*BY ORDER OF THE*
*SECRETARY OF THE AIR FORCE*

*AIR FORCE MANUAL 11-2KC-135, VOLUME 3*

*10 SEPTEMBER 2019*

*Flying Operations*

*KC-135 OPERATIONS PROCEDURES*

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This manual implements Air Force Policy Directive (AFPD) 11-2, *Aircrew Operations*; references Air Force Instruction (AFI) 11-202 Volume 3, *General Flight Rules* and AFI 11-202 Volume 3 Air Mobility Command (AMC) Supplement (SUP); implements AFI 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*; and references Air Force Tactics Techniques and Procedures (AFTTP) 3-3.KC135. This is a specialized publication intended for use by Airmen who have graduated from technical training related to this publication. It establishes rules for the operation of the KC-135 aircraft to safely and successfully accomplish worldwide mobility missions. This manual applies to all civilian employees and uniformed members of the Regular Air Force, Air Force Reserve, and Air National Guard assigned or attached all flying activities of commands operating KC-135 aircraft, including AMC, Pacific Air Forces (PACAF), United States Air Forces Europe – Air Forces Africa (USAFE-AFAFRICA), and Air Education and Training Command (AETC). Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule in the Air Force Records Information Management System. This Manual requires the collection and or maintenance of information protected by the Privacy Act of 1974 authorized by Title 5 United States Code, Section 552a, as amended, and Executive Order 9397, *Numbering System for Federal Accounts Relating to Individual Persons*, as amended. The applicable SORN F011 AF XO A, Aviation Resource Management Systems is available at:

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## *SUMMARY OF CHANGES*

This document is substantially revised and requires complete review. Major changes include incorporation of the AFI 11-2KC-135V3 AFGM 11 July 2018, clarified aircrew complement (**Table 3.1**), revision of Minimum Equipment List (MEL) waiver authority (**paragraph 4.3**), MEL (**Tables 4.1** thru **4.28**), and takeoff timing intervals (**paragraph 18.5.1**).

# Chapter 1

## GENERAL INFORMATION

**1.1. General.** This AFMAN prescribes guidance for operating the KC-135 aircraft. It is an original source document for many areas but, for utility, restates information found in aircraft flight manuals, Flight Information Publications (FLIP), and other Air Force directives. For matters where this manual is the source document, waiver authority is in accordance with (IAW) **paragraph 1.4**. For matters where this manual repeats information in another document, follow waiver authority outlined in the basic/source document. AFMAN 11-2KC-135, Volume 3, Addenda A, *C/KC-135 Aircraft Configuration*; AFMAN 11-2KC-135, Volume 3, Addenda B, *KC-135 Nuclear Employment (Classified)*; and AFMAN 11-2KC-135, Volume 3, Addenda C, *KC-135 Special Operations*, are supporting manuals to this manual.

1.1.1. Unit commanders and agency directors involved with or supporting KC-135 operations shall make current copies of this manual available to appropriate personnel. **(T-3).**

1.1.2. Transportation and Base Operations passenger manifesting agencies will maintain a current copy of this manual. **(T-3).**

**1.2. Applicability.** This manual applies to aircrew members, maintenance/support personnel, and managers involved with employing KC-135 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.

**1.4. Deviations and Waivers.** Do not deviate from policies in this manual except to protect life, preserve safety of flight, or when an in-flight emergency requires immediate action. Directive guidance (will, shall, must, etc.) throughout this manual is tiered IAW AFI 33-360, *Publications and Forms Management*. For examples of tiered waivers, see AFI 33-360. Waiver authority for Major Command (MAJCOM) supplements to this manual is MAJCOM Operations Directorate (A3). MAJCOM/A3s will forward a copy of approved long-term waivers to this manual, to AMC Stan/Eval (AMC/A3VK) for follow-on action.

1.4.1. Deviations. The Pilot in Command (PIC) shall report deviations or exceptions taken without a waiver through command channels to their Chief, MAJCOM Stan/Eval, who in turn shall notify Chief, AMC Stan/Eval, as appropriate, for follow-on action. **(T-2).**

1.4.2. For the purposes of this manual, flying MAJCOMS are: Air Combat Command (ACC), AETC, Air Force Global Strike Command (AFGSC), Air Force Materiel Command (AFMC), AFRC, Air Force Special Operations Command (AFSOC), AMC, NGB, PACAF, and USAFE-AFAFRICA. Commander Air Force forces in the grade of O-8 or higher in Combatant Commands are considered MAJCOM commanders only for forces under their operational control.

1.4.3. Permanent waivers affect theater unique circumstances and are enduring in nature. List MAJCOM/A3-approved permanent waivers in the MAJCOM supplement.

1.4.4. Long-term waivers affect multiple aircraft/multiple missions but are not permanent in nature (expire at a specific date/time). Initiate waivers to deviate from provisions in this manual with AMC Stan/Eval. MAJCOM Stan/Eval shall send AMC Stan/Eval copies of MAJCOM/A3-approved long-term waivers.

1.4.5. Short-notice waivers, to operate with degraded equipment, are for specific missions in execution. PICs shall use the Waiver Protocol procedure in **Chapter 4** to secure MAJCOM/A3 approval for short-notice waivers.

1.4.6. USAFE-AFAFRICA and PACAF planning/execution agencies may use their waiver protocol to secure MAJCOM/A3 approval for short-notice waivers.

**1.5. Supplemental Procedures.** This manual is a basic directive. Each user MAJCOM or operational theater may supplement this manual according to AFPD 11-2, *Aircrew Operations*, and AFI 33-360, *Publications and Forms Management*. Stipulate unique MAJCOM procedures (cannot be less restrictive than this basic document) and publish MAJCOM/A3- approved permanent waivers in the MAJCOM supplement. Forward MAJCOM proposed supplements (attach AF Form 673, *Request to Issue Publication*) to AMC/A3V for mandatory coordination prior to approval.

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

**1.6. Local Supplement Coordination Process.** Operations Group commanders (OG/CCs) shall define local operating procedures to this manual in a unit supplement. OG/CCs shall obtain approval from Numbered Air Force (NAF), if applicable, and MAJCOM prior to releasing their supplement. **(T-2).** Send an electronic copy of the approved version to AMC Stan/Eval (AMC/A3V) (**AMC.A37V@us.af.mil**) or NAF Director of Operations (if applicable). MAJCOM/A3V equivalent will send approved copies to AMC/A3V. **(T-2).**

**1.7. Improvement Recommendations.** Submit suggested improvements to this manual on an AF Form 847 via the 847 Central located at: **https://cs2.eis.af.mil/sites/12797/sitepages/847%20central.aspx**.

**1.8. Definitions.** Find explanations or definitions of terms and abbreviations commonly used in the aviation community in Code of Federal Regulations Title 14, Part 1; Department of Defense (DoD) Flight Information Publications (FLIP) General Planning (GP), **Chapter 2**; and Joint Pub 1-02, *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 manual are exempt from licensing IAW AFI 33-324, *The Air Force Information Collections and Reports Management Program*.

# Chapter 2

## ROLES AND RESPONSIBILITIES

**2.1. Major Command (MAJCOM).** MAJCOMs will provide guidance and approve waivers (as required), where specified throughout this instruction.

**2.2. Pilot in Command (PIC).** The pilot in command PIC is the aircrew member designated by Competent authority, regardless of rank, as being responsible for, and is the final authority for the operation of the aircraft. The PIC will ensure the aircraft is not operated in a careless, reckless, or irresponsible manner that could endanger life or property. **(T-3).** The PIC will ensure compliance with this publication and the following: **(T-3).**

2.2.1. HAF, MAJCOM, and Mission Design Series (MDS)-specific guidance.

2.2.2. Flight Information Publications (FLIP) and Foreign Clearance Guide (FCG).

2.2.3. Air Traffic Control (ATC) clearances.

2.2.4. Notices to Airmen (NOTAMs).

2.2.5. Aircraft Technical Orders (T.O.).

2.2.6. Combatant Commander's instructions and other associated directives.

**2.3. Aircrew.** Individuals designated on the flight authorization are responsible to fulfill specific aeronautical tasks regarding operating USAF aircraft as specified in this AFMAN or by other competent, supplemental authority.

## Chapter 3

## AIRCREW 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.** Table 3.1 summarizes crew position requirements for different crew types.

3.2.1. The minimum crewmember complement for a local training flight is an aircraft commander, a pilot/copilot, and a boom operator (BO).

3.2.2. Squadron commanders (SQ/CCs) shall form augmented aircrews for missions planned to take longer than a basic Crew Duty Time (CDT). **(T-3).** Augmenting aircrew members must be current, qualified, and Mission Ready (MR) IAW AFI 11-2KC-135V1, *KC-135 Aircrew Training*. **(T-3). Exception:** A Non-Mission Ready (NMR) pilot may augment provided the other two pilots are Mission Ready (MR) Instructor Pilots (IPs). The MAJCOM/A3 may designate an augmented CDT/ Flight Duty Period (FDP) if the crew compliment is manned accordingly while the flight is underway.

**Table 3.1. Aircrew Complement.**

| Crew Position | Basic Crew (Note 2) | Augmented Crew (Note 2) |
|---|---|---|
| Aircraft Commander (AC) | 1 | 2 |
| Mobility Pilot Develoment Pilot/Copilot | 1 | 1 |
| Basic Navigator | 0 | 0 (See Note 3) |
| Special Operations Air Refueling (SOAR) Navigator (SOAR Mission) | 1 (See Note 4) | 2 (See Note 4) |
| BO | 1 (See Note 1) | 2 (See Note 1) |

***NOTES:***

1. An additional BO may be included for scheduled cargo operations or Aeromedical Evacuation (AE). An augmented crew requires 2 fully qualified BOs. A Flight Boom (FB) supervised by an Instructor Boom (IB) is equivalent to a single BO, and does not meet this requirement.

2. Up to three dedicated crew chiefs do not count against the number of passengers. Add one additional crew member certified in passenger handling to the mission when more than 10 passengers are carried on any leg (Space-A/Duty Pax). For augmented crews, the Pax Monitor need not be augmented. In this case, the PIC will determine a work/rest plan that affords the Pax Monitor sufficient rest periods during the mission.

3. A basic navigator may be added to an augmented crew (non-SOAR mission) (N/A ANG). In this case, the PIC will determine a work/rest plan that affords the navigator sufficient rest periods during the mission.

4. Pilots trained specifically for the SOAR can fill the Navigator role for this mission.

**3.3. Pilots.** SQ/CCs shall augment the PIC for missions over 16 hours Flight Duty Period (FDP) and designate those additional pilots authorized to perform PIC duties. The PIC shall brief the aircrew on the plan to manage fatigue and transfer PIC duties.

3.3.1. Initial qualification pilots enrolled in a MAJCOM-approved training course may accomplish tanker/receiver Air Refueling (AAR) under IP supervision.

3.3.2. Missions With Passengers. Only qualified pilots (possessing a valid AF Form 8, *Certificate of Aircrew Qualification*) will occupy pilot seats with passengers on board (this restriction does not apply when the only passengers are Mission Essential Personnel (MEP)). **(T-3).**

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

3.3.2.2. Pilots shall not fly touch-and-go landings with passengers or hazardous cargo on board. **(T-3).** Touch-and-go landings are authorized if MEPs are the only passengers on board.

3.3.3. ACs may perform receiver AAR from the right seat while under direct IP supervision.

**3.4. Navigators.** A non-current or unqualified navigator may serve as a primary aircrew member on any mission when supervised by a qualified instructor navigator (N/A ANG). An IP may supervise navigators regaining currency on non-SOAR missions (N/A ANG).

**3.5. Boom Operators.** A non-current or unqualified BO may serve as a primary aircrew member on any mission when supervised by a qualified IB or flight examiner BO (direct supervision for critical phases of flight).

3.5.1. A non-current or unqualified BO may be used as an augmentee provided a fully qualified IB is on board, but only the qualified IB would be counted when determining if augmentation requirements have been met.

3.5.2. The IB shall supervise the non-current or unqualified BO during portions of the mission where the non-current or unqualified BO performs primary crew duties. SQ/CC may include two BOs on complex missions requiring additional crewmembers.

**3.6. Off-station/Enroute Ground Time.** Mobility planners shall provide aircrews at least 17 hours ground time between engine shutdown and subsequent takeoff. C2 agents will not ask PICs to accept less than 17 hours ground time. **(T-2).**

**3.7. Alerting Procedures.** Aircrew alert time is normally 4+l5 hours before scheduled takeoff time (allows 1 hour for reporting and 3+l5 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.

**3.8. ALFA Standby Aircraft Preflight Generation.** Accomplish daily preflights once each day during normal waking hours. Secure all hatches and doors to show unauthorized entry. Close the crew entrance door and seal in a manner which will prevent entry without damage to the seal. **(T-3).** Uncocking is required if the aircraft is turned over to Maintenance.

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

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

**3.11. Flight Attendants on Distinguished Visitor Missions.** Flight attendants may fly as primary crewmembers on designated KC-135 missions. They fall under the authority of the PIC, or mission commander (if assigned), throughout the mission. An egress briefing should be given to the flight attendants prior to the first mission leg.

## 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 should ensure a detailed explanation of the discrepancy is entered in the Air Force Technical Order (AFTO) Form 781A, *Maintenance Discrepancy and Work Document*; include the following maintenance identifiers to effectively communicate aircraft status. **(T-3).**

4.1.1. Mission Essential (ME). The PIC is required to carefully consider all factors affecting the mission (crew experience, mission complexity, weather, fatigue, etc.) when determining equipment required to safely operate the aircraft on that mission. The PIC should designate an item, system, or subsystem component essential for safe aircraft operation as ME.

4.1.2. Mission Contributing (MC). The PIC should 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. The PIC should designate discrepancies not expected to adversely impact the current mission or any subsequent mission as an open item. These items are normally cleared at home station.

**4.2. Minimum Equipment List (MEL) Rules.** 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. The MEL does not include obviously required items such as wings, rudder, flaps, landing gear, etc. However, those items not included that are related to aircraft airworthiness are automatically required to be operative. Also not included are items that do not affect the airworthiness of the aircraft such as galley equipment, passenger convenience items, etc. Careful consideration of mission requirements should be taken when accepting degraded items not listed in the MEL. Consider equipment/systems with no listed exceptions as grounding items. A PIC who accepts an aircraft with degraded equipment is not committed to subsequent operations with the same degraded equipment. Once the PIC accepts an aircraft the MEL has priority over the Minimum Equipment Subsystems List. PICs are not committed to operations with degraded equipment accepted by another PIC.

4.2.1. The PIC should consider 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 IAW AFMAN 11-2KC-135v3 Addenda A, unless specifically exempted by mission requirements/directives. **(T-3).**

4.2.3. Waiver Rules. A PIC prepared to operate with a degraded MEL item shall request a waiver through C2 channels. The PIC should be prepared to provide the C2 agent: 1) nature of request, 2) individual crewmember qualification, 3) mission leg(s) requiring the waiver, and 4) weather or other adverse condition, and 5) the governing directive(s) 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 waiver(s) for 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. **(T-3).**

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**. 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 and the mission execution authority then coordinate through appropriate C2 agency. MEL waiver authority is as follows:

4.3.1. The Wing CC is the waiver authority for all missions. **Exception:** Missions where the OG/CC is the mission execution authority. **(T-3).**

4.3.2. ANG or AFRC-Directed Missions. ANG or AFRC maintains C2 and waiver authority for ANG or AFRC-directed missions prior to mobilization. **Exception:** NGB/A3 delegates waiver authority to the unit OG/CC.

4.3.3. Other Than MEL Waivers. Determine governing source document (i.e., AFI, AFMAN, Flight Manual, Maintenance Technical Order (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.

4.3.4. Engineering Dispositions (ED). EDs 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 EDs. Most EDs allow maintenance to repair the aircraft and return it to unrestricted status; dispositions of this nature do not concern aircrews. However, EDs affecting aircrew operations require MEL waiver authority approval.

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

4.3.4.2. PICs will not accept EDs appearing incomplete, in error, or unsafe. Prior to rejecting an ED, the PIC should contact the appropriate MEL waiver authority. The waiver authority should 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 (**Tables 4.1** thru **4.28** of this manual) are arranged by aircraft system to provide the PIC a mechanism to determine minimum system requirements. Components are listed by number installed and minimum required for flight. Requirements are defined by Home Station Departure (Column A) and enroute (Column B). Forward Operating Locations (FOLs) are considered Column B. An asterisk (*) in the Required

column indicates the number required is situation dependent; refer to the Remarks/Limitations/Exceptions column for clarification.

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: One-time flights must be approved by commander with mission execution authority. 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. **(T-2).** One-time flights may include enroute stops only when necessary to recover the airplane. Example: An airplane departs on a gear-down flight from Djibouti and requires an enroute fuel stop (Cairo) before landing at the nearest repair capable facility, Sigonella NAS.

4.5.1.1.1. One-time flight to nearest repair capable facility: Flight is limited to the nearest (shortest enroute time) repair capable base.

