prior to using a particular no-go pill in the flying environment.

3.9.9.2. Aircrew members shall not operate heavy equipment or perform aircrew duties during the minimum DNIF period for each no-go pill outlined in paragraph 3.9.8.

3.9.9.3. Aircrew members shall not take no-go-pills within 12 hours of consuming alcohol, or vice versa.

3.9.9.4. Aircrew members will fill out an AMC-approved (lead command) "No-Go Pill Usage Questionnaire" detailing how they used their last prescription when requesting a refill from the FS.

3.9.9.5. Limit use of Restoril (temazepam) and Ambien (zolpidem) to a maximum of seven consecutive days and no more than 20 days in a 60-day period. In order to support dynamic MAF mission requirements, FS will consider providing a prescription for 60 days (20 pills) at a time if requested by the aircrew member.

3.9.9.6. Limit use of Sonata (zaleplon) to a maximum of 10 consecutive days and no more than 28 days in a 60-day period. In order to support dynamic MAF mission requirements, FS will consider providing a prescription for 60 days (28 pills) at a time if requested by the aircrew member.

3.9.9.7. Aircrew will inform the FS of any other medications (including nutritional supplements and over the counter medications) they are taking so the FS can evaluate potential interactions.

3.10. Crew Rest/En route Ground Time. OG/CCs shall establish procedures to place crewmembers in crew rest. MAJCOM/A3/DO may waive any portion of the crew rest period or ground time as needed to meet mission tasking.

3.10.1. Home-Station Pre-Departure Crew Rest. For missions that will keep aircrew members off station 16 hours or more, unit commanders will enter primary and deadhead aircrew members into pre-departure crew rest 24 hours before the legal for alert time. Aircrew members may perform limited non-flying duties like mission planning during the first 12 hours of pre-departure crew rest. OG/CCs may waive any portion of the first 12 hours of pre-departure crew rest. Do not manifest deadhead aircrew members as passengers to deny pre-departure crew rest. ***EXCEPTION:*** AFRC and ANG in accordance with AFI 11-202V3 and appropriate supplement.

3.10.2. Off-station/En route Crew Rest. The minimum en route crew rest period is 12 hours before legal for alert or scheduled report time when self-alerting.

3.10.2.1. Except during emergencies or as authorized by MAJCOM/A3, C2 agents shall not disturb an aircrew member in crew rest. When necessary to interrupt aircrew members' crew rest period, re-enter that aircrew in a subsequent minimum 12 hour crew rest period after they complete official duties.

3.10.2.2. Do not enter aircrew members into crew rest until they complete official post-flight duties. Those duties may include, but are not limited to, refueling, cargo on-/off-load, aircrew arming, minor maintenance, or mission debriefing.

3.10.3. Off-station/En route Ground Time. Mobility planners shall provide aircrews at least 17 hours ground time between engine shutdown and subsequent takeoff.

3.10.3.1. Mission planners, PICs, or C2 agents may modify ground time as follows:

3.10.3.1.1. In the interest of safety.

3.10.3.1.2. To start (mission reporting time) no earlier than 12 hours from the time the aircrew entered crew rest. Before reducing ground time, PICs will consider time to complete mission planning, cargo on-/off-load, and non-standard mission related duties. C2 agents will not ask PICs to accept less than 17 hours ground time.

3.10.3.2. Mobility planners should construct mission itineraries with en route ground times longer than 17 hours to afford aircrew members opportunities to recover from the cumulative effects of fatigue caused by flying on several consecutive days or due to transiting several time zones. If practical, make the en route ground time 36 hours (maximum) after three consecutive near maximum FDPs.

3.10.4. Crew Enhancement Crew Rest (CECR). CECR is not an alternative to a safety-of-flight delay but provides PICs a means to minimize the adverse effects of a crew alert and report period outside normal duty time. CECR periods should be of minimum duration and are normally used during de-positioning legs. Tasking authorities shall approve requests to delay alert time to normalize the work-rest cycle or increase messing options when mission allows. When requests are disapproved, the C2 agent will inform the PIC of the reason for disapproval.

3.10.5. Post-Mission Crew Rest (PMCR). SQ/CCs shall give aircrew members returning to home base sufficient time to recover from cumulative effects of the mission and tend to personal needs. PMCR begins upon mission termination. (N/A AFRC and ANG).

3.10.5.1. For missions that keep an aircrew off station 16 or more hours, the SQ/CC shall provide 1 hour (up to 96 hours) PMCR for each 3 hours off-station. Do not enter aircrew members in pre-departure crew rest until the PMCR period expires.

3.10.5.2. PMCR is not applicable to continuing missions and MAJCOM/A3 may suspend PMCR during contingency operations.

3.10.5.3. OG/CCs (or equivalents) are PMCR waiver authority.

3.10.6. Crew Chief Work/Rest Plan. While on Temporary Duty (TDY), the deployed crew chief or MEP maintenance technician shall report to the PIC. In conjunction with en route/transient maintenance supervisor, the PIC will determine how long the crew chief can safely perform aircraft maintenance duties. The PIC shall ensure the crew chief has sufficient time in each 24-hour period to get 8 hours of uninterrupted rest. See AFI 21-101, *Aircraft and Equipment Maintenance Management*, for detailed guidance.

3.10.7. The lead USAF component will publish MAJCOM/A3 approved crew rest criteria in the Exercise or Contingency Operation Order (OPORD), Operation Plan (OPLAN) or Concept of Operations (CONOPs).

3.10.8. The Prime Knight program streamlines the process of getting aircrews from aircraft parking ramp into lodging/crew rest. It is only successful when billeting agents receive accurate aircrew/mission information in a timely manner.

3.10.8.1. C2 Agent Responsibilities. A MAJCOM C2 agent will forward information on the departing aircrew's orders to a point of contact (POC) for the next crew rest location's Prime Knight function.

3.10.8.2. PIC Responsibilities. If departing from a location with a C2 agency, ensure a C2 agent has accurate aircrew/mission information to forward to the next Prime Knight

POC. If departing from a facility without a C2 agency, the PIC will call the next crew rest location Prime Knight POC to pass aircrew/mission information.

3.10.8.3. SQ/CC or designated authenticating official shall ensure TDY/Flight orders clearly indicate the unit fund cite so that the PIC may make Prime Knight reservations in advance. Without unit funds cite on the TDY/Flight orders, the PIC must make advance reservations using a government travel card to participate in the Prime Knight program.

3.11. Alerting Procedures. MAJCOM C2 agents shall establish a legal for alert time with the PIC and when appropriate, the Medical Crew Director (MCD) of Aeromedical Evacuation (AE) crews. Whenever possible, C2 agents will inform PICs and MCDs of aircraft status, expected patient up load time, and other pertinent mission details that will streamline mission launch. ***NOTE***: Aircraft Commanders will not be asked to accept Legal for Bravo unless the LFB time is equal to or later than the firm ETIC and consideration is given to factors affecting mission launch i.e. maintenance personnel and parts on station, slot times, airfield operating hours, diplomatic clearances, etc.

3.11.1. Aircrew alert time is normally 4+15 hours before scheduled takeoff time (allows 1 hour for reporting and 3+15 hours for mission preparation). Individual locations may increase or decrease this time depending on specific capabilities. OG/CCs may establish self-alert procedures for local training missions.

3.11.1.1. For missions with more than minimum ground time, the PIC may arrange an alert time that provides additional preparation time to accomplish the mission. The PIC may also accept alerting with reduced preparation time when the mission allows. In all cases, the PIC shall coordinate changes to standard alerting times with the appropriate C2 agency.

3.11.1.2. With PIC agreement and when cargo load warrants (i.e. outsized and 1C-5A-9-2 or 1C-5M-9-2 cargo), C2 agents may alert loadmasters up to 2 hours before normal alert time. When early alerting is warranted, the PIC and C2 agent must notify the loadmaster before he/she enters crew rest. Do not alert the loadmaster more than 1 hour before beginning cargo up load. Base the aircrew FDP on the loadmaster's show time.

3.11.1.3. C2 agents shall not alert an aircrew until the aircraft is in commission or there is reasonable assurance that maintenance technicians will complete repairs that allow the aircrew time to pre-flight and load the aircraft to meet the target takeoff time.

3.11.1.4. C2 agents shall not alert outbound crews when inbound aircraft is on A-2 or A-3 status until maintenance technicians determine required parts are available and the aircraft will be repaired within the target ground time.

3.11.1.5. Self-Alerts. Crews will self-alert at locations without a C2 agency, but must coordinate with appropriate C2 agency. The PIC may elect to self-alert on operational missions at locations with a C2 agency. Coordinate the alert time with local C2 agents to avoid FDP limitations that result from unexpected changes in the mission.

3.11.2. The aircrew release policy is as follows:

3.11.2.1. On the aircrew's initial entry or re-entry into crew rest, the controlling C2 agent, or PIC during self-alerts, will establish an expected alert time.

3.11.2.2. For all missions, the latest allowable alert time is 6 hours after the expected alert time. The PIC may extend that window to 8 hours when flying as primary crew or 12 hours when deadheading. The controlling C2 agent will not ask the PIC to accept more than the 6 hour window. ANG/ AFRC aircrew members may extend the window as necessary to deadhead to home station to meet the Firm Scheduled Return Time (FSRT).

3.11.2.3. When a C2 agent determines circumstances will not allow for aircrew alerting during the legal for alert window, at that time but not earlier than the expected alert time, the C2 agent will contact the PIC and establish a new expected alert time at least 12 hours from the time of notification.

3.11.2.4. If the mission cannot depart within 4+00 hours of any scheduled takeoff, the PIC may continue the mission after a thorough re-evaluation of all ORM factors. C2 agent will not ask the PIC to accept a takeoff outside of the 4 hour window. The PIC will coordinate with C2 to continue the mission or enter crew rest and establish a legal for alert time.

3.12. Stage Management.

3.12.1. Stage Posture. Stages operate on a positive launch principle. C2 agents shall alert aircrews using the following priority/hierarchy:

3.12.1.1. Aircrews that require an emergency return to home station.

3.12.1.2. De-positioning stage crews will be prioritized by their SRTs.

3.12.1.3. Aircrews in sequence of arrival time.

3.12.1.4. If the stage manager returns an aircrew in the stage to crew rest because of a mission delay or abort, that aircrew becomes first out when legal for alert.

3.12.2. Mechanical Stage. A C2 agent may create a mechanical stage when a delayed or aborted mission will not resume before that aircrew's FDP expires. Aircrews in a mechanical stage will be first out when a mission in the same direction transits their location while they are legal for alert. A C2 agent may bump an inbound aircrew with FDP to complete that mission to cycle aircrews in a mechanical stage. C2 agents should not normally establish a mechanical stage for ANG and AFRC crews flying unit-equipped aircraft.

3.13. Standby Force Duty. MAJCOM C2 Agents shall task units for Standby Force Duty not later than 18 hours prior to legal for alert time. This allows crewmembers 12 hours of pre-standby crew rest and 6 hours for aircraft pre-flight duty. When aircrews are unable to complete all preflight duties within 6 hours of crew show time, provide an additional 12-hour pre-standby crew rest. If MAJCOM C2 agents are unable to provide 18 hours prior notification, SQ/CC shall place the pre-standby crew in 12 hour crew rest and follow aircraft generation procedures in **paragraph 3.7.5** to prepare the aircraft for launch. SQ/CC may keep an aircrew in ALFA/BRAVO status up to 48 hours. MAJCOM/A3 may extend this period for contingencies. After completion of an alert period, launch, release, or re-enter aircrew into 12 hour pre-departure crew rest. OG/CCs may provide additional local procedures for management of Standby Force Duties.

3.13.1. ALFA Standby Aircraft Preflight Generation and Security. When tasked, SQ/CC shall posture an aircraft and aircrew as an ALFA Standby Force able to launch within 1+30hours. The following procedures apply to primary aircraft as well as spare aircraft

generated for ALFA alerts. A maintenance Dash -6 and aircrew Dash -1 preflight must be completed. Preflight validity will be in accordance with applicable flight manual. After the preflight, the PIC will notify the controlling agency. The aircraft will remain in a sealed posture and be referred to as "cocked on alert". Documentation of when the aircraft was cocked on alert must be placed in the forms. The PIC will ensure the aircraft is secure before entering crew rest. Secure all hatches and doors to show unauthorized entry. The aircrew preflight portion remains valid if performed by one crew, cocked on alert, and launched by another crew. Uncocking a generated aircraft is not a standard procedure but may be accomplished on a case by case basis. The PIC or a designated aircrew representative must be present if access to the aircraft is required. Ensure command and control and the controlling agency are notified when uncocking and recocking generated aircraft. Follow-on pre-flights done during normal waking hours do not interrupt crew rest. Begin CDT/FDP when C2 agent directs the aircrew to launch from crew rest or while performing pre-flight (begin CDT/FDP when the aircrew arrived at the aircraft to do the pre-flight).

3.13.2. BRAVO Standby Force. When tasked, SQ/CC shall posture an aircraft and/or aircrew in BRAVO Standby Force to permit launch within 3+45 hours. Follow-on pre-flights, if required, interrupt crew rest. Begin CDT/FDP when aircrew shows for duty.

3.13.3. CHARLIE Standby Force. When tasked, SQ/CC shall posture aircrews as a CHARLIE Standby Force ready to enter crew rest within 2 hours. Tasked aircrews will be legal for alert 12 hours after entering crew rest. SQ/CC may keep aircrews in CHARLIE status up to 72 hours. After 72 hours, release aircrews or enter them into 12 hours crew rest for directed mission, training mission, or subsequent standby force duty.

3.13.4. Wing Standby Force. OG/CC may place aircrews in Wing Standby status. After a 12 hour pre-departure crew rest period, aircrews are legal for alert for 12 hours and must be able to launch within 3+45 hours. After 12 hours, launch, release, or re-enter aircrews in 12 hour crew rest period before subsequent 12 hours Wing Standby duty.

3.13.5. Post-Standby Missions. On completion of standby duty, aircrew members may be dispatched on a mission. If started, post-standby crew rest must be completed before the start of pre-departure crew rest. If an aircrew member is dispatched on a mission, compute the post-mission crew rest time on standby time plus mission time.

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

3.13.6.1. 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.

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

3.14. Orientation Flights and Incentive Flights. Refer to DoD 4515.13-R, *Air Transportation*, AFI 11-401, and the appropriate MAJCOM supplement.

3.15. Interfly. Interfly is a temporary arrangement between OG/CCs or equivalent to permit the exchange or substitution of aircrew members and/or aircraft between mobility units to accomplish flying missions. Interfly will be limited to specific operations, exercises, or special circumstances. However, it may be used for events of longer duration such as unit conversion to

another model design series (MDS). AFRC/A3 has delegated interfly approval authority to unit OG/CCs for active duty/ANG interfly with AFRC and AFRC to AFRC interfly. Units utilizing this authority will inform AFRC/A3V. NGB/A3 has delegated approval authority to Wing Commanders for active duty/AFRC interfly with ANG, and OG/CC approval authority for ANG to ANG interfly. ANG units will ensure appropriate active duty General Officer support staff has notified the Air Force Directorate of Personnel General Officer Management Office (AF/DPG) prior to and active duty General Officer flying with their unit. Participating aircrews will use guidelines established by the host command or as specified in the OPLAN or CONOPS. ***EXCEPTION:*** AE crewmembers are exempt from interfly requirements.

3.15.1. Aircrew members shall be current and qualified in the MDS (aircraft and model), as well as unique systems or configuration required to fly the aircraft/mission.

3.15.2. Each affected group commander who commits resources (personnel or aircraft) must concur with interfly proposal.

3.15.3. MDS conversion training.

3.15.4. Units may request an interfly agreement for duration of their conversion. OG/CCs will forward interfly requests to individual OG/CCs for approval. Requests will include as a minimum a list of effected units, duration of the agreement, and purpose.

3.16. Mission Essential Personnel (MEP). Procedures and policies regarding MEP are contained in AFI 11-401 and AMCI 11-208, *Tanker/Airlift Operations*. PICs will ensure personnel traveling in this status are properly authorized. Crewmembers qualified in mobility aircraft are authorized MEP status on any mobility aircraft to pre/de-position in support of mobility operations. MAJCOM designated crewmembers who are assigned or authorized to accompany the normal crew compliment are allowed MEP status.

3.16.1. Crewmembers in MEP status are not authorized to:

3.16.1.1. Displace manifested passengers.

3.16.1.2. Maintain currency and/or log flying time.

3.16.1.3. Use for transportation while on leave. ***EXCEPTION:*** ANG/AFRC Air Technicians may be in a civilian leave status while traveling en route to perform in a military duty status.

3.16.1.4. Travel on Special Air Missions/Command Support Mission (SAM/CSM) aircraft unless authorized by HQ AF/CVAM through the PIC.

3.16.1.5. Travel on Special Assignment Airlift Missions (SAAM) when specifically restricted by the mission directive.

3.16.1.6. Travel on Operational Support Airlift (OSA) aircraft unless authorized by Joint Operational Support Airlift Command (JOSAC) through the PIC.

3.16.2. All MEPs require valid travel/flight orders or supporting message authorizing MEP status. OG/CCs may authorize MEP status for their mobility aircrews.

3.16.3. Flight evaluators have priority and will not be displaced by any other MEP. The priority for evaluators is MAJCOM, NAF, group, and then squadron level.

3.16.4. MEPs normally travel in the crew compartment. If the number of MEPs desiring travel exceeds the capacity of the crew compartment, the C2 agency will notify the ATOC, who in turn will coordinate with the passenger terminal; seats not previously assigned may be used for MEPs.

3.16.5. The PIC, or designated representative, will brief MEPs on seat assignment, appropriate mission information, emergency procedures including egress, and armed crewmembers. The PIC may assign an MEP aircrew-related duties for which the MEP is qualified.

3.16.6. MEPs will coordinate their travel with the appropriate C2 agency prior to travel. They will process through the C2 agency as early as possible but NLT 3 hours prior to planned block time.

3.17. Mission Mobility Observers (MMO). MAJCOM supplements or additional directives may establish programs authorizing senior military and civilian personnel to fly for mobility mission familiarization.

Chapter 4

AIRCRAFT OPERATING RESTRICTIONS

4.1. Objective. Redundant systems may allow crews to safely perform some missions when a component/system is degraded. The PIC is the final authority in determining the overall suitability of an aircraft for the mission. The PIC will ensure a detailed explanation of the discrepancy is entered in the AFTO Form 781A, *Maintenance Discrepancy and Work Document* and include the following maintenance identifiers to effectively communicate aircraft status.

4.1.1. Mission Essential (ME). The PIC will designate an item, system, or subsystem component essential for safe aircraft operation as ME.

4.1.2. Mission Contributing (MC). The PIC will designate an item, system, or subsystem component, which is not currently essential for safe aircraft operation as MC. These discrepancies should be cleared at the earliest opportunity. If circumstances change or mission safety would be compromised, re-designate as ME. Do not delay a mission to clear a MC discrepancy.

4.1.3. Open Item (OI). The PIC will designate discrepancies not expected to adversely impact the current mission or any subsequent mission as an OI. These items are normally cleared at home station.

4.1.4. Time Limited Dispatch (TLD) (C-5M). TLD level A faults are ME. TLD level B and level C are initially designated OI. Level B and level C conditions are designated ME at repair capable facilities when time remaining is insufficient for mission completion. Designate level D faults as OI. TLD limits are contained in T.O. 1C-5M-1. TLD faults that display a NOT ACTIVE status are still considered real faults because the condition which triggered the fault may not always be present.

4.2. Minimum Equipment List (MEL) Policy. The MEL is a pre-launch document that lists the minimum equipment/systems to operate the aircraft. It is impractical to prepare a list that would anticipate all possible combinations of equipment malfunctions and contingent circumstances. Consider equipment/systems with no listed exceptions as grounding items. A PIC who accepts an aircraft with degraded equipment/systems is not committed to subsequent operations with the same degraded equipment. PICs are not committed to operations with degraded equipment accepted by another PIC.

4.2.1. The PIC shall account for the possibility of additional failures during continued operation with inoperative systems or components. The MEL is not intended for continued operation over an indefinite period with systems/subsystems inoperative.

4.2.2. All emergency equipment will be installed unless specifically exempted by mission requirements/directives.

4.2.3. Waiver Policy. A PIC prepared to operate with a degraded MEL item shall request a waiver through C2 channels. The PIC shall provide the C2 agent: 1) nature of request, 2) individual crew member qualification, 3) mission leg(s) requiring the waiver, 4) weather or other adverse condition, and 5) the governing directive of waiver request to include volume, chapter, or paragraph. Initiate waiver requests as soon as possible; plan at least a 1-hour waiver process time.

4.2.4. PICs operating with degraded equipment shall coordinate mission requirements (i.e., revised departure times, fuel requirements, maintenance requirements, etc.) with the controlling C2 agency and/or flight manager.

4.2.5. If beyond C2 communication capability, or when it is necessary to protect the crew or aircraft from a situation not covered by this chapter and immediate action is required, the PIC may deviate according to **paragraph 1.4**. Report deviations (without waiver) through channels to MAJCOM/A3/DO within 48-hours. OG/CCs shall collect background information and submit a follow-up written report upon request.

4.3. Waiver Protocol. Waivers to operate with degraded equipment are granted on a case-by-case basis. The PIC determines the need for a waiver after coordinating with the lowest practical level of command. MEL waiver authority is as follows:

4.3.1. Training Missions. OG/CC or equivalent with mission execution authority.

4.3.2. MAJCOM Directed Missions. MAJCOM/A3/DO with mission execution authority. Initiate the request with MAJCOM C2 agency.

4.3.2.1. The 18 AF/CC is the waiver authority for active duty, AFRC, or ANG units flying 618 AOC (TACC) directed missions (includes Operational Readiness Inspections). The MEL waiver authority has been delegated to AMC/A3V. Contact AMC/A3V through 618 AOC (TACC).

4.3.3. Contingency Missions. COMAFFOR (or equivalent) for the agency with C2, if not specified in the OPORD/Tasking Order.

4.3.4. ANG or AFRC Directed Missions. ANG or AFRC maintains C2 and waiver authority for ANG or AFRC directed mission prior to mobilization. NGB/A3 delegates waiver authority to the unit OG/CC.

4.3.5. Other Than MEL Waivers. Determine governing source document (i.e. AFI, Flight Manual, Maintenance T.O., etc.) to ascertain the waiver authority. Use C2 channels to notify the appropriate waiver authority. Waivers of this nature may require an extended response time.

4.3.6. Engineering Dispositions (ED). Dispositions are requested when aircraft are damaged and/or established maintenance technical order procedures cannot be followed or do not exist. The on-site maintenance authority is responsible for requesting Engineering Dispositions. Most EDs allow maintenance to repair the aircraft and return it to unrestricted status; dispositions of this nature should not concern aircrews. However, EDs affecting aircrew operations require MEL waiver authority approval.

4.3.6.1. PICs shall coordinate dispositions containing flight restrictions, prohibitions, additional operating limits, or modified/non-standard operating procedures with the appropriate MEL waiver authority (see **paragraph 4.3**).

4.3.6.2. PICs will not accept dispositions appearing incomplete, in error, or unsafe. Prior to rejecting a disposition, the PIC will contact the appropriate MEL waiver authority. The waiver authority will attempt to resolve the issue. ***NOTE***: Deviations from the flight manual requires approval IAW the flight manual.

4.4. Technical Assistance. The PIC may request technical support and additional assistance from their home unit or MAJCOM C2 agency.

4.5. MEL Table Definitions/Column Identifiers. MEL tables are arranged by aircraft system to provide the PIC a mechanism to determine minimum system requirements. Requirements are defined by Column A and Column B. Column A directs systems/subsystems/components that must be operable for the aircraft to be considered in commission at the aircraft's home station IAW **paragraph 3.11.1.3** Column B directs systems/sub-systems/components required after start of the aircrew inspection at home station and at bases other than the aircrafts home station. An asterisk (*) indicates the number required is situation dependent; refer to remarks/limitations/exceptions column for clarification. ***NOTES:*** (1) Local training missions, to include off-station trainers fall under column B. (2) A few en route locations possess the capability to provide C-5 maintenance repairs. These stations have necessary skilled maintenance personnel, support equipment, technical data, and parts on hand to accomplish some major and minor repairs. Common sense and good judgment must be used by all concerned when determining minimum equipment requirements to preclude adverse operational impact or excessive maintenance support requirements. In those instances where lack of replacement parts or qualified personnel would cause a mission delay, the en route location will be considered non-repair capable and aircraft may continue operations as described in the MEL. (3) For Remarks/Limitations/Exceptions all C-5 home station bases shall be considered a repair capable facility.

4.5.1. Remarks/Limitations/Exceptions. Some technical information and procedures are contained in this column. This is not all-inclusive; crewmembers shall refer to the flight manual and other directives for procedures, techniques, limitations, etc.

4.5.1.1. One-time Flight Clarification: A Red X discrepancy must be downgraded through maintenance channels prior to flight. MEL waiver may still be required. This condition does not preclude carrying cargo and passengers unless stipulated otherwise by the waiver. The priority is to move the airplane to a repair capable facility. PICs must coordinate with appropriate agencies to ensure repair capability exists at the destination. One-time flights may include en route stops only when necessary to recover the airplane. ***EXAMPLE***: An airplane departs on a gear-down flight from Kuwait and requires an en route fuel stop (Sigonella NAS) before landing at the nearest repair capable facility, Rota NAS.

4.5.1.1.1. One-time flight to nearest repair capable facility: Flight is limited to the nearest (shortest en route time) repair capable base. ***NOTE:*** May not depart home station for a local training sortie/mission; the aircraft is already at a repair capable facility.

4.5.1.1.2. One-time flight to a repair capable facility: Flight is not restricted to the nearest repair capable facility. ***NOTE:*** May not depart home station for a local training sortie/mission; the aircraft is already at a repair capable facility.

4.5.1.2. Other Mission and Repair Clarifications:

4.5.1.2.1. Shall be repaired at next repair capable facility: Mission may continue as scheduled, item shall be repaired upon reaching a repair capable facility. Designate item ME upon reaching repair facility. Once maintenance action is initiated, and it is

determined repairs are not possible, the PIC will discuss possible courses of action with C2 agency to return aircraft to service.

4.5.1.2.2. Mission dictates requirement: PIC shall consider the entire mission profile, not just the next leg. ***EXAMPLE:*** An airplane is departing an en route station with repair capability, after engine start the FE discovers the #1 engine anti-ice is inoperative. Icing conditions are not forecasted for the next leg. However, because the mission spans several days and repair capability does not exist at the scheduled en route stops, the PIC elects to have the item repaired prior to departing.

4.6. C-5 MEL. This MEL applies to all C-5 models and lists the minimum equipment and systems to launch the aircraft under routine operations. Tables may contain single items and procedures that are not applicable to a specific model or modification. When an item is not applicable to all models the remarks section is annotated with this information. Additionally, tables that do not apply to AMP and/or C-5M modified aircraft are denoted as such in the title and will reference the user to the appropriate table. The MEL does not include all equipment or systems essential to airworthiness. See this chapter for further information including objectives, policy, and waiver protocol.

4.7. Supplements. Each MAJCOM may supplement the MEL (see Chapter 1).

4.8. One Engine Inoperative Ferry Flights. Not Used.

Table 4.1. Engines/Auxiliary Power Units (APU) (Legacy).

Engines/Auxiliary Power Units (APU) (Table 4.1. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
1-1. Engine Fuel Pump	4	4	3	**(B)** High pressure element shall be operative. One-time flight to nearest repair capable facility if low-pressure element is inoperative. Both affected fuel tank boost pumps shall be operative.
a. Fuel shutoff actuator	4	4	4	
1-2. Continuous Ignition	4	4	3	**(B)** Normal and Airstart position shall be operative. One-time flight to nearest repair capable facility.
1-3. Start Ignition	4	4	4	Either Normal or Airstart position shall be operative.
1-4. Starter	4	4	4	
1-5. Fuel Heater	4	4	3	**(B)** Required on flights with fuel temperature below 5° C. Valve must be failed closed.

Engines/Auxiliary Power Units (APU) (Table 4.1. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
1-6. Oil Pressure Indicating System				
a. Low Oil Pressure Switch	4	4	0	**(B)** The low oil pressure light may be inoperative if the oil pressure gauge is operative.
b. Oil Pressure Gauge	4	4	4	
1-7. Oil Temperature Indicator	4	4	4	
1-8. Oil Filter Differential Pressure Light	4	4	3	**(B)** Mission may continue if malfunction is determined to be an indication problem and the oil filter has been checked for clogging or indication of bearing failure (metal chips). The engine oil filter shall be checked at every stop until the indication malfunction is corrected. Carry spare seals.
1-9. N1 Indicator	2/Eng	2/Eng	1/Eng	**(B)** If possible, place the operative indicator at the engineer panel. Associated N2 shall be operative.
1-10. N2 Indicator	2/Eng	2/Eng	1/Eng	**(B)** If possible, place the operative indicator at the engineer panel. Associated N1 shall be operative.
1-11. TIT Indicator	2/Eng	2/Eng	1/Eng	**(B)** If possible, place the operative indicator at the engineer panel.
1-12. Fuel Flow Indicator	2/Eng	2/Eng	1/Eng	**(B)** If possible, place the operative indicator at the engineer panel.
1-13. Engine Overheat & Fire Detection System	4	4	4	System shall be capable of detecting both an engine fire and overheat condition. Fire warning and overheat test shall be operative (indications shall match condition of loop e.g. intact, shorted, open. Refer to flight manual). Do not take-off with a shorted system. (**B**) Open circuits. Shall be repaired at next repair capable facility. No more than one open circuit may exist and the location of the

Engines/Auxiliary Power Units (APU) (Table 4.1. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
				break shall be determined. Re-verify open circuit at each en route stop.
a. Engine Fire Annunciator/ Warning Light	2/Eng	2/Eng	1/Eng	**(B)** The associated fire handle light shall be operative. Shall be repaired at next repair capable facility.
b. Engine Overheat Annunciator/Warning Light	2/Eng	2/Eng	1/Eng	**(B)** The associated fire handle light shall be operative. Shall be repaired at next repair capable facility.
c. Engine/Pylon Optical Fire Detection System	4	4	0	**(B)** Fire, overheat, and short discriminator tests shall be operative. Shall be repaired at next repair capable facility.
1-14. Engine Fire Extinguishing System				
a. Engine Fire Handle	4	4	4	Handles shall be fully capable of automatic isolation of system components as outlined in the flight manual. **(B)** If the light in the handle is inoperative, the associated annunciator light shall operate at both pilot and flight engineer positions.
b. Bottle Out Light	4	4	0	**(B)** Check the pressure gauge on the bottle prior to each flight. Mission may continue via en route stops providing required maintenance stands are available. Shall be repaired at next repair capable facility.
c. Fire Extinguisher Bottle	4	4	4	A squib assembly can be obtained from either APU fire bottle. Remove the squib designated alternate. See item 1-23
d. Fire Extinguisher Discharge Button	4	4	4	Shall be capable of firing bottles.
e. Fire Extinguisher Bottle Select Switch	2	2	2	Both Normal and Alternate positions shall be fully operable.
1-15. Thrust Reverser	4	4	2	**(B)** May only be deactivated in symmetrical pairs IAW T.O. 1C-5A-2-4. Verify all actuators are attached to the translating cowl and that all locks are

Engines/Auxiliary Power Units (APU) (Table 4.1. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
				locked prior to deactivation. No thrust reverser may be deactivated if any hydraulic actuator leaks beyond limits. Deactivation of inboard T/Rs require restricted flight to FL 320. **(B)** Inboard T/Rs--shall be repaired at next repair capable facility.
a. THRUST REV PRESSURE light	4	4	2	**(B)** Symmetrical thrust reversers shall be deactivated. See Table 4.1. Item 1-15.
b. TH REV N LKD light	4	4	4	
c. TH REV EXTD light	4	4	2	(B) Symmetrical thrust reversers shall be deactivated. See Table 4.1. Item 1-15.
1-16. Engine Cowl Blowout Door	8	8	8	
1-17. Engine Anti-Ice	4	*	*	Mission dictates requirement. Engine and nacelle anti-ice required for flights into forecasted icing conditions.
1-18. APU	2	2	1	**(B)** Refer to T.O. 1C-5A-1, Section 2 (Starting Engines) for single APU operation. APU CONTROL circuit breaker shall remain closed.
1-19. APU Bleed Valve	2	2	1	**(B)** Required for each operative APU.
1-20. APU Isolation Valve	2	1	1	If the valve is failed open, the associated APU bleed valve and both wing isolation valves shall be operative.
1-21. APU Isolation Valve Open Light	2	0	0	Valve operation shall be confirmed prior to every departure.
1-22. APU Fire Warning System	2	2	1	**(B)** For ground operations, do not operate affected APU and associated ATM unless a fire guard is present.
1-23. APU Fire Bottle	2	2	1	**(B)** For ground operations, do not operate affected APU and associated ATM unless a fire guard is present.

Engines/Auxiliary Power Units (APU) (Table 4.1. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
1-24. APU Exhaust Gas Temperature (EGT) Indicator	2	2	1	Shall be operative on any APU that is planned to be operated. Off flag may be in view as long as indicator functions.
1-25. APU Door Open Light	2	2	0	**(B)** Confirm door is closed before departure.
1-26. APU Start Light	2	2	0	**(B)** Starting will be closely monitored by the scanner.
1-27. APU On Speed Light	2	2	0	**(B)** Verify on speed by checking APU generator frequency.
1-28. APU Accumulator	2	2	1	**(B**) APU with functioning accumulator shall be operative (C-5A/B). One-time flight with affected gear (2) down to nearest repair capable facility. Refer to **paragraph 4.9**.

Table 4.2. Bleed Air, Environmental, Etc.

Bleed Air, Environmental, Etc. Systems (Table 4.2. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
2-1. Air Conditioning Pack	2	2	1	**(B)** Floor heat must be operative and aircraft capable of maintaining pressurization. If both packs are inoperative, MAJCOM Stan/Eval approval required for one-time unpressurized flight (not to exceed 10,000 ft MSL) to a repair capable facility.
2-2. Air Conditioning Master Switch	1	1	1	Shall have control of air conditioning packs.
2-3. Air Conditioning Overheat Light	2	2	1	**(B)** Required for each operating pack.
2-4. Air Conditioning Overheat Sensor	2	2	1	**(B)** Required for each operating pack.

Bleed Air, Environmental, Etc. Systems (Table 4.2. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
2-5. Airflow Selector Switch	1	1	0	**(B)** May be electrically inoperative provided valves can be positioned using tools.
2-6. Compartment Temperature Indicator	3	0	0	Unmanned compartments shall be monitored for proper temperature. Close troop comp shutoff valve if unoccupied.
2-7. Flight Station Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools.
2-8. Relief Compartment Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools.
2-9. Cargo Compartment Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools.
2-10. Troop Compartment Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools. If compartment is unoccupied, valve will be closed.
2-11. Troop Compartment Shutoff Valve	1	1	1	May be electrically inoperative, provided control valve can be positioned using tools.
2-12. Cooling Air Exit Door	2	2	1	**(B)** Door shall be installed. If the door is stuck closed, do not operate the affected A/C below .3 Mach, with slats extended or when the aircraft is on the ground. If the door is stuck open, do not plan flight above FL 280.

Bleed Air, Environmental, Etc. Systems (Table 4.2. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
2-13. Cooling Air Exit Valve	2	2	1	**(B)** Required for each operating pack.
2-14. Cooling Fan	2	2	1	**(B)** Do not operate the affected system on the ground, or with slats extended, or below .3 Mach.
2-15. Cooling Fan Control Valve	2	2	1	**(B)** If valve is failed closed, do not operate the affected system on the ground, or with slats extended, or below .3 Mach.
2-16. Primary Heat Exchanger High Limit Sensor	2	2	1	**(B)** Required for each operating pack.
2-17. Primary Heat Exchanger Temp Control Sensor	2	2	1	**(B)** Required for each operating pack.
2-18. Flow Control and Shut-off Valve	2	2	1	**(B)** Required for each operating pack
2-19. Low Limit Temperature Control Sensor	2	2	0	**(B)** May be electrically inoperative if manual control is available. If possible, install operative sensor in the left system.
2-20. Low Limit Temperature Control Valve	2	2	0	**(B)** May be electrically inoperative if manual control is available. If possible, install operative components in the left system.
2-21. Diverter Valve	1	1	0	**(B)** May be electrically inoperative provided it can be positioned using tools.
2-22. Alternate Air Valve	1	1	0	**(B)** May be electrically inoperative provided it can be positioned using tools.
2-23. Aux Vent Valve	1	1	1	**(B)** May be electrically inoperative provided it can be positioned using tools. One-time flight to repair capable facility.
2-24. Bleed Duct Overheat Sys	3	3	3	

Bleed Air, Environmental, Etc. Systems (Table 4.2. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
2-25. Bleed Air Shutoff Valve	4	4	4	
2-26. Bleed Air Shutoff Valve Indicator Light	4	4	2	**(B)** One light may be inoperative per wing. Verify valve operation as follows: With APU supplying bleed air, turn on engine anti-ice with pylon bleed air shutoff valve in the open position and look for a pressure drop, then close pylon bleed air shutoff valve while looking for pressure increase.
2-27. Pressurization System				MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.
2-28. Automatic Pressure Controller	1	0	0	May be inoperative provided manual mode is fully operative. If the manual controller fails in-flight, use flow control switches, floor heat, engine bleed valves, and AC Master Switch to control pressurization.
2-29. Manual Pressure Controller	1	1	0	**(B)** Shall be operative for pressurized flight. If inoperative, MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility. The Outflow and Thrust Recovery valves shall be open.
2-30. Outflow Valve Indicator	1	1	0	**(B)** Cabin rate of climb and differential pressure indicator shall be operative. Use the scanner to complete preflight steps.

Bleed Air, Environmental, Etc. Systems (Table 4.2. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
2-31. Outflow Valve and Thrust Recovery Valve	1 ea	1 ea	0	**(B)** Both shall be operative for pressurized flight. Outflow and/or Thrust Recovery valve(s) may be failed open only. MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.
2-32. Cabin Altimeter and Differential Pressure Indicator	1	1	0	**(B)** Shall be operative for pressurized flight. If inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility. Cabin Press Low Light shall be operative.
2-33. Cabin Press Low Light	1	1	0	**(B)** Cabin Altimeter/Differential Pressure indicator shall function for flights above 10,000’ MSL.
2-34. Cabin Rate of Climb Indicator	1	1	0	**(B)** Automatic pressurization controller, cabin altimeter and differential pressure indicator shall be operative. If any component listed above is inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.
2-35. Emergency Depress System	1	1	0	**(B)** Shall be operative for pressurized flight. If inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.

Bleed Air, Environmental, Etc. Systems (Table 4.2. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
2-36. Floor Heat System	1	1	0	**(B)** One system (fwd or aft) may be inoperative if both packs are operable. Shall be operative if cargo requires temperature-controlled environment. ***EXCEPTION:*** Not required for pattern locals.
2-37. Floor Heat Duct Anticipator	2	2	0	**(B)** The affected floor heat valve(s) will cycle. Not recommended when using manual pressurization.
2-38. Manifold Bleed Air Pressure Indicator	1	1	1	
2-39. Pressure Aug Valve	4	4	2	**(B)** Must be failed closed.
2-40. Pressurization Mode Selector Switch	1	1	0	**(B)** Manual mode must be operative for pressurized flight. If manual mode is inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility, and the Outflow and Thrust Recovery valves shall be open.
2-41. Start Valve Open Light	4	4	4	
2-42. Temp Aug Valve	4	*	*	Mission dictates requirement. Required for flights into forecasted icing conditions. Must be failed closed.
2-43. Wheel Well Isolation Valve	1	0	0	Shall be able to manually close the valve.
2-44. Wing Isolation Valve	2	2	1	**(B)** Shall be able to manually close the valve.

Bleed Air, Environmental, Etc. Systems (Table 4.2. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
2-45. Safety Valve	2	2	0	**(B)** Both shall be operative for pressurized flight. If inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility, and the Thrust Recovery and Outflow valves shall be fully open.
2-46. Pitot Heat System 2 masts and 2 heads per system (pilot and co-pilot)	2	2	*	**(B)** Mission dictates requirement. Both systems (All 4 masts and heads) required for flights in RVSM airspace. One mast and/or head per system (pilot and co-pilot) may be inoperative for flights conducted in non-icing conditions in non-RVSM airspace.
2-47. AoA De-ice System	2	1	1	One system shall be fully operative. Associated stallimeter shall also be operative.
2-48. Windshield Heat	5	3	2	**(A)** The 3 front windshield panels shall function. **(B)** Must have windshield heat for 2 of the 3 front windshield panels.
2-49. Windshield Wiper	2	*	*	Mission dictates requirement. One system shall be operative for flights with forecast precipitation.
2-50. Total Temp Probe	2	2	2	
2-51. Total Air Temperature (TAT) Indicator	1	0	0	Use FMS total temp information.

Table 4.3. Hydraulics (Legacy).

Hydraulics (Table 4.3. LEGACY)		
Item/System	**Installed**	**Required**

		A	B	Remarks/Limitations/Exceptions
3-1. 1-2 PTU	1	1	0	**(B)** May be inoperative provided #1 ATM and #1 & #2 engine-driven pumps (all) are operative.
3-2. 2-3 PTU	1	1	0	**(B)** May be inoperative provided the 1-2 and 3-4 PTUs, and #2 and #3 engine-driven pumps (all) are operative.
3-3. 3-4 PTU	1	1	0	**(B)** May be inoperative provided #4 ATM and #3 & #4 engine-driven pumps (all) are operative.
3-4. ATM ON Light	2	2	1	**(B)** May be inoperative if ATM is made inoperative. Hydraulics must be isolated.
3-5. ATM	2	2	1	**(B)** Applicable PTU and engine-driven pumps shall be operative. Complete required preflight items after engine start. ***CAUTION:*** Do not perform anti-skid check w/engines running.
3-6. Electric Suction Boost Pump	2	2	0	**(B)** Associated hydraulic suction boost pump shall be operative. Check applicable hydraulic service center filters for popped button. If button is popped all system filters must be checked for contamination. If both electric suction boost pumps are inoperative minimize ATM starts and one-time flight to a repair capable facility.
3-7. Engine-Driven Hydraulic Pump	8	8	6	All pumps shall have positive depress capability. **(B)** Adjacent PTUs shall be operative. Only one pump on two nonadjacent engines may be inoperative. **(B)** Check pump for sheared shaft and associated system filters for contamination.

Hydraulics (Table 4.3. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
3-8. Flight Engineer Hydraulic Pressure Gauge	4	4	2	**(B)** Direct reading gauge shall be operative and periodically monitored. Associated PRESS LOW lights shall be operative. **(B)** Two inoperative gauges require one-time flight to repair capable facility.
3-9. Flight Engineer Hydraulic Quantity Indicator	4	4	3	**(B)** Sight gauge shall be monitored periodically. Associated flight engineer hydraulic pressure gauge and BOOST PRESS LOW light shall be operative.
3-10. Hydraulic Boost Press Low Light	4	4	2	**(B)** Monitor/scan associated system(s). One light inoperative requires repair at next repair capable facility. Two lights inoperative require a one-time flight to a repair capable facility.
3-11. Hydraulic Pressure Gauge (Direct Reading)	4	4	3	**(B)** Associated flight engineer hydraulic pressure gauge shall be operative.
3-12. Hydraulic Pump Press Low Light	8	8	6	**(B)** Associated flight engineer hydraulic pressure gauge shall be operative. Depress unaffected hydraulic pump. No more than one light on each non-adjacent engine may be inoperative
3-13. Hydraulic Reservoir Sight Gauge	4	4	0	**(B)** May be capped if flight engineer hydraulic quantity indicator is operative. Verify hydraulic quantity prior to launch.

Hydraulics (Table 4.3. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
3-14. Hydraulic Suction Boost Pump	4	4	2	**(B)** Check applicable hydraulic service center filters for popped button. If button is popped all system filters must be checked for contamination. #1 and #4 may be inoperative if the respective electrical suction boost pump is operative. If #2 or #3 boost pump fails, swapping the failed boost pump with either #1 or #4 is permissible provided no contamination is present.
3-15. RAT	1	1	1	
3-16. Deploy RAT Light	1	1	0	
3-17. RAT Unlocked Light	1	1	1	

Table 4.4. Landing Gear (Legacy).

Landing Gear (Table 4.4. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
4-1. Anti-Skid System				Operation with less than all anti-skid components operative is an emergency procedure and shall be IAW the flight manual. If inoperative MAJCOM Stan/Eval approval required for one-time flight to a repair capable facility.
a. Anti-Skid Off Light	1	1	1	
b. Brakes Light	1	1	0	
c. No Brakes Light	1	1	1	
d. DET Fail Light	1	1	1	

Landing Gear (Table 4.4. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
4-2. Normal Brake System	1	1	1	
a. Normal Brake Pressure Indicator	1	1	0	**(B)** EMER HYD brake pressure light shall be operative. Alternate brake pressure indicator and flight engineer's #4 hydraulic pressure gauge shall be operative. Select alternate brakes for landing. If normal brakes are required for landing, perform a Brake System Check (In-flight). Shall be repaired at next repair capable facility.
4-3. Alternate Brake System	1	1	1	
a. Alternate Brake Pressure Indicator	1	1	0	**(B**) Normal brake pressure indicator and flight engineer's #1 hydraulic pressure gauge shall be operative. Select normal brakes for landing. If alternate brakes are required for landing, perform a Brake System Check (In-flight). Shall be repaired at next repair capable facility.
4-4. Emergency Brake System	1	1	1	
a. EMER HYD Brake Pressure Light	1	1	0	**(B**) Normal brake pressure indicator shall be operative. Shall be repaired at next repair capable facility.
4-5. Anti-rotation/In-flight brake sys	1/mlg	1/mlg	*	**(B)** Aircraft climb performance capability dictates requirement. Non-SDP procedures will be used for departure planning.

Landing Gear (Table 4.4. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
4-6. Parking Brake	1	1	0	**(B)** If inoperative, brakes shall be guarded at all times when chocks are removed. Scanner shall install chocks in the event of an emergency. Do not accomplish kneeling/loading/ unloading with engines running. With engines shutdown, brakes shall be guarded if operation requires parking brake set. One-time flight to repair capable facility.
4-7. MLG Caster System	1	1	*	**(B)** Mission dictates requirement.
a. MLG Free Lights	2	2	*	**(B)** Mission dictates requirement. If inoperative, copilot shall monitor position indicators. If lights are inoperative, do not accomplish kneeling operations.
b. Aft MLG Position and Emergency Control Switch	2	2	0	**(B**) Limit caster operations. Normal caster shall be operative. Mission segments limited to tow-capable locations. Shall be repaired at next repair capable facility.
4-8. Emergency Extend Switch	5	5	0	**(B**) One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.9.1**

Landing Gear (Table 4.4. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
4-9. Kneeling System	1	1	*	Mission dictates requirement. All main landing gear shall be capable of in-flight kneeling. If not capable of in-flight kneeling, one-time flight with the affected MLG gear down to the nearest repair capable facility. Refer to **paragraph 4.9.1**
4-10. Landing Gear Warning System				
a. Landing Gear Warning Horn	1	1	0	**(B**) Shall be repaired at next repair capable facility.
b. Landing Gear Warning Light	2	2	0	One light may be inoperative. **(B)** If both lights are inoperative, one-time flight to a repair capable facility. All gear position indicators shall be operative.
c. Landing Gear Warning Test Button	1	1	0	**(B**) Shall be repaired at next repair capable facility.
d. Horn Silence Button	1	1	0	**(B**) Shall be repaired at next repair capable facility.
e. Emergency Switch On Light	1	1	0	**(B**) One-time flight with all gear down to nearest repair capable facility. Refer to **paragraph 4.9.1**
f. Bogie Pitch Annunciator Light	4	4	0	**(B**) One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.9.1**
4-11. NLG Fiber Optics Scope	1	1	0	**(B**) One-time flight with NLG down to nearest repair capable facility. Refer to **paragraph 4.9.1**

Landing Gear (Table 4.4. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
4-12. NLG Inspection Light	3	1	0	Light for the fiber optics target required day or night. **(B**) If light for the fiber optics target is inoperative, one-time flight with NLG down to the nearest repair capable facility. Refer to **paragraph 4.9.1**
4-13. MLG Inspection Light	2/mlg	*	*	Mission dictates requirement. One per MLG should be operative for night operations.
4-14. Nose Gear Steering	1	1	1	Both Normal and Emergency systems shall be operative.
a. Rudder Pedal Steering	1	1	0	**(B**) Nose Gear Steering system (wheel) shall be operative. Shall be repaired at next repair capable facility.
4-15. Position and Indicating Systems	1	1	0	**(B**) One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.9.1** Prior to landing, affected gear will be visually verified for proper down and locked indications at sequence control panel and inspection covers/fiber optics.
4-16. Relay Logic System (Sequence Control Panel)	3	3	0	**(B**) One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.9.1** Prior to landing, affected gear will be visually verified for proper down and locked indications.
4-17. Crew Entrance Door Accumulator	1	1	0	**(B**) One-time flight with nose gear down to nearest repair capable facility. Refer to **paragraph 4.9.1**

Landing Gear (Table 4.4. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
4-18. APU/Emergency MLG Extension Accumulator	2	2	1	**(B)** APU with functioning accumulator shall be operative (C-5A/B). One-time flight with affected gear (2) down to nearest repair capable facility. Refer to **paragraph 4.9.1**
4-19 MLG Secondary Strut (deflated)	4	4	3	**(B)** One-time flight to repair capable facility. Limit landing sink rate to 6 FPS (360 Ft/Min) or less.

4.9. Landing Gear.

4.9.1. Gear Down Flight Operations**.** Limit gear down flight operations to sorties required to move the aircraft to the nearest repair capable facility. Consider gear down flight only after the PIC exhausts all avenues to repair the aircraft in place.

4.9.1.1. Standard climb-out flight path charts in T.O. 1C-5-1-1 do not account for a gear-down configuration. Therefore, PICs shall not takeoff until there is reasonable assurance that they will achieve/maintain adequate obstacle clearance (to include en route stops and alternates). Non-SDP procedures will be used for departure planning.

4.9.1.2. AMC/A3V waiver approval is not required for gear down flights. However, aircrew will consider potential aircraft and flight considerations, take off and landing data (TOLD) calculations, along with proper aircraft documentation prior to known gear down flights. If the airplane is on a red X for a gear malfunction the airplane home station MXG/CC must downgrade the red X per T.O. 00-20-1 prior to flight.

4.9.1.3. Local Training Missions. Local missions will not be planned gear down. When in-flight malfunctions prohibit gear retraction (except MLG rotational malfunctions), the local may continue after the cause of malfunction has been identified and the AC and maintenance supervisor concur. Do not exceed 200 KCAS/M.60.

4.9.1.4. Gear Down Flight Procedures.

4.9.1.4.1. Refer to Variant Configuration Fuel Planning, chapter **14.5.5,** for Gear Down Flight fuel planning.

4.9.1.4.2. Plan to not exceed 200 KCAS/M.60 to help prevent APU servicing door and gear door damage. When range is a factor, fly an airspeed that yields the maximum range; do not exceed 250 KCAS/M.60. **EXCEPTION:** Tactical departures will not exceed 250 KCAS.

4.9.1.4.3. For planned gear down flight, the affected gear shall be pinned. The APU servicing door panel will be speed taped upon completion of the aircrew inspection and prior to flight. Taping may help prevent loss of the door panel. Only the door panel on the appropriate side requires speed tape.

4.9.1.4.4. After each gear down flight segment conduct a visual inspection. The MLG inspection will include affected gear-well area, LN2 servicing panel (if applicable), and doors. NLG inspection will include gear-well area, doors, folding bulkhead door, actuators, and brackets. This inspection may be accomplished by the flight engineer.

4.9.2. Operation with partial brakes. Limit operations with partial brakes only when necessary to recover the aircraft to a station that has confirmed repair capability. Any operations requiring more than one leg shall be coordinated with an AMC/A3V waiver.

Table 4.5. Flight Controls (Legacy) Refer to paragraph 4.10

FLIGHT CONTROLS (Table 4.5. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
5-1. AILERONS				
a. Aileron Actuator	2/wing	2 /wing	2/wing	
b. Aileron Trim Actuator	2	2	1	**(B)** Aileron shall be centered prior to flight. Shall be repaired at next repair capable facility.
c. Aileron Trim Position Indicator	1	1	0	**(B)** Ailerons shall be centered prior to flight. Required for touch-and-go operations.
d. Aileron Artificial Feel	1	1	0	**(B)** One-time flight to repair capable facility.
5-2. ELEVATORS				
a. Inboard Elevator Actuator	2/control surface	2/ control surface	2/ control surface	
b. Outboard Elevator Actuator	3/control surface	3/ control surface	3/ control surface	

FLIGHT CONTROLS (Table 4.5. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
c. Elevator Artificial Feel System (VFUs)	2	2	0	If test equipment is not available, do not drain VFU bottles. **(B)** If both systems are inoperative: One-time flight to nearest repair capable facility. Do not engage pitch autopilot. See **paragraph 3.7.1** for FDP limitations.
5-3. Horizontal Stabilizer Pitch Trim				
a. Normal Pitch Trim	1	1	0	**(B)** Alternate and manual trim shall be operative. One-time flight to nearest repair capable facility.
b. Alternate Pitch Trim	1	1	0	**(B)** Normal and manual trim shall be operative. One-time flight to nearest repair capable facility.
c. Manual Pitch Trim	1	1	1	
d. Trim Disconnect Switch	2	2	1	**(B)** Seat with operative switch shall be occupied at all times. One-time flight to repair capable facility.
e. Horizontal Stabilizer Trim Position Indicator	1	1	1	
5-4. RUDDERS				
a. Rudder Actuator	4	4	4	
b. Rudder Limiter	1	1	0	**(B)** MIN Q position shall be operative and selected to assure full rudder travel is available. Shall be repaired at next repair capable facility.
c. Rudder Trim	1	1	0	**(B)** Yaw Aug Man Trim shall be operative. Shall be repaired at next repair capable facility.

FLIGHT CONTROLS (Table 4.5. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
d. Rudder Trim Position Indicator	1	1	0	**(B)** One turn-and-slip indicator shall be fully operative. Rudder shall be centered prior to flight. Required for touch-and-go operations.
e. Emergency Rudder (Yaw Aug Man Trim)	1	1	0	**(B)** Comply with flight manual section 5 limitations. One-time flight to repair capable facility.
5-5. FLAPS AND SLATS				
a. Flap/Slat Asymmetry System	1	1	1	
b. Flap Position Indicator	1	1	0	**(B)** Slat indicator shall be operative. Scan flaps to verify approximate position. One-time flight to repair capable facility.
c. Ratio Shifters	2	2	0	**(B)** AUTO position of ratio shifters may be inoperative. Shall be able to manually position ratio shifters to the FLAPS UP and FLAPS DN position. Select matching position.
d. Slats	14	14	14	Refer to flight manual Section 5. See **paragraph 4.10**.
e. Slat Position Indicator	1	1	0	**(B)** Flap indicator shall be operative. Scan slats to verify position. Shall be repaired at next repair capable facility.
f. Slat Drive Disconnect Switch	1	1	0	**(B)** Takeoff and Landing will be conducted with slats retracted. See **paragraph 4.10.**
5-6. SPOILERS				
a. Flight Spoilers	10	10	10	
b. Ground Spoilers	8	8	8	

FLIGHT CONTROLS (Table 4.5. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
5-7. ALDCS	1	1	0	**(B)** Comply with flight manual section 5 limitations. Shall be repaired at next repair capable facility.
5-8. Flight Augmentation Systems (Lat, Yaw, Pitch)	1ea	1ea	0	**(B)** Refer to Before Taxi Checklist. For inoperative yaw augmentation axis, one-time flight to repair capable facility. Inoperative pitch and roll augmentation shall be repaired at next repair capable facility. When scheduled for aerial refueling, every effort should be made to launch with operative flight augmentation. With inoperative systems the applicable autopilot axis will be inoperative. See **paragraph 3.7.1** for FDP limitations.
5-9. Pilot Assist Servo (PACS)				
a. PACS Roll System	1	1	0	**(B)** Shall be repaired at next repair capable facility.
b. PACS Pitch System	1	1	0	**(B)** Shall be repaired at next repair capable facility.
5-10. Autopilot	1	1	*	**(B)** Mission dictates requirement. Pitch autopilot required for flights through RVSM airspace. If pitch autopilot is inoperative refer to **paragraph 3.7** for FDP limitations.
5-11. Flight Control Hydraulic Power System Off Light/Pressure Switch	Outbd Elevator 3/flight control All others 2/flight control	Outbd Elevator 3/flight control All others 2/flight control	Outbd Elevator 2/flight control All others 1/flight control	**(B)** Check the affected system for proper operation prior to flight.

FLIGHT CONTROLS (Table 4.5. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
5-12. Flight Control Hydraulic Power Shutoff Valve	Outbd Elevator 3/flight control All others 2/flight control	Outbd Elevator 3/flight control All others 2/flight control	Outbd Elevator 2/flight control All others 1/flight control	**(B)** Verify valve is open prior to take-off. Shall be repaired at next repair capable facility.

4.10. SLATS INOPERATIVE. Slats retracted flight operations will be limited to those sorties required to move the aircraft to the nearest repair capable facility. Slats retracted flight should only be considered after reasonable efforts to repair the aircraft have been attempted. AMC/A3V waiver approval is not required provided the airplane is being flown (slats retracted with flap system operational) to the nearest repair capable facility. If the airplane is on a red X for a slat malfunction the airplane home station MXG/CC must downgrade the red X per T.O. 00-20-1 prior to flight.

4.10.1. Slats extended flight operations: Refer to T.O. 1C-5A-1, Section 5, LIMITATIONS FOR CRUISE OPERATIONS WITH FLAPS UP – SLATS EXTENDED

Table 4.6. Fuel Systems (Legacy) Refer to Paragraph 4.11

FUEL SYSTEMS (Table 4.6. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
6-1. Aerial Refuel System	1	*	*	Mission dictates requirement.
6-2. Aerial Refuel Slipway Light	2	*	*	Mission dictates requirement. At least one light required for night air refueling.
6-3. Main Tank Boost Pump	2/Tank	2/Tank	1/Tank	**(B)** Open affected pump circuit breaker. Crossfeed and isolation valves shall be operative.

FUEL SYSTEMS (Table 4.6. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
6-4. Auxiliary Tank Boost Pump	2/Tank	*	*	Mission dictates requirement. One pump per tank may be inoperative if tank contains/will contain fuel. Both pumps may be inoperative if tank does not/will not contain fuel. Open affected pump(s) circuit breaker(s).
6-5. Extended Range Tank Boost Pump	2/Tank	*	*	Mission dictates requirement. One pump per tank may be inoperative if tank contains/will contain fuel. Both pumps may be inoperative if tank does not/will not contain fuel. Open affected pump(s) circuit breaker(s).
6-6. Pump Out Light	4	4	3	**(B)** Both boost pumps shall be operative. Place both boost pumps on. One-time flight to repair capable facility.
6-7. Main Tank Press Low Light	4	4	3	**(B)** Both boost pumps shall be operative. Place both boost pumps on. One-time flight to repair capable facility.
6-8. Fuel Jettison Valve	2	2	1	**(B)** One valve may be failed closed if all separation valves are operative.
6-9. Fuel Temperature Selector	1	1	1	
6-10. Fuel Temp Indicator	1	1	1	
6-11. Main Tank Fill Valve	4	4	3	**(B)** One valve may be failed open. Control fuel level with associated aux/ext range tank boost pumps. Shall be repaired at next repair capable facility.

FUEL SYSTEMS (Table 4.6. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
6-12. Aux Tank Refuel Valve	4	*	*	Mission dictates requirement. Valves may be failed closed if the tank is not/will not be needed for fuel. If fuel is required in any Aux or Extended Range tank, refer to **paragraph 4.11.**
6-13. Extended Range Tank Refuel Valve	4	*	*	Mission dictates requirement**.** Valves may be failed closed if the tank is not/will be needed for fuel. If fuel is required in any Extended Range tank, refer to **paragraph 4.11.**
6-14. Isolation Valve	4	4	3	**(B)** One valve may be failed closed. Respective crossfeed valve shall be operative. Shall be repaired at next repair capable facility.
6-15. Separation Valve	3	3	2	**(B)** Center separation valve may be failed closed if both aerial refuel isolation valves are operative. Outboard separation valves may be failed closed if the respective Isolation and crossfeed valves are operative.
6-16. Crossfeed Valve	2	2	1	**(B)** One valve may be failed closed; respective isolation valves and outboard separation valve shall be operative. Shall be repaired at next repair capable facility.
6-17. Ground Refuel Isolation Valve	2	2	1	
6-18. Manifold Press Low Light	4	4	2	**(B)** Inboard lights may be inoperative provided the associated manifold pressure gauge is operative.

FUEL SYSTEMS (Table 4.6. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
6-19. Fuel Manifold Pressure Indicator	2	2	1	Both shall be operative for planned aerial refueling. **(B)** Separation valves and manifold press low lights shall be operative.
6-20. Sump Low Warning	2	2	0	**(B)** The system shall be made safe prior to flight. Both associated outboard main tank boost pumps shall be operative. Place both main tank boost pumps on. Refer to Section 3 of the flight manual. Shall be repaired at next repair capable facility.
6-21. Main Tank Low Light	2	2	0	**(B)** Monitor fuel gauges for proper fuel sequence. Shall be repaired at next repair capable facility.
6-22. Vent Fill Light	2	2	0	**(B)** Control fuel level with associated aux/ext range tank boost pumps to preclude over filling. Shall be repaired at next repair capable facility.
6-23. Total Fuel Quantity Indicator	1	1	0	**(B)** Serviced tanks must have operative indicators. Shall be repaired at next repair capable facility.
6-24. Fuel Quantity Indicators	See **Paragraph 4.11.**			Do not launch with more than one inoperative fuel quantity indicator per wing. Symmetrically opposite indicator shall be operative. Refer to **paragraph 4.11**.
a. Main Tank Fuel Quantity Indicator	4	4	3	Refer to remarks in **6-24.** **(B)** No more than one indicator may be inoperative.
b. Auxiliary Tank Fuel Quantity Indicator	4	*	*	Mission dictates requirement. Refer to remarks in **6-24**.

FUEL SYSTEMS (Table 4.6. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
c. Extended Range Tank Fuel Quantity Indicator	4	*	*	Inoperative/malfunctioning system shall be made safe prior to flight. Refer to the flight manual section 3. To refuel see **Paragraph 12.15.** If fuel is not required in a tank with an inoperative indicator, verify the tank is empty prior to flight.

4.11. Fuel System. It is preferred to use standard fuel system management to the maximum extent possible. Comply with Sections 2 and 5 of the flight manual if non-standard fuel sequencing is required for a one time flight to the nearest repair capable facility.

4.11.1. For Ground Refueling Procedures with Inoperative Fuel Quantity Indicator, refer to **paragraph 12.15**

4.11.2. Fuel Quantity Indicator Failure In Flight.

4.11.2.1. Line Missions. Comply with Section 3 of the flight manual. Continue as scheduled provided Item 6-24 Remarks/Limitations/Exceptions are met and the destination has capability to safe affected tank IAW maintenance technical orders.

4.11.2.2. Local Missions. Comply with Section 3 of the flight manual and land as soon as practical. Flight may resume provided Item 6-24 Remarks/Limitations/Exceptions are met, maintenance personnel determined the nature of the malfunction, and the tank has been made safe IAW maintenance technical orders.

4.11.3. Aerial Refueling Missions.

4.11.3.1. Not used.

4.11.3.2. Line Missions. Comply with Section 3of the flight manual. Symmetrically opposite indicator shall be operative. Do not air refuel with more than one inoperative fuel quantity indicator per wing.

4.11.3.3. Local Missions. Do not conduct aerial refueling with an inoperative indicator until maintenance action has been performed (refer to **paragraph 4.11.2.2**).

4.11.3.4. Not used.

4.11.3.5. Servicing. During aerial refueling, fuel is placed in tanks with operative indicators first. Tanks with inoperative indicators should be serviced internally by transferring a known quantity from another tank.

4.11.3.6. Unless Section 5 of the flight manual, Maximum Allowable Fuel Differential limits are going to be exceeded, do not accomplish internal servicing until termination of

refueling. However; if necessary, internal servicing may be accomplished in the precontact position.

4.11.3.7. When a main tank indicator is inoperative and total main tank fuel quantity is less than 30,000 pounds, simultaneously fill all main tanks prior to servicing other tanks using the following procedures:

4.11.3.8. Position the AUTO REF switch to MAN for transfer. Monitor symmetrically opposite indicator to judge quantity in tank with inoperative indicator.

4.11.3.9. After filling the main tanks, disconnect and obtain an off-load report to verify the quantity of fuel in the tank with the inoperative indicator. Aerial refueling may continue after confirming main tank fuel quantity. Further servicing of a tank with an inoperative indicator should be made using known quantities from internal sources.

4.11.3.10. If a fuel imbalance is suspected (heavy wing or excessive aileron trim requirements), terminate aerial refueling and obtain an off-load report. Prior to internal fuel transfer, verify quantity of fuel in tanks with inoperative indicators. Refueling may be continued after fuel is balanced.

Table 4.7. Electrics (Legacy) Refer to paragraph 4.12

ELECTRICS (Table 4.7. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
7-1. AC Load Meter	5	5	3	**(B)** Shall be operative for each working generator.
7-2. AC Volt Meter	1	1	1	
7-3. Gen Volt & Frequency Selector Switch	1	1	1	
7-4. Battery	1	1	1	
7-5. Battery Light	1	1	0	**(B)** One-time flight to repair capable facility.
7-6. Battery Switch	1	1	1	**(B)** Off and bypass positions shall be operative.
7-7. BCEM	1	1	0	**(B)** If inoperative place the battery switch to bypass. Shall be repaired at next repair capable facility.
7-8. Bus Ties	4	4	3	**(B)** One BTC may be failed open provided associated generator and GLC is operative. One-time flight to repair capable facility.

ELECTRICS (Table 4.7. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
7-9. Bus Tie Open Light	4	4	4	
7-10. CSD	4	4	3	**(B)** One may be inoperative and disconnected provided the bus tie system (all functions) is operative. The oil level of the disconnected CSD shall be checked for proper oil quantity prior to flight and during all subsequent en route stops. Do not fly more than 50 hours with a disconnected CSD (non-waiverable).
7-11. CSD Fail Warning	4	4	3	**(B)** Shall be operative for each working CSD.
7-12. CSD Temperature Gauge	4	4	0	**(B)** Associated CSD Fail light shall be operative.
7-13. DC Load Meter	2	2	1	**(B)** Shall be operative for each operable transformer rectifier.
7-14. DC Volt Meter	1	1	0	**(B)** Prior to applying electrical power, check battery voltage using external meter. One-time flight to repair capable facility.
7-15. DC Volt Meter Selector Switch	1	1	0	**(B)** One-time flight to repair capable facility.
7-16. Emergency Bus Power Relay	1	1	1	
7-17. Emergency Generator	1	1	1	
7-18. Engine Driven Generator	4	4	3	**(B)** One may be inoperative provided the bus tie system (all functions) is operative. SCM airplanes on Shuttle Container Transport missions shall have all 4 generators operative.
7-19. Frequency Meter	1	1	1	
7-20. Generator Fail Light (Engines)	4	4	3	**(B)** Shall be operative for each operating CSD.

ELECTRICS (Table 4.7. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
7-21. Generator Fail Light (APU)	2	2	1	**(B)** Shall be operative for each working APU.
7-22. Generator Out Light (Engine)	4	4	3	**(B)** Shall be operative for each working generator.
7-23. Generator Out Light (APU)	2	2	1	**(B)** Do not select associated APU generator.
7-24. Generator Load Controller	4	4	3	**(B)** Shall be operative for each working generator.
7-25. Isolated Bus Switch	1	1	1	
7-26. 325 Amp Current Limiter	1	1	1	
7-27. 400 Amp Current Limiter	1	1	0	**(B)** Both transformer rectifiers shall be operative. One-time flight to a repair capable facility.
7-28. Phase Selector Switch	1	1	1	
7-29. #1 Avionics AC Bus Off Warning Light and Relay	1	1	0	**(B)** If light and/or relay are inoperative, open the INS Emer Switch C/B on Avionics AC Bus #1. In this configuration, normal INS attitude switching is possible. One-time flight to repair capable facility.
7-30. Transformer Rectifier	2	2	1	**(B)** 400 amp current limiter shall be operative. One-time flight to nearest repair capable facility.

Table 4.8. Instruments (Legacy).

INSTRUMENTS (Table 4.8. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
8-1. Flight Director System	2	2	1	**(B)** Both required for CAT II ILS.

INSTRUMENTS (Table 4.8. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
8-2. Go-Around Attitude Subsystem	1	1	0	
8-3. Navigation Selector Panel	2	2	*	**(B)** Portions may be inoperative. Available approaches and/or mission dictates requirement.
8-4. Auxiliary Navigation Selector Panel	2	0	0	
8-5. Pilot Bearing Distance Heading Indicator (BDHI)	2	2	*	**(B)** Available approaches and/or mission dictates requirement.
8-6. Horizontal Situation Indicator (HSI)	2	2	1	**(B)** Pilot with inoperative HSI shall have an operative BDHI. Shall be repaired at next repair capable facility.
8-7. Remote HSI Heading and Course Selector Panels	2	0	0	HSI heading and course selectors must be operative.
8-8. Attitude Director Indicator	2	2	2	
8-9. Rate-of-Turn Sensor	2	2	*	**(B)** Mission dictates requirement. One must be operative for flight in IMC. With inoperative indicator, corresponding ADI must be operative.
8-10. Central Air Data Computer (CADC)	2	2	2	When one CADC is replaced and test equipment is not available or the mission dictates, and the pitot static system has not been disturbed, a leak check may be deferred. Cross-check pilot and copilot airspeed indicators at 80 knots on takeoff roll. Abort the takeoff if airspeed differs by five knots or more. ***EXCEPTION:*** Maintenance leak and accuracy checks are required before flights in RVSM airspace.

INSTRUMENTS (Table 4.8. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
a. CADC drain bottles	12	12	12	If any portion of the colored indicator float ball is at or above the beveled edge of the bottle(s), specified bottle(s) should be drained. If test equipment is not available or the mission dictates a leak check may be deferred. Cross-check pilot and copilot airspeed indicators at 80 knots on takeoff roll. Abort the takeoff if airspeed differs by five knots or more. ***EXCEPTION:*** Maintenance leak and accuracy checks are required before flights in RVSM airspace.
8-11. Magnetic Compass	1	1	1	
8-12. Accelerometer	1	1	0	**(B)** MADAR shall be capable of monitoring in-flight loads.
8-13. Vertical Scale Flight Instruments (VSFI)				
a. AoA Indicator	2	2	0	**(B)** At least one stallimeter shall be operative.
b. Mach Indicator	2	2	0	**(B)** Use corresponding calibrated airspeed to maintain desired Mach.
c. Airspeed Indicator	2	2	2	
d. Vertical Velocity Indicator (VVI)	2	2	2	
e. Altimeter	2	2	2	

Table 4.9. Avionics (Legacy).