4.5.1.1.2. One-time flight to a repair capable facility: Flight is not restricted to the nearest repair capable facility.

4.5.1.1.3. One-time ferry flights of KC-135 aircraft with non-standard fuel loads will utilize guidance and recommended procedures described in the "C/KC-135 Non-standard Fuel Loads" memorandum. **(T-2).** A non-standard fuel load is defined as any fuel load not specified in T.O. 1C-135-5-1, intentionally loaded to mitigate a system malfunction.

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. Once maintenance action is initiated, and it is determined repairs are not possible, the PIC should 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 enroute station with repair capability, after engine start the PIC 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 enroute stops, the PIC elects to have the item repaired prior to departing.

4.5.2. Aircraft Model Identification. The tables apply to KC-135 /R/T model aircraft. Specific information for aircraft modified with TCTO 628, Multi Point Refueling System (MPRS), is listed in **tables 4.19** through **4.26**. Specific information for aircraft modified with TCTO 1823 (Blk 45), is listed in **table 4.28**.

4.5.3. Minimum Equipment List. The Tables are divided into major systems.

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

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| Engines | 4 | 4 | 4 | 1) Do not takeoff with non-standard aircraft configuration or power unless a hostile threat to the aircraft and/or crew makes it imperative.<br>2) Do not takeoff unless all four engines will achieve takeoff power settings. |
| Engine Ignition | 8 | 4* | 4* | One per engine. |
| N1 Gauges | 4 | 4 | 4 | Analog gauge must operate, digital may be inoperative. |
| Tachometer (N2) | 4 | 4 | 3* | (A/B) Either analog or digital display must be operational<br>(B) One may be inoperative after engine start provided all other indicators for affected engine are operating normally. |
| Exhaust Gas Temperature (EGT) Gauge | 4 | 4 | 4 | Either analog or digital display must be operational. |
| Engine Fuel Flowmeter | 4 | 4 | 3* | One may be inoperative provided all other indicators for affected engine are operating. |
| Oil Pressure Gauges | 4 | 4 | 4 | |
| Engine Low Oil Pressure Warning Lights | 4 | 4 | 0 | |
| Oil Temperature Indicators | 1 | 1 | 1 | For Block 45, see **Table 4.28.** |
| Engine Fire/ Overheat Detection & Extinguishing System | 1 | 1 | 1 | |

| | | | | |
|---|---|---|---|---|
| Power Management Control (PMC) | 4 | 4 | 3 | Refer to Aircraft Flight Manual, Section 3 and paragraph 4.8 of this manual. |
| APU | 2 | 1* | 0* | Ensure engine start capability exists at recovery site. |

**Table 4.2. Hydraulics.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| Hydraulic Systems | 2 | 2 | 2 | Must have appropriate accumulator preload. |
| Auxiliary Pumps | 2 | 2* | 2* | Right Aux pump may be inoperative for Operations Plan (OPLAN) generation |
| Hydraulic Pumps | 4 | 4 | 4 | |
| Hydraulic Systems Pressure Gauge | 9/10** | 9/10 | * | *Sufficient operable gauges to monitor all system hydraulic pressures in-flight.<br>**4 Pilot Station, 3 Wheel Well & 2 Boom Pod [ 1 added gauge on air refuelable tankers (ARR) ] |
| Hydraulic Quantity Gauge | 1 | 1 | 1 | |
| Copilot Instrument Power System (CIPS) Hydraulic Motor | 1 | 1 | 1 | Must be able to operate hydraulically (NORMAL) and electrically (EMERGENCY). |
| Hydraulic Pump Inop Caution Lights | 4 | 4 | 4 | |

**Table 4.3. Flight Controls.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| Warning Horn and Cutout Switch | 1 | 1 | 1 | |
| Stabilizer Trim Control Switches | 2 | 2 | 1* | The trim switch must operate for the pilot flying during critical phases of flight. |
| Stabilizer Trim Cutout Switch | 1 | 1 | 1 | |

| | | | | |
|---|---|---|---|---|
| Electric Trim Motor | 1 | 1 | 1 | Autopilot pitch trim motor does not satisfy requirement. |
| Power Rudder System | 1 | 1 | 1 | |
| Flap Position Indicators | 4 | 4 | 2* | *Outboard Flap Indicators may be inoperative provided:<br>a) Flaps operate normally.<br>b) Flap position is verified within 2 degrees of selected setting before takeoff.<br><br>For Block 45, see **Table 4.28.** |
| Spoiler Systems | 2 | 2 | 2 | |
| Engine Failure Assist System (EFAS) | 1 | 1 | 1 | |
| Series Yaw Damper (SYD) | 1 | 1 | 1 | |
| SYD Fail Light | 2 | 2 | 1 | Applies to aircraft equipped with TCTO 1886 |
| Stabilizer Trim Brake | 1 | 1 | 1 | |

**Table 4.4. Landing Gear and Brakes.**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| Landing Gear Position Indicators | 3 | 3 | 3 | |
| Landing Gear Lock Alignment Stripes | 3 | 3 | 3 | |
| Wheel Brakes | 8 | 8 | 8 | |
| Anti-skid System | 1 | 1 | 1 | |
| Parking Brake | 1 | 1 | 1 | |
| Landing Gear Handle Warning Light | 1 | 1 | 1 | |

| | | | | |
|---|---|---|---|---|
| Truck Level Indicators | 2 | 2 | 2 | |
| Oleo Extension Indicators | 2 | 2 | 2 | |

**Table 4.5. Air Conditioning, Pressurization, and Bleed Air System.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| Cabin Pressure Control | 1 | 1 | 1 | Automatic mode must be operable.<br>Crews shall not plan to use alternate pressurization as the primary means to pressurize the aircraft.<br>**Exception**: Waiver required for unpressurized flight, See AFI 11-202V3 for additional requirements. |
| Air Conditioning Temperature Control | 1 | 1 | 1 | Either automatic or manual mode must be operable. |
| Bleed Valves | 4 | 4 | 3* | One time flight to a station with repair capability authorized. |
| Bleed Air (Air Conditioning) Crossover Valve | 1 | 1 | 1 | |
| Cabin Altitude Gauge | 1 | 1 | 1 | |
| Cabin Pressure Warning Light | 1 | 1 | 1 | |
| Bleed Air System Caution Lights | 12 | 12 | 8* | Leak detect lights must illuminate when the bleed air press-to-test switch is depressed. |

**Table 4.6. Autopilot.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |

| | | | | |
|---|---|---|---|---|
| Autopilot | 1 | 1 | 0* | For Block 45, see **Table 4.28.**<br>1) Required for Reduced Vertical Separation Minima (RVSM) and Minimum Navigation Performance Specifications (MNPS) operations (see FLIP). See **Chapter 3**, of this manual for FDP limits.<br>2) Reference T.O. 1C-135(K)R(II)-1, Section II AAR and Autopilot (AP) coupled approach limitations. |
| Disengage Button | 2 | 1* | 0* | For autopilot on air refueling, pilot flying must have an operable disengage button. |

**Table 4.7. Fuel Systems.**

**Note:** Non-standard Fuel Loads—**WAIVER REQUIRED.** For operating procedures, see AFLCMC/WKD C/KC-135 Non-standard Fuel Loads Memo**.** For Multi-Point Refueling System (MPRS), see **Tables 4.19 – 4.26.**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| Tank to Engine Manifold Valves | 4 | 4 | 3* | Must fail to open position. Pull circuit breaker. |
| Center Wing to Fwd Body Tank (Drain) Valves | 2 | 1* | 1* | May be failed to closed position only. |
| AR to Engine Manifold Valve | 1 | 1 | 1 | |
| Reserve Tank (Drain) Valves | 2 | 0* | 0* | If fuel is not needed for flight, and valves are verified closed. |
| Upper Deck (Drain) Valve | 1 | 0* | 0* | Must be able to manually open valve if needed. |
| Wing to Aft Body Tank Valves | 4 | 4 | 4 | |

| | | | | |
|---|---|---|---|---|
| Air Refueling Line Valve | 1 | 1 | 0* | When electric function has failed, must be able to manually open. Must be open for all takeoffs regardless of gross weight. |
| Boost Pumps | 8 | 8 | 8 | |
| Override Pumps | 2 | 2 | 0* | Zero required if center wing fuel is not necessary for mission accomplishment. |
| Air Refueling Pumps | 4 | 4 | 3* | All must operate for extended over-water operation. |
| Engine Manifold Fuel Low Pressure Warning Light | 1 | 1 | 1 | |
| Fuel Low Pressure Warning Lights | 4 | 0 | 0 | |
| Fuel Dump System | 1 | 1 | 1 | |
| Fuel Temperature Gauge | 1 | 0 | 0 | |
| Integrated Fuel Management Panel (IFMP) | 1 | 1* | 1* | Refer to IFMP Continuous Built-In Test (CBIT) codes below: |
| Total Fuel Quantity | 1 | 1 | 0* | Compute total fuel and Takeoff and Landing Data (TOLD) (if required) manually. |
| Center of Gravity (CG) Indicator | 1 | 1 | 0* | Compute CG and TOLD (if required) manually. |
| Fuel Transfer Quantity Display | 1 | 0 | 0 | |
| Fuel Transfer Rate Display | 1 | 0 | 0 | |

| | | | | |
|---|---|---|---|---|
| Fuel Gauges/ Displays | 10 | 10 | * | Must be able to read fuel quantity on Control Display Unit (CDU) “Fuel type/quantity” page. |
| Main Tanks | 4 | 4 | 4 | |
| Center Wing Tank | 1 | 1 | 1 | |
| Reserve Tank | 2 | 2 | 0* | 1) Maintenance must confirm an empty tank; comply with Non-Standard Fuel Load guidance.<br>2) Check and comply with ICDU Malfunction/Action messages. |
| Forward Body Tank | 1 | 1 | 1 | |
| Aft Body Tank | 1 | 1 | 1 | |
| Upper Deck Tank | 1 | 1 | 0* | 1) Verify tank quantity.<br>2) Check and comply with ICDU Malfunction/Action messages. |
| Fuel Management Advisory Computer (FMAC) | 1 | 1 | 1 | Refer to FMAC CBIT codes below: |

| **FMAC/IFMP Internal CBIT Codes/Title** | |
|---|---|
| 01 | FMAC Inoperative |
| 02 - Reserved | N/A |
| 03 - FMAC Channel A Failure | Functional unless Channel B has also failed (Both will be operable for column A, but one can be inoperable for column B) |
| 04 - FMAC Channel B Failure | Functional unless Channel A has also failed (Both will be operational for column A, but one can be inoperable for column B) |
| 05 - 06 | FMAC Inoperative |

| | |
|---|---|
| 07 – IFMP Channel A Failure | Functional unless Channel B has also failed (Both will be operational for column A, but one can be inoperable for column B) |
| 08 – IFMP Channel B Failure | Functional unless Channel A has also failed (Both will be operational for column A, but one can be inoperable for column B) |
| 09 – 16 | FMAC Inoperative |

**Table 4.8. Navigation Systems and Associated Equipment.**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| Magnetic Compass | 1 | 1 | 1 | |
| Synchro Repeaters | 4 | 4 | 4 | [Removed for Block 45] |
| 1553 Data Bus | 2 | 2 | 2 | The bus has 2 channels (A & B). Both channels must be operative. |
| Global Positioning System (GPS) | 4 | 4 | 2 | GPS required for Required Navigational Performance (RNP) airspace.<br>See Multi-Mode Receiver (MMR) GPS CBIT codes in Table 4.27. |
| Interial Navigation Unit (INU)-1 (EGI) | 1 | 1 | 1 | Refer to INU1/INU2 status in Table 4.27. |
| INU-2 (EGI) | 1 | 1 | 1 | Refer to INU1/INU2 status in Table 4.27. |
| Vertical Gyro (VRS-3010/20) | 1 | 1* | 1* | Backup attitude for copilot's INU-2 attitude source. |
| Very High Frequency Omni Range (VOR) | 2 | 2 | 0* | As required for primary or backup navigation or approach. |
| Instrument Landing System (ILS) | 2 | 2 | 0* | As required for approach. |
| TACAN | 1 | 1 | 0* | As required for primary or backup navigation, approach, formation, or rendezvous. |

| | | | | |
|---|---|---|---|---|
| Identification Friend or Foe (IFF)/Selective Identification Feature (SIF) | 1 | 1 | 1 | Mode 4 & Mode 5 (M4 & M5) as required for mission. |
| Traffic Alert and Collision Avoidance System (TCAS) | 1 | 1 | 1 | |
| Enhanced Ground Proximity Warning System (E- GPWS) | 1 | 1* | 1* | Not required for operational missions, unless in mountainous terrain. In all cases continue mission to a station with repair capability. |
| Microwave Landing System (MLS) | 2 | 0* | 0* | As required for approach. Refer to MLS CBIT codes in Table 4.27. |
| Flight Data Recorder (FDR) | 1 | 1 | 1 | If FDR fail light is illuminated, consult maintenance personnel to determine if fault is GROUNDING or FLYABLE.<br>See paragraph 4.9. |
| Cockpit Voice Recorder (CVR) | 1 | 1 | 0* | One time flight to a station with repair capability authorized, provided FDR is operable. |
| Emergency Locator Transponder (ELT) | 1 | 1 | 0* | If inoperative, continue the mission to a station with repair capability. |
| Electronic Cabinet Cooling | 1 | 1 | 1 | |
| Electronic Cabinet Cooling Overheat Light | 2 | 2 | 0* | Verify fan operation. |

**Table 4.9. Flight Instruments.**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| Standby Attitude Director Indicator (ADI) | 1 | 1 | 1 | |
| Airspeed Indicators | 2 | 2 | 2 | Both analog and digital displays are required to be functional. |

| | | | | |
|---|---|---|---|---|
| True Airspeed Indicator (Nav Station) | 1 | 0* | 0* | May be inoperative with no associated pitot static problems. |
| TCAS Vertical Speed Indicators (VSI) | 2 | 2 | 1* | TCAS information must be available on copilot VSI (if installed).<br>For Block 45, see Table 4.28. |
| Altitude Alerter | 1 | 1 | 1 | 1) Required for RVSM operations (see FLIP GP).<br>2) Tone or audio must be operative in addition to the altitude readout. |
| Barometric Altimeters | 3 | 2* | 2* | 1) Both Pilot altimeters: Both analog and digital displays are required to be functional.<br>2) Navigator altimeter: May be inoperative. |
| Radio Altimeters | 2 | 1* | 1* | Pilot side must be operational. For Block 45 BIT code, see Table 4.28. |
| Outside Air Temperature Gauge | 2 | 1 | 1 | |
| Accelerometer | 1 | 0 | 0 | |
| Flight Director/ Rotation Go-Around System (FD/RGA) | 2 | 1* | 1* | Flight Director required for RNP 0.3 airspace |
| Angle of Attack (AOA) | 2 | 1 | 1 | |
| Comparator Warning System | 1 | 1 | 0 | |
| Pitot Static Heat | 1 | 1 | 1 | |

**Table 4.10. Oxygen Equipment.**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| Oxygen System | 2 | 2 | 1* | Primary system must be operable, with enough pressure to complete the mission. |

| | | | | |
|---|---|---|---|---|
| MA-1 Portable Oxygen Bottles | 8 | * | * | One per primary crewmember. |
| Oxygen Regulators | 9 | * | * | Each primary crewmember must have access to an operable regulator during flight. |

**Table 4.11. Ice and Rain Protection.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| Engine Anti-Ice | 4 | 4 | 3* | (A/B) CDU indication on "Engine Data 3/5" indicates switch position rather than valve position and is not a suitable substitute for cockpit indication.<br>(B) If repair specialists are not available, one anti-ice valve can be manually locked half open by maintenance personnel. Observe Flight Manual procedures, Section 3. |
| Windshield Wiper System | 1 | 0* | 0* | At least one wiper must be operational for flights into forecast precipitation at arrival or departure base. |
| Window Anti-Ice System (Window Heat) | 2 | 2 | 2 | Pilot and Copilot #1 and #2 windows must operate. |
| Boom Operator Heated Window | 1 | 1 | 0* | Required for Air Refueling Mission |
| Q Inlet Heat | 1 | 1 | 1 | |
| AOA Transmitter Anti-Ice | 2 | 2 | 1* | Operative AOA transmitter must have anti-ice protection. |