AVIONICS (Table 4.9. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
9-1. VHF Command Radio	2	2	1	

AVIONICS (Table 4.9. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
9-2. UHF Command Radio	2	2	1	
9-3. VHF Nav Radio	2	2	1	
9-4. HF Radio	2	2	*	**(B)** Mission dictates requirement.
9-5. ADF				
a. A-model aircraft	2	1	*	**(B)** Mission dictates requirement.
b. B-model aircraft	1	1	*	**(B)** Mission dictates requirement.
9-6. TACAN	2	2	1	**(B)** When possible, install operable TACAN in the #1 position.
9-7. Marker Beacon	1	1	0	**(B)** Available approaches dictates requirement.
9-8. Inertial Navigation Systems (INUs)	3	3	2	**(B)** Three sources of attitude required (2 INUs and SAI). One INU inoperative procedure: Two fully operative INUs required. These should be installed in the #1 and #3 positions. Line missions--shall be repaired at next repair capable facility.
9-9. Fuel Savings Advisory System (FSAS)				
a. FSAS Computer	1	1	*	**(B)** Mission dictates requirement. Required for flights in RVSM airspace (altitude alerting). If inoperative, wind shear warning will be inoperative.
b. Display Interface Control Unit (DICU)	1	1	*	**(B)** Mission dictates requirement. Required for flights in RVSM airspace (altitude alerting).
9-10. Standby Attitude Indicator				
a. SAI	1	1	0	**(B)** Three sources of attitude required (3 INUs). Line missions--shall be repaired at next repair capable facility.

AVIONICS (Table 4.9. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
b. Air Data Unit	1	0	0	
9-11. CADC Select Switch	1	1	*	**(B)** Mission dictates requirement. Required for flights in RVSM airspace.
9-12. IFF	1	1	1	Mode 3A and C shall be operative.
a. Mode 4 Computer	1	1	*	**(B)** Mission dictates requirement. Do not delay takeoff except when the aircraft will transit an area where safe passage procedures are implemented. In-flight failures: Continue to intended destination. Where safe passage is implemented, follow procedures for inoperative Mode 4.
9-13. TCAS System	1	1	0	**(B)** Shall be repaired at next repair capable facility.
a. TCAS Displays	2	1	0	Shall be repaired at next repair capable facility.
b. Mode S	1	*	*	Mission dictates requirement.
9-14. Interphone System				Shall be able to communicate with all occupied positions.
a. Cockpit Loudspeaker	3	3	1	
b. Microphone Switch (Yoke)	2	2	1	**(B)** Shall be repaired at next repair capable facility.
c. Microphone Switch (Floor)	2	1	0	Should be operative at engineer position.
d. Interphone Cords	16	*	*	One required for each occupied primary crew position. Cargo compartment cords are mission dependent.
9-15. Public Address (PA) System	1	1	0	

AVIONICS (Table 4.9. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
a. Troop Compartment PA	1	1	*	**(B)** Shall be operative when carrying passengers unless other means of communication is available (i.e., bullhorn).
9-16. Avionics Equipment Cooling System				
a. Avionics Cooling Fan	2	2	1	**(B)** Shall be repaired at next repair capable facility.
b. Cooling Fan Fail Light	2	2	1	**(B)** Light shall be operative for selected fan.
c. COMPT OVHT Light	1	1	0	**(B)** Periodically scan avionics compartment. Shall be repaired at next repair capable facility.
d. Cooling Effects Detector	1	1	0	**(B)** Periodically scan avionics compartment. Shall be repaired at next repair capable facility.
f. Flight Engineer's Panel Fan Fail Light	1	1	0	**(B)** Periodically check fan in-flight.
g. Flight Engineer's Panel Fan	1	1	1	
9-17. Flight Management System (FMS)				
a. Control Display Unit (CDU)	3	3	2	**(B)** Operative units should be installed in the #1 and #3 positions. INU associated with the inoperative CDU will not be operative. SAI shall be operative. Line missions--shall be repaired at next repair capable facility.
b. Bus-Subsystem Interface Unit (BSIU)	3	3	3	
c. Data Loader	1	1	*	**(B)** Mission dictates requirement.
d. GPS Key Fill Panel	2	1	*	Mission dictates requirement.

AVIONICS (Table 4.9. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
e. FMS/INS Status Panel	2	2	1	**(B)** Attd Fail, Hdg Fail, and CDU Msg indicators on malfunctioning should be operative. If these lights are inoperative, one-time flight to repair facility. Monitor associated CDU.
f. FMS Aux Control Panel	1	1	1	
g. FMS Master Power Control Panel	1	1	1	
h. Comm/Nav Radio Volume Control Panel	1	1	*	**(B)** Mission dictates requirement. Portions may be inoperative.
i. GPS Receiver Processor Unit (RPU)	3	3	0	**(B)** CDU with operative RPU must be installed in the pilot position. If a second is installed, it should be placed in the co-pilot position. Select the working GPS for the integrated nav solution. If all three RPUs are inoperative, all CDUs must be functional to place INUs in triple mix; refer to FLIP for RNP requirements. Line missions--shall be repaired at next repair capable facility.
j. GPS Antenna	2	2	0	**(B)** Select the working GPS for the integrated nav solution. If both antennae are inoperative, all CDUs must be functional to place INUs in triple mix. Refer to **Table 4.9.** 9-17i Remarks/Limitations/ Exceptions.
k. GPS Antenna Electronics Unit (AEU)	2	2	0	**(B)** Select the working GPS for the integrated nav solution. If both AEUs are inoperative, all CDUs must be functional to place INUs in triple mix. Refer to **Table 4.9.** Item 17i Remarks/Limitations/ Exceptions.

AVIONICS (Table 4.9. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
9-18. Radar Altimeter	2	2	1	Considered operative with either analog or digital display. If pilot's position is inoperative refer to **Table 4.14**. Item 14-2. Both shall be operational for CAT II ILS approaches.
9-19. Weather Radar	1	1	*	**(B)** Shall be operative for flights into areas of known or forecast thunderstorms.

Table 4.10. Recording and Emergency Location (Legacy).

RECORDING & EMERGENCY LOCATION (Table 4.10. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
10-1. Emergency Locator Transmitter (ELT)	1	1	1	May be inoperative for local airland flights at or in the vicinity of home station. FIR shall be operative.
10-2. Flight Incident Recorder (FIR)	1	1	0	**(B)** FIR may be inoperative provided CVR is operative. Shall be repaired at next repair capable facility.
10-3. Cockpit Voice Recorder (CVR)	1	1	0	**(B)** CVR may be inoperative provided FIR (including all FIR inputs) is operative. Shall be repaired at next repair capable facility.

Table 4.11. MADAR (Legacy).

MADAR (Table 4.11. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
11-1. Signal Acquisition Remote (SAR) Units				

a. SAR 03, 04, 19, 20, 21, 22	1	1	0	Required for FIR input and engine vibration monitoring. Refer to **paragraph 4.12.**
b. SAR 01, 05, 13, 14, 17, 18, 27, 28, 29	1	1	0	Required for FIR input.
11-2 MADAR III				
a. MDCR Workstation	1	1	0	**(B)** Shall be repaired at next repair capable facility.
b. POU	1	1	0	**(B)** MDCR should be operative. If both MDCR and POU are inoperative, shall be repaired at next repair capable facility.
c. Communications controller	1	1	0	**(B)**MDCR and POU will be inoperative. Repair at next repair capable facility.
d. MDCR Media	1	1	0	**(B)** Shall be repaired at next repair capable facility.
e. Multiplexer/Processor (MUX/PROC)	1	1	0	Required for FIR input. **(B)** Shall be repaired at next repair capable facility.
f. Power Supply (P/S)	1	1	0	Required for FIR input. **(B)** Shall be repaired at next repair capable facility.
g. Signal Conditioner/ Multiplex (SCM)	1	1	0	Required for FIR input. **(B)** Shall be repaired at next repair capable facility.

4.12. MADAR operational procedures.

4.12.1. Both Engine Vibration Indicating (EVI) channels indicating vibration (fan or core) out of limits will require confirmation of engine condition by ground test equipment. MADARS may be used for confirmation of engine condition if ground test equipment is not available.

4.12.2. One EVI channel indicating vibration (fan or core) out of limits and the other channel inoperative will require confirmation of engine condition by ground test equipment. MADARS may be used for confirmation of engine condition if ground test equipment is not available.

4.12.3. One usable EVI channel indicating a vibration (fan or core) out of limits and one usable EVI channel indicating within limits suggest an indicating system malfunction. To determine if an indication malfunction exists apply the following:

4.12.3.1. If channel 08 mil value is more than 2.5 times greater than the channel 09 mil value or the channel 09 value is more than 1.1 times greater than the channel 08 value, an indicating system malfunction exists.

Table 4.12. Cargo Door System (Troop & Cargo) (Legacy).

CARGO DOOR SYSTEM (Table 4.12. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
12-1. Visor and Forward Ramp	1	*	*	Mission dictates requirement. May depart if manual override is required to open, close, or lock the visor or forward ramp assembly. Door locks may be inoperative if all locks are confirmed locked and are not required for the mission.
12-2. Forward Ramp Manual Locking Pin	8	8	8	**(B)** If locking ball is missing, secure pin with safety wire and annotate in AFTO Form 781A.
a. Yellow Streamer	8	8	0	
b. Mechanical Lock Indicator	10	10	0	**(B)** Verify all locks are locked; lock indicator lights shall be operative.
12-3. Visor Door Mechanical Lock Indicator	23	23	0	**(B)** Verify all locks are locked; lock indicator lights shall be operative.
12-4. Ramp Extension Support Jack	4	*	*	Mission dictates requirement. Refer to T.O. 1C-5A-9 for loading limitations when less than four jacks are serviceable.
12-5. Aft Cargo Doors and Ramp	1	*	*	Mission dictates requirement. May depart if manual override is required to open, close, or lock the doors or aft ramp assembly. Door locks may be inoperative if all locks are confirmed locked and are not required for the mission.
12-6. Aft Ramp Manual Locking Pin	14	14	14	**(B)** If locking ball is missing, secure pin with safety wire and annotate in AFTO Form 781A.
a. Yellow Streamer	14	14	0	
b. Mechanical Lock Indicator	14	14	0	**(B)** Verify all locks are locked; lock indicator lights shall be operative.

Table 4.13. Oxygen System (Legacy).

OXYGEN SYSTEM (Table 4.13. LEGACY)		
Item/System	**Installed**	**Required**

		A	B	Remarks/Limitations/Exceptions
13-1. 25 Liter Converter	1	1	0	**(B)** 25 liter converter may be inoperative provided the other converter is serviced with an adequate quantity for the mission. May result in passenger limitations. Line missions--shall be repaired at next repair capable facility.
13-2. 75 Liter Converter	1	1	0	**(B)** 75 liter converter may be inoperative provided the other converter is serviced with an adequate quantity for the mission. Will result in passenger limitations. Line missions--shall be repaired at next repair capable facility.
13-3. Oxygen Shut-off Valve	1	1	1	
13-4. Recharging Hose	10	10	7	**(B)** No more than one inoperative per compartment. Shall be repaired at next repair capable facility.
13-5. Flight Crew Oxygen Regulator	5	5	3	**(B)** P, CP, and FE positions shall be operative. Navigator and Observer position shall be operative if occupied.
13-6. Relief Bunk Oxygen System	6	6	0	**(B)** Do not occupy bunk with inoperative regulator above 10,000 Ft MSL.
13-7. Continuous Flow Oxygen Regulator	2	2	2	
13-8. Drop-Down Mask	101	*	*	One per occupied seat in each compartment. May result in passenger limitations.
13-9. Oxygen Quantity Indicator (25 liter)	1	1	0	**(B)** 75 liter indicator shall be operative. If required for mission and servicing capability exists, service 25 liter converter prior to launch.
13-10. Oxygen Quantity Indicator (75 liter)	1	1	0	**(B)** 25 liter indicator shall be operative. If required for mission and servicing capability exists, service 75 liter converter prior to launch.
13-11. Quantity Low Light	2	2	1	**(B)** When serviced, corresponding quantity indicator shall be operative.

OXYGEN SYSTEM (Table 4.13. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
13-12. Oxygen Quantity Indicator (25 liter) Test Switch	1	1	0	**(B)** 75 liter indicator shall be operative. If required for mission and servicing capability exists, service 25 liter converter prior to launch.
13-13. Oxygen Quantity Indicator (75 liter) Test Switch	1	1	0	**(B)** 25 liter indicator shall be operative. If required for mission and servicing capability exists, service 75 liter converter prior to launch.
13-14. Oxygen Warning System	1	1	1	Not required for flights below 10,000 ft MSL. If passengers are on board, and the oxygen warning system is inoperative, the flight is limited to 10,000 ft MSL. If flight above 10,000 ft MSL is required, the crew shall be on oxygen. Shall be repaired at next repair capable facility.
13-15. EPOS	88	*	*	One per occupied seat in each compartment. May result in pax limitations.
13-16. Portable Oxygen Bottles	16	16	*	Crewmembers entering/transitioning a compartment without quick access to oxygen bottles in flight must carry a portable oxygen bottle. Crewmembers occupying a primary crew position without a quick don oxygen mask require a portable oxygen bottle.

Table 4.14. Warning Systems (Legacy).

WARNING SYSTEMS (Table 4.14. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
14-1. Stallimiter System	2	1	1	One fully functioning system required for all departures.

WARNING SYSTEMS (Table 4.14. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
14-2. Ground Proximity Warning System (GPWS)	1	1	0	If the GPWS is inoperative due to a bad radar altimeter in the pilot position, replace with copilot's radar altimeter. **(B)** Shall be repaired at next repair capable facility.
14-3. Wind Shear and Altitude Alert Warning	1	1	*	**(B)** Mission dictates requirement. Altitude alerting required for RVSM airspace. Wind shear requires operable FSAS. If the wind shear alert / warning function is inoperative, the flight engineer will provide reference ground speed per the flight manual.
14-4. Master Caution System	1	1	1	As long as safety-of-flight is not affected, some annunciator lights may be inoperative (e.g., flare inop, nose loc ant off, etc.). Aircraft may be flown with an annunciator light that will not reset as long as the master caution resets. Engineer caution panel shall be operative.
a. Master Caution Light	2	2	1	Must be able to reset.
b. Master Auto Light	2	2	1	
14-5. Door Warning System (Lock Status Lights)				
a. Visor	25	25	24	**(B)** If all flight manual Section 3 criteria are met, one lock may be in bypass.
b. Forward Ramp	2	2	0	**(B)** Lights may be inoperative provided mechanical pins are installed and the locks are verified locked.
c. Crew Entrance Door	1	1	1	
d. Aft Ramp	2	2	0	**(B)** Lights may be inoperative provided mechanical pins are installed and the locks are verified locked.
e. Fwd Underfloor Access Door	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
f. Aft Winch Access Hatch	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.

WARNING SYSTEMS (Table 4.14. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
g. Aft Bilge Access Hatch	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
h. Forward Bilge Access Hatch	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
i. Left and Right Side Cargo Doors	4	4	0	**(B)** Lights may be inoperative provided the door(s) are verified closed and locked.
j. Center Cargo Door	2	2	2	
k. Ramp to Pressure Door	4	4	2	**(B)** Outboard lights may be inoperative provided the door is verified closed and locked.
l. Horizontal Stabilizer Access Door	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked. Repair as soon as practical.
14-6. Smoke Detector System	1	1	0	**(B)** If any component is inoperative, the associated compartment shall be scanned at least once every hour. FSS detection system (if applicable) shall be fully operative. Troop compartment shall be occupied if troop/center wing detector is inoperative and additional crewmembers are available.
14-7. Bailout Alarm	1	1	0	**(B)** PA should be operative. If PA system is inoperative, interphone communication shall be maintained.

Table 4.15. Fire Suppression System (FSS) (Legacy) Refer to Paragraph 4.13

FIRE SUPPRESSION SYSTEM (FSS) (Table 4.15. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
15-1. DEWARS	2	2	1	**(B)** FSS system functions shall be operative. Some malfunctions may require the dewar to be drained.

FIRE SUPPRESSION SYSTEM (FSS) (Table 4.15. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
15-2. Nitrogen Fire Suppression Control Panel	1	1	1	Shall be capable of fire warning and discharge. ***EXCEPTION:*** Discharge capability is N/A when LN2 is depleted and no servicing capability exists.
15-3. Nose Wheel Well Control Panel	1	1	0	**(B)** Shall be repaired at next repair capable facility.
15-4. Optical Detection	1	1	0	**(B)** If any component is inoperative, associated compartment shall be scanned every hour. Smoke detection system shall be fully operative. One-time flight to repair capable facility.
15-5. Isolation Valve	2	2	1	**(B) S**hall be operative for each serviced dewar.
15-6. Outboard Main Tank ΔP Switch	2	2	0	**(B)** Do not pressurize wings (vent wings). Shall be repaired at next repair capable facility.
15-7. Overboard Relief Valves	2	2	1	**(B)** Shall be operative for each serviced dewar.
15-8. Pressure Limiters	2	2	1	**(B)** Shall be operative for each serviced dewar.
15-9. Primary Climb/Dive Valve	2	2	0	**(B)** Secondary climb/dive valve must be operative. Manual override shall be operative.
15-10. Primary Regulator	2	2	1	**(B)** Shall be operative for each serviced dewar.
15-11. Secondary Climb/Dive Valve	2	2	0	**(B)** Primary climb/dive valve must be operative. Manual override shall be operative.
15-12. Secondary Pressure Regulator	2	2	1	**(B)** Shall be operative for each serviced dewar.
15-13. Vent Box Float Switch	2	2	2	
15-14. Wing Pressure Warning System	2	2	2	

FIRE SUPPRESSION SYSTEM (FSS) (Table 4.15. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
15-15. Liquid Nitrogen Service Panel	1	1	1	**(B)** As long as safety-of-flight is not affected, some functions may be inoperative. Repair at next repair capable facility.
15-16. Central Processing Unit (CPU)	1	1	1	Shall be capable of fire warning and discharge. ***EXCEPTION:*** Discharge capability is N/A when LN2 is depleted and no servicing capability exists.
15-17. FSS Fire Detection	1	1	1	

4.13. FSS Servicing.

4.13.1. Because of the increased safety margin provided by the FSS, obtain full LN2 servicing at stations with servicing capability. ***NOTE:*** Fully serviced is defined as 650 pounds per operational dewar to allow for gauge inaccuracies, automatic shutoff settings, and LN2 boil-off.

4.13.2. Home Station Departures. The airplane will be fully serviced.

4.13.3. En Route Stations WITH Servicing Capability. The airplane will be fully serviced unless directed otherwise by the PIC. ***EXCEPTION:*** Station supply depleted or equipment malfunctions (all servicing trucks inoperative).

4.13.3.1. PIC should pass less than full LN2 requirements for next mission leg during maintenance debrief.

4.13.4. En route Stations WITHOUT Servicing Capability. The mission may continue regardless of the amount of LN2 on board. If the remaining LN2 will be depleted prior to the next en route stop, vent wings to retain a fire fighting reserve. Do not vent wings until just prior to descent; make an AFTO Form 781information entry.

4.13.5. Local Missions. Not less than that required for the planned mission duration (plus an adequate fire fighting reserve). For ERCCs, airplanes will be fully serviced for the first half to ensure the second half will have adequate LN2.

4.13.6. General Requirements.

4.13.6.1. Flight is not permitted with system LN2 (liquid nitrogen) leaks in excess of 50 pounds per dewar per 12 hours. Allow 1 hour after servicing for system stabilization prior to start of leak check.

4.13.6.2. Use the following values to calculate the minimum amount of LN2 required by **paragraphs 4.13.3.1** and **4.13.5** These values are guides; amounts used may vary. Document significant variations in AFTO Form 781. Two hundred fifty (250) pounds required for firefighting (adequate for one application to the largest zone) plus:

4.13.6.3. Twelve pounds for every 1,000-feet of descent planned during a line or AAR mission.

EXAMPLE: An AAR mission that requires an 8,000-foot descent from initial level off altitude to rendezvous altitude, followed by a final cruise altitude of FL370 will need 540 pounds of LN2. (8,000 + 37,000 = 45,000 feet of total descent x 12 = 540 pounds).

4.13.6.4. One hundred twenty (120) pounds will be used for each hour of local transition flying.

4.13.7. Missions expecting to transit a threat environment

4.13.7.1. If nitrogen servicing is not available at the last stop prior to entering the threat environment, FE's will adhere to the following.

4.13.7.2. NON-THREAT ENVIRONMENT LEGS. After departing the last station with servicing capability, vent the wings prior to each descent. Enter an information note in the AFTO FORM 781A each time the wings are vented.

4.13.7.3. THREAT ENVIRONMENT LEGS. Regardless of the nitrogen quantity, do not vent wings on legs into and within threat locations.

4.13.7.4. Nitrogen is not required to fly in a threat environment. If nitrogen is not available, do not delay the mission.

Table 4.16. Emergency Equipment (Legacy).

EMERGENCY EQUIPMENT (Table 4.16. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
16-1. Life Raft/Survival Kit	4	4	*	**(B)** Mission dictates requirement. Troop compartment rafts may be inoperative or missing; however, total troop passengers will be reduced by 25 per inoperative raft. A raft shall be installed at the #2 escape hatch. A raft shall be installed at #6 service door when the troop compartment is occupied. ***EXCEPTION:*** Locals/Depot sorties may operate without a life raft provided the flight will not take place over water; a survival kit will be carried.
16-2. Descent Reel	24	24	*	**(B)** One required per occupant on the flight deck.

EMERGENCY EQUIPMENT (Table 4.16. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
16-3. Escape Slide/Exit	5	5	*	**(B)** Mission dictates requirement. The #5 service door slide/exit shall be operational. If troop compartment is occupied, #4 hatch and #6 service door slide/exits shall be operational. Limit troop compartment to 40 pax/crew when 3L and/or 3R troop compartment slide/exit is not operational.
16-4. Escape Rope	8	8	*	**(B)** Mission dictates requirement. Three escape ropes shall be installed in the cargo compartment and one above the troop compartment ladder. Troop compartment exits, slides, and life rafts are not considered operative unless an escape rope is installed.
16-5. First Aid Kit	22	22	*	**(B)** Mission dictates requirement. Full complement required when carrying personnel in the troop compartment. If troop compartment is not occupied, a minimum requirement of 5 on the flight deck and 2 in the cargo compartment.
16-6. Fire Extinguishers				
a. Aircraft with operative FE 1301 System	15	15	9	**(B)** Minimum of 3 operative extinguishers per compartment (flight deck, cargo, troop). Shall be replaced/repaired at next repair capable facility.
b. Aircraft with inoperative FE 1301 System	17	17	10	**(B)** Minimum of 3 operative extinguishers per compartment (flight deck, cargo, troop), plus 1 additional extinguisher of not less than 1-gallon in the cargo compartment. Shall be replaced/repaired at next repair capable facility.
16-7. Life Vest	95	*	*	**(B)** Mission dictates requirement. One per occupant during over water flights. May result in pax limitations.
16-8. Crash Axe	3	3	2	**(B)** A minimum of one crash axe shall be available on the flight deck and one available in the troop.

EMERGENCY EQUIPMENT (Table 4.16. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
16-9. Emergency Exit Light	12	12	*	**(B)** Required for all operative exits. An emergency exit light may be repaired by replacing (2) 327 bulbs if not charging. Troop compartment lights not required when compartment is unoccupied. May result in pax limitations.
16-10. Rope Ladder	1	1	0	Both release handles required to consider ladder operative. **(B)** Not required if emergency escape slide and emergency descent reels (1 per occupant) are operative. Shall be repaired at next repair capable facility.
16-11. FE 1301	20	0	0	Bottles may be inoperative as long as detection system is operative. If inoperative 1 fire extinguisher of not less than 1-gallon shall be placed in the cargo compartment. If an additional fire extinguisher is not available, one-time flight to repair capable facility.

Table 4.17. Miscellaneous Equipment (Legacy).

MISCELLANEOUS EQUIPMENT (Table 4.17. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
17-1. Lock Blocks, Pressure Door Hinge	2	2	*	**(B)** Mission dictates requirement.
a. F-valve Safety Guard	1	1	0	
17-2. Night Curtain	2	0	0	
17-3. Service Door Safety Gate	2	2	0	

MISCELLANEOUS EQUIPMENT (Table 4.17. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
17-4. Window Shade	12	6	*	**(A)** Six required, installed in cargo compartment. **(B)** Non-tactical--if shades are missing, install six in cargo compartment. If six shades are not available, fabricate covers for cargo compartment windows.
17-5. Winch	2	*	*	Mission dictates requirement. One required for all cargo missions.
17-6. Water System, Potable	1	0	0	When serviced, all functions shall be operative. If inoperative, system shall be drained prior to flight.
17-7. Latrines				
a. Crew	1	1	0	**(B)** Troop compartment latrines shall be operable. Shall be repaired at next repair capable facility
b. Troop Compartment	2	2	0	**(B)** One-time flight to repair capable facility. ***EXCEPTION:*** Mission may continue with both inoperative with C2 concurrence and troop compartment unoccupied. Mission may continue with one inoperative with C2 concurrence and troop compartment occupancy IAW Addenda A.

Table 4.18. Defensive Systems (Legacy).

DEFENSIVE SYSTEMS (Table 4.18. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
18-1. Defensive System	1	*	*	Mission dictates requirement. ***NOTE*:** System is operational if the MWS and/or LAIRCM is fully operational. The AN/ALE-47 CMDS must be working for either system to be operational.

DEFENSIVE SYSTEMS (Table 4.18. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
18-2. AAR-47 (MWS Sensors)	4	*	*	Requires all 4 sensors for operation. AAR-47 is not required when ALQ-24 LAIRCM Lite is operational and ALE-47 CMDS, is capable of manual flare dispense.
18-3. ALE-47 (CMDS)	1	*	*	Must be capable of flare dispense in auto and manual modes. ALE-47 is not required when ALQ-24 LAIRCM Full, is fully operational.
18-4. ALQ-24 (LAIRCM)	1	*	*	ALE-47 must be capable of flare dispense in auto and manual mode if configured with LAIRCM Lite (two Turrets). ALE-47 not required when configured with LAIRCM Full (Three Turrets).
18-5. AAR-54 (LAIRCM Sensors)	4	*	*	Requires all 4 sensors for operation.

Table 4.19. Lighting (Legacy).

LIGHTING (Table 4.19. LEGACY)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
20-1 Interior Lights Master Switch	1	1	0	
20-2 Exterior Lighting		*	*	See AFI 11-202V3 requirements. Navigation lights (at least one bulb in each position) required for night operations. Anti-collision lights (1 upper and 1 lower) required for day or night operations.

Table 4.20. Engines/Auxiliary Power Units (APU) (AMP).

Engines/Auxiliary Power Units (APU) (Table 4.20. AMP)

Item/System	Installed	Required		
		A	B	Remarks/Limitations/Exceptions
20-1. Engine Fuel Pump	4	4	3	**(B)** High pressure element shall be operative. One-time flight to nearest repair capable facility if low-pressure element is inoperative. Both affected fuel tank boost pumps shall be operative.
a. Fuel shutoff actuator	4	4	4	
20-2. Continuous Ignition	4	4	3	**(B)** Normal and Airstart position shall be operative. One-time flight to nearest repair capable facility.
20-3. Start Ignition	4	4	4	Either Normal or Airstart position shall be operative.
20-4. Starter	4	4	4	
20-5. Fuel Heater	4	4	3	**(B)** Required on flights with fuel temperature below 5° C. Valve must be failed closed.
20-6. Oil Pressure Indicating System				
a. Low Oil Pressure Switch	4	4	0	**(B)** The low oil pressure light may be inoperative if the oil pressure gauge is operative.
b. Oil Pressure Gauge	4	4	4	
20-7. Oil Temperature Indicator	4	4	4	
20-8. Oil Filter Differential Pressure Light	4	4	3	**(B)** Mission may continue if malfunction is determined to be an indication problem and the oil filter has been checked for clogging or indication of bearing failure (metal chips). The engine oil filter shall be checked at every stop until the indication malfunction is corrected. Carry spare seals.
20-9. N1 Indicator	2/Eng	2/Eng	1/Eng	**(B)** If possible, place the operative indicator at the engineer panel. Associated N2 shall be operative.
20-10. N2 Indicator	2/Eng	2/Eng	1/Eng	**(B)** If possible, place the operative indicator at the engineer panel. Associated N1 shall be operative.

Engines/Auxiliary Power Units (APU) (Table 4.20. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
20-11. TIT Indicator	2/Eng	2/Eng	1/Eng	**(B)** If possible, place the operative indicator at the engineer panel.
20-12. Fuel Flow Indicator	2/Eng	2/Eng	1/Eng	**(B)** If possible, place the operative indicator at the engineer panel.
20-13. Engine Overheat & Fire Detection System	4	4	4	System shall be capable of detecting both an engine fire and overheat condition. Fire warning and overheat test shall be operative (indications shall match condition of loop e.g. intact, shorted, open. Refer to flight manual). Do not take-off with a shorted system. (**B**) Open circuits. Shall be repaired at next repair capable facility. No more than one open circuit may exist and the location of the break shall be determined. Re-verify open circuit at each en route stop.
a. Engine Fire Annunciator/ Warning Light	2/Eng	2/Eng	1/Eng	**(B)** The associated fire handle light shall be operative. Shall be repaired at next repair capable facility.
b. Engine Overheat Annunciator/Warning Light	2/Eng	2/Eng	1/Eng	**(B)** The associated fire handle light shall be operative. Shall be repaired at next repair capable facility.
c. Engine/Pylon Optical Fire Detection System	4	4	0	**(B)** Fire, overheat, and short discriminator tests shall be operative. Shall be repaired at next repair capable facility.
20-14. Engine Fire Extinguishing System				
a. Engine Fire Handle	4	4	4	Handles shall be fully capable of automatic isolation of system components as outlined in the flight manual. **(B)** If the light in the handle is inoperative, the associated annunciator light shall operate at both pilot and flight engineer positions.
b. Bottle Out Light	4	4	0	**(B)** Check the pressure gauge on the bottle prior to each flight. Mission may

Engines/Auxiliary Power Units (APU) (Table 4.20. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
				continue via en route stops providing required maintenance stands are available. Shall be repaired at next repair capable facility.
c. Fire Extinguisher Bottle	4	4	4	A squib assembly can be obtained from either APU fire bottle. Remove the squib designated alternate. See **Table 4.20.** item 20-23.
d. Fire Extinguisher Discharge Button	4	4	4	Shall be capable of firing bottles.
e. Fire Extinguisher Bottle Select Switch	2	2	2	Both Normal and Alternate positions shall be fully operable.
20-15. Thrust Reverser	4	4	2	**(B)** May only be deactivated in symmetrical pairs IAW T.O. 1C-5A-2-4. Verify all actuators are attached to the translating cowl and that all locks are locked prior to deactivation. No thrust reverser may be deactivated if any hydraulic actuator leaks beyond limits. Deactivation of inboard T/Rs require restricted flight to FL 320. **(B)** Inboard T/Rs--shall be repaired at next repair capable facility.
a. THRUST REV PRESSURE light	4	4	2	**(B)** Symmetrical thrust reversers shall be deactivated. See **Table 4.20.** item 20-15.
b. TH REV N LKD light	4	4	4	
c. TH REV EXTD light	4	4	2	**(B)** Symmetrical thrust reversers shall be deactivated. See **Table 4.20.** item 20-15.
20-16. Engine Cowl Blowout Door	8	8	8	
20-17. Engine Anti-Ice	4	*	*	Mission dictates requirement. Engine and nacelle anti-ice required for flights into forecasted icing conditions.
20-18. APU	2	2	1	**(B)** Refer to T.O. 1C-5A-1, Section 2 (Starting Engines) for single APU

Engines/Auxiliary Power Units (APU) (Table 4.20. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
				operation. APU CONTROL circuit breaker shall remain closed.
20-19. APU Bleed Valve	2	2	1	**(B)** Required for each operative APU.
20-20. APU Isolation Valve	2	1	1	If the valve is failed open, the associated APU bleed valve and both wing isolation valves shall be operative.
20-21. APU Isolation Valve Open Light	2	0	0	Valve operation shall be confirmed prior to every departure.
20-22. APU Fire Warning System	2	2	1	**(B)** For ground operations, do not operate affected APU and associated ATM unless a fire guard is present.
20-23. APU Fire Bottle	2	2	1	**(B)** For ground operations, do not operate affected APU and associated ATM unless a fire guard is present.
20-24. APU Exhaust Gas Temperature (EGT) Indicator	2	2	1	Shall be operative on any APU that is planned to be operated. Off flag may be in view as long as indicator functions.
20-25. APU Door Open Light	2	2	0	**(B)** Confirm door is closed before departure.
20-26. APU Start Light	2	2	0	**(B)** Starting will be closely monitored by the scanner.
20-27. APU On Speed Light	2	2	0	**(B)** Verify on speed by checking APU generator frequency.
20-28. APU Accumulator	2	2	1	**(B)** One-time flight with affected gear (2) down to nearest repair capable facility. APU with functioning accumulator shall be operative.

Table 4.21. Bleed Air, Environmental, Etc.

Bleed Air, Environmental, Etc. Systems (Table 4.21. AMP)		
Item/System	**Installed**	**Required**

		A	B	Remarks/Limitations/Exceptions
21-1. Air Conditioning Pack	2	2	1	**(B)** Floor heat must be operative and aircraft capable of maintaining pressurization. If both packs are inoperative, MAJCOM Stan/Eval approval required for one-time unpressurized flight (not to exceed 10,000 ft MSL) to a repair capable facility.
21-2. Air Conditioning Master Switch	1	1	1	Shall have control of air conditioning packs.
21-3. Air Conditioning Overheat Light	2	2	1	**(B)** Required for each operating pack.
21-4. Air Conditioning Overheat Sensor	2	2	1	**(B)** Required for each operating pack.
21-5. Airflow Selector Switch	1	1	0	**(B)** May be electrically inoperative provided valves can be positioned using tools.
21-6. Compartment Temperature Indicator	3	0	0	Unmanned compartments shall be monitored for proper temperature. Close troop comp shutoff valve if unoccupied.
21-7. Flight Station Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools.
21-8. Relief Compartment Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools.
21-9. Cargo Compartment Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools.
21-10. Troop Compartment Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools. If compartment is unoccupied, valve will be closed.

Bleed Air, Environmental, Etc. Systems (Table 4.21. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
21-11. Troop Compartment Shutoff Valve	1	1	1	May be electrically inoperative, provided control valve can be positioned using tools.
21-12. Cooling Air Exit Door	2	2	1	**(B)** Door shall be installed. If the door is stuck closed, do not operate the affected A/C below .3 Mach, with slats extended or when the aircraft is on the ground. If the door is stuck open, do not plan flight above FL 280.
21-13. Cooling Air Exit Valve	2	2	1	**(B)** Required for each operating pack.
21-14. Cooling Fan	2	2	1	**(B)** Do not operate the affected system on the ground, or with slats extended, or below .3 Mach.
21-15. Cooling Fan Control Valve	2	2	1	**(B)** If valve is failed closed, do not operate the affected system on the ground, or with slats extended, or below .3 Mach.
21-16. Primary Heat Exchanger High Limit Sensor	2	2	1	**(B)** Required for each operating pack.
21-17. Primary Heat Exchanger Temp Control Sensor	2	2	1	**(B)** Required for each operating pack.
21-18. Flow Control and Shut-off Valve	2	2	1	**(B)** Required for each operating pack
21-19. Low Limit Temperature Control Sensor	2	2	0	**(B)** May be electrically inoperative if manual control is available. If possible, install operative sensor in the left system.
21-20. Low Limit Temperature Control Valve	2	2	0	**(B)** May be electrically inoperative if manual control is available. If possible, install operative components in the left system.

Bleed Air, Environmental, Etc. Systems (Table 4.21. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
21-21. Diverter Valve	1	1	0	**(B)** May be electrically inoperative provided it can be positioned using tools.
21-22. Alternate Air Valve	1	1	0	**(B)** May be electrically inoperative provided it can be positioned using tools.
21-23. Aux Vent Valve	1	1	1	**(B)** May be electrically inoperative provided it can be positioned using tools. One-time flight to repair capable facility.
21-24. Bleed Duct Overheat Sys	3	3	3	
21-25. Bleed Air Shutoff Valve	4	4	4	
21-26. Bleed Air Shutoff Valve Indicator Light	4	4	2	**(B)** One light may be inoperative per wing. Verify valve operation as follows: With APU supplying bleed air, turn on engine anti-ice with pylon bleed air shutoff valve in the open position and look for a pressure drop, then close pylon bleed air shutoff valve while looking for pressure increase.
21-27. Pressurization System				MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.
21-28. Automatic Pressure Controller	1	0	0	May be inoperative provided manual mode is fully operative. If the manual controller fails in-flight, use flow control switches, floor heat, engine bleed valves, and AC Master Switch to control pressurization.

Bleed Air, Environmental, Etc. Systems (Table 4.21. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
21-29. Manual Pressure Controller	1	1	0	**(B)** Shall be operative for pressurized flight. If inoperative, MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility. The Outflow and Thrust Recovery valves shall be open.
21-30. Outflow Valve Indicator	1	1	0	**(B)** Cabin rate of climb and differential pressure indicator shall be operative. Use the scanner to complete preflight steps.
21-31. Outflow Valve and Thrust Recovery Valve	1 ea	1 ea	0	**(B)** Both shall be operative for pressurized flight. Outflow and/or Thrust Recovery valve(s) may be failed open only. MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.
21-32. Cabin Altimeter and Differential Pressure Indicator	1	1	0	**(B)** Shall be operative for pressurized flight. If inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility. Cabin Press Low Light shall be operative.
21-33. Cabin Press Low Light	1	1	0	**(B)** Cabin Altimeter/Differential Pressure indicator shall function for flights above 10,000’ MSL.

Bleed Air, Environmental, Etc. Systems (Table 4.21. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
21-34. Cabin Rate of Climb Indicator	1	1	0	**(B)** Automatic pressurization controller, cabin altimeter and differential pressure indicator shall be operative. If any component listed above is inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.
21-35. Emergency Depress System	1	1	0	**(B)** Shall be operative for pressurized flight. If inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.
21-36. Floor Heat System	1	1	0	**(B)** One system (fwd or aft) may be inoperative if both packs are operable. Shall be operative if cargo requires temperature-controlled environment. ***EXCEPTION:*** Not required for pattern locals.
21-37. Floor Heat Duct Anticipator	2	2	0	**(B)** The affected floor heat valve(s) will cycle. Not recommended when using manual pressurization.
21-38. Manifold Bleed Air Pressure Indicator	1	1	1	
21-39. Pressure Aug Valve	4	4	2	**(B)** Must be failed closed.

Bleed Air, Environmental, Etc. Systems (Table 4.21. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
21-40. Pressurization Mode Selector Switch	1	1	0	**(B)** Manual mode must be operative for pressurized flight. If manual mode is inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility, and the Outflow and Thrust Recovery valves shall be open.
21-41. Start Valve Open Light	4	4	4	
21-42. Temp Aug Valve	4	*	*	Mission dictates requirement. Required for flights into forecasted icing conditions. Must be failed closed.
21-43. Wheel Well Isolation Valve	1	0	0	Shall be able to manually close the valve.
21-44. Wing Isolation Valve	2	2	1	**(B)** Shall be able to manually close the valve.
21-45. Safety Valve	2	2	0	**(B)** Both shall be operative for pressurized flight. If inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility, and the Thrust Recovery and Outflow valves shall be fully open.
21-46. Pitot Heat System 2 masts and 2 heads per system (pilot and co-pilot)	2	2	*	**(B)** Mission dictates requirement. Both systems (All 4 masts and heads) required for flights in RVSM airspace. One mast and/or head per system (pilot and co-pilot) may be inoperative for flights conducted in non-icing conditions in non-RVSM airspace.

Bleed Air, Environmental, Etc. Systems (Table 4.21. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
21-47. AoA De-ice System	2	1	1	One system shall be fully operative. Associated stallimeter shall also be operative.
21-48. Windshield Heat	5	3	2	**(A)** The 3 front windshield panels shall function. **(B)** Must have windshield heat for 2 of the 3 front windshield panels.
21-49. Windshield Wiper	2	*	*	Mission dictates requirement. One system shall be operative for flights with forecast precipitation.
21-50. Total Temp Probe	2	2	2	
21-51. Total Air Temperature (TAT) Indicator	1	0	0	Use FMS total temp information.

Table 4.22. Hydraulics (AMP).

Hydraulics (Table 4.22. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
22-1. 1-2 PTU	1	1	0	**(B)** May be inoperative provided #1 ATM and #1 & #2 engine-driven pumps (all) are operative.
22-2. 2-3 PTU	1	1	0	**(B)** May be inoperative provided the 1-2 and 3-4 PTUs, and #2 and #3 engine-driven pumps (all) are operative.
22-3. 3-4 PTU	1	1	0	**(B)** May be inoperative provided #4 ATM and #3 & #4 engine-driven pumps (all) are operative.
22-4. ATM ON Light	2	2	1	**(B)** May be inoperative if ATM is made inoperative. Hydraulics must be isolated.

Hydraulics (Table 4.22. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
22-5. ATM	2	2	1	**(B)** Applicable PTU and engine-driven pumps shall be operative. Complete required preflight items after engine start. ***CAUTION:*** Do not perform anti-skid check w/engines running. ***CAUTION:*** Do not perform an I-BIT with engines running. Shall be repaired at next repair capable facility.
22-6. Electric Suction Boost Pump	2	2	0	**(B)** Associated hydraulic suction boost pump shall be operative. Check applicable hydraulic service center filters for popped button. If button is popped all system filters must be checked for contamination. If both electric suction boost pumps are inoperative minimize ATM starts and one-time flight to a repair capable facility.
22-7. Engine-Driven Hydraulic Pump	8	8	6	All pumps shall have positive depress capability. **(B)** Adjacent PTUs shall be operative. Only one pump on two nonadjacent engines may be inoperative. **(B)** Check pump for sheared shaft and associated system filters for contamination.
22-8. Flight Engineer Hydraulic Pressure Gauge	4	4	2	**(B)** Direct reading gauge shall be operative and periodically monitored. Associated PRESS LOW lights shall be operative. **(B)** Two inoperative gauges require a one-time flight to a repair capable facility.

Hydraulics (Table 4.22. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
22-9. Flight Engineer Hydraulic Quantity Indicator	4	4	3	**(B)** Sight gauge shall be monitored periodically. Associated flight engineer hydraulic pressure gauge and BOOST PRESS LOW light shall be operative.
22-10. Hydraulic Boost Press Low Light	4	4	2	**(B)** Monitor/scan associated system(s). One light inoperative requires repair at next repair capable facility. Two lights inoperative requires a one-time flight to a repair capable facility.
22-11. Hydraulic Pressure Gauge (Direct Reading)	4	4	3	**(B)** Associated flight engineer hydraulic pressure gauge shall be operative.
22-12. Hydraulic Pump Press Low Light	8	8	6	**(B)** Associated flight engineer hydraulic pressure gauge shall be operative. Depress unaffected hydraulic pump. No more than one light on each non-adjacent engine may be inoperative
22-13. Hydraulic Reservoir Sight Gauge	4	4	0	**(B)** May be capped if flight engineer hydraulic quantity indicator is operative. Verify hydraulic quantity prior to launch.
22-14. Hydraulic Suction Boost Pump	4	4	2	**(B)** Check applicable hydraulic service center filters for popped button. If button is popped all system filters must be checked for contamination. #1 and #4 may be inoperative if the respective electrical suction boost pump is operative. If #2 or #3 boost pump fails, swapping the failed boost pump with either #1 or #4 is permissible provided no contamination is present.
22-15. RAT	1	1	1	

Hydraulics (Table 4.22. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
22-16. Deploy RAT Light	1	1	0	
22-17. RAT Unlocked Light	1	1	1	

Table 4.23. Landing Gear (AMP).

Landing Gear (Table 4.23. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
23-1. Anti-Skid System				Operation with less than all anti-skid components operative is an emergency procedure and shall be IAW the flight manual. If inoperative MAJCOM Stan/Eval approval required for one-time flight to a repair capable facility.
a. Anti-Skid Off Light	1	1	1	
b. Brakes Light	1	1	0	
c. No Brakes Light	1	1	1	
d. DET Fail Light	1	1	1	
23-2. Normal Brake System	1	1	1	
a. Normal Brake Pressure Indicator	1	1	0	**(B)** EMER HYD brake pressure light shall be operative. Alternate brake pressure indicator and flight engineer's #4 hydraulic pressure gauge shall be operative. Select alternate brakes for landing. If normal brakes are required for landing, perform a Brake System Check (In-flight). Shall be repaired at next repair capable facility.

Landing Gear (Table 4.23. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
23-3. Alternate Brake System	1	1	1	
a. Alternate Brake Pressure Indicator	1	1	0	**(B**) Normal brake pressure indicator and flight engineer's #1 hydraulic pressure gauge shall be operative. Select normal brakes for landing. If alternate brakes are required for landing, perform a Brake System Check (In-flight). Shall be repaired at next repair capable facility.
23-4. Emergency Brake System	1	1	1	
a. EMER HYD Brake Pressure Light	1	1	0	**(B**) Normal brake pressure indicator shall be operative. Shall be repaired at next repair capable facility.
23-5. Anti-rotation/In-flight brake sys	1/mlg	1/mlg	*	**(B)** Aircraft climb performance capability dictates requirement. Non-SDP procedures will be used for departure.
23-6. Parking Brake	1	1	0	**(B)** If inoperative, brakes shall be guarded at all times when chocks are removed. Scanner shall install chocks in the event of an emergency. Do not accomplish kneeling/loading/ unloading with engines running. With engines shutdown, brakes shall be guarded if operation requires parking brake set. One-time flight to repair capable facility.
23-7. MLG Caster System	1	1	*	**(B)** Mission dictates requirement.

Landing Gear (Table 4.23. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
a. MLG Free Lights	2	2	*	**(B)** Mission dictates requirement. If inoperative, copilot shall monitor position indicators. If lights are inoperative, do not accomplish kneeling operations.
b. Aft MLG Position and Emergency Control Switch	2	2	0	**(B**) Limit caster operations. Normal caster shall be operative. Mission segments limited to tow-capable locations. Shall be repaired at next repair capable facility.
23-8. Emergency Extend Switch	5	5	0	**(B**) One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.14.1**
23-9. Kneeling System	1	1	*	Mission dictates requirement. All main landing gear shall be capable of in-flight kneeling. If not capable of in-flight kneeling, one-time flight with the affected MLG gear down to the nearest repair capable facility. Refer to **paragraph 4.14.1**
23-10. Landing Gear Warning System				
a. Landing Gear Warning Horn	1	1	0	**(B**) Shall be repaired at next repair capable facility.
b. Landing Gear Warning Light	2	2	0	One light may be inoperative. **(B)** If both lights are inoperative, one-time flight to a repair capable facility. All gear position indicators shall be operative.

Landing Gear (Table 4.23. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
c. Landing Gear Warning Test Button	1	1	0	**(B)** Shall be repaired at next repair capable facility.
d. Horn Silence Button	1	1	0	**(B)** Shall be repaired at next repair capable facility.
e. Emergency Switch On Light	1	1	0	**(B)** One-time flight with all gear down to nearest repair capable facility. Refer to **paragraph 4.14.1**
f. Bogie Pitch Annunciator Light	4	4	0	**(B)** One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph** 4.14.1
23-11. NLG Fiber Optics Scope	1	1	0	**(B)** One-time flight with NLG down to nearest repair capable facility. Refer to **paragraph 4.14.1**
23-12. NLG Inspection Light	3	1	0	Light for the fiber optics target required day or night. **(B)** If light for the fiber optics target is inoperative, one-time flight with NLG down to the nearest repair capable facility. Refer to **paragraph 4.14.1**
23-13. MLG Inspection Light	2/mlg	*	*	Mission dictates requirement. One per MLG should be operative for night operations.
23-14. Nose Gear Steering	1	1	1	Both Normal and Emergency systems shall be operative.
a. Rudder Pedal Steering	1	1	0	**(B)** Nose Gear Steering system (wheel) shall be operative. Shall be repaired at next repair capable facility.

Landing Gear (Table 4.23. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
23-15. Position and Indicating Systems	1	1	0	**(B**) One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.14.1** Prior to landing, affected gear will be visually verified for proper down and locked indications at sequence control panel and inspection covers/fiber optics.
23-16. Relay Logic System (Sequence Control Panel)	3	3	0	**(B**) One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.14.1** Prior to landing, affected gear will be visually verified for proper down and locked indications.
23-17. Crew Entrance Door Accumulator	1	1	0	**(B**) One-time flight with nose gear down to nearest repair capable facility. Refer to **paragraph 4.14.1**
23-18. APU/Emergency MLG Extension Accumulator	2	2	1	**(B**) APU with functioning accumulator shall be operative (C-5A/B). One-time flight with affected gear (2) down to nearest repair capable facility. Refer to **paragraph 4.14.1**
23-19 MLG Secondary Strut (deflated)	4	4	3	**(B**) One-time flight to repair capable facility. Limit landing sink rate to 6 FPS (360 Ft/Min) or less.

4.14. Landing Gear.

4.14.1. Gear Down Flight Operations**.** Limit gear down flight operations to sorties required to move the aircraft to the nearest repair capable facility. Consider gear down flight only after the PIC exhausts all avenues to repair the aircraft in place.

4.14.1.1. Standard climb-out flight path charts in T.O. 1C-5A-1-1 do not account for a gear-down configuration. Therefore, PICs shall not takeoff until there is reasonable

assurance that they will achieve/maintain adequate obstacle clearance (to include en route stops and alternates). Non-SDP procedures will be used for departure planning.

4.14.1.2. AMC/A3V waiver approval is not required for gear down flights. However, aircrew will consider potential aircraft and flight considerations, take off and landing data (TOLD) calculations, along with proper aircraft documentation prior to known gear down flights. If the airplane is on a red X for a gear malfunction the airplane home station MXG/CC must downgrade the red X per T.O. 00-20-1 prior to flight.

4.14.1.3. Local Training Missions. Local missions will not be planned gear down. When in-flight malfunctions prohibit gear retraction (except MLG rotational malfunctions), the local may continue after the cause of malfunction has been identified and the AC and maintenance supervisor concur. Do not exceed 200 KCAS/M.60.

4.14.1.4. Gear Down Flight Procedures.

4.14.1.4.1. Refer to Variant Configuration Fuel Planning, chapter **14.5.5**, for Gear Down Flight fuel planning.

4.14.1.4.2. Plan to not exceed 200 KCAS/M.60 to help prevent APU servicing door and gear door damage. When range is a factor, fly an airspeed that yields the maximum range; do not exceed 250 KCAS/M.60. ***EXCEPTION:*** Tactical departures will not exceed 250 KCAS.

4.14.1.4.3. For planned gear down flight, the affected gear shall be pinned. The APU servicing door panel will be speed taped upon completion of the aircrew inspection and prior to flight. Taping may help prevent loss of the door panel. Only the door panel on the appropriate side requires speed tape.

4.14.1.4.4. After each gear down flight segment conduct a visual inspection. The MLG inspection will include affected gear-well area, LN2 servicing panel (if applicable), and doors. NLG inspection will include gear-well area, doors, folding bulkhead door, actuators, and brackets. This inspection may be accomplished by the flight engineer.

4.14.2. Operation with partial brakes. Limit operations with partial brakes only when necessary to recover the aircraft to a station that has confirmed repair capability. Any operations requiring more than one leg shall be coordinated with an AMC/A3V waiver.

Table 4.24. Flight Controls (AMP) Refer to paragraph 4.15

FLIGHT CONTROLS (Table 4.24. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
24-1. AILERONS				
a. Aileron Actuator	2/wing	2/wing	2/wing	

FLIGHT CONTROLS (Table 4.24. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
b. Aileron Trim Actuator	2	2	1	**(B)** Aileron shall be centered prior to flight. Shall be repaired at next repair capable facility.
c. Aileron Trim Position Indicator	1	1	0	**(B)** Ailerons shall be centered prior to flight. Required for touch-and-go operations.
d. Aileron Artificial Feel	1	1	0	**(B)** One-time flight to repair capable facility.
24-2. ELEVATORS				
a. Inboard Elevator Actuator	2/control surface	2/control surface	2/control surface	
b. Outboard Elevator Actuator	3/control surface	3/control surface	3/control surface	
c. Elevator Artificial Feel System (VFUs)	2	2	0	If test equipment is not available, do not drain VFU bottles. **(B)** If both systems are inoperative: One-time flight to nearest repair capable facility. Do not engage pitch autopilot. See **paragraph 3.7.1.** for FDP limitations.
24-3. Horizontal Stabilizer Pitch Trim				
a. Normal Pitch Trim	1	1	0	**(B)** Alternate and manual trim shall be operative. One-time flight to nearest repair capable facility.
b. Alternate Pitch Trim	1	1	0	**(B)** Normal and manual trim shall be operative. One-time flight to nearest repair capable facility.
c. Manual Pitch Trim	1	1	1	

FLIGHT CONTROLS (Table 4.24. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
d. Trim Disconnect Switch	2	2	1	**(B)** Seat with operative switch shall be occupied at all times. One-time flight to repair capable facility.
e. Horizontal Stabilizer Trim Position Indicator	1	1	1	
24-4. RUDDERS				
a. Rudder Actuator	4	4	4	
b. Rudder Limiter	1	1	0	**(B)** MIN Q position shall be operative and selected to assure full rudder travel is available. Shall be repaired at next repair capable facility.
c. Rudder Trim	1	1	0	**(B)** Yaw Aug Man Trim shall be operative. Shall be repaired at next repair capable facility.
d. Rudder Trim Position Indicator	1	1	0	**(B)** One mechanical inclinometer shall be fully operative; Rudder shall be centered prior to flight. Required for touch-and-go operations.
e. Emergency Rudder (Yaw Aug Man Trim)	1	1	0	**(B)** Comply with flight manual section 5 limitations. One-time flight to repair capable facility.
24-5. FLAPS AND SLATS				
a. Flap Slat Asymmetry System	1	1	1	
b. Flap Position Indicator	1	1	0	**(B)** Slat indicator shall be operative. Scan flaps to verify approximate position. One-time flight to repair capable facility.

FLIGHT CONTROLS (Table 4.24. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
c. Ratio Shifters	2	2	0	**(B)** AUTO position of ratio shifters may be inoperative. Shall be able to manually position ratio shifters to the FLAPS UP and FLAPS DN position. Select matching position.
d. Slats	14	14	14	Refer to flight manual Section 5. See **paragraph 4.15**.
e. Slat Position Indicator	1	1	0	**(B)** Flap indicator shall be operative. Scan slats to verify position. If the slats are retracted, the slat position indicator circuit breaker for the malfunctioning side may be pulled to remove the maximum safe airspeed indicator and normal airspeed may be resumed. The associate air conditioning pack will default to low flow. Shall be repaired at next repair capable facility.
f. Slat Drive Disconnect Switch	1	1	0	**(B)** Takeoff and Landing will be conducted with slats retracted. See **paragraph 4.15**.
24-6. SPOILERS				
a. Flight Spoilers	10	10	10	
b. Ground Spoilers	8	8	8	
24-7. ALDCS	1	1	0	**(B)** Comply with flight manual section 5 limitations. Shall be repaired at next repair capable facility.

FLIGHT CONTROLS (Table 4.24. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
24-8. Stability Augmentation System (SAS)				Refer to Before Taxi Checklist. When scheduled for aerial refueling, every effort should be made to launch with operative augmentation. With inoperative systems the applicable autopilot axis will be inoperative.
a. AUG Power Switch	1	1	1	
b. Pitch Augmentation	1	1	0	Shall be repaired at next repair capable facility. See **paragraph 3.7.1.** for FDP limitations.
c. Lateral Augmentation	1	1	0	Shall be repaired at next repair capable facility.
d. Yaw Augmentation	1	1	0	Refer to Yaw Augmentation Inoperative procedures in flight manual in Section 3 and 5. One time flight to a repair capable facility.
24-9. Pilot Assist Servo System				
a. PACS Roll System	1	1	0	**(B)** Shall be repaired at next repair capable facility.
b. PACS Pitch System	1	1	0	**(B)** Shall be repaired at next repair capable facility.
24-10. Automatic Flight Control System				
a. AFCS Power Switch	1	1	1	
b. Autopilot	2	2	*	**(B)** Mission dictates requirement. Pitch autopilot required for flights through RVSM airspace. If pitch autopilot is inoperative refer to **paragraph 3.7.** for FDP limitations.
24-11. Autothrottle	2	2	0	

FLIGHT CONTROLS (Table 4.24. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
24-12. Flight Control Hydraulic System Off Light/Pressure Switch	Outbd Elevator 3/flight control All others 2/flight control	Outbd Elevator 3/flight control All others 2/flight control	* Outbd Elevator 2/flight control All others 1/flight control	**(B)** Check the affected system for proper operation prior to flight.
24-13. Flight Control Hydraulic Power Shutoff Valve	Outbd Elevator 3/flight control All others 2/flight control	Outbd Elevator 3/flight control All others 2/flight control	* Outbd Elevator 2/flight control All others 1/flight control	**(B)** Verify valve is open prior to takeoff. Shall be repaired at next repair capable facility.
c. Extended Range Tank Fuel Quantity Indicator	4	*	*	

4.15. SLATS INOPERATIVE. Slats retracted flight operations will be limited to those sorties required to move the aircraft to the nearest repair capable facility. Slats retracted flight should only be considered after reasonable efforts to repair the aircraft have been attempted. AMC/A3V waiver approval is not required provided the airplane is being flown (slats retracted with flap system operational) to the nearest repair capable facility. If the airplane is on a red X for a slat malfunction the airplane home station MXG/CC must downgrade the red X per T.O. 00-20-1 prior to flight.

4.15.1. Slats extended flight operations: Refer to T.O. 1C-5A-1, Section 5, LIMITATIONS FOR CRUISE OPERATIONS WITH FLAPS UP – SLATS EXTENDED.

Table 4.25. Fuel Systems (AMP) Refer to Paragraph 4.16

FUEL SYSTEMS (Table 4.25. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
25-1. Aerial Refuel System	1	*	*	Mission dictates requirement.

FUEL SYSTEMS (Table 4.25. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
25-2. Aerial Refuel Slipway Light	2	*	*	Mission dictates requirement. At least one light required for night air refueling.
25-3. Main Tank Boost Pump	2/Tank	2/Tank	1/Tank	**(B)** Open affected pump circuit breaker. Crossfeed and isolation valves shall be operative.
25-4. Auxiliary Tank Boost Pump	2/Tank	*	*	Mission dictates requirement. One pump per tank may be inoperative if tank contains/will contain fuel. Both pumps may be inoperative if tank does not/will not contain fuel. Open affected pump(s) circuit breaker(s).
25-5. Extended Range Tank Boost Pump	2/Tank	*	*	Mission dictates requirement. One pump per tank may be inoperative if tank contains/will contain fuel. Both pumps may be inoperative if tank does not/will not contain fuel. Open affected pump(s) circuit breaker(s).
25-6. Pump Out Light	4	4	3	**(B)** Both boost pumps shall be operative. Place both boost pumps on. One-time flight to repair capable facility.
25-7. Main Tank Press Low Light	4	4	3	**(B)** Both boost pumps shall be operative. Place both boost pumps on. One-time flight to repair capable facility.
25-8. Fuel Jettison Valve	2	2	1	**(B)** One valve may be failed closed if all separation valves are operative.
25-9. Fuel Temperature Selector	1	1	1	
25-10. Fuel Temp Indicator	1	1	1	

FUEL SYSTEMS (Table 4.25. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
25-11. Main Tank Fill Valve	4	4	3	**(B)** One valve may be failed open. Control fuel level with associated aux/ext range tank boost pumps. Shall be repaired at next repair capable facility.
25-12. Aux Tank Refuel Valve	4	*	*	Mission dictates requirement. Valves may be failed closed if the tank is not/will not be needed for fuel. If fuel is required in any Aux or Extended Range tank, refer to **paragraph 4.16.**
25-13. Extended Range Tank Refuel Valve	4	*	*	Mission dictates requirement**.** Valves may be failed closed if the tank is not/will be needed for fuel. If fuel is required in any Extended Range tank, refer to **paragraph 4.16.**
25-14. Isolation Valve	4	4	3	**(B)** One valve may be failed closed. Respective crossfeed valve shall be operative. Shall be repaired at next repair capable facility.
25-15. Separation Valve	3	3	2	**(B)** Center separation valve may be failed closed if both aerial refuel isolation valves are operative. Outboard separation valves may be failed closed if the respective Isolation and crossfeed valves are operative.
25-16. Crossfeed Valve	2	2	1	**(B)** One valve may be failed closed; respective isolation valves and outboard separation valve shall be operative. Shall be repaired at next repair capable facility.
25-17. Ground Refuel Isolation Valve	2	2	1	

FUEL SYSTEMS (Table 4.25. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
25-18. Manifold Press Low Light	4	4	2	**(B)** Inboard lights may be inoperative provided the associated manifold pressure gauge is operative.
25-19. Fuel Manifold Pressure Indicator	2	2	1	Both shall be operative for planned aerial refueling. **(B)** Separation valves and manifold press low lights shall be operative.
25-20. Sump Low Warning	2	2	0	**(B)** The system shall be made safe prior to flight. Both associated outboard main tank boost pumps shall be operative. Place both main tank boost pumps on. Refer to Section 3 of the flight manual. Shall be repaired at next repair capable facility.
25-21. Main Tank Low Light	2	2	0	**(B)** Monitor fuel gauges for proper fuel sequence. Shall be repaired at next repair capable facility.
25-22. Vent Fill Light	2	2	0	**(B)** Control fuel level with associated aux/ext range tank boost pumps to preclude over filling. Shall be repaired at next repair capable facility.
25-23. Total Fuel Quantity Indicator	1	1	0	**(B)** Serviced tanks must have operative indicators. Shall be repaired at next repair capable facility.
25-24. Fuel Quantity Indicators	See **Paragraph 4.16**.			Do not launch with more than one inoperative fuel quantity indicator per wing. Symmetrically opposite indicator shall be operative. Refer to **paragraph 4.16**.

FUEL SYSTEMS (Table 4.25. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
a. Main Tank Fuel Quantity Indicator	4	4	3	Refer to remarks in **25-24**. **(B)** No more than one indicator may be inoperative.
b. Auxiliary Tank Fuel Quantity Indicator	4	*	*	Mission dictates requirement. Refer to remarks in **25-24**. Inoperative/malfunctioning system shall be made safe prior to flight. Refer to the flight manual section 3. To refuel see **Paragraph 12.15.** If fuel is not required in a tank with an inoperative indicator, verify the tank is empty prior to flight.

4.16. Fuel System. It is preferred to use standard fuel system management to the maximum extent possible. Comply with Sections 2 and 5 of the flight manual if non-standard fuel sequencing is required for a one time flight to the nearest repair capable facility.

4.16.1. For Ground Refueling Procedures with Inoperative Fuel Quantity Indicator, refer to **Paragraph 12.15**

4.16.2. Fuel Quantity Indicator Failure In Flight.

4.16.2.1. Line Missions. Comply with Section 3 of the flight manual. Continue as scheduled provided Item 25-24 Remarks/Limitations/Exceptions are met and the destination has capability to safe affected tank IAW maintenance technical orders.

4.16.2.2. Local Missions. Comply with Section 3 of the flight manual and land as soon as practical. Flight may resume provided Item 25-24 Remarks/Limitations/Exceptions are met, maintenance personnel determined the nature of the malfunction, and the tank has been made safe IAW maintenance technical orders.

4.16.3. Aerial Refueling Missions.

4.16.3.1. Line Missions. Comply with Section 3of the flight manual. Symmetrically opposite indicator shall be operative. Do not air refuel with more than one inoperative fuel quantity indicator per wing.

4.16.3.2. Local Missions. Do not conduct aerial refueling with an inoperative indicator until maintenance action has been performed (see **Paragraph 4.16.2.2**).

4.16.3.3. Servicing. During aerial refueling, fuel is placed in tanks with operative indicators first. Tanks with inoperative indicators should be serviced internally by transferring a known quantity from another tank.

4.16.3.4. Unless Section 5 of the flight manual, Maximum Allowable Fuel Differential limits are going to be exceeded, do not accomplish internal servicing until termination of refueling. However; if necessary, internal servicing may be accomplished in the precontact position.

4.16.3.5. When a main tank indicator is inoperative and total main tank fuel quantity is less than 30,000 pounds, simultaneously fill all main tanks prior to servicing other tanks using the following procedures:

4.16.3.6. Position the AUTO REF switch to MAN for transfer. Monitor symmetrically opposite indicator to judge quantity in tank with inoperative indicator.

4.16.3.7. After filling the main tanks, disconnect and obtain an off-load report to verify the quantity of fuel in the tank with the inoperative indicator. Aerial refueling may continue after confirming main tank fuel quantity. Further servicing of a tank with an inoperative indicator should be made using known quantities from internal sources.

4.16.3.8. If a fuel imbalance is suspected (heavy wing or excessive aileron trim requirements), terminate aerial refueling and obtain an off-load report. Prior to internal fuel transfer, verify quantity of fuel in tanks with inoperative indicators. Refueling may be continued after fuel is balanced.

Table 4.26. Electrics (AMP).

ELECTRICS (Table 4.26. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
26-1. AC Load Meter	5	5	3	**(B)** Shall be operative for each working generator.
26-2. AC Volt Meter	1	1	1	
26-3. Gen Volt & Frequency Selector Switch	1	1	1	
26-4. Battery	1	1	1	
26-5. Battery Light	1	1	0	**(B)** One-time flight to repair capable facility.
26-6. Battery Switch	1	1	1	**(B)** Off and bypass positions shall be operative.
26-7. BCEM	1	1	0	**(B)** If inoperative place the battery switch to bypass. Shall be repaired at next repair capable facility.

ELECTRICS (Table 4.26. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
26-8. Bus Ties	4	4	3	**(B)** One BTC may be failed open provided associated generator and GLC is operative. One-time flight to repair capable facility.
26-9. Bus Tie Open Light	4	4	4	
26-10. CSD	4	4	3	**(B)** One may be inoperative and disconnected provided the bus tie system (all functions) is operative. The oil level of the disconnected CSD shall be checked for proper oil quantity prior to flight and during all subsequent en route stops. Do not fly more than 50 hours with a disconnected CSD (non-waiverable).
26-11. CSD Fail Warning	4	4	3	**(B)** Shall be operative for each working CSD.
26-12. CSD Temperature Gauge	4	4	0	**(B)** Associated CSD Fail light shall be operative.
26-13. DC Load Meter	2	2	1	**(B)** Shall be operative for each operable transformer rectifier.
26-14. DC Volt Meter	1	1	0	**(B)** Prior to applying electrical power, check battery voltage using external meter. One-time flight to repair capable facility.
26-15. DC Volt Meter Selector Switch	1	1	0	**(B)** One-time flight to repair capable facility.
26-16. Emergency Bus Power Relay	1	1	1	
26-17. Emergency Generator	1	1	1	

ELECTRICS (Table 4.26. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
26-18. Engine Driven Generator	4	4	3	**(B)** One may be inoperative provided the bus tie system (all functions) is operative. SCM airplanes on Shuttle Container Transport missions shall have all 4 generators operative.
26-19. Frequency Meter	1	1	1	
26-20. Generator Fail Light (Engines)	4	4	3	**(B)** Shall be operative for each operating CSD.
26-21. Generator Fail Light (APU)	2	2	1	**(B)** Shall be operative for each working APU.
26-22. Generator Out Light (Engine)	4	4	3	**(B)** Shall be operative for each working generator.
26-23. Generator Out Light (APU)	2	2	1	**(B)** Do not select associated APU generator.
26-24. Generator Load Controller	4	4	3	**(B)** Shall be operative for each working generator.
26-25. Isolated Bus Switch	1	1	1	
26-26. 325 Amp Current Limiter	1	1	1	
26-27. 400 Amp Current Limiter	1	1	0	**(B)** Both transformer rectifiers shall be operative. One-time flight to a repair capable facility.
26-28. Phase Selector Switch	1	1	1	
26-29. Transformer Rectifier	2	2	1	**(B)** 400 amp current limiter shall be operative. One-time flight to nearest repair capable facility.

Table 4.27. Instruments (AMP).

INSTRUMENTS (Table 4.27. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**

INSTRUMENTS (Table 4.27. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
27-1. Standard Central Air Data Computer (SCADC)	2	2	2	When one SCADC is replaced and test equipment is not available or the mission dictates, and the pitot static system has not been disturbed, a leak check may be deferred. Cross-check pilot and copilot airspeed indicators at 80 knots on takeoff roll. Abort the takeoff if airspeed differs by five knots or more. ***EXCEPTION:*** Maintenance leak and accuracy checks are required before flights in RVSM airspace
a. SCADC drain bottles	12	12	12	If any portion of the colored indicator float ball is at or above the beveled edge of the bottle(s), specified bottle(s) should be drained. If test equipment is not available or the mission dictates a leak check may be deferred. Cross-check pilot and copilot airspeed indicators at 80 knots on takeoff roll. Abort the takeoff if airspeed differs by five knots or more. ***EXCEPTION:*** Maintenance leak and accuracy checks are required before flights in RVSM airspace
27-2. Magnetic Compass	1	1	1	
27-3. Accelerometer	1	1	0	**(B)** MADAR shall be capable of monitoring in-flight loads.
27-4. Multifunction Display Units (MFDU)				
a. Pilots Station	6	6	4	**(B)** Operable units shall be installed in pilot's left, pilot's center, copilot's left and copilot's center positions.

INSTRUMENTS (Table 4.27. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
b. Flight Engineer Station	1	1	1	Operable unit may be taken from pilot's or copilot's right position.
4. 27-5. MFDU Controls				
a. Cursor Control Device (CCD)	2	2	1	**(B)** One-time flight to repair base. Cross-side function shall be operational. Operable CCD shall be installed on pilot's side.
b. Cursor Control Panel (CCP)	1	1	1	
27-6. Multifunction Control Display Unit (MCDU)				
a. Pilot	1	1	0	**(B)** Copilots and observers MCDU shall be operational. Circuit breaker for inoperative MCDU shall be pulled.
b. Copilot	1	1	1	
c. Observer	1	1	0	**(B)** Pilots and copilots MCDU shall be operational. Circuit breaker for inoperative MCDU shall be pulled.

Table 4.28. Avionics (AMP).

AVIONICS (Table 4.28. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
28-1. Versatile Integrated Avionics (VIA)	2	2	1	**(B)** BIP shall be operational. Circuit breakers for associated VIA and AIU shall be pulled for flight. If C/B for VIA/AIU 1 is pulled, the VIA/AIU Alt power switch shall be placed to ALT for flight. Refer to Section 3 VIA/AIU Failures. One-time flight to nearest repair capable facility.

AVIONICS (Table 4.28. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
28-2. Avionics Interface Unit (AIU)	2	2	1	**(B)** BIP shall be operational. Circuit breakers for associated VIA and AIU shall be pulled for flight. If C/B for VIA/AIU 1 is pulled, the VIA/AIU Alt power switch shall be placed to ALT for flight. Refer to Section 3 VIA/AIU Failures. One-time flight to nearest repair capable facility.
28-3. VIA/AIU Alternate Power Switch	1	1	1	
28-4. Backup Integrating Processor (BIP)	1	1	0	**(B)** Both VIAs/AIUs shall be operational. One-time flight to nearest repair capable facility.
28-5. Bus Subsystem Interface Unit (BSIU)	2	2	2	
28-6. Data Loader	1	1	*	**(B)** Mission dictates requirement.
28-7. Communication Navigation Panel (CNP)	2	2	1	**(B)** If possible place the operative CNP in the pilot's position. MCDUs shall be operable.
28-8. Multi-Mode Receiver (MMR)	2	2	1	Two required for CAT II ILS approaches
28-9. V/UHF Radio	2	2	1	**(B)** Operational radio shall be placed in the #1 position.
28-10. HF Radio	2	1	*	Mission dictates requirement.
a. Datalink Printer	1	1	*	**(B)** Mission dictates requirement.
28-11. UHF #3	1	1	1	
28-12. Embedded Global Positioning System/Inertial Navigation System (EGI)	2	2	1	**(B)** Three sources of attitude required (1 EGI, MIRS and SAI). Shall be repaired at next repair capable facility. GPS function may be inoperative.
28-13. Micro Inertial Reference System (MIRS)	1	1	0	**(B)** Three sources of attitude required (2 EGIs and SAI). Shall be repaired at next repair capable facility.
28-14. IFF	1	1	1	Mode 3A and C shall be operative.

AVIONICS (Table 4.28. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
a. Mode 4 Computer	1	1	*	**(B)** Mission dictates requirement. Do not delay takeoff except when the aircraft will transit an area where safe passage procedures are implemented. In-flight failures: Continue to intended destination. Where safe passage is implemented, follow procedures for inoperative Mode 4.
28-15. TCAS System	1	1	0	**(B)** Shall be repaired at next repair capable facility.
a. Mode S	1	*	*	Mission dictates requirement.
28-16. Flight Management System (FMS)	2	2	1	**(B)** Two required for RNP. Refer to Section 3 Unable RNP Procedures.
28-17. Standby Attitude Indicator (SAI)	1	1	0	Both EGIs and the MIRs shall be operational. Line missions – Shall be repaired at next repair capable facility.
28-18. Navigation Database	1	1	1	The aircraft must always have a database loaded. May not depart any location with database loading capabilities with an expired database. ***NOTE:*** The PIC may request loading of the next period's database if the current database will expire prior to reaching a database capable location. Comply with AFI 11-202V3.
28-19. Interphone System				Shall be able to communicate with all occupied positions.
a. Cockpit Loudspeaker	3	3	1	
b. Microphone Switch (Yoke)	2	2	1	**(B)** Shall be repaired at next repair capable facility.
c. Microphone Switch (Floor)	2	1	0	Should be operative at flight engineer position.
d. Interphone Cords	16	*	*	One required for each occupied primary crew position. Cargo compartment cords are mission dependent.
28-20. Public Address (PA) System	1	1	0	**(B)** If inoperative in troop compartment, interphone communications shall be maintained when compartment is occupied.

AVIONICS (Table 4.28. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
a. Troop Compartment PA	1	1	*	**(B)** Shall be operative when carrying passengers unless other means of communication is available (i.e., bullhorn).
28-21. Avionics Equipment Cooling System				
a. Avionics Cooling Fan	2	2	1	**(B)** Shall be repaired at next repair capable facility.
b. Flight Engineer's Panel Fan Fail Light	1	1	1	**(B)** Periodically check fan in-flight.
c. Flight Engineer's Panel Fan	1	1	1	
28-22. Radar Altimeter	2	2	1	The operative radar altimeter must be selected to the PFD of the pilot controlling the AFCS.
28-23. Weather Radar	1	1	*	**(B)** Shall be operative for all flights into areas of known or forecast thunderstorms.

Table 4.29. Recording and Emergency Location (AMP).

RECORDING & EMERGENCY LOCATION (Table 4.29. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
29-1. Emergency Locator Transmitter (ELT)	1	1	1	May be inoperative for local airland flights at or in the vicinity of home station. FIR shall be operative.
29-2. Flight Incident Recorder (FIR)	1	1	0	**(B)** FIR may be inoperative provided CVR is operative. Shall be repaired at next repair capable facility.
29-3. Cockpit Voice Recorder (CVR)	1	1	0	**(B)** CVR may be inoperative provided FIR (including all FIR inputs) is operative. Shall be repaired at next repair capable facility.

Table 4.30. MADAR (AMP) Refer to paragraph 4.17

MADAR (Table 4.30. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
30-1. Signal Acquisition Remote (SAR) Units				
a. SAR 03, 04, 19, 20, 21, 22	1	1	0	Required for FIR input and engine vibration monitoring. Refer to **paragraph 4.17.**
b. SAR 01, 05, 13, 14, 17, 18, 27, 28, 29	1	1	0	Required for FIR input.
30-2 MADAR III				
a. MDCR Workstation	1	1	0	**(B)** Shall be repaired at next repair capable facility.
b. POU	1	1	0	**(B)** MDCR should be operative. If both MDCR and POU are inoperative, shall be repaired at next repair capable facility.
c. Communications controller	1	1	0	**(B)** MDCR and POU will be inoperative. Repair at next repair capable facility.
d. MDCR Media	1	1	0	**(B)** Shall be repaired at next repair capable facility.
e. Multiplexer/Processor (MUX/PROC)	1	1	0	Required for FIR input. **(B)** Shall be repaired at next repair capable facility.
f. Power Supply (P/S)	1	1	0	Required for FIR input. **(B)** Shall be repaired at next repair capable facility.
g. Signal Conditioner/ Multiplex (SCM)	1	1	0	Required for FIR input. **(B)** Shall be repaired at next repair capable facility.

4.17. MADAR operational procedures.

4.17.1. Both Engine Vibration Indicating (EVI) channels indicating vibration (fan or core) out of limits will require confirmation of engine condition by ground test equipment. MADARS may be used for confirmation of engine condition if ground test equipment is not available.

4.17.2. One EVI channel indicating vibration (fan or core) out of limits and the other channel inoperative will require confirmation of engine condition by ground test equipment. MADARS may be used for confirmation of engine condition if ground test equipment is not available.

4.17.3. One usable EVI channel indicating a vibration (fan or core) out of limits and one usable EVI channel indicating within limits suggest an indicating system malfunction. To determine if an indication malfunction exists apply the following:

4.17.3.1. If channel 08 mil value is more than 2.5 times greater than the channel 09 mil value or the channel 09 value is more than 1.1 times greater than the channel 08 value, an indicating system malfunction exists.

Table 4.31. Cargo Door System (Troop & Cargo) (AMP).

CARGO DOOR SYSTEM (Table 4.31. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
31-1. Visor and Forward Ramp	1	*	*	Mission dictates requirement. May depart if manual override is required to open, close, or lock the visor or forward ramp assembly. Door locks may be inoperative if all locks are confirmed locked and are not required for the mission.
31-2. Forward Ramp Manual Locking Pin	8	8	8	**(B)** If locking ball is missing, secure pin with safety wire and annotate in AFTO Form 781A.
a. Yellow Streamer	8	8	0	
b. Mechanical Lock Indicator	10	10	0	**(B)** Verify all locks are locked; lock indicator lights shall be operative.
31-3. Visor Door Mechanical Lock Indicator	23	23	0	**(B)** Verify all locks are locked; lock indicator lights shall be operative.
31-4. Ramp Extension Support Jack	4	*	*	Mission dictates requirement. Refer to T.O. 1C-5A-9 for loading limitations when less than four jacks are serviceable.
31-5. Aft Cargo Doors and Ramp	1	*	*	Mission dictates requirement. May depart if manual override is required to open, close, or lock the doors or aft ramp assembly. Door locks may be inoperative if all locks are confirmed locked and are not required for the mission.
31-6. Aft Ramp Manual Locking Pin	14	14	14	**(B)** If locking ball is missing, secure pin with safety wire and annotate in AFTO Form 781A.

CARGO DOOR SYSTEM (Table 4.31. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
a. Yellow Streamer	14	14	0	
b. Mechanical Lock Indicator	14	14	0	**(B)** Verify all locks are locked; lock indicator lights shall be operative.

Table 4.32. Oxygen System (AMP).

OXYGEN SYSTEM (Table 4.32. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
32-1. 25 Liter Converter	1	1	0	**(B)** 25 liter converter may be inoperative provided the other converter is serviced with an adequate quantity for the mission. May result in passenger limitations. Line missions--shall be repaired at next repair capable facility.
32-2. 75 Liter Converter	1	1	0	**(B)** 75 liter converter may be inoperative provided the other converter is serviced with an adequate quantity for the mission. Will result in passenger limitations. Line missions--shall be repaired at next repair capable facility.
32-3. Oxygen Shut-off Valve	1	1	1	
32-4. Recharging Hose	10	10	7	**(B)** No more than one inoperative per compartment. Shall be repaired at next repair capable facility.
32-5. Flight Crew Oxygen Regulator	5	5	3	**(B)** P, CP, and FE positions shall be operative. Navigator and Observer position shall be operative if occupied.
32-6. Relief Bunk Oxygen System	6	6	0	**(B)** Do not occupy bunk with inoperative regulator above 10,000 Ft MSL.
32-7. Continuous Flow Oxygen Regulator	2	2	2	

OXYGEN SYSTEM (Table 4.32. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
32-8. Drop-Down Mask	101	*	*	One per occupied seat in each compartment. May result in passenger limitations.
32-9. Oxygen Quantity Indicator (25 liter)	1	1	0	**(B)** 75 liter indicator shall be operative. If required for mission and servicing capability exists, service 25 liter converter prior to launch.
32-10. Oxygen Quantity Indicator (75 liter)	1	1	0	**(B)** 25 liter indicator shall be operative. If required for mission and servicing capability exists, service 75 liter converter prior to launch.
32-11. Quantity Low Light	2	2	1	**(B)** When serviced, corresponding quantity indicator shall be operative.
32-12. Oxygen Quantity Indicator (25 liter) Test Switch	1	1	0	**(B)** 75 liter indicator shall be operative. If required for mission and servicing capability exists, service 25 liter converter prior to launch.
32-13. Oxygen Quantity Indicator (75 liter) Test Switch	1	1	0	**(B)** 25 liter indicator shall be operative. If required for mission and servicing capability exists, service 75 liter converter prior to launch.
32-14. Oxygen Warning System	1	1	1	Not required for flights below 10,000 ft MSL. If passengers are on board, and the oxygen warning system is inoperative, the flight is limited to 10,000 ft MSL. If flight above 10,000 ft MSL is required, the crew shall be on oxygen. Shall be repaired at next repair capable facility.
32-15. EPOS	88	*	*	One per occupied seat in each compartment. May result in pax limitations.
32-16. Portable Oxygen Bottles	16	16	*	Crewmembers entering/transitioning a compartment without quick access to oxygen bottles in flight must carry a portable oxygen bottle. Crewmembers occupying a primary crew position without a quick don oxygen mask require a portable oxygen bottle.

Table 4.33. Warning Systems.

WARNING SYSTEMS (Table 4.33. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
33-1. Stallimiter System	2	1	1	One fully functioning system required for all departures.
33-2. Enhanced Ground Proximity Warning System (EGPWS)	1	1	0	**(B)** Shall be repaired at next repair capable facility. Altitude alerting required for RVSM airspace.
33-4. Master Caution Light	2	2	0	**(B)** CWA aural alerts and a minimum of one reset function must be operative.
33-5. Door Warning System (Lock Status Lights)				
a. Visor	25	25	25	**(B)** If all flight manual Section 3 criteria are met, one lock may be in bypass.
b. Forward Ramp	2	2	0	**(B)** Lights may be inoperative provided mechanical pins are installed and the locks are verified locked.
c. Crew Entrance Door	1	1	1	
d. Aft Ramp	2	2	0	**(B)** Lights may be inoperative provided mechanical pins are installed and the locks are verified locked.
e. Fwd Underfloor Access Door	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
f. Aft Winch Access Hatch	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
g. Aft Bilge Access Hatch	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
h. Forward Bilge Access Hatch	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
i. Left and Right Side Cargo Doors	4	4	0	**(B)** Lights may be inoperative provided the door(s) are verified closed and locked.
j. Center Cargo Door	2	2	2	

WARNING SYSTEMS (Table 4.33. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
k. Ramp to Pressure Door	4	4	2	**(B)** Outboard lights may be inoperative provided the door is verified closed and locked.
l. Horizontal Stabilizer Access Door	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked. Repair as soon as practical.
33-6. Smoke Detector System	1	1	0	**(B)** If any component is inoperative, the associated compartment shall be scanned at least once every hour. FSS detection system (if applicable) shall be fully operative. Troop compartment shall be occupied if troop/center wing detector is inoperative and additional crewmembers are available.
33-7. Bailout Alarm	1	1	0	**(B)** PA should be operative. If PA system is inoperative, interphone communication shall be maintained.

Table 4.34. Fire Suppression System (FSS) (AMP) Refer to Paragraph 4.18

FIRE SUPPRESSION SYSTEM (FSS) (Table 4.34. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
34-1. DEWARS	2	2	1	**(B)** FSS system functions shall be operative. Some malfunctions may require the dewar to be drained.
34-2. Nitrogen Fire Suppression Control Panel	1	1	1	Shall be capable of fire warning and discharge. ***EXCEPTION:*** Discharge capability is N/A when LN2 is depleted and no servicing capability exists.
34-3. Nose Wheel Well Control Panel	1	1	0	**(B)** Shall be repaired at next repair capable facility.

FIRE SUPPRESSION SYSTEM (FSS) (Table 4.34. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
34-4. Optical Detection	1	1	0	**(B)** If any component is inoperative, associated compartment shall be scanned every hour. Smoke detection system shall be fully operative. One-time flight to repair capable facility.
34-5. Isolation Valve	2	2	1	**(B)** Shall be operative for each serviced dewar.
34-6. Outboard Main Tank ΔP Switch	2	2	0	**(B)** Do not pressurize wings (vent wings). Shall be repaired at next repair capable facility.
34-7. Overboard Relief Valves	2	2	1	**(B)** Shall be operative for each serviced dewar.
34-8. Pressure Limiters	2	2	1	**(B)** Shall be operative for each serviced dewar.
34-9. Primary Climb/Dive Valve	2	2	0	**(B)** Secondary climb/dive valve must be operative. Manual override shall be operative.
34-10. Primary Regulator	2	2	1	**(B)** Shall be operative for each serviced dewar.
34-11. Secondary Climb/Dive Valve	2	2	0	**(B)** Primary climb/dive valve must be operative. Manual override shall be operative.
34-12. Secondary Pressure Regulator	2	2	1	**(B)** Shall be operative for each serviced dewar.
34-13. Vent Box Float Switch	2	2	2	
34-14. Wing Pressure Warning System	2	2	2	
34-15. Liquid Nitrogen Service Panel	1	1	1	**(B)** As long as safety-of-flight is not affected, some functions may be inoperative. Repair at next repair capable facility.
34-16. Central Processing Unit (CPU)	1	1	1	Shall be capable of fire warning and discharge. ***EXCEPTION:*** Discharge capability is N/A when LN2 is depleted and no servicing capability exists.
34-17. FSS Fire Detection	1	1	1	

4.18. FSS Servicing.

4.18.1. Because of the increased safety margin provided by the FSS, obtain full LN2 servicing at stations with servicing capability. ***NOTE:*** Fully serviced is defined as 650 pounds per operational dewar to allow for gauge inaccuracies, automatic shutoff settings, and LN2 boil-off.

4.18.2. Home Station Departures. The airplane will be fully serviced.

4.18.3. En Route Stations WITH Servicing Capability. The airplane will be fully serviced unless directed otherwise by the PIC. ***EXCEPTION***: Station supply depleted or equipment malfunctions (all servicing trucks inoperative).

4.18.3.1. PIC should pass less than full LN2 requirements for next mission leg during maintenance debrief.

4.18.4. En route Stations WITHOUT Servicing Capability. The mission may continue regardless of the amount of LN2 on board. If the remaining LN2 will be depleted prior to the next en route stop, vent wings to retain a fire fighting reserve. Do not vent wings until just prior to descent; make an AFTO Form 781information entry.

4.18.5. Local Missions. Not less than that required for the planned mission duration (plus an adequate fire fighting reserve). For ERCCs, airplanes will be fully serviced for the first half to ensure the second half will have adequate LN2.

4.18.6. General Requirements.

4.18.6.1. Flight is not permitted with system LN2 (liquid nitrogen) leaks in excess of 50 pounds per dewar per 12 hours. Allow 1 hour after servicing for system stabilization prior to start of leak check.

4.18.6.2. Use the following values to calculate the minimum amount of LN2 required by **paragraphs 4.18.3.1** and **4.18.5** These values are guides; amounts used may vary. Document significant variations in AFTO Form 781. Two hundred fifty (250) pounds required for firefighting (adequate for one application to the largest zone) plus:

4.18.6.3. Twelve pounds for every 1,000-feet of descent planned during a line or AAR mission. EXAMPLE: An AAR mission that requires an 8,000-foot descent from initial level off altitude to rendezvous altitude, followed by a final cruise altitude of FL370 will need 540 pounds of LN2. (8,000 + 37,000 = 45,000 feet of total descent x 12 = 540 pounds).

4.18.6.4. One hundred twenty (120) pounds will be used for each hour of local transition flying.

4.18.7. Missions expecting to transit a threat environment

4.18.7.1. If nitrogen servicing is not available at the last stop prior to entering the threat environment, FE's will adhere to the following.

4.18.7.2. NON-THREAT ENVIRONMENT LEGS. After departing the last station with servicing capability, vent the wings prior to each descent. Enter an information note in the AFTO FORM 781A each time the wings are vented.

4.18.7.3. THREAT ENVIRONMENT LEGS. Regardless of the nitrogen quantity, do not vent wings on legs into and within threat locations.

4.18.7.4. Nitrogen is not required to fly in a threat environment. If nitrogen is not available, do not delay the mission.

Table 4.35. Emergency Equipment (AMP).

EMERGENCY EQUIPMENT (Table 4.35. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
35-1. Life Raft/Survival Kit	4	4	*	**(B)** Mission dictates requirement. Troop compartment rafts may be inoperative or missing; however, total troop passengers will be reduced by 25 per inoperative raft. A raft shall be installed at the #2 escape hatch. A raft shall be installed at #6 service door when the troop compartment is occupied. ***EXCEPTION:*** Locals/Depot sorties may operate without a life raft provided the flight will not take place over water; a survival kit will be carried.
35-2. Descent Reel	24	24	*	**(B)** One required per occupant on the flight deck.
35-3. Escape Slide/Exit	5	5	*	**(B)** Mission dictates requirement. The #5 service door slide/exit shall be operational. If troop compartment is occupied, #4 hatch and #6 service door slide/exits shall be operational. Limit troop compartment to 40 pax/crew when 3L and/or 3R troop compartment slide/exit is not operational.
35-4. Escape Rope	8	8	*	**(B)** Mission dictates requirement. Three escape ropes shall be installed in the cargo compartment and one above the troop compartment ladder. Troop compartment exits, slides, and life rafts are not considered operative unless an escape rope is installed.

EMERGENCY EQUIPMENT (Table 4.35. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
35-5. First Aid Kit	22	22	*	**(B)** Mission dictates requirement. Full complement required when carrying personnel in the troop compartment. If troop compartment is not occupied, a minimum requirement of 5 on the flight deck and 2 in the cargo compartment.
35-6. Fire Extinguishers				
a. Aircraft with operative FE 1301 System	15	15	9	**(B)** Minimum of 3 operative extinguishers per compartment (flight deck, cargo, troop). Shall be replaced/repaired at next repair capable facility.
b. Aircraft with inoperative FE 1301 System	17	17	10	**(B)** Minimum of 3 operative extinguishers per compartment (flight deck, cargo, troop), plus 1 additional extinguisher of not less than 1-gallon in the cargo compartment. Shall be replaced/repaired at next repair capable facility.
35-7. Life Vest	95	*	*	**(B)** Mission dictates requirement. One per occupant during over water flights. May result in pax limitations.
35-8. Crash Axe	3	3	2	**(B)** A minimum of one crash axe shall be available on the flight deck and one available in the troop.
35-9. Emergency Exit Light	12	12	*	**(B)** Required for all operative exits. An emergency exit light may be repaired by replacing (2) 327 bulbs if not charging. Troop compartment lights not required when compartment is unoccupied. May result in pax limitations.
35-10. Rope Ladder	1	1	0	Both release handles required to consider ladder operative. **(B)** Not required if emergency escape slide and emergency descent reels (1 per occupant) are operative. Shall be repaired at next repair capable facility.

EMERGENCY EQUIPMENT (Table 4.35. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
35-11. FE 1301	20	0	0	Bottles may be inoperative as long as detection system is operative. If inoperative 1 fire extinguisher of not less than 1-gallon shall be placed in the cargo compartment. If an additional fire extinguisher is not available, one-time flight to repair capable facility.

Table 4.36. Miscellaneous Equipment (AMP).

MISCELLANEOUS EQUIPMENT (Table 4.36. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
36-1. Lock Blocks, Pressure Door Hinge	2	2	*	**(B)** Mission dictates requirement.
a. F-valve Safety Guard	1	1	0	
36-2. Night Curtain	2	0	0	
36-3. Service Door Safety Gate	2	2	0	
36-4. Window Shade	12	6	6	Six required in cargo compartment.
36-5. Winch	2	*	*	Mission dictates requirement. One required for all cargo missions.
36-6. Water System, Potable	1	0	0	When serviced, all functions shall be operative. If inoperative, system shall be drained prior to flight.
36-7. Latrines				
a. Crew	1	1	0	**(B)** Troop compartment latrines shall be operable. Shall be repaired at next repair capable facility

MISCELLANEOUS EQUIPMENT (Table 4.36. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
b. Troop Compartment	2	2	0	**(B)** One-time flight to repair capable facility. ***EXCEPTION:*** Mission may continue with both inoperative with C2 concurrence and troop compartment unoccupied. Mission may continue with one inoperative with C2 concurrence and troop compartment occupancy IAW Addenda A.

Table 4.37. Defensive Systems (AMP).

DEFENSIVE SYSTEMS (Table 4.37. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
37-1. Defensive System	1	*	*	Mission dictates requirement. ***NOTE*:** System is operational if the MWS and/or LAIRCM is fully operational. The AN/ALE-47 CMDS must be working for either system to be operational.
37-2. AAR-47 (MWS Sensors)	4	*	*	Requires all 4 sensors for operation. AAR-47 is not required when ALQ-24 LAIRCM Lite is operational and ALE-47 CMDS, is capable of manual flare dispense.
37-3. ALE-47 (CMDS)	1	*	*	Must be capable of flare dispense in auto and manual modes. ALE-47 is not required when ALQ-24 LAIRCM Full, is fully operational.
37-4. ALQ-24 (LAIRCM)	1	*	*	ALE-47 must be capable of flare dispense in auto and manual mode if configured with LAIRCM Lite (two Turrets). ALE-47 not required when configured with LAIRCM Full (Three Turrets).
37-5. AAR-54 (LAIRCM Sensors)	4	*	*	Requires all 4 sensors for operation.

Table 4.38. Lighting (AMP).

LIGHTING (Table 4.38. AMP)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
38-1 Interior Lights Master Switch	1	1	0	
38-2 Exterior Lighting		*	*	See AFI 11-202V3 requirements. Navigation lights (at least one bulb in each position) required for night operations. Anti-collision lights (1 upper and 1 lower) required for day or night operations.
38-3 Pilot/ Copilot AMP Panel Lighting	1	1	*	(B) Mission dictates requirement.
38-4 Flight Engineer/ Navigator AMP Panel Lighting	1	1	*	(B) Mission dictates requirement.

Table 4.39. Engines/Auxiliary Power Units (APU) (C-5M).

Engines/Auxiliary Power Units (APU) (Table 4.39. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
39-1. Engine Fire Detection System	2/eng	2/eng	1/eng	Fire Detection Control Box shall be operative. One loop per engine may be inoperative provided that all segments of the parallel loop are operative.
39-2. Engine Fire Extinguishing System				
a. Engine Fire Handle	4	4	4	Handles shall be fully capable of automatic isolation of system components as outlined in T.O. 1C-5M-1. **(B)** If the light in the handle is inoperative, the associated CWA shall be operative.
b. Fire Extinguisher Bottle	2/eng	2/eng	2/eng	

Engines/Auxiliary Power Units (APU) (Table 4.39. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
c. Fire Extinguisher Discharge Button	4	4	4	Shall be capable of firing bottles.
d. Fire Extinguisher Bottle Select Switch	2	2	2	
39-3. Thrust Reverser	4	4	2	**(B)** If either or both inboard TRs are deactivated, be familiar with 1C-5M-1, Section 2, Rapid Descent without TRs.
39-4. Starter Air Valve	4	4	2	**(B)** One SAV may be electrically inoperative per wing. MAJCOM Stan/Eval approval required for flight if more than two SAVs are inoperative.
39-5. Nacelle Anti-Ice	4	*	*	Mission dictates requirement. Anti-ice required for flights into forecasted icing conditions. Valves that are failed open are considered operational.
39-6. Auxiliary Power Unit (APU)	2	2	1	**(B)** Refer to T.O. 1C-5M-1, Section 2 for single APU operation.
39-7. APU Bleed Valve	2	2	1	**(B)** Required for APU to be considered operative.
39-8. APU Isolation Valve	2	1	1	If the valve is failed open, the associated APU bleed valve and both wing isolation valves shall be operative
39-9. APU Isolation Valve Open Light	2	0	0	Valve operation shall be confirmed prior to every departure.

Engines/Auxiliary Power Units (APU) (Table 4.39. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
39-10. APU Fire Warning System	2	2	1	If either channel in the dual sensing loop is operative, the respective fire warning system shall be considered operational. **(B)** For ground operations, do not operate APU and associated ATM with inoperative fire warning unless a fire guard is present.
39-11. APU Fire Bottle	2	2	1	**(B)** For ground operations, do not operate affected APU and associated ATM unless a fire guard is present.
39-12. APU Start Battery	1	1	*	MAJCOM approval required for flight with a single battery.
39-13. APU Start Battery Control Electronic Module (BCEM)	1	1	*	**(B)** Place the APU Battery Charger Switch to BYP.
39-14. APU Battery Isolation Contactor (ABIC)	1	1	0	**(B)** APU start will rely upon APU battery charge.
39-15. APU Battery Charger Switch	1	1	0	**(B)** APU start will rely upon APU battery charge.

Table 4.40. Bleed Air, Environmental, Etc.

Bleed Air, Environmental, Etc. Systems (Table 4.40. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**

Bleed Air, Environmental, Etc. Systems (Table 4.40. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
40-1. Air Conditioning Pack	2	2	1	**(B)** Aircraft shall be capable of maintaining cabin altitude less than10,000' MSL. If aircraft is capable of maintaining cabin altitude with one pack and floor heat inoperative, either the floor heat or pack shall be repaired at next repair capable facility. If both packs are inoperative, MAJCOM Stan/Eval approval required for one-time unpressurized flight not to exceed 10,000’ MSL.
40-2. Air Conditioning Master Switch	1	1	1	Shall have control of air conditioning packs.
40-3. Air Conditioning Overheat Light	2	2	1	**(B)** Required for each operating pack.
40-4. Air Conditioning Overheat Sensor	2	2	1	**(B)** Required for each operating pack.
40-5. Airflow Selector Switch	1	1	0	**(B)** May be electrically inoperative provided valves can be positioned using tools.
40-6. Compartment Temperature Indicator	3	0	0	Unmanned compartments shall be monitored for proper temperature. Close troop comp shutoff valve if unoccupied.
40-7. Flight Station Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools.
40-8. Relief Compartment Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools.

Bleed Air, Environmental, Etc. Systems (Table 4.40. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
40-9. Cargo Compartment Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools.
40-10. Troop Compartment Temp Control Valve	1	1	1	Auto mode may be inoperative provided temp control valve can be controlled in manual mode, or positioned using tools. If compartment is unoccupied, valve will be closed.
40-11. Troop Compartment Shutoff Valve	1	1	1	May be electrically inoperative, provided control valve can be positioned using tools.
40-12. Cooling Air Exit Door	2	2	1	**(B)** Door shall be installed. If the door is stuck closed, do not operate the affected A/C below .3 Mach, or with slats extended, or when the aircraft is on the ground. If the door is stuck open, do not plan flight above FL 280.
40-13. Cooling Fan	2	2	1	**(B)** Do not operate the affected system on the ground, or with slats extended, or below .3 Mach.
40-14. Cooling Fan Control Valve	2	2	1	**(B)** If valve failed closed, do not operate the affected system on the ground, or with slats extended, or below .3 Mach.
40-15. Primary Heat Exchanger High Limit Sensor	2	2	1	**(B)** Required for each operating pack.
40-16. Primary Heat Exchanger Temp Control Sensor	2	2	1	**(B)** Required for each operating pack.
40-17. Flow Control Valve (FCV)	2	2	1	**(B)** Required for each operating pack.
40-18. Low Limit Temperature Control Sensor	2	2	1	**(B)** If possible, install operative sensor in the left system.

Bleed Air, Environmental, Etc. Systems (Table 4.40. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
40-19. Low Limit Temperature Control Valve	2	2	1	**(B)** If possible, install operative components in the left system.
40-20. Diverter Valve	1	1	0	**(B)** May be electrically inoperative provided it can be positioned using tools.
40-21. Alternate Air Valve	1	1	0	**(B)** May be electrically inoperative provided it can be positioned using tools.
40-22. Aux Vent Valve	1	1	1	**(B)** May be electrically inoperative provided it can be positioned using tools. One-time flight to repair capable facility.
40-23. Bleed Air Overheat and Warning System (BAOWS)	7	7	7	If either channel in the dual sensing loop is operative, the respective overheat system shall be considered operational.
40-24. Engine Bleed Air System				
40-25. Pylon Shutoff Valve (PSOV)	4	4	4	Valve must be fully operational for starting.
a. Pylon Shutoff Valve (PSOV) Lights	4	4	0	**(B)** May be inoperative provided valve functionality can be determined.
b. Pressure Regulator Shutoff Valve (PRSOV)	4	4	2	**(B)** One may be failed per wing
c. High Pressure Regulator Shutoff Valve (HPSOV)	4	4	2	**(B)** One may be failed closed per wing.
d. Fan Air Modulating Valve (FAMV)	4	4	2	**(B)** May be failed in the open position.
40-26. Air Management System Control (AMSC)	2	2	1	Operative unit should be installed in the right-hand system.
40-27. Cabin Pressure Control System (CPCS)				MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.

Bleed Air, Environmental, Etc. Systems (Table 4.40. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
40-28. Manual Pressure Controller	1	1	0	**(B)** Shall be operative for pressurized flight. If inoperative, MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to repair capable facility. The Outflow and Thrust Recovery valves shall be open.
40-29. Automatic Pressure Controller	1	0	0	May be inoperative provided manual mode is fully operative. If the manual controller fails in-flight, use flow control switches, floor heat, PSOVs, and AC Master Switch to control pressurization.
40-30. Pressurization Mode Selector Switch	1	1	0	**(B)** Manual mode must be operative for pressurized flight. If manual mode is inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility. The Outflow and Thrust Recovery valves shall be open.
40-31. Outflow Valve Indicator	1	1	0	**(B)** Cabin rate of climb and differential pressure indicator shall be operative. Use the Scanner to complete preflight steps.
40-32. Outflow Valve and Thrust Recovery Valve	1 ea	1ea	0	**(B)** Both shall be operative for pressurized flight. Outflow and/or Thrust Recovery valve(s) may be failed open only. MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.

Bleed Air, Environmental, Etc. Systems (Table 4.40. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
40-33. Cabin Altimeter and Differential Pressure Indicator	1	1	0	**(B)** Shall be operative for pressurized flight. If inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.
40-34. Cabin Rate of Climb Indicator	1	1	0	**(B)** Automatic pressurization controller, cabin altimeter and differential pressure indicator shall be operative. If any component listed above is inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.
40-35. Emergency Depress System	1	1	0	**(B)** Shall be operative for pressurized flight. If inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility.
40-36. Safety Valve	2	2	0	**(B)** Both shall be operative for pressurized flight. If inoperative MAJCOM Stan/Eval approval required for one-time flight (not to exceed 10,000 ft MSL) to a repair capable facility. The Outflow and Thrust Recovery valves shall be fully open.

Bleed Air, Environmental, Etc. Systems (Table 4.40. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
40-37. Floor Heat System	1	1	0	**(B)** Aircraft shall be capable of maintaining cabin altitude less than 10,000' MSL. If aircraft is capable of maintaining cabin altitude with one pack and floor heat inoperative, either the floor heat or pack shall be repaired at next repair capable facility. Shall be operative if cargo requires temperature-controlled environment.
40-38. Manifold Bleed Air Pressure Indicator	1	1	1	
40-39. Wing Isolation Valve	2	2	1	
40-40. Pitot Heat System (2 masts and 2 heads per system)	2	2	*	**(B)** Mission dictates requirement. Both systems (All 4 masts and heads) required for flights in RVSM airspace. One mast and/or head per system (pilot and co-pilot) may be inoperative for flights conducted in non-icing conditions in non-RVSM airspace.
40-41. AoA De-ice System	2	1	1	One system shall be fully operative. Associated stallimeter shall be operative.
40-42. Windshield Heat	5	3	2	**(A)** The 3 front windshield panels shall function. **(B)** Must have windshield heat for 2 of the 3 front windshield panels.
40-43. Windshield Wiper	2	*	*	Mission dictates requirement. One system shall be operative for flights with forecast precipitation.
40-44. Total Air Temperature (TAT) Indicator	1	0	0	TAT may be obtained using EDS.

Table 4.41. Hydraulics (C-5M).

Hydraulics (Table 4.41. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
41-1. 1-2 PTU	1	1	0	**(B)** May be inoperative provided #1 ATM and #1 & #2 engine-driven pumps (all) are operative.
41-2. 2-3 PTU	1	1	0	**(B)** May be inoperative provided the 1-2 and 3-4 PTUs, and #2 and #3 engine-driven pumps (all) are operative.
41-3. 3-4 PTU	1	1	0	**(B)** May be inoperative provided #4 ATM and #3 & #4 engine-driven pumps (all) are operative.
41-4. ATM ON Light	2	2	1	**(B)** May be inoperative if ATM is made inoperative. Hydraulics must be isolated.
41-5. ATM	2	2	1	**(B)** Applicable PTU and engine-driven pumps shall be operative. Complete required preflight items after engine start. ***CAUTION:*** Do not perform anti-skid check w/engines running. ***CAUTION:*** Do not perform an I-BIT with engines running. Shall be repaired at next repair capable facility.
41-6. Electric Suction Boost Pump	2	2	0	**(B)** Associated hydraulic suction boost pump shall be operative. Check applicable hydraulic service center filters for popped button. If button is popped all system filters must be checked for contamination. If both electric suction boost pumps are inoperative minimize ATM starts and one-time flight to a repair capable facility.

Hydraulics (Table 4.41. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
41-7. Engine-Driven Hydraulic Pump	8	8	6	All pumps shall have positive depress capability. **(B)** Adjacent PTUs shall be operative. Only one pump on two nonadjacent engines may be inoperative.
41-8. Flight Engineer Hydraulic Pressure Gauge	4	4	2	**(B)** Direct reading gauge shall be operative and periodically monitored. Associated PRESS LOW lights shall be operative. **(B)** Two inoperative gauges requires one-time flight to repair capable facility.
41-9. Flight Engineer Hydraulic Quantity Indicator	4	4	3	**(B)** Sight gauge shall be monitored periodically. Associated flight engineer hydraulic pressure gauge and BOOST PRESS LOW light shall be operative.
41-10. Hydraulic Boost Press Low Light	4	4	2	**(B)** Monitor/scan associated system(s). One light inoperative requires repair at next repair capable facility. Two lights inoperative requires a one-time flight to a repair capable facility.
41-11. Hydraulic Pressure Gauge (Direct Reading)	4	4	3	**(B)** Associated flight engineer hydraulic pressure gauge shall be operative.
41-12. Hydraulic Pump Press Low Light	8	8	6	**(B)** Associated flight engineer hydraulic pressure gauge shall be operative. Depress unaffected hydraulic pump. No more than one light on each non-adjacent engine may be inoperative

Hydraulics (Table 4.41. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
41-13. Hydraulic Reservoir Sight Gauge	4	4	0	**(B)** May be capped if flight engineer hydraulic quantity indicator is operative. Verify hydraulic quantity prior to launch.
41-14. Hydraulic Suction Boost Pump	4	4	2	**(B)** Check applicable hydraulic service center filters for popped button. If button is popped all system filters must be checked for contamination. #1 and #4 may be inoperative if the respective electrical suction boost pump is operative. If #2 or #3 boost pump fails, swapping the failed boost pump with either #1 or #4 is permissible provided no contamination is present.
41-15. RAT	1	1	1	
41-16. Deploy RAT Light	1	1	0	

Table 4.42. Landing Gear (C-5M).

Landing Gear (Table 4.42. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
42-1. Anti-Skid System				Operation with less than all anti-skid components operative is an emergency procedure and shall be IAW the flight manual. If inoperative MAJCOM Stan/Eval approval required for one-time flight to a repair capable facility.
a. Anti-Skid Off Light	1	1	1	
b. Brakes Light	1	1	0	

Landing Gear (Table 4.42. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
c. No Brakes Light	1	1	1	
d. DET Fail Light	1	1	1	
42-2. Normal Brake System	1	1	1	
a. Normal Brake Pressure Indicator	1	1	0	**(B)** EMER HYD brake pressure light shall be operative. Alternate brake pressure indicator and flight engineer's #4 hydraulic pressure gauge shall be operative. Select alternate brakes for landing. If normal brakes are required for landing, perform a Brake System Check (In-flight). Shall be repaired at next repair capable facility.
42-3. Alternate Brake System	1	1	1	
a. Alternate Brake Pressure Indicator	1	1	0	**(B**) Normal brake pressure indicator and flight engineer's #1 hydraulic pressure gauge shall be operative. Select normal brakes for landing. If alternate brakes are required for landing, perform a Brake System Check (In-flight). Shall be repaired at next repair capable facility.
42-4. Emergency Brake System	1	1	1	
a. EMER HYD Brake Pressure Light	1	1	0	**(B**) Normal brake pressure indicator shall be operative. Shall be repaired at next repair capable facility.
42-5. Anti-rotation/In-flight brake sys	1/mlg	1/mlg	*	**(B)** Aircraft climb performance capability dictates requirement. Non-SDP procedures will be used for departure.

Landing Gear (Table 4.42. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
42-6. Parking Brake	1	1	0	**(B)** If inoperative, brakes shall be guarded at all times when chocks are removed. Scanner shall install chocks in the event of an emergency. Do not accomplish kneeling/loading/ unloading with engines running. With engines shutdown, brakes shall be guarded if operation requires parking brake set. One-time flight to repair capable facility.
42-7. MLG Caster System	1	1	*	**(B)** Mission dictates requirement.
a. MLG Free Lights	2	2	*	**(B)** Mission dictates requirement. If inoperative, copilot shall monitor position indicators. If lights are inoperative, do not accomplish kneeling operations.
b. Aft MLG Position and Emergency Control Switch	2	2	0	**(B**) Limit caster operations. Normal caster shall be operative. Mission segments limited to tow-capable locations. Shall be repaired at next repair capable facility.
42-8. Emergency Extend Switch	5	5	0	**(B**) One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.19.1**

Landing Gear (Table 4.42. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
42-9. Kneeling System	1	1	*	Mission dictates requirement. All main landing gear shall be capable of in-flight kneeling. If not capable of in-flight kneeling, one-time flight with the affected MLG gear down to the nearest repair capable facility. Refer to **paragraph 4.19.1**
42-10. Landing Gear Warning System				
a. Landing Gear Warning Horn	1	1	0	**(B**) Shall be repaired at next repair capable facility.
b. Landing Gear Warning Light	2	2	0	One light may be inoperative. **(B)** If both lights are inoperative, one-time flight to a repair capable facility. All gear position indicators shall be operative.
c. Landing Gear Warning Test Button	1	1	0	**(B**) Shall be repaired at next repair capable facility.
d. Horn Silence Button	1	1	0	**(B**) Shall be repaired at next repair capable facility.
e. Emergency Switch On Light	1	1	0	**(B**) Consider light illuminated and refer to Emergency NLG Extension – EMERG SW ON LIGHT ON prior to nose landing gear extension.
f. Bogie Pitch Annunciator/Indicator	4	4	0	**(B**) One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.19.1**

Landing Gear (Table 4.42. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
42-11. NLG Fiber Optics Scope	1	1	0	**(B)** One-time flight with NLG down to nearest repair capable facility. Refer to **paragraph 4.19.1**
42-12. NLG Inspection Light	3	1	0	Light for the fiber optics target required day or night. **(B)** If light for the fiber optics target is inoperative, one-time flight with NLG down to the nearest repair capable facility. Refer to **paragraph 4.19.1**
42-13. MLG Inspection Light	2/mlg	*	*	Mission dictates requirement. One per MLG should be operative for night operations.
42-14. Nose Gear Steering	1	1	1	Both Normal and Emergency systems shall be operative.
a. Rudder Pedal Steering	1	1	0	**(B)** Nose Gear Steering system (wheel) shall be operative. Shall be repaired at next repair capable facility.
42-15. Position and Indicating Systems	1	1	0	**(B)** One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.19.1** Prior to landing, affected gear will be visually verified for proper down and locked indications at sequence control panel and inspection covers/fiber optics.
42-16. Relay Logic System (Sequence Control Panel)	3	3	0	**(B)** One-time flight with affected gear down to nearest repair capable facility. Refer to **paragraph 4.19.1** Prior to landing, affected gear will be visually verified for proper down and locked indications.

Landing Gear (Table 4.42. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
42-17. Crew Entrance Door Accumulator	1	1	0	**(B)** One-time flight with nose gear down to nearest repair capable facility. Refer to **paragraph 4.19.1**
42-18. Emergency MLG Extension Accumulator	2	2	1	One-time flight with affected gear (2) down to nearest repair capable facility. Refer to **paragraph 4.19.1**
42-19 MLG Secondary Strut (deflated)	4	4	3	**(B)** One-time flight to repair capable facility. Limit landing sink rate to 6 FPS (360 Ft/Min) or less.

4.19. Landing Gear.

4.19.1. Gear Down Flight Operations**.** Limit gear down flight operations to sorties required to move the aircraft to the nearest repair capable facility. Consider gear down flight only after the PIC exhausts all avenues to repair the aircraft in place.

4.19.1.1. Standard climb-out flight path charts in T.O. 1C-5M-1-1 do not account for a gear-down configuration. Therefore, PICs shall not takeoff until there is reasonable assurance that they will achieve/maintain adequate obstacle clearance (to include en route stops and alternates).

4.19.1.2. AMC/A3V waiver approval is not required for gear down flights. However, aircrew will consider potential aircraft and flight considerations, take off and landing data (TOLD) calculations, along with proper aircraft documentation prior to known gear down flights. If the airplane is on a red X for a gear malfunction the airplane home station MXG/CC must downgrade the red X per T.O. 00-20-1 prior to flight.

4.19.1.3. Local Training Missions. Local missions will not be planned gear down. When in-flight malfunctions prohibit gear retraction (except MLG rotational malfunctions), the local may continue after the cause of malfunction has been identified and the AC and maintenance supervisor concur. Do not exceed 200 KCAS/M.60.

4.19.1.4. Gear Down Flight Procedures.

4.19.1.4.1. Refer to Variant Configuration Fuel Planning, chapter **14.5.5**, for Gear Down Flight fuel planning.

4.19.1.4.2. Plan to not exceed 200 KCAS/M.60 to help prevent APU servicing door and gear door damage. When range is a factor, fly an airspeed that yields the

maximum range; do not exceed 250 KCAS/M.60. ***EXCEPTION:*** Tactical departures will not exceed 250 KCAS.

4.19.1.4.3. For planned gear down flight, the affected gear shall be pinned. The APU servicing door panel will be speed taped upon completion of the aircrew inspection and prior to flight. Taping may help prevent loss of the door panel. Only the door panel on the appropriate side requires speed tape.

4.19.1.4.4. After each gear down flight segment conduct a visual inspection. The MLG inspection will include affected gear-well area, LN2 servicing panel (if applicable), and doors. NLG inspection will include gear-well area, doors, folding bulkhead door, actuators, and brackets. This inspection may be accomplished by the flight engineer.

4.19.2. Operation with partial brakes. Limit operations with partial brakes only when necessary to recover the aircraft to a station that has confirmed repair capability. Any operations requiring more than one leg shall be coordinated with an AMC/A3V waiver.

Table 4.43. C-5M Flight Controls (C-5M) Refer to paragraph 4.20

FLIGHT CONTROLS (Table 4.43. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
43-1. AILERONS				
a. Aileron Actuator	2/wing	2/wing	2/wing	
b. Aileron Trim Actuator	2	2	1	**(B)** Aileron shall be centered prior to flight. Shall be repaired at next repair capable facility.
c. Aileron Trim Position Indicator	1	1	0	**(B)** Ailerons shall be centered prior to flight. Required for touch-and-go operations.
d. Aileron Artificial Feel	1	1	0	**(B)** One-time flight to repair capable facility.
43-2. ELEVATORS				
a. Inboard Elevator Actuator	2/control surface	2/control surface	2/control surface	
b. Outboard Elevator Actuator	3/control surface	3/control surface	3/control surface	

FLIGHT CONTROLS (Table 4.43. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
c. Elevator Artificial Feel System (VFUs)	2	2	0	If test equipment is not available, do not drain VFU bottles. **(B)** If both systems are inoperative: One-time flight to nearest repair capable facility. Do not engage pitch autopilot.
43-3. Horizontal Stabilizer Pitch Trim				
a. Normal Pitch Trim	1	1	0	**(B)** Alternate and manual trim shall be operative. One-time flight to nearest repair capable facility.
b. Alternate Pitch Trim	1	1	0	**(B)** Normal and manual trim shall be operative. One-time flight to nearest repair capable facility.
c. Manual Pitch Trim	1	1	1	
d. Trim Disconnect Switch	2	2	1	**(B)** Seat with operative switch shall be occupied at all times. One-time flight to repair capable facility.
e. Horizontal Stabilizer Trim Position Indicator	1	1	1	
43-4. RUDDERS				
a. Rudder Actuator	4	4	4	
b. Rudder Limiter	1	1	0	**(B)** MIN Q position shall be operative and selected to assure full rudder travel is available. Shall be repaired at next repair capable facility.
c. Rudder Trim	1	1	0	**(B)** Yaw Aug Man Trim shall be operative. Shall be repaired at next repair capable facility.

FLIGHT CONTROLS (Table 4.43. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
d. Rudder Trim Position Indicator	1	1	0	**(B)** One mechanical inclinometer shall be fully operative; Rudder shall be centered prior to flight. Required for touch-and-go operations.
e. Emergency Rudder (Yaw Aug Man Trim)	1	1	0	**(B)** Comply with flight manual section 5 limitations. One-time flight to repair capable facility.
43-5. FLAPS AND SLATS				
a. Flap Slat Asymmetry System	1	1	1	
b. Flap Position Indicator	1	1	0	**(B)** Slat indicator shall be operative. Scan flaps to verify approximate position. One-time flight to repair capable facility.
c. Ratio Shifters	2	2	0	**(B)** AUTO position of ratio shifters may be inoperative. Shall be able to manually position ratio shifters to the FLAPS UP and FLAPS DN position. Select matching position.
d. Slats	14	14	14	Refer to flight manual Section 5. See **paragraph 4.20**.

FLIGHT CONTROLS (Table 4.43. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
e. Slat Position Indicator	1	1	0	**(B)** Flap indicator shall be operative. Scan slats to verify position. If the PCIU is operative, use the associated EDS test points to determine slat position in addition to a visual scan. If the slats are retracted, the slat position indicator circuit breaker for the malfunctioning side may be opened to remove the maximum safe airspeed indicator and normal airspeed may be resumed. The associate air conditioning pack will default to low flow. Shall be repaired at next repair capable facility.
f. Slat Drive Disconnect Switch	1	1	0	**(B)** Takeoff and Landing will be conducted with slats retracted. See **paragraph 4.20**.
43-6. SPOILERS				
a. Flight Spoilers	10	10	10	
b. Ground Spoilers	8	8	8	
43-7. ALDCS	1	1	0	**(B)** Comply with flight manual Section 5 limitations. Shall be repaired at next repair capable facility.

FLIGHT CONTROLS (Table 4.43. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
43-8. Stability Augmentation System (SAS)				Refer to Before Taxi Checklist. When scheduled for aerial refueling, every effort should be made to launch with operative augmentation. With inoperative systems the applicable autopilot axis will be inoperative. For inoperative pitch autopilot see **paragraph 3.7.1.** for FDP limitations.
a. AUG Power Switch	1	1	1	
b. Pitch Augmentation	1	1	0	Shall be repaired at next repair capable facility. ***NOTE:*** Pitch Augmentation System is operative with one VIA/AIU subsystem/LRU disabled IAW the FE preflight procedure.
c. Lateral Augmentation	1	1	0	Shall be repaired at next repair capable facility. ***NOTE:*** Lateral Augmentation System is operative with one VIA/AIU subsystem/LRU disabled IAW the FE preflight procedure.
d. Yaw Augmentation	1	1	0	Refer to Yaw Augmentation Inoperative procedures in flight manual Sections 3 and 5. One time flight to a repair capable facility. ***NOTE:*** Yaw Augmentation System is operative with one VIA/AIU subsystem/LRU disabled IAW the FE preflight procedure.
43-9. Pilot Assist Servo System				

FLIGHT CONTROLS (Table 4.43. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
a. PACS Roll System	1	1	0	**(B)** Shall be repaired at next repair capable facility. ***NOTE:*** PACS Roll System is operative if the side passing the supplemental system checks is selected IAW the FE preflight procedure.
b. PACS Pitch System	1	1	0	**(B)** Shall be repaired at next repair capable facility. ***NOTE:*** PACS Pitch System is operative if the side passing the supplemental system checks is selected IAW the FE preflight procedure.
43-10. Automatic Flight Control System				
a. AFCS Power Switch	1	1	1	
b. Autopilot	2	2	*	**(B)** Mission dictates requirement. Pitch autopilot required for flights through RVSM airspace. If pitch autopilot is inoperative refer to **paragraph 3.7.** for FDP limitations. ***NOTE:*** Autopilot system is operative with one VIA/AIU subsystem/LRU disabled IAW the FE preflight procedure.
43-11. Autothrottle	2	2	0	***NOTE:*** Autothrottle System is operative with one VIA/AIU subsystem/LRU disabled IAW the FE preflight procedure.
43-12. Flight Control Hydraulic System Off Light/Pressure Switch	Outbd Elevator 3/flight control All others 2/flight control	Outbd Elevator 3/flight control All others 2/flight control	* Outbd Elevator 2/flight control All others 1/flight control	**(B)** Check the affected system for proper operation prior to flight.

FLIGHT CONTROLS (Table 4.43. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
43-13. Flight Control Hydraulic Power Shutoff Valve	Outbd Elevator 3/flight control All others 2/flight control	Outbd Elevator 3/flight control All others 2/flight control	* Outbd Elevator 2/flight control All others 1/flight control	**(B)** Verify valve is open prior to takeoff. Shall be repaired at next repair capable facility.

4.20. SLATS INOPERATIVE. Slats retracted flight operations will be limited to those sorties required to move the aircraft to the nearest repair capable facility. Slats retracted flight should only be considered after reasonable efforts to repair the aircraft have been attempted. AMC/A3V waiver approval is not required provided the airplane is being flown (slats retracted with flap system operational) to the nearest repair capable facility. If the airplane is on a red X for a slat malfunction the airplane home station MXG/CC must downgrade the red X per T.O. 00-20-1 prior to flight.

4.20.1. Slats extended flight operations: Refer to T.O. 1C-5M-1, Section 5, LIMITATIONS FOR CRUISE OPERATIONS WITH FLAPS UP – SLATS EXTENDED.

Table 4.44. Fuel Systems (C-5M) Refer to Paragraph 4.21

FUEL SYSTEMS (Table 4.44. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
44-1. Aerial Refuel System	1	*	*	Mission dictates requirement.
44-2. Aerial Refuel Slipway Light	2	*	*	Mission dictates requirement. At least one light required for night air refueling.
44-3. Main Tank Boost Pump	2/Tank	2/Tank	1/Tank	**(B)** Open affected pump circuit breaker. Crossfeed and isolation valves shall be operative.

FUEL SYSTEMS (Table 4.44. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
44-4. Auxiliary Tank Boost Pump	2/Tank	*	*	Mission dictates requirement. One pump per tank may be inoperative if tank contains/will contain fuel. Both pumps may be inoperative if tank does not/will not contain fuel. Open affected pump(s) circuit breaker(s).
44-5. Extended Range Tank Boost Pump	2/Tank	*	*	Mission dictates requirement. One pump per tank may be inoperative if tank contains/will contain fuel. Both pumps may be inoperative if tank does not/will not contain fuel. Open affected pump(s) circuit breaker(s).
44-6. Main Tank Press Low Light	4	4	3	**(B)** Both boost pumps shall be operative. Place both boost pumps on. Shall be repaired at next repair capable facility.
44-7. Fuel Jettison Valve	2	2	1	**(B)** One valve may be failed closed if all separation valves are operative.
44-8. Main Tank Fill Valve	4	4	3	**(B)** One valve may be failed open. Control fuel level with associated aux/ext range tank boost pumps. Shall be repaired at next repair capable facility.
44-9. Aux Tank Refuel Valve	4	*	*	Mission dictates requirement. Valves may be failed closed if the tank is not/will not be needed for fuel. If fuel is required in any Aux or Extended Range tank, refer to **paragraph 4.21**.

FUEL SYSTEMS (Table 4.44. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
44-10. Extended Range Tank Refuel Valve	4	*	*	Mission dictates requirement**.** Valves may be failed closed if the tank is not/will be needed for fuel. If fuel is required in any Extended Range tank, refer to **paragraph 4.21**.
44-11. Isolation Valve	4	4	3	**(B)** One valve may be failed closed. Respective crossfeed valve shall be operative. Shall be repaired at next repair capable facility.
44-12. Separation Valve	3	3	2	**(B)** Center separation valve may be failed closed if both aerial refuel isolation valves are operative. Outboard separation valves may be failed closed if the respective Isolation and crossfeed valves are operative.
44-13. Crossfeed Valve	2	2	1	**(B)** One valve may be failed closed; respective isolation valves and outboard separation valve shall be operative. Shall be repaired at next repair capable facility.
44-14. Ground Refuel Isolation Valve	2	2	1	
44-15. Manifold Press Low Light	4	4	2	**(B)** Inboard lights may be inoperative provided the associated manifold pressure gauge is operative.
44-16. Fuel Manifold Pressure Indicator	2	2	1	Both shall be operative for planned aerial refueling. **(B)** Separation valves and manifold press low lights shall be operative.

FUEL SYSTEMS (Table 4.44. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
44-17. Sump Low Warning	2	2	0	**(B)** The system shall be made safe prior to flight. Both associated outboard main tank boost pumps shall be operative. Place both main tank boost pumps on. Refer to Section 3 of the flight manual. Shall be repaired at next repair capable facility.
44-18. Main Tank Low Light	2	2	0	**(B)** Monitor fuel gauges for proper fuel sequence. Shall be repaired at next repair capable facility.
44-19. Vent Fill Light	2	2	0	**(B)** Control fuel level with associated aux/ext range tank boost pumps to preclude over filling. Shall be repaired at next repair capable facility.
44-20. Total Fuel Quantity Indicator	1	1	0	**(B)** Serviced tanks must have operative indicators. Shall be repaired at next repair capable facility.
44-21. Fuel Quantity Indicators	See **Paragraph 4.21**.			Do not launch with more than one inoperative fuel quantity indicator per wing. Symmetrically opposite indicator shall be operative. Refer to **paragraph 4.21**.
a. Main Tank Fuel Quantity Indicator	4	4	3	Refer to remarks in **44-21**. **(B)** No more than one indicator may be inoperative.
b. Auxiliary Tank Fuel Quantity Indicator	4	*	*	Mission dictates requirement. Refer to remarks in **44-21**.

FUEL SYSTEMS (Table 4.44. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
c. Extended Range Tank Fuel Quantity Indicator	4	*	*	Inoperative/malfunctioning system shall be made safe prior to flight. Refer to the flight manual Section 3. To refuel see **paragraph 12.15**. If fuel is not required in a tank with an inoperative indicator, verify the tank is empty prior to flight.

4.21. Fuel System. It is preferred to use standard fuel system management to the maximum extent possible. Comply with Sections 2 and 5 of the flight manual if non-standard fuel sequencing is required for a one time flight to the nearest repair capable facility.

4.21.1. For Ground Refueling Procedures with Inoperative Fuel Quantity Indicator, refer to **Paragraph 12.15**

4.21.2. Fuel Quantity Indicator Failure In Flight.

4.21.2.1. Line Missions. Comply with Section 3 of the flight manual. Continue as scheduled provided. Item 44-24 Remarks/Limitations/Exceptions are met and the destination has capability to safe affected tank IAW maintenance technical orders.

4.21.2.2. Local Missions. Comply with Section 3 of the flight manual and land as soon as practical. Flight may resume provided Item 44-21 Remarks/Limitations/Exceptions are met, maintenance personnel determined the nature of the malfunction, and the tank has been made safe IAW maintenance technical orders.

4.21.3. Aerial Refueling Missions.

4.21.3.1. Line Missions. Comply with Section 3 of the flight manual. Symmetrically opposite indicator shall be operative. Do not air refuel with more than one inoperative fuel quantity indicator per wing.

4.21.3.2. Local Missions. Do not conduct aerial refueling with an inoperative indicator until maintenance action has been performed (see **Paragraph 4.21.2.2**).

4.21.3.3. Servicing. During aerial refueling, fuel is placed in tanks with operative indicators first. Tanks with inoperative indicators should be serviced internally by transferring a known quantity from another tank.

4.21.3.4. Unless Section 5 of the flight manual, Maximum Allowable Fuel Differential limits are going to be exceeded, do not accomplish internal servicing until termination of refueling. However; if necessary, internal servicing may be accomplished in the precontact position.

4.21.3.5. When a main tank indicator is inoperative and total main tank fuel quantity is less than 30,000 pounds, simultaneously fill all main tanks prior to servicing other tanks using the following procedures:

4.21.3.6. Position the AUTO REF switch to MAN for transfer. Monitor symmetrically opposite indicator to judge quantity in tank with inoperative indicator.

4.21.3.7. After filling the main tanks, disconnect and obtain an off-load report to verify the quantity of fuel in the tank with the inoperative indicator. Aerial refueling may continue after confirming main tank fuel quantity. Further servicing of a tank with an inoperative indicator should be made using known quantities from internal sources.

4.21.3.8. If a fuel imbalance is suspected (heavy wing or excessive aileron trim requirements), terminate aerial refueling and obtain an off-load report. Prior to internal fuel transfer, verify quantity of fuel in tanks with inoperative indicators. Refueling may be continued after fuel is balanced.

Table 4.45. Electrics (C-5M).

ELECTRICS (Table 4.45. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
45-1. Integrated Drive Generator (IDG)	4	4	2	**(B)** One may be inoperative per wing provided the bus tie system (all functions) and ACXTR is operative.
45-2. Generator Relay (GR)	4	4	2	**(B)** One may be inoperative per wing provided the bus tie system (all functions) and cross tie relay is operative.
45-3. Bus Tie Relay (BTR)	4	4	2	**(B)** One may be inoperative per wing provided the ACXTR is operative. Generator shall be operative on engine with inoperative BTR.
45-4. APU Power Relay (APR)	1	1	1	
45-5. External Power Relay (EPR)	1	1	0	
45-6. AC Cross Tie Relay (ACXTR)	1	1	0	**(B)** If failed open, all IDG's shall be operational. If failed closed, one IDG per wing shall be operational. One time flight to a repair capable facility.

ELECTRICS (Table 4.45. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
45-7. AC Load Meter	4	4	2	**(B)** One may be inoperative per wing.
45-8. Generator Out Light	4	4	2	**(B)** Shall be operative for each working generator.
45-9. Bus Tie Open Light	4	4	4	
45-10. Aircraft Battery	1	1	1	
a. Aircraft Battery Switch	1	1	1	**(B)** OFF and BYP positions shall be operative.
b. Battery Charger Electronics Module (BCEM)	1	1	0	**(B)** If inoperative place the battery switch to BYP. Shall be repaired at next repair capable facility.
c. Aircraft Battery Light	1	1	0	**(B)** One-time flight to repair capable facility.
45-11. 600 Amp Current Limiter	1	1	1	
45-12. 750 Amp Current Limiter	1	1	0	**(B)** Both transformer rectifiers shall be operative. Only self contained APU start available. One-time flight to a repair capable facility.
45-13. Regulated Transformer Rectifier Unit (RTRU)	2	2	1	**(B)** 750 Amp current limiter shall be operative. One-time flight to nearest repair capable facility.
45-14. Isolated Bus Switch	1	1	1	
45-15. DC Load Meter	2	2	1	**(B)** Shall be operative for each operable RTRU.
45-16. DC Volt Meter	1	1	0	**(B)** Prior to applying electrical power, check battery voltage using external meter. One-time flight to repair capable facility.
a. DC Volt Meter Selector Switch	1	1	0	**(B)** One-time flight to repair capable facility.
45-17. Emergency Generator System	1	1	1	

ELECTRICS (Table 4.45. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
45-18. Emergency Bus Power Relay (EBPR)	1	1	1	
45-19. Interior Lights Master Switch	1	1	0	
45-20. Exterior Lighting		*	*	See AFI 11-202V3 requirements. Navigation lights (at least one bulb in each position) required for night operations. Anti-collision lights (1 upper and 1 lower) required for day or night operations.
45-21. Pilot/ Copilot AMP Panel Lighting	1	1	*	(B) Mission dictates requirement.
45-22. Flight Engineer/ Navigator AMP Panel Lighting	1	1	*	(B) Mission dictates requirement.

Table 4.46. Instruments (C-5M).

INSTRUMENTS (Table 4.46. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
46-1. Standard Central Air Data Computer (SCADC)	2	2	2	When one SCADC is replaced and test equipment is not available or the mission dictates, and the pitot static system has not been disturbed, a leak check may be deferred. Cross-check pilot and copilot airspeed indicators at 80 knots on takeoff roll. Abort the takeoff if airspeed differs by five knots or more. ***EXCEPTION:*** Maintenance leak and accuracy checks are required before flights in RVSM airspace

INSTRUMENTS (Table 4.46. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
a. SCADC drain bottles	12	12	12	If any portion of the colored indicator float ball is at or above the beveled edge of the bottle(s), specified bottle(s) should be drained. If test equipment is not available or the mission dictates a leak check may be deferred. Cross-check pilot and copilot airspeed indicators at 80 knots on takeoff roll. Abort the takeoff if airspeed differs by five knots or more. ***EXCEPTION:*** Maintenance leak and accuracy checks are required before flights in RVSM airspace
46-2. Magnetic Compass	1	1	1	
46-3. Accelerometer	1	1	0	**(B)** EDS shall be capable of monitoring in-flight loads.
46-4. Multifunction Display Units (MFDU)				
a. Pilots Station	6	6	4	**(B)** Operable units shall be installed in pilot's left, pilot's center, copilot's left and copilot's center positions.
b. Flight Engineer Station	1	1	1	Operable unit may be taken from pilot's or copilot's right position.
46-5. MFDU Controls				
a. Cursor Control Device (CCD)	2	2	1	**(B)** Cross-side function shall be operational. Operable CCD shall be installed on pilot's side. One-time flight to repair capable facility.
b. Cursor Control Panel (CCP)	1	1	1	
46-6. Multifunction Control Display Unit (MCDU)				

INSTRUMENTS (Table 4.46. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
a. Pilot	1	1	0	**(B)** Copilots and observers MCDU shall be operational. Circuit breaker for inoperative MCDU shall be pulled.
b. Copilot	1	1	1	
c. Observer	1	1	0	**(B)** Pilots and copilots MCDU shall be operational. Circuit breaker for inoperative MCDU shall be pulled.

Table 4.47. Avionics (C-5M).

AVIONICS (Table 4.47. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
47-1. Versatile Integrated Avionics (VIA)	2	2	1	**(B)** BIP shall be operational. Circuit breakers for associated VIA and AIU shall be pulled for flight. If C/B for VIA/AIU 1 is pulled, the VIA/AIU Alt power switch shall be placed to ALT for flight. Refer to Section 3 VIA/AIU Failures. One-time flight to nearest repair capable facility.
47-2. Avionics Interface Unit (AIU)	2	2	1	**(B)** BIP shall be operational. Circuit breakers for associated VIA and AIU shall be pulled for flight. If C/B for VIA/AIU 1 is pulled, the VIA/AIU Alt power switch shall be placed to ALT for flight. Refer to Section 3 VIA/AIU Failures. One-time flight to nearest repair capable facility.
47-3. VIA/AIU Alternate Power Switch	1	1	1	
47-4. Backup Integrating Processor (BIP)	1	1	0	**(B)** Both VIAs/AIUs shall be operational. One-time flight to nearest repair capable facility.
47-5. Bus Subsystem Interface Unit (BSIU)	2	2	2	

AVIONICS (Table 4.47. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
47-6. Data Loader	1	1	*	**(B)** Mission dictates requirement.
47-7. Communication Navigation Panel (CNP)	2	2	1	**(B)** If possible place the operative CNP in the pilot's position. MCDUs shall be operable.
47-8. Multi-Mode Receiver (MMR)	2	2	1	Two required for CAT II ILS approaches
47-9. V/UHF Radio	2	2	1	**(B)** Operational radio shall be placed in the #1 position.
47-10. HF Radio	2	1	*	Mission dictates requirement.
a. Datalink Printer	1	1	*	**(B)** Mission dictates requirement.
47-11. UHF #3	1	1	1	
47-12. Embedded Global Positioning System/Inertial Navigation System (EGI)	2	2	1	**(B)** Three sources of attitude required (1 EGI, MIRS and SAI). Shall be repaired at next repair capable facility. GPS function may be inoperative.
47-13. Micro Inertial Reference System (MIRS)	1	1	0	**(B)** Three sources of attitude required (2 EGIs and SAI). Shall be repaired at next repair capable facility.
47-14. IFF	1	1	1	Mode 3A and C shall be operative.
a. Mode 4 Computer	1	1	*	**(B)** Mission dictates requirement. Do not delay takeoff except when the aircraft will transit an area where safe passage procedures are implemented. In-flight failures: Continue to intended destination. Where safe passage is implemented, follow procedures for inoperative Mode 4.
47-15. TCAS System	1	1	0	**(B)** Shall be repaired at next repair capable facility.
a. Mode S	1	*	*	Mission dictates requirement.
47-16. Flight Management System (FMS)	2	2	1	**(B)** Refer to Unable RNP Procedures.
47-17. Standby Attitude Indicator (SAI)	1	1	0	Both EGIs and the MIRs shall be operational. Line missions – Shall be repaired at next repair capable facility.

AVIONICS (Table 4.47. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
47-18. Navigation Database	1	1	1	The aircraft must always have a database loaded. May not depart any location with database loading capabilities with an expired database. ***NOTE:*** The PIC may request loading of the next period's database if the current database will expire prior to reaching a database capable location. Comply with AFI 11-202V3.
47-19. Interphone System				Shall be able to communicate with all occupied positions.
a. Cockpit Loudspeaker	3	3	1	
b. Microphone Switch (Yoke)	2	2	1	**(B)** Shall be repaired at next repair capable facility.
c. Microphone Switch (Floor)	2	1	0	Should be operative at flight engineer position.
d. Interphone Cords	16	*	*	One required for each occupied primary crew position. Cargo compartment cords are mission dependent.
47-20. Public Address (PA) System	1	1	0	**(B)** If inoperative in troop compartment, interphone communications shall be maintained when compartment is occupied.
a. Troop Compartment PA	1	1	*	**(B)** Shall be operative when carrying passengers unless other means of communication is available (i.e., bullhorn).
47-21. Avionics Equipment Cooling System				
a. Avionics Cooling Fan	2	2	1	**(B)** Shall be repaired at next repair capable facility.
b. Flight Engineer's Panel Fan Fail Light	1	1	1	**(B)** Periodically check fan in-flight.
c. Flight Engineer's Panel Fan	1	1	1	
d. EPC Equipment Rack Fan	2	1	1	Refer to Section 3 for ground operating limits.

AVIONICS (Table 4.47. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
e. AC Load Center Equipment Fan	1	1	0	**(B)** Periodically scan courier compartment. Shall be repaired at next repair capable facility. Refer to flight manual Section 3 for ground operating limits.
f. A-41 Rack Fan	1	1	0	**(B)** Periodically scan A-41 rack in-flight. One-time flight to repair facility. Refer to flight manual Section 3.
g. Avionics Supplemental Cooling Fan	1	1	0	**(B)** Periodically scan avionics compartment. Shall be repaired at next repair capable facility.
47-22. Radar Altimeter	2	2	1	The operative radar altimeter must be selected to the PFD of the pilot controlling the AFCS.
47-23. Weather Radar	1	1	*	**(B)** Shall be operative for all flights into areas of known or forecast thunderstorms.

Table 4.48. Recording and Emergency Location (C-5M).

RECORDING & EMERGENCY LOCATION (Table 4.48. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
48-1. Emergency Locator Transmitter (ELT)	1	1	1	May be inoperative for local airland flights at or in the vicinity of home station. FIR shall be operative.
48-2. Digital Flight Data Recorder (DFDR)	1	1	0	**(B)** DFDR may be inoperative provided CVR is operative. Shall be repaired at next repair capable facility.
48-3. Cockpit Voice Recorder (CVR)	1	1	0	**(B)** CVR may be inoperative provided DFDR (including all DFDR inputs) is operative. Shall be repaired at next repair capable facility.

Table 4.49. Embedded Diagnostic System (EDS) (C-5M).