**Table 4.12. Electrical Systems.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |

| | | | | |
|---|---|---|---|---|
| Alternating Current (AC) Generator System | 3 | 3 | 2* | 1) A one-time takeoff and flight is permitted with Integrated Drive Generator (IDG) disconnected.<br>2) The two remaining operational generators must be paralleled and supply power to all three generator buses. The disconnected IDG will be repaired prior to the next flight. |
| Bus Tie Breaker Circuit Open Light | 3 | 3 | 3 | |
| Generator Control Breaker Circuit Open Caution Light | 3 | 3 | 3 | |
| IDG Failure Caution Light | 3 | 3 | 3 | |
| IDG Disconnect Light | 3 | 3 | 3 | |
| Generator Control Unit | 3 | 3 | 3 | |
| Battery Loadmeter | 1 | 1 | 1 | |
| Transformer Rectifiers (TR) | 4 | 4 | 3* | One battery charging TR may be inoperative. |
| Battery (Aircraft/APU) | 2 | 2 | 1* | One battery may be inoperative provided the associated battery charging TR is operational. |
| Direct Current (DC) Ammeter & Voltmeter Selector | 1 | 1 | 1 | |
| Voltmeter & Freq Meter Selector (AC Meter Selector) | 1 | 1 | 1 | |
| AC Volt Meter | 1 | 1 | 1 | |
| DC Volt Meter | 1 | 1 | 1 | |

| | | | | |
|---|---|---|---|---|
| Frequency Meter | 1 | 1 | 1 | |
| Switched DC Bus | 1 | 1* | 1* | Bus must be powered with battery power switch in both normal and emergency positions. |
| AC Generator Buses | 3 | 3 | 3 | |
| Copilot Instrument Power System (CIPS) | 1 | 1 | 1 | Must be able to operate hydraulically (NORMAL) and electrically (EMERGENCY). |
| AC Ammeter | 3 | 3 | 3 | |

**Table 4.13. Communications.**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| Interphone System | 1 | 1 | 1 | 1) All primary crewmembers must be able to transmit and receive on interphone.<br>2) System must be operable at pilot and copilot positions for all missions and boom refueling position for air refueling missions.<br>3) CALL function must be operable. |
| Com 1 Ultra High Frequency (UHF) Radio | 1 | 1 | 1 | |
| Com 2/3 UHF/Very High Frequency (VHF) Radio | 2 | 1* | 1* | As mission requirements dictate. |
| High Frequency (HF) Radio | 2 | 0* | 0* | As mission requirements dictate. Refer to HF CBIT codes below in Table 4.27. |
| Satellite Communications (SATCOM) | 1 | 0* | 0* | Comply with Air Traffic Control (ATC) and mission requirements. See SATCOM CBIT Codes in Table 4.27. |
| VHF Datalink | 2 | 0* | 0* | Comply with ATC and mission requirements. |

| | | | | |
|---|---|---|---|---|
| Automatic Communications Processor (ACP) | 2 | 0* | 0* | Comply with ATC and mission requirements. |
| Communications Management Unit (CMU) | 2 | 0* | 0* | Comply with ATC and mission requirements. See CMU CBIT codes Table 4.27. |

**Table 4.14. Air Refueling Equipment (Only Required for Air Refueling Missions) (For MPRS see Tables 4.19 – 4.26).**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| Boom Sighting Door | 1 | 1 | 1 | Door must operate. |
| Boom Azimuth Indicator | 1 | 1 | 1 | |
| Boom Telescoping Indicator | 1 | 1 | 1 | |
| Boom Elevation Indicator | 1 | 1 | 1 | |
| Boom Signal Coil | 1 | 1 | 1* | Not required for drogue AR. See exceptions in Chapter 15. |
| Boom Signal Amplifier | 1 | 1 | 0* | In TMO, the tanker must have disconnect capability. |
| AR Flood Light | 1 | 1 | 0* | Required for all Boom AR missions. N/A for MPRS. |
| AR Nozzle Light | 1 | 1 | 0* | Required for all Boom AR missions. N/A for MPRS. |

**Table 4.15. Miscellaneous Equipment (For MPRS, see Tables 4.19 - 4.26).**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |

| | | | | |
|---|---|---|---|---|
| Position lights: Wing Tips & Tail | 4 | 4 | 3* | Both wing tip lights and one tail light must be operative. |
| Strobe Lights | 2 | 2* | 2* | For air refueling missions, the Lower Red Strobe will be operational and one Upper Strobe of either color will be operational. |
| Landing Lights | 3 | 3 | 2* | One wing landing light may be inoperative |
| Taxi Lights | 2 | 2 | 0* | One taxi or terrain light must be operative for night operations. |
| Terrain Light | 1 | 1 | 0* | One taxi or terrain light must be operative for night operations. |
| Emergency Alarm Bell System | 1 | 1 | 1 | |
| Fire Fighter's Equipment | 2 | 2 | 2 | Fire fighter's equipment consist of Protective Breathing Equipment (PBE) and Fireman's Gloves. |
| Fire Extinguishers | 3 | 3 | 2* | One on flight deck and one at aft hatch. |
| Escape Ropes | 4 | 4 | 4 | |
| Door Warning Light | 1 | 1 | 0* | Crew entry door and cargo door must be visually verified secured. |
| Overhead Panel Caution Light | 2 | 2 | 1 | |

**Table 4.16. Control Display Units (CDUs).**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| CDU-900B | 2 (3P)<br>3 (4P) | 2<br>3 | 2<br>3 | |
| **CBIT Codes/Title** | | **Remarks/Limitations** | | |

| | |
|---|---|
| 01 - 06 | CDU inoperative. |
| 07 (1553 CD Status) | CDU operative, however, FMAC/Fuel Savings Advisory System (FSAS) information unavailable on CDU. |
| 08 - 16 | CDU inoperative. |

**Table 4.17. Multi-Functional Displays (MFDs).**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| Multifunction Display (MFD) | 5 (3P) | 5 | 3* | The center MFD and one of the pilot's MFDs can be inoperative, provided Primary Flight Display (PFD) mode can be displayed on the remaining pilot's MFD. **MFD 2B must be operational for all flights.** |
| | 6 (4P) | 6 | 4* | **(4P):** For enroute, the navigator's MFD is not required.<br>For Block 45, see Table 4.28. |
| MFD Control Panel (CP) | 2 (3P) | 2 | 2 | |
| | 3 (4P) | 3 | 2* | (4P): The navigator's and copilot's MFD CP must be operational. The copilot MFD CP must be associated with an operational radar control panel. |
| MFD CONFIG switch | 2 | 2 | 1* | Copilots side must function |

| **CBIT Codes/Title** | **Remarks/ Limitations** |
|---|---|
| 01 – 04 | MFD inoperative. |
| 05 – Weather (WXR) Fail | MFD operative. Radar data unavailable on MFD. |
| 06 – 11 | MFD inoperative (for Block 45, Code 10 is a SPARE). |
| 12 – AC Out Fail | MFD operative, however, autopilot and flight director NAV-LOC will be inoperative. |

| | |
|---|---|
| 13 – 14 | MFD inoperative. |
| 15 – Control Panel Fail | MFD CP inoperative. |
| 16 – Parity Fail | |

**Table 4.18. Color Weather Radar (WXR).**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| WXR-700X Radar | 1 | 1 | 0* | Required if thunderstorms or Instrument Meteorological Conditions (IMC) conditions are forecast along route of flight. |
| WCP-701 Radar Control Panel (RCP) | 2 (3P)<br>3 (4P) | 2<br>3 | 0*<br>0* | One panel must be operational if radar is required to complete the mission. |
| Predictive Wind Shear (PWS) | 1 | 1 | 0* | Required if thunderstorms or IMC conditions are forecast on departure or arrival. |

| **CBIT Codes/Title** | **Remarks/Limitations** |
|---|---|
| 01 – 02 | Radar Remote Transmitter (RT) inoperative. |
| 03 – On-side Attitude Fail | Stab switch inoperative; Radar RT inoperative for 3P. |
| 04 – Control 0 Invalid | Pilot's radar controls inoperative (MFD). |
| 05 – Control 1 Invalid | Copilot's radar controls inoperative (MFD). |
| 06 – Control 2 Invalid | Navigator's radar controls inoperative (MFD). |
| 07 – Control 3 Invalid | Pilot's RCP inoperative. |
| 08 – Control 4 Invalid | Copilot's RCP inoperative. |
| 09 – Control 5 Invalid | Navigator's RCP inoperative. |
| 10 – Heading Fail | Radar RT inoperative. |
| 11 – 12 | PWS inoperative. |
| 13 thru 16 - Unused | |

**Table 4.19. AR Pod Fuel Systems (Non-standard Fuel Loads – WAIVER REQUIRED) For operating procedures, see Non-standard Fuel Load Memo, 17 Mar 2014.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| Wing Isolation Control Valve | 2 | 1* | 1* | Must be functional from Pilot's Wing Isolation Valve Control Panel. |
| Pod Control Panel (PCP) Offload Total | 2 | 0* | 0* | IFMP Total Fuel, Forward body, and Aft body tank quantity gauges must be functional. Compute offload |
| Gravity Drain Manifold | 1 | 1 | 1 | |

**Table 4.20. AR Pod Exterior Lighting.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| Pod Illumination Lights | 2 | 1* | 1* | Pod refuel only on side with operating PCP. |
| Outboard Nacelle Illumination Lights | 2 | 1* | 1* | Pod refuel only on side with operating PCP. |
| Horizontal Stabilizer Illumination Lights | 2 | 1* | 1* | Pod refuel only on side with operating PCP. |

**Table 4.21. AR Pod Trailing Components.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| Paradrogue | 2 | 1* | 1* | Pod refuel only on side with operating PCP. |
| MA-4 Reception Coupling | 2 | 1* | 1* | Pod refuel only on side with operating PCP. |

| | | | | |
|---|---|---|---|---|
| Buffer Spring Assembly | 2 | 1* | 1* | Pod refuel only on side with operating PCP. |
| Hose Assembly (Pod Hose) | 2 | 1* | 1* | Pod refuel only on side with operating PCP. |

**Table 4.22. Boom Operator AR Pod Receiver Viewing System.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| AR Pod Receiver Viewing Mirrors (Existing Observation Window—Two per side in Boom Pod) | 4 | 2* | 2* | Adequate field of vision to conduct AR Pod refueling, mirrors must be installed on side of the aircraft corresponding to functioning AR Pod(s). |

**Table 4.23. Boom Operator Compartment AR Pod Controls and Indicators.**

| Item/System | Installed | Required | | |
|---|---|---|---|---|
| | | A | B | Remarks/Limitations/Exceptions |
| Aerial Refuel Master Switch | 1 | 1 | 1 | Must be on to provide pod exterior lighting, PCP switch, and emergency breakaway signal switch power. |
| Emergency Breakaway Switch Signal (On Boom Telescope Lever) | 1 | 1 | 1 | Must be functional for AAR missions. |
| Pod Control Panel (Left & Right) | 2 | 1* | 1* | One side may be inoperative if other side is operative. |
| Hose Jettison Switch | 2 | 2 | 2 | Hose must be at full trail to jettison. |
| Master Power/On Switch | 2 | 1* | 1* | Pod refuel only with operating PCP. |
| Isolation Valve Switch | 2 | 1* | 1* | Pod refuel only with operating PCP. |
| Fuel Pressure High Light | 2 | 1* | 1* | Pod refuel only with operating PCP. |

| | | | | |
|---|---|---|---|---|
| Ram Air Turbine Overspeed Light | 2 | 1* | 1* | Pod refuel only with operating PCP. |
| Fuel Temperature High Light | 2 | 1* | 1* | Pod refuel only with operating PCP. |
| Fuel Pressure Low Light | 2 | 1* | 1* | Pod refuel only with operating PCP. |
| Pod Failed Light | 2 | 1* | 1* | Pod refuel only with operating PCP. |
| Full Trail Advisory Light | 2 | 1* | 1* | Pod refuel only with operating PCP. |
| Pod Refueling Range Advisory Status Lights (Green) | 14 | 7* | 7* | Pod refuel only with operating PCP. |
| Pod Forward Limit Advisory Status Lights (Amber) | 2 | 1* | 1* | Pod refuel only with operating PCP. |
| Pod Warning Advisory Status Lights | 2 | 1* | 1* | Pod refuel only with operating PCP. |
| Hose Stowed Advisory Light (Blue) | 2 | 1* | 1* | Pod refuel only with operating PCP. |
| Alarm Override/Volume Switch/Control | 1 | 1 | 1 | |
| Pod Valve Switch | 2 | 1* | 1* | Must be functional on operating PCP for overwater fighter deployments. |
| Pod Valve Armed/Open Light | 2 | 1* | 1* | Must be functional on operating PCP. |
| PCP Lights Dim Switch | 1 | 0* | 0* | PCP(s) must still be functional. Refuel at crew's discretion. |
| Panel Lights Test Switch | 1 | 1 | 1 | |

| | | | | |
|---|---|---|---|---|
| Pod Light Dimming Flood Control | 2 | 1* | 1* | Refuel at crew's discretion. |
| Built-In Test Equipment (BITE) Switch | 2 | 1* | 1* | Must be functional on operating PCP. |
| Reset Switch | 2 | 0 | 0 | |
| Rewind/Trail Switch | 2 | 1* | 1* | Must be functional on operating PCP. |

**Table 4.24. AR Pod Receiver Signal Lights.**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| Red Lights | 4 | 2* | 2* | Must be functional on operating pod. |
| Amber Lights (Yellow) | 4 | 2* | 2* | Must be functional on operating pod. |
| Green Lights | 4 | 2* | 2* | Must be functional on operating pod. |

**Table 4.25. Pilot AR Pod Controls and Indicators.**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| Drogue Not Stowed Indictor Lights (Left & Right) | 2 | 0* | 0* | Visually confirm drogue is fully stowed upon completion of AR Pod refueling. |
| AR Pod Engaged Indictor Lights (Left & Right) | 2 | 0* | 0* | Visually confirm when receiver is in the contact or disconnect position. Visually monitor offload by all means available. |
| Isolation Valve Switches | 2 | 1* | 1* | Remaining Isolation valve switch must be functional. |
| Isolation Valve Open/Closed (Position) Indicator Lights (Left & Right) | 2 | 1* | 1* | Boom Operator's PCP Isolation valve switch must be functional on PCP to be used during AR Pod refueling. |

**Table 4.26. AR Pod/Pylon.**

| **Item/System** | **Installed** | **Required** | |
|---|---|---|---|

| | | A | B | Remarks/Limitations/Exceptions |
|---|---|---|---|---|
| Ram Air Turbine | 2 | 1* | 1* | Must be functional on operating pod. |
| Fuel Pump | 2 | 1* | 1* | Must be functional on operating pod. |
| Fuel Supply Line | 2 | 2 | 2 | |
| Hose Drum Assembly | 2 | 1* | 1* | Must be functional on operating pod. |
| Drogue | 2 | 1* | 1* | Must be functional on operating pod. |
| Power Supply | 2 | 1* | 1* | Must be functional on operating pod. |
| Tensator Unit (5 Cassettes on each pod) | 10 | 5* | 5* | Must be functional on operating pod. |
| Vane Pump | 2 | 1* | 1* | Must be functional on operating pod. |
| Fuel Control Valve (FCV) | 2 | 1* | 1* | Must be functional on operating pod. |
| Digital Refueling Control Unit (DRCU) | 2 | 1* | 1* | Must be functional on operating pod. |