EMBEDDED DIAGNOSTIC SYSTEM (EDS) (Table 4.49. C-5M)		
Item/System	**Installed**	**Required**

		A	B	Remarks/Limitations/Exceptions
49-1. Auxiliary Maintenance Computer (AMC)	1	1	0	**(B)** Refer to **paragraph 12.17.3**. Shall be repaired at next repair capable facility.
49-2. Personal Computer Interface Unit (PCIU)	1	1	0	**(B)** Refer to **paragraph 12.17.2.**
49-3. Remote Memory Module (RMM)	1	1	0	**(B)** Shall be repaired at next repair capable facility.
49-4. Printout Unit (POU)	1	1	0	
49-5. Remote Interface Unit (RIU)	6	6	3	**(B)** Operative RIUs shall be placed in odd numbered positions. Place operative even RIUs in the following sequence: 6, 2, 4. Refer to flight manual Section 3.
49-6. Bus Adapter Unit (BAU)	2	2	1	**(B)** Operative BAU shall be placed in the right hand (#2) position. Shall be repaired at next repair capable facility.

Table 4.50. Cargo Door System (Troop & Cargo) (C-5M).

CARGO DOOR SYSTEM (Table 4.50. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
50-1. Visor and Forward Ramp	1	*	*	Mission dictates requirement. May depart if manual override is required to open, close, or lock the visor or forward ramp assembly. Door locks may be inoperative if all locks are confirmed locked and are not required for the mission.
50-2. Forward Ramp Manual Locking Pin	8	8	8	**(B)** If locking ball is missing, secure pin with safety wire and annotate in AFTO Form 781A.
a. Yellow Streamer	8	8	0	
b. Mechanical Lock Indicator	10	10	0	**(B)** Verify all locks are locked; lock indicator lights shall be operative.
50-3. Visor Door Mechanical Lock Indicator	23	23	0	**(B)** Verify all locks are locked; lock indicator lights shall be operative.
50-4. Ramp Extension Support Jack	4	*	*	Mission dictates requirement. Refer to T.O. 1C-5A-9 for loading limitations when less than four jacks are serviceable.

CARGO DOOR SYSTEM (Table 4.50. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
50-5. Aft Cargo Doors and Ramp	1	*	*	Mission dictates requirement. May depart if manual override is required to open, close, or lock the doors or aft ramp assembly. Door locks may be inoperative if all locks are confirmed locked and are not required for the mission.
50-6. Aft Ramp Manual Locking Pin	14	14	14	**(B)** If locking ball is missing, secure pin with safety wire and annotate in AFTO Form 781A.
a. Yellow Streamer	14	14	0	
b. Mechanical Lock Indicator	14	14	0	**(B)** Verify all locks are locked; lock indicator lights shall be operative.

Table 4.51. Oxygen System (C-5M).

OXYGEN SYSTEM (Table 4.51. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
51-1. 25 Liter Converter	1	1	0	**(B)** 25 liter converter may be inoperative provided the other converter is serviced with an adequate quantity for the mission. May result in passenger limitations. Line missions--shall be repaired at next repair capable facility.
51-2. 75 Liter Converter	1	1	0	**(B)** 75 liter converter may be inoperative provided the other converter is serviced with an adequate quantity for the mission. Will result in passenger limitations. Line missions--shall be repaired at next repair capable facility.
51-3. Oxygen Shut-off Valve	1	1	1	
51-4. Recharging Hose	10	10	7	**(B)** No more than one inoperative per compartment. Shall be repaired at next repair capable facility.

OXYGEN SYSTEM (Table 4.51. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
51-5. Flight Crew Oxygen Regulator	5	5	3	**(B)** P, CP, and FE positions shall be operative. Navigator and Observer position shall be operative if occupied.
51-6. Relief Bunk Oxygen System	6	6	0	**(B)** Do not occupy bunk with inoperative regulator above 10,000 Ft MSL.
51-7. Continuous Flow Oxygen Regulator	2	2	2	
51-8. Drop-Down Mask	101	*	*	One per occupied seat in each compartment. May result in passenger limitations.
51-9. Oxygen Quantity Indicator (25 liter)	1	1	0	**(B)** 75 liter indicator shall be operative. If required for mission and servicing capability exists, service 25 liter converter prior to launch.
51-10. Oxygen Quantity Indicator (75 liter)	1	1	0	**(B)** 25 liter indicator shall be operative. If required for mission and servicing capability exists, service 75 liter converter prior to launch.
51-11. Quantity Low Light	2	2	1	**(B)** When serviced, corresponding quantity indicator shall be operative.
51-12. Oxygen Quantity Indicator (25 liter) Test Switch	1	1	0	**(B)** 75 liter indicator shall be operative. If required for mission and servicing capability exists, service 25 liter converter prior to launch.
51-13. Oxygen Quantity Indicator (75 liter) Test Switch	1	1	0	**(B)** 25 liter indicator shall be operative. If required for mission and servicing capability exists, service 75 liter converter prior to launch.
51-14. Oxygen Warning System	1	1	1	Not required for flights below 10,000 ft MSL. If passengers are on board, and the oxygen warning system is inoperative, the flight is limited to 10,000 ft MSL. If flight above 10,000 ft MSL is required, the crew shall be on oxygen. Shall be repaired at next repair capable facility.

OXYGEN SYSTEM (Table 4.51. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
51-15. EPOS	88	*	*	One per occupied seat in each compartment. May result in pax limitations.
51-16. Portable Oxygen Bottles	16	16	*	Crewmembers entering/transitioning a compartment without quick access to oxygen bottles in flight must carry a portable oxygen bottle. Crewmembers occupying a primary crew position without a quick don oxygen mask require a portable oxygen bottle.

Table 4.52. Warning Systems (C-5M).

WARNING SYSTEMS (Table 4.52. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
52-1. Stallimiter System	2	1	1	One fully functioning system required for all departures.
52-2. Enhanced Ground Proximity Warning System (EGPWS)	1	1	0	**(B)** Shall be repaired at next repair capable facility. Altitude alerting required for RVSM airspace.
52-4. Master Caution Light	2	2	0	**(B)** CWA aural alerts and a minimum of one reset function must be operative.
52-5. Door Warning System (Lock Status Lights)				
a. Visor	25	25	25	**(B)** If all flight manual Section 3 criteria are met, one lock may be in bypass.
b. Forward Ramp	2	2	0	**(B)** Lights may be inoperative provided mechanical pins are installed and the locks are verified locked.
c. Crew Entrance Door	1	1	1	

WARNING SYSTEMS (Table 4.52. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
d. Aft Ramp	2	2	0	**(B)** Lights may be inoperative provided mechanical pins are installed and the locks are verified locked.
e. Fwd Underfloor Access Door	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
f. Aft Winch Access Hatch	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
g. Aft Bilge Access Hatch	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
h. Forward Bilge Access Hatch	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked.
i. Left and Right Side Cargo Doors	4	4	0	**(B)** Lights may be inoperative provided the door(s) are verified closed and locked.
j. Center Cargo Door	2	2	2	
k. Ramp to Pressure Door	4	4	2	**(B)** Outboard lights may be inoperative provided the door is verified closed and locked.
l. Horizontal Stabilizer Access Door	1	1	0	**(B)** Light may be inoperative provided the door is verified closed and locked. Repair as soon as practical.
52-6. Smoke Detector System	1	1	0	**(B)** If any component is inoperative, the associated compartment shall be scanned at least once every hour. FSS detection system (if applicable) shall be fully operative. Troop compartment shall be occupied if troop/center wing detector is inoperative and additional crewmembers are available.
52-7. Bailout Alarm	1	1	0	**(B)** PA should be operative. If PA system is inoperative, interphone communication shall be maintained.

Table 4.53. Fire Suppression System (FSS) (C-5M) Refer to Paragraph 4.22

FIRE SUPPRESSION SYSTEM (FSS) (Table 4.53. C-5M)

Item/System	Installed	Required		
		A	B	Remarks/Limitations/Exceptions
53-1. DEWARS	2	2	1	**(B)** FSS system functions shall be operative. Some malfunctions may require the dewar to be drained.
53-2. Nitrogen Fire Suppression Control Panel	1	1	1	Shall be capable of fire warning and discharge. ***EXCEPTION:*** Discharge capability is N/A when LN2 is depleted and no servicing capability exists.
53-3. Nose Wheel Well Control Panel	1	1	0	**(B)** Shall be repaired at next repair capable facility.
53-4. Optical Detection	1	1	0	**(B)** If any component is inoperative, associated compartment shall be scanned every hour. Smoke detection system shall be fully operative. One-time flight to repair capable facility.
53-5. Isolation Valve	2	2	*	**(B) S**hall be operative for each serviced dewar.
53-6. Outboard Main Tank ΔP Switch	2	2	0	**(B)** Do not pressurize wings (vent wings). Shall be repaired at next repair capable facility.
53-7. Overboard Relief Valves	2	2	1	**(B)** Shall be operative for each serviced dewar.
53-8. Pressure Limiters	2	2	*	**(B)** Shall be operative for each serviced dewar.
53-9. Primary Climb/Dive Valve	2	2	0	**(B)** Secondary climb/dive valve must be operative. Manual override shall be operative.
53-10. Primary Regulator	2	2	*	**(B)** Shall be operative for each serviced dewar.
53-11. Secondary Climb/Dive Valve	2	2	0	**(B)** Primary climb/dive valve must be operative. Manual override shall be operative.
53-12. Secondary Pressure Regulator	2	2	*	**(B)** Shall be operative for each serviced dewar.
53-13. Vent Box Float Switch	2	2	2	
53-14. Wing Pressure Warning System	2	2	2	

FIRE SUPPRESSION SYSTEM (FSS) (Table 4.53. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
53-15. Liquid Nitrogen Service Panel	1	1	1	**(B)** As long as safety-of-flight is not affected, some functions may be inoperative. Repair at next repair capable facility.
53-16. Central Processing Unit (CPU)	1	1	1	Shall be capable of fire warning and discharge. ***EXCEPTION:*** Discharge capability is N/A when LN2 is depleted and no servicing capability exists.
53-17. FSS Fire Detection	1	1	1	

4.22. FSS Servicing.

4.22.1. Because of the increased safety margin provided by the FSS, obtain full LN2 servicing at stations with servicing capability. ***NOTE:*** Fully serviced is defined as 650 pounds per operational dewar to allow for gauge inaccuracies, automatic shutoff settings, and LN2 boil-off.

4.22.2. Home Station Departures. The airplane will be fully serviced.

4.22.3. En Route Stations WITH Servicing Capability. The airplane will be fully serviced unless directed otherwise by the PIC. ***EXCEPTION***: Station supply depleted or equipment malfunctions (all servicing trucks inoperative).

4.22.3.1. PIC should pass less than full LN2 requirements for next mission leg during maintenance debrief.

4.22.4. En route Stations WITHOUT Servicing Capability. The mission may be continued regardless of the amount of LN2 on board. If the remaining LN2 will be depleted prior to the next en route stop, vent wings to retain a fire fighting reserve. Do not vent wings until just prior to descent; make an AFTO Form 781information entry.

4.22.5. Local Missions. Not less than that required for the planned mission duration (plus an adequate fire fighting reserve). For ERCCs, airplanes will be fully serviced for the first half to ensure the second half will have adequate LN2.

4.22.6. General Requirements.

4.22.6.1. Flight is not permitted with system LN2 (liquid nitrogen) leaks in excess of 50 pounds per dewar per 12 hours. Allow 1 hour after servicing for system stabilization prior to start of leak check. Flight may be permitted if the leaking dewar is drained (refer to Item 53-1).

4.22.6.2. Use the following values to calculate the minimum amount of LN2 required by **paragraphs 4.22.3.1** and **4.22.5** These values are guides; amounts used may vary. Document significant variations in AFTO Form 781. Two hundred fifty (250) pounds required for firefighting (adequate for one application to the largest zone) plus:

4.22.6.3. Twelve pounds for every 1,000-feet of descent planned during a line or AAR mission. EXAMPLE: An AAR mission that requires an 8,000-foot descent from initial level off altitude to rendezvous altitude, followed by a final cruise altitude of FL370 will need 540 pounds of LN2. (8,000 + 37,000 = 45,000 feet of total descent x 12 = 540 pounds).

4.22.6.4. One hundred twenty (120) pounds will be used for each hour of local transition flying.

4.22.7. Missions expecting to transit a threat environment

4.22.7.1. If nitrogen servicing is not available at the last stop prior to entering the threat environment, FE's will adhere to the following.

4.22.7.2. NON-THREAT ENVIRONMENT LEGS. After departing the last station with servicing capability, vent the wings prior to each descent. Enter an information note in the AFTO FORM 781A each time the wings are vented.

4.22.7.3. THREAT ENVIRONMENT LEGS. Regardless of the nitrogen quantity, do not vent wings on legs into and within threat locations.

4.22.7.4. Nitrogen is not required to fly in a threat environment. If nitrogen is not available, do not delay the mission.

Table 4.54. Emergency Equipment (C-5M).

EMERGENCY EQUIPMENT (Table 4.54. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
54-1. Life Raft/Survival Kit	4	4	*	**(B)** Mission dictates requirement. Troop compartment rafts may be inoperative or missing; however, total troop passengers will be reduced by 25 per inoperative raft. A raft shall be installed at the #2 escape hatch. A raft shall be installed at #6 service door when the troop compartment is occupied. ***EXCEPTION:*** Locals/Depot sorties may operate without a life raft provided the flight will not take place over water; a survival kit will be carried.
54-2. Descent Reel	24	24	*	**(B)** One required per occupant on the flight deck.

EMERGENCY EQUIPMENT (Table 4.54. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
54-3. Escape Slide/Exit	5	5	*	**(B)** Mission dictates requirement. The #5 service door slide/exit shall be operational. If troop compartment is occupied, #4 hatch and #6 service door slide/exits shall be operational. Limit troop compartment to 40 pax/crew when 3L and/or 3R troop compartment slide/exit is not operational.
54-4. Escape Rope	8	8	*	**(B)** Mission dictates requirement. Three escape ropes shall be installed in the cargo compartment and one above the troop compartment ladder. Troop compartment exits, slides, and life rafts are not considered operative unless an escape rope is installed.
54-5. First Aid Kit	22	22	*	**(B)** Mission dictates requirement. Full complement required when carrying personnel in the troop compartment. If troop compartment is not occupied, a minimum requirement of 5 on the flight deck and 2 in the cargo compartment.
54-6. Fire Extinguishers				
a. Aircraft with operative FE 1301 System	15	15	9	**(B)** Minimum of 3 operative extinguishers per compartment (flight deck, cargo, troop). Shall be replaced/repaired at next repair capable facility.
b. Aircraft with inoperative FE 1301 System	17	17	10	**(B)** Minimum of 3 operative extinguishers per compartment (flight deck, cargo, troop), plus 1 additional extinguisher of not less than 1-gallon in the cargo compartment. Shall be replaced/repaired at next repair capable facility.
54-7. Life Vest	95	*	*	**(B)** Mission dictates requirement. One per occupant during over water flights. May result in pax limitations.
54-8. Crash Axe	3	3	2	**(B)** A minimum of one crash axe shall be available on the flight deck and one available in the troop.

EMERGENCY EQUIPMENT (Table 4.54. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
54-9. Emergency Exit Light	12	12	*	**(B)** Required for all operative exits. An emergency exit light may be repaired by replacing (2) 327 bulbs if not charging. Troop compartment lights not required when compartment is unoccupied. May result in pax limitations.
54-10. Rope Ladder	1	1	0	Both release handles required to consider ladder operative. **(B)** Not required if emergency escape slide and emergency descent reels (1 per occupant) are operative. Shall be repaired at next repair capable facility.
54-11. FE 1301	20	0	0	Bottles may be inoperative as long as detection system is operative. If inoperative 1 fire extinguisher of not less than 1-gallon shall be placed in the cargo compartment. If an additional fire extinguisher is not available, one-time flight to repair capable facility.

Table 4.55. Miscellaneous Equipment (C-5M).

MISCELLANEOUS EQUIPMENT (Table 4.55. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
55-1. Lock Blocks, Pressure Door Hinge	2	2	*	**(B)** Mission dictates requirement.
a. F-valve Safety Guard	1	1	0	
55-2. Night Curtain	2	0	0	
55-3. Service Door Safety Gate	2	2	0	
55-4. Window Shade	12	6	6	Six required in cargo compartment.
55-5. Winch	2	*	*	Mission dictates requirement. One required for all cargo missions.

MISCELLANEOUS EQUIPMENT (Table 4.55. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
55-6. Water System, Potable	1	0	0	When serviced, all functions shall be operative. If inoperative, system shall be drained prior to flight.
55-7. Latrines				
a. Crew	1	1	0	**(B)** Troop compartment latrines shall be operable. Shall be repaired at next repair capable facility
b. Troop Compartment	2	2	0	**(B)** One-time flight to repair capable facility. ***EXCEPTION:*** Mission may continue with both inoperative with C2 concurrence and troop compartment unoccupied. Mission may continue with one inoperative with C2 concurrence and troop compartment occupancy IAW Addenda A.

Table 4.56. Defensive Systems (C-5M).

DEFENSIVE SYSTEMS (Table 4.56. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
56-1. Defensive System	1	*	*	Mission dictates requirement. ***NOTE*:** System is operational if the MWS and/or LAIRCM is fully operational. The AN/ALE-47 CMDS must be working for either system to be operational.
56-1. AAR-47 (MWS Sensors)	4	*	*	Requires all 4 sensors for operation. AAR-47 is not required when ALQ-24 LAIRCM Lite is operational and ALE-47 CMDS, is capable of manual flare dispense.
56-2. ALE-47 (CMDS)	1	*	*	Must be capable of flare dispense in auto and manual modes. ALE-47 is not required when ALQ-24 LAIRCM Full, is fully operational.

DEFENSIVE SYSTEMS (Table 4.56. C-5M)				
Item/System	**Installed**	**Required**		
		A	**B**	**Remarks/Limitations/Exceptions**
56-3. ALQ-24 (LAIRCM)	1	*	*	ALE-47 must be capable of flare dispense in auto and manual mode if configured with LAIRCM Lite (two Turrets). ALE-47 not required when configured with LAIRCM Full (Three Turrets).
56-4. AAR-54 (LAIRCM Sensors)	4	*	*	Requires all 4 sensors for operation.

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. Currency of notes is a crewmember's responsibility.

5.1.1. Checklist Inserts. MAJCOM/A3V and the AFMC Flight Manual Manager are the checklist insert approval authorities. Send checklist inserts to MAJCOM/A3V, who will in turn coordinate with AFMC for approval. All checklist inserts must have a POC. OGVs shall approve local in-flight guides and inserts not affecting flight manual guidance and procedures.

5.1.2. Abbreviated checklists items that do not apply to the unit's aircraft or mission may be lined out.

5.1.3. Emergency checklists. Either pilot may be required to accomplish an emergency checklist from either seat. The pilot accomplishing the checklist must ensure compliance with all checklist items regardless of which crew position (PF, PM, P, CP) is designated to respond.

5.2. Duty Station. Both pilots and flight engineer shall be in their seats during flight. One of them may be out of their seat for brief periods to meet physiological needs. With both pilots in their seats, PICs may authorize rest periods for one pilot occupying a primary duty station during non-critical phases of flight (the other pilot will be awake and alert). When additional aircrew personnel are on board, the observer's seat should be occupied, preferably by a C-5 qualified pilot if available, to assist the crew in avoiding other aircraft during ground operations, takeoffs, departures, penetrations, approaches and landings. Crewmembers will notify the pilot prior to departing assigned primary duty stations.

5.3. Flight Station Entry. PICs may authorize passengers and observers access to the flight station during all phases of flight; the total number of persons permitted is limited to the number of seats with operable seat belts and oxygen. Passengers and observers will not be permitted access to primary crew positions.

5.4. Takeoff and Landing Policy. An aircraft commander, or above, will occupy either the left or the right seat during all takeoffs and landings. The designated PIC (A-code) is not required to occupy a primary position, but still retains overall authority for conduct of the mission.

5.4.1. An AC or IP will make all takeoffs and landings during:

5.4.1.1. Aircraft emergencies, unless conditions prevent compliance.

5.4.1.2. Airlift of nuclear weapons.

5.4.1.3. Category II ILS approaches and landings when the weather is below Category I minimums.

5.4.1.4. Substandard airfield operations.

5.4.2. Unless the other pilot in the seat is a certified AC or higher, pilots in command (PIC) with less than 100 primary assigned aircraft (PAA) hours since AC certification will make all takeoffs and landings under any of the following conditions:

5.4.2.1. Ceiling/visibility less than 300 feet and/or RVR 40 (3/4 SM visibility).

5.4.2.2. RCR less than 12.

5.4.2.3. Crosswind component greater than 15 knots.

5.5. Landing Gear and Flap Operating Policy. The pilot flying (PF) will command configuration changes. The pilot monitoring (PM) will verify appropriate airspeed and configuration prior to echoing the gear or flap actuation command. All gear operation will be activated by the pilot in the right seat and all flap operation will be activated by the PNF. ***EXCEPTION:*** During touch-and-go landings the IP/EP may activate the flaps as PF.

5.6. Outside Observer/Jump Seat Duties. Available crewmembers will assist in clearing during taxi operations, receiver air to air refueling (AAR), 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 (unless authorized by the PIC). Crewmembers will have seat belts fastened when occupying a duty position, unless crew duties dictate otherwise.

5.7.2. Crewmembers performing instructor or flight examiner duties are exempt from seat belt requirements if not occupying a primary crew position; however, they will have a seat available with an operable seat belt.

5.7.3. Litter patients, actual or simulated, must remain secured on litters for takeoff and landing.

5.8. Aircraft Lighting. IAW AFI 11-202V3, AFI 11-218, *Aircraft Operations and Movement on the Ground*, and applicable T.O.s.

5.9. Portable Electronic Devices. IAW AFI 11-202V3.

5.9.1. Do not connect unauthorized equipment (laptop computers, video equipment, food preparation equipment, radios/tape players, CD players, etc.) to the aircraft intercom, PA, radio systems, or electrical system. Approved vacuum cleaners are authorized for ground use.

5.9.2. Aircrew members shall not use uncertified Government Furnished Equipment (GFE) or personal devices with RF transmit/receive capability on AMC aircraft carrying hazard class 1 explosive cargo at anytime. Prohibited devices include cellular phones, and laptop computers/PDAs with wireless capability enabled (i.e. Bluetooth). Loadmasters will ensure passengers comply with this restriction. Aircrew members may use certified GFE such as PFPS laptops and PDAs with infrared transmitters.

5.9.3. The following handheld (HH) GPS units meet the requirements of AFI 11-202v3 and may be used with approved laptop computers in flight: Bendix King KLX100 and Garmin GPS 35-USB.

5.9.3.1. The use of HH GPS for moving map display (MMD) is designed as a situational awareness tool and its use is voluntary.

5.10. Tobacco Use on Air Force Aircraft. Tobacco use of any type is prohibited on Air Force aircraft.

5.11. Advisory Calls. The PF will announce intentions for departures, arrivals, approaches, and when circumstances require deviating from normal procedures. The PM will make all advisory calls except those designated for other crewmembers. ***NOTE***: Automated aircraft advisory calls satisfy this requirement. Mandatory calls are as follows:

5.11.1. During climb out and descent the PF will call departing X altitude for Y altitude when initiating altitude changes.

5.11.2. Deviations.

5.11.2.1. Any crewmember will immediately notify the PF when deviation of heading (+/- 10 degrees), airspeed (+/-10 kts), or altitude (+/- 100 feet) is observed and no attempt is being made to correct the deviation.

5.11.2.2. Any crewmember seeing a potential terrain or obstruction problem will immediately notify the PF.

5.11.3. Advisory calls: Refer to **Table 5.1** through **Table 5.4** for a listing of mandatory advisory calls, responses, and aircrew actions.

Table 5.1. Climb Out.

PHASE OF FLIGHT	PM CALL	PF RESPONSE
Transition Altitude	"Transition Altitude, 29.92"	"Transition Altitude, 29.92"
1000 below assigned altitude	"Altitude (passing) for Altitude (assigned)"	"Altitude (passing) for Altitude (assigned)"

Table 5.2. Descent.

PHASE OF FLIGHT	PM CALL	PF RESPONSE
Transition Level	"Transition Level (local altimeter)"	"Transition Level (local altimeter)"
1000' above assigned altitude	"Altitude (passing) for Altitude (assigned)"	"Altitude (passing) for Altitude (assigned)"

Table 5.3. Non-precision Approaches (4).

PHASE OF FLIGHT	PM CALL	PF RESPONSE
100' above Final Approach Fix (FAF) altitude	"100 above"	

100’ above step down altitude	“100 above”	
100’ above Minimum Descent Altitude (MDA)	“Approaching Minimums”	Acknowledge
At MDA	“Minimums”	
Runway environment in sight	“Runway in sight”	“Landing” or “Going Around”
Missed Approach Point (MAP)	“Missed Approach Point” (3)	“Landing” or “Going Around”

Table 5.4. Precision Approaches (4.

PHASE OF FLIGHT	PM CALL	PF RESPONSE
100 feet above glide slope intercept altitude	“100 above”	
100 feet above Decision Height (DH) /Decision Altitude (DA)	“Approaching Minimums”	Acknowledge
At DH/DA	“Minimums”	(2)
Only approach lights in sight (CAT I ILS)	“Approach lights in sight”	“Continuing” (1)
Runway environment in sight	“Runway in Sight”	“Landing” or “Going Around”
Approach lights and/or runway environment not in sight	“Go around”	“Going around”
At 100’ Above TDZE (CAT I ILS)	“100 feet” (3)	“Landing” or “Going around”

NOTES:

(1) With weather at CAT I minimums on a CAT I ILS, the pilot may not see the runway environment at DA; however, the initial portion of the approach lights may be visible. The pilot may continue to 100 HAT with reference to the approach lights only. The pilot may not descend below 100 feet above touchdown zone elevation using the approach lights as reference unless the red terminating bars or the red side row bars are distinctly visible and identifiable.

(2) The PF will announce his/her intentions to either land, continue (CAT I), or go-around. Respond with the intention to land if runway environment is in sight, will remain in sight throughout touchdown and the aircraft is in a position for a safe landing.

(3) If the pilot flying has stated “landing” then this call is not required.

(4) Refer to stabilized approach criteria in paragraph 5.12.

5.12. Stabilized Approach. Unstable approaches are primary contributors to numerous military and civilian mishaps. Stabilized approaches are essential for the safe operation of aircraft and are mandatory. The following criteria define specific parameters that mitigate risk during this critical phase of flight. This philosophy requires aircrew to take immediate corrective actions to stabilize the approach when outside designated parameters.

5.12.1. The following criteria apply to all approaches:

5.12.1.1. At 1000 feet AGL:

5.12.1.1.1. Aircraft is in approach configuration. Circling configuration is acceptable for circling approaches.

5.12.1.1.2. Airspeed is appropriate for the configuration and conditions.

5.12.1.1.3. Sink rate is no greater than 1000fpm. ***NOTE:*** Under certain conditions (WX, Threats, Terrain, etc.) some IAPs and Tactical Approaches may require greater than a 1000 fpm descent rate.

5.12.1.1.3.1. Non-precision Approaches. Pilots should calculate a constant descent gradient profile from the FAF altitude to the VDP (IAW AFMAN 11-217V1). This is considered the safest profile and should be used to the max extent possible. During a go-around, ensure descent below the MDA does not occur.

5.12.1.1.4. All briefings and checklists are complete unless contrary to T.O. guidance.

5.12.1.1.5. Aircraft is on the correct track.

5.12.1.1.6. Aircraft in the correct bank angle to maintain proper approach track for instrument, circling, or visual/tactical approach.

5.12.1.1.7. Power set to maintain the descent profile at approach speed.

5.12.1.1.8. If these criteria are not met by 1000 feet AGL, the PM will announce the deviation and the PF will take immediate corrective action. PM states “1000 xxxx,” where “xxxx” equates to a concise description of the unstable characteristic(s) which clearly relay to the PF what actions are required to return the aircraft to a stable platform. Examples: “1000, fast,” or “1000, half dot low”. If criteria are met, PM will simply state “1000.”

5.12.1.2. From 500 AGL to the runway, if these parameters are exceeded the PM will announce “Go-Around” and the PF will execute a go-around/missed approach. If criteria for stable approach are met, the PM will state “500.”

5.12.1.3. Momentary minor corrections or deviations are acceptable and defined as:

5.12.1.3.1. Airspeed: +10/-5 kts from target

5.12.1.3.1.1. Bank Angle: +/- 15 degrees from target

5.12.1.3.1.2. Rate of Descent: +/- 300 FPM from target

5.12.2. Descent Planning and Energy Management. Aircrews will ensure the aircraft is following the planned descent profile. All non-tactical descents should follow a normal descent profile IAW AFMAN 11-217V1 procedures and techniques in the absence of ATC or FLIP guidance. All tactical descents should follow published tactical procedures/profiles. When unforeseen interruptions alter the planned descent, immediately correct any deviations. It may be necessary to hold, request vectors, or take alternate actions in order to comply with the planned descent profile.

5.12.3. Visual Transition. It is imperative for aircrews to review the airfield environment. Identify key features such as approach light type, airfield lighting, geographic layout/configuration of runways, taxiways, ramps, etc. To the max extent possible, this study will take place during the crew mission briefing and reviewed again prior to descent.

5.12.4. Missed Approach/Go-Around. Aircrews will conduct a thorough briefing for anticipated missed approach/go-around scenarios. This briefing will include a discussion of specific crewmember duties.

5.12.5. Tactical Approaches. It is recognized the above criteria is not always valid due to the type of tactical approach required. In these situations (either real-world or training as briefed by Intel/Tactics or attained from other valid threat sources, e.g. GCI, AWACS, Tower, etc.) the PF is required to brief the maneuver parameters prior to execution, to include when to expect the aircraft to be stable and when to go around. If the threat is known prior to departure, the crew will accomplish briefing prior to departure during mission planning. If the threat arises during the sortie, the PIC will include the stability requirements as part of the arrival briefing.

5.12.6. FTUs only. FTUs will train students to ensure they understand and are capable of complying with all aspects of stabilized approach criterion. FTU instructors must use their expertise and experience to deviate from the guidelines of stabilized approach criteria as required during appropriate instructional scenarios.

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

5.13.1. Aircraft Interphone. Primary crewmembers will monitor interphone during critical phases of flight. Crewmembers will advise the PF before checking off interphone. Crewmembers will ensure personnel on headset, or within listening distance, are cleared prior to discussing classified information over interphone. The PIC may allow the troop compartment and aft flight deck loadmasters to go off interphone at cruise provided the public address (PA) system is operative.

5.13.2. Command Radios.

5.13.2.1. The PM normally makes all air traffic control (ATC) radio calls.

5.13.2.2. In terminal areas, all crewmembers (if able) will monitor the command radio unless directed otherwise. A crewmember will be designated to monitor C2 frequencies on the inbound and outbound legs.

5.13.2.3. The pilot operating the radios will notify the crew which radio is primary, and update the crew when the primary radio changes.

5.13.2.4. One pilot will record and read back all ATC clearances; another pilot will monitor and ensure correct read back.

5.13.2.5. Both pilots will monitor UHF and VHF guard emergency frequencies to the maximum extent possible. ***EXCEPTION*:** Only one crewmember is required to monitor guard frequencies during tanker or receiver rendezvous and AAR.

5.13.2.6. The Federal Communications Commission (FCC) prohibits the use of unauthorized frequencies for interplane, HAVE QUICK, or SECURE VOICE training.

5.14. Crew Resource Management (CRM)/Threat and Error Management.

5.14.1. Threat and Error Management provides strategies and tactics to help crews target threats to safe flight operations and decreases the potential for crew error. External threats are events that occur outside the influence of the flight crew and require crew attention and management to maintain adequate safety margins. Internal threats are crew related and are factors that could lead to an error if not recognized and controlled.

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

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

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

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

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

5.14.2.5. Safety permitting, stabilize the aircraft.

5.14.2.6. The initiating crewmember will voice their concerns to the crew.

5.14.2.7. The PIC will provide all other crewmembers with the opportunity to voice inputs relative to the stated concerns.

5.14.2.8. After considering all inputs, the PIC will direct the aircrew to continue the current course of action or direct a new course of action.

5.14.3. Sterile Cockpit. With the exception of cruise flight, conversation below 18,000’ MSL will be limited to mission, departure, or approach essential items. Every effort will be made to accomplish briefings and appropriate checklists prior to top of descent (TOD). Sterile cockpit procedures also apply during taxi, and air refueling operations.

5.14.4. Heads-up/Heads-down. Any crewmember that observes both pilots heads-down at the same time (other than heads-down instrument flying) shall alert the PF without delay.

5.14.5. CRM Enhancement. PICs will conduct a CRM exercise on the first suitable segment of each mission. This will be done at level off on a non interference basis with other mission requirements. Take the exercise to a logical conclusion and ensure crew communications and duties are appropriate. Suggested topics are rapid decompression, oceanic contingency

operation, emergency divert or other MAJCOM or locally generated Special Interest Item (SII).

5.14.6. Critical Action Coordination. Those actions that are flight critical/irreversible in nature and should always be confirmed by another crew member. These actions include, but are not limited to: pulling the engine fire handle, placing the engine start switch to stop, discharging agent, and dumping fuel. Both pilots must verbally and visually identify the affected control, (i.e. "CONFIRM NUMBER ONE"). The pilot performing the action will point to the affected control. The pilot monitoring the action will verbally and visually confirm the proper control is selected, (i.e. "NUMBER ONE CONFIRMED"). The pilot performing the action then actuates the affected control.

5.15. Use of Automation. It is imperative that crews safely use automation. These procedures provide an outline to maximize use of automation while ensuring safety is not compromised.

5.15.1. General Automation Procedures. There must be a clear understanding of the Pilot Flying (PF) and the Pilot Monitoring (PM) duties at all times. Aircrews are expected to fly the aircraft using the highest level of automation, balanced with the requirement to maintain basic flying skills. However, Pilots are authorized to choose an appropriate level of automation consistent with changing flight environments. If the use of automation creates a loss of situational awareness or results in task saturation, shift to a less demanding level or disconnect the automation entirely and re-establish desired aircraft path and control. Both pilots are responsible for ensuring the aircraft is following the desired flight path.

5.15.2. Verbalize, Verify, and Monitor (VVM) is a closed-loop system of communication designed to significantly reduce typical automation selection errors between the PF and PM. VVM consists of the following three step process:

5.15.2.1. Prior to making any changes in the MCDU, FMS-800, AFCS Panel, etc., , the pilot making the entries will VERBALIZE the intended changes.

5.15.2.2. Both pilots will VERIFY the intended changes prior to execution.

5.15.2.3. Both pilots will MONITOR the aircraft to ensure the expected performance is achieved.

5.15.2.4. The PF will announce changes to the level of automation, flight director and autopilot mode selections, and mode transitions to the maximum extent possible (e.g. "Autopilot engaged ","Altitude Hold", "Autothrottles", "Nav-Capture", etc.). The PM will acknowledge the call.

5.15.3. FMS-800/MCDU Programming. Normally, the PM should make all FMS/MCDU inputs. Any change which will affect the lateral or vertical path should be coordinated with the PF before execution to ensure that the PF is aware of these changes. The PF will acknowledge and approve these changes by saying EXECUTE. The PF may elect to make FMS/MCDU inputs above 10,000'.

5.15.3.1. With the autopilot engaged, the PF should make all changes to AFCS modes and settings, unless directed otherwise by the PF (this includes setting assigned headings and altitudes). In all cases the new settings will be verbally confirmed with the other pilot.

5.15.3.2. With the autopilot disengaged, the PM should make all AFCS inputs at the direction of the PF. When receiving ATC vectors or altitude change clearances, the PM should automatically set assigned headings and engage HDG SEL mode, or set the new altitude and await the PF's instructions to engage a vertical mode.

5.15.3.3. VNAV. The Altitude Select Window is set by the PF and verbally confirmed by the PM. The commanded altitude depends on the vertical mode to be used for the climb/descent. If using VNAV, the PF may elect to set the highest level cleared in a climb or the lowest level cleared in a descent. This will allow VNAV management of the climb profile for intervening altitude restrictions. If not using VNAV, set current altitude clearance. Do not preselect a subsequent altitude until an altitude hold or altitude capture FMA is displayed and clearance to that altitude has been issued. At no time should an expected ATC clearance be set in the Altitude Select Window.

5.15.3.4. Standard Terminology. When directing the PM to make AFCS inputs, clarity is of the utmost importance. Standard terminology aids clarity and brevity and ensures that crews effectively operate in concert with each other, while maintaining situational awareness. Although very precise, standard terminology can unnecessarily congest cockpit communication. Therefore, in-flight context may allow simplified direction and execution. For example "Preselect 10,000" is obviously an altitude command and does not require the noun "altitude" to clearly communicate the PF's desires. Vertical speeds appended with UP or DOWN are sufficiently clear. Any time the PM is unsure of a command, he/she will ask for clarification. If an uncommanded FMA is displayed, the PF will clearly restate the command and ensure the correct change is made. The following standard terminology will be used:

5.15.3.4.1. SELECT, SET or ENGAGE directs the selection of a value and/or a mode on the AFCS panel which results in the value being placed in the "engaged" (top green) portion of the FMA. SELECT or SET is normally used with rotary knobs; however, ENGAGE is acceptable.

5.15.3.4.2. ARM directs the selection of a mode on the AFCS panel which results in the value being in the "armed" (bottom, cyan) portion of an FMA.

5.15.3.4.3. ENGAGE should be used to request autopilot or autothrottle engagement.

5.15.3.4.4. UP or DOWN should be used to indicate a change in vertical speed.

5.15.3.4.5. EXECUTE should be used by the PF to indicate agreement with a programmed change to the flight path.

5.15.3.4.6. PRESET or PRESELECT should be used to change an AFCS value without changing the engaged or armed mode (e.g. when setting a missed approach heading before the missed approach point).

5.15.3.4.7. Examples of use. Exact, scripted communication is not as important as clarity. The examples in AFTTP 3-3.C-5, under Approved Terminology, demonstrate how this terminology can be used to ensure clear, efficient communication between pilots. The general framework is action, axis, and setting, e.g. "SET SPEED 250".

5.16. Transportation of Pets. Transporting pets (dogs and cats) in conjunction with the sponsor's permanent change of station is authorized. Other pets or animals are normally prohibited, but may be moved according to DoD 4515.13R, *Air Transportation Management*.

5.17. Alcoholic Beverages. The MAJCOM/A3/DO or NAF/CC may authorize the dispensing of alcoholic beverages.

5.18. Runway, Taxiway, and Airfield Requirements.

5.18.1. Minimum Runway and Taxiway Requirements. The following lengths and widths are for normal operations. In all cases, ensure obstacle clearance requirements are met. Landing distance will not exceed runway available.

5.18.1.1. Runway Length. Minimum runway length is 6000 feet (1,830 meters).

5.18.1.2. Runway Width. Minimum runway width is 147 feet (45 meters).

5.18.1.3. Taxiway Width. Minimum taxiway width is 75 feet (23 meters). If a 180-degree turn is required, 150 feet (46 meters) of stressed pavement (e.g. runway/taxiway intersection) is required.

5.18.2. Runway Length for Takeoff and Landing. Do not takeoff if computed critical field length exceeds runway available. Minimum runway for a normal landing is landing distance based on a threshold crossing height of 50 feet.

5.18.2.1. Runway Length for Takeoff and Intersection Takeoffs. Normally, the PF will initiate takeoffs from the beginning of the approved usable portion of the runway. The decision to make intersection takeoffs rests solely with the PIC.

5.18.2.2. Pilots may accomplish intersection takeoffs provided the operating environment (i.e., gross weight, obstructions, climb criteria, weather, etc.) allows a safe takeoff and departure. Calculate takeoff performance based on the runway remaining from the point at which the takeoff is initiated.

5.18.2.3. During operations on runways partially covered with snow or ice, base takeoff computations on the reported runway surface condition (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, compute takeoff data based on the uncleared portion up to 50 feet either side of centerline.

5.18.2.4. Use of Overruns. 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.

5.18.3. Arresting Cables.

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

5.18.3.2. Do not takeoff or land over an approach end cable that has been reported as slack, loose, or improperly rigged by NOTAM, automated terminal information service (ATIS), or ATC.

5.18.3.3. Operations are authorized on runways where BAK-12 systems with an eight-point cable tie-down system are installed. When operating from runways equipped with other types of systems, or if it is unknown whether the BAK-12 system includes eight point tiedowns, aircrews should recognize the increased risk of damage to the aircraft.

5.18.4. Other Airfield Requirements.

5.18.4.1. Consult with AMC/A3AS (Airfield Suitability Branch) for suitability guidance. Airfield certification requirements are detailed in the ASRR.

5.18.4.2. Aircrews and planning agencies will contact AMC/A3AS for all questions pertaining to airfield weight bearing capacity and will review the GDSS/GDSS2/ASRR before all off-station operations. AMC/A3 is the waiver authority for the restrictions in GDSS/GDSS2 Giant Report and ASRR for AMC and AMC-gained aircraft, unless specifically delegated in AFI 11-2MDS Vol 3 or AMCI 11-208. Direct GDSS/GDSS2 Giant Report and ASRR waiver requests to AMC/A3AS. AMC/A3V is the OPR for waivers to airfield restrictions. MAJCOM/A3 is the waiver authority for non-AMC missions. The PIC is responsible for waiver compliance. Aircrews will consult the web-based airfield database maintained by AMC/A3AS (Airfield Suitability Branch) and comply with the GDSS/GDSS2/ASRR for updates to airfield operability and weight bearing capability.

5.18.5. RCR Limitations. When no RCR is available, the PIC will refer to the performance manual for standard ICAO conversions based on general runway condition; be conservative when dealing with unknown conditions (e.g., forward operating bases (FOBs), unpaved runways). Minimum RCR for takeoff or landing is the lowest RCR depicted in the flight manual (never less than 3). 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. Consider the runway surface as wet when there is sufficient water on the surface to cause a reflective glare or when rain is falling.

5.18.6. Wind Limitations. Airfields will be considered below minimums for takeoff and landing when winds (including gusts) are greater than:

5.18.6.1. Maximum wind (any direction)—50 knots.

5.18.6.2. Maximum tailwind component—10 knots.

5.18.6.3. Maximum crosswind components, corrected for RCR, as specified in the flight manual. For actual category II ILS approaches, the maximum crosswind component is 10 knots or as specified in the flight manual, whichever is lower.

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

5.19.1. Do not taxi an aircraft within 25 feet of obstructions without wing walkers monitoring the clearance between aircraft and obstruction. With wing walkers, avoid taxi obstructions by at least 10 feet. ***EXCEPTION:*** IAW AFI 11-218, *Aircraft Operations and Movement on the Ground*, aircraft may taxi without marshallers/wing walkers at home station along fixed taxi lines which have been measured to ensure a minimum of 10 feet clearance from any permanent obstruction. Adjacent aircraft are also considered a permanent obstruction, provided the aircraft is parked properly in its designated spot and is not moving.

Aerospace Ground Equipment (AGE) and vehicles are considered a permanent obstruction, provided it is parked entirely within a designated area. Areas will be designated by permanent markings such as painted boxes or lines on the ramp or another suitable means.

5.19.2. 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 using AFI 11-218 signals. 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, marshallers shall have an illuminated wand in each hand. Wing walkers are only required to have one illuminated wand. Observers should be in a position to see wing walkers at all times (through door or windows) and communicate with the pilot.

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

5.19.3.1. Carefully review airfield layout paying particular attention to taxi routes, turn requirements, and areas for potential FOD.

5.19.3.2. Minimize power settings during all taxi operations.

5.19.4. Taxi Criteria. Refer to **Table 5.5** for minimum taxi clearance criteria. Use extreme caution when scanning from inside the airplane. Wing tip and tail growth in turns and the distance from the fuselage to the wing tip make determination of actual clearance very difficult.

Table 5.5. Minimum Taxi Clearance Criteria.

Lateral Clearance Of Component	To An Obstacle	Without Wing Walker	With Wing Walker
Main Gear Pod	Less than 3-feet high	25-feet	10-feet
Outboard Nacelle	3-feet high, but less than 6-feet high	25-feet	10-feet
Wing Tip	6-feet or higher	25-feet	10-feet

5.19.4.1. Where possible, avoid 180° turns. If it becomes necessary to accomplish a 180° turn on a narrow runway, the turn should be accomplished at an intersection of a link taxiway or at a designated turn around pad. Normally, the airplane is positioned on the opposite side of the runway and the turn is made toward an intersecting taxiway.

5.19.4.2. Where possible, avoid taxi operations that position an engine over an unprepared or un-swept surface. If unavoidable, leave the engine in idle (to the maximum extent possible) until the engine is over an improved surface.

5.19.4.3. After landing and clearing the runway, and with approval of the PIC, the loadmaster may open the aft cargo door and lower the ramp to prepare for cargo off/onload provided equipment, and cargo remain secure in the cargo compartment.

5.20. Fuel Jettison Procedures.

5.20.1. Aircrews should consider burning down fuel versus jettison, unless safety of flight dictates an immediate jettison (as determined by the pilot in command). Except in the case of an emergency, before jettisoning fuel, notify the appropriate ATC or flight service facility of intentions, altitude, and location. If available, the PIC will use designated jettison areas, except when safety of flight would be compromised.

5.20.2. For missions tasked by higher headquarters authority, the tasking C2 agency may authorize fuel jettison when an urgent operational requirement dictates immediate recovery/reconstitution of the aircraft and/or aircrew. The tasking C2 agency may provide fuel jettison instructions in the OPORD, mission directive, SPINS, etc.

5.20.3. For training missions, the OG/CC may approve fuel jettison when an urgent operational requirement exists to expedite recovery of the aircraft and all alternatives have been exhausted.

5.20.4. OG/CCs will establish jettison areas and procedures to minimize the impact of fuel jettisoning. Ideally, establish jettison areas at altitudes above 20,000 feet AGL, off published airways, avoiding urban areas, agricultural regions, and water supply sources. Avoid circling descents. Initiate AF Form 813, *Request for Environmental Impact Analysis*, and submit it to the base environmental coordinator.

5.20.5. All jettisons will be followed up with a detailed report filed by the pilot in command immediately after landing using a MAJCOM approved form for unusual occurrence or inflight emergency. Submit completed form through unit OGV to MAJCOM/Stan Eval. Unit OGVs will retain forms for 6 months. Document all pertinent information, including the following items:

5.20.5.1. Scheduled Duration.

5.20.5.2. Actual Duration.

5.20.5.3. Landing Gross Weight.

5.20.5.4. Computed Stopping Distance.

5.20.5.5. Recovery Field.

5.20.5.6. Runway Available.

5.20.5.7. Jettison Altitude/Location.

5.20.5.8. Outside air temperature.

5.20.5.9. Wind direction and velocity.

5.20.5.10. Jettison Amount.

5.20.5.11. Reason for Jettison.

5.20.5.12. Approval Authority.

5.21. Aircraft Speed. IAW AFI11-202V3 and flight manual.

5.22. Bird/Wildlife Aircraft Strike Hazard (BASH) Programs. BASH programs are centralized unit efforts that provide information cross-feed, hazard identification, and a consolidated course of action. As a minimum, unit commanders must implement the following procedures:

5.22.1. Ensure compliance with the following Bird Watch condition restrictions.

5.22.1.1. Bird Watch Condition Low - No operating restrictions.

5.22.1.2. 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.

5.22.1.3. Bird Watch Condition Severe - All takeoffs and landings are prohibited. Waiver authority is local OG/CC or equivalent. Parent MAJCOM/A3 waiver is required to operate at airfields not controlled by the MAF.

5.22.2. Commanders establish Phase II of the BASH program during increased periods of migratory bird activity. Schedulers shall 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. Publish significant bird hazards in FLIP Area Planning (AP) and the IFR Supplement along with the associated airfield operating hour restrictions and avoidance instructions.

5.22.3. When operating at airfields where no BASH program exists, a PIC has the authority to delay takeoffs and arrivals due to bird condition after coordinating with the appropriate C2 authority.

5.22.4. Consider bird migratory patterns during the en route portion of the mission to help minimize the potential of an in-flight bird strike. The Bird Avoidance Model (BAM) on AFSC/SEF website contains BASH information including regionalized Continental United States (CONUS) bird migration patterns, Portable Flight Planning System (PFPS) software overlay, and the latest news. The Avian Hazard Advisory System (AHAS) website is another source for real time bird hazard information. Both sites may be accessed through the AMC aircrew mission planning portal at: **https://www.my.af.mil/gcss-af/afp40/USAF/ep/globalTab.do?command=org&channelPageId=-1325640&pageId=0** See AFPAM 91-212, *Bird Aircraft Strike Hazard (BASH) Management Techniques*, for additional information.

5.22.5. Following a bird strike, aircrews should land as soon as conditions permit, or as practicable, to have the aircraft inspected by qualified maintenance personnel. Bird strike damage cannot be accurately assessed in-flight, and undetected damage may result in a complex airborne emergency.

5.23. Functional Check Flights (FCFs), Acceptance Check Flights (ACFs) and Operational Check Flights (OCFs). Check flights will be accomplished IAW T.O. 1C-5A-6, AFI 21-101, *Aircraft and Equipment Maintenance Management*, T.O. 1-1-300, *Functional Check Flights and Maintenance Operational Checks*, and T.O. 1C-5-6CF-1, *Acceptance and/or Functional Check Procedures Manual.* Crews should only perform tasks or functions contained in specific technical order guidance. If requested to perform a non-standard function, PICs should contact their OG/CC to see if an FCF applies.

5.23.1. The OG/CC, or deployed equivalent, may authorize temporary waivers to FCF procedures for aircrew qualification when operationally necessary. Permanent waivers require MAJCOM/A3/DO approval IAW Chapter 1.

5.23.2. The OG/CC is responsible for the wing FCF program. Publish additional guidance in local supplement to this instruction. The OG/CC may authorize a partial FCF to check only those systems disturbed by maintenance, an inspection or modification.

5.23.3. Conduct check flights 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.

5.23.3.1. FCF/ACFs that involve airworthiness and/or safety of flight checks require parachutes, helmets, oxygen masks and survival kits to be on board for all personnel.

5.23.4. The decision to approve a combined FCF and ferry flight is the responsibility of the MAJCOM/A3/DO.

5.23.5. The OG/CC will only certify highly experienced instructors as FCF crewmembers. The OG/CC will determine FCF crew complement after a thorough ORM assessment for that specific FCF flight. ACF certified aircrew will only perform the work package they are certified to conduct. OCFs do not require FCF/ACF certification but should be accomplished by experienced crewmembers.

5.23.5.1. FCF crewmembers will be certified IAW 11-2FT Vol 1 and AFMC certified training plans located on HQ AFMC Stan/Eval COP. ACF certified crewmembers will receive training IAW 11-2FT Vol 1 and a training plan tailored to the ACF work package. This training plan will be coordinated with the 339 FLTS.

5.23.5.2. FCF or ACF certification will be annotated on the individual's letter of X's. Certification applies only to the current C-5 model that the individual is qualified in. Differences training will be conducted if the individual changes qualification.

5.23.5.3. FCF/ACF crews will comply with the additional training/currency requirements IAW 11-2FT (e.g., hanging harness, 180 day FCF currency etc.) which will be tracked by local ARMS products. ***EXCEPTION:*** FCF currency may be maintained in the simulator.

5.23.5.4. Prior to conducting FCF/ACF the AC will review AFMC FCIFs for applicable guidance.

5.23.6. Ideally, conduct FCFs in daylight, VMC. OG/CCs may authorize a flight under a combination of VMC and IMC. Begin the flight in VMC. If the aircraft and all systems are operating properly, the crew may proceed IFR through cloud cover to "VFR on Top" for the altitude phase of the flight. Preflights will not be conducted in the rain/snow or on a wet aircraft.

5.23.6.1. FCF/ACF profiles will be tailored from T.O. 1C-5A-6CF or 1C-5M-6CF to suit specific work packages. Prior coordination with the 339 FLTS will be accomplished to ensure all appropriate checks will be complied with.

5.23.7. If a malfunction occurs during a FCF, the OG/CC may subsequently release the aircraft for flight providing the malfunction is not related to the condition generating the FCF, and the original condition operationally checked good.

5.23.8. Only FCF crews shall perform high-speed taxi checks. Perform checks IAW the flight manual and maintenance technical orders. Prepare the aircraft with minimum fuel

necessary to accomplish the check to limit brake/tire wear, (ensure fuel on board will permit a safe return to base should the aircraft unexpectedly become airborne) and turn on the anti-skid system. The PIC will calculate takeoff data for the highest speed planned and ensure runway available allows sufficient stopping distance for existing conditions without exceeding normal brake energy limits.

5.23.9. Operational Check Flights (OCF). An OCF is a flight that does not require an FCF. OCFs cover conditions which require verification of maintenance by the accomplishments of an in-flight procedure or when test equipment does not exist to perform the check on the ground. Units may perform an OCF provided local operating procedures are published IAW this AFI.

5.23.9.1. The Ram Air Turbine check is an OCF item. Only the Traffic Pattern RAT (manual) check from 1C-5A-6/1C-5M-6 is authorized. The check may be accomplished at the end of a local training sortie or, if on a departure, a full stop taxi back will be accomplished for a maintenance inspection as required.

5.24. Participation in Aerial Events. See AFI 11-209, *Aerial Event Policy and Procedures*, and the appropriate MAJCOM supplement.

5.25. Traffic Alerting and Collision Avoidance System (TCAS). It is imperative to follow resolution advisories (RAs) to obtain aircraft separation computed by TCAS. Failure to follow the computed RA may increase the probability of a midair collision. Pilots who deviate from an ATC clearance in response to an RA shall notify ATC of the deviation as soon as practical and promptly return to the ATC clearance when the traffic conflict is resolved or obtain a new clearance.

5.26. Radar Altimeter. (N/A AMP and C-5M)

5.26.1. 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.

5.26.2. Before departure set the radar altimeter for emergency return. Normally, use the height above touchdown/height above aerodrome (HAT/HAA) for IMC, or 500 feet for VMC departures.

5.26.3. Not used.

5.26.4. Set the radar altimeter to the HAT/HAA during instrument approaches.

5.27. Reduced Power Takeoffs. Accomplish IAW T.O. 1C-5A-1 or 1C-5M-1 and T.O. 1C-5A-1-1 or 1C-5M-1-1.

5.28. Aircraft Recovery from Unprepared Surfaces. Aircrews should not attempt to recover an aircraft after inadvertent entry onto unprepared surfaces not suitable for taxi; ground crews will accomplish aircraft recovery. Unless an emergency dictates otherwise, aircrews may only accomplish recovery if there is no aircraft damage, the surface will support the aircraft, and the PIC has coordinated with appropriate MAJCOM headquarters maintenance authorities through 618 AOC (TACC), or appropriate C2 agency.

5.29. Aircrew Fatigue. It is the crewmember's responsibility to be properly rested for each mission. However, if circumstances prevent this, no MAF/AMC crewmember should feel

pressured to fly when not properly rested. A PIC with a crewmember that is fatigued should immediately notify the Stage Manager, 618 AOC (TACC), Home Station, or appropriate Command and Control if unable to start or complete a mission safely. Declaring "Safety of Flight" may be required in this situation.

5.30. Aviation Safety Action Program (ASAP). The Military Aviation Safety Action Program is an anonymous, self-reporting system modeled after successful FAA/Airline programs to encourage the voluntary reporting Operational issues and events. It is designed to provide a non-punitive environment for the open reporting of safety concerns and information that might be critical to identifying hazardous situations and precursors to accidents. These safety concerns may be either observed or experienced by the submitter. The goal is to prevent mishaps by addressing those unintentional errors, hazardous situations and events, or high-risk activities not identified and/or correctable by other methods or through traditional safety reporting sources.

5.30.1. The AMC ASAP website is accessible at **www.safety-masap.com**. Username and Password can be obtained from the crewmember's Wing/Group Safety office. Crewmembers can contact the AMC ASAP program manager via email at **amc.asap@scott.af.mil.** AFRC has a similar program called Close Call that can be found on AFRC's Safety website through the AF Portal at **https://www.my.af.mil/gcss-af/USAF/ep/globalTab.do?channelPageId=s6925EC134BF30FB5E044080020E329A9**.

Chapter 6

AIRCREW PROCEDURES

Section 6A—Pre-Mission

6.1. Aircrew Uniform.

6.1.1. Aircrew will wear the aircrew uniform, as outlined in AFI 36-2903, *Dress and Personal Appearance of Air Force Personnel*, and the appropriate MAJCOM supplement, on all missions, unless otherwise authorized. When the Foreign Clearance Guide (FCG) requires civilian attire, dress conservatively.

6.1.2. OG/CCs will determine clothing and equipment to be worn or carried aboard all flights commensurate with mission, climate, and terrain involved.

6.1.2.1. See AFI 11-301V1, *Aircrew Flight Equipment (AFE) Program*, for minimum aircrew clothing requirements. All crewmembers will have Nomex gloves in their possession.

6.1.2.2. Crewmembers will remove rings and scarves before performing aircrew duties.

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.

6.2. Personal Requirements.

6.2.1. Refer to current Unit Deployment Manager guidance for applicable deployment requirements.

6.2.2. Passport. Crewmembers will carry a valid passport on all missions outside the CONUS. ***EXCEPTION:*** Unit commanders may authorize newly assigned personnel who have applied for, but not yet received, a passport to act as crewmembers on missions not scheduled to transit locations where passports are required.

6.2.3. Shot Record. Crewmembers must maintain worldwide shot requirements.

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. Crewmembers will contact the local airfield manager before driving on the flight line.

6.2.5. Identification Tags. Crewmembers will carry two identification tags on all flights.

6.2.6. FOD Hazards. Crewmembers will not wear wigs, hairpieces, rings, ornaments, or earrings in the aircraft or on the flight line. ***EXCEPTION:*** Crewmembers may wear plain elastic hair fasteners and/or pins, clips, or barrettes providing they do not interfere with the wearing of headsets, or the donning of oxygen equipment. They will be accounted for before and after flight.

6.2.7. Helmets and Oxygen Masks. Crewmembers will carry a personal helmet:

6.2.7.1. When required for wear of the aircrew chemical defense ensemble.

6.2.7.2. While performing cargo compartment observer duties during combat entry/exit checklists.

6.2.8. Flashlights. Each crewmember must carry an operable flashlight for night flights.

6.2.9. A reflective belt or suitable substitute will be worn on flight lines during hours of darkness or periods of reduced visibility.

6.2.10. AF Form 1199, *Air Force Entry Control Card*.

6.3. Pre-Mission Actions.

6.3.1. Before transiting areas outside the CONUS, aircrews will review and obtain theater-specific information necessary to successfully operate there. The review, at a minimum, should include AFI 11-202V3, *Air Force Tactics, Techniques and Procedures (AFFTP) 3-3.C-5, Combat Aircraft Fundamentals – C-5*, and the following:

6.3.1.1. . Review tasking, itinerary, and altitude reservation (ALTRV) requirements.

6.3.1.2. . Review applicable OPORD, SPINS, Virtual Risk Assessment (VRA), Country Risk Assessment (CRA), and FLIP. Obtain and carry this information if required.

6.3.1.3. Review the FCG for areas of operation (to include classified portion). Obtain necessary diplomatic clearances where required.

6.3.2. Obtain required customs forms.

6.3.3. Obtain worldwide FLIPs and sufficient communications security (COMSEC) materials for the duration of the mission.

6.3.4. Ensure physiological training, annual physical, immunizations, and flight evaluations will remain current for all crewmembers throughout the TDY period.

6.3.5. Ensure visas have been received, if required.

6.3.6. Obtain terrain charts for unfamiliar destinations if available.

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

6.3.8. Passenger Restrictions. Release space available seats to the maximum extent possible unless overriding safety, legal or security concerns prohibit space available travelers from flying on specific missions. The only passengers on missions transporting DVs will be those of the official party and those space available passengers authorized by the lead POC for the traveling party. Authorization must be approved 24 hours in advance.

6.3.8.1. Space Available Passengers. For other than revenue and White House missions, PICs are authorized to release space available seats on mission legs when no official passengers are aboard (positioning and de-positioning legs). Coordinate with C2 agency to release available seats to the passenger terminal. PICs are encouraged to release maximum space available seats subject to the following restrictions:

6.3.8.1.1. Revenue Missions. These are missions for which the using agency (typically a government agency other than DoD) is reimbursing DoD for use of the aircraft. Space available passengers on revenue missions must be approved 24 hours in advance by USAF/ CVAM, theater AMD or JOSAC (as appropriate) and the using agency contact officer through unit C2 agencies. This is essential to ensure proper

funding and reimbursement. Consult C2 to determine mission revenue status if in doubt. Congressional Delegations (CODEL) are not revenue missions.

6.3.8.1.2. White House Support Missions. Space available passengers will generally not be permitted aboard White House support mission aircraft without express permission of HQ USAF/CVAM. This is normally due to the security status of the aircraft, which may include positioning and de-positioning legs. When it is necessary to move aircrew members or support personnel on White House support mission aircraft, the WHMO will be advised and permission obtained through the unit C2 and CVAM. On de-positioning legs space available passengers will usually be permitted if the aircraft is no longer required to maintain an upgraded security status.

6.3.8.1.3. Billing. Space available passengers on revenue missions may be subject to being billed commercial first-class airfare by the using agency for the applicable route, depending on that agency's policy. If the DV or on-board contact officer releases seats, aircraft commander must ensure that any additional financial liability for the passengers is specified by the using agency on-board contact officer. PIC will ensure passengers understand and agree to any reimbursement conditions prior to boarding.

6.3.9. Ensure the correct aircraft navigation database is loaded or will be carried, as appropriate.

6.3.9.1. Aircrews are directed to compare their scheduled return times with the expiration of the loaded navigation database prior to departure from home station. If the scheduled return time exceeds the expiration of the database, add the appropriate info note to the aircraft forms prior to departure from home station to ensure maintenance personnel are aware of the need to load a new database.

6.4. Aircrew Publications Requirements. Primary crewmembers will carry (or have in-flight access to) the publications specified in **Table 6.1** on all missions. These publications may be either individual crewmember's or contained in unit developed publications kits. "P" designates the publication is required to be carried in paper format. "D" designates the publication may be carried in either paper or digital format. If publications are carried in a digital format, the unit will provide the media to view the digital publications. Units may specify additional publications in their local unit supplement. Reference AFI 11-215, *USAF Flight Manuals Program*, for guidance on electronic publications.

Table 6.1. Aircrew Publications.

Publication (1C-5A/B Only)	Format
Technical Order (T.O.) 1C-5A-1	P (2 Copies)
Technical Order (T.O.) 1C-5A-1-4 (AMP modified aircraft only)	P (2 Copies)
T.O. 1C-5A-1-1	P
T.O. 1C-5A-1CL-1	P (2 Copies)
T.O. 1C-5A-1CL-2	P

T.O. 1C-5A-1CL-4	P (3 Copies)
T.O. 1C-5A-1CL-5	P
T.O. 1C-5A-9	P*
T.O. 1C-5A-9CL-1	P*
T.O. 1C-5A-9-2	P*
AFI 11-2C-5V3	P
AFI 11-202V3	D
Publication (1C-5M Only)	**Format**
Technical Order (T.O.) 1C-5M-1	P (2 Copies)
T.O. 1C-5M-1-1	P
T.O. 1C-5M-1CL-1	P (2 Copies)
T.O. 1C-5M-1CL-2	P
T.O. 1C-5M-1CL-3	P (2 Copies)
T.O. 1C-5M-1CL-4	P (3 Copies)
T.O. 1C-5M-9	P*
T.O. 1C-5M-9CL-1	P*
T.O. 1C-5M-9-2	P*
AFI 11-2C-5V3	P
AFI 11-202V3	D
*Not required for missions/locals without loadmasters	

6.5. Airfield Review. Aircrews will consult the web-based airfield database maintained by AMC/A3AS (Airfield Suitability Branch) and comply with the GDSS/GDSS2/ASRR for updates to airfield operability and weight bearing capability. Refer to AFI 11-202V3 Chapter 8 for non-US Government and Foreign Terminal Instrument Procedures.

6.6. Aircrew Intelligence Briefing. Aircrews 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. Obtain timely intelligence updates prior to entering a specific area of operations (AOR). 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 office as soon as practical to ensure timely dissemination of mission reports (MISREPs).

Section 6B—Pre-departure

6.7. Global Decision Scheduling System 2 (GDSS2) Account. Pilots will obtain a GDSS2 account prior to operating on IFM-planned sorties. Download aircrew departure papers using the

GDSS2 account, at locations without an AMC C2 presence. For operational missions, ensure GDSS2 account passwords are active prior to departing home station. There is also a web-based version of GDSS2 that can be accessed using a CAC at the following link: **https://gdss2ams.c2.amc.af.mil/gdss2web**/

6.8. Flight Crew Information File (FCIF).

6.8.1. Crewmembers will review FCIF, Volume 1, before all missions or ground aircrew duties, and update the FCIF currency record with the latest FCIF item number, date, and crewmember's initials.

6.8.1.1. Electronic signatures, or PEX Sign-Off, may be used on FCIFs.

6.8.2. Crewmembers delinquent in FCIF review or joining a mission en route will receive an FCIF update from a primary aircrew member counterpart on the mission.

6.8.3. Crewmembers not assigned or attached to the unit operating a mission will certify FCIF review by entering the last FCIF number and their initials after their name on the file copy of the flight authorization or file copy of their crew orders. This applies to all crewmembers if the electronic sign-in system is not working at show time.

6.9. Flight Crew Bulletins (FCB). Items in the FCB may include local procedures and policies concerning equipment and personnel generally not found in any other publications.

6.10. Mission Kits. Carry mission kits on all operational missions. Publications and forms may be maintained and carried electronically provided operable in-flight viewing/printing capability exists. Suggested items include: ***NOTE***: * Indicates mandatory for all missions away from home station.

6.10.1. Publications:

6.10.1.1. *AFI 11-401, *Aviation Management.*

6.10.1.2. * DoDM 4140.25-M, Vol. II Ch 16, *Government Fuel Card Program Management Office DoD Fleet Card, AIR Card®, and SEA Card®.*

6.10.1.3. *AFMAN 24-204, *Preparing Hazardous Materials for Military Air Shipments.*

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

6.10.1.5. *Airfield Suitability and Restrictions Report (ASRR).

6.10.1.6. *AMC Aircrew Border Clearance Guide.

6.10.1.7. *AMCH 11-214, *AMC Aircrew Hazardous Materials Handbook.*

6.10.1.8. *Flight Crew Bulletin (FCB).

6.10.1.9. AFI 11-289, *Phoenix Banner, Silver, Copper Operations.*

6.10.1.10. *AMCI 24-101 V11, *Cargo and Mail Policy.*

6.10.1.11. *AMCI 90-903, *Aviation Operational Risk Management(ORM) Program.*

6.10.2. Forms:

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

6.10.2.2. DD Form 1351-2C, *Travel Voucher or Sub Voucher (Continuation Sheet).*

6.10.2.3. *CBP Form 6059B, *US Customs and Border Protection Declaration Form.*

6.10.2.4. Not used.

6.10.2.5. *DD Form 2131, *Cargo/Passenger Manifest.*

6.10.2.6. *CBP Form 7507, *General Declaration (Outward/Inward).*

6.10.2.7. *AF IMT 15, *United States Air Force Invoice.*

6.10.2.8. *SF 44, *Purchase Order Invoice Voucher*.

6.10.2.9. AF IMT 457, *USAF Hazard Report.*

6.10.2.10. *AF IMT 651, *Hazardous Air Traffic Report (HATR).*

6.10.2.11. *AFTO Form 781, *ARMS Aircrew/Mission Flight Data Document.*

6.10.2.12. *AF IMT 1297, *Temporary Issue Receipt.*

6.10.2.13. *AF IMT 2282, *Statement of Adverse Effect-Use of Government Facilities.*

6.10.2.14. AF IMT 664, *Aircraft Fuels Documentation Log.*

6.10.2.15. AF IMT 4052, *C-141/C-130/C-5/C-17 Refueling.*

6.10.2.16. AF IMT 4053, *Pilot's INS Flight Plan and Log Computation.*

6.10.2.17. *AF IMT 4054, *Performance and Fuel Management Log.*

6.10.2.18. *AF IMT 4097, *C-5 Aircraft Fatigue Tracking Worksheet.*

6.10.2.19. *AF IMT 4101, *Relay Logic Landing Gear Malfunctions*.

6.10.2.20. AF IMT 4115, *Flight Plan and Record.*

6.10.2.21. *AFTO Form 198 (200 for C5M), *TOLD Card Worksheet (C-5 A/B).*

6.10.2.22. *AFTO Form 199 (201 for C5M), *TOLD Card (C-5 A/B).*

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

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

6.10.2.25. AF IMT 72, *Air Report (AIREP).*

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

6.10.2.27. AF IMT 711B, *USAF Mishap Report.*

6.10.2.28. *AF IMT 4031, *Crew Resource Management (CRM) Assessment Sheet.*

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

6.10.2.30. HMS Customs Declaration.

6.10.2.31. Japanese Customs Service Forms.

6.10.2.32. *AMC Form 97, *AMC In-Flight Emergency and Unusual Occurrence Worksheet.*

6.10.3. Orders:

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

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

6.10.3.3. *AF Form 4327a, *Crew Flight (FA) Authorization* (or MAJCOM prescribed according to AFI 11-401, *Flight Management).*

6.10.4. Miscellaneous:

6.10.4.1. *Box car seals.

6.10.4.2. *Masking tape.

6.11. Route Navigation Kits.

6.11.1. 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.

6.11.2. The minimum contents of route navigation kits are in **Table 6.2**.

6.11.3. On local unit training sorties, local area navigation kits may be used in lieu of route navigation kits in **Table 6.2**. Contents of these kits will be determined by the unit.

Table 6.2. Route Navigation Kit Contents.

Item	Number	Type *
FLIP Planning (Sections GP, AP/1, AP/1A, AP/1B, AP/2, AP/3, AP/4,)	1	D
FLIP IFR Supplement	1	P
FLIP Flight Information Handbook	1	P
FLIP En Route (High and Low) & Arrival Charts	1	P
FLIP Instrument Approach Procedures (High and Low)	2	P
Standard Instrument Departures (SID) (East and West US Volumes 1 and 2)	2	P
Instrument Departures Europe and North Africa (High and Low)	2	P
Standard Terminal Arrival Routes (STARs)	2	P
OPREP-3 Report Format	1	P
Topographical and Sectional Charts for areas of operation (GNC/OPC/TPC/JNC/JOG/Sectionals)	As Required	P
FLIP VFR Supplement	1	P
DoD Area Arrival Charts	(2) If available	P
***** P designates paper; D designates digital versions may be carried in lieu of paper.		

6.12. Briefing Requirements.

6.12.1. Pre-Departure Briefing Items. The PIC will contact the local C2 agency to confirm mission requirements. The PIC and controlling agency jointly share responsibility to identify special briefing requirements. Briefings may include buffer zone, electronic warfare activities, SAFE PASSAGE, Electromagnetic Interference (EMI), diplomatic clearance, hazardous cargo, anti-hijacking procedures, operations and safety supplements to flight manuals, and OPORD procedure.

6.12.2. Pilot in Command Pre-Departure Briefing. Cover all applicable items of the operations briefing, including MAJCOM, NAF, unit special interest items (SIIs), CRM, and ORM levels and mitigating factors. Brief crewmembers on the specific mission details if not previously accomplished. Use a MAJCOM approved briefing guide.

6.12.2.1. Pilot in Command En Route Briefing. In the en route system, the PIC will ensure that an aircrew briefing is conducted prior to the first sortie of the day. As a minimum, brief crewmembers on specific mission details for that day's sortie(s), CRM, and the ORM level and mitigating factors for the mission. Complete this briefing prior to engine start.

6.12.3. Specialized Briefing. Use specialized briefings to detail operating procedures or SIIs peculiar to various crew positions, and to answer questions relating to those specialties. Specialized briefings review tactics and procedures, AAR information, and technical instructions for specialized equipment operations. All crewmembers should attend each briefing. Crewmembers may only be excused from specialized briefings for pre-flight duties, however the PIC will back brief all appropriate items. Use a MAJCOM approved specialized briefing guide.

6.12.4. Weather Briefings. The PIC will obtain a briefing on current weather, trends, and forecast for the proposed route, destination, and alternates. The PIC will brief primary crewmembers on appropriate weather conditions before departure.

6.12.4.1. Aircrews flying flight-managed sorties will use the weather briefing provided with the IFM aircrew departure papers. This weather briefing satisfies requirement for 6.12.4. Local weather flights/agencies may update local takeoff weather data, but aircrews, working through their flight manager/dispatcher, will use 618 AOC (TACC) weather operations (or the Operational Weather Squadron (OWS) supporting the theater C2 Agency) as the final arbiter for weather-related issues and further updates.

6.12.4.2. On sorties not planned by a flight manager, crews should obtain weather information from their local weather flight or the OWS responsible for weather support at their location.

6.12.4.3. If adequate services are not available, and the crew cannot contact their home weather flight, OWS, or 618 AOC (TACC) weather operations, obtain weather through any means available prior to mission accomplishment.

6.12.4.4. Weather information is permitted from US Military weather services, any FAA-approved weather source, or any host nation civil or military weather source.

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

6.12.6. Peacetime and Wartime SAFE PASSAGE Procedures. Pilots must be familiar with peacetime and wartime safe passage of friendly military aircraft.

6.12.7. IFM Briefing. PICs will thoroughly review the aircrew departure papers provided for IFM sorties. The PIC, or designated representative, will contact the flight manager if there are discrepancies with the departure papers or to resolve any questions before signing the flight plan.

6.12.8. Training/Evaluation Briefing. Before all training/evaluation missions, instructors/flight examiners will brief the crew on requirements and objectives for each student or examinee.

6.12.9. Intelligence Briefings. Before operating in a combat environment, the crew will obtain a current intelligence briefing.

6.13. Call Signs.

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

6.13.2. Operational Missions. Use call signs assigned by OPORD, FRAG, or diplomatic clearance. If no call sign has been assigned, use unit static call signs. When flying AMC missions, and no other call sign has been assigned, 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). To complete flight plans, 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.

6.13.3. The Reach 01 and 18 call signs are reserved for the AMC/CC and 18 AF/CC.

6.13.4. Aeromedical Evacuation (AE). For actual AE missions, use the call sign “Evac" followed by the five-digit aircraft number (example, Evac 12345) or mission designator. Refer to FLIP GP Chapter 4. When the AE portion of the mission is completed, normal call signs will be used. This does not alleviate the responsibility to use diplomatically cleared call signs when required.

6.14. Instrument Flight Rules. Conduct flight operations under IFR to the maximum extent possible without unacceptable mission degradation.

6.15. Flight Plan/Data Verification.

6.15.1. Computer Flight Plan (CFP) Use. CFPs are the official sources of performance, navigation, and climatic 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 MAJCOM validated CFPs.

6.15.1.1. Use CFPs to the maximum extent practical. Flight crews may manually compute flight plans. The PIC has final responsibility for flight plan accuracy and diplomatic clearance compliance.

6.15.1.1.1. Flight plan uplink. Airline operational control (AOC) use is authorized for “flight Plan Uplink”. To use, send the FM a request. If no response is received within 5 minutes, contact the FM via other means or upload manually. The PIC is responsible for verifying waypoints and flight plan accuracy.

6.15.1.2. Verify CFPs for route of flight and fuel computation accuracy before departure. Pass any flight plan discrepancies to the C2 flight planning office. On flight-managed sorties, promptly notify the flight manager of any flight plan discrepancies, to ensure the correct route of flight is filled with air traffic control.

6.15.1.3. Inform your Flight Manager when the average wind for a route segment exceeds either 30 degrees error in direction, 25 knots in speed, or when temperature deviation error exceeds 5 degrees for the flight planned altitude. If unable to report inflight, report actual winds or temperatures at the first opportunity.

6.15.2. All waypoint data retrieved from a database should be verified by one or more of the following methods:

6.15.2.1. Latitude/longitude from current FLIP.

6.15.2.2. Bearing/distance from a flight plan.

6.15.2.3. Ground Based NAVAIDs.

6.16. Departure Planning. Use AFI 11-202V3, AFMAN 11-217, this chapter, and the appropriate MAJCOM supplements. Regardless of the type of departure flown (IFR/VFR), review the following (as appropriate): IFR Departure Procedure, instrument approach plate, NOTAMS, GDSS Giant Report, and suitable terrain charts. At the earliest opportunity but NLT one hour prior to scheduled takeoff time, the PIC shall provide the engineer with a completed MAJCOM approved Departure Planning Worksheet (current version of worksheet located on AMC/A3V and Jeppesen websites). Complete all applicable sections of worksheet which must include as a minimum the following; SDP information, takeoff runway direction, length, slope, screen height (non-SDP), height and distance of any known obstacles affecting departure path (non-SDP), and four engine climb gradient restrictions. The PIC may use the SDP weight, with applicable corrections applied, as a planning max weight to pass to C2 agencies for next mission leg.

6.16.1. VFR Departures. ***NOTE:*** VFR departures will not be flown in lieu of obstacle clearance planning.

6.16.1.1. VFR departures are authorized when there is no authorized IFR departure method for the airport, when the aircraft cannot depart using one of the IFR departure methods contained in AFI 11-202V3 and AFMAN 11-217V1, when operational requirements dictate (i.e. tactical necessity), or when most of the sortie is planned as a VFR flight. VFR departures require detailed planning to ensure obstacles and terrain are avoided.

6.16.1.2. IAW AFI 11-202V3 and AFMAN 11-217V2 crews are specifically authorized to depart VFR without meeting IFR departure procedure restrictions along the planned departure route with one engine inoperative while adhering to the following:

6.16.1.2.1. Utilize radar advisory, monitoring, or control services when practical, and ensure flight following by any available means (e.g., FSS or C2).

6.16.1.2.2. Crews must be knowledgeable of and comply with guidance contained in AFMAN 11-217V2.

6.16.1.2.3. Crews are responsible for terrain and obstacle planning/avoidance and must climb to the Minimum IFR Altitude (MIA) as soon as practical.

6.16.1.2.4. Crews will use all available resources to mitigate risk. This includes (but not limited to) supervisors, ORM, aircraft flight manuals, and aircraft commander discretion.

6.16.1.2.5. Operations IAW this authorization are to be used as the last resort when the mission justifies the increased risk.

6.16.1.3. The minimum climb performance for VFR departures is determined by ensuring all the following conditions are met:

6.16.1.3.1. All-engine climb capability ensures obstacle avoidance along the departure route.

6.16.1.3.2. One Engine Inoperative (OEI) climb capability shall ensure departure or emergency return route provides obstacle avoidance. ***NOTE:*** If unable to comply with any of the above conditions, download cargo/fuel or delay until conditions that are more favorable exist.

6.16.1.4. Refer to FLIP for host nation VFR requirements before flying VFR outside of CONUS.

6.16.1.5. When departing VFR, maintain VFR cloud clearances until obtaining an IFR clearance or reaching the IFR MEA.

6.16.2. IFR Departures: Aircrews must use an approved IFR departure method as outlined in AFI 11-202V3 and AFMAN 11-217V1.

6.16.2.1. An IFR departure is not authorized at airfields without an instrument approach.

6.16.2.2. IFR departures require detailed planning to ensure obstacles and high terrain are avoided. Adhere to screen height/departure end of runway (DER) requirements for IFR departure planning (AFMAN 11-217V1). ***NOTE:*** Screen height requirements for departures depend on the agency that wrote the departure and/or the airfield where the departure is being flown. There is no standard or easy way for crews to determine screen height requirements. Therefore, when using departures other than those listed below, or when any doubt exists about which screen height to use, plan to cross the DER at 35 feet (minimum) unless you can ascertain a different screen height requirement from an appropriate authority.

6.16.2.2.1. Special Departure Procedure: Published on SDP. ***NOTE:*** Screen height requirements are built into the SDP, no further calculation of screen height is required.

6.16.2.2.2. USAF/USN non-joint-use airfields: Zero feet unless published otherwise.

6.16.2.2.3. Other than USAF/USN non-joint-use airfields (Civil/Joint Use/ICAO/NATO/etc.): 35 feet unless published otherwise.

6.16.2.3. Aircraft must meet the published climb gradient for the departure runway with all engines operating. If no minimum climb gradient is published, 200 ft/nm will be used.

NOTE: In the event the aircraft is unable to meet the published ALL ENGINE climb gradient, download cargo/fuel or delay until more favorable conditions exist.

6.16.2.4. Use one of the following methods to ensure the aircraft can vertically clear all obstacles along the planned departure route with OEI. For the purposes of OEI departure planning, AMC/A3 and 18 AF/CC, as the operations supervisors (equivalent mission execution authority supervisor), deem all 618 AOC (TACC) and CVAM tasked missions as 'operationally necessary'.

6.16.2.4.1. An 'operational' mission is defined as all missions that are not designated as training specific missions. A training mission may be considered 'operational' if external users (e.g. tanker/receiver AAR training, cargo load training, JA/ATT, etc.) are scheduled as part of the training mission. For all missions not deemed 'operational' (local training sorties); the operations supervisor will be the mission execution authority supervisor, e.g. the OG/CC, or equivalent, delegated no lower than Sq/DO.

6.16.2.4.2. Special Departure Procedure (SDP). SDPs are MDS-specific OEI escape procedures intended only for emergency use. They are applicable after the loss of an engine and, where available, will be used for engine-out departure planning when operationally necessary. Retrieve current SDPs from the SDP website (contact OGV for current username password). 'Ad hoc' requests for fields not currently listed may be requested through OGV NLT 48 hrs prior to scheduled departure. AMC/A3VX authorizes the use of Ad Hoc SDPs for a maximum of 7 days after the analysis date.

6.16.2.4.3. Minimum climb gradient. The TERPS standard minimum climb gradient is 200 ft/nm, which is based on the standard obstacle clearance surface (OCS) of 152 ft/nm plus the required obstacle clearance (ROC) of 48 ft/nm. If an SDP is not available, the crew must ensure compliance with any obstacle-based minimum climb gradients for the selected departure, with one-engine inoperative. Minimum climb gradients may be published as a 'Trouble T' restriction in the IFR Take-off Minimums section of FLIP or on a SID. When operationally necessary, crews may subtract 48'/nm from published climb gradients before computing engine-out takeoff data. Minimum climb gradients do not take into account low, close in obstacles (obstacles or terrain 200' AGL and below) which should normally be published as a note on the SID or IFR departure procedure (Trouble T). Crews must also ensure the aircraft can vertically clear low close-in obstacles along the planned departure path. ***NOTE:*** If OEI obstacle clearance cannot be satisfied by one of the above methods, download cargo/fuel or delay until more favorable conditions exist.

6.17. Weather Minimums for Takeoff use Table 6 3.

Table 6.3. Weather Minimums for Takeoff.

MISSION	VIS	REMARKS

Operational	1000 RVR (305 meters)	When less than RVR 1600, but equal to or greater than RVR 1000, the crew may take off if mission priority dictates, 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	1600 RVR (488 Meters)	For runways with more than one operating RVR readout, RVR must read 1600 minimum on all.
NOTES: If no RVR readout is available for the departure runway, visibility must be reported to be 1/2 mile (800 meters). When weather is below approach and landing minimums (ceiling or visibility) a takeoff alternate is required (See **paragraph 6.19.**)		

6.18. Alternate Planning. Select alternate airports meeting the requirements of AFI 11-202V3. Choose alternates that best meet mission requirements and conserve fuel; they should not be within the same terminal area, if terminal forecasts are marginal. Select alternates that are not restricted by FLIP, FCG, or diplomatic clearances, and are compatible with the mission load and performance characteristics of the aircraft. The PIC 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. Refer to chapter 14 for fuel planning guidance.

6.19. Departure Alternates.

6.19.1. A departure alternate is required if weather is below landing minimums for lowest suitable approach (at departure aerodrome) or if crosswinds (corrected for RCR) are out of limits for landing. If planning an ILS approach, Category I minimums will be used.

6.19.2. Suitability of Departure Alternates. When a departure alternate is required, the aircraft must be capable of maintaining the MEA or minimum obstruction clearance altitude (MOCA), whichever is higher, to the alternate using OEI performance criteria. To qualify as a departure alternate, the airfield must meet one of the following conditions:

6.19.2.1. For an alternate within 30 minutes flying time, the existing weather 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;

6.19.2.2. For an alternate within two hours flying time, the existing weather must be at least 500-1 above the lowest compatible published approach minimums, but not less 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.

6.20. Destination Requirements (*for filing purposes*). Refer to chapter 14 for fuel planning guidance. The forecast destination weather will be according to AFI 11-202V3 and the following:

6.20.1. File two alternates when:

6.20.1.1. The forecast visibility (intermittent or prevailing) is less than published for the available DoD or National Aeronautical Charting Office (NACO) precision approach; or

6.20.1.2. The forecast ceiling OR visibility (intermittent or prevailing) is less than published for all other approaches. For approaches with no published ceiling requirement (e.g. Jeppesen approaches), the minimum required ceiling shall be computed by taking the published HAA or HAT and rounding it up to the nearest one hundred feet (or as determined by MAJCOM TERPs review). For example, a Jeppesen VOR approach with a published HAA of 642 feet would require a forecasted ceiling of 700 feet; or

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

6.20.2. File an alternate, regardless of forecast weather, when the departure or destination aerodrome is outside the CONUS. ***EXCEPTION***: OCONUS, intra-theater flights that do not exceed 3-hours, comply with basic AFI 11-202V3.

6.20.3. When filing to a remote or island destination, aircrews may use 2+00 holding fuel (in lieu of an alternate). 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:

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

6.20.3.2. 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. However, if a precision approach is available, the ceiling or visibility may be intermittently below non-precision approach minimums (excluding ASR), but not below precision approach minimums (for ETA plus 2 hours). ***NOTE:*** See Chapter 14 for fuel planning considerations to a remote or island destination.

6.21. Adverse Weather.

6.21.1. Flight into areas of forecast or reported severe turbulence is prohibited.

6.21.1.1. The C-5 is a category II aircraft for turbulence. Crews should confirm the type of aircraft the forecast turbulence applies to, or what type of aircraft reported the encounter, to gain a more accurate picture for their route of flight. Turbulence category charts are found in Air Force Weather Agency technical note AFWA/TN 98/002, *Meteorological Techniques*.

6.21.1.2. The PIC is responsible for ensuring all passengers are seated, with seat belts fastened, when areas of moderate or greater turbulence are encountered or anticipated.

WARNING: Serious injury may occur if passengers do not have their seat belts fastened and the aircraft encounters moderate or severe turbulence.

6.21.2. Flight into areas of forecast or reported severe icing is prohibited. Prolonged operation, such as cruise flight or holding, in areas of moderate icing should be avoided.

6.21.2.1. Do not takeoff under conditions of freezing rain or freezing drizzle. ***NOTE:*** Air Force Weather Agency technical note AFWA/TN 98/002, *Meteorological Techniques*, states that freezing drizzle is equivalent to moderate icing and freezing rain is equivalent to severe icing. When freezing fog is forecast or reported, aircrews will confirm with weather agencies what type (if any) icing is associated with the freezing fog.

6.21.2.2. Freezing precipitation, snow, freezing fog, or temperatures near 0°C, may cause ice or frost to accumulate on aircraft surfaces. When an aircraft requires de-icing/anti-icing prior to takeoff, refer to the following:

6.21.2.2.1. Aircrews will only use de-ice and anti-ice fluids listed in their respective flight manual. Aircrews will be familiar with and follow all restrictions in their associated flight manual with respect to anti-ice/de-ice procedures and holdover times.

6.21.2.2.2. MIL-A-8243 Type I and Type II de-icing fluids provide little anti-icing benefit, and therefore have limited holdover times. As a guide, for approved anti-icing fluids, crews may use published anti-icing holdover times IAW TO 42C-1-2, *Aircraft Anti-icing Procedures*, and AFFSA holdover tables located at the AFFSA website. The holdover time begins when anti-icing fluid is first applied and the PIC shall use time, temperature, and dilution of mixture to determine when times are exceeded and re-apply fluid if required.

6.21.2.2.3. In all cases, PICs will ensure a visual inspection of the aircraft is completed within 5 minutes of departure.

6.21.3. 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 2000 feet, avoid them by at least:

6.21.3.1. 20 NMs at or above flight level FL 230.

6.21.3.2. 10 NMs below FL230.

6.21.3.3. 5 NMs for tactical low-level operations below FL230 provided the outside air temperature is at or above 0°C at flight altitude. Avoid gust fronts and winds preceding a rapidly moving thunderstorm. ***CAUTION*:** Aircraft damage may occur 20NMs or more from any thunderstorms. Aircrews must familiarize themselves with information on thunderstorm development and hazards. Refer to AFH 11-203, *Weather for Aircrews*.

6.21.4. The use of ground-based radar as a means of thunderstorm avoidance should only be used to assist in departing an inadvertently penetrated area of significant weather. It should never be considered a normal avoidance procedure. When relying exclusively on ground-based radar for weather avoidance, and the ground controller is unable to provide avoidance instructions, attempt to maintain VMC by:

6.21.4.1. Changing routing.

6.21.4.2. Diverting to alternate.

6.21.4.3. Declaring an emergency and requesting priority assistance.

6.21.5. Aircrews should avoid flying in areas of recently dissipated thunderstorms and advected clouds (horizontal movement of clouds caused by wind) downwind of thunderstorms.

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

6.21.6.1. Attempt to maintain VMC.

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

6.21.6.3. Avoid areas of high lightning potential, i.e., clouds within plus or minus 5,000 feet of the freezing level or plus or minus 8°C of the freezing level. ***NOTE***: Approaches or departures may be accomplished when thunderstorms are within 10NMs providing they are not producing any hazardous conditions (such as hail, lightning, strong winds, gusts fronts, heavy rain, wind shear, or microburst) at the airport, and are not forecast or observed to be moving in the direction of the route of flight (to include the planned missed approach corridor, if applicable).

6.21.7. When performing approaches and landings at locations where temperatures are 0°C or below, refer to AFI 11-202V3 and the *Flight Information Handbook* (FIH) Section D, Temperature Correction Chart, to correct MDA, DA, and other barometric altitudes inside the FAF. When Temperature is below -30C or if in mountainous terrain apply correction to all altitudes on the approach plate.

6.21.8. Do not fly into an area of known or forecast moderate or greater mountain wave turbulence. Refer to AFH 11-203v1 and AFH 11-203v2, *Weather for Aircrews*, for additional information on mountain wave turbulence.

6.21.9. Significant Meteorological Information (SIGMET). National Weather Service in-flight weather advisories are not limiting to Air Force aircraft. Contact the nearest military weather facility or flight service station for details, if applicable.

6.21.10. Volcanic Dust Precautions. Aircraft flight operations in areas of forecast or known volcanic activity or dust is prohibited. Plan all missions to avoid volcanic activity by at least 20 NMs.

6.21.10.1. Crews that are planned to fly through or divert through predicted low density area will fill out the “low density volcanic ash aircrew worksheet” as soon as conditions permit and turn in the form to MX during debrief, or to the first available MX technician if at an en route location, at first opportunity. MX will use this worksheet to update G081 to determine additional aircraft inspection requirements and track long term effects. Only use AFTO Form 781 write-ups for actual or suspected ash penetration. The worksheets will be made available with the aircraft forms prior to flight and will be filled out at the earliest opportunity, during flight if possible.

6.21.11. Lightning Avoidance. The following conditions are most conducive to lightning strikes and prolonged flight in them should be avoided:

6.21.11.1. Within 8C of freezing level.

6.21.11.2. In clouds or in any intensity of precipitation or turbulence associated with thunderstorm activity.

6.22. Operational Risk Management (ORM). ORM is a logic based, common sense approach to making calculated decisions on human, material, and environmental factors before, during, and after all operations. USAF policy on ORM is contained in Air Force Policy Directive 90-9, *Operational Risk Management*. PICs will accomplish ORM worksheets IAW MAJCOM and local guidance as part of preflight activities.

6.22.1. Flying units will develop a local ORM program to include personal ORM assessment for all missions and accomplished by all crewmembers prior to each flight. The ORM worksheet is a living document and aircrews should update their risk factors as their mission evolves to ensure an accurate risk assessment.

Section 6C—Preflight

6.23. Hazard Identification and Mitigation. If not previously briefed in the Specialized Briefing, refer to **paragraph 6.12.3**., the PIC will brief primary mission hazards facing the crew during takeoff and climb-out, after the entire crew is assembled at the aircraft.

6.24. AFTO Forms 781 Series.

6.24.1. Review AFTO Forms 781 series before applying power to the aircraft or operating aircraft systems. An 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 PIC may sign the exceptional release. Ensure that the DD Form 1896, *Jet Fuel Identaplate***,** and AIR card are aboard the aircraft.

6.24.2. One-Time Flights. An aircraft may be released for a one-time flight with a condition that might be hazardous for continued use, provided the aircraft is airworthy for one flight to another station. Refer to T.O. 00-20-1, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures,* for downgrade authority and procedures. After the maintenance release is obtained, coordinate mission requirements with the controlling agency. The PIC's concurrence is required before the aircraft can be flown.

6.24.3. For Red X clearing procedures at stations without maintenance support refer to **paragraph 12.3**

6.25. Aircraft Servicing and Ground Operations.

6.25.1. Aircraft Refueling. Aircrew members are normally not required to refuel or defuel aircraft; however, crewmembers qualified in ground refueling/defueling may perform these duties. When crewmembers are required to refuel/defuel, the flight engineer will act as the team supervisor. Aircrews will only refuel/defuel in cases when maintenance support is not readily available and the mission would be delayed. Crewmembers may augment maintenance refueling teams at en route stops. If required, the PIC will designate other crewmembers to assist the flight engineer. Crewmembers will comply with T.O. 00-25-172, applicable maintenance T.O.s, and refueling/defueling checklists.

6.25.2. Aircrew Dash One Preflight Inspection Requirements. Accomplish IAW the flight manual.

6.25.3. Fire Protection and Crash Rescue.

6.25.3.1. The aircraft engine fire extinguisher system fulfills the minimum requirements for fire protection during engine start.

6.25.3.2. A fireguard is required for all engine starts including the APU. A crewmember or ground controller may act as fireguard.

6.25.4. Aircrew and Maintenance Engine Runs.

6.25.4.1. Aircrew are authorized to perform engine runs when qualified maintenance personnel are not available. A mixture of aircrew and maintenance personnel is not recommended, if possible use all aircrew. When an aircrew member is required to start or run up engines for maintenance purposes, the following procedures apply:

6.25.4.1.1. Maintenance personnel will accomplish all necessary inspections and preparations for the engine run. These actions include but are not limited to: intake/exhaust inspections, access panel security servicing, and AFTO Form 781 documentation. C-5M only: The EDS must be on and configured for RMM data collection for all engine starts/runs.

6.25.4.1.2. Use only aircrew checklists. Begin with the "before starting engines" checklist and complete all appropriate checklists in their entirety through the "before leaving airplane" checklist.

6.25.4.1.3. Checklist deviations are authorized when maintenance requires less than four engines to be started.

6.25.4.1.4. Operate symmetrical engines when power settings above ground idle are required.

6.26. Aircraft Recovery Away from Home Station. Refer to Chapter 12 for procedures.

6.27. Aircrew Flight Equipment Requirements.

6.27.1. Oxygen. 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 Crew Regulators Oxygen 100% and Passenger Continuous Flow portions of the Oxygen Duration Chart in the flight manual.

6.27.1.1. Aircrew members will comply with the oxygen requirements in AFI 11-202V3.

6.27.1.2. Crewmembers occupying a crew station will have an oxygen mask connected and readily available for use from before engine start until engine shutdown.

6.27.2. Rafts. On overwater flights do not carry more passengers and crewmembers than the life rafts will accommodate.

6.27.3. Life preserver units (LPUs) or Personal Floatation Device. The loadmaster will place an LPU within easy reach of each passenger and aircrew member before takeoff on overwater flights (outside gliding distance to land). Ensure the appropriate number and type of life preservers are aboard for overwater missions carrying children and infants.

6.28. Fleet Service. Ensure the required fleet service items are aboard the aircraft early enough to permit inventory prior to engine start.

6.29. Cargo Documentation. Proper cargo or mail documentation will accompany each load.

6.29.1. Load Data Information (Applicable to AFRC/ANG completing 618 AOC [TACC]-directed missions). At stations where there is no mobility air transportation function, the aircrew will collect the required load information on each leg, and submit it to the first station, which has such a function. The report will be submitted on AF Form 4075, *Aircraft Load Data Worksheet*.

6.30. Airlifting Hazardous Cargo. ***NOTE*:** Installed flares do not constitute hazardous cargo. However, any additional loads of flares are not considered aircraft equipment and shall be properly packaged and prepared IAW AFMAN 24-204.

6.30.1. AMCH 11-214, *AMC Aircrew Hazardous Material Handbook*, contains a description of the types and classes of hazardous cargo that may be carried. AMC and AMC-gained PICs are responsible for ensuring that all procedures contained in AMCH 11-214 are complied with when airlifting hazardous cargo.

6.30.1.1. For more information regarding hazardous materials, refer to AFMAN 24-204, *Preparing Hazardous Materials for Military Air Shipment.*

6.30.2. Flight Planning. Based on the Hazardous Cargo Briefing and IAW AMCH 11-214 Chapter 7, the PIC will:

6.30.2.1. Enter "Hazardous Cargo" and the mission identifier or flight number in the appropriate section of the flight plan. Use *Remarks* section of DD175, *Military Flight Plan*, and *Other Information* section of DD1801, *International Flight Plan, DOD*. Refer to the FCG for country specific requirements concerning over-flight when transporting hazardous materials cargo.

6.30.2.2. If possible, plan the flight to minimize overflying heavily populated or otherwise critical areas. Approach, landing, and takeoff tracks are excluded.

6.30.2.3. Prepare a departure message at stations when a C2 center is not available. The remarks section of the departure message will include: Class of hazardous material, DoD class or division for explosives, net explosive weight (NEW), and gross weight. If required, request special handling (e.g., isolated parking, security, technical escort teams, etc.).

6.30.2.4. If estimated time en route (ETE) is less than 1 hour, or if other circumstances preclude timely message receipt at destination, notify the next destination of the ETA and information listed in **paragraph 6.30.2.3**. If available, C2 will relay required information to next destination.

6.31. Handling of Classified Cargo, Registered Mail, Mission Capable (MICAP) Parts, Very, Very Important Part (VVIP), Forward Supply System (FSS) Shipments, and Courier Material.

6.31.1. MICAP, VVIP, sensitive cargo, courier materials, and registered mail moving within the normal airlift system are receipted at the on and offload stations using the air cargo manifest. For unit moves operated in accordance with Defense Transportation Regulation

(DTR), Part III, Mobility, classified or sensitive cargo movement is normally manifested utilizing the DD Form 2130-1, *C-5 Load Plan,* or similar automated product (such as CALM or AALPS), and will normally be accompanied by a unit courier. However, if classified/sensitive unit cargo is offered without an accompanying courier, the DD Form 1907, *Signature and Tally Record***,** must be used.

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

6.31.1.1.1. Primary crewmembers will not be designated couriers without the consent of the PIC.

6.31.1.1.2. Crewmembers on aircraft scheduled to make an extended en route stop at a location where DCS couriers cannot provide en route support will not be designated as couriers.

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

6.31.2.1. During unscheduled en route stops crewmembers may place courier material in temporary custody of the following agencies 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 material is lost, stolen or otherwise compromised, report circumstances to the nearest Defense Courier Station and notify the local US military commander or US Government activity.

6.31.4. Life or death urgency shipments consist of biological or other medical supplies of such urgency that human life is dependent upon immediate receipt. Shipments will be manifested separately and the manifest annotated with the words LIFE OR DEATH URGENCY. All shipments will be handled on a hand-to-hand receipt basis, using either the air cargo manifest or the DD Form 1907, for unit moves. The PIC, or designated representative, will be briefed on the urgency of the shipment and be made the custodian during flight.

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 or as specified in a MAJCOM supplement.

6.32.1. Scheduled takeoff time may be adjusted to make good a time over target (TOT), Air Refueling Control Time (ARCT), or time of arrival (TOA). PICs shall notify C2 agency before takeoff to adjust the scheduled takeoff time.

6.32.2. Early Departures. 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 channels provided the impact on local and downrange facilities and crew duty is evaluated.

6.33. Not Used.

Section 6E—En route

6.34. Flight Progress. In-flight, use all available navigational aids to monitor FMS performance. Immediately report malfunctions or any loss of navigation capability that degrades centerline accuracy to the controlling air route traffic control center (ARTCC). Use the following procedures for flight progress:

6.34.1. Another pilot will verify waypoint data inserted into the INS/FMS. Check both the coordinate information and the distances between waypoints against the flight plan.

6.34.2. Operations in International/Territorial Airspace. (See FLIP, FCG, NAT Doc 007, and AP, for further guidance). US military aircraft and DoD personnel entering another nation to conduct US government business 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).

6.34.2.1. 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.

6.34.2.2. Consistent with international law, the US recognizes sea claims up to 12NMs. Diplomatic constraints and/or a lack of diplomatic clearances usually result in missions operating in international airspace. Therefore, 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 12NMs; however, specific guidance from certain US authorities may establish limits, which differ from the standard.

6.34.2.3. Flight Information Region (FIR). An FIR is 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 AC avoids flight in territorial airspace.

6.34.2.4. 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).

6.34.2.5. 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.

6.34.2.6. ATC 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.

6.34.2.7. In the event ATC agency challenges the validity of a flight routing or attempts to negate existing clearances, ACs must evaluate the circumstances. The normal response will be to attempt to advise the ATC agency that the aircraft will continue to planned destination, as cleared in international airspace. The key phrase is "in international airspace." 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 before mission departure, as being valid authorization.

6.34.2.8. 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 before performing the critical portion of the mission.

6.34.2.9. Aircrews (except on weather reconnaissance missions) normally are not tasked to and should not fly "due regard" routings unless coordinated with the appropriate MAJCOM C2 and specifically directed in the mission FRAG. The "due regard" or "operational" option obligates the military AC to be their own ATC agency to separate their aircraft from all other air traffic. If operational requirements dictate, ACs may exercise the "due regard" option to protect their aircraft. Aircraft will return to normal air traffic services as soon as practical.

6.35. In-Flight Meals. Pilots should not eat meals at the same time, and their meals should consist of different menu items.

6.36. Communications Instructions Reporting Vital Intelligence Sightings 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 aircraft. Aircraft subjected to harassment or hostile action by foreign aircraft will immediately contact the nearest USAF 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 agency. 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 6V5 and AFI 10-206, *Operational Reporting.*

6.37. Communications.

6.37.1. Crews will conduct an HF radio ground check before takeoff if use of the HF radio may be required for ATC or C2 communications. Attempt to establish HF contact before going out of UHF/VHF range. If unable to establish HF contact with the controlling HF station, and an alternate means of relay of ATC information is not available, the aircraft

should return to the nearest suitable support base. In the case of airborne HF failure, crews are authorized to continue under the following conditions:

6.37.1.1. If SATCOM-equipped use Satellite Voice Communications to contact responsible station via special telephone numbers/short codes published in State AIPs (Aeronautical Information Publication).

6.37.1.2. If not SATCOM-equipped, attempt to contact ATC facility on VHF or attempt VHF relay via another aircraft on 123.45 MHz.

6.37.2. Pilots shall provide ARTCC position and weather observations when required. If unable to contact an ATC agency, attempt to relay through the GLOBAL HF stations.

6.38. In-Flight Emergency Procedures. The PIC shall report deviations from directives that may occur as a result of an emergency according to AFI 11-202V3. Time and conditions permitting, inform passengers of the situation and intentions.

6.38.1. Notification of Control Agencies. When practical after completing the aircraft emergency action checklists and associated actions, the PIC shall furnish ATC and appropriate C2 agencies with a description of the difficulty, assistance required, intentions, and any other pertinent information.

6.38.2. The PIC may initiate a CONFERENCE HOTEL/SKYHOOK when additional expertise is necessary. Communications procedures are as follow:

6.38.2.1. Local Area. Use appropriate UHF or VHF frequencies.

6.38.2.2. En route. Attempt to establish a phone patch with the nearest or controlling C2 Center using global HF network, UHF/VHF stations, SATCOM, etc. If unable, aircrews are permitted to use ARINC radio service as an additional avenue for phone patch connectivity.

6.38.2.3. Provide the following information when time permits:

6.38.2.3.1. Description of the situation to include actions taken and intentions.

6.38.2.3.2. What assistance is being requested.

6.38.2.3.3. Fuel on board and hours of endurance.

6.38.2.3.4. Position.

6.38.2.3.5. Altitude and flight conditions.

6.38.2.3.6. Number of personnel and DVs on board.

6.38.2.3.7. Qualification of PIC.

6.38.2.3.8. Planned landing destination and ETA.

6.39. Need for Medical Assistance. When a person aboard the aircraft requires medical care, the PIC will notify the station of intended landing in sufficient time so the aircraft may be met by medical personnel. Notification will include the patient's sex, approximate age, and major complaint.

6.40. Weather Forecasts. It is the pilot's responsibility to obtain destination weather prior to descent. The primary sources are 618 AOC (TACC) weather operations, OWSs, and USAF

weather flights via pilot-to-meteorologist service (PMSV) or through a USAF aeronautical station. For aircraft flying in EUCOM AOR (ENAME operations) contact USAFE/OWS at Sembach AB GE. SOUTHCOM AOR contact 612 SPTS/WX at Davis-Monthan AFB, AZ. The ATC system can provide weather information to en route aircraft.

Section 6F—Arrival

6.41. Descent. Before descent into unfamiliar areas, pilots will review appropriate terrain charts to increase aircrew situational awareness of obstructions. Primary crewmembers 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.

6.41.1. 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. A visual approach may be flown during night VFR conditions if an approved instrument approach to the landing runway is not available or operational missions require a tactical approach. ***NOTE:*** A visual glide slope indicator, VASI, PAPI, etc., is required.

6.41.1.1. On training/evaluation flights, pilots may fly non-precision approaches or VFR traffic patterns to accomplish required training and evaluations. The pilot not flying will monitor a precision approach when practical to enhance safety.

6.41.1.2. For recovery at home station, pilots may elect to fly a visual or non-precision approach, if weather minimums permit.

6.42. Instrument Approach Procedures.

6.42.1. Aircraft category. In FAA airspace, the C-5 is a category "D" aircraft. If approach speeds exceed 165 knots, the minimums for category "E" will be used. Consult appropriate FLIP and AFMAN 11-217v1 for ICAO categories.

6.42.2. Prior to starting an instrument approach, pilots will confirm their aircraft can comply with the missed approach climb gradient requirements established in AFI 11-202V3.

6.42.3. Weather minimums. Before starting an instrument approach, or beginning an en route descent, pilots will confirm the existing weather is reported to be:

6.42.3.1. At or above required visibility for straight-in or sidestep approaches.

6.42.3.1.1. 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 and DA will be no lower than 200 feet HAT.

6.42.3.2. At or above required ceiling and visibility for circling approaches.

6.42.3.2.1. For circling approaches with no published ceiling requirement, the required ceiling shall be computed by taking the published HAA plus 100 feet rounded up to the next one hundred foot value (e.g., if the HAA is 747 feet, add 100 feet to get 847 feet and then round up to the next one hundred foot value which would be 900 feet. Your ceiling for the approach must be at or above 900 feet.) When circling minimums are published, but not by category, circling approach minimums will be as published, but in no case lower than 600 feet and 2 miles visibility.

6.42.3.3. 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. (This applies only to the ALS itself, not to VASIs, PAPIs, and other lights that are not a component of the ALS.)

6.42.3.4. If the ceiling is below the value depicted for published DoD or NACO precision approach, but visibility is at or above authorized minimums, comply with fuel requirements before initiating en route descent, penetration, or approach.

6.42.3.5. Variable visibility/ceiling reports. If variable visibilities/ceilings are reported, pilots may use the greatest value reported. If it is subsequently determined that weather is below minimums for the approach, comply with **paragraph 6.42.10**. Do not attempt further approaches until the lowest visibility/ceiling reported is at/above approach minimums.

6.42.4. Not used.

6.42.5. Category I ILS Procedures. Decision altitude for precision approaches will be as published, but no lower than 200 feet height above touchdown (HAT).

6.42.5.1. ILS Precision Runway Monitor (PRM) Approaches. Both pilots must be certified to conduct an ILS PRM approach. Comply with the following operational procedures:

6.42.5.1.1. Two operational VHF communication radios are required.

6.42.5.1.2. The approach must be briefed as an ILS/PRM approach.

6.42.5.1.3. If unable to accept an ILS PRM approach clearance, contact the FAA ATCSCC at 1-800-333-4286 prior to departure time to obtain a pre-coordinated arrival time. Pilots who arrive at a PRM airport unable to accept PRM approach clearance, who did not contact ATC prior to departure, should expect an ATC directed divert to a non-PRM airport.

6.42.5.1.4. All breakouts from the approach shall be hand flown. Autopilots shall be disengaged when a breakout is directed.

6.42.5.1.5. Should a TCAS Resolution Advisory (RA) be received, the pilot shall immediately respond to the RA. If following an RA requires deviating from an ATC clearance, the pilot shall advise ATC as soon as practical. While following an RA, comply with the turn portion of the ATC breakout instruction unless the pilot determines safety to be a factor.

6.42.6. Category II ILS Procedures. DH is based on radar altitude. HAT may be no lower than 100 feet; however, published radar altimeter setting may be lower than 100 feet (to correspond with a 100 foot HAT). Minimum RVR is 1200. Maximum crosswind limitation is 10 knots.

6.42.6.1. The following airfield and aircraft equipment must be operational (AFI 11-230, *Instrument Procedures*).

6.42.6.1.1. Approach lights.

6.42.6.1.2. Runway centerline lighting.

6.42.6.1.3. High intensity runway lights or touchdown zone lights.

6.42.6.1.4. Two transmissometers when RVR is less than 1600.

6.42.6.1.5. ILS far field monitor.

6.42.6.1.6. Sequenced flashers.

6.42.6.1.7. Both VHF NAV receivers.

6.42.6.1.8. Both radar altimeters

6.42.6.1.9. Autopilot and autoland sub-system (FMS-800 airplanes).

6.42.6.1.10. Autopilot (For AMP airplanes category II approaches must be performed with the DUAL mode FMA displayed and coupled to the autopilot).

6.42.6.2. Aircrews will not execute an actual Category II ILS to minimums unless both pilots are qualified and current in Category II ILS. The PIC must have logged at least 100 hours in command since AC certification.

6.42.7. MLS Approaches. Conduct MLS approaches IAW AFI 11-202V3 and AFMAN 11-217V1.

6.42.8. NDB Procedures. NDB approaches may be flown during day, night, or IMC conditions after compliance with any airfield restrictions in GDSS/GDSS2/ASRR. Back up each approach with available navaids/GPS to include loading the NDB coordinates in the FMS.

6.42.9. RNAV Procedures. Properly trained C-5 aircrews are permitted to fly RNAV and RNAV (GPS) approaches. RNAV and RNAV (GPS) approaches will be flown only to LNAV minimums and IAW AFI 11-202V3.

6.42.9.1. Traditional approaches (ILS, NDB, VOR, TACAN) found in DAFIF are not coded to the same standards as RNAV approaches. Due to the amount of errors, traditional approaches pulled from the DAFIF database may be flown solely via the FMS in day VMC only.

6.42.10. After Beginning Descent or Approach. IAW AFI 11-202V3 Chapter 8, after beginning an en route descent or published approach, and the weather is reported or observed to be below approach minimums, the PIC has the option of continuing the approach to the missed approach point (MAP)/DA. Comply with the last assigned clearance until a new or amended clearance is received. ***EXCEPTION:*** Do not continue a CAT II ILS if the weather is reported to be below CAT II minima.

6.42.10.1. Do not continue the approach below minimums unless the runway environment is in sight and the aircraft is in a position to make a safe landing.

6.42.10.2. If the approach is continued, sufficient fuel must be available to complete the approach and missed approach, and proceed to a suitable alternate with normal fuel reserve.

6.42.10.3. The PIC has final responsibility for determining when the destination is below designated minimums, and for initiating proper clearance request.

6.42.11. Holding. An aircraft may hold at a destination that is below landing minimums, but forecast to improve to or above minimums provided:

6.42.11.1. The aircraft has more fuel remaining than that required to fly to the alternate and hold for the appropriate holding time, and the weather at the alternate is forecast to remain at or above alternate filing minimums for the period, including the holding time.

6.42.11.2. Destination weather is forecast to be at or above minimums before excess fuel will be consumed.

6.42.12. Auto-land landings are prohibited.

6.43. Not Used.

6.44. Unscheduled Landings. When an unscheduled landing or crew rest occurs at a base without a passenger facility, the PIC should immediately advise the appropriate C2 agency and request assistance in arranging substitute airlift for passengers on board. The following procedures apply when obtaining support for service members, in a group travel status, who are transported on AMC aircraft flying a Transportation Working Capital Fund (TWCF) mission, which incurs an unscheduled delay due to weather, aircraft maintenance, or foreign diplomatic clearance problems, forcing the members to be lodged at that location until the aircraft can continue its mission.

6.44.1. If the delay is at a location where DoD facilities and AMC TWCF funds are available, payment for lodging (contract or on-base) and other required support is charged to local TWCF funds via the US Bancorp Government Purchase Card (GPC) account, in accordance with locally established procedures. TWCF payment is applicable for only those service members in a group travel status aboard any C-5 aircraft delayed at these locations, regardless of the command owning the aircraft, provided the aircraft is flying a TWCF mission (SAAM, CJCS Exercise, JA/ATT, or Contingency) with an AMC mission identifier.

6.44.2. If the aircraft delay is at a location where TWCF funds are not available (regardless if DoD facilities are available or not), the aircraft commander will utilize SF 44, Purchase Order-Invoice-Vouchering (or AF IMT 15, United States Air Force Invoice) authority to acquire the necessary meals, quarters, and transportation for only the group travel status passengers. Upon return to home station, the aircraft commander will turn in the SF 44 or AF IMT 15 to the local accounting liaison/budget office. Supporting documentation should include a copy of the service members' group travel orders along with applicable invoices/receipts for lodging, meals, and other required support. Upon validation of the SF 44 or AF IMT 15, the accounting liaison/budget office forwards the bills for these charges to the DFAS Field Site for payment, citing the funds of the unit whose aircraft incurred the delay.

6.44.3. This policy does not apply to those passengers traveling on delayed aircraft flying TWCF missions who are authorized per diem on their individual travel orders or in a space available status.

6.45. Maintenance. Complete the AFTO Form 781 after each flight. After landing, crewmembers debrief maintenance personnel on the condition of the aircraft, engines, avionics equipment, and all installed special equipment as required. At stations without maintenance support, when a maintenance requirement exists the PIC will ensure a thorough debrief is

provided to the C2 agency. On all AMC/ANG/AFRC missions, notify 618 AOC (TACC) Logistics Control (618 AOC/XOCL).

6.45.1. An entry will be placed in AFTO 781A, "Aircraft Subjected to Salt Spray" (state lowest altitude and duration) anytime the aircraft is flown under 1000 feet above sea except for takeoffs and landings.

6.46. Border Clearance.

6.46.1. Normal Operations.

6.46.1.1. The unit dispatching the mission is normally responsible for the border clearance of its aircraft.

6.46.1.2. When support is not available, border clearance is the responsibility of the PIC. Duties may be assigned to ground personnel or to the loadmaster, but the PIC retains ultimate responsibility. When a C-5 aircraft is on-loaded at a base without an air traffic function, the PIC is responsible for ensuring the following:

6.46.1.2.1. Crewmembers, troops, and passengers possess current passports and valid visas, when required.

6.46.1.2.2. Crewmembers, troops, and passengers have current certificates of immunization (shot record).

6.46.1.2.3. Cargo entry documents are in proper order.

6.46.1.2.4. Departing or entering the United States through a location where border clearance can be obtained.

6.46.1.2.5. 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.

6.46.1.2.6. Spraying the aircraft (see the FCG and **paragraph 6.47**).

6.46.2. Procedures for US Entry.

6.46.2.1. En route, the loadmaster will distribute personal customs declarations (when not accomplished by passenger services) to all passengers, troops, and crewmembers. The loadmaster will also brief passengers and crewmembers on customs regulations, and prepare and compile necessary border clearance forms for the PIC's signature.

6.46.2.2. 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.

6.46.2.3. Obtain a permit to proceed when military necessities require that an aircraft, which has landed in the United States for customs clearance, to proceed to another base in the US to obtain border clearance. The permit to proceed delays customs inspection of cargo, passengers, and crew until arrival at the offload station, and saves intermediate offloading 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 or directed by the controlling C2 center.

6.46.2.4. 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 crewmembers unless necessary for safety or the preservation of life and property (scanner excepted). 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.

6.46.3. Inspections of U.S. Aircraft by Foreign Officials.

6.46.3.1. Follow USAF 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, PICs must be aware of, and adhere to, any specific FCG provisions for individual countries.

6.46.3.2. If confronted with a search request by foreign authorities, aircrews should use the following procedures.

6.46.3.2.1. In most cases, search attempts may be halted simply by a statement of the PIC to the foreign official that the aircraft is a sovereign instrumentality not subject to search without consent of USAF 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 that may honestly, but mistakenly, believe they have authority to search USAF aircraft.

6.46.3.2.2. If foreign authorities insist on conducting a search, the PIC should make every effort to delay the search until he or she can contact USAF headquarters (through MAJCOM C2) or the appropriate embassy officials. The PIC should then notify these agencies of foreign request by the most expeditious means available and follow their instructions.

6.46.3.2.3. If foreign officials refuse to desist in their search request, pending notification to USAF headquarters or the appropriate embassy, the PIC 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.

6.46.3.2.4. If permission is refused and the foreign authorities insist on forcing their way on board an aircraft, the PIC should state that he protests the course of action being pursued and that he intends to notify both USAF headquarters and the appropriate American embassy of the foreign action. The PIC should not attempt physical resistance, and should thereafter report the incident to USAF headquarters and appropriate embassy as soon as possible. The PIC should escort foreign authorities if the inspection cannot be avoided.

6.46.3.3. Other procedures may apply when carrying sensitive cargo or equipment. Follow these procedures and applicable portions of classified FCG supplements.

6.46.4. Exercises and Contingency Operations.

6.46.4.1. General. Certain airlift missions, which do not transit normal ports of entry or exit, require special procedures to expedite compliance with customs, public health, immunization, and agricultural requirements. A joint memorandum of understanding, between these agencies and MAJCOM establishes certain procedures and waivers.

6.46.4.2. Implementation. Implementation of the agreement is not automatic. Traffic and border clearing agencies implement all or part of the agreement as necessary for each operation. Inspection and clearance may be accomplished at the US onload or offload base, or at the foreign onload or offload base.

6.46.4.3. Customs Procedures.

6.46.4.3.1. Outbound: No requirement. Filing of Customs Form 7507, *General Declaration (Outward/Inward)*, is not required unless directed.

6.46.4.3.2. Inbound. Prepare one copy of the following documents before arrival:

6.46.4.3.2.1. Customs Form 7507 (Passenger list not required).

6.46.4.3.2.2. Cargo manifest.

6.46.4.3.2.3. For troops out of country less than 140 days:

6.46.4.3.2.3.1. Troop commander's certificate for examination of troop baggage.

6.46.4.3.2.3.2. One copy of the US Customs Baggage Declaration Form for each passenger not under command of the troop commander, to include observers, support personnel, civilians, news reporters, and crewmembers.

6.46.4.3.2.3.3. Upon arrival at a CONUS offload base, a customs representative will meet the aircraft and accept the troop commander's certificate with respect to troop baggage. Individual baggage declarations are not required. The troop commander should have inspected troop baggage.

6.46.4.3.2.3.4. Troops will debark under the observation of the customs representative with only a spot check of articles and baggage. The customs officer may elect to make a more extensive inspection.

6.46.4.3.2.4. For troops who are out of the country 140 days or more:

6.46.4.3.2.4.1. One copy of the U.S. Customs Baggage Declaration Form for each passenger. This includes observers, support personnel, civilians, news media personnel, and crewmembers. Personnel may use DD Form 1854, *Customs Accompanied Baggage, U.S.*, or Customs Form 6059B.

6.46.4.3.2.4.2. Upon arrival at a CONUS offload base, a customs representative will meet the aircraft and collect all declarations. Troops will debark under the observation of the customs representative who may make discretionary examination of the baggage.

6.46.4.4. Public Health Procedures.

6.46.4.4.1. When operating from a base without a traffic officer, the AC will ensure all crewmembers and passengers are properly immunized.

6.46.4.4.2. Spray the aircraft if required.

6.46.4.5. Immigration Procedures.

6.46.4.5.1. Outbound: No requirements.

6.46.4.5.2. Inbound: Submit the following to the immigration inspector if carrying civilian passengers.

6.46.4.5.2.1. One copy of Customs Form 7507 (found at **http://www.customs.gov**).

6.46.4.6. Agriculture Procedures:

6.46.4.6.1. Outbound: No requirement.

6.46.4.6.2. Inbound: Consult AMC Border Clearance Guide.

6.46.4.6.2.1. The command being airlifted will instruct troops that no fresh fruit, milk, milk products, vegetables, plants, plant pests, soil samples, animals, meat, and animal products can be brought into the United States. All items of troop personal gear/cargo are to be thoroughly cleaned of mud, dirt, sand, and other foreign material before being brought aboard the aircraft. Personal gear and equipment must be examined for snails and other plant pests to prevent their accidental entry into the U.S.

6.46.4.6.2.2. Before loading, the command responsible for cargo being airlifted will clear vehicles and cargo of snails or other plant pests and of all mud and soil.

6.46.4.6.2.3. When required by agricultural quarantine regulations, the FCG, or higher headquarters, the aircraft will receive an aerosol treatment 30 minutes before landing.

6.46.4.6.2.4. On arrival, agricultural inspectors will inspect the aircraft after troops have disembarked. Crewmembers will assemble remains of in-flight lunches for prompt removal by fleet service personnel.

6.46.4.6.2.5. Inspectors examine baggage, equipment, vehicles, and cargo as offloaded. Any items, vehicles, or cargo found to be contaminated will be held for such treatment as the inspector may direct (washing, steam cleaning, physical cleaning, or fumigation).

6.46.5. Military Customs Pre-clearance Inspection Program. All crewmembers will ensure compliance with Military Customs Pre-clearance requirements.

6.47. Insect and Pest Control.

6.47.1. Responsibility. PICs will ensure required spraying is accomplished according to AFJI 48-104, *Quarantine Regulations of the Armed Forces*, Department of Defense FCG, or as directed by higher headquarters. Certify the spraying on Customs Form 7507, or on forms provided by the country transited. Aircraft should never be sprayed with passengers on board. The only exception is when mandated by the FCG.

6.47.1.1. 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. Wear leather or Nomex gloves while spraying.

6.47.1.1.1. Direct the nozzle toward the ceiling of the compartment or space being sprayed.

6.47.1.1.2. Spray spaces inaccessible from within the aircraft after completely loading fuel, baggage, cargo, and passengers, including baggage compartments, wheel wells, and other similar spaces.

6.47.1.1.3. 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 before boarding crew or passengers. Close all doors and hatches for 10 minutes after dispensing and ventilate for 15 minutes before allowing anyone on board.

6.47.1.2. Duration of spray will be according to **Table 6.4** 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.

Table 6.4. Spray Chart.

Location	Seconds
Crew Compartment	42
Troop Compartment	50
Cargo Compartment	374
Underfloor Compartment	51

6.47.2. Responsibility of PIC In-flight. When seeing any insect or rodent infestation of the aircraft in-flight, notify the destination C2 center, airfield management operations, or airport manager of the situation before landing so the proper authorities can meet the aircraft.

6.47.3. 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. Do not onload or offload 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

6.48. Dropped Objects. If an externally dropped object is discovered, the flight crew will:

6.48.1. Notify TACC or the controlling agency as soon as practical; include details of routing, altitude, weather, etc.

6.48.2. Notify maintenance at the first military station transited.

6.49. Cockpit Voice Recorder (CVR). If involved in a mishap or incident, after landing and terminating the emergency, pull the CVR power circuit breaker.

6.50. Aircrew Flight Equipment (AFE) and Dash 21 Equipment Documentation. The PIC or designated representative will:

6.50.1. Before departing home station or en route stations, ensure appropriate serviceable protective clothing, aircrew flight equipment, survival, and Dash 21 equipment for the entire or remainder of the mission are aboard the aircraft.

6.50.2. Before 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.

6.50.3. Before departing home station and following en route crew changes, review, sign, and date the AFTO Form 46, *Prepositioned Life Support Equipment*, to ensure all required protective clothing and aircrew flight equipment and survival equipment have been certified as installed by Aircrew Flight Equipment personnel 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.

6.50.3.1. Anti-Exposure Suits. Any mission conducting operations North of 78 degrees and South of 60 degrees is required to carry anti-exposure suits.

6.50.4. Missing Equipment. Aircrew members discovering equipment missing will accomplish the following:

6.50.4.1. Make an AFTO Form 781A entry for equipment found missing. Additionally, ensure equipment removed from the aircraft at an en route station is documented in the AFTO Form 781A.

6.50.4.2. 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.

6.50.4.3. Advise the PIC and determine whether the missing equipment should be recovered or replaced before mission continuation.

6.50.4.4. Assist, as required, in preparing reports of survey for missing equipment.

6.50.4.5. When possible, advise AMC/A3TL (or MAJCOM aircrew flight equipment office) and appropriate C2 agency (or airport management) before mission continuation.

6.50.5. Additional Equipment. If more equipment is discovered during the preflight than is annotated on the AF Form 4076 or 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.

6.51. Passenger Restrictions.

6.51.1. No-show passenger baggage or baggage of passengers removed from flight will be downloaded prior to departure. ***EXCEPTION:*** see **paragraph 13.4.2.7**

6.51.2. The cargo compartment will not be used to airlift personnel, except by specific approval of AMC/A3.

6.52. Airfield Data Reports. Aircrews transiting unfamiliar airfields or airfields where conditions may adversely affect subsequent flight will:

6.52.1. 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., and previously unknown obstacles, airfield markings, or other safety critical items to AMC/A3AS.

6.52.2. Debrief the next C2 center transited.

6.53. Impoundment of Aircraft. If an aircraft is involved in a serious in-flight incident, the PIC should impound the aircraft immediately after landing IAW AFI 21-101, *Aircraft and Equipment Management*, and contact the controlling C2 agency for further instructions.

6.54. Wake Turbulence Avoidance. Comply with wake turbulence avoidance criteria. Acceptance of traffic information, instructions to follow an aircraft, or a visual approach clearance is acknowledgment that the PIC will ensure takeoff and landing intervals and accepts responsibility of providing wake turbulence separation. Refer to FLIP General Planning (GP) for more information concerning wake turbulence separation.

6.55. Overflying En Route Stops. The C2 agency may approve a request to overfly a scheduled en route stop (NGB/A3X for ANG-directed missions, AFRC command center for AFRC-directed missions).

6.56. Classified Equipment and Material. Comply with the following or as directed in MAJCOM supplement.

6.56.1. Equipment. When classified equipment is onboard, ensure the C2 Center or airfield management operations office is aware of the requirement for aircraft security according to Chapter 7 of this AFI. At bases not under jurisdiction of the Air Force, ensure the aircraft and equipment are protected. AFI 31-401, *Information Security Program Management*, provides specific guidance concerning the security of various levels of classified equipment aboard aircraft. For classified aircraft components which cannot be removed and stored, lock and seal the aircraft. If available, use Ravens to guard the aircraft; otherwise, use guards employed by the host country for flightline/airport area control. Do not leave unguarded classified information stored in navigation or radio equipment.

6.56.2. Material. Ensure 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.

6.56.3. 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) before deployment overseas, or as specified in the OPORD or contingency/exercise tasking.

6.56.4. Attempt to fix an inoperable Mode 4 before 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.

6.56.5. 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 364.2.

6.56.6. 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 Air Tasking Order (ATO).

6.56.7. Ground and in-flight checks of the Mode 4, when conducted, are mandatory maintenance debrief items. Crews will annotate successful and unsuccessful interrogation of the Mode 4 on all aircraft forms (AFTO Form781A).

6.56.8. Aircrews will carry COMSEC equipment and documents required to operate the Mode 4 on missions when required for mission accomplishment. Before departing for any destination without COMSEC storage facilities, crews will contact their local COMSEC managers for guidance.

6.57. Cockpit Congestion and Loose Objects.

6.57.1. Store only the minimum amount of professional gear required to accomplish the mission on the flight deck. Additional items will be secured in the crew rest area or the cargo compartment.

6.57.2. Place only soft items on the top bunk.

6.57.3. No items (checklists, charts, etc.) will be placed on the throttle quadrant or bogie emergency position switches.

6.58. Hung Ordnance Procedures. Conduct the following procedures after the live firing of chaff/flares or the crew suspects aircraft battle damage:

6.58.1. After landing, taxi to the de-arm area or another suitable safe location to check for hung ordnance.

6.58.2. The scanner or another qualified crewmember will deplane the aircraft and check all chaff/flare dispensers for hung ordnance or damage. ***NOTE:*** ALE-40/47 flare squibs that fail to fire are not considered hung ordnance.

6.58.3. If hung ordnance is found, identified by a protruding or partially ejected 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.

6.58.4. If hung ordnance is not found, the aircraft can proceed to the parking location.

Chapter 7

AIRCRAFT SECURITY

7.1. General. This chapter provides guidance on aircraft security and preventing and resisting aircraft piracy (hijacking) of the C-5 aircraft. AFI 13-207, *Preventing and Resisting Aircraft Piracy (Hijacking)(FOUO)*, AFI 31-101, *Integrated Defense (FOUO)*, 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-5 is a "Protection Level 3" resource. Aircraft security at non-United States military installations is the responsibility of the controlling agency.

7.3. Integrated Defense. The following security procedures will implement AFI 31-101 requirements for C-5 aircraft:

7.3.1. The aircraft will be parked in an established restricted area and afforded protection IAW AFI 31-101.

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. Portable security lighting will be provided during the hours of darkness if sufficient permanent lighting is not available. Post security forces IAW AFI 31-101.

7.3.3. At non-United States military installations, the PIC 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 PIC.

7.3.5. Security support is a continual requirement and is not negated by the presence of aircrew or ground crewmembers. Security force support terminates only after the aircraft doors are closed and the aircraft taxis.

7.4. Standby Aircraft Security. Ensure aircraft hatches and doors are secure to show unauthorized entry. The PIC shall notify the C2 agency the aircraft is sealed and provide them a means to access the aircraft in an emergency. Annotate the forms with the time the aircraft was sealed. The C2 Senior Controller may grant access to a sealed aircraft, shall document time of entry and ensure it remains launch capable. The PIC or designated representative must be present if access to the aircraft is required and will ensure the aircraft is resealed. The aircrew pre-preflight portion will remain valid if performed by one aircrew, sealed, and flown by another aircrew. ***NOTE:*** WG/CCs should develop local procedures for documentation and management IAW TO 00-20-1 and MAJCOM Supplement.

7.5. En Route Security. The planning agency must coordinate with the execution agency to ensure adequate en route security is available. The PIC 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.

7.5.1. The PHOENIX RAVEN team will consist of three 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 in MEP status and is responsible to the PIC at all times. In turn, the PIC is responsible for the team's welfare (transportation, lodging, etc.). Ensure security team members receive a mission briefing and aircraft egress/passenger briefing (as appropriate).

7.5.2. On arrival, the PIC will assess the local situation and take the following actions as required:

7.5.2.1. Area patrol. Request area security patrols from local security forces. If local authorities request payment for this service, use the Aviation Into-Plane Reimbursement (AIR) Card or Standard Form 44 (SF 44).

7.5.2.2. Aircrew surveillance. During short ground times, direct armed crewmembers to remain with the aircraft and maintain surveillance of aircraft entrances and activities in the aircraft vicinity.

7.5.2.3. Inadequate Security. If, in the opinion of the PIC, airfield security is inadequate and the PIC determines the safety of the aircraft is in question, the PIC may waive the FDP 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 a 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 PIC 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.

7.5.3. 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.

7.5.3.1. Normally, non-United States nationals, such as cargo handlers, can perform their duties under escort and should not be placed on the EAL.

7.5.3.2. Personnel not on the EAL or aircrew orders must be escorted within the area.

7.6. Detecting Unauthorized Entry.

7.6.1. When parking on a secure ramp, the aircraft will normally be left unlocked/unsealed to allow ground personnel immediate access. If, in the PIC's judgment, the aircraft needs to be locked and sealed in order to detect unauthorized entry, then:

7.6.1.1. Use available aircraft ground security locking devices.

7.6.1.2. 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).

7.6.1.3. Close and seal the crew entrance door (box car seal).

7.6.1.4. Wipe the immediate area around lock and latches clean to aid in investigation of a forced entry.

7.6.1.5. Report any unauthorized entry or tampering to the Office of Special Investigation (OSI), security forces or local authorities, and the C2 agency. Have aircraft thoroughly inspected prior to flight.

7.6.2. Security awareness is crucial to effective mission accomplishment. Aircrews must always remain vigilant to their surroundings, especially at high threat, low security locations. In addition to normal preflight activities, aircrews must inspect areas of the aircraft not covered by normal preflight duties, to include aircraft wheel wells, flap pack area, aft empennage area, avionics compartments, and environmental compartment of the aircraft 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.

7.7. Preventive Measures. Commanders at all levels must ensure preventive measures are taken to minimize access to the aircraft by potential hijackers. When a C-5 is operating away from home station, the PIC will comply with this chapter and AFI 13-207, as supplemented.

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 PIC is fully satisfied with inspection results. In the absence of qualified passenger service representatives, the PIC will ensure the anti-hijacking inspection of passengers and baggage is accomplished.

7.7.2. Not used.

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. ***EXCEPTION:*** Special agents, guards of the Secret Service or State Department, RAVEN Team Members, and other individuals specifically authorized to carry weapons. See **paragraph 13.7**

7.7.4.1. RAVENs will only be armed in-flight on specifically designated missions identified on the mission “frag” as “RAVEN in-flight arming required”.

7.7.5. If weapons must be cleared, instruct the individual(s) to:

7.7.5.1. Move to a safe, clear area at least 50 feet from any aircraft, equipment, or personnel before un-holstering or un-slinging their weapons.

7.7.5.2. Clear weapons in accordance with standard safety procedures. Ensure troop/PIC retains ammunition IAW **paragraph 7.7.4.1**.

7.8. Preventing and Resisting Hijacking.

7.8.1. The Administrator, Federal Aviation Administration (FAA), has exclusive responsibility to direct law enforcement activity related to actual or attempted aircraft piracy (hijacking) in the United States. See CJCSI 3610.01B, 49 USC 46501, and 49 USC 44903(e).

7.8.2. In taking action during an aircraft hijacking situation, military forces will act under military command within the scope of their duties.

7.8.3. 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 Federal Bureau of Investigation (FBI) with all pertinent information. Where possible, the FAA will consult and cooperate with DoD prior to directing any law enforcement activity.

7.8.4. An aircraft is most vulnerable to hijacking when the aircrew is aboard and the aircraft is operationally ready for flight.

7.8.5. 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.

7.8.6. Should preventive efforts fail, any actual attempt to hijack a military aircraft must be resisted in a manner appropriate to the situation.

7.8.7. 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.

7.8.8. Delaying actions have been most successful in overcoming hijackings without loss of life or property.

7.8.9. In the case of an aircraft carrying passengers, the primary concern is the safety of the passengers.

7.8.10. 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.

7.9. 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.

7.9.1. The following guidelines should be used to counter a hijacking, actual or threatened, while the aircraft is on the ground:

7.9.1.1. Delay movement of the aircraft to provide time for ground personnel and the aircrew to establish communication and execute coordinated resistance actions.

7.9.1.2. 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:

7.9.1.2.1. MAJCOM commander exercising operational control of the aircraft.

7.9.1.2.2. MAJCOM commanders in whose AOR the airfield lies.

7.9.1.2.3. Senior operational commander on scene.

7.9.1.2.4. PIC in compliance with MAJCOM directives.

7.9.2. A hijacked aircraft carrying weapons of mass destruction will not be allowed to takeoff. Refer to DoD 5210.41M, *Nuclear Weapon Security Manual*, paragraph 9B(3), for additional guidance.

7.10. 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:

7.10.1. Engage the hijacker(s) in conversation in an attempt to calm them and to evaluate what course of action might be effective.

7.10.2. Dissuade the hijacker.

7.10.3. Use facts or subterfuge to convince the hijacker intermediate stops are necessary.

7.10.4. Propose more favorable alternatives, such as landing in a neutral, rather than a hostile, country.

7.10.5. Exploit any reasonable opportunity to incapacitate or overcome the hijacker physically, including the prudent use of firearms.

7.11. Communications Between Aircrew and Ground Agencies. Crews facing a hijacking threat will transmit an in-the-clear notification of hijacking to ATC. If an in-the-clear transmission is not possible, set transponder to 7500. If unable to set transponder, or if not under radar control, transmit a radio message indicating transponder change to 7500. Notify ground agencies by any means available as soon as practical and follow-up with situation reports as circumstances permit. Covert signals are no longer to be used per FAA guidance.

7.12. Forced Penetration of Unfriendly Airspace. Refer to FIH for international signals for air intercept.

7.13. Arming of Crewmembers. When crews are directed to be armed by the mission execution authority, the PIC will determine which crewmembers will be armed (two loadmasters and one flight engineer [normally, the scanner] will be armed unless directed otherwise). All crewmembers should know who is armed. The following procedures apply when arming is directed:

7.13.1. Weapons Issue. Before departing home station, obtain weapons, ammunition, box, lock and key. Crewmembers 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 IMT 1297, *Temporary Issue Receipt.*

7.13.2. Wearing of Weapons. Wear weapons in a holster, concealed at all times to prevent identifying armed crewmembers. Do not wear weapons off the flight line except to and from the C2, armories, and other facilities associated with aircrew activities.

7.13.2.1. AMC Passenger Terminal Procedures. Armed crewmembers must discreetly identify themselves to AMC passenger service personnel upon arrival at security

checkpoints. One crewmember will present a valid set of crew orders, their military identification card, and AF Form 523, *USAF Authorization to Bear Firearms*, authorizing the carrying of concealed weapons. Once terminal personnel verify this, they will allow the crewmember to vouch for the remaining crewmembers. The entire crew will then proceed through the magnetometer without removing objects from their pockets. This will prevent passengers from determining which crewmembers are armed.

7.13.3. Weapons Storage In-Flight. Crewmembers will be armed before beginning preflight, onload or offload duties and until completion of all post-flight duties. When no passengers are aboard that require that the aircrew be armed, weapons may be stored in the gun box in-flight after a satisfactory stowaway check. Crewmembers will rearm before landing. Weapons need not be unloaded before placing them in a gun box.

7.13.4. Weapons Storage on the Ground.

7.13.4.1. Aircrews will store weapons and ammunition in the most secure facility available, normally the base armory.

7.13.4.2. In the event a secure facility is unavailable:

7.13.4.2.1. Non-stage aircrews may store weapons and ammunition in the aircraft gun box.

7.13.4.2.2. Stage aircrews should contact C2 for guidance.

7.13.5. When storing weapons in the gun box:

7.13.5.1. Weapons should not normally be unloaded.

7.13.5.2. Inform C2 which crew member has the gun box key.

7.13.6. Crewmembers will ensure they are reissued the same weapon until mission termination at home station.

7.13.7. 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.

7.14. Force Protection. Crews must be alert to possibility of terrorist activities at all times. Reference AFPAM 10-100, *Airman's Manual,* CJCS Guide 5260, *Antiterrorism Personal Protection Guide: A Self-Help Guide to Antiterrorism,* and AFI 10-245, *Antiterrorism (AT),* for Force Protection measures.

Chapter 8

OPERATIONAL REPORTS AND FORMS

8.1. General. This chapter provides guidelines for worksheets, reports, and forms associated with AMC operational activities. Consult governing instruction or contact wing, unit, or local flight safety officers for assistance with safety forms.

8.2. AF IMT 457, *USAF Hazard Report.* The AF IMT 457 is a tool to notify supervisors and commanders of a hazardous condition that requires prompt corrective action. For hazardous weather, complete the front side of an AF IMT 457 and send it to the parent wing flying safety office. If addressing a computer flight plan deficiency, attach a copy of the AF IMT 72, *Air Report (AIREP).* Send your report so the parent unit receives it within 5 days of the event. For more information, see AFI 91-202, *The US Air Force Mishap Prevention Program.*

8.3. AF IMT 651, *Hazardous Air Traffic Report (HATR).* The AF IMT 651 is a tool to report near midair collisions and alleged hazardous air traffic conditions. See Attachment 3 of AFI 91-202 for more information concerning the HATR program.

8.3.1. AFI 91-204, *Safety Investigations and Reports*, and AFMAN 91-223, *Aviation Safety Investigations and Reports*, list HATR reportable incidents.

8.3.2. The PIC shall report the hazardous condition to the nearest ATC agency (e.g. center, Flight Service Station (FSS), control tower, or aeronautical radio station) as quickly as safety allows. Include the following information in the radio call (as appropriate):

8.3.2.1. Aircraft identification or call sign.

8.3.2.2. Time and place (radial/DME of NAVAID, position relative to the airfield, incident, etc).

8.3.2.3. Altitude or flight level.

8.3.2.4. Description of the other aircraft or vehicle.

8.3.2.5. Advise controlling ATC agency that the PIC will file a HATR upon landing.

8.3.3. Deadline to file a HATR is 24 hours after event via any communication mode available. If landing airport has a USAF airfield management function, submit completed AF IMT 651 to the airfield management officer for forwarding to wing safety office. If landing airport does not have an airfield management office, notify the safety office of the Air Force base nearest to location where the condition occurred, PIC's home base safety office, or as prescribed by overseas MAJCOM. In that case, provide contact sufficient information to prepare AF IMT 651.