**Table 4.27. Flight Management System.**

| **INU1/INU2 Status Codes/Title** | **Remarks/Limitations** |
|---|---|
| RPU – Receiver/Processor Unit | NGO = EGI GPS functions Inoperative |
| SEN REF – Sensor Reference | NGO = EGI Inertial Sensor Inoperative |
| DGT ATT – Digital Altitude | NGO = EGI Digital Altitude Inoperative |
| BATT – Battery | NGO = Present position and/or keys may be lost after power cycling. Replace battery. Enroute allowable. |
| NAV – Navigation | NGO = EGI Navigation Inoperative |

| | |
|---|---|
| ALT – Altitude Loop Fail | NGO = EGI Altitude Inoperative |
| **INU1/INU2 1553 IRB Status**<br>NGO Inertial Reference Bus 1 (IRB) | Operational as long as Dual 1553B Bus B (FMB) is operative. Allowable for enroute. |
| NGO IRB2 | Operational as long as Dual 1553 Bus A (FMA) is operative. Allowable for enroute. |
| **MMR GPS CBIT Codes/Title**<br>01 – GPS Receiver Processor Unit Fail | GPS Inoperative |
| 02 – GPS Battery Fail | MMR will require several minutes to acquire present position upon power-up. |
| 03 – Reserved | N/A |
| 04 – 05 | GPS Inoperative |
| 06 thru 07 – Reserved | N/A |
| 08 thru 11 – Spare | N/A |
| 12 thru 16 – Reserved | N/A |
| **MLS CBIT** | MLS Inoperative |
| 02 – Reserved – Landing Antenna Failure | N/A |
| 03 – Reserved – Omni Antenna | N/A |
| 04 – Reserved – Tail Antenna Failure | N/A |
| 05 – Reserved – Distance Measuring Equipment (DME) Bus Input Failure | N/A |
| 06 thru 16 – Spare | N/A |

| | |
|---|---|
| VHF/UHF 1553 | Operational as long as FMB is operative. Allowable for enroute. |
| NGO FMB | Operational as long as FMA is operative. Allowable for enroute. |
| **HF CBIT Codes/Title** | HF Inoperative |
| 03 – Anti-Jam (AJ) Processor Fail | Reload AJ time and keys |
| 04 – Fault is Present | HF Inoperative |
| 05 – Reserved | N/A |
| 06 – 09 | HF Inoperative |
| 10 – Communication Error | Reload data-fill |
| 11 – 14 | HF Inoperative |
| 15 – Terminal Fail | Either 1553 FMA, FMB or both busses to radio may be down. Check HF 1553 status below: |
| 16 – Subsystem Fail | Either 1553 FMA, FMB or both busses to radio may be down. Check HF 1553 status below: |
| **HF 1553 Status** | Operational as long as FMB is operative. Allowable for enroute. |
| NGO FMB | Operational as long as FMA is operative. Allowable for enroute. |
| **SATCOM CBIT** | SATCOM Inoperative |
| 05 – Multi-Purpose Control and Display Unit (MCDU) #1 Input Fail (Integrated Processing Center (IPC)2) | Copilot will be unable to operate SATCOM. Pilot & Nav will. |
| 06 – MCDU #2 Input Fail (IPC1) | Pilot will be unable to operate SATCOM. Copilot & Nav will. |
| 07 – MCDU #3 Input Fail (IPC1) | Navigator will be unable to operate SATCOM. Pilot & Copilot will. |
| 08 – Input Bus Failure | Pilot will be unable to operate SATCOM. |
| 09 – 10 | SATCOM Inoperative |

| | |
|---|---|
| 11 – High Power Amplifier (HPA) Over Temperature | Check for SATCOM fan operation |
| 12 – Voice/Data Channel 1 Fail | No voice communications on SATCOM possible, but data link operations will be functional as long as bit 13 (Voice/Data Channel 2 Fail) is not also faulted. |
| 13 – Voice/Data Channel 2 Fail | No voice communications on SATCOM possible, but data link operations will be functional as long as bit 12 (Voice/Data Channel 1 Fail) is not also faulted. |
| 14 – Satellite Data Unit Strapping Parity | SATCOM Inoperative |
| 15 – Receiver (Rx) Combiner/Cable Fault | SATCOM Inoperative |
| 16 – Aircraft ID (International Civil Aviation Organization (ICAO) Address) Failure | CMU not sending aircraft ID from Aircraft Personality Module (APM). Check CMU and APM module. |
| **SATCOM Aeronautical Radio Incorporated (ARINC)** Status NGO | SATCOM inoperable. Requires position data sent from IPC to aim the antenna. |
| **CMU CBIT Codes/Title** 01 – MCDU #1 Key | Operational as long as bits 5 or 6 are not faulty. Enroute – pilot discretion. |
| 02 – Printer Input Failure | Printer Inoperative. Pilot discretion. |
| 3 – | CMU Inoperative |
| 04 – Reserved | N/A |
| 05 – MCDU #2 Key Input Failure | Operational as long as bits 1 or 6 are not faulty. Enroute – pilot discretion. |
| 06 – MCDU #3 Key Input Failure | Operational as long as bits 1 or 5 are not faulty. Enroute – pilot discretion. |

| | |
|---|---|
| 07 – | Copilot is unable to communicate with the CMU. Enroute – pilot discretion. |
| 08 – SATCOM Receiver Transmitter (SRT) Data #1 Failure | No SATCOM data link capability. As mission dictates. Enroute – pilot discretion. |
| 09 – Crosstalk Input Failure | Left and Right side CMU cannot determine master/slave status. Enroute – pilot discretion. |
| 10 – HF Datalink (HFDL) #1 Input Failure | No HF data link operations. As mission dictates. |
| 11 – SRT Data #2 Failure | CMU Inoperative. No data link capabilities. |
| 12 – HFDL #2 Input Failure | N/A |
| 13 – VHF Datalink (VDL) #1 Input Failure | Operational as long as bit 14 (VDL #2) is not also faulted. Enroute – pilot discretion. |
| 14 – VDL #2 Input Failure | Operational as long as bit 13 (VDL #1) is not also faulted. Enroute – pilot discretion. |
| 15.– IPC Bus 9 Input Failure | Operational as long bit 16 (IPC #2) is not also faulted. Enroute – pilot discretion. |
| 16 – IPC Bus 10 Input Failure | Operational as long bit 15 (IPC #1) is not also faulted. Enroute – pilot discretion. |

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | **A** | **B** | **Remarks/Limitations/Exceptions** |
| **Multi-Mode Receiver (MMR)** | 2 | 1* | 1* | |

| | | | | |
|---|---|---|---|---|
| MMR CBIT Codes/Title<br>01 – Aircraft Communication and Reporting System (ACARS)/Flight Management System (FMS) Bus #1 Failure | IPC#1 is unable to communicate with the MMR. Enroute – pilot discretion. | | | |
| 02 – ACARS/FMS Bus#2 Failure | IPC #2 is unable to communicate with the MMR. Enroute – pilot discretion.<br>Comply with ATC and mission requirements | | | |
| 03 – Air Data Input Bus #1 Failure | N/A | | | |
| 04 – Air Data Input Bus #2 Failure | MMR Inoperative | | | |
| 05 – 07 | MMR GPS Inoperative | | | |
| 08 thru 16 – Spare | N/A | | | |
| MMR TUNE BUS NGO | MMR Inoperative | | | |
| **IPC** | 2 | 2* | 2* | IPC Inoperative<br>Comply with bit code limitations |
| **Communication Computing Module (CCM) Software**<br>**Communication, Navigation, Surveillance (CNS)** | | | | |
| Interactive Multifunction Display (IMFD) | Enroute allowable unless cross-side IPC also has NGO for IMFD software | | | |
| CCM Node | IPC Inoperative if failed | | | |

| | |
|---|---|
| **CCM CBIT Codes/Title**<br>01 – 10 | IPC Inoperative (BITs 09 and 10 are SPAREs for Block 45). |
| 11 thru 16 – Spare | N/A |
| **CCM 1553 Status**<br>NGO FMA | Operational as long as FMB is operative. Allowable for enroute. |
| NGO FMB | Operational as long as FMA is operative. Allowable for enroute. |
| **CCM ARINC Status**<br>Aeronautical Radio Incorporated (ARINC) 1 | CCM 1 bus 1 fail. Enroute allowed as long as bus 2 (ARINC 3) is not faulted. |
| ARINC 2 | CCM 1 bus 2 fail. Enroute allowed as long as bus 1 (ARINC 2) is not faulted. |
| ARINC 3 | CCM 2 bus 1 fail. Enroute allowed as long as bus 4 (ARINC 3) is not faulted. |
| ARINC 4 | CCM 2 bus 2 fail. Enroute allowed as long as bus 3 (ARINC 2) is not faulted. |
| **Input/Output Control (IOC) Software**<br>ARINC Protocol Function (APF) | IPC Inoperative |
| Flight Management Function (FMF) | Enroute allowable unless cross-side IPC also shows FMF software as NGO. |
| IOC Node | IPC Inoperative if failed. |
| **IOC CBIT Codes/Title**<br>01 – 06 | IPC Inoperative |
| 07 thru 16 – Spare | N/A |
| IOC Software Status | Enroute allowable as long as cross-side IOC software is operational. |

| | |
|---|---|
| APF | |
| IOC | Enroute allowable as long as cross-side IOC software is operational. |
| **IOC ARINC Status**<br>ARINC 1- MCDU 1 Display #1 Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 2 – 702A Bus | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 3 – CFDS Bus Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 4 – 1,2,3 Display #1 Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 5 – MCDU 2, 3 Display #1 Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 6 – Pilot MFD Data Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 8 – 582 TACAN Data from | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 9 – TCAS Display Data Input #2 | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 15 – Copilot MFD Data Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 16 – Navigator MFD Data Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 17 – TCAS Display Data Input #1 | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 31 – Printer Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 33 – 702A Bus #1 Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |

| | |
|---|---|
| ARINC 34 – MCDU 2,3 Display #2 Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 34- MCDU 2,3 Display #2 Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| ARINC 35- MCDU 1 Display #2 Input | Enroute allowable as long as cross-side IPC does not also indicate same error. |
| **Power and Environmental Module (PEM) CBIT**<br>**Codes/Title**<br>01 – PEM Failure | IPC Inoperative |
| 02 – Fan Fault | Mission can proceed, replace PEM when applicable. Possibility of overheat condition which could cause the IPC to shut down. Proceed on pilot's discretion. |
| 03 – Replace Battery | Approximately 2-3 days of holdup are left. Replace battery. |
| 04 – Power Conditioning Unit A Fail | If Power Conditioning Unit B is operational, IPC will function normally. |
| 05 – Unit A Over Temperature Condition | IPC Will shut off if a fan fault results in an over-temp condition. |
| 06 – Power Conditioning Unit B Fail | If Power Conditioning Unit A is operational, IPC will function normally. |
| 07 – Unit B Over Temperature Condition | IPC Will shut off if fan fault results in an over-temp condition. |
| 08 thru 16 – Spare | IPC Inoperative. |
| **Digital Switching Module (DSM) CBIT**<br>**Codes/Title**<br>01 – Switch A Hardware Failure | IPC Inoperative. |

| | | | | |
|---|---|---|---|---|
| 02 – Switch B Hardware Failure | No required action. | | | |
| 03 – Point of Load Regulator (POLR) A Failure | IPC Inoperative. | | | |
| 04 – Point of Load Regulator (POLR) B Failure | No required action. | | | |
| 05 thru 16 – Spare | N/A | | | |
| DSM Local Area Network (LAN) Status NGO | IPC Inoperative. | | | |
| **Data Loader (DLDR)** | 2 | 1 | 0* | Valid databases required |
| **CBIT Codes/Title** | | | | |
| 01 thru 03 - Reserved | N/A | | | |
| 04 – 06 | DLDR inoperative | | | |
| 07 – Reserved | N/A | | | |
| 08 – Read Access Memory (RAM) Fault | DLDR inoperative | | | |
| 09 – Reserved | N/A | | | |
| 10 – Fault | DLDR inoperative | | | |
| 11 -12 | DLDR inoperative on ground | | | |
| 13 – Fault B Bus | DLDR Still operable unless bit 14 (Bus A) is also faulted | | | |

| | | | | |
|---|---|---|---|---|
| 14 – Fault A Bus | DLDR Still operable unless bit 13 (Bus B) is also faulted | | | |
| 15 – 16 | DLDR inoperative | | | |
| **DLDR 1553 Status**<br>NGO FMA | Operational as long as FMB is operative. Allowable for enroute | | | |
| NGO FMB | Operational as long as FMA is operative. Allowable for enroute. | | | |
| **Item/System** | **Installed** | **Required** | | |
| | | A | B | Remarks/Limitations/Exceptions |
| | 2 | 2 | 1* | *Digital Air Data Computer )DADC) 1 required |
| **CBIT Codes/Title** | **Remarks/Limitations** | | | |
| 01 – 05 | Central Air Data Computer (CADC) Inoperative | | | |
| 06 – 07 | CADC DEGRADED | | | |
| 08 – 10 | CADC Inoperative | | | |
| 11 – 12 | CADC DEGRADED. | | | |
| 13 – Baro System Fault | CADC Inoperative | | | |
| 14 – Altimeter Fault or Altitude Alerter Fault | CADC DEGRADED | | | |
| 15 – Subsystem Status | CADC Inoperative | | | |
| 16 – Terminal Status | Check CADC 1553 Status below to determine if at least one 1553 bus is still available. | | | |

| | | | | |
|---|---|---|---|---|
| **CADC 1553 Status**<br>NGO FMA | Operational as long as FMB is operative. Allowable for enroute. | | | |
| NGO FMB | Operational as long as FMA is operative. Allowable for enroute | | | |
| **Integrated Hand Controller (IHC)** | 3 | 1* | 1* | One pilot IHC must be operable |
| **Thermal Printer** | 1 | 0 | 0 | Refer to Printer CBIT codes below: |
| **Printer CBIT Codes/Title**<br>01 – Printer Out of Paper | Replace the paper roll in the printer | | | |
| 02 – 12 | Printer Inoperative | | | |
| 13 – 16 Spare | N/A | | | |

**Table 4.28. BLOCK 45.**

| **Item/System** | **Installed** | **Required** | | |
|---|---|---|---|---|
| | | A | B | **Remarks/Limitations/Exceptions** |
| **MFD**<br>Pilot (1A,1B)<br>Copilot (2A,2B)<br>Center | <br>2<br>2<br>1 | <br>2<br>2<br>1 | <br>1*<br>1*<br>1 | PFD mode must be operable to be displayed on the remaining Pilot MFD.<br>MFD 2B must be operable. |
| Center Display Control Panel | 1 | 1 | 1 | |
| Electronic Engine and Instrument Display (EEID) | 1 | 1 | 1 | |
| Vertical Speed Indicator (VSI) | 2 | 2 | 1* | Copilot's EHSI/VSI must operate. |

| | | | | |
|---|---|---|---|---|
| Data Concentrator Unit (DCU) | 1 | 1 | 1* | Channel B must be operative. |
| Sync Button | 2 | 0 | 0 | |
| AP Controller | 1 | 0* | 0* | Required if AP is required for mission. |
| Radio Altimeter (RA) Emit Standby Mode | 1 | 0* | 0* | EMCON: Mission-specific. |
| Oil Temp Indicator | 4 | 4 | 4 | |
| Flap Position Indicators | 4 | 4 | 2* | Outboard indicator may be inoperative on either flap gauge provided:<br>a) Flaps operate normally.<br>b) Flap position is verified before takeoff. |
| Autopilot | 2 | 2 | 0* | 1) Required for RVSM and MNPS (see FLIP). See **AFMAN 11-202 V3_MAF-SUP**, for Flight Duty Period (FDP) limits.<br>2) Ref T.O. 1C-135(K)R(II)-1, Section II AR AP coupled approach limitations. |
| AP Aural Warning Generator | 1 | 0* | 0* | Required if AP is required for mission. |
| Comparator Warning System | 1 | 1 | 0 | |
| Flight Director | 2 | 1* | 1* | Required for RNAV departures. Required for RNP 0.3 airspace. |
| Mode Select Panel | 2 | 1* | 1* | Must be able to control AP & FD in Tied Mode. |
| **Reserved for add'l Status Codes/Title** | Remarks/Limitations | | | |

**4.6. One Engine Inoperative Ferry Operations.** PICs will only conduct three-engine ferry operations after exhausting all other avenues to return an aircraft with an inoperative engine to Mission Capable status. Each three-engine ferry sortie must be approved by MAJCOM/A3. The owning MAJCOM will provide execution authority for these sorties. **(T-2).** As directed by the

appropriate MAJCOM, only highly-qualified crewmembers from MAJCOM/A3V, NAF Stan/Eval, or unit Operations Group Stan/Eval (OG/OGV) will conduct three-engine ferry flights. **(T-2).** The following procedures apply:

4.6.1. Plan ferry operations well ahead to allow sufficient time for completion of maintenance preparation actions. Plan the flight to the nearest destination possessing a usable maintenance support capability. Obtain clearances and alert all enroute, alternate, and abort bases along the intended route of flight.

4.6.2. The PIC shall abide by aircraft flight manual and T.O. 1C-135(K)(I)-1, 1C-135(K)R(II)-1, 1C-135(K)-1, 1C-135, 1C-135(K)R(I)-1, and 1C-135(K)R-1-1 limitations.

4.6.3. All primary aircraft systems not specifically associated with the failed engine must be fully operational.

4.6.4. Download cargo (including mission support kits) prior to ferry operations. Return all cargo and support equipment to the main operating base (MOB) of assignment via organic support aircraft or other airlift means.

4.6.5. Use the minimum crew necessary for the ferry operation. A maximum of two crew chiefs (one 7-skill level) may be added. Do not carry passengers or other non-essential personnel.

4.6.6. Performance data must satisfy takeoff field length requirements, gear down three-engine climb performance, and final segment two-engine asymmetric go-around capability.

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

4.7.1. Standard climb-out flight path charts in T.O. 1C-135(K)R-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 enroute stops and alternates).

4.7.2. Time and communications capability permitting, validate takeoff data with MAJCOM/A3V or unit OG/OGV.

**4.8. Power Management Control (PMC) Operations.** After engine start, if a PMC is found to be inoperative, the PIC may (authorize) takeoff with one PMC inoperative on all missions. Do not turn off an operational PMC to practice a PMC inoperative takeoff. Simulated three-engine approaches and touch-and-go landings are not authorized with a PMC inoperative.

**4.9. Flight Data Recorder (FDR) Fail Light.** If an aircraft lands with an FDR Fail Light illuminated during an enroute mission, consult maintenance personnel to diagnose the severity of the FDR fail. The diagnosis could result in the aircraft being able to continue on to a repair station.

4.9.1. A “go” condition results in a red-diagonal and a “no-go” results in a Red-X. The AFTO Form 781A will be documented with the condition causing the FDR Fail Light to illuminate and GROUNDING or FLYABLE will be annotated along with guidance that it must be rechecked after every sortie, if required, until the aircraft reaches a repair capable location. **(T-3).**

4.9.2. Aircrew on enroute stops (Column B) with the FDR Fail Light illuminated are authorized to continue on the planned mission sequence until the FDR can be repaired at the next suitable repair station provided maintenance personnel document the malfunction as FLYABLE.