8.3.4. Grant individuals who submit a HATR immunity from disciplinary action provided:

8.3.4.1. If they were the offending party, their violation was not deliberate.

8.3.4.2. They committed no criminal offense.

8.3.4.3. Their actions did not result in a mishap.

8.3.4.4. They properly reported the incident using procedures above.

8.4. AMC Form 97, *AMC In-Flight Emergency and Unusual Occurrence Worksheet*. The AMC Form 97 is a tool to notify appropriate authorities of any mishap involving crewmembers or aircraft. Unless other MAJCOM guidance directs, PICs shall complete all appropriate areas of the form in as much detail as possible. When notified, MAJCOM C2 agents will inform their supervisor/commander to start investigation and reporting activities IAW AFI 91-204, *Safety Investigations and Reports*, and Operation Report 3 (OPREP-3) procedures.

8.4.1. PICs will report crewmember or passenger injury, aircraft damage, or injury/damage to another organization's people or equipment caused by PIC's aircraft/crewmember. At a minimum, report the following:

8.4.1.1. Any physiological episode (physiological reaction, near accident, or hazard in-flight due to medical or physiological reasons). These include (***NOTE:*** Crewmembers and passengers involved in a physiological episode will see a flight surgeon to be evaluated and to ensure the incident is reported in the Air Force Safety Automated System (AFSAS) as soon as practical.):

8.4.1.1.1. Proven or suspected case(s) of hypoxia.

8.4.1.1.2. Decompression sickness due to evolved gas (bends, chokes, neurocirculatory collapse), or severe reaction to trapped gas that results in incapacitation.

8.4.1.1.3. Hyperventilation.

8.4.1.1.4. Spatial disorientation or distraction that results in an unusual attitude.

8.4.1.1.5. Loss of consciousness regardless of cause.

8.4.1.1.6. Death by natural causes of any crewmember during flight.

8.4.1.1.7. Unintentional loss of pressurization if cabin altitude is above FL180, regardless of effects on people on board.

8.4.1.1.8. Inappropriate use of alcohol and effects of hangover that affect in-flight duties (crewmembers only).

8.4.1.1.9. Illness (both acute and pre-existing), including food poisoning, dehydration, myocardial infarction, seizure, and so forth.

8.4.1.1.10. Exposure to toxic, noxious, or irritating materials such as smoke, fumes, or liquids.

8.4.1.2. A human factors related situation, e.g. misinterpretation of instruments; information overload (i.e. tactile, aural, and visual input too fast to permit reasonable analysis/decision); aircrew task saturation (i.e. too many responses/actions required in a short period of time); or confused switchology (i.e. adjacent switches where actuation of wrong switch creates dangerous situation). Anonymous reports are acceptable.

8.4.1.3. A condition that required engine shutdown, in-flight flameout, engine failure, suspected engine power loss, or loss of thrust that required descent below MEA. Engine failures include, but are not limited to, shrapnel from a failed internal engine component penetrating the engine case, engine case rupture/burn-through, engine nacelle fire, substantial fuel leak, or unselected thrust reversal. Consistent with safety, immediately

report incidents that involve multiple engines (may report single-engine incidents upon landing). ***NOTE:*** Exclude intentional shutdowns for training and/or FCF unless the engine fails to restart.

8.4.1.4. A flight control malfunction (including the autopilot and trim systems) that results in an unexpected or hazardous change of flight attitude, altitude, or heading. Enter the flag words, "Reportable Flight Control Malfunction" in the AFTO 781A.

8.4.1.5. A landing gear malfunction aggravated by failed emergency system or procedures.

8.4.1.6. A cargo door, ramp or other door malfunction when intent for flight exists which could affect system integrity.

8.4.1.7. An in-flight loss of all pitot-static or gyro-stabilized attitude/directional instrument indications.

8.4.1.8. Any spillage/leakage of radioactive, toxic, corrosive, or flammable material from aircraft stores or cargo.

8.4.1.9. Conditions that required pilot to depart takeoff or landing surface.

8.4.1.10. All in-flight fires regardless of damage.

8.4.1.11. All bird strikes regardless of damage.

8.4.1.12. Incidents that, in the PIC's judgment, are in the interest of flight safety.

8.4.1.13. Hard landing accompanied by an associated MADAR printout.

8.4.2. Always provide your home station safety officer a copy of relevant information. Make every effort to preserve all mission and flight related documents, such as flight plans, weather briefings, NOTAMS, Weight and Balance form, etc., for collection by appropriate safety officials. PICs shall use the following precedence to report mishaps (as soon as feasible after event):

8.4.2.1. MAJCOM flight safety officer (FSO).

8.4.2.2. Any FSO.

8.4.2.3. The nearest USAF C2 center.

8.4.2.4. Any USAF Airfield Management Operations.

8.5. Report Violations, Unusual Events, or Circumstances. PICs shall document events that require them to deviate from AFI 11-202V3 (unless waived by competent authority) or alleged navigation errors (include over-water position errors over 24NMs, border, or ATC violations).

8.5.1. Describe deviation(s) using the following report format:

8.5.1.1. Facts. Report pertinent details of the event.

8.5.1.2. Investigation and analysis. Report circumstances which required/drove deviation(s).

8.5.1.3. Findings and conclusions.

8.5.1.4. Recommendations to prevent recurrence.

8.5.1.5. Corrective actions taken.

8.5.2. Include the following attachments with the report:

8.5.2.1. Formal notification of incident.

8.5.2.2. AMC Form 41 or approved crew orders.

8.5.2.3. Crewmembers' official statements (if applicable).

8.5.2.4. Other pertinent documents submitted in evidence (logs, charts, etc.).

8.5.3. If the aircraft is appropriately equipped, the PIC shall download original flight plan to any suitable media and turn it in to the C2 center or parent standardization and evaluation office.

8.5.4. OG/CC shall send the original investigation report to the appropriate MAJCOM within 45 days of the event/notification. ANG/AFRC OG/CCs shall send original investigation report through channels to AFRC/IGI within 35 days of the event/notification. AFRC/IGI will send the investigation report to MAJCOM within 45 days of event/notification.

8.5.5. Use OPREP-3 reporting procedures contained in AFI 10-206, *Operational Reporting*, for navigation errors over 24 NMs.

8.5.5.1. When notified of a navigation position error, the PIC (or agency that receives initial notification) shall document the circumstances surrounding the incident (using report format below) and ensure C2 agents submit an OPREP-3.

8.5.5.2. Include the following information in the report:

8.5.5.3. The name and location of agency/unit submitting report.

8.5.5.4. Affected mission identification number.

8.5.5.5. Reference OPREPs-3 to determine type of event (i.e., state "navigation position error.").

8.5.5.6. The date, time (Zulu), and location (e.g., ARTCC area) of alleged infraction.

8.5.5.7. Describe facts and circumstances. Include aircraft type and tail number, unit (aircrew's wing or squadron), home base, route of flight, point of alleged deviation, and miles off course.

8.5.6. PICs shall expeditiously report unusual events/circumstances that impact their mission to appropriate MAJCOM agencies. Reportable events include, but are not limited to, spectrum interference, interception, fuel dumping, multiple engine failure, hostile fire, injury to passenger or aircrew member, etc. This list is not all exhaustive. Most events require C2 agents to forward OPREP reports to higher headquarters. In all cases, pass the "who, what, when, where, why, and how" of the incident to a C2 agency.

8.5.6.1. The Spectrum Interference Resolution Program, covered in AFI 10-707, *Spectrum Interference Resolution Program*, establishes procedures to combat the effect of meaconing, intrusion, jamming, and interference. PICs who encounter electromagnetic interference (EMI) will report the event to the nearest C2 agency as soon as practical.

8.5.6.1.1. Address EMI reports to: HQ AMC SCOTT AFB IL//A63// and addressees listed in AFI 10-707. Send reports via electronic message format with the following information in plain text:

8.5.6.1.1.1. Frequency selected when EMI occurred.

8.5.6.1.1.2. Equipment affected by EMI. Location of the system. The system function, name, nomenclature, manufacturer with model number or other system description. The operating mode of the system, if applicable (frequency agile, pulse doppler, search, etc.).

8.5.6.1.1.3. Description of EMI (noise, pulsed, continuous, intermittent, etc).

8.5.6.1.1.4. Effect EMI had on system performance (reduced range, false targets, reduced intelligibility, data errors, etc.).

8.5.6.1.1.5. Date(s) and time(s) of EMI.

8.5.6.1.1.6. Location where EMI occurred (coordinates or line of bearing, if known, otherwise state as unknown).

8.5.6.1.1.7. Source of the EMI if known.

8.5.6.1.1.8. List other units that received interference (if known) and their location or distance and bearing from your location.

8.5.6.1.1.9. A clear, concise narrative summary on what you know about the EMI with any actions taken to resolve the problem.

8.5.6.1.1.10. Whether or not PIC wants expert/technical assistance (include level of security clearance expert requires).

8.5.6.1.1.11. Specify impact the EMI had on your mission.

8.5.6.1.1.12. Provide a POC (Name, Rank, DSN/Commercial Phone Number, and Duty hours).

8.5.6.1.2. C2 agents must prepare an OPREP-3 if EMI is suspected meaconing, intrusion, or jamming, interference sufficient to cause a hazard, or, if in the PIC's judgment, the situation warrants such a report.

8.5.6.1.3. PICs shall serve as classification authority for EMI reports. Evaluate the adversaries' ability to exploit certain systems using EMI and protect information accordingly. PICs on a non-sensitive mission or who judge the EMI to be interference from a non-hostile source need not classify EMI reports unless that report would reveal system vulnerability. Classify interference report(s) at stations located in combat areas or during sensitive military missions.

8.6. Petroleum, Oil, and Lubricants (POL) - Aviation Fuels Documentation. This section prescribes aviation POL (AVPOL) procedures that ensure correct documentation, form and invoice processing, and program supervision. Use the Multi Service Corporation (MSC) air card for the purchase of aviation fuel and ancillary ground services at commercial airports (and some military installations) worldwide. The air card is authorized for use by all U.S. government aircraft, state, and local law enforcement aircraft, and some foreign government aircraft. All PICs should plan to use the "platinum" MSC card. In most cases, there will be no changes when

refueling at non-Defense Energy Support Center (DESC) contract locations. The MSC card is accepted at approximately 4,800 locations worldwide. A list of all MSC-accepting merchants can be found at **https://www.airseacard.com**. It replaces the Standard Form (SF) 44, *Purchase Order-Invoice-Voucher*, at locations that accept the MSC card.

8.6.1. Responsibilities. Aircrew and maintenance personnel will be familiar with AVPOL procedures and documentation requirements of this chapter. Improper use of the MSC card could create financial liability for the purchaser.

8.6.2. Refuel/defuel USAF aircraft at DoD locations whenever possible. If DoD service is not available, purchase fuel from other source(s) in 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. ***NOTE:*** DoD FLIP en route supplements identify locations with into-plane contracts.

8.6.3. AVPOL Forms Documentation and Procedures.

8.6.3.1. The DD Form 1898, *Fuel Sale Slip*, is the fuel transaction receipt used for purchases at other DoD locations, including DFSC into-plane contract locations. Log and place the DD Form 1898 inside the AF Form 644. The PIC or designated representative shall complete this form. ***NOTE:*** If the contractor insists on a unique invoice along with the DD Form 1898, annotate the vendor's invoice with "DUPLICATE DD Form 1898 ACCOMPLISHED."

8.6.3.2. The AF IMT 664, *Aircraft Fuels Documenting Log***,** is a tool to log and store all AVPOL transaction forms. Record all off-station transactions on the front of the form and insert the original form inside the envelope. Turn in the AF IMT 664, with supporting forms, to maintenance debriefing or as directed by local procedures. The PIC or designated representative shall complete this form when appropriate.

8.6.3.3. The SF 44, *Purchase Order-Invoice-Voucher*, may be used to purchase fuel, ground services and/or other authorized products when no MSC card contract is in place.

8.6.3.3.1. SF 44 fuel purchases where FBO agrees to invoice DESC for payment.

8.6.3.3.1.1. The aircrew shall present the SF 44 as the purchase invoice when an FBO refuses to accept the MSC card. The aircrew shall complete the SF 44 and attach it to the FBO vendor ticket/invoice when the FBO also declines use of the SF 44 and uses its own invoice/receipt. Fuel purchases shall be documented on a separate SF 44 from ground services and other authorized products since the FBO must invoice DESC for the fuel and the customer for non-fuel product and services.

8.6.3.3.1.2. Copies 1 and 2 of the SF 44 shall be provided to the FBO. Copy 1 of the SF 44 and one copy of the FBO commercial invoice, if applicable, shall be forwarded to the following address by the FBO to bill/invoice DESC: DESC-RRF, Building 1621-K, 2261 Hughes Avenue, Suite 128, Lackland AFB, Texas 78236.

8.6.3.3.1.3. Copy 3 of the SF 44 and one copy of the FBO commercial invoice, if applicable, shall be provided to the aircrew. Log and place a copy inside the AF

IMT 664. Aircrews shall present all fuel purchase receipts to the designated aviation squadron Certifying Official and/or Accountable Official upon return to home station to enable timely validation and financial obligation processing into the Fuels Automated System (FAS).

8.6.3.3.2. SF 44 fuel purchases where the FBO requires cash payment.

8.6.3.3.2.1. Cash fuel purchases are only authorized when either the DOD 4500.54G, *DoD Foreign Clearance Guide*, requires cash payment, or when FBO locations outside the United States and U. S. Territories refuse MSC card and/or SF 44 invoicing processes. Aircrews required to pay cash for aviation fuel purchases shall employ the following procedures (***NOTE:*** these procedures do not apply to non-fuel products or services):

8.6.3.3.2.1.1. The aircrew shall obtain cash from a local DoD Finance source that is charged to an approved Treasury suspense account prior to home station departure.

8.6.3.3.2.1.2. Aircrews shall complete the SF 44 and obtain the FBO fuel vendor annotation in block 11 of the SF 44 to confirm total cash amount and also sign and date the SF 44 blocks 20 and 21. Log and place a copy inside the AF IMT 664. Aircrew shall return unused cash to their local DoD Finance source upon return to home station. Present the completed SF 44 (for non-fuel charges only) to the appropriate home station administrative personnel for processing (e.g., Wing Refueling Document Control Officer, Finance Office, etc.)

8.6.3.3.3. SF 44 purchases of ground services and other approved products (not fuel).

8.6.3.3.3.1. Complete a separate SF 44 for non-fuel purchases. Provide the FBO copies 1 and 2 of the SF 44. The FBO shall use copy 1 and one copy of the FBO commercial invoice, if applicable, to directly bill/invoice the purchasing organization. Block 9 of the SF 44 shall reflect the organization name and address of the finance office responsible for payment to the FBO. The purchasing organization shall make payment to the FBO upon receipt of the invoice from the FBO. Log and place a copy inside the AF IMT 664.

8.6.3.3.4. If the vendor presents their own form for signature and accepts the SF 44, write the statement "SF 44 Executed" on the vendor’s form.

8.6.3.3.5. Turn in two copies of the SF 44 to the operations officer at home station.

8.6.3.3.6. Present the aircraft identaplate for purchases at SITCO Agreement locations. Make certain the invoice includes date of transaction, grade of product, quantity issued/defueled, unit of measure, and signature of Air Force member who accepted product. If vendor also requires completed SF 44 write statement, "AF FORMS EXECUTED” on vendor’s invoice. Log and place a copy inside the AF IMT 664.

8.6.3.4. Purchasing Aviation Fuel in Canada. The DoD and Canadian Department of National Defense have signed a memorandum of understanding allowing DoD aircraft to use the DD Form 1896, **Jet Fuel Identaplate**, when refueling at Canadian airfields with a

Canadian National Defense Contract (CNDC). Use the AIR for fuel purchases at Canadian airports without a CNDC and for ground handling services at all Canadian airports.

8.6.3.5. Use host country forms to effect purchases at foreign military airfields, including "replacement-in-kind" locations. Hand scribe information from aircraft identaplate on the local form. Log and place a copy inside the AF IMT 664.

8.7. AMC Form 54, *Aircraft Commander's Report on Services/Facilities*. The AMC Form 54 is a tool to report level of excellence for services encountered during mobility operations. Be quick to identify outstanding performers and attempt to resolve problems at lowest level practical. PICs should advise affected agency on their intent to submit an AMC Form 54. Provide a copy of the completed form to local station AMC C2 agency. Upon return to home station, PICs will coordinate form with SQ/CC and OG/CC. For AMC Forms 54 that require AMC coordination, OG/CCs shall review and submit AMC Form 54 to 18AF/CC.

8.8. AMC Form 196, *Aircraft Commander's Report on Crew Member*. The AMC Form 196 is a tool to document an aircrew member or mission essential ground personnel's outstanding, below average, or unsatisfactory performance during a mobility mission. Be quick to identify outstanding performers and attempt to solve problems at lowest level practical (provide local senior leaders opportunity to resolve problems as they occur). Send the report to subject's unit commander.

8.9. AMC Form 43, *Transient Aircrew Facilities Report*. The AMC Form 43 is a tool to report the level of excellence for transient facilities. Any crewmember may submit this report whether or not the PIC includes an unsatisfactory item in the trip report. Send completed AMC Form 43 to AMC/MWPS, or MAJCOM equivalent.

8.10. AF Form 4096, *Airdrop/Tactical Airland/Air Refueling Mission Recap*. The AF Form 4096 is a tool to document details of airdrop, tactical airland, AAR, or station keeping equipment SKE)/zone marker (ZM) missions. PIC or designated representative shall complete Form 4096 (or command supplement) and submit same to home-station tactics office.

8.11. Operation Forms for Loadmasters/Boom Operators. Detailed instructions for the preparation, distribution, and use of the following forms may be found in the governing directive.

8.11.1. DD Form 2131, *Passenger Manifest* (AMCI 24-101V14)

8.11.2. DD Form 1385, *Cargo Manifest* (DoD 4500.32R)

8.11.3. DD Form 1854, *US Customs Accompanied Baggage Declaration* (DoD 5030.49R)

8.11.4. DD Form 1907, *Signature and Tally Record* (DoD 4500 32.R)

8.11.5. CBP 6059B, *US Customs Accompanied Baggage Declaration* (DoD 5030.49R)

8.11.6. CBP 7507, *General Declaration* (Outbound/Inbound)

8.11.7. AF Form 4069, *Tiedown Equipment Checklist*

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

8.11.9. AMC Form 148, *Boarding Pass/Ticket/Receipt*

Chapter 9

TRAINING AND OPERATING LIMITATIONS

9.1. Passengers on Training Missions.

9.1.1. Initial qualification or re-qualification for pilots will not be conducted with passengers onboard (N/A MEP).

9.1.2. Mission certification training, evaluations, off station trainers, and JA/ATTs may carry passengers only if the aircrew in training is qualified. Receiver AAR is authorized if the pilot flying is qualified (AF Form 8 on file documenting successful completion of an aircraft checkride including air refueling).

9.1.3. Touch-and-go landings and multiple practice approaches are prohibited with passengers onboard. (N/A with MEP.) ***EXCEPTION***: When approved by the MAJCOM, maintenance and civilian employees, under direct contract to the DoD and engaged in official direct mission support activities, considered "mission essential" may be onboard when touch-and-go or stop and-go landings are performed providing the mission is a designated training flight and an IP or EP is in command.

9.1.4. IAW AFI 11-202V3, practice emergency procedures are prohibited with any passengers onboard. Passengers are defined as anyone listed on a passenger manifest or listed on flight orders as MEP.

9.2. Touch-and-go Landing Limitations.

9.2.1. Touch-and-go landings will only be accomplished under the direct supervision of an IP/EP.

9.2.2. Limitations.

9.2.2.1. Comply with all flight manual restrictions and procedures to include performance degradation with fuel, cargo limits, etc. Do not exceed a gross weight of 635,850 pounds.

9.2.2.2. Minimum runway length: 7000-feet. Minimum runway width: 150-feet.

9.2.2.3. Minimum ceiling/visibility: 300 ft and RVR 40 (3/4 SM visibility).

9.2.2.4. RCR shall be 12 or higher.

9.2.2.5. Do not accomplish touch-and-go landings on slush covered runways.

9.2.2.6. When calculating maximum takeoff and landing crosswind component the normal zone shall not be exceeded regardless of RCR. Do not apply an approach or rotation speed increase to allow crosswind operations in the normal zone.

9.2.2.7. Touch-and-go landings may be performed with cargo onboard provided the PIC and loadmaster determine suitability of cargo and normal landing weight is not exceeded. Touch-and-go landings with hazardous cargo on board are prohibited. ***EXCEPTION:*** Home station touch-and-go training may be accomplished with diesel powered vehicles on board provided the only listed hazard is engine internal combustion.

9.2.2.7.1. Cargo security is checked prior to the first touch-and-go and thereafter at an interval determined by the PIC (should not exceed 1 hour). PICs must allow additional time required for this inspection.

9.3. Training on Operational Missions.

9.3.1. Crews may perform multiple approaches and touch-and-go landings on operational airlift (TWCF) and 618 AOC (TACC) directed missions provided the following requirements are met:

9.3.1.1. Normal touch-and-go limitations apply and MEPs are briefed of the activity.

9.3.1.2. All transition training will be accomplished during the first 12 hours of the FDP.

9.3.1.3. Pre-mission coordination requirements. Activity shall be approved by TWCF/TACC tasking authority and unit training is charged to unit. As part of pre-mission planning, aircraft commanders will contact parent wing 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 unit OG/CC and the airfield(s) where training is to be accomplished. They will then coordinate with the 618 AOC (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, wing current operations will coordinate with 618 AOC (TACC) to re-cut the mission and add the training mission number(s) in GDSS2.

9.3.1.4. 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.

9.3.2. Crews may accomplish AAR training on operational missions provided applicable items of 9.5.1. and 15.2.1. are complied with.

9.4. Simulated Emergency Flight Procedures.

9.4.1. Simulated emergency flight procedures will be conducted IAW AFI 11-202V3 and **Table 9.1** of this instruction

9.4.1.1. The PIC or IP will alert all crewmembers prior to practicing emergency procedures.

9.4.1.2. In an actual emergency, terminate all training and flight maneuvers practice.

9.4.2. Simulated emergency procedures are prohibited during aerial refueling. ***EXCEPTION:*** Breakaway procedures may be practiced under the direct supervision of an ARIP/EP.

9.4.3. Engine Out Limitations (Simulated). Do not practice an actual engine shutdown.

9.4.3.1. Units with a co-located, same-type, simulator will not conduct simulated engine failures in the aircraft.

9.4.3.2. Simulated emergencies may be practiced only during training, evaluation, or currency flights when an instructor or evaluator pilot is in one of the pilot seats. IP candidates in a pilot seat and under the supervision of an EP not in a pilot seat may

practice simulated emergency procedures during initial or requalification upgrade evaluations to IP.

9.4.3.3. Weather Minimums:

9.4.3.3.1. Day – circling minimums for the approach being flown (600/2 if none published).

9.4.3.3.2. Night – 1000 feet and 2 statute miles or circling minimums for the approach being flown, whichever is higher.

9.5. Flight Maneuvers.

9.5.1. The practice of the following maneuvers are prohibited in flight.

9.5.1.1. Stall and approach to stalls.

9.5.1.2. Dutch roll.

9.5.1.3. Emergency descent.

9.5.1.4. Unusual Attitudes

9.5.1.5. Compound emergencies

9.5.1.6. Simulated engine out takeoffs

9.5.1.7. Bank angles greater than 45 degrees (except MAJCOM-approved tactics maneuvers).

9.5.1.8. Jammed stabilizer.

9.5.1.9. Landing with inoperative hydraulic systems.

9.5.1.10. Simulated runaway pitch trim malfunctions.

9.5.1.11. RAT deployment.

9.5.1.12. In-flight gear kneeling.

9.5.1.13. No-slat landing.

9.5.1.14. Minimum run landings.

9.5.1.15. Rejected takeoffs.

9.5.1.16. Emergency boom latching.

9.5.1.17. Reverse aerial refueling.

9.5.1.18. PACS off landing.

9.5.1.19. Simultaneous simulated engine failures and no flap approach training.

9.5.1.20. Simulated two engines out landings and missed approaches.

9.6. Briefing Requirements.

9.6.1. Training/Evaluation Briefing. Before all training/evaluation missions, instructors/flight examiners will brief the crew on requirements and objectives for each student or examinee.

9.6.2. 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.

9.7. Simulated Instrument Flight.

9.7.1. 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.

9.8. MPD/SOC Pilot Training.

9.8.1. SOC graduates may practice aerial refueling from the left seat (to include the contact position) with the following restrictions:

9.8.1.1. Accomplished under direct ARIP supervision.

9.8.1.2. No passengers are authorized.

9.8.1.3. Contacts by non-AAR qualified SOC pilots will only be made after receiving acknowledgment from the tanker pilot and boom operator. The boom operator must be fully qualified. (N/A during FTU training provided the boom operator is under direct instructor supervision.)

9.8.2. An FP may perform any tactical maneuver under the direct supervision of an IP.

9.9. Category II ILS Training.

9.9.1. Flight training and evaluation may be conducted using any ILS where signal output is accurate and stable enough to achieve the desired training.

9.9.2. Weather. No lower than Category I minimums.

9.9.3. Winds. Maximum crosswind component of 15 knots.

9.9.4. When a category II decision height is not published, DH for training will be based on a height above terrain of 100 feet.

9.9.5. Do not combine with no-flap approach.

9.10. No Flap Landings.

9.10.1. No flap landings may be conducted for flight training and evaluations. No flap landings will only be flown to a full-stop landing.

9.10.2. Winds. 15 knot maximum crosswind component.

9.10.3. Maximum gross landing weight 525,000 pounds (for training).

Table 9.1. Training Flight Restrictions.

Maneuver	Altitude	Remarks
Instrument Missed / Low approaches	MDA/DA/DH	Initiate practice instrument missed approaches no lower than the minimum altitude for the type of approach executed.
Visual Low Approach	Initiate no lower	

/ Planned Go Around	than 100 ft AGL	
Men and equipment on runway	Initiate above 500 ft AGL	
Simulated Engine Failure	(One throttle at idle) Initiate above 500 feet AGL	Simulated engine failures are not authorized at less than 2-engine Vmca (C-5M: Vapp or 125 knots, whichever is higher). Simulated engine failure will not be practiced when any actual emergency exists, during no-flap landings, or during practice category II ILS approaches. Simulate use of "MIN Q."
Go-Around and Missed Approach		
All Engines	Initiate above 100 feet AGL	IPs and EPs shall not plan to initiate a go-around or missed approach below 100 feet AGL.
3 engines	Initiate no lower than 200 ft AGL	Use all engines if below 200 feet AGL.
NOTE: These restrictions do not apply to operational missions.		

9.11. Maintenance Opportune Training.

9.11.1. All aircraft in the en route system on AMC missions are available for opportune training except those designated non-available in the advisory section of GDSS Mission Detail by the 18 AF/TACC (i.e. AAM, 1A1, Phoenix Banner, and Med Evac missions). Mission planners will annotate GDSS for those missions not allowed to be used for opportune training. The en route maintenance production supervisor will brief the aircraft commander of the intention to train, either at the aircraft or at the AMCC, prior to entering crew rest. If a conflict arises between the crew and en route maintenance teams it should be routed through TACC duty officer/operations director for resolution. ***NOTE***: PIC approval is not required.

9.11.2. Training will not be performed on aircraft carrying hot cargo or on CLOSE WATCH missions. All training will be complete and the aircraft ready for flight not later than 2 hours prior to crew show. Crews are not required to remain with the aircraft while training is performed.

9.11.3. Use of ANG aircraft will be supported on a pre-coordinated basis. The en route unit POC will coordinate with the owning ANG Wing Command Post and Current Operations to obtain permission to utilize the ANG aircraft for training purposes.

9.12. Manual Gear Lowering.

9.12.1. **For training purposes, manual lowering of landing gear may be demonstrated to simulate an electrical power failure that would require manual actuation and override of normal landing gear selector valves.** Procedures in section 3 of T.O. 1C-5A-1 will be followed with the following exceptions (***NOTE:*** All training objectives pertaining to emergency extension of the gear using emergency extend switches can be accomplished in the simulator.):

9.12.2. Control circuit breakers for the gear to be manually extended will be opened prior to initiating the emergency extension checklist.

9.12.3. Landing gear emergency extend switches located on the control pedestal will not be used for practice emergency extension.

Chapter 10

AIRCREW OPERATIONS IN CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR THREAT ENVIRONMENT

10.1. Overview. The proliferation of Chemical, Biological, Radiological, and Nuclear (CBRN) weapons and the means to deliver them present serious security threats to the global operations of air mobility forces. This chapter describes the CBRN threat, passive defense measures to mitigate that threat, and guidance for ground and flight operations in a contaminated environment. Refer to AFPAM 10-100 for additional guidance.

10.2. Understanding the CBRN Threat.

10.2.1. Chemical Weapons. Militarily significant chemical weapons include nerve, blister, choking, and blood agents. A key point for aircrew members to remember is that time is on your side. The ultra-violet (UV) rays of the sun, high temperatures, and high absorption rates of chemicals all decrease their lethality. Most chemical agents will either evaporate or absorb into surfaces. For decontamination, cleaning with hot soap and water and/or a 5 percent bleach solution currently appears to be the best and most practical method of removing chemical agents that may remain as a contact hazard on glass, and unpainted metal. Currently, the only decontaminate authorized for use on aircraft is soap and water. ***WARNING***: Recent tests indicate that as a decontaminated aircraft dries, the absorbed chemical warfare agent (CWA) may resurface from painted surfaces causing contact and vapor hazards.

10.2.2. Biological Weapons. Biological warfare agents (BWA) are normally divided into three areas: bacteria (i.e., Anthrax) that live outside the cell, reproduce, and are normally susceptible to antibiotics; toxins (i.e., Ricin), that are poisons produced by living organisms or plants; and viruses (i.e., Smallpox) that normally require the host of a living cell to survive and reproduce. Viruses and toxins do not respond to antibiotics. It is probable that the medical community would be the first to recognize that an upsurge in “flu-like symptoms” is actually a bio attack. Although BWA are degraded by UV rays, humidity and high/low temperatures, some BWA (i.e., Anthrax spores) may have a long life, lasting decades under the right conditions. Current immunizations and good personal hygiene help prevent infection.

10.2.3. Radiological Weapons. The radiation dispersal device (RDD), or so-called “dirty bomb,” is the typical radiological weapon. RDD is any device that disseminates radioactive material without using a nuclear detonation. Key points to remember are that shielding and distance are the best defenses against radiation exposure.

10.2.4. Nuclear Weapons. The threat from a nuclear device is from the initial blast, heat, and radiation. In addition, the Electromagnetic Pulse (EMP) from a nuclear detonation can damage electronic equipment. The best protection is a combination of shielding, distance from the blast, and limited time of exposure.

10.3. CBRN Passive Defense Measures. Passive defense measures are those activities conducted to negate, contain, and manage the effects of CBRN attack. Passive defense measures include pre, trans, and post-attack actions designed to mitigate the CBRN threat through contamination avoidance, protection, and contamination control.

10.3.1. Contamination Avoidance. Contamination avoidance is the most important passive defense measure. Techniques for contamination avoidance include inflight diversion, survival launch, and minimizing exposure to contaminated cargo, aerospace ground equipment (AGE), and material handling equipment (MHE).

10.3.1.1. Inflight Diversion. When advised that a destination airfield is under CBRN attack or has been contaminated, the aircrew will divert to an uncontaminated airfield, if at all possible. Authority to land at a contaminated airfield will be specified in the controlling OPORD

10.3.1.2. Survival Launch. If caught on the ground during attack warning, every reasonable effort will be made to launch to avoid the attack. Upon proper clearances, aircrew may launch to survive if they have sufficient fuel and unrestricted, safe access to the runway. In practice, this option may only be practical for aircraft that have just landed or aircraft at or near the end of the runway. If launch is not possible, shut down engines and avoid running environmental control systems. Close aircraft doors/hatches/ramps, don Individual Protective Equipment (IPE), and seek personal protective cover on the base. If time does not permit using base facilities, remain in the sealed aircraft for a minimum of one-hour after the attack and/or follow host-base guidance.

10.3.1.3. Avoiding Cross Contamination from AGE, MHE, and Cargo. All formerly contaminated equipment and cargo must be marked to facilitate contamination avoidance and the use of protective measures. Additionally, the air shipment of formerly contaminated cargo requires special precautions and must be specifically authorized by the senior transportation commander.

10.3.2. Protection. When exposure to chemical and/or biological agents cannot be avoided, protection provides the force with the ability to survive and operate in a CBRN environment. Protection is afforded by individual protective equipment, collective protection, and hardening of facilities.

10.3.2.1. Individual Protective Equipment. The current in-flight protective gear for aircrew members is the Aircrew Chemical Defense Ensemble (ACDE). The ACDE includes the Aircrew Eye/Respiratory Protection (AERP) or Joint Service Aircrew Mask (JSAM) "above the shoulder" equipment and the CWU-66/P Aircrew Chemical Ensemble (ACE). The Ground Crew Ensemble (GCE) consists of the protective mask, C2 series canister (or filter element for MCU-2A/P protective mask), and over garment, boots, and gloves. The ACDE and GCE provide protection against chemical and biological agents. They do not provide blast or radiation protection from an RDD or nuclear detonation. The ACDE requires care during donning using "buddy dressing" procedures and Aircrew Flight Equipment (AFE) expertise during processing through the Aircrew Contamination Control Area (ACCA). ***NOTE***: AECMs will utilize the MCU-2A series mask.

10.3.2.1.1. ACDE/GCE Issue. Aircrews will be issued sized ACDE and GCE at home station. Aircrews will ensure their ACDE and GCE are available at all times while in a CBRN threat area. Aircrew members will confirm the mobility bag contents and correct sizes.

10.3.2.1.2. ACDE Wear During Ground Operations. Because aircraft contamination is unlikely to occur during flight; ground operations can represent the highest threat to aircrew safety. Protection from enemy attacks and exposure to liquid chemical agents is paramount. Aircrews should limit activities to essential duties only and separate ground duties from air duties.

10.3.2.2. Collective Protection. Collective protection provides a temperature-controlled, contamination-free environment to allow personnel relief from continuous wear of IPE such as the ACDE. The basic concept for most facility collective protective solutions is to employ overpressure, filtration, and controlled entry/exit. The intent is to provide rest and relief accommodations, as well as provide medical treatment in contamination free zone. All pressurization systems should be shut down and doors sealed if the crew finds itself in need of immediate protection. Crewmembers should avail themselves of facilities, if provided, on the airfield.

10.3.2.3. Hardening. Permanent and expedient hardening measures are used to strengthen buildings and utility systems or provide barriers to resist blast effects. To reduce the potential of vapor exposure, personnel should consider the use of facilities above the first floor.

10.3.3. Contamination Control. In the post-attack environment, contamination control measures limit the spread of chemical, biological, and radiological contamination through disease prevention measures, decontamination, and use of Exchange Zone (EZ) operations. Effective contamination control helps sustain air mobility operations by minimizing performance degradation, casualties, or loss of material.

10.3.3.1. Disease Prevention. Up-to-date immunizations, standard personal hygiene practices, and the use of chemoprophylaxis are effective biological warfare defensive measures.

10.3.3.2. Decontamination.

10.3.3.2.1. Inflight Decontamination. Air washing is a useful inflight decontamination technique for removing most of the liquid agent from aircraft metal surfaces. However, vapor hazards may remain in areas where the airflow characteristics prevent complete off-gassing (i.e., wheel wells, flap wells, rivet and screw heads, joints, etc.). Flights of at least 2 to 4 hours are recommended, and lower altitudes are more effective than higher altitudes. Fly with the aircraft configured (gear, flaps, and slats extended) as long as possible to maximize the airflow in and around as many places as possible. Be advised that exterior contamination may seep into the aircraft interior creating a vapor hazard for aircrews. Use of ACDE is recommended. Follow smoke and fume elimination procedures to help purge interior contamination.

10.3.3.2.2. Limits of Decontamination. Complete decontamination of aircraft and equipment may be difficult, if not impossible, to achieve. Formerly contaminated assets will be restricted to DOD-controlled airfields and not released from US government control.

10.3.3.3. Exchange Zone (EZ) Operations**.** The AMC Concept for Air Mobility Operations in a Chemical and Biological Environment (CB CONOPS) describes a

method for continuing the vital flow of personnel into a contaminated airfield while limiting the number of air mobility aircraft and personnel exposed to the contaminated environment. The purpose of the EZ is to minimize the spread of contamination within the air mobility fleet, preserving as many aircraft as possible for unrestricted international flight. The EZ is an area (located at uncontaminated airfield) set aside to facilitate the exchange of uncontaminated (clean) cargo/passengers to a contaminated (dirty) airframe, or vice versa, without cross-contamination. Additional information on the EZ is available through AMC/A3X.

10.4. Flight Operations.

10.4.1. Mission Planning. Aircrews must be mentally prepared to face the dangers of CBRN weapons. Flight/mission planning must be thorough. Aircraft commanders should emphasize ACDE wear, crew coordination, CBRN hazards and countermeasures, inflight diversion, plans for onload/offload in the event of a ground attack, and plans for the return leg in the event of aircraft contamination. Alternative scenario plans should also be considered in the event Mission-Oriented Protective Posture (MOPP) conditions change.

10.4.2. Establishing the Threat Level. Aircrews should monitor command and control channels to ensure they receive the latest information concerning the destination's alert condition. Diversion of aircraft to alternate "clean" locations may be required, unless operational necessity otherwise dictates. The TACC or theater C2 agency (normally through the controlling OPORD) will direct aircrew pre-exposure activities such as medical pre-treatment for chemical/biological exposure.

10.4.3. Fuel Requirements. Extra fuel may be needed to compensate for altitude restrictions as the result of CB agent exposure. During purge periods, the aircraft will be unpressurized. Although the aircrew can use the aircraft oxygen systems, passengers wearing GCE cannot, thus restricting the aircraft cruise altitude and increasing fuel requirements accordingly.

10.4.4. Oxygen Requirements. Operating a contaminated aircraft will increase oxygen requirements. Aircrew wear of ACDE will require use of the aircraft oxygen system to counter actual/suspected 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 flight manual charts to calculate the required reservoir levels.

10.4.5. Donning Equipment. Aircrew will don ACDE based on the alarm condition (See Airman’s Manual (AFPAM 10-100). Use the "buddy dressing" procedures, and refer to AMCVA 11-303, *AERP Donning Checklist* and AMCVA 11-304, *ACDE Donning Checklist*, to ensure proper wear. When wearing the ACDE, Atropine and 2 PAM Chloride auto injectors will be kept in the upper left ACDE pocket. If the integrated survival vest/body armor is worn, the Atropine and 2 PAM Chloride auto injectors may be kept in the lower right flight suit pocket. This standardized location will enable personnel to locate the medication should an individual be overcome by CWA 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 the CBRN threat area or when an alarm “yellow” or higher has been declared. When inbound to a CBRN threat area, prior to descent, the aircraft commander will ensure crew and passengers don appropriate protective equipment IAW arrival destination's MOPP level and brief aircrew operations in the CBRN

threat area. As a minimum, this briefing will include: flight deck isolation, oxygen requirements, air conditioning system requirements, IPE requirements, ground operations, and MOPP levels. Aircrew members must determine if the wear of the integrated survival vest/body armor and LPUs will restrict dexterity and mobility to the point that it becomes a safety issue. If the aircrew deems the equipment to create a safety of flight concern, then the items may be pre-positioned (instead of worn) on the aircraft to be readily available to the aircrew.

10.4.6. Communicating Down-line Support. Pass aircraft and cargo 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 agent symptoms and whether they are wearing chemical defense ensembles.

10.5. Ground Operations.

10.5.1. Crew Rest Procedures. Operational necessity may require the aircrew to rest/fly in a contaminated environment. If the mission is not being staged by another aircrew or pre-flight crews are not available, the aircrew may pre-flight, load, and secure the aircraft prior to entering crew rest. The departing aircrew will perform necessary crew preparations and pre-flight briefings. Then, they will report to the ACCA for processing and ACDE donning with assistance from AFE personnel. If possible, aircrew transport should be provided in a covered vehicle. Aircrews should avoid pre-flighting the aircraft prior to departure to prevent contamination spread to them and/or 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.

10.5.2. Onload and Offload Considerations. Extreme care must be exercised to prevent contamination spread to the aircraft interior during ground operations, particularly to the flight deck area. Reduce the number of personnel entering the aircraft. Contaminated engine covers, safety pins and chocks will not be placed in the aircraft unless sealed in clean plastic bags. 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. Prior to entering the aircraft all personnel should implement boot wash/decontamination procedures. Aircrew exiting aircraft into a contaminated environment will don plastic overboots and overcape prior to leaving the aircraft.

10.5.3. 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.

10.5.4. Airlift of Retrograde Cargo. Only CRITICAL retrograde cargo will be moved from a contaminated to an uncontaminated airbase. Critical requirements are pre-designated in theater war plans. Onload cargo will be protected prior to and while being transported to the aircraft. If contaminated, protective cover(s) will be removed/replaced just prior to placing the cargo on the aircraft. It is the user's responsibility to decontaminate cargo for air shipment. The airlift of contaminated or formerly contaminated cargo requires the approval of the senior transportation commander.

10.5.5. Passenger/Patients. A path should be decontaminated between the aircraft and the ground transportation vehicle to reduce interior contamination when loading/unloading passengers/patients. Normally, externally contaminated patients and those infected with contagious biological agents will not be transported onboard AMC or AMC-procured aircraft. The AMC/CC is the waiver authority to this policy. ***NOTE:*** An altitude below 10,000 feet is recommended due to AECM use of the ground chemical mask.

10.5.6. 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 capabilities. Individuals involved should be closely monitored for adverse physiological effects.

10.5.7. 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. A more extensive discussion of this subject is found in AFMAN 10-2602, *Nuclear, Biological, Chemical, and Conventional (NBCC) Defense Operations and Standards*.

Table 10.1. Task Time Multipliers.

Heat Category	WBGT[1] Index (ºF)	Light (Easy) Work		Moderate Work		Hard (Heavy) Work	
		Work/ Rest[2]	Water Intake[3] (Quart/Hour)	Work/ Rest[2]	Water Intake[3] (Quart/Hour)	Work/ Rest[2]	Water Intake[3] (Quart/Hour)
1	78-81.9	NL[4]	1/2	NL	3/4	40/20 min	3/4
2	82-84.9	NL	1/2	50/10 min	3/4	30/30 min	1
3	85-87.9	NL	3/4	40/20 min	3/4	30/30	1
4	88-89.9	NL	3/4	30/30 min	3/4	20/40 min	1
5	≥90	50/10 min	1	20/40 min	1	10/50 min	1

NOTES:

1. If wearing MOPP 4, add 10ºF to Wet Bulb Globe Temperature (WBGT). If wearing personal body armor in humid climates, add 5ºF to WBGT.

2. Rest means minimal physical activity (sitting or standing), accomplished in shade if possible.

3. ***CAUTION:*** Daily fluid intake should not exceed 12 quarts. Hourly fluid intake should not exceed 1 quart. The work/rest time and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specified work category. Individual water needs will vary ±¼ quart/ hour.
4. NL=no limit to work time per hour.

10.5.8. Outbound with Actual/Suspected Chemical Contamination. Once airborne 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. Detection paper only detects certain liquid agents and will not detect vapor hazards. Above the shoulder ACDE should only be removed if there is absolutely no vapor hazard. Be advised that residual contamination (below the detectable levels of currently fielded detection equipment) may be harmful in an enclosed space. 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, avoid those areas for the remainder of the flight, and keep the cargo compartments cool. 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). Upon arrival, the contaminated aircraft will be parked in an isolated area and cordoned to protect unsuspecting ground personnel.

10.5.9. Documenting Aircraft Contamination. When it is suspected or known that an aerospace vehicle or piece of equipment has been contaminated with a radiological, biological or chemical contaminant, a Red X will be entered and an annotation will be made in historical records for the lifecycle of the equipment.

10.5.10. 10-Foot Rule. The 10-foot rule was developed in order to provide guidance for protecting personnel using or handling contaminated resources (such as pallets) or working in locations with materials that might retain a residual chemical. The 10-foot rule embodies a safety factor that goes beyond current OSD guidance (which allows removal of IPE whenever detectors no longer detect a chemical agent vapor hazard). There are two phases associated with the 10-foot rule.

10.5.10.1. Initial Phase. During the initial phase, personnel will remain in MOPP 4 whenever they stay within 10 feet of the contaminated equipment for more than a few seconds. This MOPP level provides personnel the maximum protection from the chemical agent as it transitions from a contact and vapor hazard to a vapor hazard only.

10.5.10.2. Follow-on Phase. In the follow-on phase, personnel will use gloves of a sort (i.e. leather, rubber, cloth, etc.) when operating on or handling the contaminated equipment. Although a contact hazard is unlikely, relatively small amounts of the agent may still be present. The use of gloves will ensure that unnecessary bare skin contact with agent residue is avoided.

10.5.10.3. **Table 10 2.** shows times associated with initial and follow-on phases of the 10-foot rule. To simplify response processes, commanders may choose to use the worst case scenario as the foundation for all 10-foot rule actions, i.e., 24 hours for the initial phase and all periods of time greater than 24 hours for the follow-on phase.

Table 10.2. Ten-Foot Rule Time Standards (Source: AFMAN 10-2602).

"10 Foot Rule" Time Standards*		
Agent	**Initial Phase**	**Follow-on Phase**
HD	0-12 HRS	Greater than 12 hrs
GB	0-12 HRS	Greater than 12 hrs
GD, GF, GA	0-18 HRS	Greater than 12 hrs
VX, R33	0-24 HRS	Greater than 24 hrs
* Rule is based on expected contamination on an airbase following a chemical attack. Adjust times if agent concentration is higher than expected.		

Chapter 11

NAVIGATION PROCEDURES

11.1. General. This chapter establishes procedures and requirements for worldwide en route C-5 navigation. It is to be used in conjunction with procedures and requirements set forth in AFI 11-202V3, AFI 11-217, and FLIP. Since airspace and associated navigational aid equipment capability are rapidly evolving, pilots must maintain an in-depth knowledge of current requirements/policies.

11.1.1. Prolonged Loss of Contact. Aircrews must ensure they are following proper navigation crosscheck procedures to maintain airspace situational awareness.

11.1.1.1. Aircrews will use navigation charts to identify radio frequency changeover points to minimize the likelihood of prolonged loss of communication with ATC/radio operators. Additionally, crews must monitor both VHF and UHF Guard to the maximum extent possible.

11.1.1.2. In the event of known or suspected loss of two-way radio capability, follow the communications failure procedures published in the FIH.

11.1.1.3. In cases of suspected loss of contact with ATC, attempt to reestablish contact using other aircraft to relay messages to ATC controllers.

11.2. Operations in International/Territorial Airspace. (See AFTTP 3-3.C-5., FLIP, FCG, and AP, for further procedures and guidance).

11.3. Mission Planning.

11.3.1. The PIC or designated representative shall verify that proposed routes and flight altitudes and levels provide proper terrain clearance and meet FLIP and Foreign Clearance Guide requirements.

11.3.2. Pilots shall crosscheck the computer flight plan (CFP) route of flight against the ATC Acknowledgement Message, and the route of flight entered on the DD Form 175, *Military Flight Plan*, DD Form 1801, *DoD International Flight Plan*, or ICAO flight plan.

11.3.3. If a CFP is out of date or not available and routing or meteorological information is desired, the PIC should obtain direct assistance from the 618 AOC (TACC) flight planner or IFM. CFPs and CFP tracks to assist in manual flight planning are available with a current GDSS2 account through the AMC Aircrew Portal.

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

11.4. Master Flight Plan.

11.4.1. Only one CFP (Master) shall be used on the flight deck. Annotate the Master CFP by writing “MASTER” on top of the cover page.

11.4.1.1. For all flights, circle each waypoint number on the Master CFP when the correct coordinates are checked by another crewmember.

11.4.1.2. When not under radar contact, annotate waypoint crossing times, flight level and fuel remaining on the right margin adjacent to the waypoint. Check the magnetic course, temperature deviation and compare the predicted winds to the actual winds aloft. Note trends to fuel remaining (actual vs. planned). See **paragraph 14.5.2** for additional guidance.

11.4.1.2.1. Adjacent to the next waypoint, record the ETA reported to ATC (this includes estimates automatically reported via ADS).

11.4.1.3. All navigation information appearing on the Master CFP must be checked against the best available prime source data. When a re-route is necessary, it is recommended that TACC provide a new Master CFP. For reroutes inflight, clearly cross out the old waypoints and enter new waypoints in their place.

11.5. Category I Routes.

11.5.1. Oceanic Plotting Chart.

11.5.1.1. Prior to flight, the PIC or designated representative shall plot the oceanic portion of the flight on an appropriate chart (e.g. OPC, GNC, Jeppesen). Place the following information on the chart: Mission number, Preparer's and PIC's name, Date, Flight plan course depicting reporting points with proper names or coordinates. On AAR missions, plot the ARIP, ARCP, exit, and turn points.

11.5.1.2. When crossing an oceanic reporting point, non-radar procedures will be followed in accordance with **paragraph 11.4.1.2**.

11.5.1.3. Ten (10) minutes after passing each oceanic waypoint or every 500 miles (whichever is shorter), record and plot the following: Present position, steering solution used for navigation, track heading, and time. Ensure compliance with course and ETA tolerances.

11.5.1.4. If a revised clearance is received, record and plot the new course on the chart.

11.5.1.5. Multiple legs on the same chart are permissible when practical.

11.5.2. Coast-Out.

11.5.2.1. Obtain a coast out fix prior to, or immediately on entering the oceanic segment. Perform a gross navigational error check using available NAVAIDS and annotate the position and time on the chart using the procedures in **Tables 11.1**, Coast-Out Fix.

Table 11.1. Coast-Out Fix.

C-5 AMP / C-5M Coast Out

1. Validate accuracy of FMS steering solution
    a. On the Fix page (INIT REF 3/3, LS L2), enter a ground-based Navaid
    b. Record radial DME as FMS position: e.g., “FMS: XXX/100/35”
    c. Manually tune Navaid and record radial/DME as RAD position: e.g., “RAD: XXX/100/35”
2. Note INU accuracy (INIT REF 1/3, POS 2/4 & POS 3/4. LS R6)
    a. Record INU1 & INU2 difference from the FMS solution: e.g., “INU1: 2.3nm” & “INU2: 1.7nm”
3. Note Altimeter Accuracy (for RVSM airspace)
    a. Crosscheck the altimeters and record readings of Pilot, Copilot and Standby. At intervals of approximately one hour, crosscheck between primary/standby so they agree within 200 feet.

C-5 Legacy Coast-Out Fix.

Coast-Out Fix Plotting Method FMS/GPS Configured Steering Solution

1. Select the **UPDATE** page on each CDU.
2. Display **MANUAL**.
3. When at desired coast-out point, simultaneously press **FREEZE** on all three CDUs and press the **MARK** key on any one CDU
4. Record the INU pure inertial position. (Data Line 1 on each CDU)
5. Record the integrated position (found on the CDU scratch pad where **MARK** was selected.
6. Plot the coast-out fix.
7. Compare all positions selected to the coast-out point.
8. To terminate coast-out plotting, select **REJECT** on each CDU.

Note Altimeter Accuracy (for RVSM airspace). Crosscheck the altimeters and record readings of Pilot, Copilot and Standby. At intervals of approximately one hour, crosscheck between primary/standby ensuring they agree within 200 feet.

Triple-Mix Configured Steering Solution

1. Record aircraft position in relation to NAVAIDs and simultaneously press **FREEZE** on all INS. Select **MARK** on one CDU for the triple-mix position. 2. Record the INS triple mix position and all three INS pure inertial positions on the chart. Plot the coast-out fix. Compare the coast-out fix to the INS triple-mix or GPS position. 3. To terminate coast-out plotting, select 4. **REJECT** on each CDU. Note Altimeter Accuracy (for RVSM airspace). Crosscheck the altimeters and record readings of Pilot, Copilot and Standby. At intervals of approximately one hour, crosscheck between primary/standby so they agree within 200 feet.
Alternate Coast-Out Fix Plotting Method
1. Validate accuracy of GPS/INU steering solution. 2. Display Pure Inertial position on all three CDUs: Select INAV. Lateral Scroll each FMS head to **INU CONTROL** page. 3. Read the **UPDATE DIFF** in nautical miles directly from data line 3 and record for each INU to determine most accurate unit for subsequent INS only operations. 4. Record time and most accurate INU on the chart. Crosscheck the altimeters and record readings of Pilot, Copilot and Standby. At intervals of approximately one hour, crosscheck between primary/standby so they agree within 200 feet.

11.6. Navigation and Communication Capability.

11.6.1. Immediately report malfunctions or loss of navigation capability which degrades centerline accuracy to the controlling agency. Refer to flight manual, FLIP, NAT Doc 007 and appropriate publications for procedures and system malfunctions regarding navigation performance and vertical separation in RVSM, RNP, RNAV and BRNAV airspace.

11.6.1.1. All DAFIF errors will be reported to the aircraft's home station System Support Representative (SSR) who will in turn file a report with NGA as necessary.

11.6.2. North Atlantic and US west coast or Hawaii route minimum navigation performance specifications (MNPS) are mandatory. Minimum equipment and contingency procedures are in FLIP AP/2.

11.6.3. Required navigation performance (RNP) RNAV (e.g., RNP-10) standards are increasingly being applied globally. Minimum equipment and navigation tolerances are in FLIP AP/3.

11.6.4. Reduced vertical separation minimums (RVSM) are mandatory when specified. Required equipment and contingency procedures are in FLIP GP.

11.6.5. Navigation and Communication Certification for AMP and C-5M Model Aircraft listed in **Table 11.2** and **Table 11.3**. for Legacy Aircraft.

Table 11.2. Navigation and Communication Capability of AMP and C-5M Model Aircraft.

Nav/Comm Capability of AMP and C-5M			
Function	**Requirement**	**Compliant**	**Remarks**
Comm	8.33 KHz Radio Spacing	Yes	At least one ARC-210 radio must be operative
	Datalink -CPDLC	Yes	AERO-I must be operative
	Datalink - ATS/AOC	Yes	AERO-I or HFDL must be operative
NAV	FM Immunity	Yes	At least one MMR must be operative
	RNAV (GPS) Appr	Yes	1. LNAV Minima only 2. DME/DME RNP 0.3 not authorized 3. AMP aircraft - Flown only as RNP in RNP mode 4. C-5M Aircraft - Flown in RNP mode or dedicated GPS mode
	RNAV (RNP) Appr	No	
	NGA Nav Database	Yes	Level 2 only - approved for all operations excluding RNAV(RNP) approaches
	RVSM	Yes	Refer to GP; 2 SCADC, one transponder and one AP with altitude alerting operative
	MNPS	Yes	UNABLE RNP CWA not displayed or IAW section 3 procedures for UNABLE RNP
	RNAV 10/RNP 10	Yes	UNABLE RNP CWA not displayed or IAW section 3 procedures for UNABLE RNP
	BRNAV	Yes	UNABLE RNP CWA not displayed or IAW section 3 procedures for UNABLE RNP
	RNP 5	Yes	UNABLE RNP CWA not displayed or IAW section 3 procedures for UNABLE RNP 5

	RNP 4 Oceanic Routes	Yes	1. UNABLE RNP CWA not displayed 2. C-5M Aircraft: with ATC approval, may continue on RNP 4 Oceanic Routes in dedicated INU/GPS or dedicated GPS mode (UNABLE RNP CWA displayed) if route PRAIM check was completed
	PRNAV	Yes	UNABLE RNP CWA not displayed or IAW section 3 procedures for UNABLE RNP
	RNAV-2	Yes	UNABLE RNP CWA not displayed or IAW section 3 procedures for UNABLE RNP
	RNAV-1	Yes	UNABLE RNP CWA not displayed or IAW section 3 procedures for UNABLE RNP
	RNP-1	Yes	UNABLE RNP CWA not displayed
	RNP 0.3	Yes	UNABLE RNP CWA not displayed
Surv	ADS-A	Yes	AERO-I operative
	ADS-B out	No	Future Upgrade
	Elementary Mode S	Yes	transponder operative
	Enhanced Mode S	No	Future Upgrade
	TCAS version 7	Yes	transponder operative and TCAS ON
MISC	TAWS	Yes	EGPWS operative
	406 Mhz ELT	No	Future Upgrade
	Stage 3 Noise	**	AMP: Not Compliant C-5M: compliant at gross weights ≤ 769K
	Stage 4 Noise	**	AMP: Not Compliant C-5M: compliant at gross weights ≤ 769K

Table 11.3. Navigation and Communication Capability of Legacy Aircraft.

Nav/Comm Capability of Legacy			
Function	**Requirement**	**Compliant**	**Remarks**
Comm	8.33 KHz Radio Spacing	Yes	At least one ARC-210 radio must be operative
	Datalink -CPDLC	No	
	Datalink - ATS/AOC	No	
NAV	FM Immunity	Yes	
	RNAV (GPS) Appr	No	
	RNAV (RNP) Appr	No	
	NGA Nav Database	Yes	
	RVSM	Yes	Refer to GP; 2 CADC, one transponder and one AP with altitude alerting operative
	MNPS	Yes	
	RNAV 10/RNP 10	Yes	
	BRNAV	Yes	
	RNP 5	No	
	RNP 4 Oceanic Routes	No	
	PRNAV	No	
	RNAV-2	No	
	RNAV-1	No	
	RNP-1	No	
	RNP 0.3	No	
Surv	ADS-A	No	
	ADS-B out	No	
	Elementary Mode S	Yes	transponder operative
	Enhanced Mode S	No	
	TCAS version 7	Yes	transponder operative and TCAS ON
MISC	TAWS	No	
	406 Mhz ELT	No	Future Upgrade
	Stage 3 Noise	No	

	Stage 4 Noise	No	

11.7. Grid Operations.

11.7.1. Grid Operations. Operations above 70 degrees north and below 60 degrees south require thorough study and understanding of instrument approach procedures (IAP) and of INS procedures and heading displays. The PIC will decide whether headings will be magnetic, grid, or true oriented and ensure the other pilots understand what type heading is being displayed on the HSIs, BDHIs, and CDUs. ***NOTE:*** Grivation (GV) shown on the IAP applies to other aircraft and will not be used for C-5 operations. IAPs above approximately 65 degrees north contain the following notice: Grid courses are true polar courses and convergence angle factor shall not be applied. Convergence angle factors apply to sub-polar navigation charts used by aircraft other than C-5 and must not be used. C-5s will use a convergence factor of 1.00000.

11.7.2. Review applicable AFI's and flight manuals prior to grid operations.

Chapter 12

FLIGHT ENGINEER / AIRCREW MAINTENANCE SUPPORT PROCEDURES

12.1. General: This chapter contains flight engineer procedures not contained in the flight manual, other portions of this AFI, or other publications.

12.2. Responsibilities. The flight engineer is responsible to the pilot in command for all inspections and procedures required by the applicable technical orders and regulations.

12.2.1. Second Engineer. A qualified second engineer can perform scanner duties without direct supervision and is responsible to the primary engineer for the completion of all duties for which they are qualified. When performing primary FE duties, the second engineer must be under the supervision of an instructor or flight examiner.

12.3. Authority 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 highest qualified flight engineer on scene may obtain authorization to sign off the Red X from the home station MXG/CC or designated representative, in accordance with T.O. 00-20-1. Other crew members are not authorized to clear a Red X. ***EXCEPTION:*** The flight engineer may clear Red Xs for fan stops, pitot covers, gear pins, engine cowls, access panels, throttle lock plate, NLG steering manifold input arm, and single point refueling (SPR) drains when qualified maintenance personnel are not available, unless prohibited by the home station MXG/CC or OG/CC.

12.4. Aircraft Servicing and Ground Operations. The flight engineer 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. 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 crewmembers to assist the flight engineer. A flight engineer may assist the normal maintenance function when critical taskings dictate their use, provided this action does not impact crew duty and crew rest limits specified in Chapter 3 of this AFI. ***EXCEPTION:*** Flight Engineers will not service Nitrogen or Oxygen. ***WARNING:*** Do not load/off-load cargo containing explosives, oxygen, flammable gases or liquids during fuel servicing operations.

12.4.1. Fuel Servicing Operations. Unless servicing JP-4, simultaneous servicing of fuel while loading passengers, cargo, performing maintenance, aircrew members performing inspections, or operating aircraft systems is considered to be a normal fuel servicing operation. If refueling/defueling with JP-4 Concurrent Servicing operations are required IAW TO 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding.* Aircrew members qualified in ground refueling may perform fuel servicing duties. Aircrews will only refuel in cases when maintenance support is not readily available and the mission would be delayed. Flight Engineers are qualified in ground refueling operations.

12.4.1.1. When aircrew members are required to refuel, the flight engineer will act as the refueling team supervisor. Flight engineers will comply with T.O. 00-25-172 and applicable T.O. 1C-5A-2 series T.O.s when acting as refueling supervisor and panel operators.

12.4.1.1.1. Concurrent Ground Operations. The PIC and chief servicing supervisor (CSS) shall ensure aircrew members and servicing personnel accomplish concurrent servicing (CS) in accordance with T.O. 00-25-172 and servicing technical orders. Aircrews performing Dash-1 preflight inspections or cargo loading concurrent with servicing must have cooperation and close coordination with the CSS. The CSS will remain in continuous intercom contact with fuel servicing team members during the entire servicing operation. Team members include CSS, a monitor for each SPR in use, refueling panel monitor, fuel specialists. When the aircrew is at the aircraft, the PIC is responsible for all aspects of aircraft operations and shall inform the CSS how aircrew members will participate in passenger evacuation/safety. In keeping with the guidelines in T.O. 00-25-172, CSS has authority over all phases of CS operations to include personnel participating in the refuel.

12.4.1.2. Designate a current and qualified maintenance personnel or aircrew member to remain on the flight deck to monitor interphone and be prepared to broadcast a request for emergency assistance on a radio tuned to the appropriate agency with ready access to an emergency response team anytime aircrew members are in the aircraft and fuel servicing is being conducted. The PA may be used to direct passenger evacuation in an emergency.

12.4.1.3. Unless environmental conditions dictate, the primary emergency exit will remain open and stairs/ladders in place.

12.4.1.4. With passengers on board a current and qualified aircrew member will be designated the passenger compartment monitor (PCM) and shall continuously monitor passengers during fuel servicing operations. PCMs will not perform other duties during fuel servicing.

12.4.1.5. The PCM shall brief passengers on emergency egress, exits, prohibitions, and hazards. Passengers will remain seated except for brief physiological needs, but will not wear seat belts. When possible, conduct this briefing prior to fuel servicing. If fuel servicing is in progress, the briefing will be given immediately after boarding.

12.4.1.6. When authorized, passengers may board or exit the aircraft for the express purpose of loading for departure or off-loading upon arrival. Boarding or exiting must be opposite of fuel servicing operations. Once onboard, except for emergencies, passengers shall not deplane once fuel servicing commences.

12.4.1.7. Passengers are not required to ground themselves.

12.4.1.8. The PIC, or designated maintenance/aircrew representative will advise PCMs when to evacuate passengers.

12.4.1.9. The PCM shall set the interior lighting as bright as possible to suit the combat environment.

12.4.1.10. The following guidance will be used for fuel servicing (refuel) operations:

12.4.1.10.1. Electric and electronic equipment may be on and operated to include operations performed by aircrew members during required inspections with the following exceptions:

12.4.1.10.1.1. TACANs and radar altimeters must be turned off.

12.4.1.10.1.2. Radar will be in STBY, TEST, or OFF.

12.4.1.10.1.3. IFF may be in standby but, if time permits, should be turned off.

12.4.1.10.1.4. Radio operations are authorized. ***EXCEPTION:*** Use of HF radios is prohibited.

12.4.1.10.2. Simultaneous fuel and oxygen servicing is not authorized.

12.4.1.10.3. APU's and ATM's may be used.

12.4.1.11. Avoid refueling with JP-8+100 while transiting airfields with JP-8+100 capabilities. AMC aircraft are not allowed to operate on JP-8+100, except in emergency conditions. All JP-8+100 locations are required to maintain a clean JP-8 capability to support transient aircraft. If inadvertent refueling with JP-8+100 occurs comply with the following:

12.4.1.11.1. De-fuel the aircraft prior to flight.

12.4.1.11.2. Make an AFTO Form 781 entry stating "Caution: Aircraft refueled using JP-8+100, preventative measures must be taken when de-fueling."

12.4.2. Hot Refueling. Hot refueling (refueling with aircraft engines running) will only be conducted by crews that have been authorized and certified according to AFI 11-235, *Forward Area Refueling Point (FARP) Operations*.

12.4.3. Aircrew Dash One Preflight Inspection Requirements.

12.4.3.1. The aircrew dash one preflight inspection will remain valid until either:

12.4.3.1.1. Aircraft ground time exceeds 48 hours (72 hours provided the aircraft is sealed, not flown, and documented entry control is maintained).

12.4.3.1.2. When an aircrew assumes a -1 pre-flighted/thru-flighted (as required) spare or quick turn aircraft, a thorough visual inspection is required. No additional -1 inspection is required.

12.5. Aircraft Recovery Away from Main Operating Base (MOB). The PIC is responsible for ensuring the aircraft is turned to meet subsequent mission tasking. If qualified maintenance specialists are unavailable, the aircrew is responsible for turning the aircraft to meet subsequent mission taskings.

12.5.1. The PIC is responsible for the recovery items including:

12.5.1.1. Parking and receiving.

12.5.1.2. Aircraft servicing, including Aircraft Ground Equipment (AGE) usage.

12.5.1.3. Supervision of minor maintenance within local capability.

12.5.1.4. Minor configuration changes to meet mission tasking.

12.5.1.5. Securing the aircraft before entering crew rest.

12.5.1.6. Coordinating aircraft security requirements.

12.5.1.7. Documenting AFTO Form 781-series.

12.5.2. In all cases where aircrews must service the aircraft without qualified maintenance specialist assistance, comply with the appropriate maintenance T.O.

12.5.3. 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 that reflects that the applicable maintenance inspection (i.e. preflight, thru-flight, basic post-flight) is overdue.

12.6. Aircraft Structural Integrity Program. The purpose of this program is to provide a reliable system for predicting potential or impending failures based on historical records of the aircraft's exposure to those actions contributing to fatigue failures.

12.6.1. On AMP and Legacy aircraft the program is monitored through the use of AF IMT 4097, *Aircraft Identification*. The C-5M uses the EDS for normal operations.

12.6.2. AMP and Legacy flight engineers will:

12.6.2.1. Ensure all applicable sections of AF IMT 4097 are completed according to procedures in **paragraph 12.6.3**.

12.6.2.2. Always leave a newly initiated form on the aircraft. Initiate a new form by completing section I.

12.6.2.3. Keep all completed AF IMT 4097s and newly initiated form in aircraft stowage pouch (if available) or flight engineer station publication rack.

12.6.2.4. Remove all completed AF IMT 4097s and turn into maintenance debrief at home station. ***NOTE:*** If the crew and maintenance do not conduct a formal debrief (e.g. first period local, mission thru-flights, debrief not available), AF IMT 4097s will be left on the aircraft. (Units may establish local procedures if deemed necessary to minimize lost forms.)

12.6.2.5. When interflying with another wing's aircraft, the engineer returning the aircraft to its home station will turn in all completed AF IMT 4097s to maintenance debrief , note in **paragraph 12.6.2.4** applies.

12.6.2.6. When delivering an aircraft to depot or another wing, the engineer will return all completed AF IMT 4097s for routing to home-station maintenance documentation section.

12.6.3. AF IMT 4097 instructions. Complete an AF IMT 4097 for each sortie. Do not complete a log for any ground operation or sortie that does not involve an attempted takeoff. This includes ground aborts for maintenance, operations, weather, and onload or offload exercises. When a sortie is terminated before an attempted takeoff, transcribe the section I information contained on the log to a new AF IMT 4097. Use the same log number.

12.6.3.1. The AF IMT 4097 will be closed out after each sortie, runway abort, or landing on a substandard runway. The criteria in AFI 11-401 and MAJCOM supplement pertaining to sorties, landing, and flying time entries made in the AFTO Form 781 by the pilot in command apply with the following exceptions:

12.6.3.1.1. Do not start a new log for in-flight mission symbol changes.

12.6.3.1.2. Do not start a new log for practice full stop landings.

12.6.3.1.3. Start a new log when the aircraft remains on the ground more than 20 minutes after touchdown, regardless of circumstances.

12.6.3.2. Weights. Except for section VI, enter weights to the nearest thousand pounds. Always right adjust the three columns. For example, enter a weight of 94,500 pounds as 095. For section VI, enter values in thousands and tenths of thousands, such as 94.5 for the above example.

12.6.3.3. Altitudes. Enter altitude to the nearest thousands of feet in section III. Enter altitude as thousands and tenths of thousands of feet in section V. The decimal point is on the form. (***EXAMPLE:*** Enter 24,600-feet as 24.6 in section V.)

12.6.3.4. Accuracy and neatness are essential. All numbers and letters must be legible. Do not use diagonal marks (/) on zeroes.

12.6.3.4.1. Section I**,** Aircraft Identification.

12.6.3.4.1.1. Effective Date. Enter the Zulu date the form was started into the effective date block (e.g. yyyy-mm-dd). For each mission departure from home station, the AFTO Form 781J, *Aerospace Vehicle-Engine Flight Document*, will contain the correct information for the effective date and columns 1-20 in a special block. This information will be used for confirmation. All discrepancies on the AF IMT 4097 will be corrected to agree with the AFTO Form 781J.

12.6.3.4.1.2. Columns 1-3. Aircraft tail number: Enter the last 3 numbers of the aircraft's serial number.

12.6.3.4.1.3. Columns 4-8. Log number: Only one log number will be used for each sortie flown. Place the year in columns 4-5. Right adjust the remaining three digits, ending in column 8. Unused columns should contain zeroes. No dashes are permitted. ***EXAMPLE:*** The ninth log of the calendar year 2010 would be entered as 10009.

12.6.3.4.1.4. Column 9. Normally, the letter "A" will be entered in this column. (***EXCEPTION***: Enter C when ALDCS is off; enter D when aerial refueling with a KC-10 tanker and ALDCS is off; enter E when aerial refueling with KC-10 tanker and ALDCS is on.) In instances when additional AF IMT 4097s are needed (i.e. aborted takeoff, aircraft remaining on the ground more than 20 minutes after an intermediate landing, landings on substandard runways), add a suffix letter beginning with B through Z with the exception of C, D, and E explained above. (***EXAMPLE***: Initial log number 05011A, aircraft aborts takeoff for a door warning light on--initiate new log with number 05011B. Aircraft makes a full stop landing with taxi back for another takeoff, but is delayed on the ground over 20 minutes--initiate a new log with number 05011F. The mission is then completed after further flight. The aircraft has flown one sortie and has used one log number although three AF IMT 4097s are completed.) ***NOTE:*** When an AF IMT 4097 is initiated for a flight that is aborted on the runway during an attempted takeoff resulting in mission termination, the form will be completed as much as possible. Include the reason for the abort in the remarks section.