## Chapter 5

## OPERATIONAL PROCEDURES

**5.1. Checklists.** A checklist is not complete until all items have been accomplished. Momentary hesitations for coordination items, Red Ball Maintenance, Air Traffic Control (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. Checklist steps may be performed from memory, if the crewmember performing the steps from memory later returns to the checklist in order to verify those steps were accomplished correctly and the aircraft is in the correct configuration.

5.1.1. Checklist Inserts. MAJCOM/A3V (or equivalent) and the AFMC Flight Manual Manager are the checklist insert approval authorities. Send checklist inserts to MAJCOM/A3V, who coordinates with AFMC for approval. All checklist inserts must have a POC. **(T-2).** OG/OGVs shall approve local in-flight guides and inserts not affecting T.O. guidance and procedures. **(T-1).**

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

5.1.3. Crewmembers may use the most current version of applicable fanfold checklists in lieu of abbreviated checklists. Fanfold checklists must be current and contain all applicable basic flight manual supplement information.

5.1.4. When the crew complement consists of multiple boom operators, the AC should designate one BO as the primary boom. The primary BO is responsible for the completion of all checklist items. **Exception**: The passenger briefing may be delegated to the passenger monitor.

5.1.5. Crews operating aircraft modified with TCTO 1823 (Block 45) will comply with Block 45 Standard Operating Procedures (SOP) as outlined in AFTTP 3-3.KC-135, *Combat Aircraft Fundamentals*. **(T-3).**

**5.2. Duty Station.** Both pilots 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). The PIC, pilot/copilot, BO and navigator (if applicable) will be at their duty stations during all critical phases of flight. The BO primary duty station will be the navigator station when no navigator is on board.

**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 pilot or co-pilot positions.

**5.4. Takeoff and Landing Rules.** An AC, or above, will occupy either the left or the right seat during all takeoffs and landings. **(T-2).** 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 heavyweight landings greater than 235,000 pounds and landings during emergencies, unless conditions prevent compliance. **(T-3).**

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: **(T-3).**

5.4.2.1. Ceiling/visibility less than 300 feet and 3/4 SM visibility (1200 m) and/or Runway Visual Range (RVR) of 4,000 FT (1200 m).

5.4.2.2. Runway Condition Rearding (RCR) equivalent to less than a wet runway. See **paragraph 5.9.3** for operations at RAF Fairford and RAF Mildenhall.

5.4.2.3. Crosswind component greater than 15 knots.

**5.5. Landing Gear and Flap Operating Guidance.** The pilot flying (PF) commands configuration changes. The pilot monitoring (PM) verifies appropriate airspeed and configuration prior to actuating the gear or flaps.

**5.6. Outside Observer/Jump Seat Duties.** Available crewmembers should assist in clearing during taxi operations, receiver AAR, and any time the aircraft is below 10,000 feet Above Ground Level (AGL).

**5.7. Portable Electronic Devices.** MAJCOM approved Electronic Flight Bags may be connected to designated power sources when available.

5.7.1. For both Classified and Unclassified operations, aircrew will not connect any electronic devices into the EEID RS232 Data and/or VGA Video Port. **(T-2).**

**5.8. Advisory Calls.** Refer to AFMAN 11-202V3 AMC SUP and **Table 5.1** for a listing of mandatory advisory calls, responses, and aircrew actions. **Note:** Automated aircraft advisory calls satisfy this requirement.

**Table 5.1. VMC Approaches.**

| PHASE OF FLIGHT | PM CALL | PF RESPONSE |
|---|---|---|
| 1000 feet above Height Above Touchdown (HAT) | "1000, stable" or "1000, (deviation)" | Acknowledge |
| 500 feet above Height Above Touchdown (HAT) | "500, stable" or "500, Go-around" | Acknowledge or "Going Around" |

**5.9. Runway, Taxiway, and Airfield Requirements.**

5.9.1. Minimum Runway and Taxiway Requirements. Minimum runway length is 7,000 feet. Minimum runway width is 147 feet. Minimum taxiway width is 74 feet.

5.9.2. Runway Length for Takeoff and Landing.

5.9.2.1. 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. In no case will a takeoff be made from a position where less than 7000 feet of runway remains. **(T-3).**

5.9.2.2. Crews should normally use 0.80 delayed braking factor (DBF) for computing landing distance. The PICs may direct using up to 0.90 DBF as an exception on a case by case basis, but must be aware of the resultant increase in brake wear. OG/CC or equivalent approval is required for landings with greater than a 0.90 DBF. When using greater than 0.80 DBF crews will brief the planned braking speed.

5.9.2.3. Headwind benefits are normally accepted as an increase in margin of safety and not used when computing takeoff and landing performance. However, for operational necessity, PICs may direct using 50% of the steady-state headwind component for takeoff and landing data computation. OG/CC may authorize up to 100% of the steady-state headwind component.

5.9.3. Operations from RAF Fairford and RAF Mildenhall. An RCR of 15 may be used for computing takeoff performance for all operational and training missions when wet (no standing water) runway conditions exist. This authorization does not apply to landing data computations or when standing water is on the runway. Determination of standing water versus wet runway conditions is made by the local OG/CC.

**5.10. Traffic Alert and Collision Avoidance System (TCAS).** Operate the TCAS with sensitivity set to Traffic Advisory/Resolution Advisory (TA/RA) at all times except when in cell formation, during air refueling, or when operational necessity dictates. **(T-2).**

**5.11. Terminal Area Navigation (RNAV) Procedures.** Properly trained KC-135 aircrews are authorized to perform IFR RNAV operations to include instrument departures, arrivals, and approaches using LNAV minima.

# Chapter 6

## AIRCREW PROCEDURES

**6.1. In-flight Emergency Procedures.** The PIC may initiate a CONFERENCE HOTEL/SKYHOOK when additional expertise is necessary. Boeing provides 24-hour support for C/KC-135 in-flight emergencies. To use this service: obtain a phone patch to one of the numbers listed below, tell the operator you have an "INFLIGHT EMERGENCY" and identify the base or location in which the phone patching is established. These numbers are only to be used for in-flight emergency support: DSN 743-5687, Commercial: 800-721- 0422 or 206-655-9200.

**6.2. 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. **(T-2).** Crewmembers will contact the local airfield manager before driving on the flight line. **(T-3).**

**6.3. Helmets and Oxygen Masks.** Crewmembers will carry a personal helmet and oxygen mask whenever the aircrew requires Polarized Lead-Lanthanum-Zirconate-Titanate Ceramic Materials (PLZT) flash-blindness devices, helmet-mounted Night Vision Devices (NVDs) or as mission requirements dictate. **(T-2).**

6.3.1. Helmet mounted NVDs are authorized for use by trained and certified aircrew. **Exception:** not authorized during takeoff, landing, or AAR. **(T-2).**

**6.4. Aircrew Publications Requirements.** Each primary crewmember must carry an Electronic Flight Bag (EFB) with current publications and configured IAW "Mobility Air Forces Electronic Flight Bag Baseline Configuration" document on the AMC EFB Sharepoint. **(T-2).** Additionally, at a minimum, each primary crew position must have a "hard copy" of their checklist. **(T-3).** Units may specify additional publications in their local unit supplement to this manual. Reference AFI 11-215, *Flight Manuals Program,* for guidance on electronic publications.

**6.5. Departure Planning.** Use AFI 11-202V3, AFMAN 11-217, *Flight Operations*, this chapter, and appropriate MAJCOM supplements. Regardless of the type of departure flown (Instrument Flight Rules (IFR)/Visual Flight Rules (VFR)), review the following (as appropriate): IFR Departure Procedure, instrument approach procedures, Notice to Airmen (NOTAMS), GDSS Giant Report, and suitable terrain charts. All performance data computations will be reviewed by both pilots. **(T-3).** Ensure that the Digital Aeronautical Flight Information File (DAFIF) image file on Flight Management System (FMS) PCMCIA card is current for date(s) of flight. **(T-3).**

6.5.1. Departure planning priority is as follows:

6.5.1.1. Ensure the aircraft is capable of the published climb restrictions with one engine inoperative (OEI). **(T-3).**

6.5.1.2. If the aircraft is not capable of the published climb restriction with one engine inoperative but is capable of the published climb restrictions with all engines operative:

6.5.1.2.1. Use the current Special Departure Procedure (SDP) for planned departure runway, or subtract up to 48 ft/nm from the published climb gradient for OEI.

6.5.1.3. Use of a VFR departure as described in AFI 11-202V3 and AFMAN 11-217.

6.5.1.4. Special Departure Procedures. If the MilPlanner calculated Maximum Takeoff Gross Weight exceeds the Fuel Management Advisory Computer (FMAC) computed

maximum (producing a "no go" message), the crew will adhere to limits set by the FMAC. **(T-2).**

**6.6. Aircrew Flight Equipment.**

6.6.1. Life Preserver Units (LPU). The passenger monitor will place a 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. **(T-2).**

6.6.2. Over-water is defined as any flight exceeding 50 NM from the nearest shoreline or a power-off glide distance (15:1), whichever is less.

6.6.3. Restraining Harness. Personnel performing duties near an open (or suspected open) door or hatch in-flight will be restrained by a PCU-17/P restraint harness and one HBU-6/P safety strap. **(T-2).**

**6.7. Oxygen Mask and Oxygen System Requirements.**

6.7.1. Oxygen. For flights where the total number of individuals on board the aircraft does not exceed the total number of operational flight crew oxygen system stations, 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. **(T-2).** Calculate using the 100 percent oxygen chart, figure 2-17, in the in-flight manual.

6.7.1.1. Crewmembers occupying or transiting the cargo compartment will have a portable oxygen walk-around bottle with quick-don mask/helmet, or Emergency Passenger Oxygen System (EPOS) available for use in the event of an emergency. **(T-2).**

6.7.1.2. Crewmembers performing passenger monitoring duty will use a portable oxygen bottle with helmet or quick don attached. **(T-2).**

6.7.1.3. On missions carrying passengers, if EPOS is not prepositioned throughout the cargo compartment, distribute EPOS to each passenger regardless of planned flight altitude. **(T-2).**

6.7.2. MA-1 Portable Oxygen Bottles. Ensure that the portable oxygen bottles at the Pilot, Copilot, and BO's forward and aft stations are unmodified/modified2 bottles. **(T-2).** If additional unmodified/modified2 bottles are available, install in the crew compartment first.

6.7.2.1. There are three types of A-21 regulators on MA-1 portable oxygen bottles, unmodified, modified and modified2. Except for fill times, operation of the bottles are identical. Reference 1C-135(K)(I)-1 for bottle descriptions and identification.

**6.8. Instrument Approach Procedures.**

6.8.1. RNAV Standard Instrument Departure (SID)/Standard Terminal Arrival (STAR) and Approach Procedures. RNAV and RNAV (GPS) approaches will be flown only to LNAV minima. **(T-2).**

6.8.1.1. When flying RNAV SIDs, ensure pilot flying's primary course is set to FMS. **(T-0).** The crew will ensure the flight directors are set to NAV/LOC (Blk 40) or NAV (Blk 45) to provide flight director guidance prior to reaching 500ft AGL, IAW FAA Advisory Circular 90-100A, *U.S. Terminal and En Route Area Navigation Operations*. **(T-0).**

6.8.1.1.1. Crews operating Blk 45 equipped aircraft may couple the autopilot system to the PF's flight director for lateral guidance when flying an RNAV SID/STAR.

6.8.1.2. Flight director lateral guidance must be available anytime the KC-135 is operating in Required Navigation Performance (RNP) 0.3 airspace.

**6.9. KC-135 CNS/ATM Operational Approvals.** See **Table 6.1** for complete listing of KC-135 Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) approved operations.

**Table 6.1. KC-135 CNS/ATM Operational Approvals.**

| Airspace/Equipment Type.29.1 | Aircraft Certified | Operational Approval | Pilot Training Required | Notes |
|---|---|---|---|---|
| FM Immunity | Yes | Yes | No | |
| 8.33 Radios | Yes | Yes | No | |
| Elementary Mode S | Yes | Yes | No | Requires Flight ID Code |
| Enhanced Mode S | Yes | Yes | N/A | Transmits Acft Location & Direction |
| IFF Mode 5 | Yes | Yes | Yes | TCTO 1857 CBT difference training |
| ETCAS | Yes | Yes | Yes | Training incorporated into initial qualification |
| RNAV/GPS Approaches | Yes | Yes | Yes | Training incorporated into initial qualification |
| RNAV (RNP) Approaches | Yes | No | Yes | Will require augmented receiver for certification |
| LNAV/VNAV | Yes | Yes | Yes | Down to LNAV MDA minima only |
| LPV | No | No | NA | |
| RNP (AR) (Authorization Required) | No | No | N/A | |
| ILS PRM | Yes | Yes | Yes | Training incorporated into mission certification training |
| ILS (SA) (Special Authorization) | No | N/A | N/A | |
| GLS | No | No | N/A | |
| RVSM | Yes | Yes | Yes | Training incorporated into initial qualification |
| RNAV/GPS Enroute | Yes | Yes | Yes | Training incorporated into initial qualification |

| | | | | |
|---|---|---|---|---|
| RNP 10 | Yes | Yes | No | |
| RNP 5 | Yes | Yes | No | |
| RNP 4 (Oceanic/Remote) | Yes | Yes | No | |
| RNP 0.3 | Yes | Yes | No | |
| RNAV 1 (P-RNAV) | Yes | Yes | No | |
| RNAV 2 (US-RNAV) | Yes | Yes | No | |
| RNAV 5 (B-RNAV) | Yes | Yes | No | |
| MNPS | Yes | Yes | Yes | Mission Certification Training and continuation training |
| CPDLC/FANS 1/A | Yes | Yes | Yes | Mission Certification Training and continuation training |
| HF Data Link | Yes | Yes | No | |
| SATCOM Data Link | Yes | Yes | No | |
| SATCOM Voice | Yes | Yes | No | |
| ADS-B Out | No | No | N/A | |
| ADS-C | Yes | Yes | No | |
| VHF Data Link | Yes | Yes | No | |

**6.10. Flight Data Recorder/Cockpit Voice Recorder (FDR/CVR).** Pulling the FDR/CVR Circuit Breaker disables three pieces of equipment: Cockpit Voice Recorder, Flight Data Recorder, and Turbine Engine Monitoring System (TEMS). If involved in a mishap or incident, after landing and terminating the emergency, pull the FDR/CVR power circuit breaker. This procedure keeps the CVR from recording over itself, but retains the FDR/TEMS Data. If Area of Responsibility (AOR) Special Instructions direct clearing the CVR information, crews should utilize the "Erase" function during engine shutdown vice pulling the circuit breaker.

**6.11. Fall Protection.** Aircrew members are prohibited from climbing onto the upper fuselage or wing surfaces. PICs will ensure no other personnel (excluding qualified ops/maintenance personnel), have access to, or be allowed to, climb onto the fuselage or wings. **(T-3).**

**6.12. In-Flight Check of the Mode 4 and Mode 5.** Aircrews can request the Mode 4 and Mode 5 interrogation check through NORAD on UHF frequency 364.2. See **Table 6.2** for Sector Operations Centers (SOCCS) that conduct interrogation checks.

**Table 6.2. Sector Operations Centers (SOCCS).**

| CONUS SECTOR | LOCATION | CALL SIGN |
|---|---|---|
| Western | Lewis-McChord JB, WA | Bigfoot |
| Eastern | Rome, N.Y. | Huntress |

**6.13. Aircraft Systems Operation.**

6.13.1. MFD. PF must have the top MFD set with the full ADI for all takeoffs, final approaches and landings. Course guidance appropriate for the current ATC clearance, will be displayed on a PF MFD. PF may use the CDI at the base of the full ADI for course guidance when the PM has a CDI needle displayed. **Exception:** When malfunctions limit the pilot to a single operable MFD.

6.13.1.1. Due to MFD anti-glare degradation and associated cost to repair MFDs, crewmembers should not touch/clean MFD displays unless using approved AEROKLEEN MFD wet and dry packets by AERO-CHEM. **(T-2).** Using any other chemicals to clean the MFDs will remove the anti-glare coating.

6.13.2. Weather and Terrain Monitoring. Weather and terrain should be displayed to the maximum extent. Do not configure the weather radar to simultaneously operate in an excessive number of modes since this will significantly degrade normal radar performance in each individual mode.