12.6.3.4.1.5. Columns 10-12. No entries will be made in these columns.

12.6.3.4.1.6. Columns 13-17. Airframe hours: To nearest hour. Decimal and tenth of hour omitted.

12.6.3.4.1.7. Columns 18-20. AGS: Aircraft Generation Squadron. (***EXAMPLE***: 60 AGS would be entered as 060.)

12.6.3.4.2. **Section II,** Initial Takeoff and Final Landing Data.

12.6.3.4.2.1. Flight Engineer: Enter rank, last name, and flying organization of FE at panel for takeoff.

12.6.3.4.2.2. Initial Takeoff Data:

12.6.3.4.2.2.1. Columns 21-24. Date: Enter the takeoff Zulu date as day and month.

12.6.3.4.2.2.2. Columns 25-27. Gross weight: Aircraft gross weight at brake release. (Zero fuel weight plus columns 30-32) Entry will be to the nearest thousand pounds.

12.6.3.4.2.2.3. Columns 28-29. CG: Takeoff center of gravity to the nearest whole percent.

12.6.3.4.2.2.4. Columns 30-32. Fuel weight: Fuel weight at brake release to the nearest thousand pounds.

12.6.3.4.2.2.5. Columns 33-36. Time Z: Sortie takeoff time to agree with the takeoff time as recorded on the AFTO Form 781. ***EXCEPTION:*** at **paragraph 12.6.3.1**

12.6.3.4.2.2.6. Columns 37-40. Airfield ICAO code: ICAO designation (4 letters) for the airfield at which the takeoff occurred. If no ICAO code is listed for an airfield, leave blank and annotate the name of the airfield of takeoff in the remarks section.

12.6.3.4.2.2.7. Column 41. Substandard runway: Enter an "X" if the runway is not asphalt or concrete.

12.6.3.4.2.3. Final Landing Data:

12.6.3.4.2.3.1. Columns 42-44. Fuel weight: Fuel weight at engine shutdown or 5 minutes after final touchdown, whichever comes first, to the nearest thousand pounds. ***NOTE:*** This entry and the fuel entry (columns 30-32) are extremely important and must be accurate. The chronological event (cruise periods, touch-and-go (T&G), intermediate full stops and takeoffs) fuel weight is computed using the initial takeoff and final landing fuel weight.

12.6.3.4.2.3.2. Columns 45-48. Time Z: Sortie landing time as recorded on the AFTO Form 781. ***EXCEPTION:*** see **paragraph 12.6.3.1**.

12.6.3.4.2.3.3. Columns 49-52. Airfield ICAO code: ICAO designation (4 letters) for the airfield at which the final landing occurred. If no ICAO code is listed for an airfield, leave blank and annotate the name of the airfield of

landing in the remarks section.

12.6.3.4.2.3.4. Column 53. Substandard runway: Enter an "X" if the runway is not asphalt or concrete.

12.6.3.4.2.3.5. Column 54. Fuel sequencing: Enter "S" for standard fuel sequence; enter "N" for non-standard fuel sequence. When "N" is entered, make an entry in the remarks block to indicate fuel quantity in each tank containing fuel, and the total flight time spent in non-standard configuration.

12.6.3.4.3. **Section III,** Flight Profile Data:

12.6.3.4.3.1. This section allows for four separate cruise periods. Do not enter temporary cruise periods of less than 15 minutes (due to clearance changes, weather, etc.). Entries are required for low-level clean configuration events where a cruise period time and altitude is held longer than 5 minutes at 6,000-feet mean sea level (MSL) or lower. Neither traffic nor the climb or descent portions of the sortie are to be entered. These entries are to be made left-to-right in chronological time sequence as they occur. The first cruise period start time should begin after the initial climb and cruise is stabilized. (Mach and altitude stabilized). Cruise period stop times should be entered when one of the following events occur:

12.6.3.4.3.1.1. Climb or descent in excess of 4,000-feet from recorded altitude is initiated.

12.6.3.4.3.1.2. Altitude increases by more than 4,000 from the last recorded value. This may occur when multiple step-climbs (less than 4,000-feet each) are performed.

12.6.3.4.3.1.3. Cruise Mach number is stabilized at 0.10 from the last recorded value. ***NOTE:*** Climb and descent criteria will normally govern when to close out a cruise period. The Mach number change criteria are possible during aerial refueling operations and turbulence encounters.

12.6.3.4.3.2. Subsequent cruise periods should begin when Mach/altitude conditions are stabilized. The stop time for the last chronological cruise entry indicates scheduled cruise has ended and descent for landing follows.

12.6.3.4.3.3. Cruise entries are not required if the entire flight remains in the initial takeoff airfield's traffic pattern. (See section II, columns 37-40.) However, a cruise entry will be required when:

12.6.3.4.3.3.1. The traffic pattern altitude (6,000-feet MSL) is exceeded, regardless of time duration.

12.6.3.4.3.3.2. Each time an aircraft departs from one base traffic pattern and flies to another base regardless of altitude or time duration.

12.6.3.4.4. **Section IV,** Transition Training—Touch-and-go Landings, Additional Full Stops, and Takeoffs.

12.6.3.4.4.1. Columns 10-11. Sequence number: Keypunch instructions, no entry required.

12.6.3.4.4.2. Columns 12-55. T&G: There is space to record 22 touch-and-go landings. Enter additional T&Gs in remarks column, if required. Enter the Zulu time at touchdown for each T&G. Enter T&Gs left to right on the first line as they occur. After the 11th T&G entry, begin second line and enter 12th and subsequent T&Gs left to right as they occur. Leave unused portion blank. Do not skip any entries. Time entries should always be ascending in chronological order (allowance is made for passing through 2400Z).

12.6.3.4.4.3. Columns 56-59. Full stop: There is space to record two practice full stop landings. Enter additional full stop landings in the remarks section. Enter the Zulu time at touchdown for the first practice full stop on the first line. Leave unused portion of section IV blank. ***NOTE:*** Do not enter practice landings on substandard runways. A new log must be accomplished for each substandard runway practice landing.

12.6.3.4.4.4. Columns 60-63. Takeoff: There is space to record two additional takeoffs. Enter additional takeoffs in remarks section. Enter the Zulu time at takeoff for the additional takeoffs as they occur. Leave unused portion blank.

12.6.3.4.5. **Section V,** In-flight Operations:

12.6.3.4.5.1. Columns 10-11. Sequence numbers: Keypunch instructions, no entry required.

12.6.3.4.5.2. Columns 12-16. Event: Place an "X" in the appropriate column.

12.6.3.4.5.2.1. Column 12. Terrain Following (TF)/Low Level (LL).**

12.6.3.4.5.2.2. Column 13. Aerial Refueling (R).*

12.6.3.4.5.2.3. Column 14. Airdrop (A).*

12.6.3.4.5.2.4. Column 15. Cargo Jettison (CJ).*

12.6.3.4.5.2.5. Column 16. Fuel Jettison (FJ). *Simulated events will be recorded. **Usually applies during tactical VFR training (TVT) sorties. Use LL when flying a clean configuration event at or below 2,000-feet AGL for longer than 5 minutes.

12.6.3.4.5.3. Columns 17-20. Event start time (Zulu time): For airdrop or cargo jettison, the start time is when the aerial delivery system (ADS) doors start to open. For AAR, start time is when the aircraft enters tanker wake turbulence or the aircraft is within approximately 500-feet of the tanker.

12.6.3.4.5.4. Columns 21-24. Event stop time (Zulu time): For airdrop or cargo jettison, stop time is when the ADS doors are closed. For AAR, time ends when the aircraft leaves the tanker wake turbulence or the aircraft is approximately 500-feet from the tanker.

12.6.3.4.5.5. Columns 25-27. Incremental weight: Enter the weight on loaded or off loaded for the event "X-ed" in columns 12-16. Enter "000" for simulated events.

12.6.3.4.5.6. Columns 28-31. Altitude or clearance plane setting: Enter the

altitude in thousands and tenths of thousands of feet. A decimal point has been provided on the form. For terrain following and low-level, enter the altitude in feet AGL.

12.6.3.4.5.7. Columns 32-39. Terrain following and low-level: If an "X" was placed in column 12, make the following entries:

12.6.3.4.5.7.1. Columns 32-33. Route code: Enter the code number of low-level route flown.

12.6.3.4.5.7.2. Columns 34-35. Mode: Place an "X" in the appropriate column, "A" for automatic, "M" for manual.

12.6.3.4.5.7.3. Column 36. Ride setting: Enter a "0".

12.6.3.4.5.7.4. Columns 37-39. Mach: Enter the 3-digit Mach number being flown for terrain following. (Decimal is assumed.) ***NOTE:*** An altitude entry is required for all events. Columns 17-31 must be completed for each event. Columns 32-39 must be completed for terrain following and low level only. Do not place decimal points in any columns. All allowed decimal points are preprinted on the form.

12.6.3.4.6. **Section VI,** Sortie Time and Takeoff Weight Computation:

12.6.3.4.6.1. Flight Duration:

12.6.3.4.6.1.1. Landing time: Enter the ending Zulu landing time.

12.6.3.4.6.1.2. Takeoff time: Enter the initial Zulu takeoff time.

12.6.3.4.6.1.3. Total time: Enter the total flight time in hours and minutes.

12.6.3.4.6.1.4. Total time: Enter the total flight time in hours and tenths. ***NOTE:*** The takeoff and landing time entries in sections II and VI should be the same as recorded in the AFTO Form 781 for the sortie being reported. ***EXCEPTION:*** see **paragraph 12.6.3.1**.

12.6.3.4.6.2. Takeoff Weight Computation. Complete the takeoff weight computation portion when computing takeoff requirements. The operating weight and cargo, passenger, and miscellaneous weight entries should not change. The FE need not readjust section VI entries in case of delays. ***NOTE:*** LN2 weight will be included in the aircraft operating weight.

12.6.3.4.6.3. Remarks: Enter any appropriate comments that could influence aircraft fatigue factors. Examples are: severe turbulence encountered, hard landing, non-standard fuel sequence, high load maneuvers, unpressurized flight, and in-flight thrust reverser operation. If active lift distribution control system (ALDCS) is off or inoperative in flight, record the conditions and flight duration. Record the appropriate sequence number from section V, In-flight Operations Data, of any AAR event occurring behind the KC-10. ***EXAMPLE:*** "KC-10 AAR, seq XX" where "XX" is the sequence number. Other required remarks are mentioned in the various section instructions. ***NOTE:*** If all blocks for a specific maneuver are completed and additional blocks are needed, use another AF IMT 4097 for continuation. Use same log number and annotate in the remarks section

of the continuation form, "Continuation of log number XXXXX.

12.6.4. The C-5M Aircraft Structural Integrity Program is automated in the EDS. C-5M Flight Engineer's will:

12.6.4.1. Ensure all applicable tabs are completed within the EDS program according to procedures in **paragraph 12.6.5**

12.6.4.2. Use the AF IMT 4097 and the procedures in this chapter during operations with a failed PCIU, AMC, or when deemed necessary.

12.6.4.3. At home station, remove the RMM and turn into maintenance debrief. ***NOTE:*** If the crew and maintenance do not conduct a formal debrief (e.g. first period local, mission thru-flights, debrief not available), the RMM will be left on the aircraft. (Units may establish local procedures if deemed necessary.)

12.6.4.4. When interflying with another wing's aircraft, the engineer returning the aircraft to its home station will turn in the RMM to maintenance debrief, note in **paragraph 12.6.4.3** applies.

12.6.4.5. When delivering an aircraft to depot or another wing, the engineer will return the RMM to home station documentation section.

12.6.5. EDS Instructions (C-5M only). Complete the applicable data input for each sortie. Do not complete input for any ground operation or sortie that does not involve an attempted takeoff. This includes ground aborts for maintenance, operations, weather, and onload or offload exercises. When a sortie is terminated before an attempted takeoff, complete the applicable sections to document crew actions.

12.6.5.1. Start-up and initialization. This data is entered and will be used to pre-populate additional fields. The flight engineer name shall be entered using first name initial, full last name, and rank. DSN phone number shall be used as the military employee number. Enter the initial takeoff and final landing airfield ICAO designations.

12.6.5.2. Log start. Select the log start event and enter the basic operating weight and cargo weight obtained from DD Form 365-4 *Weight and Balance Clearance Form F-Transport/Tactical* or the automated Form F. Also enter the cumulative airframe hours as depicted in the AFTO Form 781-series. ***NOTE:*** Load Environmental Spectra Survey (LESS) equipped aircraft - fuel weights are prefilled for automatically detected events when the LESS circuit breakers are closed.

12.6.5.3. Take off. Select the takeoff event from the tab and document the gross weight (zero fuel weight plus fuel weight), center of gravity, and fuel weight as of brake release. Annotate with a check mark if the takeoff is accomplished on a substandard runway.

12.6.5.4. Cruise. If not automatically detected after 15 minutes when above 6,000 feet MSL or 5 minutes when at or below 6,000 feet MSL, manually enter a cruise event and document the start time, stop time, Mach and altitude. Use the remarks section to identify abnormal cruise conditions.

12.6.5.5. Aerial refueling. Record the start of an air refueling event as the time the aircraft enters the tanker wake turbulence. Enter the beginning fuel weight and the incremental weight as the total amount of fuel offloaded by the tanker, the mach, altitude

at which the air refueling occurred, and the tanker type. The stop time is recorded when the aircraft departs the tanker wake turbulence at the completion of the event.

12.6.5.6. Air drop, terrain following and low level. Not currently used.

12.6.5.7. Cargo jettison. Record the fuel weight, the incremental weight offloaded, mach and altitude.

12.6.5.8. Fuel jettison, Record the incremental weight offloaded, mach and altitude.

12.6.5.9. Touchdown. Record the fuel weight upon landing for full stop landings. This event also provides the capability to record a landing on a substandard runway or flights using non standard fuel sequencing. For touch and go operations, the fuel load entry is optional for each touchdown event logged. Use the remarks section to enter appropriate comments that could influence aircraft fatigue factors. Examples are: unpressurized flight, severe turbulence encountered, hard landing, high load maneuvers and unpressurized flight.

12.6.5.10. Engine start, ALDCS, taxi, lift off, gear cycle, new flight, engine shutdown and log stop. These are additional automatic events that do not require attention unless abnormal conditions occur. Use the remarks section to identify abnormal conditions.

12.6.5.11. Runway abort. Select the runway abort event and then enter the reason for the rejected take off.

12.6.5.12. Over-g. Select the over-g event and enter relevant information about the exceedance condition.

12.6.5.13. After documenting the required information within each event details viewer, the save button shall be selected to record the data onto the RMM.

12.7. Not Used.

12.8. Performance Data, including TOLD Card.

12.8.1. The aircraft performance manual or MAJCOM approved computer based TOLD program will be used for all aircraft performance calculations. All performance data will be computed by a first flight engineer or higher. A second engineer may compute performance data if supervised by an instructor. TOLD conditions and computations will be placed on the TOLD Card Worksheet. ***EXCEPTION*:** The TOLD Card Worksheet printed from the computer based TOLD program may be used in lieu of AFTO Form 198, *TOLD Card Worksheet*.

12.8.2. All TOLD calculations will be verified by another qualified flight engineer (preferred) or a pilot. Aircraft takeoff and landing gross weights will be verified by comparing them to the DD Form 365-4 or another independent means. One of the following methods will be used for TOLD verification:

12.8.2.1. FSAS, except when GW is limited by 3 engine climb.

12.8.2.2. TAB data contained in pilot's checklist (1C-5A-1CL-1 or 1C-5M-1CL-1) for conditions listed in 1C-5A-1CL-1 or 1C-5M-1CL-1.

12.8.2.3. T.O. 1C-5A-1-1 or 1C-5M-1-1.

12.8.3. Runway slope calculations. When using non-DoD/NOAA airfield diagrams and approach plates to determine runway information for takeoff and landing data calculations, the aircrew must calculate runway slope since non-DoD/NOAA publications do not do this for you. To calculate runway slope you must extract the departure end elevation and approach end elevation from the airfield diagram and use the following formula:

$$\text{Slope in Percent} = \frac{(\text{Departure End Elevation} - \text{Approach End Elevation}) \times 100}{\text{Runway Length}}$$

12.8.4. Field elevation calculations. For all TOLD calculations other than obstacle clearance, screen height, and "ghost obstacles" use the airfield field elevation.

12.8.4.1. Use one of the following elevations for obstacle clearance calculations:

12.8.4.1.1. No depicted slope. Use the *lowest* elevation on departure runway.

12.8.4.1.2. Depicted slope. Use the *highest* elevation on departure runway.

12.8.4.2. For screen height and "ghost obstacles" use the departure end of runway elevation (DER).

12.8.5. During performance calculations, the engineer will ensure the following:

12.8.5.1. Gross Weight (GW). Aircraft does not exceed maximum GW, zero fuel weight (ZFW), or center of gravity (CG) specified in aircraft flight manual. GW may be further restricted by operating conditions such as icing, temperature, pressure altitude, runway length and slope, aerodrome weight bearing capacity, departure maneuvering, and known limiting obstacles.

12.8.6. Obstacle clearance and climb gradient calculations. All inputs required for obstacle clearance and climb gradient calculations will be provided by the PIC on a MAJCOM approved Departure Information Worksheet as specified in **paragraph 6.16** The FE will calculate TOLD using SDP or Non-SDP procedures as applicable to the specific departure, in accordance with the Departure Information Worksheet instructions and the performance manual.

12.8.6.1. Average (10 nm) AEO climb gradient. Compute using computer based program or enter appropriate Aircraft Performance Manual sheet 1 of the Climbout Flight Path (Four Engine) chart at 10 NM and intersect aircraft COF. Read height at obstacle and divide by 10 to obtain average AEO climb gradient.

12.8.6.1.1. Ensure this climb gradient is no lower than required AEO climb gradient listed on departure worksheet. If required climb gradient cannot be achieved performing **paragraph 12.8.5.1**, calculate by entering appropriate Aircraft Performance Manual sheet 2 of the Climbout Flight Path (Four Engine) chart. If this climb gradient is equal to or greater than required climb gradient the flaps must be left at the take-off setting with power set at Takeoff-inflight until climb gradient restriction is met.

12.9. Fuel Management/Monitoring. AF IMT 4054, Performance and Fuel Management Log.

12.9.1. The purpose of this form is to provide a snap shot view of aircraft performance and fuel consumption and should be completed when directed by the PIC. When applicable, use T.O. 1C-5A-1-1, 1C-5M-1-1 or MAJCOM approved computer based fuel log program and appropriate information from the CFP, AF IMT 4052, *C-141/C-130/C-5/Refueling Computation* (AAR fuel card) if used, or AF IMT 4053, *INS Flight Plan and Log* (normal fuel card) if used, to complete AF IMT 4054.

12.9.2. **:**

12.9.2.1. Zero Fuel Weight (ZFW). Obtain zero fuel weight from the DD Form 365-4 (Form F).

12.9.2.2. Takeoff (TO) FUEL. Obtain takeoff fuel by adding fuel tank quantities.

12.9.2.3. TO GW. Calculate takeoff gross weight by adding ZFW to T/O FUEL.

12.9.2.4. TEMPERATURE DEVIATION. Use the forecast level off temperature deviation.

12.9.2.5. INITIAL ALTITUDE. Confirm initial four-engine cruise ceiling using level-off gross weight and level-off temperature deviation.

12.9.2.6. ENGINE OIL READINGS. Record oil pressure and temperature during first stabilized cruise segment. (Mach and altitude stabilized).

12.9.2.7. AERIAL REFUELING.

12.9.2.7.1. Before takeoff obtain the following information from the CFP or AF IMT 4052 if used: BURNOFF BEHIND TANKER, FUEL REQUIRED AT EXIT, PLANNED TRANSFER. Calculate SUBTOTAL by adding FUEL REQUIRED AT EXIT to BURNOFF BEHIND TANKER. Subtract the PLANNED TRANSFER from the subtotal to obtain FUEL REQUIRED AT ARCP.

12.9.2.7.2. Forty-five minutes before the ARCP compute ESTIMATED FUEL AT ARCP based on your ETA to the ARCP. Subtract from the SUBTOTAL to obtain REQUIRED TRANSFER. Advise the aircraft commander of the required fuel transfer. AERIAL REFUELING periods 2 and 3 are completed in the same method if required.

12.9.3. **:**

12.9.3.1. "A. BEGIN DESCENT TIME." Obtain begin descent time from the pilot.

12.9.3.2. "B. TIME." Record Zulu time of observation.

12.9.3.3. "C. ZFW." Obtain zero fuel weight from DD Form 365-4 or ZFW block above.

12.9.3.4. "D. FUEL REMAINING." Obtain fuel remaining from fuel gauge readings.

12.9.3.5. "E. GW." Calculate actual gross weight by adding FUEL REMAINING to ZFW.

12.9.3.6. "F. ALT/MACH." Record current flight level and Mach number. ***EXAMPLE***: 350/77.

12.9.3.7. "G. TEMP DEV." Use en route temperature deviation obtained from the ACFP. If a significant discrepancy (i.e. > 5°C) exist between the actual temperature deviation

and the ACFP forecast for that leg and planned altitude, actual temperature deviation may be used.

12.9.3.8. "H. PAGE #." Page number in T.O. 1C-5A-1-1 or 1C-5M-1-1 that is used to compute time in block I. Enter “Comp” if electronic program is used.

12.9.3.9. "I. FUEL ETE." Compute fuel ETE using computation blocks at bottom of form (section III), and record in hours and minutes.

12.9.3.10. "J. ETE BDP/OH or ARCP." Subtract Zulu time from BDT to obtain ETE BDP/OH or ARCP.

12.9.3.11. "K. EXTRA TIME." Subtract ETE BDP/OH or ARCP from FUEL ETE to obtain EXTRA TIME.

12.9.3.12. "L. 4 ENG CEIL." Compute 4-engine cruise ceiling using current gross weight and actual temperature deviation. (C-5M) Use optimum step climb altitude.

12.9.3.13. "M. 3 ENG CEIL." Compute 3-engine cruise ceiling using current gross weight and actual temperature deviation.

12.9.3.14. "N. PILOT'S INITIALS." Pilot will review and initial at least every hour and 20 minutes and may discontinue the form at his or her discretion.

12.9.4. :

12.9.4.1. FUEL REQUIRED OH or ARCP. Enter FUEL REQUIRED OH from CFP, AF IMT 4053 (block 13) or AF IMT 4052 (block 56) for airland/final destination or FUEL REQUIRED ARCP from AF IMT 4054 section 1 for aerial refueling missions.

12.9.4.2. ZFW. Enter zero fuel weight.

12.9.4.3. OH GW/TIME. Obtain OH GW by adding FUEL REQ OH or ARCP and ZFW. Obtain TIME using the applicable TEMP DEV and 1C-5A-1-1 or 1C-5M-1-1 performance charts or electronic program.

12.9.4.4. AGW/TIME. Record actual gross weight. Compute TIME using the applicable TEMP DEV and 1C-5A-1-1 or 1C-5M-1-1 performance charts or electronic program.

12.9.4.5. FUEL ETE. Subtract AGW/TIME from OH GW/TIME to compute FUEL ETE. Fuel ETE will be recorded in hours and minutes.

12.10. Fault Code Reporting Procedures.

12.10.1. The fault reporting method (FRM) is used to isolate system malfunctions with a minimum amount of troubleshooting and provide a description of the malfunction for maintenance.

12.10.2. System malfunctions, whether monitored by EDS (C-5M only), MADAR auto or manual faults (C-5A/B only) or observed by a crewmember, will be troubleshot using the Fault Reporting Method (FRM) or Fault Isolation Manual (FIM) procedures contained in EDS or MADAR to maximum extent possible.

12.10.3. The manual fault code (FC) derived from the troubleshooting routine and the auto fault code reported by MADAR will be recorded in AFTO Form 781A along with the

description of the malfunction. Include any additional information required for clarification of the discrepancy.

12.10.4. When documenting EDS faults, AFTO Form 781A discrepancies shall be based on the fault isolation (FI) and include reference to the fault detection (FD). If the FD does not have a FI, the AFTO Form 781A entry shall be based on the FD.

12.10.5. Before finalizing the flight during EDS shutdown, the flight engineer shall evaluate each active fault to determine its validity. To facilitate evaluation of recovered faults, select the event log and review each fault occurring after the MFDU fault log reset during the preflight. After eliminating any induced and/or nuisance faults, ensure all actual faults are recorded in the AFTO Form 781A. A comprehensive list of nuisance faults can be found in the current AMC Checklist Inserts.

12.11. Weight and Balance. The flight engineer is responsible for completion of DD Form 365-4 (Form F), in the absence of a qualified Loadmaster when no cargo or passengers are on board.

12.12. Monitoring Primary Radios. The FE will monitor the primary radio for flight clearances, altitudes, heading changes, and radio frequencies. The FE is not required to copy departure clearances.

12.13. Ground Refueling Procedures with Inoperative Fuel Quantity Indicators:

12.13.1. Primary method:

12.13.1.1. A known quantity of fuel is transferred from an adjacent tank to a tank with inoperative quantity indicator. The crew will transfer fuel internally to the configuration or sequence required prior to flight when servicing is complete.

12.13.2. Alternate method:

12.13.2.1. The tank with the inoperative indicator and the corresponding tank on the opposite wing will be emptied and will not be serviced by maintenance.

12.13.2.2. When a single refueling unit is used, the tank with the inoperative fuel quantity indicator will be filled individually and prior to remaining tanks, when possible, within wing loading limitations.

12.13.2.3. When a dual refueling unit is used, the tank with the inoperative fuel quantity indicator and the corresponding tank on the opposite wing may be filled simultaneously.

12.13.2.4. The refueling unit shall be used to determine the amount of fuel in the tank with inoperative indicator.

12.13.3. Maintenance may service aircraft to the following fuel values without the aircrew monitoring:

12.13.3.1. Outboard main tank inoperative—284,000 pounds.

12.13.3.2. Inboard main tank inoperative—281,000 pounds.

12.13.3.3. Outboard or inboard auxiliary tank inoperative—269,000 pounds.

12.13.3.4. Outboard or inboard extended range tank inoperative—278,000 pounds. ***CAUTION:*** Observe wing differential loading limits.

12.14. Wheel and Brake Procedures.

12.14.1. If dragging wheels or brakes are suspected during taxi, deplane the scanner and comply with **paragraphs 12.16.1.1** through **12.16.1.5** Comply with **paragraphs 12.16.1** and **12.16.2** if any portion of the fire suppression system (FSS) wheel well fire detecting system is inoperative.

12.14.2. Pre-departure End-of-Runway Inspection for Overheated Brakes. Unless the aircraft is parked on or immediately adjacent to the takeoff portion of the active runway the aircrew will complete the pre-departure end-of-runway inspection as follows:

12.14.2.1. Use the scanner and another crewmember other than pilot, copilot, or FE. The additional crewmember deplanes with scanner and performs scanner duties while scanner accomplishes brake check.

12.14.2.2. Maintain interphone contact throughout the inspection.

12.14.2.3. To inspect, approach directly from the front or rear of the tire, touch main landing gear tire and cautiously move the hand toward the wheel. Then place the hand near the brake to determine excessive heat without touching the brake surface. Repeat for each main landing gear (MLG) wheel and brake assembly.

12.14.2.4. If any brake is significantly hotter than the majority advise maintenance corrective action is required. If an obviously dangerous overheated condition is observed do not taxi the airplane.

12.14.2.5. If no brake is found significantly hotter than the majority of brakes, the brake check is satisfactory.

12.14.3. In-flight Procedures:

12.14.3.1. Inspect the MLG wheel wells after takeoff for evidence of heat, smoke, or fire. If abnormalities are detected, extend the landing gear immediately at or below 250 KCAS/.60 Mach.

12.14.3.2. Inspect the cargo compartment sidewall and floor areas adjacent to the MLG wheel wells for evidence of heat (discoloration or variation in surface temperature) at 15-minute intervals for the first hour of flight. Inspect hourly for the remainder of flight.

12.15. PCIU (C-5M Only).

12.15.1. PCIU Security. The PCIU does not contain virus protection or internal security features to prevent loading of unauthorized software. All software loaded on the EDS PCIU require Computer Program Identification Numbers (CPINs). Authorized uses of the PCIU are described in the flight manual and also include the MILTOLD and FPM programs. The OG and MXG are the approving authority for all other uses.

12.15.2. PCIU Failure. To allow data recovery after a PCIU failure, attempt to replace the PCIU prior to AMC power down. If the PCIU is not replaced prior to power down, the AMC will store all data except the .dat files created for that flight (i.e. aircraft form entries).

12.15.2.1. Operations with a failed PCIU result in the loss of or inability to auto generate AFTO form 781A entries. When operating with a failed PCIU, the MFDU should be used

as a reference to ensure accurate manual documentation of all AFTO form 781A entries. The flight summary report can be printed and taken to debrief if required.

12.15.2.2. During operations with a failed PCIU the FE shall annotate in the aircraft forms, all Thrust Reverser deployments including airspeed/groundspeed at time of deployment. For example; Engine 1, 2, 3, and 4 TRs deployed on landing airspeed 110 knots. If deployment is during ground operations, indicate engine operation at or above idle. For example #1 eng TR deployed for op ck, ground speed 0, throttle at idle.

12.15.2.3. The EDS Aircraft Structural Integrity Program is not fully functional with a failed PCIU. Use the AF IMT 4097 for all flights with a failed PCIU.

12.15.3. AMC Failure. Operations with a failed AMC will be held to a minimum.

12.15.3.1. During operations with a failed AMC the FE shall annotate in the aircraft forms, all Thrust Reverser deployments including airspeed/groundspeed at time of deployment. For example; Engine 2 and 3 TRs deployed on descent airspeed 230 knots. If deployment is during ground operations, indicate engine operation at or above idle. For example #1 and #4 eng TR deployed for op ck, ground speed 0, engine throttles idle.

12.15.3.2. The EDS Aircraft Structural Integrity Program is not fully functional with a failed AMC. Use the AF IMT 4097 for all flights with a failed AMC.

12.15.4. RMM Failure. If the RMM card fails prior to data download, attempt to replace the card prior to power down of the EDS and PCIU. If replacement is not practical all AFTO form 781A entries, TLDs, and exceedences must be reviewed and entered in the aircraft forms as appropriate.

Chapter 13

CARGO AND PASSENGER PROCEDURES

13.1. General. The loadmaster coordinates loading or offloading with air terminal operations or the shipping agency, plans loads, provides in-flight services to passengers, and supervises on loading or off loading operations.

13.2. Responsibilities for Aircraft Loading.

13.2.1. AMC Designated Stations:

13.2.1.1. Aerial port personnel are responsible for selecting cargo and mail for airlift, promptly completing documentation, palletizing cargo, load planning (as required), computing load distribution, and moving cargo to and from the aircraft to meet scheduled departure. Before starting loading operations, they will advise the loadmaster of destination, size, weight, and types of cargo (classified, hazardous, etc.) to permit proper positioning. They will also coordinate traffic activities affecting loading and offloading, and assign sufficient aerial port loading personnel for cargo loading. Aerial port personnel are responsible for safe positioning of material handling equipment (MHE) and cargo to and/or from the aircraft cargo door, ramp or auxiliary ground loading ramps. Under the supervision of the loadmaster, aerial port personnel will prepare the aircraft for loading, stow loading equipment if the aircraft is not to be reloaded, physically load the aircraft, tie down cargo and equipment, release tie down and physically offload cargo.

13.2.1.2. The loadmaster is responsible for aircraft preflight, load planning (as required), certifying load plans, preparing weight and balance documentation, operating aircraft equipment, and supervising cargo tie down. The loadmaster coordinates with the loading crew supervisor to validate the cargo against manifests, supervises and directs on/offloading and is responsible for safe movement of cargo into and out of the aircraft. The loadmaster will notify the PIC, C2, or terminal operations officer if loading personnel are injured or cargo, aircraft equipment, or aircraft structure is damaged during on/offloading. The loadmaster will brief the PIC on hazardous cargo 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 applicable aircraft technical orders or USAF/MAJCOM publications. If cargo is refused or rearranged for these reasons, forward all applicable information, including a copy of the load plan, to MAJCOM Stan/Eval through Stan/Eval channels. AMC personnel attach an AMC Form 54, *Aircraft Commander's Report on Services/Facilities.* ***EXCEPTION:*** The loadmaster may deviate from load plans to facilitate ease of on/offloading of cargo and to alleviate unnecessary aircraft reconfiguration without submitting documentation. The loadmaster must take into consideration the next station's cargo configuration requirements and will ensure the aircraft is in proper weight and balance limits. A new load plan is not required.

13.2.1.4. The loadmaster is the on-scene expert and final authority for load planning and final authority for accepting cargo for airlift. Some loads are not specifically detailed in applicable directives and require the loadmaster to use his/her best judgment based on training, experience, and knowledge to determine the best and safest method of loading

the cargo. When difficulties arise, they should seek the advice of other personnel (i.e., squadron, group, wing, or MAJCOM Stan/Eval personnel).

13.2.1.4.1. Non-standard cargo/equipment that exceed limitations and is not contained in the aircraft loading manuals requires certification for air shipment. The shipper will provide a copy of the certification to the loadmaster prior to loading. If the certification letter with loading instructions/requirements is not provided to the loadmaster, the cargo will not be loaded. Contact Air Transportability Test Loading Agency (ATTLA) or ASC/ENFC at Wright Patterson AFB, OH, voicemail (937) 255-2330/2547 or MAJCOM Stan/Eval for questions concerning cargo certification.

13.2.2. 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 MHE for on/offloading. Loadmaster responsibilities and authority are the same as described in **paragraphs 13.2.1.2**. and **13.2.1.3**.

13.2.3. During joint airborne air transportability training (JA/ATT), special assignment airlift missions (SAAM), and USAF mobility, and contingency missions, the loadmaster can accept DD Form 2133, *Joint Airlift Inspection Record*, as valid pre-inspection of equipment being offered for air shipment**.** This form, validated by two joint inspector signatures (user and transporting force), may be used in lieu of applicable portions of the vehicle inspection portion of the applicable loading checklist. However, this does not relieve the loadmaster from ensuring accompanying loads are secured 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.

13.3.1. Cargo compartment troop doors and the crew entrance door will be unobstructed and operative when passengers and troops are transported in cargo compartment.

13.3.2. Ensure that at least one unobstructed safety aisle is available in the cargo compartment to allow movement between the flight deck and the troop compartment. Cargo and loose equipment shall not be stowed on the cargo compartment walkways. ***NOTE:*** All passenger hand carried items must be of a size to fit under the seat and must not obstruct the safety aisle(s). Any items that do not fit under a seat, or obstruct an aisle way will be stowed with checked baggage and secured for flight.

13.3.3. Troop compartment occupancy is limited to 40 total personnel, including crewmembers, when either #3L or #3R escape hatches are not fully operational. Personnel will not be transported in the troop compartment when either the #4 escape hatch and/or the #6 service door is not fully operational. The slide and associated exit shall meet the following requirements to be considered fully operational:

13.3.3.1. The slide must be capable of pneumatic inflation.

13.3.3.2. Exits must be capable of being opened with reasonable effort.

13.3.3.3. The #6 service door guides must remain in the tracks and the door must stay latched in the open position.

13.3.3.4. Emergency Exit Light installed and charging.

13.3.4. Simultaneous Cargo and Passenger On/Off loading:

13.3.4.1. Left side cargo compartment operations. High stairs ("Galaxy stairs") shall be in place prior to stowing the troop ladder or conducting operations in the vicinity of the ladder.

13.4. Pre-Mission Duties.

13.4.1. Cargo Missions:

13.4.1.1. The loadmaster, will coordinate with aerial port personnel to establish loading times. Loading times that differ from the normal pre-departure sequence of events will be established, with PIC 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. When reporting for duty, the loadmaster checks in with the Air Terminal Operations Center (ATOC) or other designated location to obtain load brief and assist in load planning as required.

13.4.1.1.1. Aerial Port Expediter (APEX) Loading Operations. APEX is an aerial port loading program directly managed and supervised by air transportation personnel. It provides port 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 aerial port management the ability to evenly distribute port workloads. It will not serve as an aircrew enhancement or alleviate the loadmasters' responsibility to on/off load aircraft.

13.4.1.1.2. As part of AMC's Velocity Initiative, APEX provides the capability for aerial ports to on/offload cargo without loadmasters. APEX Load Directors are qualified to on/offload all types of cargo.

13.4.1.1.2.1. Load Directors have overall control until formally relieved by the outbound primary loadmaster. A full cargo briefing must be given by the Load Director.

13.4.1.1.2.2. Loadmasters who need on/offloads for training or evaluations should notify ATOC upon arrival. ATOC should make every effort to accommodate the request.

13.4.1.1.2.3. Loadmasters shall treat APEX loaded aircraft like any duty-loaded or staged aircraft. Any cargo discrepancies that cannot be corrected by the loadmasters in a timely manner will be reported to ATOC.

13.4.1.1.2.4. Forward negative APEX trend data to AMC/A3VX through Stan/Eval channels.

13.4.1.2. Proper cargo documentation will accompany each load. A consolidated statement (manifest) will be delivered to the aircraft 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 load plan with transportation control numbers (TCN) will accompany the load.

13.4.1.3. Tiedown equipment will be exchanged on a one-for-one basis. If this is not possible, annotate the AF Form 4069, *Tiedown Equipment Checklist*. At non-AMC stations, 463L pallets will normally be exchanged on a one for one basis.

13.4.1.4. Fleet Service Checklist.

13.4.1.4.1. Loadmasters will make every effort to ensure that the AF IMT 4128, *Fleet Service Checklist*, is signed by the fleet service representative and placed aboard the aircraft prior to departure.

13.4.1.4.2. Annotate inventory changes in section III. Place item nomenclature, increase/decrease amounts, station, date, and reason for change.

13.4.2. Passenger Missions: Maximize seat availability on all missions.

13.4.2.1. Manifesting. Passenger service or airfield management personnel manifest passengers at locations with an AMC passenger processing activity.

13.4.2.2. The PIC and loadmaster are responsible for ensuring all passengers are properly manifested.

13.4.2.3. At locations without an AMC passenger processing capabilities, it may be necessary for crews to perform passenger service functions. These functions include manifesting, anti-hijacking processing, and ensuring visa/passport requirements are met. When the aircrew accomplishes manifesting, anti-hijack-processing is completed by the aircrew IAW AFI 13-207, *Preventing and Resisting Aircraft Piracy (Hijacking)* (FOUO). Do not hesitate to contact 618 AOC/XOGX, Aerial Port Control Center (APCC); DSN 779-0350/0355, commercial; 618-229-0350/0355, if any questions arise such as who may travel to specific locations or pass-port/visa requirements. Aircraft operating within other MAJCOMs which have operational C2 over that aircraft will contact the appropriate AMOCC for specific details. File a copy of the DD Form 2131, *Cargo/Passenger Manifest*, with the flight plan. If not filed with the flight plan, annotate the location of the manifest on the flight plan IAW AFI 11-202 V3, *General Flight Rules.*

13.4.2.4. Ensure both ATMs and the APU on the side used to enplane passengers are shut down. ***EXCEPTION:*** if passenger buses are parked directly behind the aircraft and passengers will be on/offloaded over the aft ramp, both APUs may be operated. A passenger service representative or crewmember will assist passengers at the bottom of the steps/stairs, and the loadmaster will assist in seating passengers. DVs, passengers requiring assistance, and families should be boarded first to minimize separation. Make every effort to seat families together. Ensure that only adult, English-speaking, physically capable, and willing passengers are seated in emergency exit rows. Do not seat mothers with infants, or children under 15 years old, in emergency exit rows.

13.4.2.5. When children under the age of two are accepted as passengers, their sponsor has the option to either hold the child or place him/her in a Department of Transportation-approved Infant Car Seat (ICS). Although the use of ICS for children processed through AMC-owned or controlled terminals (including gateways) is no longer mandatory, all passengers (duty and space-A), regardless of age, are required to be assigned their own seat. This policy will provide an infant and their sponsor with a dedicated seat allowing the use of an ICS at the sponsors discretion; this mirrors current FAA (commercial)

standards. The FAA has banned the use of booster seats, harnesses, and vest child restraints.

13.4.2.5.1. Passengers may hand-carry their ICS. If used, secure the ICS to the seat using the seat belt. Adults will not hold the ICS during any phase of flight. In the event of turbulence or emergency landing, it is highly recommended for infants to be secured in an ICS. To prevent blocking an exit route, the ICS should not be used in an aisle seat.

13.4.2.6. Decisions regarding eligibility or acceptance of a passenger with disabilities for flight need to be determined at the lowest level possible. Problems concerning eligibility or acceptance that cannot be resolved locally must be reported (circumstances, chronology, names, units, etc.) to AMC/A4T. For time sensitive problems, telephone AMC/A4TP DSN 779-4592 or 618 AOC/APCC.

13.4.2.7. Download the baggage of no-show passengers and those removed from a flight. In the case of SAAM or exercise missions at non-AMC locations, coordinate with CRG or deploying unit CC to decide if downloading of baggage is necessary.

13.4.2.8. RUSH baggage movement will be accomplished IAW AMCI 24-101V14, *Military Airlift—Passenger Service.* The loadmaster will ensure ATOC provides a copy of the AMC Form 70, *Rush Baggage Manifest*, for the shipment of RUSH baggage.

13.4.2.9. Ensure all food items are removed from the aircraft by fleet service and returned to the flight kitchen if an extended delay occurs. Ensure that a copy of AF Form 3516, *Food Service Inventory Transfer Receipt*, is received from fleet service to relieve the loadmaster of meal accountability.

13.4.2.10. Pillow and Blanket Distribution. Hand out pillows and blankets only when requested by passengers. At en route locations, leave used pillows and blankets on seats for thru-load passengers. Do not mix used and unused pillows and blankets.

13.5. Passenger Handling.

13.5.1. The loadmaster is a key figure in good passenger relations. The following rules should be observed:

13.5.1.1. Address passengers by proper titles.

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.

13.5.2.1. Ensure crewmember's entertainment media (magazines, DVD, etc.) are of an appropriate nature.

13.5.3. In-flight Procedures:

13.5.3.1. Passengers may move about the cabin after reaching cruise altitude and the seat belt sign is off; however, judgment must be exercised on the number of passengers allowed out of their seats at any one time. Encourage passengers to remain seated with their seat belts fastened. Due to concern for their safety, passengers are not allowed to lounge or sleep on emergency equipment. Discourage passengers from congregating around galley, lavatory and crew bunk areas.

13.5.3.2. Make frequent checks on cabin temperature, passengers with small children, and cleanliness of the cabin and lavatories.

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 and extinguish unnecessary compartment lights.

13.5.3.5. Passengers may visit the flight deck only when approved by the PIC. Use good judgment when requesting this authority. Refer to **paragraph 5.3** for further guidance.

13.5.3.6. Passengers will not be permitted access to checked baggage.

13.5.4. Body Fluid/Bio-Hazard Clean-Up:

13.5.4.1. Aircrew personnel are the first line of defense when human fluids/waste contaminate aircraft. Because of the potential health risk to passengers and crew, crewmembers will immediately clean-up, to the best of their ability, all body fluids/waste when it does not detract from their primary duties. Loadmasters will request troop commanders, team leaders, or traveling companions assist with the in-flight clean-up whenever possible. The clean-up will be accomplished using kits provided by fleet service and the procedures listed below.

13.5.4.1.1. Cordon off the contaminated area if possible.

13.5.4.1.2. Use non-sterile vinyl or nitrile gloves that cover part of the arm.

13.5.4.1.3. Wear safety goggles or glasses and an N-95 disposable respirator or equivalent surgical mask to protect the mucous membranes and inhalation of blood-borne pathogens that may exist.

13.5.4.1.4. Wear disposable coveralls and footwear covers to protect skin, clothing and footwear if available.

13.5.4.1.5. Apply paper towels or other absorbent material to the fluid to absorb the fluids and minimize the spill area.

13.5.4.1.6. Use fluid from clean-up kit.

13.5.4.1.7. Place all material into bag.

13.5.4.1.8. Avoid touching the mouth or face area with soiled hands or gloves. Wash hands thoroughly with soap and water after cleaning or clean hands with an alcohol-based hand gel (at least 60% alcohol) when soap and water are not available.

13.5.4.1.9. Annotate type of body fluid/bio-hazard cleaned-up and location in AFTO Form 781A, *Aircraft Maintenance Discrepancy and Work Document*.

13.5.4.1.10. When it is not possible for aircrew personnel or passengers to clean-up during flight, fleet service will be notified prior to landing.

13.5.5. Meal Service:

13.5.5.1. Ensure each passenger receives the meal ordered by verifying the passenger's AMC Form 148, *AMC Boarding Pass/Ticket*.

13.5.5.2. Box Meals. After takeoff, distribute box meals to passengers who boarded at the previous station. This lessens confusion when flight segments are short and more passengers board at subsequent stations. Frozen/Cooked meals will not be accepted for passengers. Box meals should be served in the following sequence:

13.5.5.2.1. Small children requiring assistance.

13.5.5.2.2. Distinguished Visitors (DV).

13.5.5.2.3. All other passengers.

13.5.5.3. Do not serve liquids or hot foods during turbulence.

13.5.5.4. When purchased meals are not furnished to passenger(s), the loadmaster will annotate the individual's AMC Form 148, *AMC Boarding Pass/Ticket* to reflect reimbursement is authorized. Inform the passenger(s) they may receive refunds at the passenger service counter at the next station, originating location, or destination terminal.

13.5.5.5. Complimentary snacks and beverages are authorized on Transportation Working Capital Fund (TWCF) funded missions (including AFRC flown missions) for passenger consumption only. Complimentary snacks are not authorized on JA/ATT, Joint Chief of Staff (JCS) exercises, or SAAM missions. The squadron or port operations officer will ensure snacks and beverages are placed on board when departing AMC stations. When departing from other stations and no snacks or beverages are placed onboard, the loadmaster may obtain required snacks and beverages from the local in-flight kitchen.

13.6. En Route and Post-Flight Duties.

13.6.1. At stations where a crew change is made and loading or offloading is required, the inbound loadmaster is responsible for offloading the aircraft. The outbound loadmaster is responsible for planning and loading the outbound load.

13.6.2. 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.). If unable to conduct a face to face briefing, leave written instructions with the cargo manifest or local C2.

13.6.3. Assist passengers in deplaning. If BLUE BARK, DVs, COIN ASSIST, or couriers are onboard, the loadmaster informs the traffic or protocol representative respectively.

13.7. Loaded Weapons. Troops or deadhead crewmembers will not retain custody of ammunition on an aircraft. They will turn it in to the troop commander or PIC. Troops may carry unloaded weapons and ammunition aboard the aircraft during combat operations.

Weapons are considered loaded if a magazine or clip is installed in the weapon. This applies even though the clip or magazine is empty.

13.7.1. Personnel who will engage an enemy force immediately on 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. The troop commander will coordinate with the loadmaster prior to directing personnel to load any weapons.

13.7.2. Personnel who will not immediately engage an enemy force will store basic ammunition loads in a centralized palletized location for redistribution on arrival at the objective. Magazines or clips will not be inserted into weapons.

13.7.3. Dummy clips that can be easily identified may be loaded for training at the order of the troop commander in coordination with the aircrew.

13.8. Weight and Balance.

13.8.1. Accomplish weight and balance for this aircraft according to T.O.1-1B-50, *Weight and Balance*, and Addenda A of this AFI. The unit possessing the aircraft maintains the primary weight and balance handbook containing the current aircraft status and provides a supplemental weight and balance handbook for each aircraft. The supplemental handbook should be enclosed in a wear-resistant binder (preferably metal), stenciled "Weight and Balance" with the airplane model and complete serial number on the cover or a spine.

13.8.2. The supplemental handbook will include T.O. 1C-5A-5-2, *Weight and Balance Manual*, AFI 11-2C-5 V3 Addend 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 aircraft's basic weight, basic moment, and center of gravity.

13.8.3. The loadmaster/boom operator will file the original DD Form 365-4, *Weight and Balance Clearance Form F—Transport/Tactical*, at the departure airfield and maintain a physical or electronic copy for the duration of the flight.

13.8.4. The weight and balance section of the unit possessing the aircraft will maintain the required documents.

13.9. Cargo Validation On/Offloading Procedures and Format. Use the following format when tasked to validate a new loading procedure or when encountering any cargo you feel requires special or specific on/offloading or tiedown procedures not currently listed in applicable loading manuals. After completion, send through standardization channels to AMC/A3VX.

13.9.1. General Loading Data:

13.9.1.1. Nomenclature of item. Give military or civilian name, national stock number (NSN), and a brief description of the item; i.e., dump truck, medical van, etc.

13.9.1.2. Dimensions (in inches). Length, width, and height. Rough drawing or picture of the unit pointing out critical dimensions, projections, overhangs, etc.

13.9.1.3. Weight (in pounds). Gross weight, individual axle weight, or data plate weight if possible.

13.9.2. Number of loading crew personnel and loadmasters required to on/offload cargo and their position to observe clearances, if required.

13.9.3. Equipment and Material Requirements. Special equipment and material required to on/offload cargo; i.e., cargo winch, prime mover, shoring requirements.

13.9.4. Aircraft Configuration Required.

13.9.5. Preparation of Cargo for Loading. Components that must be removed or reconfigured to on/ offload cargo (i.e., helicopter struts, exhaust stacks, cabs, etc.).

13.9.6. On/offloading Procedures.

13.9.7. Location of Tiedown Points.

13.9.8. Comments.

13.10. Emergency Airlift of Personnel.

13.10.1. Apply the following procedures to ensure a safe, efficient loading method for the emergency airlift of personnel and aeromedical evacuation (AE) of litter patients from areas faced with enemy siege, hostile fire, for humanitarian evacuations, or when directed by the 618 AOC (TACC).

13.10.2. Emergency airlift normally is accomplished without the use of individual seats or safety belts. Evacuees will be seated on the cargo compartment floor and restrained with tiedown straps. Approximately 600 evacuees can be transported in this configuration, but can vary depending on individual sizes. Loading procedures and actual placement of evacuees will be determined by the loadmaster and PIC.

13.10.3. The maximum altitude for emergency airlift will not exceed FL 250.

13.11. Rucksacks.

13.11.1. The following procedures apply to loading of rucksacks. During administrative (training) deployments, rucksacks may be loaded on deploying vehicles or palletized.

13.11.2. During tactical deployments into a FOB/OB, rucksacks not loaded on vehicles will be carried by the individuals onto the aircraft. Allocate pallet space on the load plan for loading rucksacks.

13.12. Flight Station and Troop Compartment Access: During loading operations, do not place cargo in a position that will restrict the use of the flight station or troop compartment stair ladders during flight.

13.13. Cargo and Material Handling Equipment (MHE) Issues.

13.13.1. Lithium Batteries and Pyrotechnic Material (Class/Division 1.3G). Aircraft halon fire extinguishers are ineffective in fighting fires involving primary (non-rechargeable) lithium batteries and pyrotechnic material. Primary lithium batteries shipped as cargo or installed/contained in equipment and pyrotechnic material will not be accepted as cargo without the shipper providing a suitable fire extinguisher(s). For non-rechargeable lithium batteries this may be C02, Class D, or a specialized fire extinguisher (e.g., LITH-X). Dry chemical agent is preferred extinguisher for pyrotechnic material. These extinguishers will only help reduce the intensity of the fire until the lithium and pyrotechnic material expends

itself. Aircraft halon fire extinguishers are suitable when transporting only rechargeable (lithium ion) batteries. Fire extinguisher requirements for non-rechargeable lithium batteries and pyrotechnic material do not apply to items being hand carried by troops during Chapter 3 operations. ***NOTE*:** Aircraft potable water will not be used as a fire suppression system for lithium batteries or pyrotechnic material. Water presents a hazard to electronic equipment located in the center accessory compartment and ARO compartment and water, in less than a large quantity, is ineffective.

13.13.2. Hazardous Materials in ISU-90 Containers. Load plans must allow in-flight access in event of an emergency, or hazardous materials will be removed from the container. Some containers have built-in "HAZMAT" access panels; however, when these containers are utilized, any hazardous materials must be positioned to permit access through the panel. ***EXCEPTION:*** See AFMAN 24-204 for hazardous cargo not required to be accessible in-flight. Hazardous materials in the upper compartment of the container are inaccessible unless the adjacent pallet position is left empty to facilitate opening the doors. If the person responsible for the container is not on board, the key or combination for locks on containers must be on the container adjacent to the lock. AMC inspectors and aircrew are authorized access on all cargo containers placed on AMC aircraft except when waived by AMC/A3 for security reasons.

13.13.3. Weissenfel MB-1 Chain and 1998 Davis MB-1 Devices. Effective immediately, the Weissenfel MB-1 chain will not be used. The Weissenfel MB-1 chain can be identified by the word W-ITALY stamped on the chain hook. The 1998 Davis MB-1 tiedown device will not be used. These devices can be identified by a stamp reading contract number SPO470-98-C-5103. Remove any Weissenfel MB-1 chain or 1998 Davis MB-1 device from the aircraft. Examine chained palletized cargo for these chains and devices. If they are found, replace them with other chains and devices. Return the chains and devices to maintenance or the aerial port activity.

13.13.4. Commercial Cargo Straps. Do not use commercial cargo straps. The only authorized cargo straps are the CGU/1b, 5k air cargo strap, PN 1670-00-725-1437, strap, webbing universal tiedown, PN 5340-00-980-9277 (army version of the AF CGU/1b, 5k strap) and the 10,000-pound restraint assembly cargo, NSN 1670-00-406-2657.

13.13.5. Ratchet device stamped: PECK & HALE, LLC, CGU-1/B 5000 LBS CAP. 94658 6MRW/1465B with white unmarked strap will not be used. Remove any deficient devices found on the aircraft and turn them in to aerial port personnel for final disposition.

Chapter 14

FUEL PLANNING

14.1. General. This chapter is designed to assist aircrews in fuel planning for airland and aerial refueling missions. The planning procedures in this chapter apply to AMC-tasked and 618 AOC (TACC)-flight managed missions in addition to local missions. Missions should be planned at altitudes, routes, and airspeeds to minimize fuel usage.

14.2. Fuel Conservation. It is Air Force policy to conserve aviation fuel when it does not adversely affect training, flight safety, or operational readiness. Aircrew and mission planners will manage aviation fuel as a limited commodity and precious resource. Fuel optimization will be considered throughout all phases of mission planning and execution. Comply with the following whenever consistent with tech order guidance and safety:

14.2.1. Fuel Loads. Excessive ramp and recovery fuel adds to aircraft gross weight and increases fuel consumption. Do not carry extra fuel beyond optimum requirements for safe mission accomplishment and training objectives.

14.2.2. Flight Planning. Aircrew and mission planners will optimize flight plans and flight routing for fuel efficiency.

14.2.3. APU Usage. Minimize the APU usage to the maximum extent possible. Early coordination may be required to ensure external power carts and heating/cooling units are available.

14.2.4. Center-of-Gravity (CG). Whenever possible, load and maintain aircraft at an aft CG consistent with mission requirements and Flight Manual restrictions.

14.2.5. Engine Start. Delay engine start on all departures whenever practical to minimize fuel consumption.

14.2.6. Taxi. Consider engine out taxi when permitted by Flight Manual.

14.2.7. Departure Planning. If winds allow, consider use of opposite direction runway to reduce taxi and/or expedite departure routing.

14.2.8. Takeoff. Consider a rolling takeoff as well as reduced power when able. This saves fuel and engine wear. Clean up on schedule and do not delay gear and flap retraction.

14.2.9. Climb/Descent. In-flight procedures such as climb/descent profiles and power settings should also be considered for efficient fuel usage. Constant descent arrivals should be performed when able.

14.2.10. Weather Deviations. Attempt to coordinate for off-course deviation early so gross maneuvering is not required.

14.2.11. Cruise techniques. Attempt to trim the aircraft and match throttle settings whenever possible. Fly fuel efficient speeds and altitudes to the maximum extent possible.

14.2.12. Approach. Fly the most direct routing to arrival approach consistent with mission requirements. Partial flap approaches should be considered if landing performance allows.

14.2.13. Holding. If holding is required, hold clean at the most fuel efficient altitude and request a large holding pattern. Hold at endurance or performance manual recommended holding speeds, conditions permitting.

14.2.14. Parking. Consider using shortest taxi route and avoid double blocking when able.

14.3. Fuel Planning Procedures. Aircrew should employ the following aviation fuel optimization measures without compromising flight safety or jeopardizing mission/training accomplishment:

14.3.1. Plan a 45-minute fuel reserve at destination or alternate (when an alternate is required).

14.3.2. Plan fuel to an alternate only when AFI 11-202V3 or AFI 11-2C-5V3 requires the filing of an alternate.

14.3.2.1. When only one alternate is required, use the closest suitable airfield meeting mission requirements (such as special requirements for hazmat or patients) and 11-202V3 weather criteria.

14.3.2.2. If two alternates are required, use the two closest suitable airfields meeting 11-202V3 weather criteria and fuel plan to the more distant of the two.

14.3.2.3. When selecting an alternate, suitable military airfields are preferred if within 75 nautical miles of destination.

14.3.2.4. The practice of selecting an alternate in another weather system or selecting an alternate based on maintenance capability will not be used.

14.3.2.5. For remote destinations, holding is authorized in lieu of an alternate airport. In such situations, use 2+00 hrs reserve fuel (1+15 holding in lieu of an alternate and 0+45 reserve).

14.3.3. For all missions other than local training missions, calculate 15 minutes of contingency fuel using destination (or alternate, if appropriate) gross weights. Local training missions are not required to carry contingency fuel. If contingency fuel is carried on local training missions, it should not exceed 15 minutes. Contingency fuel is not considered reserve fuel since it can be consumed at any point during the mission. Contingency fuel will be included in the initial Required Ramp Fuel Load (RRFL) calculation.

14.3.3.1. AMC's ACFP will calculate reserves and contingency fuel as holding fuel. Computer flight plans will have 1+00 holding when combining 0+45 reserve and 0+15 contingency fuel (for remote destinations ACFP will plan 2+00 holding, plus 15 minutes contingency).

14.3.3.2. Reserve and contingency fuel will be computed using consumption rates providing maximum endurance at 10,000 feet MSL at destination gross weight. If an alternate is required, compute using weight at alternate destination. When computing reserve fuel for remote destinations, use consumption rates providing maximum endurance at 20,000 feet MSL.

14.3.4. Using all available planning tools and guidance in this chapter, PICs will determine the RRFL. When actual fuel load exceeds the RRFL by more than 5,000 lbs, defuel the aircraft to the RRFL.

14.3.4.1. When there is a conflict between an on-time departure and defueling, the 618 AOC (TACC) deputy director of operations (DDO) or MAJCOM C2 equivalent will determine which takes precedence. The OG/CC will make this determination when serving as execution authority for the mission.

14.3.5. Tankering fuel for convenience is prohibited. MAJCOM C2 or 618 AOC (TACC)-sanctioned tankered fuel is deemed operationally necessary, and will be included in the RRFL.

14.3.5.1. Force Extension/AAR. If during mission planning it is determined that scheduled AAR is not needed for operational or training purposes, attempt to get it cancelled through appropriate C2 channels.

14.4. Computer Flight Plan (CFP) & Advanced Computer Flight Planning (ACFP).

14.4.1. The Flight Manager uses the AMC approved ACFP system to create and calculate the CFP included in the Departure Papers. CFPs are optimized for en route weather, winds and temperature. Therefore, changing altitudes and accepting direct routing may actually degrade fuel efficiency.

14.4.2. Validate the CFP by confirming the correct MDS, routing, cargo and passenger weight (within 10,000 lbs), and winds are valid during the expected flight time. If the computer flight plan does not meet these criteria the FM will provide a new computer flight plan.

14.4.3. Fuel savings may be further optimized by using Mission Index Flying (MIF) profiles, and should be used to the maximum extent possible when able.

14.5. Fuel Requirements. This section augments AFI 11-202V3 fuel requirements.

14.5.1. Fuel Cards. With a valid CFP, manual fuel cards are not required. AC's are responsible for verifying fuel requirements prior to flight. Inflight, AC's will periodically verify that the fuel remaining is sufficient.

14.5.1.1. If a CFP is unobtainable, complete a manual fuel plan (AF IMT 4052 or 4053) using guidance in this AFI, **Table 14.1**, in conjunction with AMCPAM 11-2 or TO 1C-5M-1-1.

14.5.1.2. AMC has determined that ACFP is extremely accurate in calculating fuel burn. To verify fuel requirements, the AC will ensure that the CFP is valid IAW **paragraph 14.4.2**, and may use additional means of verification as appropriate.

14.5.1.3. In flight, the AC will periodically check the Fuel Remaining. If it becomes apparent that the actual fuel remaining is less than the calculated Fuel Remaining on the CFP or manual fuel card, consider diverting.

14.5.1.3.1. Fuel divert when the aircraft commander determines any "11-202v3 Fuel Reserve" fuel will likely be burned (0+45 or 2+00 at remote destinations). Do not divert using hydraulic heat exchanger operation as justification.

Table 14.1. Fuel Requirements.

EAST COAST HOLDOWN	6000	For departures from Dover, Andrews, McGuire, Martinsburg and Westover. ***NOTE:*** Hold down fuel is added as a departure bias and will be burned at the top of climb. Hold down fuel will be annotated on the CFP as "Fuel D" at the beginning of the CFP; for manual fuel planning add it as identified extra.
EN ROUTE (Block 1)		Time and Fuel from departure to destination.
EN ROUTE RESERVE (Not used) (Block 2)		Not used.
EN ROUTE + RESERVE (Block 3)		Total of 1 and 2.
ALTERNATE / MISSED APPROACH (Block 4)		Calculate an alternate when AFI 11-202V3 or this regulation requires the filing of an alternate. Calculate fuel to alternate from OH destination to closest suitable alternate (suitable military airfields are preferred if within 75NM), or to most distant alternate when two are required. Compute using OH destination GW (takeoff GW minus blocks 3 and 7a).
	8000	Missed Approach Fuel: Required for vis-only approaches. Add 8000 lbs if destination is below ceiling minimums, but at or above visibility minimums. ACFP adds this in automatically.
OFF COURSE MANEUVERING	600/min	**Departure**. Terrain clearance and air traffic control (ATC) requirements.
	400/min	**Cruise**. ATC requirements ***NOTE:*** In both cases, compute fuel based on anticipated increase in flying time, not time spent maneuvering off course.
THUNDERSTORM FUEL	6000	Fifteen minutes of fuel at en route fuel burn rate if forecast thunderstorms are scattered or numerous along the route of flight.
	3000	Eight minutes of fuel at en route fuel burn rate if forecast thunderstorms are few along the route of flight.

	1500	Four minutes of fuel at en route fuel burn rate if forecast thunderstorms are isolated along the route of flight. ***NOTE:*** Thunderstorm corrections are not cumulative. Use the highest applicable correction for the forecast conditions. Thunderstorm fuel is added in the identified extra fuel block.
HOLDING (Block 5)		**Total Holding Fuel is the sum of "11-202v3 Fuel Reserve" and Contingency Fuel.** **For non-remote destinations**: Total holding fuel will be 1 hr (45 min of "11-202v3 fuel reserve" and 15 min contingency). Calculate using the +30 line at 10,000 ft in the Holding chart; multiply value by 2 (due to chart scale). **For remote destination**: Total holding fuel will be 2 hrs and 15 min (2 hrs of "11-202v3 fuel reserve" and 15 mins contingency). Calculate using the Holding chart: 2+00 (using the 1+00 at 20,000 ft line); multiply value by 2 (due to chart scale) plus 0+15 (using the +15 at 10,000 ft line) ***NOTE:*** **Contingency fuel** Contingency is fuel to compensate for unforeseen circumstances during any phase of flight (i.e. unforecasted weather, launch delay, etc). Contingency fuel should NOT be considered reserve fuel or part of the minimum landing fuel. Local training missions are not required to have contingency fuel.
EARLY DESCENT	6000	For Dover and Martinsburg arrivals from the west, early descent fuel will be annotated on the CFP as "Fuel I" and included in Identified Extra. For manual fuel planning, add Early Descent Fuel to Identified Extra fuel.
DESCENT, APPROACH/LANDING (Block 6)	5000	When manually flight planning, add 15 minutes and 5000 pounds of fuel to fuel overhead destination for approach and landing. For verification of ACFP use 7000.
INSUFFICIENT AND UNRELIABLE NAVAIDS	5000	At destination airfield.
ENGINE RUNNING ONLOAD AND OFFLOAD	100/min	

STORED FUEL (Block 7B)		Tankered fuel is additional fuel carried through a primary destination for use on a subsequent leg. Although tankering fuel for convenience is prohibited, 618 AOC (TACC)-sanctioned tankered fuel is deemed operationally necessary, and will be included in the required ramp fuel load. Add fuel when fuel is unavailable at en route stops, compressed ground times during single day, multi-sortie missions preclude refueling, or if en route refueling would delay or be detrimental to mission accomplishment. ***NOTE***: When deemed financially prudent by the aircrew or mission planners, aircrews may tanker fuel when transiting airfields without DoD contract fuel. The decision to tanker fuel should be based on careful analysis of mission requirements and limiting factors.
TAXI AND ACCELERATION (Block 9)	3000	When more than 15 minutes taxi time is anticipated, add 120 pounds per minute, not to exceed 5,000 pounds total.
MINIMUM PLANNED LANDING FUEL		The minimum planned landing fuel at the primary destination is the greater of: 18,000 lbs or The sum of Alternate Fuel and computed "11-202v3 Fuel Reserve".

14.5.2. Alternate Planning. Refer to **paragraphs 6.18** and **14.3.2**. For those missions flight managed by 618 AOC (TACC), flight managers will provide a route of flight to the primary alternate if greater than 75 miles from the destination (When two alternates are required the FM will use the furthest as the primary). This route of flight is only for providing an accurate fuel plan and is not part of the route of flight filed with ATC. If no routing to alternate is included, ACFP calculates a direct route to the alternate.

14.5.3. Canned fuel loads will not be used and final servicing will be delayed until accurate fuel requirements are known. Aircraft commanders will not add any additional fuel without first discussing the reason with their FM and receiving their agreement that additional fuel is justified. Ensure ramp fuel is correct upon arrival at aircraft.

14.5.3.1. When an aircraft commander believes the fuel load is insufficient to execute the mission contact will be made with the FM to identify and resolve the differences. When the aircraft commander and FM do not reach an agreement, the aircraft commander is the final authority for adding additional fuel. The FM will add a comment to the crew papers indicating the final fuel load, as determined by the AC.

14.5.4. AAR Fuel Planning. If a valid CFP is not available, accomplish a manual fuel plan using the AF IMT 4052**.** AAR fuel planning guidance can be found in AMCPAM 11-2 or T.O. 1C-5M-1-1, Section 11.

14.5.4.1. Formatting altitude. If the end refuel tanker weight is unknown, use 400,000 lbs for a KC-10 and 150,000 lbs for a KC-135.

14.5.4.2. In-flight Fuel Planning. For single and multiple AAR, PICs will ensure recovery fuel requirements and required on-load are computed.

14.5.4.3. Recovery fuel requirement computation. After reaching the cruise altitude and before AAR, estimate the fuel on board at the ARCP and compare this with the ARCP required fuel on the CFP, AF IMT 4052 Block 14 or Block 35(for multiple AARs) to ensure recovery capability from the ARCP.

14.5.4.4. Fuel on-load confirmation. Approximately 45 minutes before each ARCP, complete the fuel on-load requirements to ensure sufficient fuel is obtained from the tanker.

14.5.5. Variant Configuration Fuel Planning. The following procedures were developed to standardize fuel planning for variant configurations.

14.5.5.1. Estimate the flying time for the configuration you have.

14.5.5.1.1. Use the calibrated airspeed/mach limit from T.O. 1C-5A-1 or 1C-5M-1-1, Section 5, for the configuration you have and convert it to a true airspeed (TAS) using T.O. 1C-5A-1-1 or 1C-5M-1-1 (enter the chart at 25,000-feet).

14.5.5.1.2. Use the average forecast wind factor (FWF) from the CFP to convert the TAS to ground speed (GS).

14.5.5.1.3. Apply the ground speed to the total distance remaining to arrive at the total time en route.

14.5.5.2. Estimate a takeoff gross weight using the following:

14.5.5.2.1. Flights with a drag index less than 150 or a takeoff gross weight less than 550,000 pounds.

14.5.5.2.1.1. 30,000 pounds per hour for the first hour.

14.5.5.2.1.2. 25,000 pounds per hour for remaining flight time.

14.5.5.2.1.3. Determine your category I leg reserve fuel:

14.5.5.2.1.3.1. Cat I leg Reserve Fuel = $\frac{\text{(25,000 pounds) (reserve time in minutes)}}{\text{(60 minutes)}}$

14.5.5.2.2. Alternate fuel: 25,000 pounds per hour.

14.5.5.2.3. Holding fuel: 15,000 pounds.

14.5.5.2.4. Approach and landing: 7,000 pounds.

14.5.5.2.5. Start, taxi, and takeoff: 3,000 pounds.

14.5.5.3. Flights with a drag index greater than 150 or a takeoff gross weight at or greater than 550,000 pounds.

14.5.5.3.1. 35,000 pounds for the first hour.

14.5.5.3.2. 30,000 pounds per hour for remaining flight time.

14.5.5.3.3. Determine category 1 leg reserve fuel:

14.5.5.3.3.1. Category I leg Reserve Fuel = (30,000 pounds) (reserve time in minutes)

(60 minutes)

14.5.5.3.4. Alternate fuel: 30,000 pounds per hour.

14.5.5.3.5. Holding fuel: 20,000 pounds.

14.5.5.3.6. Approach and landing: 7,000 pounds.

14.5.5.3.7. Start, taxi, takeoff: 3,000 pounds.

14.5.5.4. Using estimated gross weight, obtain a performance ceiling from T.O. 1C-5A-1-1 or 1C-5M-1-1.

14.5.5.5. Determine the optimum range airspeed and compare it to T.O. 1C-5A-1 or 1C-5M-1-1, Section 5 limits. Use the lower of the two.

14.5.5.6. Convert the calibrated airspeed/mach to a true airspeed using T.O. 1C-5A-1-1 or 1C-5M-1-1.

14.5.5.7. Use the forecast wind factor to determine an average ground speed.

14.5.5.8. Determine the air distance for the entire route.

14.5.5.8.1. Air Distance = (ground distance) (true airspeed) divided by (ground speed).

14.5.5.9. Obtain a climb range and climb fuel from T.O. 1C-5A-1-1, and correct for variant configuration.

14.5.5.10. Subtract the climb range from the total air distance.

14.5.5.11. Determine the en route fuel requirement using T.O. 1C-5A-1-1 or 1C-5M-1-1, and correct for variant configuration.