6.13.3. Global Positioning System (GPS), Mode 4 and/or Mode 5, and secure voice/HAVE QUICK keys. Load as required.

**6.14. Aircrew Complement.** At a minimum, KC-135 aircraft will be operated using three-person procedures (two pilots and one boom operator). **(T-3).** Commanders may designate that a mission use four-person procedures (minimum two pilots, one navigator and one boom operator) if navigator currency/training is required (N/A ANG). When a mission is scheduled as four-person, a "Navigator suite or B-Kit" must be installed at the navigator station. **(T-3).**

6.14.1. Nuclear Employment Missions. See AFMAN 11-2KC-135 Vol 3 Addenda B for crew complement guidance.

6.14.2. Special Operations Air Refueling (SOAR) will be flown utilizing four-person complement (Navigator or Third Pilot). **(T-2).**

6.14.2.1. SOAR Navigator. Navigator's duties (on both SOAR and Non-SOAR missions) include mission planning/study, operating equipment at duty station, and functioning as crew lead for navigation, rendezvous and communications duties as directed by appropriate flight manuals and mission directives. Pilots provide backup for all navigator duties.

# Chapter 7

## AIRCRAFT SECURITY

**7.1. General.** This chapter provides guidance on aircraft security and preventing and resisting aircraft piracy (hijacking) of the C/KC-135 aircraft. AFI 13-207-O, *Preventing and Resisting Aircraft Piracy (Hijacking) (FOUO)*, AFI 31-101, *Integrated Defense*, 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. **(T-2)**

**7.2. Security.** The C/KC-135 is normally a "Protection Level 3 (PL3)" resource but the mission may dictate a higher PL in some cases. Aircraft security must be appropriately coordinated through the controlling agency, particularly at locations other than US military installations. PICs will evaluate security measures upon arrival, and if deemed inadequate, will coordinate additional security requirements with the local airport authority and controlling C2 agency. **(T-2).**

**7.3. Integrated Defense.** The following security procedures will implement AFI 31-101 requirements for C/KC-135 aircraft:

7.3.1. The aircraft will be parked and afforded protection IAW AFI 31-101 requirements for the protection level assigned to the aircraft or mission. **(T-2).**

7.3.2. 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 PIC will coordinate aircraft movement with the controlling C2 agency and depart to a station where adequate security can be maintained. **(T-2).**

7.3.3. The security force must be made aware of all visits to the aircraft. The security force POC must be identified to the PIC. **(T-3).**

7.3.4. 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.

# 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 (FSOs) for assistance with safety forms.

**8.2. Petroleum, Oil, and Lubricants (POL) - Aviation Fuels Documentation.**

8.2.1. The AIR Card® is the aircraft fuel and oil charge card.

8.2.2. Aircrew Responsibilities.

8.2.2.1. Pilots should accurately record fueling actions on the AFTO Form 781H, *Aerospace Vehicle Flight Status and Maintenance*.

8.2.2.2. Receiver capable aircraft should record fuel onloads using AF Form 664, *Aircraft Fuels Documentation Log*. Record issuing tanker's refueling information (i.e., tail number, unit of assignment, and home station.).

8.2.2.3. Collect all pertinent information to document in-flight refuel operation to include, receiver aircraft Mission Design Series (MDS), unit of assignment, and home station. Obtain information from flying schedule prior to flight, verbally/visually during flight, or by any means following flight.

8.2.2.4. As soon as workload permits, get receiver aircraft's tail number (use interplane radio, boom interphone, or visually if open communication would compromise the mission during clandestine or covert operations or threaten safety of flight). When refueling the same receiver multiple times on a single mission, enter a separate line on the DD Form 791, *Aerial Tanker In-Flight Issue Log*, for each AAR.

8.2.2.5. Boom operators may submit an incomplete DD Form 791 only after exhausting all means to obtain the required data. In those cases, boom operators must include a brief explanation as to why the data is missing. Unit commanders should develop a local procedure to collect required information prior to the form's final processing.

8.2.2.6. Comply with locally established procedures to complete DD Form 791 for classified in-flight refuelings.

8.2.3. Wing scheduling Responsibilities.

8.2.3.1. Provide a member to the AVPOL advisory group.

8.2.3.2. By the 7th of each month, prepare monthly report for Invoice Control Officer. Include organization (squadron), MDS, programmed flying hours for previous and current months in the report.

8.2.3.3. Include receivers' MDS, command of assignment, unit or squadron, DoDAAC for USAF receivers, UIC for USN receivers, POC name, phone number, and home station name (for each in-flight refueling sortie) on the weekly schedule. **(T-3).**

8.2.3.4. Maintain the wing's current master list of receiver unit POCs and telephone numbers.

**8.3. Operation Forms for Boom Operators.** Detailed instructions for the preparation, distribution, and use of the following forms may be found in the governing directive.

8.3.1. DD Form 2131, *Passenger Manifest* (AMCI 24-101V14)

8.3.2. DD Form 1385, *Cargo Manifest* (DoD 4500.32R)

8.3.3. DD Form 1854, *US Customs Accompanied Baggage Declaration* (DoD 5030.49R)

8.3.4. DD Form 1907, *Signature and Tally Record* (DoD 4500.32.R)

8.3.5. CBP Form 6059B, *US Customs Accompanied Baggage Declaration* (DoD 5030.49R)

8.3.6. CBP Form 7507, *General Declaration (Outbound/Inbound)* (AFI 24-401, 402, 403,404)

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

8.3.8. AMC Form 148, *Boarding Pass/Ticket/Receipt*

# Chapter 9

# TRAINING AND OPERATING LIMITATIONS

**9.1. General.** This chapter outlines training rules and applies to all PACAF, USAFE-AFAFRICA, AMC and AMC-gained units performing AMC-directed missions, local training, or off-station training flights.

**9.2. Passengers on Training Missions.** See AFI 11-401.

9.2.1. Senior Officer Course and FTL-E qualified members, without a current MSN evaluation, will not conduct tanker or receiver AAR with passengers. **(T-2).**

9.2.2. Touch-and-go landings and multiple practice approaches are prohibited with passengers onboard (MEPs are not considered passengers for this purpose). **(T-2). 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 landings are performed providing the mission is a designated training flight and an IP or EP is in command.

**9.3. Touch-and-go Landings**

9.3.1. Touch-and-go landings will only be accomplished under the direct supervision of an IP/EP, or SQ/CC certified AC. **(T-3).** Refer to AFI 11-2KC-135V1 for certification requirements.

9.3.2. Limitations.

9.3.2.1. Comply with all flight manual restrictions and procedures to include performance degradation with fuel, cargo limits, etc.

9.3.2.2. Use a runway of sufficient length and width to permit a safe, normal, full-stop landing. Landing gross weight for touch-and-go landings will not exceed 200,000 lbs. **(T-3).**

9.3.2.3. Minimum ceiling/visibility: 300ft and 3/4 SM (1200 meters) or RVR 4000ft (1200 meters) with direct IP supervision, 1000ft and 2 SM visibility for touch-and-go certified ACs.

9.3.2.4. Runway must be either Dry, Wet, have an RCR of 9 or greater, or a FICON of 4 or greater for the entire runway. **(T-2).**

9.3.2.5. Do not accomplish touch-and-go landings on slush covered runways. **(T-2).**

9.3.2.6. Maximum crosswind component: 15 knots with direct IP supervision, 10 knots for non-instructors.

9.3.2.7. Touch-and-go landings may be performed with cargo on board provided PIC and BO determine suitability of the cargo. Touch-and-go landings with hazardous cargo on board are prohibited. **(T-2).** Cargo security is checked prior to the first touch-and-go and periodically at an interval determined by the PIC (normally not to exceed 1 hour). PICs must allow additional time required for this inspection.

9.3.2.8. All PMCs operating.

**9.4. Simulated Emergency Procedures In-flight.**

9.4.1. Simulated emergency flight procedures will be conducted IAW AFI 11-202V3 and this manual. **(T-2).**

9.4.1.1. Unless specifically authorized elsewhere in this chapter, do not practice emergency procedures that degrade aircraft performance or flight control capabilities in flight.

9.4.2. Engine-Out Limitations (Simulated). See AFI 11-2KC-135V1, regarding approval for simulated engine-out training syllabus.

9.4.2.1. Do not simulate failure of two engines in flight (simulator only demonstration, except CFIC and USAFWS). **(T-2). Note**: During a go-around or missed approach, use the asymmetric engine as required to ensure at least a 3.3% climb gradient. **(T-3).**

9.4.2.2. FPCs and FPQs may practice engine-out maneuvers under direct IP supervision.

9.4.2.3. All PMCs must be operating.

9.4.2.4. Weather Minimums:

9.4.2.4.1. Maximum crosswind for simulated engine-out landings is 15 knots.

9.4.2.4.2. Day – circling minimums for the approach being flown (600/2 if none published).

9.4.2.4.3. Night – 1000 feet and 2 statute miles or circling minimums for the approach being flown, whichever is higher.

9.4.2.5. Simulated Engine Failure will not be initiated below 200 feet AGL. **(T-3).**

**9.5. Flight Maneuvers.**

9.5.1. Practice of the following maneuvers are prohibited in-flight:

9.5.1.1. Stalls and approach to stalls including initial buffet.

9.5.1.2. Dutch roll.

9.5.1.3. Emergency descent.

9.5.1.4. Unusual attitudes.

9.5.1.5. Compound emergencies (except simulated engine-out with rudder power off or FCAS off, FTU or USAFWS only).

9.5.1.6. Tactics maneuvers (except those specified in AFTTP 3-3.KC-135, AFTTP3-1.KC-135/KC-10, Tactics Bulletins, or otherwise specifically authorized by MAJCOM/A3).

9.5.1.7. Bank angles greater than 45 degrees.

9.5.1.8. Simulated jammed stabilizer demonstration approaches.

9.5.2. The following maneuvers are authorized for qualification and continuation training. “FTU” maneuvers are restricted to FTU only during formal training under direct FTU instructor supervision. “USAFWS” maneuvers are restricted to USAFWS instructors and

students under direct USAFWS instructor supervision. "Direct instructor pilot (IP) supervision" requires the IP to have immediate access to the controls.

9.5.2.1. Approach and Landing, Simulated Engine-Out: direct IP supervision.

9.5.2.2. Approach and Go-Around, Simulated Engine-Out: direct IP supervision.

9.5.2.3. Approach and Go-Around, Simulated Engine-Out, Rudder Power Off: direct IP supervision.

9.5.2.4. Landing, Simulated Engine-Out, 4-Engine Takeoff: direct IP supervision.

9.5.2.5. Simulated Engine Failure, Takeoff Continued: direct IP supervision.

9.5.2.6. Simulated 2-Engine Landing: OFT, FTU, or USAFWS.

9.5.2.7. Landing Attitude Demonstration: direct IP supervision.

9.5.2.8. Spoiler and Lateral Control Demonstration: IP supervised, must be accomplished above 10,000 feet AGL.

9.5.2.9. Trim Demonstration: IP supervised.

9.5.2.10. No-Airspeed/No AOA Approach and Landing: OFT, FTU, or USAFWS.

9.5.2.11. Air Refueling Demonstrations R064-067, R071, R072, R225, R400-460: FTU or USAFWS.

9.5.2.12. Landing Gear Manual Extension and Main Flap Manual Operation exercises.

**9.6. Operating Limitations.**

9.6.1. Takeoffs.

9.6.1.1. Maximum crosswind for takeoff during peacetime is 25 knots, except as noted below. RCR may limit this capability.

9.6.1.1.1. Commanders with mission execution authority may approve takeoffs for locally-executed operational missions within the maximum flight manual limitation.

9.6.1.1.2. MAJCOM/A3 (or equivalent) unless otherwise delegated, may approve takeoffs for MAJCOM-directed off-station missions within the maximum flight manual limitations.

9.6.2. Performance Requirements. Do not practice traffic pattern operations, instrument approaches, low approaches or go-arounds at gross weights that will not afford a minimum of 3.3% climb gradient at threshold speed minus 10 knots, 3 engines, flaps 30, gear down, symmetric N1 setting and selected asymmetric N1 setting (between idle and maximum asymmetric N1). **(T-3).**

9.6.3. Planned Go-Arounds and Visual Low Approaches. Initiate a planned missed approach not later than:

9.6.3.1. Precision approach – Decision Height (or 200-feet HAT, whichever is higher).

9.6.3.2. Non-precision approach - missed approach point (MAP).

9.6.3.3. Visual approach or VFR pattern - 100 feet AGL. **Note**: Not applicable to landing attitude demonstrations.

9.6.4. Normally, do not exceed 30 degrees of bank during the final turn for landing.

9.6.5. Practice Landing Gear Manual Extension and Main Flap Manual Operation. Accomplish clear of clouds (not applicable with IP supervision). May be accomplished day or night.

9.6.6. Landings.

9.6.6.1. Maximum crosswind during peacetime is 25 knots. RCR may limit this capability. Commanders with execution authority over the mission may approve full-stop landings up to the maximum flight manual limitations. **(T-3).**

9.6.6.2. Flap setting - Do not practice landings with less than 30 flaps. **(T-2).**

9.6.6.3. Gross weight. Landing gross weight will not exceed 235,000 lbs. **(T-3).** Landing gross weight for touch-and-go landings will not exceed 200,000 lbs. **(T-3).**

9.6.6.4. Multiple full-stop landings - Compute brake energy prior to each subsequent takeoff and apply corrections to $V_{MB}$ and $V_{NB}$.

9.6.6.5. Hard Landing Indicator (HLI) Instructions. If a HD LDG annunciator illuminates, the flight crew will: **(T-3).**

9.6.6.5.1. If the HLI illuminated on a touch and go landing, the landing gear will not be retracted and a full-stop landing will be made as soon as practicable. **(T-3).**

9.6.6.5.2. Complete the AMC Form 97, *In-Flight Emergency and Unusual Occurrence Worksheet*, and provide a copy to maintenance and operations supervisors.

9.6.6.5.3. Document the aircraft forms with “HLI Illuminated” or “Crew verified hard landing with no HLI illumination”.

9.6.6.5.4. FDR data will be analyzed prior to the next flight.

9.6.6.5.5. If the HLI illuminates and the aircrew states that a hard landing actually occurred and/or visual damage is noted, the aircraft should be immediately impounded for inspection IAW TO 1C-135-6, *Aircraft Scheduled Inspection and Maintenance Requirements*.

# Chapter 10

# Chapter 11

# NAVIGATION PROCEDURES

**11.1. General.** This chapter establishes procedures and requirements for worldwide enroute KC-135 navigation. It is to be used in conjunction with procedures and requirements set forth in AFI 11-202V3, AFMAN 11-217, FLIP and applicable FAA and/or ICAO procedures and instructions. Since airspace and associated navigational aid equipment capability are rapidly evolving, pilots must maintain an in-depth knowledge of current requirements/policies. See **chapter 6** for navigator responsibilities during 4-person SOAR and non-SOAR operations.

**11.2. Navigation Databases.**

11.2.1. Flight Planning Navigation Database. Flight plans created using Mobility Air Forces Automated Flight Planning Service (MAFPS), Advanced Computer Flight Plan (ACFP), or the Portable Flight Planning Software (PFPS) use the navigation date from the DAFIF.

11.2.1.1. Pilots are responsible for ensuring the accuracy of flight plan waypoints against current aeronautical charts, terminal instrument procedures, or FLIP documents (i.e., AP/1B).

11.2.1.2. If a suspected error is found in the DAFIF database, immediately report it to the unit system support representative (SSR). The SSR determines if the issue is a DAFIF, FMS, or an AWE, error and report it to the appropriate agency. When away from home station, relay information to the SSR via unit OG/OGV.

**11.3. Required Navigation Performance (RNP) Airspace.** RNP airspace is considered special qualification airspace and its location can be found in applicable theater AP publication. The PIC is responsible for a thorough review of the aircraft forms and maintenance logs to ascertain the status of RNP equipment. To operate in RNP airspace, FMS must be set as the primary source, with MMR1/2 or EGI1/2 as the steering solution and if the autopilot is to be used, the appropriate functions should be operable. **(T-1)**. Additionally, if an EGI is the steering solution, it must be in CIVIL mode and INUx/GPS selected. **(T-1).** During flight, immediately notify ATC if any of the required equipment fails after entry into RNP airspace and coordinate a plan of action. Document all RNP required equipment malfunctions or failures in the aircraft forms, including any equipment that exceeds RNP tolerances.

11.3.1. Aircrews should set steering solutions to INU1/GPS (Pilot) and INU2/GPS (Copilot) in Civil Mode unless directed otherwise for specific operations or missions. KC-135 aircraft with properly functioning steering solutions comply with all civil navigation performance requirements for Required Navigation Performance Area Navigation (RNP RNAV) RNP-10, RNP-4, RNP-2 RNAV, RNP-1 RNAV, Time of Arrival Control (TOAC), Basic Area Navigation, Precision Area Navigation (PRNAV), and Reduced Vertical Separation Minimum (RVSM). GPS1/A/H (Pilot) and GPS2/A/H (Copilot) may serve as a secondary steering solution.

11.3.1.1. In civilian airspace, crews will use GPS Precise Positioning Service (PPS) civilian mode. **(T-2).** Crews will not operate in Mil mode unless specifically authorized by MAJCOM/A3V or Director of Mobility Forces (DIRMOBFOR) message. **(T-2). Exception**: Crews are authorized to use MIL mode and Y-ONLY in Special Use Airspace (SUA), to include the NTTR (Nevada Test and Training Range).