14.5.5.11.1. Fuel Required = (1,000) (air distance) divided by (air nautical miles per 1,000 pounds of fuel).

14.5.5.12. Determine the Category I fuel reserve.

14.5.5.13. Compute alternate fuel.

14.5.5.14. Obtain a holding fuel from T.O. 1C-5A-1-1, and correct for variant configuration.

14.5.5.15. Approach and landing fuel: 7,000 pounds.

14.5.5.16. Start, taxi and takeoff: 3,000 pounds. ***NOTE:*** This procedure requires the use of estimates to get started. The estimates are general and were developed to cover a wide range of situations. Consequently, you may need to run the procedure twice to refine the fuel load.

14.5.6. Low-Altitude Fuel Planning.

14.5.7. Equal Time Point, Depressurization Fuel, and Required Ramp Fuel Load (RRFL). ETP calculations are required on portions of routes when the total time between the Last Suitable Airfield (LSAF) and the First Suitable Airfield (FSAF) is 3-hours or more. LSAF and FSAF selected for ETPs calculated in ACFP are authorized for use in-flight. FSAF and LSAF are the airports closest to the coast out and coast in waypoints that meet applicable destination alternate requirements except weather. Forecast weather conditions for LSAF/FSAF (ETA from the ETP/DF +/- 1 Hour) will meet or exceed minimums for the lowest compatible approach or 500/1, whichever is greater. ACFP selects ETP as the point on the route of flight where the time to travel to either the LSAF or FSAF is equivalent, within a 3-minute tolerance. ACFP ETP calculations use wind data, great circle distances, and cruise and descent times from the ETP to LSAF and ETP to FSAF.

- Crews can use the following formula to verify ACFP ETP calculations:

$$\text{TIME in hours (ETP to FSAF)} = \frac{\text{DISTANCE (LSAF to FSAF)}}{(WF2 - WF1) + 2(TAS)}$$

- If the LSAF/FSAF is not on the flight plan course, ACFP will use a point 90 deg perpendicular from the LSAF and/or FSAF to the flight plan course to determine the total distance between LSAF and FSAF.

14.5.8. Depressurization Fuel. Depressurization fuel will be calculated in ACFP at FL250. If additional fuel is required from the ETP, then ACFP automatically adds the additional fuel into block 10. During all flight portions crews will discuss exercising depressurization procedures. Crews will calculate the fuel required to a recovery airfield in the event of depressurization at the ETP to determine if additional fuel must be added to the CFP RRFL when not accomplished by ACFP. Plan to arrive at the recovery airfield with 0+30 minutes reserve fuel at optimal cruise speed for the depressurization transit altitude. Transit should be planned at:

14.5.8.1. 25,000 feet MSL when passenger supplemental oxygen is available.

14.5.8.2. 10,000 feet MSL when passenger supplemental oxygen is not available.

14.5.8.3. Plan on burning all other fuel. Local supplements will not dictate “IAF” or “top of descent fuel.”

Chapter 15

AIR TO AIR REFUELING (AAR)

15.1. General. This chapter establishes procedures for aircrews to air refuel the C-5 and is in addition to procedures in the flight manual, and air refueling manual.

15.2. AAR Limitations. The following limitations apply:

15.2.1. An AAR qualified AC, not necessarily the PIC, must on-load all mission required fuel during aerial refueling operations. ***EXCEPTION:*** An AAR qualified aircraft commander candidate on an Operational Mission Evaluation satisfies this requirement. An AC candidate on Line Training Mission satisfies this requirement provided he/she has completed the prerequisite AAR requirements detailed in AFI 11-2C5v1 and an ARIP occupies the right seat.

15.2.2. Tanker Autopilot. Tanker pilots will 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). Tanker pilots will notify the receiver when copilot autopilot-off training is conducted and receive confirmation that the receiver pilot flying the aircraft is qualified.

15.2.3. AAR Without Tanker Disconnect Capability. Without tanker disconnect capability means the boom operator cannot trigger an immediate disconnect. AAR will not be conducted after a loss of tanker disconnect capability. ***EXCEPTIONS:*** 1. Fuel emergency situation. 2. 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. ***NOTE:*** When conducting AAR without tanker 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.

15.2.4. Manual Boom Latching (MBL) (also referred to as Emergency Boom Latching (EBL), Override Boom Latching (OBL) and amplifier override). This is an emergency procedure. Normal tanker disconnect capability and automatic disconnect limits are inoperative. Use of this procedure must be authorized in the mission directive. ***NOTE:*** The boom operator and receiver pilot will coordinate all actions as required by applicable directives and checklists when making AAR contacts using emergency boom latching procedures.

15.2.5. Reverse AAR procedures will be accomplished for operational necessity only. Refer to flight manual guidance.

15.2.6. Emergency Separations/Breakaways. Follow procedures IAW T.O. 1C-5A-1 or 1C-5M-1. When separation between receiver and tanker has been effected, the receiver pilot advises the tanker "WELL CLEAR" and states altitude passing. When the situation has stabilized, coordinate clearance back to precontact. Restrict all emergency separations/ breakaways to 1000’ below individual tanker’s altitude.

15.2.7. Practice Emergency Separations:

15.2.7.1. Prior to the actual accomplishment of a practice emergency separation, coordination between the tanker pilot, boom operator, and receiver pilot is mandatory. Coordination will include when the separation will occur and who will give the command of execution.

15.2.7.2. Practice emergency separations may be accomplished with passengers on board. Ensure all passengers are seated with seat belts fastened. ***NOTE:*** Practice emergency separations will terminate no lower than 1000' below tanker altitude.

15.2.8. Receiver AAR 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 ARIP supervision. The following procedures apply:

15.2.8.1. The receiver pilot will inform and receive acknowledgment from the tanker. The boom operator at the controls will be qualified for the applicable category receiver. (This restriction does not apply during FTU training provided the student boom operator is under direct instructor supervision).

15.2.8.2. For receiver pilot initial qualification or requalification, 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/astern until post air refueling.

15.2.9. If a change of pilot control is made, the receiver aircraft will move back to at least the pre-contact/astern position except for immediate assumption of control by the instructor pilot.

15.2.10. 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 complete.

15.2.11. When conducting AAR behind a KC-135, tanker disconnect capability will be demonstrated by a boom operator initiated disconnect before conducting a limit demonstration or a practice emergency separation from the contact position.

15.2.12. Weather Limitations.

15.2.12.1. Turbulence: Terminate refueling if moderate turbulence is encountered.

15.2.12.2. Visibility: Do not close from 1 NM range (2 NM for receiver or tanker formations) unless you have visual contact with the tankers. Discontinue refueling if in-flight visibility is insufficient to continue safe refueling operations.

15.2.12.3. AAR alternate airfields must meet the criteria of AFI 11-202V3 for alternate airports.

15.3. Communications Failure. Aircraft experiencing two-way communications failure during the conduct of AAR shall continue flight in accordance with the following procedures:

15.3.1. Squawk code 7600 for at least 2 minutes before exiting the track or anchor.

15.3.2. 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 proceed in accordance with "Procedures for Two Way Radio Failure IFR-VFR" set forth in DoD Flight Information Handbook.

15.4. Operational Reporting. Air refueling command and control reporting will be in accordance with **Chapter 2** of this instruction.

15.5. Military Assumes Responsibility for Separation of Aircraft (MARSA) Applicability for Aerial Refueling.

15.5.1. 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.

15.5.2. If MARSA has not been accepted by the tanker before the receiver reaches the air refueling initial point (ARIP), the receiver may be required to hold at the ARIP.

15.5.3. Once the rendezvous is completed, headings and altitude assignments may be made with the tanker's concurrence with MARSA remaining in effect.

15.5.4. Upon completion of the rendezvous, receiver aircraft will remain within 3 miles of the tanker until MARSA is terminated.

15.5.5. MARSA ends when normal separation standards are established, ATC accepts control at end of refueling, and ATC advises MARSA is terminated.

15.6. Altitude Reservations.

15.6.1. An ALTRV is authorization by a central altitude reservation function (CARF, EUCARF, PACMARF, CARU) or the appropriate ARTCC/CERAP under certain circumstances, for airspace utilization under prescribed conditions. Air refueling on operational missions often utilizes an ALTRV under these conditions. ALTRVs may include all, a portion, or portions of the intended route of flight. Request and approval format can be found in FAA 7610.4J.

15.6.2. PICs will ensure ALTRV approval is received prior to mission execution. ALTRV status may be verified through the appropriate 618 AOC (TACC) cell.

15.6.3. Aircraft must depart within the assigned AVANA (ALTRV Void if Aircraft Not Airborne) time for the purpose of providing separation between altitude reservations. Normal AVANA will be 30 minutes. If a mission is to be delayed beyond the AVANA time, coordinate with the C2 authority as soon as possible. Rescheduling will normally be in 24-hour increments after the original schedule.

15.6.4. Aircraft on an ALTRV must operate within the altitude, time, and areas specified in the approval. An ALTRV APVL authorizes the aircraft to climb or descend as specified. Controllers are not required to issue a climb or descent clearance for the various flight segments. They may, however, request that the pilot advise them prior to initiating an altitude change.

15.6.5. In a non-radar environment, the aircraft shall advise ATC if actual fix timing will be more than plus or minus 5 minutes from the planned ALTRV en route fix estimate.

15.6.6. File flight plans (DD Form 1801 or DD Form 175) containing ALTRVs IAW FLIP GP. Include the name of the ALTRV in the remarks section of the flight plan. ALTRV requests or approvals do not eliminate the responsibility to obtain proper diplomatic clearance or file flight plans.

15.7. Receiver Pilot in Command Responsibilities.

15.7.1. Squawking normal when separation from the tanker is greater than 3 miles.

15.7.2. Maintaining two-way radio contact with ATC until cleared to the refueling block altitude, established in that block, and cleared to the AAR frequency by ATC.

15.7.3. Receiver pilots are reminded that oceanic clearances and readback are required for all flights within North Atlantic (NAT) controlled airspace. References for oceanic clearance procedures are contained in FLIP Area Planning (AP)/2 and NAT Doc 007.

15.7.3.1. Receiver pilots will not rely on the tanker to obtain and readback oceanic clearance. To the maximum extent possible, receiver pilots should obtain their own, individual clearance from the oceanic control authority of the airspace in which they intend to operate, prior to entering oceanic airspace. Pilots will request oceanic clearance prior to oceanic entry point IAW procedures established in AP/2 and NAT Doc 007. Consider obtaining clearance and providing read-back prior to rendezvous and air refueling.

15.7.3.2. Tanker aircraft will not accomplish clearance read back for receiver aircraft. Receiver PICs are responsible for ensuring that oceanic clearance is always read back, and acknowledged by the oceanic controlling authority, prior to entering oceanic airspace.

15.8. Tanker Pilot in Command Responsibilities. Tanker ACs are responsible for:

15.8.1. Remaining within the protected lateral, longitudinal, and vertical airspace of the refueling track or anchor including orbit patterns.

15.8.2. Notifying the appropriate ATC facility of all altitudes vacated and not anticipated for further use by refueling aircraft. Such altitudes shall not be reoccupied without further ATC clearance.

15.8.3. Receiver navigation, regardless of the number of tankers or receivers, after rendezvous completion through completion of refueling operations (AAR and MARSA have been terminated) except when under control responsibility of a military radar facility while in an anchor area.

15.8.4. Maintaining communications with the appropriate ATC facility. All communications during refueling operations, including those concerning the receivers, shall be between the ATC facility or military radar unit and tanker. To the extent practical, receivers shall establish communications with the tanker prior to or when departing the ARIP on the specified AAR frequency. The tanker shall assume position reporting responsibility for the receivers upon rendezvous completion.

15.8.5. Coordinating altitude and route clearance:

15.8.5.1. From the ATC facility for receivers and tanker at least 5 minutes prior to refueling completion except when both aircraft are operating on an approved altitude reservation (ALTRV).

15.8.5.2. Through the radar controller when operating in refueling anchors with military ground radar. At least 5 minutes prior to completing refueling operations, the military radar facility shall forward requests to the assigned ATC facility and subsequently relay ATC clearances for the tanker and receiver aircraft from the ATC facility.

15.8.5.3. Tanker aircrews should not normally obtain oceanic clearances for receiver aircraft intending to operate in NAT oceanic airspace. This is a receiver AC responsibility.

15.8.5.4. Tanker aircrews will not read back receiver aircraft oceanic clearance. This is a receiver PIC responsibility.

15.8.6. Vertically position aircraft prior to reaching the planned exit point, to facilitate the safe and efficient transfer of separation responsibility from the military, under the provisions of MARSA, to the ATC facility on completion of refueling operations. Vertical separation of receivers and tankers shall be accomplished within the assigned altitudes.

15.8.7. Providing each receiver, upon request, with the aircraft's position at the completion of refueling operations. Additional information concerning amendments or changes to the receiver's ATC clearance shall also be provided as appropriate.

15.8.8. Coordinating all refueling formation operations to ensure all aircraft are in proper post air refueling formation prior to cell breakup. Prior to terminating air refueling, the lead tanker will confirm all aircraft in the formation are in proper post air refueling position with required lateral/vertical separation.

15.9. ATC Clearance. AAR operations are normally conducted on tracks or anchor areas published in DoD FLIP. Operational considerations may require AAR outside published areas or within an ALTRV. The tanker PIC shall receive specific ATC clearance from the appropriate ATC facility for the following:

15.9.1. Entry to/exit from assigned aerial refueling altitude block (except on an approved ALTRV).

15.9.2. Altitudes requested for tanker and receiver aircraft upon completion of air refueling.

15.9.3. Routing for each aircraft or formation flight when exiting the refueling track prior to or beyond the exit point, or if different from the flight plan routing.

15.9.4. Extending the refueling operations beyond the track or anchor exit point due to adverse winds, mission requirements, etc.

15.9.5. Use of altitudes in excess of those for which specific clearance has been granted (i.e., tobogganing).

Chapter 16

COMBAT MISSION PLANNING

16.1. General. This chapter provides combat mission planning guidance for planners and aircrews, standardizing procedures for planning, briefing, and reviewing all missions. Planners and aircrews should reference AFTTP 3-3.C-5.

16.2. Mission Planning. The first steps in planning are to analyze the tasking, gather all pertinent information, and decide what additional support is required. Having this information on hand before developing the detailed plan will save time in the long run. Planners will 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 that enhance mission success. Intelligence and meteorology and/or climatology requirements will be identified early because this information may not be readily available. Mission support requests will 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 will be ready to operate in the joint arena with little or no face-to-face coordination.

16.2.1. Tasking Order Analysis. ATO contents are discussed in AFTTP 3-1. General Planning. An ATO will task elements of composite forces, provide mission objectives and general guidance, and indicate actions required by individual situations. The Air Mobility Element (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 102-2V1, *Joint Users Handbook—US Message Text Format (JUH-USMTF)*, Air Tasking Order/Confirmation (ATOCONF), and AFTTP 3-1. General Planning. Airspace control procedures may be implemented in the ATO, SPINS, or published in a separate Airspace Coordination Order (ACO). Planners and aircrew will understand and comply with all aspects of current airspace control procedures. The following items should be extracted from the ATO:

16.2.1.1. Mission number.

16.2.1.2. Security classification.

16.2.1.3. Tasking organization.

16.2.1.4. Concept of operations and mission description to include type of mission, assault zone description, required aircraft and aircrews, and participating forces and units.

16.2.1.5. Schedule of events (SOE).

16.2.1.6. Rules of engagement (ROE).

16.2.1.7. Communications & Electronic Operating Instructions (CEOI).

16.2.1.8. Special Instructions (SPINS).

16.2.1.9. Command and control instructions.

16.2.1.10. Scheduled airlift support (e.g. JSEAD, AWACS, ABCCC, CAP, etc.).

16.2.1.11. 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 de-confliction.

16.2.2. 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.

16.2.3. 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 (e.g., TOTs, available CAF support, etc.) will be specified in the tasking document. AFTTP 3-1. General Planning provides a suggested list of significant mission events.

16.2.4. 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.

16.2.5. 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).

16.2.6. Meteorology/Climatology Analysis. Weather information will be included in both planning and briefing functions for all missions. AFTTP 3-1. General Planning contains an outline for meteorology/climatology analysis.

16.2.7. Mission Support. Planners need to identify, request, and coordinate additional mission support above that provided in the OPORD and ATO/SPINS. The point of contact for coordination is the AMD and the DIRMOBFOR staff.

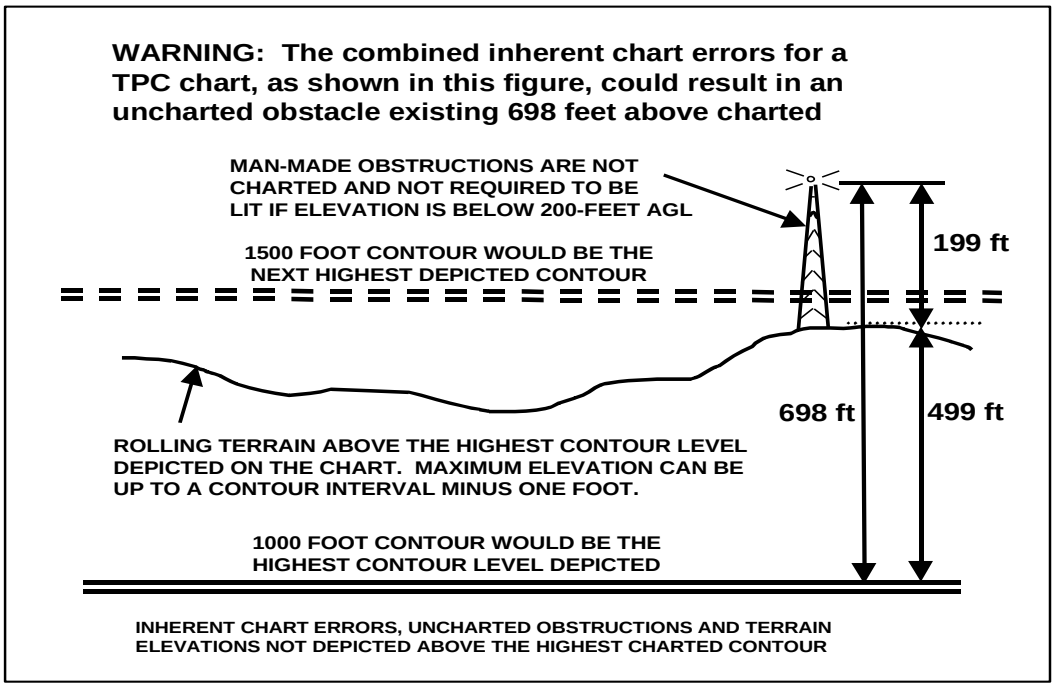
16.2.8. Mission Considerations. Review mission considerations IAW AFTTP 3-3.C-5

16.2.8.1. Evasion Plan of Action (EPA). AFTTP 3-3.C-5 Chapter 2 and AFTTP 3.3.C-5 include suggested EPA planning information.

16.3. Route Planning. To the maximum extent possible, crews should follow guidance listed in AFTTP 3-3.35B, chapter 2.

16.4. Low Altitude Restrictions. Low 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 will ensure accurate terrain analysis by evaluating both spot elevations and the highest contour level. Refer to **Figure 16.1 Inherent Chart Errors**. ***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).

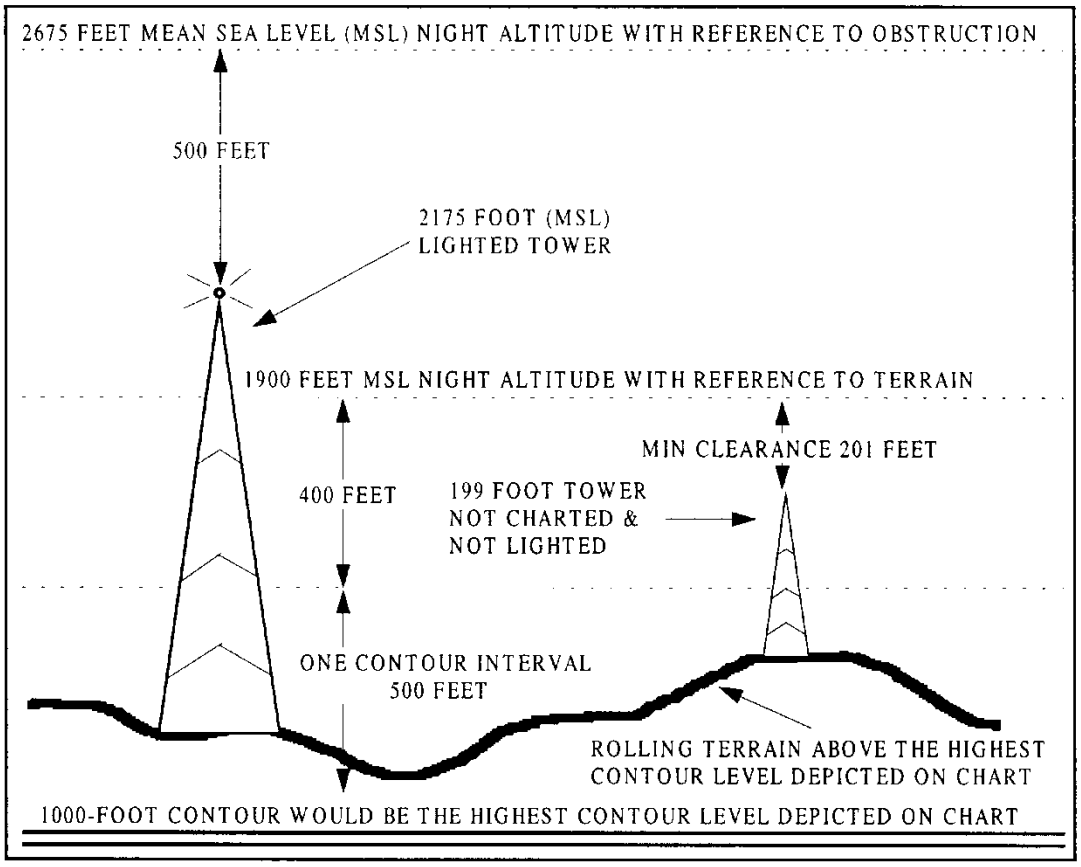
Figure 16.1. Inherent Chart Errors.



16.4.1. Day VMC En route. Plan a minimum of 500 feet above the highest obstacle within 3 NM or 400 ft plus one chart contour interval. If the altitude for the next leg is higher than the current leg altitude, climbs will be completed before the turnpoint. If the altitude for the next leg is lower, do not initiate descent until after the turnpoint. Legs may be segmented to allow flight closer to the ground. Once the obstruction is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segmented altitude, if lower. See **Figure 16.2**

16.4.2. Night VMC En route. Night routes flown may 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 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 before the turnpoint. If the altitude for the next leg is lower, do not initiate descent until after the turnpoint. Legs may be segmented to allow flight closer to the ground. Once the obstruction is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segmented altitude, if lower. See **Figure 16.2**. ***NOTE:*** Planning a route on a JOG chart, if available, may reduce night en route altitudes. If the route has been planned on a JOG and night altitudes are verified, the route may be flown with the lower altitudes when flying with reference to a TPC.

Figure 16.2. Night VMC En route Altitude.



16.4.3. 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 orientation and aircraft malfunctions or when either pilot will leave the seat during low-level operations, etc). An MSA will be computed for each leg or route segment or entire low level route. The MSA is 1000 feet above the highest obstruction within 5 NMs of route centerline.

16.4.4. 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 . This altitude should be rounded off to the next higher 100-foot increment. If the altitude for the next leg is higher than the current leg altitude, climbs will be completed before the turn point. If the altitude for the next leg is lower, do not initiate descent until after the turn point.

16.4.5. 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) to the elevation of the highest obstruction to flight within 22 NMs of planned route centerline. ***NOTES:*** 1. Climbing to ESA may put the aircraft in a controlled (i.e., IFR) altitude structure requiring coordination with Air Traffic Control agencies. 2. 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.

16.5. Peacetime Route Restrictions. See AFTTP 3-3.C-5, chapter 2.

16.6. 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. Low-level navigation charts will be annotated with any added, deleted, or changed information in the most recent Chart Update Manual (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 copies, if available, of a master chart reduce the probability of missing or misplotted data on aircrew charts. ***CAUTION:*** 1:50,000 and smaller scale maps do not depict aeronautical information, may not show man-made obstacles, and are rarely updated through the CHUM.

16.6.1. Chart Annotation. As described in AFTTP 3-3.C-5, chapter 2.

16.7. 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.

16.8. 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 that do not meet three-engine climb performance, terrain analysis, threat locations, terrain masking, and tactics will 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.

16.9. Tactical Aircrew Coordination. Effective crew coordination is crucial to the success of any flight, especially during tactical 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 specific portions of the arrival and who will make required/desired calls, 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.

16.10. Briefings.

16.10.1. Mission Planning Pre-Brief. The purpose of the mission planning pre-brief is to familiarize all crewmembers with the general aspects of the mission. The group or squadron

commander, combat support group staff specialists, all crewmembers of each participating crew, and other personnel concerned with the mission should attend. During the briefing, indicate what preparation has been accomplished and what is yet to be accomplished. Reference AFTTP 3-3.C-5 for inclusive items.

16.11. Mission Debriefings. Hold immediately after the mission if practical. Reference AFTTP 3-3.35B for suggested items to include in the debrief.

Chapter 17

EMPLOYMENT TRAINING

17.1. General. ***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 it to become classified.

17.1.1. Each unit will have a tactics ground training program developed by tactics and intelligence staffs tailored to the unit's wartime taskings.

17.1.2. Crews will follow guidance in AFTTP 3-3.C-5 when performing tactical arrivals and departures, or when operating into locations with a hostile threat environment, except as noted in this chapter.

17.1.3. Cargo compartment observers will not remain in the cargo compartment for take-off and landing. PICs will coordinate observer positioning/repositioning prior to accomplishing the combat entry/exit checklist. Cargo compartment observers will wear protective headgear at all times while in a threat environment.

17.2. Tactical Airland Checklists. Combat Entry and Combat Exit checklists will be executed at the appropriate time prior to entering and upon departing the threat or low altitude environment.

17.3. Energy Management. Performance data will be carefully considered and energy management is essential when planning low altitude operations. This is particularly necessary in mountainous terrain, at heavy gross weights, at high pressure altitudes, and/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. Knowledge of factors that can lead to Pilot Induced Oscillations (PIO) during the landing phase is critical. It does no good to avoid the threat successfully only to exceed aircraft and/or pilot capabilities during the approach and landing phase. ***WARNING:*** Uncoordinated flight reduces stall margins and can cause an abrupt departure from controlled flight. Uncoordinated flight increases airframe structural loading and should be avoided unless an actual threat exists.

17.4. Tactical Arrival.

17.4.1. Rapid descents may be accomplished in accordance with the flight manual.

17.4.2. Threats permitting, use all available aids (e.g., map reading, INS/GPS, TACAN) to remain position oriented.

17.4.3. The pilots and other crewmembers as designated by the PIC share responsibility for en route navigation, terrain avoidance, and time control. During low altitude operations, a composite crosscheck is paramount for the pilots to ensure threat avoidance and navigation are not done at the expense of basic aircraft control.

17.4.4. Maintain flight planned altitude using the best available altimeter setting, radar altimeter information, or terrain.

17.4.5. Any given approach offers advantages and disadvantages. The approach should avoid all threat envelopes. If this is not possible, reduce aircraft exposure time as much as possible using the proper altitude, airspeed, and flight path. The entry, slowdown, and approach must ensure a successful landing on the first attempt, but leave adequate margins for the unexpected.

17.4.6. Planning cannot be overemphasized. Analyze environmental factors such as altitude winds, visibility, and weather phenomena and take full advantage of terrain. Also consider decision points, emergency escape plans, and alternate approaches. Decision points are times, positions, or events which should commit you to a specific course of action. Having emergency escape plans and alternate courses of action available will enhance survival.

17.4.7. Plan approaches to the Assault Landing Zone (ALZ) IAW AFTTP 3-3.C-5 Chapter 7 and the 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. Plan to intercept the glidepath no later than three-quarters of a mile prior to the touchdown zone. For tactical approaches limit bank angles to 30 degrees below 1,000-feet AGL at night and 400-feet AGL during day. ***EXCEPTION***: Level flight turns during night tactical approaches may use bank angles up to 45 degrees no lower than 500 ft AGL. 1000 ft AGL night restriction still applies to final turn.

17.4.8. Low Altitude Approaches. Use these approaches primarily when a low altitude ingress is necessary, e.g., radar SAMs en route to the field. All maneuvering is done at low altitudes. Enter these approaches from any direction at en route altitude and airspeed.

17.4.9. High Altitude Approaches. Use these approaches when a high or medium altitude ingress is necessary, e.g., small arms environment, and allow some reconnaissance of the field as you fly over. Base initial altitude, airspeed, and heading on the threat.

17.5. Ground Operations. This section outlines procedures to follow when conducting engines running on/off loads (ERO). Crews should spend minimum time on the ground when accomplishing EROs. Preparation and a thorough briefing enhance your ability to operate quickly and safely. Brief appropriate ground personnel and subsequent aircrews on unexpected hazards encountered during takeoff or landing, e.g., dust, winds, hostile activity. Conduct EROs according to **Chapter 5**. Conduct emergency airlift of personnel according to **Chapter 13**.

17.6. Emergency Airlift of Personnel. Conduct emergency airlift of personnel according to **Chapter 13**. For airlift of patients, see **Chapter 20.**

17.7. Tactical Departures.

17.7.1. Low Escape. See AFTTP 3-3.C-5 Chapter 7. Use this departure when a low altitude escape is necessary, e.g., radar SAM threat. Remain as low as required while accelerating to en route airspeed. Low escapes should not normally be planned to exceed the recommended maximum airspeed of 350 KCAS. ***NOTE:*** When specific threats dictate, speeds up to the maximum operating limits may be used. Retract flaps when clear of all obstacles and at or above VMFR, even if below flap retract altitude, but no lower than 400’ AGL. Climb to en route altitude when able as determined by the threat.

17.7.2. High Escape. See AFTTP 3-3.C-5 Chapter 7. Use this departure when a high or medium altitude escape is necessary, e.g., small arms environment. Accelerate to the best climb speed for the conditions and spiral up to altitude remaining within the confines of the desired maneuver area.

Chapter 18

AIRCRAFT FORMATION

18.1. Not Used.

Chapter 19

AIRDROP OPERATIONS

19.1. Not Used.

Chapter 20

AEROMEDICAL EVACUATION (AE)

20.1. Mission.

20.1.1. This chapter applies to Air Force C-5 Aircrew, AE aircrew and all management levels concerned with operation of the C-5 aircraft. All operators involved in AE missions on C-5 aircraft will use this AFI.

20.1.2. C-5 aircraft may be used for AE transport of ill or injured DoD members and their dependents. These AE missions may be directed at any time by C2 agencies. AE personnel will utilize the procedures in applicable AFI 11-2AE-V3 series and AFI 41-307, *Aeromedical Evacuation Patient Considerations and Standards of Care*, in conjunction with this publication, to accomplish the AE mission.

20.2. Operational Control and Reporting of AE Forces.

20.2.1. AMC is lead command for AE. AMC Directorate of Operations (AMC/A3) is the executive agent for operational AE missions.

20.2.2. Command and control of AE missions are the same as other airlift missions.

20.2.3. The PIC is a qualified pilot responsible for command and control of all persons aboard the aircraft during an AE mission. In matters of flight safety, crew duty waivers, or operational considerations, his/her decisions are final (see AFI 11-2MDS-specific V3 for a more detailed list of PIC responsibilities).

20.2.4. Medical Crew Director (MCD). The MCD is a qualified flight nurse responsible for the overall supervision of patient care and management of AECMs assigned to AE missions. He/she advises the PIC on patients' conditions and the use of medical equipment that may affect aircraft operations. The MCD is directly responsible for the safety and medical well-being of patients on the aircraft and coordinates enplaning and deplaning procedures with supporting agencies. In matters of patient care, the decisions of the MCD are final.

20.3. Alerting Procedures.

20.3.1. At all locations AMC C2 agency will alert the PIC/MCD. The MCD will alert the medical crew. The goal is to link the PIC, local AMC C2 agency and MCD before mission execution.

20.3.2. When the AE crew is staged separate from the front-end crew, the MCD will contact AMC local C2 agency and establish alert, showtime, etc. with the C2 agency. The MCD will make every effort to communicate with the front-end crew any mission irregularities prior to crew rest. Utilize local AMC C2 agency to leave messages for non-emergency. Crew rest will be based on scheduled launch time. Do not violate crew rest.

20.3.3. The local AMC C2 agency will provide PIC/MCD AE mission information when he/she checks on mission status. Local C2 agency will be the link between the AE crews and the PIC, thus permitting mission status updates to both parties without interruption of crew rest.

20.3.4. AE mission requirements can change depending on clinical status of patient(s) and aircraft availability. There will be occasions when aircraft cannot depart (i.e. MX problems) or emergency patient movement that may separate an AE crew from the front-end crew. The MCD is responsible for communicating these changes with the PIC and local AMC C2 agency to de-conflict problems.

20.4. Pilot in Command Responsibilities.

20.4.1. Establish communications link with the MCD during pre-mission planning and throughout the mission.

20.4.2. Brief AE crew on the mission, flight plan, flight profile, and current threat (as applicable). Identify armed crewmembers (as required).

20.4.3. The PIC will fully integrate front-end and Aeromedical Evacuation Crew Members (AECM) into single crew throughout mission including en route transportation, dining, billeting, etc.

20.4.4. Coordinate with MCD and C2 agencies for cabin altitude/flight restrictions based on patient requirements. When the sortie is being flight managed, coordinate flight restrictions with the FM if the FM provided plan needs to be modified.

20.4.5. For missions with combined cargo and patients, coordinate with the MCD for loading, positioning, and egress considerations.

20.4.6. Comply with hazardous cargo/passenger restrictions in AFI 24-101.

20.4.7. Advise AECMs of intentions to start engines, taxi, itinerary changes, in-flight difficulties, and additional responsibilities of the flight crew.

20.4.8. Transmit load messages and radio transmissions to tasking AE C2 agency as requested by the MCD.

20.4.9. Brief the MCD on additional responsibilities of the flight crew.

20.5. Loadmaster Responsibilities.

20.5.1. Assist the AE crew with aircraft systems.

20.5.2. Coordinate emergency evacuation plan with the MCD.

20.5.3. Operate aircraft systems, (i.e. doors, ramps, emergency exits, etc).

20.5.4. Assist the AE crew as necessary, providing such assistance does not interfere with primary duties.

20.5.5. Operate galley and prepare food and beverages for food service provided to patients by AECMs.

20.5.6. Assist with aircraft configuration for AE operations.

20.5.7. The Charge Medical Technician (CMT) is responsible for medical vehicle movement/positioning around the aircraft. Coordinate vehicle movement/enplaning/deplaning/ERO requirements with the CMT.

20.6. Aeromedical Evacuation Crew Responsibilities.

20.6.1. Responsible for patient clinical care activities including loading, positioning, and off-loading.

20.6.2. Assist loadmaster/maintenance crew with aircraft configuration for AE operations.

20.6.3. Install and remove medical equipment/supplies.

20.6.4. The MCD or designated AECM should monitor interphone (headset) during flight. The MCD will be on headset with the PIC during critical phases of flight and during in-flight emergencies.

20.6.5. The CMT is responsible for all ground operations involved with patients. The CMT, in coordination with the loadmaster, is responsible for vehicle movement/positioning around the aircraft.

20.7. Ground Operations.

20.7.1. Engines should be shut down during enplaning and deplaning of patients. ***EXCEPTION:*** ERO procedures as outlined in **paragraph** 20.14.

20.8. Aircraft Refueling.

20.8.1. Refueling normally begins after deplaning patients are off the aircraft and prior to enplaning that station's patients.

20.8.1.1. Simultaneous fuel and oxygen servicing is not authorized.

20.8.2. Concurrent Ground Operations. Concurrent servicing (CS) is the simultaneous servicing of fuel or oxygen with or without patients on board while cargo loading/unloading or maintenance operations are being performed. CS will not be accomplished on the C-5 while patients are on board.

20.8.2.1. The PIC and Chief Servicing Supervisor (CSS) shall ensure aircrew members and servicing personnel accomplish Concurrent Servicing (CS) per AFI 32-2001, *The Fire Protection Operations and Fire Prevention Program*, and TO 00-25-172. The CSS will coordinate with all personnel involved prior to beginning concurrent operations.

20.8.2.2. Prior to starting concurrent servicing, the total number of patients, passengers, and crew on board the aircraft will be given to the fire department.

20.8.2.3. A current and qualified crewmember for the type of aircraft being serviced will be appointed as a Passenger Compartment Monitor (PCM) and shall continuously monitor patients/passengers during CS. PCMs will not perform other duties during servicing. ***EXCEPTION:*** see MDS guidance below. AECMs and passenger service representatives will not serve as PCMs.

20.8.2.4. The PCM will brief patients on emergency egress, exit prohibitions, and hazards. Ambulatory patients will remain seated but will not wear seatbelts during CS. When possible, the PCM should conduct the briefing prior to servicing.

20.8.2.5. Loading ramps/stairs are in place for immediate use and exits (excluding the overhead escape hatches) are opened for egress.

20.8.2.6. At least two qualified AECMs (one must be a FN) will remain onboard to observe patients and assist patients in the event of an egress.

20.8.2.7. The PIC, designated aircrew representative, or CSS will advise PCMs and AECMs when to evacuate patients.

20.8.2.8. Patients 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. Individuals must properly ground themselves before boarding the aircraft.

20.8.2.9. If cabin lights, electrical power to operate medical equipment and aircraft interphone are operating prior to refueling, use may be continued during servicing operations provided it does not radiate energy. (Do not turn electronic equipment on or off during refueling.) ***EXCEPTION:*** Only those systems, switches or electrical circuits needed to operate equipment to sustain life, may be turned on and used during refueling.

20.8.2.10. 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.

20.8.2.11. The PCM will set the interior lighting as bright as possible to suit the combat environment.

20.8.2.12. Do not use the on board toilet facilities during servicing.

20.9. Aircraft Configuration.

20.9.1. On designated ARM and operational AE missions, configure the aircraft during preflight per TO 1C-5-9 and AFI 11-2C5 V3 Addenda A.

20.9.2. Litter Support Provisions.

20.9.3. Available litter spaces and ambulatory seating will depend on the aircraft cabin's mission configuration.

20.9.4. AECMs will have portable oxygen available. AECMs normally use an MA-1 portable oxygen bottle. If MA-1 bottles are not available, PBE's may be used as portable oxygen.

20.9.5. Do not secure aircraft or medical equipment adjacent to an emergency exit in a manner that will prevent or impede egress.

20.9.6. Life Preservers. Use the Adult/Child life preserver for patients.

20.10. Passengers and Cargo.

20.10.1. The PIC, 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. The PIC will advise the appropriate C2 agency of the number seats available for passengers.

20.10.2. 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. Refer to AFMAN 24-204, *Preparing Hazardous Materials for Air Shipments* for hazardous product special provisions rating. P4 and P5 rated hazardous material have no AE restrictions. Conflicts will be referred to the respective tasking AE command element for decision. Litter patients will be positioned forward of cargo pallets. ***EXCEPTION***: If cargo is in place, and

the PIC and MCD agree, patients may be transported aft of the cargo. The MCD and loadmaster will ensure patient egress is not affected by mixed cargo/patient loads.

20.10.3. Cargo will not be bumped except in unusual/abnormal cases, and only after the MCD has coordinated with the PIC and notified the tasking AE command element.

20.10.4. Do not move ambulatory patients to litters in order to provide seating for additional patients or passengers.

20.10.5. Patient Therapeutic Liquid Oxygen (PT LOX) may be transported for positioning and de-positioning AE Crews. A maximum of 25 PTLOX serviced units may be transported simultaneously without HAZMAT certification. Processing through aerial port is not required. If shipping more than six PTLOX containers as cargo, do not cover with plastic. This will prevent potential high concentration of oxygen levels. ***WARNING*:** Ensure the cargo floor is free from any oil or petroleum products.

20.10.6. AE Movement of Contaminated/Contagious Personnel. It is United States Transportation Command (USTRANSCOM) policy that patients personnel, or casualties with known or suspected contamination from chemical, biological, or nuclear warfare agents will not be transported within the aeromedical patient movement system. Decontamination must be performed prior to transport to prevent the potential spread of contamination. In rare cases, transport may be essential to preserve life or continue critical missions. If such transport is deemed essential, all efforts must be made to prevent the spread of contamination. In these cases, prior approval must be given by the involved geographic combatant commanders, Commander USTRANSCOM, and the Secretary of Defense (SECDEF) in consultation with Department of Defense medical authorities.

20.10.6.1. Patients with known or suspected or highly contagious disease will not be transported within the patient movement system. These include infections with any agent that may pose a potential threat to national security, require special public health actions, and/or have the potential to cause public panic and social disruption. Patients known or suspected to be infected with a highly contagious disease should be treated “in place” or with minimal transportation to medical authorities. In extreme circumstances there may be a requirement to move index cases (approximately two) for evaluation or critical medical care. If patient movement is required, prior approval must be given by the involved geographic combatant commanders, Commander USTRANSCOM, and SECDEF in consultation with medical authorities.

20.10.6.2. AMC will train and equip AE crews and stage required equipment at key hubs to carry out these limited missions for movement of contaminated and contagious patients. ***NOTE:*** If AECMs are utilizing the MCU-2A ground chemical mask, an altitude below 10,000 feet is recommended due to reported valve failure during rapid decompression.

20.11. Crash/Fire/Rescue.

20.11.1. Aircraft carrying patient(s) will be provided CFR protection per TO 00-25-172. When concurrent fuel servicing with patients/passengers on board a major aircraft rescue and fire vehicle will be available to respond within three minutes or as determined by the base Fire Chief. (***NOTE***: When servicing with JP-4 or Jet B Fuel, a major aircraft rescue and fire vehicle will be positioned at the aircraft).The flight crew will coordinate CFR requirements.

20.11.2. 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.

20.12. AE Call Sign/Use of Priority Clearance. If a medical emergency occurs during flight, and is determined by the MCD to be an urgent situation, a request for AIR EVAC Priority will be requested. The PIC may request "AIR EVAC priority" for preferential ATC handling if a delay will affect a patient's well being. AIR EVAC priority will only be used for that portion of the flight requiring expedited handling. Do not request priority for routine air evacuations to avoid ATC delays or inconveniences. It is the PIC's responsibility to use this option only for bona fide medical situations that demand priority handling. Use this status judiciously.

20.13. Load Message.

20.13.1. The MCD will complete an AF Form 3858, *C-130/C-141 Aeromedical Evacuation Off-load Message,* and coordinate for transmission of patient information to C2 a minimum of 30 minutes prior to estimated time of arrival.

20.14. ERO Procedures.

20.14.1. AE EROs are not conducted on C-5s for AE missions.

20.14.2. AECM's may exit the aircraft to conduct ground duties if not contraindicated by Intel/SPINS (Special Instructions).

20.14.3. The loadmaster will be positioned on the left side, at the foot of the ramp and on headset during actual on-load procedures.

20.14.4. Baggage will be loaded on the aircraft ramp and will not impede emergency egress.

20.14.5. If duties permit, loadmasters will assist AECMs with securing baggage.

20.15. Floor Loading Procedures.

20.15.1. Floor loading of patients is 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 aeromedical readiness missions (ARMs), joint training operations, exercises, etc. The cargo/ramp floor will be configured with all rollers stowed (cargo permitting). Maximum altitude for floor loaded patients is FL 350. Patients will have an EPOS pre-positioned on their litter when floor loaded.

20.15.1.1. Ambulatory Patients. If available, any cushioning material may be used for seating, to prevent the patient from having to sit on the cargo floor. Seat ambulatory patients to face forward in the aircraft. Attach a cargo tie-down strap for each row of patients, in a manner that it will provide forward restraint and body stability.

20.15.1.2. Litter Patients. Refer to AFI 11-2AE V3 Addenda A for additional floor loading litter procedures.

Chapter 21

SEARCH AND RESCUE OPERATIONS

21.1. Not Used.

Chapter 22

EMERGENCY NUCLEAR AIRLIFT

22.1. Not Used.

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DCS, Operations, Plans and Requirements

Attachment 1

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Abbreviations and Acronyms.

AAR—Air to Air Refueling

ABIC—APU Battery Isolation Contactor

AC—Air Conditioner

AC—Aircraft Commander

AC—Alternating Current

ACCA—Aircrew Contamination Control Area

ACDE—Aircrew Chemical Defense Ensemble

ACE—Aircrew Chemical Ensemble

ACF—Acceptance Check Flight

ACFP—Advanced Computer Flight Plan

ACM—Additional Crew Member

ACO—Airspace Control Order

ACXTR—AC Cross Tie Relay

ADI—Attitude Direction Indicator

ADF—Automatic Direction Finder

ADS—Automatic Dependant Surveillance

AE—Aeromedical Evacuation

AECM—Aeromedical Evacuation Crew Member

AEO—All engines operating

AEOO—Aeromedical Evacuation Operations Officer

AERP—Aircrew Eye/Respiratory Protection

AEU—Antenna Electronics Unit

AFCS—Automatic Flight Control System

AFE—Aircrew Flight Equipment

AFI—Air Force Instruction

AFMC—Air Force Material Command

AFPD—Air Force Policy Directive

AFRC—Air Force Reserve Component

AFSAS—Air Force Safety Automated System

AFTTP—Air Force Tactics Techniques and Procedures

AGE—Aircraft Ground Equipment

AGL—Above Ground Level

AGW—Actual Gross Weight

AHAS—Avian Hazard Advisory System

AIR—Aviation Into-Plane Reimbursement

AIREP—Air Report

AIU—Avionics Interface Unit

ALDCS—Active Lift Distribution Control Subsystem

ALE—Automatic Link Establishment

ALS—Approach Lighting System

ALTRV—Altitude Reservation

ALZ—Assault Landing Zone

AMC—Air Mobility Command

AMC—Auxiliary Maintenance Computer

AMCC—Air Mobility Control Center

AMSC—Air Management System Control

AMD—Air Mobility Division

AME—Air Mobility Element

AMP—Avionics Modernization Program

AMT—Air Movement Table

ANG—Air National Guard

AoA—Angle of Attack

AOC—Air Operations Center

AOR—Area of Responsibility

AP—Area Planning

AP—Auto Pilot

APCC—Aerial Port Control Center

APEX—Aerial Port Expediter

APOD—Aerial Port of Disembarkation

APR—APU Power Relay

APU—Auxiliary Power Unit

ARIP—Air Refueling Initial Point

ARMS—Aviation Resource Management Systems

ASAP—Aviation Safety Action Program

ASR—Airport Surveillance Radar

ASRR—Airfield Suitability and Restriction Report

AT—Anti-Terrorism

AT—Auto Throttle

ATA—Actual Time of Arrival

ATC—Air Traffic Control

ATIS—Automated Terminal Information Service

ATM—Air Turbine Motor

ATO—Air Tasking Order

ATOC—Air Terminal Operations Center

ATOCONF—Air Tasking Order/Confirmation

ATS—Auto Throttle System

ATTLA—Air Transportability Test Loading Agency

AVANA—ALTRV Void if Aircraft Not Airborne

AVPOL—Aviation Petroleum, Oil, and Lubricants

AWACS—Airborne Warning and Control System

BAM—Bird Avoidance Model

BAOWS—Bleed Air Overheat and Warning System

BASH—Bird Aircraft Strike Hazard

BAU—Bus Adapter Unit

BCEM—Battery Control Electronic Module

BDHI—Bearing Distance Heading Indicator

BDP—Begin Descent Point

BIP—Backup Integrating Processor

BRNAV—Basic Area Navigation Airspace

BSIU—Bus-Subsystem Interface Unit

BTC—Bus Tie Contactor

BTR—Bus Tie Relay

BWA—Biological Warfare Agent

C2—Command and Control

C2IPS—Command and Control Information Processing System

CAC—Common Access Card

CADC—Central Air Data Computer

CAF—Combat Air Force

CARF—Central Altitude Reservation Function

CARU—Canadian Altitude Reservation Unit, Combined Center/Approach Control

CAT I—Category I ILS Approach

CAT II—Category II ILS Approach

CBRN—Chemical, Biological, Radiological, and Nuclear

CCA—Contamination Control Area

CCD—Cursor Control Device

CCP—Cursor Control Panel

CD—Compact Disc

CDT—Crew Duty Time

CECR—Crew Enhancement Crew Rest

CEOI—Communications & Electronic Operating Instructions

CFL—Critical Field Length

CFP—Computer Flight Plan

CFR—Code of Federal Regulations

CFR—Crash/Fire/Rescue

CG—Center of Gravity

CHOP—Change of Operations Control

CHUM—Chart Update Manual

CM—Counter-Fatigue Management

CMT—Charge Medical Technician

CNDC—Canadian National Defense Contract

CNP—Communication Navigation Panel

CODEL—Congressional Delegation

COE—Certification of Equivalency

COF—Climb Out Factor

COMAFFOR—Commander Air Force Forces

COMSEC—Communications Security

CONOPS—Concept of Operations

CONUS—Contiguous United States

CP—Co-Pilot

CPCS—Cabin Pressure Control System

CPIN—Computer Program Identification Number

CPU—Central Processing Unit

CRE—Contingency Response Elements

CRG—Contingency Response Group

CSD—Constant Speed Drive

CS—Concurrent Servicing

CSS—Chief Servicing Supervisor

CVAM—Office of Assistant Vice Chief of Staff of the Air Force, Special Air Missions Division

CVR—Cockpit Voice Recorder

CW—Chemical Warfare

DA—Decision Altitude

DAFIF—Digital Aeronautical Flight Information File

DAO—Defense Attaché Officer

DC—Direct Current

DCS—Defense Courier Service

DDO—Deputy Director of Operations

DER—Departure End of Runway

DESC—Defense Energy Support Center

DFDR—digital Flight Data Recorder

DFSC—Defense Fuel Supply Center

DH—Decision Height

DICU—Display Interface Control Unit

DIRMOBFOR—Director of Air Mobility Forces

DME—Distance Measuring Equipment

DoD—Department of Defense

DSN—Defense Switched Network

DTD—Data Transfer Device

DTR—Defense Transportation Regulation

DV—Distinguished Visitor

DVD—Digital Video Disc

EAL—Entry Access List

EAR—End Air Refueling

EBL—Emergency Boom Latching

EBPR—Emergency Bus Power Relay

ED—Engineering Disposition

EDS—Embedded Diagnostic System

EGI—Embedded Global Positioning System/Inertial Navigation System

ELT—Emergency Locator Transmitter

EMCON—Emission Control

EMI—Electromagnetic Interference

EMP—Electromagnetic Pulse

EP—Evaluator Pilot

EPA—Evasion Plan of Action

EPOS—Emergency Passenger Oxygen System

EPR—External Power Relay

ERCC—Engine Running Crew Change

ERO—Engine Running On/Offload

ESA—Emergency Safe Altitude

ETA—Estimated Time of Arrival

ETD—Estimated Time of Departure

ETE—Estimated Time En route

ETIC—Estimated Time In Commission

ETP—Equal Time Point

EUCARF—European Central Altitude Reservation Facility

EVI—Engine Vibration Indicating

EZ—Exchange Zone

FAA—Federal Aviation Administration

FAF—Final Approach Fix

FAMV—Fan Air Modulating Valve

FARP—Forward Area Refueling Point

FAS—Fuels Automated System

FBI—Federal Bureau of Investigation

FBO—Fixed Base Operator

FC—Fault Code

FCB—Flight Crew Bulletin

FCC—Federal Communications Commission

FCF—Functional Check Flight

FCG—Foreign Clearance Guide

FCIF—Flight Crew Information File

FCV—Flow Control Valve

FD—Fault Detection

FDP—Flight Duty Period

FE—Flight Engineer

FI—Fault Isolation

FIH—Flight Information Handbook

FIM—Fault Isolation Manual

FIR—Flight Incident Recorder

FIR—Flight Information Region

FLIP—Flight Information Publications

FM—Flight Manager

FMA—Flight Mode Annunciation

FMC—Fully Mission Capable

FMS—Flight Management System

FN—Flight Nurse

FOD—Foreign Object Damage

FOL—Forward Operating Location

FP—First Pilot

FPM—Feet Per Minute

FRAG—Fragmentary Order

FRM—Fault Reporting Method

FS—Flight Surgeon

FSAF—First Suitable Airfield

FSO—Flying Safety Officer

FSRT—Firm Scheduled Return Time

FSS—Fire Suppression System

FSS—Flight Service Station

FSS—Forward Supply System

FTU—Flight Training Unit

FWF—Forecast Wind Factor

GCE—Ground Crew Ensemble

GCI—Ground Control Intercept

GDSS—Global Decision Support System

GES—Ground Earth Station

GFE—Government Furnished Equipment

GLC—Generator Line Contactor

GMT—Greenwich Mean Time

GP—General Planning

GPC—Government Purchase Card

GPS—Global Positioning System

GPWS—Ground Proximity Warning System

GR—Generator Relay

GS—Ground Speed

G/S—Glide Slope

GV—Grivation

GW—Gross Weight

HATR—Hazardous Air Traffic Report

HAZMAT—Hazardous Material

HDG—Heading

HF—High Frequency

HH—Handheld

HPSOV—High Pressure Regulator Shutoff Valve

HSI—Horizontal Situation Indicator

HQ—Have Quick

IAP—Instrument Approach Procedure

IAS—Indicated Airspeed

IAW—In Accordance With

ICAO—International Civil Aviation Organization

ICS—Infant Car Seat

IDG—Integrated Drive Generator

IFF—Identification Friend or Foe

IFM—Integrated Flight Management

IFR—Instrument Flight Rules

ILS—Instrument Landing System

IMC—Instrument Meteorological Conditions

IMT—Integrated Management Tool

INOP—Inoperative

INS—Inertial Navigation System

INU—Inertial Navigation System

IP—Initial Point

IP—Instructor Pilot

IPE—Individual Protective Equipment

ISA—International Standard Atmospheric

JA/ATT—Joint Airborne/Air Transportability Training

JCS—Joint Chief of Staff

JOSAC—Joint Operational Support Airlift Center3

JSAM—Joint Service Aircrew Mask

KCAS—Knots Calibrated Airspeed

KIAS—Knots Indicated Airspeed

KTS—Knots

LAIRCM—Large Aircraft Infrared Countermeasures

LESS—Load Environmental Spectra Survey

LN2—Liquid Nitrogen

LNAV—Lateral Navigation

LOC—Localizer

LPU—Life Preserver Unit

LRC—Long Range Cruise

LRU—Line Replaceable Unit

LSAF—Last Suitable Airfield

MACH—Mach Number

MADARS—Malfunction Analysis Detection and Reporting System

MAF—Mobility Air Forces

MAJCOM—Major Command

MARSA—Military Assumes Responsibility for Separation of Aircraft

MAX—Maximum Thrust

MBL—Manual Boom Latching

MC—Mission Contributing

MCD—Medical Crew Director

MCDU—Multifunction Control Display Unit

MCT—Maximum Continuous Thrust

MDA—Minimum Descent Altitude

MDS—Mission Design Series (e.g., C-5)

MEL—Minimum Equipment List

ME—Mission Essential

MEA—Minimum En Route Altitude

MEP—Mission Essential Personnel

MFDU—Multifunction Display Unit

MHE—Material Handling Equipment

MIA—Minimum IFR Altitude

MICAP—Mission Capable

MIRS—Micro Inertial Reference System

MLG—Main Landing Gear

MLS—Microwave Landing System

MMD—Moving Map Display

MMO—Mission Mobility Observers

MMR—Multi-Mode Receiver

MNPS—Minimum Navigation Performance Specifications

MOB—Main Operating Base

MOCA—Minimum Obstruction Clearance Altitude

MOPP—Mission Oriented Protective Posture

MPF—Mission Planning Folder

MR—Mission Ready

MSA—Minimum Safe Altitude

MSC—Medical Service Corps

MSC—Multi Service Corporation

MSL—Mean Sea Level

MWS—Missile Warning System

MX—Maintenance

NACO—National Aeronautical Charting Office

NAF—Numbered Air Force

NAT—North Atlantic Track

NDB—Non-Directional Radio Beacon

NEW—Net Explosives Weight

NGA—National Geospatial-Intelligence Agency

NGB—National Guard Bureau

NLG—Nose Landing Gear

NLT—No Later Than

NM—Nautical Mile

NORAD—North American Aerospace Defense Command

NOTAM—Notice to Airmen

NSN—National Stock Number

OAT—Outside Air Temperature

OBL—Override Boom Latching

OCF—Operational Check Flight

OCONUS—Outside the Contiguous United States

OEI—One engine inoperative

OGV—Operations Group Stan Eval

OH—Overhead

OI—Open Item

OIS—Obstacle Identification Surface

OPC—Oceanic Plotting Chart

OPCON—Operational Control

OPLAN—Operational Plan

OPORD—Operations Order

OPR—Office of Primary Responsibility

OPREP—Operational Report

OPSEC—Operational Security

ORI—Operational Readiness Inspection

ORM—Operations Risk Management

OSA—Operational Support Airlift

OSD—Office of the Secretary of Defense

OSI—Office of Special Investigation

OST—Off-Station Trainer

OWS—Operational Weather Squadron

P—Pilot

PA—Privacy Act

PA—Public Address

PAA—Primary Assigned Aircraft

PACAF—Pacific Air Forces

PACMARF—Pacific Military Altitude Reservation Facility

PAPI—Precision Approach Path Indicator

PAR—Precision Approach Radar

PCIU—Personal Computer Interface Unit

PCM—Passenger Compartment Monitor

PDO—Publication Distribution Office

PEX—Patriot Excalibur

PF—Pilot Flying

PFPS—Portable Flight Planning System

PIC—Pilot in Command

PIO—Pilot Induced Oscillation

PMCR—Post Mission Crew Rest

PM—Pilot Monitoring

PMSV—Pilot to Metro Service

PNAF—Prime Nuclear Airlift Force

PNF—Pilot Not Flying

POC—Point of Contact

POL—Petroleum, Oil, and Lubricants

POU—Print Out Unit

PPR—Prior Permission Required

PRM—Precision Runway Monitor

PRNAV—Precision Area Navigation

PRSOV—Pressure Regulator Shutoff Valve

PSN—Proper Shipping Name

PSP—Patient Support Pallet

PSOV—Pylon Shutoff Valve

PTLOX—Patient Therapeutic Liquid Oxygen

PTU—Power Transfer Unit

RA—Resolution Advisory

RA/BA—Radar Altitude/Barometric Altitude

RAT—Ram Air Turbine

RCR—Runway Condition Reading

RDD—Radiation Dispersal Device

RDS—Records Disposition Schedule

RIU—Remote Interface Unit

RMM—Remote Memory Module

RNAV—Area Navigation

RNP—Required Navigation Performance

ROE—Rules of Engagement

RRFL—Required Ramp Fuel Load

RSC—Runway Surface Condition

RTRU—Regulated Transformer Rectifier Unit

RVR—Runway Visual Range

RVSM—Reduced Vertical Separation Minimum

RZ—Rendezvous

SAAM—Special Assignment Airlift Mission

SAI—Standby Attitude Indicator

SAR—Signal Acquisition Remote

SATCOM—Satellite Communications

SAV—Starter Air Valve

SCADC—Standard Central Air Data Computer

SCM—Signal Conditioner/ Multiplex

SDP—Special Departure Procedures

SECDEF—Secretary of Defense

SF—Standard Form

SID—Standard Instrument Departure

SIGMET—Significant Meteorological Information

SII—Special Interest Item

SKE—Station Keeping Equipment

SOC—Senior Officer Course

SOE—Sequence of Events

SPINS—Special Instructions

SPR—Single Point Refueling

SSR—System Support Representative

STM—Supplemental Training Mission

STT—Special Tactics Team

T&G—Touch and Go

TACAN—Tactical Air Navigation

TACC—Tactical Airlift Control Center

TAS—True Airspeed

TAT—Total Air Temperature

TCAS—Traffic Collision Avoidance System

TCN—Transportation Control Numbers

TLD—Time Limited Dispatch

TO—Takeoff

TOA—Time of Arrival

TOD—Top of Descent

TOGA—Takeoff/Go-Around

TOLD—Take off and Landing Data

TOT—Time over Target

TR—Thrust Reverser

TWCF—Transportation Working Capital Fund

UE—Unit Equipped

UHF—Ultra High Frequency

USAF—United States Air Force

USAFE—United States Air Forces in Europe

USTRANSCOM—United States Transportation Command

UV—Ultra Violet

VASI—Visual Approach Slope Indicator

VDP—Visual Descent Point

VFU—Elevator Artificial Feel System

VHF—Very High Frequency

VIA—Versatile Integrated Avionics

VNAV—Vertical Navigation

VOR—VHF Omnidirectional Radio Range

VRA—Virtual Risk Assessment

VSFI—Vertical Scale Flight Instrument

VVI—Vertical Velocity Indicator

VVIP—Very, Very, Important Part

VVM—Verbalize, Verify, and Monitor

WHMO—White House Military Office

WX—Weather

ZFW—Zero Fuel Weight

ZM—Zone Marker

Terms - The following is a list of common mobility terms and associated abbreviation. Additional terms common to the aviation community may also be found in FAR, Part 1 and DoD FLIP General Flight Planning, Chapter 2.

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.

Advanced Echelon (ADVON)—In advance of the main force, the initial group prepares for the reception of aircraft and personnel; also a small group that serves as liaison between the command and the supported command.

Aeromedical Evacuation (AE)—Movement of patients under medical supervision between medical treatment facilities (MTFs) by fixed-wing aircraft.

Aeromedical Evacuation Control Team (AECT)—A coordination center, within the Joint Air Operations Center, 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) or 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.

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 databases 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.

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.

Airlift—Aircraft is considered to be performing airlift when manifested passengers or cargo is carried.

Air Mobility Control Center (AMCC)—Provides global coordination of tanker and airlift for AMC and operationally reports to the AMC 618 AOC (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 Operations Control Center (AMOCC)—Operations center which controls movement of theater assigned air mobility assets.

Air Mobility Element (AME)—Command and control center deployed in theater where detailed planning, coordinating, and tasking for theater tanker and airlift operations are accomplished. The AME receives direction from the director, mobility forces (DIRMOBFOR). The AME is the focal point for communications and the source of control and direction for theater tanker and airlift forces.

Air Refueling Control Point (ARCP)—The planned geographic point over which the receiver(s) arrive in the observation/pre-contact/astern position with respect to the assigned tanker.

Air to Air Refueling Exit Point (AAR 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 (ANG) and Air Force Reserve Command (AFRC) forces, both Associate and Unit-Equipped.

Air Route Traffic Control Center (ARTCC)—A facility that provides Air Traffic Control (ATC) services to aircraft operating on IFR flight plans within controlled airspace, principally during the en route phase of flight.

Air Traffic Control (ATC)—A service provided by an appropriate authority to promote the safe, orderly and expeditious use of the air transportation system and to maximize airspace utility.

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.

AMC History System (AHS)—Database that compiles and stores tanker activity input by line units.

Assembly Staging Base—The base where tanker aircraft composing the task force assembles.

Augmented Crew—Basic aircrew supplemented by additional qualified aircrew members to permit in-flight rest periods.

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.

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. However, a single bird in a critical location may elevate the BWC to moderate or severe.

Bird Watch Condition (BWC) 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. However, could be caused by only a single bird in a critical location.

Bird Watch Condition (BWC) 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. However, could be caused by only a single bird in a critical location.

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 (DoD), and the dependents of both categories who travel in connection with the death of an immediate family member. It also applies to escorts for dependents of military members traveling under competent orders.

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 segment on which the position of the aircraft cannot be accurately determined by the overhead crossing of a radio aid at least once each hour with positive course guidance between such radio aids. This is designated on the ACFP by the plus (+) or ampersand (&) symbol.

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.

Charge Medical Technician (CMT)—AET responsible for ensuring completion of enlisted aeromedical crew duties.

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.

Combat Control Team (CCT)—see **Special Tactics Team (STT)**.

Command and Control (C2)—Exercise of direction and authority over assigned forces by a properly designated command echelon in the accomplishment of the mission.

Command and Control (C2) Center—Each C2 center provides supervision, guidance, and control within its assigned area of responsibility. For the purpose of this AFI, C2 centers include

operations centers, local AMC C2s, air mobility elements, tanker airlift control elements (TALCE), air mobility control centers, unit command posts, 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 Fuel—Identified extra to compensate for unforeseen circumstances during any phase of flight (i.e. unforecasted weather, launch delay, etc).

Contingency Mission—Mission operated in direct support of an OPORD, OPLAN, disaster, or emergency.

Critical Phase Of Flight—Takeoff, air refueling, approach, or landing.

Deadhead Time—Duty time for crewmembers positioning or de-positioning for a mission or mission support function.

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.

Depressurization Fuel—The additional fuel required in the event of a cabin depressurization followed by an extended diversion to an alternate at low altitude where fuel consumption is increased.

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.

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).

Director of Mobility Forces (DIRMOBFOR)—When established, the director of mobility forces serves as the designated agent for all air mobility issues in the area of responsibility or joint operations area, and for other duties as directed. The director of mobility forces exercises coordinating authority between the air operations center (or appropriate theater command and control node), the tanker airlift control center, the air mobility operations control center (when established and when supporting subordinate command objectives), and the joint movement center, in order to expedite the resolution of air mobility issues. Additionally, the director of mobility forces, will ensure the effective integration of intertheater and intratheater air mobility operations, and facilitate the conduct of intratheater air mobility operations.

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).

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 aircrew's entry into crew rest will be delayed until post-flight duties are complete.

Dual Role—Any mission where both air refueling and airlift are provided to the user. Primary mission role is normally air refueling. Missions where cargo movement is primary require a dedicated funded special assignment airlift mission (SAAM).

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 PIC 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, sec. 7.

Employment Base—Base or airfield normally in the forward area from which combat operations are flown; may be a main base (MB), limited base (LB), or standby base (SB).

Equal Time Point (ETP)—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 In Commission (ETIC)—Estimated time required to complete required maintenance.

Equal Time Point (ETP) Definition—A point along a route at which an aircraft may either proceed to the First Suitable Airfield (FSAF) or return to the Last suitable Airfield (LSAF) in the same amount of time based on all engines operating. FSAF and LSAF are airports closest to the coast out and coast in waypoints that meet recovery airfield requirements.

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 performs transition training. Each operations group commander will designate familiar fields within their local flying area.

Forced 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 inter-theater 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.

Instructor Supervision—Supervision by an instructor of like specialty. For critical phases of flight, the instructor must occupy one of the seats or stations, with immediate access to the controls.

Interfly—The exchange and/or substitution of aircrews and aircraft between Mobility Air Forces (MAF) including crewmembers and/or aircraft from AMC, AETC, ACC, PACAF, USAFE, and AMC-gained ANG and AFRC forces.

In-Place Time (IPT)—Time when an aircraft and crew are at an operating base and prepared to load for the mission.

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.

Loading Time—Specific time established jointly by the commanders concerned when aircraft loading will 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)—FN responsible for supervising patient care and AEMCs assigned to AE missions. On missions where a FN is not onboard, the senior AET will function as MCD.

Mission—Movement of aircraft from a designated point of origin to a designated destination as defined by assigned mission identifier, mission nickname, or both in the schedule, mission directive, OPORD, OPLAN, or FRAG order.

Mission Advisory—Message dispatched by command and control agencies, liaison officers, or ACs advising all interested agencies of any changes in status affecting the mission.

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.

Mobility Air Force (MAF)—Forces assigned to mobility aircraft or MAJCOMs with operational or tactical control of mobility aircraft.

Mobility Readiness Spares Package (MRSP)—An air transportable package of aircraft spares to support various operations.

Multipoint Refueling System (MPRS)—Refers to aircraft modified with TCTO 628, which allows offload of fuel in-flight from either of two wing tip mounted air to air refueling (AAR) pods.

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)—Functions of command and control involving composition of subordinate forces, authority to approve allocation of assets to specific missions, assignment of tasks, designation of objectives, and authoritative direction necessary to accomplish the mission. This is a higher authority than the command that performs specific mission functions.

Operational Necessity—A mission associated with war or peacetime operations in which the consequences of an action justify the risk of loss of aircraft and crews.

Operational Risk Management (ORM)—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.

Operational Missions—Missions executed at or above 618 AOC (TACC) level.

Operations Order (OPORD)—Directive from a commander to subordinate commanders to announce the plan, state intentions, provide necessary information and instructions for a situation and assign specific tasks to subordinate commands.

Operations Plan (OPLAN)—A plan for a single or a series of connected operations to be carried out simultaneously or in succession, based on stated assumptions; a directive to permit subordinate commanders to prepare supporting plans and orders.

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.

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. PIC 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 PIC for not complying with permit to proceed procedures.)

Point Of No Return—Most distant point along the planned route from which an aircraft may safely return to its point of departure or alternate airport with approach and landing fuel.

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 center whose primary duty is the coordination of ground handling activities on the ramp during large-scale operations.

Readiness Spares Package (RSP)—An air deployable package of selected spares to support a specific mission, operation, or aircraft model design series (MDS).

Required Ramp Fuel Load (RRFL)—Minimum fuel required at engine start to complete the mission.

Scheduled Return Date (SRD)—Scheduling tool used by 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 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. 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)—Team of Air Force personnel organized, trained, and equipped to establish and operate navigational or terminal guidance aids, communications, and aircraft control facilities in support of combat aerial delivery operations.

Stations Time (Air Force)—Normally, one hour prior to take-off for the C-5. Aircrews will have completed their pre-flight duties and be at their crew positions. Passengers will be seated and cargo will be secured.

618 Tanker Airlift Control Center (618 AOC [TACC])—Operations center that controls tanker and airlift forces worldwide through a network of computer systems. The 618 AOC (TACC) is organized into geographic cells consisting of East, West, and Emergency Action Cells. The 618 AOC (TACC) contains the following functions: Mobility Management, Global Channel Operations, Operations Management, Current Operations, Global Readiness, Weather, Logistics Readiness Center, Aerial Port Control Center, International Clearances, and Flight Plans.

Tactical Event—Tactical Approach/Departure.

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.

Tanker Task Force (TTF)—Force of tanker aircraft assembled and tasked to perform a specific function.

Tankered Fuel—Additional fuel carried through a primary destination for use on a subsequent leg.

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 of 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 intra-theater 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 inter-theater and CONUS patient movement.

Time Out—Common assertive statement used to voice crewmember concern when safety may be jeopardized.

Training Mission—Mission 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.

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 customers. 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—Operations confined to a single service.

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.

Unit Type Code (UTC)—A 5-letter or -digit combination code used to identify standard deployment packages of personnel and equipment in a data automation environment.

Zero Fuel Weight—Weight, expressed in pounds, of a loaded aircraft not including wing and body tank fuel. All weight in excess of the maximum zero fuel weight will consist of usable fuel.