11.3.1.2. Crews should employ properly keyed GPS receivers that make maximum use of encrypted PPS signals for both military and civil operations. At a minimum, GPS Keys shall be loaded in EGI-1 at all times. **(T-3).** Additionally, crews should avoid the use of "Mixed mode" which permits the receiver free use of unencrypted GPS signals.

11.3.1.2.1. It is not necessary to load keys on every mission provided the keys currently loaded are not expired. If keys are current, crews should not load them again unless the previously loaded keys are first deleted. If GPS keys are not current and not available to load, crews should use mixed mode, or no satellites will be visible. Operating Automatic Dependent Surveillance- Contract (ADS-C) while in mixed mode, with INUx/GPS steering solution selected, is not authorized. **(T-2).** If flight using ADS-C is required, with expired keys or mixed mode selected, crews will either turn ADS-C off or remove the INU from the steering solution by selecting GPSx/A/H. **(T-2).** This will allow a valid Figure Order of Merit (FOM) to be transmitted through the ADS-C reporting.

**11.4. Navigation Systems Crosscheck.** Pilots should obtain a navigation system crosscheck every 30 minutes during cruise. Update automatic navigation computers as necessary to ensure the computer present position remains within 5 NM of the actual aircraft position. **(T-3).** This update requirement does not apply to malfunctioning automatic DR equipment that is not being used for navigation. Make an AFTO Form 781A entry for excessively drifting navigation sources.

**11.5. Air Traffic Rules.** See FLIP General Planning, the Foreign Clearance Guide (FCG), FAA Handbook 7610.4, and AFI 11-202V3 for additional requirements or restrictions.

11.5.1. Unless authorized by the controlling agency, aircraft operating in controlled airspace under IFR on all routes published or unpublished, must fly along a direct course between NAVAIDS or fixes defining the route (AFI 11-202V3). Deviations will only be approved by the controlling agency or when operating in special-use airspace or on Military Training Routes.

**11.6. Inertial Navigation System.**

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

11.6.2. For Block 40.X configured aircraft, steering should be through FMS pilot's steering source-autopilot tie-in except when conducting AAR.

## Chapter 12

## AIRCREW MAINTENANCE SUPPORT PROCEDURES

**12.1. General.** This chapter contains aircrew procedures not contained in the flight manual, other portions of this manual, or other publications.

**12.2. Aircraft Servicing and Ground Operations.** Aircrews are normally not required to service the aircraft.

12.2.1. For stops requiring minimum ground time, defined as 6 hours or less and qualified Maintenance personnel are not available, crewmembers current in G190 will accomplish a postflight walkaround and check/service engine oil as necessary. Stops longer than 6 hours or requiring fuel service will require support from properly trained Maintenance personnel. **(T-2).**

12.2.2. Aircrew members current in aircraft servicing (G190) may augment qualified refueling supervisors. The aircraft servicing course does not qualify crews to perform maintenance tasks. Aircrew members are not authorized to serve as refueling supervisors, only qualified transient alert and maintenance personnel may serve as refueling supervisors. **(T-2)**.

12.2.3. 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:

12.2.3.1. De-fuel the aircraft prior to next flight.

12.2.3.2. Make an AFTO Form 781A entry stating “Caution: Aircraft refueled using JP-8+100, preventative measures must be taken when de-fueling.”

**12.3. Aircraft Recovery Away from Home Station.** When an aircraft is scheduled to land at a base other than home station, a crew chief should accompany the aircraft.

12.3.1. The PIC is responsible for ensuring the aircraft is turned to meet subsequent mission taskings.

12.3.2. When a “cocked on” aircraft is no longer needed for alert, a current and qualified aircrew should accomplish the “After Landing, and Engine Shutdown” or the “Uncocking” checklists prior to turning the aircraft over to Maintenance.

# Chapter 13

## CARGO AND PASSENGER HANDLING PROCEDURES

**13.1. General.** The BO is responsible for assuring all cargo is properly secured in compliance with T.O. 1C-135-9. Regardless of passenger seating, all cargo and the Palletized Airline Seating Pallet will be secured using 3G forward restraint criteria. **(T-2).**

13.1.1. Certain items may require additional restraint based on Air Transportability Test Loading Activity (ATTLA) certification.

13.1.2. The BO coordinates on/offloading with air terminal operations or shipping agencies, plans loads, supervises on/offloading operations, performs pre/postflight checks of aircraft and systems, computes aircraft weight and balance, ensures safety and comfort of passengers and troops, and security of cargo, mail, and baggage during flight.

**13.2. Responsibilities 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 PIC (or designated representative) of destination, size, weight, and types of cargo (classified, hazardous, etc.) to permit proper positioning. **(T-2).** They will also coordinate traffic activities affecting on/off loading activity, and assign sufficient aerial port loading personnel for cargo handling. Aerial port personnel are responsible for safe positioning of material handling equipment (MHE) and cargo to or from the aircraft cargo door. Under the supervision of the BO, aerial port personnel will prepare the aircraft for loading, stow loading/tiedown 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. **(T-2).**

13.2.1.2. The BO is responsible for aircraft preflight, load planning (as required), certifying load plans, preparing weight and balance documentation, completing all required load/tipping computations, operating aircraft equipment and cargo tie down. They coordinate with the loading crew supervisor to verify cargo against load plan and manifests. The BO supervises loading operations and is responsible for safe movement of cargo into and out of the aircraft. The BO is responsible to 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 BO then briefs the PIC on any hazardous cargo and cargo jettison capability prior to engine start.

13.2.1.2.1. Responsibility for Customs Procedures. Unless otherwise directed, use the Foreign Clearance Guide, the AMC Aircrew Border Clearance Guide, and **Chapter 6** of this directive for specific inbound/outbound customs requirements. **(T-0).**

13.2.1.3. Loads planned by qualified load planners will normally be accepted by the BO 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. **(T-2).** If cargo is refused or rearranged for these reasons,

forward all applicable information, including a copy of the load plan, to AMC/A3VK through Stan/Eval channels. AMC units will include AMC Form 54, *Aircraft Commander's Report On Services/Facilities*. **(T-2). Exception:** The BO may deviate from load plans only to facilitate ease of on/offloading of cargo and to alleviate unnecessary aircraft reconfiguration. The BO must take into consideration the next station's cargo configuration requirements and will ensure the aircraft is in proper weight and balance limits. **(T-2).**

13.2.1.4. The BO is the on-scene expert for load planning and accepting cargo for airlift. Some loads are not specifically detailed in applicable directives and may require the BO to seek advice of other personnel (i.e., available boom operators, squadron, group, wing or MAJCOM evaluators) or use their best judgment, based on training, experience, and knowledge, to determine the safest and most efficient method of cargo loading.

13.2.1.4.1. Non-standard cargo/equipment not contained in the aircraft loading manual may require certification for air shipment. The shipper will provide a copy of the certification to the BO prior to loading. If the certification letter with loading instructions/requirements is not provided to the BO, the cargo will not be loaded. **(T-2).** Contact ATTLA at Wright Patterson AFB, OH, voicemail (937) 255-2330/2547 or MAJCOM Stan/Eval for questions concerning cargo certification.

13.2.1.4.2. Maintenance is responsible for the upload and configuration of training mission equipment (baggage bins etc.) and cargo roller systems. Maintenance is responsible for uploading and assisting BO with configuration of additional equipment needed per AFMAN 11-2KC-135V3, Addenda A. BO must ensure all equipment has been properly configured/secured and accomplish a cargo roller system preflight (if installed) prior to departure. Aircraft equipment must be inventoried and configured IAW T.O. 1C- 135-21, *Equipment Inventory List All -135 Series Aircraft*, AFMAN 11-2KC-135 V3 Addenda A, and T.O. 1C-135-9, *Cargo Loading Manual*. **(T-2).**

13.2.1.4.3. Sufficient cargo handling and securing equipment must be on board each KC-135 to properly secure all planned cargo items from home station and items listed in departure and pre-departure messages. **(T-2).**

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. BO's responsibilities and authority are the same as described in **paragraph 13.2.1.2** and **13.2.1.3**.

13.2.3. During Joint Airborne Air Transportability Training (JA/ATT), Special Assignment Airlift Mission (SAAM), USAF mobility, and contingency missions, the BO can accept DD Form 2133, *Joint Airlift Inspection Record*, as a valid pre-inspection of equipment being offered for air shipment. **(T-2).** This form, validated by two joint inspector signatures (user and transporting force), may be used in lieu of the applicable portions of the T.O. 1C-135-9. However, this does not relieve the BO 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. **(T-2).**

## 13.3. Emergency Exits and Safety Aisles.

13.3.1. Passengers, troops and crew must have ready access to emergency exits. Load aircraft in such a manner that at least one unobstructed safety aisle in the cargo compartment allows

movement from the crew compartment to the aft escape hatch and access to cargo for fire-fighting. **(T-2). 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, should be stowed with checked baggage and secured for flight.

13.3.2. Aisle requirement. A safety aisle is defined as a minimum 14 inch-wide space extending from the aircraft fuselage or the edge of the extended canvas troop seat to the vertical stacking line of the cargo and is sufficient for an individual to proceed through. If, in the case of centerline cargo loading with two aisles and sufficient aisle space cannot be maintained, passengers or cargo must be downloaded according to relative shipping priority. **(T-2).** Tie-down devices are permitted, but they must not obstruct the opening or installation of hatches and operation of emergency gear or flap extension ports.

13.3.3. Ensure only adult, English-speaking passengers are seated next to emergency exits. Do not seat any passenger with infants, children under 15 years old, or physically challenged persons, in seats adjacent to emergency exits. Boom operators will demonstrate emergency hatch operation to persons seated next to emergency exits. **(T-2).**

## 13.4. Pre-Mission Duties.

13.4.1. Cargo Missions.

13.4.1.1. The BO, will coordinate with aerial port personnel to establish loading times. Loading times differing from the normal pre-departure sequence of events will be established, with PIC coordination, before the BO 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 BO checks in with the Air Terminal Operations Center (ATOC) or other designated location to obtain load brief and assist in load planning as required. The BO will ensure a fully stocked and serviceable hazardous spill kit or Protective Clothing Kit is onboard prior to cargo upload. **(T-2).**

13.4.1.1.1. Duty Boom Operator. Duty BO can be used as a means of flow control at stations with limited aerial port personnel and/or when units are deployed as part of an Expeditionary Air Refueling Squadron or tactical/contingency operation. They do not relieve the primary aircrew BO of aircraft preflight and cargo security check requirements. Duty BO ensure items loaded on aircraft do not exceed aircraft limitations and adequate restraint is applied to cargo to prevent movement. Duty BO are required to restrain cargo for flight limits. They will accomplish a basic cargo loading preflight and all appropriate loading preparation checklists prior to conducting loading operations and will ensure the flight crew receives sufficient copies of all required cargo load documentation. They will ensure the oncoming flight BO receives all required briefings on the aircraft load to include hazardous materials briefings. Duty BO duties require crew rest. **(T-2).**

13.4.1.2. Proper cargo documentation or mail documentation will accompany each load. **(T-2).** 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 will accompany the load. **(T-2).**

13.4.1.2.1. Load Data Information (Applicable to AFRC/ANG completing 618 TACC-directed mission). 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. **(T-2).** The report will be submitted on AF Form 4075, *Aircraft Load Data Worksheet*.

**13.5. Airlifting Hazardous Cargo.**

13.5.1. PICs will comply with AFMAN 24-204, *Preparing Hazardous Materials For Military Air Shipments*, and AFJI 11-204, *Operational Procedures For Aircraft Carrying Hazardous Materials*, when carrying hazardous cargo. **(T-2).**

13.5.2. AFJI 11-204 prescribes guidance and procedures to inform base support elements of arriving or departing aircraft carrying hazardous cargo. It also lists actions to be taken by aircraft commanders, aircrew members, and technical escorts during in-flight emergencies that involve such material.

13.5.2.1. For more information regarding hazardous materials, refer to AFMAN 24-204.

13.5.3. Flight Planning. Based on the Hazardous Cargo Briefing, the PIC will:

13.5.3.1. Annotate "Hazardous Cargo" on flight plans when any amount of the following is transported:

13.5.3.1.1. Division 1.1 through 1.3 explosives.

13.5.3.1.2. Division 1.4 explosives which transit United Kingdom or Italy.

13.5.3.1.3. Toxic chemical ammunition (Compatibility Group K).

13.5.3.1.4. Highly-toxic substances.

13.5.3.1.5. Division 6.2 infectious substances which require technical escorts and/or special protective equipment.

13.5.3.1.6. Nuclear weapons.

13.5.3.1.7. Class 7 Radioactive Material (Yellow III label).

13.5.3.1.8. All other hazardous materials, except Class 9 and ORM-D when aggregate gross weight exceeds 1,000 pounds (454 kg).

**13.6. Passenger Missions.** 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 dedicated to Distinguished Visitor support 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. **(T-2).**

13.6.1. Maximize seat availability on all missions. The maximum number of passengers may be limited by the aircrew complement, amount of Aircrew Flight Equipment (AFE), operable seats with seat belts, baggage securing capabilities, aircraft configuration and latrine capacity vs. personnel loading (see **Table 13.3**), as well as a thorough assessment of Operational Risk Management (ORM) based on mission requirements. Passengers should be seated as far forward in the passenger compartment as possible. Seating aft of the aft escape hatch is prohibited. PIC is the final authority for seat release.

13.6.2. Passenger Missions. A basic aircrew of two pilots and one boom operator may carry 10 passengers maximum. An additional aircrew member certified by SQ/CC in passenger handling will be assigned to the mission in order to carry more than 10 passengers (Space A/MEP/Duty Pax). **(T-3)** When an additional crewmember is carried for passenger handling duties the KC-135 may carry 36 passengers (maximum of 40 souls on board). **(T-2).** Crewmembers added to a mission to fulfill the requirements of an augmented CDT may not act as passenger monitors.

13.6.2.1. Passenger briefing requirements are the responsibility of the aircrew member performing passenger duties. Additionally, the boom operator or aircrew member assigned passenger monitor duties is responsible for passenger monitoring during the remainder of the flight unless exchanging duties with another qualified crew member.

13.6.3. Manifesting. Passenger service or base operations personnel manifest passengers at locations with an AMC passenger processing activity. Sufficient copies of the passenger manifest must be given to the boom operator prior to passenger boarding.

13.6.4. The auxiliary power unit must be shut down prior to boarding passengers unless adequate ear protection is provided. **(T-2).** A passenger service representative or crewmember should assist passengers at the bottom of the steps/stairs, and the passenger monitor should assist in seating passengers. Distinguished Visitors, passengers requiring assistance, and families should be boarded first to minimize separation. Make every effort to seat families together.

13.6.5. Brief passengers using the passenger briefing checklist. Passenger monitors will brief all passengers on emergency exits upon arrival at the aircraft. **(T-2).** The crewmember who completed the briefing is responsible for notifying the aircraft commander that the passenger briefing is complete.

13.6.5.1. Demonstration of onboard aircrew life sustaining equipment is required for all missions carrying passengers. **(T-2).** Ensure a demonstration kit is onboard prior to departure. **(T-2).** The passenger safety briefing/life sustaining equipment demonstration may be inhibited by factors such as noise, short ground times, overcrowded cargo/passenger compartments, etc. These conditions should not be used as an excuse to fail to perform a proper and thorough briefing.

13.6.6. Place one passenger information guide at each airline type seat and one for every 5 seating positions in the case of side facing troop seats. Order printed copies of the Air Force Visual Aid 11-226 at the Air Force Publications website **http://www.e-publishing.af.mil**.

13.6.7. Passenger Loading With A/M 135 Cargo Loading Roller System Installed. **Tables 13.1** and **13.2** are planning factors for carrying space available passengers. Latrine capacity (**Table 13.3**) and egress capabilities should be taken into consideration.

**Table 13.1. Space-A Only Seat Release Without Palletized Airline Seating Pallet Installed.**

| Pallets of Cargo | Seats to Release |
|---|---|
| 6 | 0 |
| 5 | 10 |

| | |
|---|---|
| **4** | **15** |
| **3** | **20** |
| **2** | **25** |
| **0-1** | **30** |

**Table 13.2. Space-A Only Seat Release with Palletized Airline Seating Pallet installed.**

| **Pallets of Cargo** | **Seat Release with all Pallets above 50”** | **Seat Release with one or more Pallets 50” or less** |
|---|---|---|
| **5** | **N/A** | **10** |
| **4** | **10** | **15** |
| **3** | **20** | **20** |
| **2** | **25** | **25** |
| **0-1** | **30** | **30** |
| **Note*:*** A troop seat is available at STA 1140 for crewmembers and crew chiefs. | | |

13.6.7.1. Do not wedge or secure baggage between pallets or between the aircraft fuselage and the adjacent right hand (RH) side of pallets. If passenger baggage is not pre-palletized, weights must be provided by passenger service or ATOC prior to loading.

13.6.7.2. Duty passenger baggage requirements and the capability to safely stow all baggage and maintain aisle space to all emergency exits should be considered in overall planning for maximum seating arrangements when using the A/M 135 roller system for deployment/redeployment. Except for unit deployment/redeployment, use the following guidance for passenger seating requirements.

13.6.7.2.1. Space-A passengers should be seated on the seat pallet in pallet position number one (if installed) or in left hand (LH) and RH troop seats adjacent to empty pallet positions. They should not be seated in troop seats adjacent to cargo pallets. To enhance egress capability when carrying space-A passengers, troop seats adjacent to cargo pallets should be stowed, if practical. The number of pallets carried must be considered before determining seat release.

13.6.7.2.2. The seat pallet should be moved forward one detent (approximately 10 inches) to provide required 30 inch spacing forward of netted or strapped cargo. A sufficient aisle to and from the cockpit must be maintained for egress. Adjust weight and balance accordingly.

**13.7. Passenger Handling.** Passengers will not lounge or sleep under or on top of cargo, baggage bins, or baggage secured to the floor. **(T-3).**

13.7.1. Meal Service. The AMC Form 148, *Boarding/Pass Ticket*, indicates if a meal was ordered by a passenger.

**13.8. Passenger Restrictions.**

13.8.1. Under normal circumstances, the total number of personnel aboard KC-135 aircraft must not exceed the number of serviceable seats with seat belts, or the capacity/capability of available AFE. Personnel will not be seated aft of the aft emergency escape hatch. **(T-3).** The PIC is the final arbiter as to how many space-A passengers can be safely transported.

13.8.2. Latrine Capacity vs. Personnel Loading. PICs should consider the limited capacity of latrine facilities when carrying passengers. Waiver authority to exceed maximum latrine capacity during deployment operations rests with the OG/CC. For all other missions, use **Table 13.3** to calculate the total latrine capacity (in gallons) required against the maximum number of personnel and the sortie duration. Add additional devices or download passengers as required to meet mission requirements. The loss of capacity from unusable devices (e.g., inoperative commode, missing urinal, etc.) must be considered before calculating personnel accommodations. Aircraft modified with the 36 gallon capacity latrine (TCTO 1C-135-1596) need not compute maximum personnel loading against **Table 13.3**. If TCTO 1C-135-1596 is installed the maximum capacity is 60 people for 12 hours.

13.8.2.1. Standard aircraft configuration with one latrine commode and two urinals provides approximately 16 gallons of total capacity. This may be reduced by up to 1.5 gallons depending on the total amount of chemically treated water (pre charge) placed in each device. Extra devices (urinals, commode cartridges) may be added to accommodate larger passenger loads/increased sortie durations provided they can be safely stored, swapped and/or used inflight. Calculate .5 gal. pre-charge for each added device. Plan configuration requirements prior to home station departure.

**Table 13.3. Latrine Capacity vs Personnel Loading Chart.**

Sortie Duration In Hours

Number of Personnel

| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 5.7 | 6.4 | 7.1 | 7.8 | 8.5 | 9.2 | 9.9 | 10.6 | 11.3 | 12.0 | 12.7 | 13.4 | 14.1 |
| 21 | 5.9 | 6.6 | 7.4 | 8.1 | 8.9 | 9.6 | 10.3 | 11.1 | 11.8 | 12.5 | 13.3 | 14.0 | 14.7 |
| 22 | 6.1 | 6.9 | 7.7 | 8.4 | 9.2 | 10.0 | 10.7 | 11.5 | 12.3 | 13.1 | 13.8 | 14.6 | 15.4 |
| 23 | 6.3 | 7.1 | 7.9 | 8.7 | 9.6 | 10.4 | 11.2 | 12.0 | 12.8 | 13.6 | 14.4 | 15.2 | 16.0 |
| 24 | 6.5 | 7.4 | 8.2 | 9.1 | 9.9 | 10.7 | 11.6 | 12.4 | 13.3 | 14.1 | 14.9 | 15.8 | 16.6 |
| 25 | 6.8 | 7.6 | 8.5 | 9.4 | 10.3 | 11.1 | 12.0 | 12.9 | 13.8 | 14.6 | 15.5 | 16.4 | 17.3 |
| 26 | 7.0 | 7.9 | 8.8 | 9.7 | 10.6 | 11.5 | 12.4 | 13.3 | 14.2 | 15.2 | 16.1 | 17.0 | 17.9 |
| 27 | 7.2 | 8.1 | 9.1 | 10.0 | 11.0 | 11.9 | 12.8 | 13.8 | 14.7 | 15.7 | 16.6 | 17.6 | 18.5 |
| 28 | 7.4 | 8.4 | 9.3 | 10.3 | 11.3 | 12.3 | 13.3 | 14.2 | 15.2 | 16.2 | 17.2 | 18.2 | 19.1 |
| 29 | 7.6 | 8.6 | 9.6 | 10.6 | 11.7 | 12.7 | 13.7 | 14.7 | 15.7 | 16.7 | 17.7 | 18.8 | 19.8 |
| 30 | 7.8 | 8.9 | 9.9 | 11.0 | 12.0 | 13.1 | 14.1 | 15.2 | 16.2 | 17.3 | 18.3 | 19.4 | 20.4 |
| 31 | 8.0 | 9.1 | 10.2 | 11.3 | 12.4 | 13.4 | 14.5 | 15.6 | 16.7 | 17.8 | 18.9 | 19.9 | 21.0 |
| 32 | 8.2 | 9.3 | 10.5 | 11.6 | 12.7 | 13.8 | 14.9 | 16.1 | 17.2 | 18.3 | 19.4 | 20.5 | 21.7 |
| 33 | 8.4 | 9.6 | 10.7 | 11.9 | 13.1 | 14.2 | 15.4 | 16.6 | 17.7 | 18.8 | 20.0 | 21.1 | 22.3 |
| 34 | 8.6 | 9.8 | 11.0 | 12.2 | 13.4 | 14.6 | 15.8 | 17.0 | 18.2 | 19.4 | 20.6 | 21.7 | 22.9 |
| 35 | 8.9 | 10.1 | 11.3 | 12.5 | 13.8 | 15.0 | 16.2 | 17.4 | 18.7 | 19.9 | 21.1 | 22.3 | 23.6 |
| 36 | 9.1 | 10.3 | 11.6 | 12.8 | 14.1 | 15.4 | 16.6 | 17.9 | 19.1 | 20.4 | 21.7 | 22.9 | 24.2 |
| 37 | 9.3 | 10.6 | 11.9 | 13.2 | 14.5 | 15.7 | 17.0 | 18.3 | 19.6 | 20.9 | 22.2 | 23.5 | 24.8 |
| 38 | 9.5 | 10.8 | 12.1 | 13.5 | 14.8 | 16.1 | 17.5 | 18.8 | 20.1 | 21.5 | 22.8 | 24.1 | 25.4 |
| 39 | 9.7 | 11.1 | 12.4 | 13.8 | 15.2 | 16.5 | 17.9 | 19.2 | 20.6 | 22.0 | 23.3 | 24.7 | 26.1 |
| 40 | 9.9 | 11.3 | 12.7 | 14.1 | 15.5 | 16.9 | 18.3 | 19.7 | 21.1 | 22.5 | 23.9 | 25.3 | 26.7 |
| 41 | 10.1 | 11.5 | 13.0 | 14.4 | 15.9 | 17.3 | 18.7 | 20.2 | 21.6 | 23.0 | 24.5 | 25.9 | 27.3 |
| 42 | 10.3 | 11.8 | 13.3 | 14.7 | 16.2 | 17.7 | 19.1 | 20.6 | 22.1 | 23.6 | 25.0 | 26.5 | 28.0 |
| 43 | 10.5 | 12.0 | 13.5 | 15.0 | 16.6 | 18.1 | 19.6 | 21.1 | 22.6 | 24.1 | 25.6 | 27.1 | 28.6 |
| 44 | 10.7 | 12.3 | 13.8 | 15.4 | 16.9 | 18.4 | 20.0 | 21.5 | 23.1 | 24.6 | 26.1 | 27.7 | 29.2 |
| 45 | 11.0 | 12.5 | 14.1 | 15.7 | 17.3 | 18.8 | 20.4 | 22.0 | 23.6 | 25.1 | 26.7 | 28.3 | 29.9 |
| 46 | 11.2 | 12.8 | 14.4 | 16.0 | 17.6 | 19.2 | 20.8 | 22.4 | 24.0 | 25.7 | 27.3 | 28.9 | 30.5 |
| 47 | 11.4 | 13.0 | 14.7 | 16.3 | 18.0 | 19.6 | 21.2 | 22.9 | 24.5 | 26.2 | 27.8 | 29.5 | 31.1 |
| 48 | 11.6 | 13.3 | 14.9 | 16.6 | 18.3 | 20.0 | 21.7 | 23.3 | 25.0 | 26.7 | 28.4 | 30.1 | 31.7 |
| 49 | 11.8 | 13.5 | 15.2 | 16.9 | 18.7 | 20.4 | 22.1 | 23.8 | 25.5 | 27.2 | 28.9 | 30.7 | 32.4 |
| 50 | 12.0 | 13.8 | 15.5 | 17.3 | 19.0 | 20.8 | 22.5 | 24.3 | 26.0 | 27.8 | 29.5 | 31.3 | 33.0 |
| 51 | 12.2 | 14.0 | 15.8 | 17.6 | 19.4 | 21.1 | 22.9 | 24.7 | 26.5 | 28.3 | 30.1 | 31.8 | 33.6 |
| 52 | 12.4 | 14.2 | 16.1 | 17.9 | 19.7 | 21.6 | 23.3 | 25.2 | 27.0 | 28.8 | 30.6 | 32.4 | 34.3 |
| 53 | 12.6 | 14.5 | 16.3 | 18.2 | 20.1 | 21.9 | 23.8 | 25.6 | 27.5 | 29.3 | 31.2 | 33.0 | 34.9 |
| 54 | 12.8 | 14.7 | 16.6 | 18.5 | 20.4 | 22.3 | 24.2 | 26.1 | 28.0 | 29.9 | 31.7 | 33.6 | 35.5 |
| 55 | 13.1 | 15.0 | 16.9 | 18.8 | 20.8 | 22.7 | 24.6 | 26.5 | 28.5 | 30.4 | 32.3 | 34.2 | 36.2 |
| 56 | 13.3 | 15.2 | 17.2 | 19.1 | 21.1 | 23.1 | 25.0 | 27.0 | 28.9 | 30.9 | 32.9 | 34.8 | 36.8 |
| 57 | 13.5 | 15.5 | 17.5 | 19.5 | 21.5 | 23.4 | 25.4 | 27.4 | 29.4 | 31.4 | 33.4 | 35.4 | 37.4 |
| 58 | 13.7 | 15.7 | 17.7 | 19.8 | 21.8 | 23.8 | 25.9 | 27.9 | 29.9 | 32.0 | 34.0 | 36.0 | 38.0 |
| 59 | 13.9 | 16.0 | 18.0 | 20.1 | 22.2 | 24.2 | 26.3 | 28.3 | 30.4 | 32.5 | 34.5 | 36.6 | 38.7 |
| 60 | 14.1 | 16.2 | 18.3 | 20.4 | 22.5 | 24.6 | 26.7 | 28.8 | 30.9 | 33.0 | 35.1 | 37.2 | 39.3 |

| | |
|---|---|
| *NOTES:* Chart Go/No-Go coding based on standard acft config of 1 commode and 2 urinals | |
| Go | Meets mission requirements |
| | May exceed capacity. Consider adding additional devices |
| No-Go | Exceeds capacity. Add additional devices and recalculate (Notes 1, 2 and 3) or download pax |
| 1. Device capacity: commode cartridge = 4 gal., urinal = 6 gal | |
| 2. Pre-charge is approximately .5 gal per device | |
| 3. Caution (Yellow) area reflects max capacity reduction for chemical pre-charge | |
| 4. Missions less than 6 hours and/or less than 20 pax need not be calculated. | |

**13.9. Human Remains.** Transport human remains on KC-135 aircraft IAW AMCI 11-208, *Mobility Air Forces Management*, and AMCI 24-6051V11, *Cargo and Mail Policy*, guidance. **(T-1).**

# Chapter 14

# FUEL PLANNING AND CONSERVATION

**14.1. General.** This chapter is designed to assist pilots and planners in fuel planning for KC- 135 missions. AMC approved flight planning software and T.O. 1C-KC-135-1-1, Performance Manual are the primary preflight references. The planning procedures in this chapter apply to all AMC-tasked and 618 Air Operations Center (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.**

14.2.1. Fuel Loads. Authorized Fuel Loads and Sequences. Aircraft will be loaded with fuel according to requirements of T.O. 1C-135-5-3, Fuel Loading Data. **(T-3).** Non-AMC units may develop standard alternate fuel requirements for local training missions; however, these fuel requirements will not be less than those specified in this volume. Tankering fuel for convenience is prohibited. **(T-3).** FM-planned tankered fuel is deemed operationally necessary, and will be included in the required ramp fuel load (RRFL). Excessive ramp and recovery fuel adds to aircraft gross weight and increases fuel consumption. Do not ferry extra fuel beyond optimum requirements for safe mission accomplishment and training objectives.

14.2.2. Taxi. Consider two engine (symmetric) taxi after conclusion of the mission.

14.2.3. Cargo Loading for Optimal Fuel Efficient Center of Gravity (CG). Optimal zero fuel CG is 25% of MAC for the KC-135.

**14.3. Fuel Planning Procedures.**

14.3.1. Using all available planning tools (including MAFPS, ACFP, and Computer Flight Plan) 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.

14.3.1.1. Identified extra fuel may be added to RRFL:

14.3.1.1.1. When fuel availability is limited or not available at enroute stops.

14.3.1.1.2. For known holding delays in excess of standard.

14.3.1.1.3. For anticipated off course weather avoidance.

14.3.1.1.4. When reliable wind data or receiver profiles are not available.

14.3.1.2. Airlift missions. Plan Long Range Cruise (LRC) and optimum altitude.

14.3.1.3. Tanker Mission. Plan to and from the AAR track or anchor at LRC and optimum altitude.

14.3.2. When a PIC believes the fuel load is insufficient to execute the mission, the PIC should contact the Flight Manager to identify and resolve the differences. When the PIC and Flight Manager do not reach an agreement, the PIC is the final authority for adding additional fuel. The Flight Manager will add a comment to the crew papers indicating the final fuel load, “as determined by the AC”. **(T-2).**

**14.4. Fuel Requirements.** This section augments AFI 11-202V3 fuel requirements.

14.4.1. Required Ramp Fuel. Will consist of all fuel required for mission accomplishment, to include fuel required for engine start, taxi, APU operation, takeoff, enroute, enroute reserve, air refueling, depressurization, descent, approach and landing, alternate, transition, and holding/minimum landing. Zero fuel baseline is 4,400 lbs (2,000 lbs in the forward body tank for ballast and 600 lbs in each of the main tanks). This zero fuel baseline, plus reserve fuel, contingency fuel and any other identified alternate and/or required fuel will be used to calculate planned final landing fuel. When Actual Fuel Load exceeds the RRFL by more than 5,000 lbs, defuel the aircraft to the RRFL. When there is a conflict between an on time departure and defueling, the OG/CC will determine which takes precedence. **(T-3).**

14.4.2. Start Engines, Taxi, APU operation, and Takeoff. A standard planning factor of 2500 lbs of fuel is typically used. Fuel planning may be adversely affected by considerable taxi operations or ATC delays.

14.4.3. Enroute Fuel. Fuel from Start of Climb segment at the departure location to Begin Descent Point at destination.

14.4.4. Category 1 Reserves. Not authorized.

14.4.5. Air Refueling Fuel. Scheduled offload. **Exception**: For KC-135 R/T receiver aircraft, scheduled offload minus scheduled onload. If scheduled onloads are not completed it may be impossible to complete the mission.

14.4.6. Extra Fuel. The difference between the flight planned fuel and the fuel on board the plane will not exceed 5,000 pounds. **(T-2).** The extra fuel may be added to RRFL: when fuel availability is limited or not available at enroute stops, for known holding delays in excess of standard, for anticipated off course weather avoidance, when reliable wind data or receiver profiles are not available.

14.4.6.1. Use 2,500 pounds if forecasted thunderstorms are scattered or numerous along the route of flight, 1,300 pounds if forecast thunderstorms are few along the route of flight, and 700 pounds if forecast thunderstorms are isolated along the route of flight. **(T-2).** Thunderstorm forecasts is based on the DD Form 175-1, *Flight Weather Briefing*, or equivalent.

14.4.6.2. 618 AOC (TACC) and local missions add 15 minutes (3,000 lbs) of East coast hold down fuel for departures from Andrews, Dover, Martinsburg, McGuire, Stewart, and Westover. **Note:** Hold down fuel is added as a departure bias and is burned at the top of climb. For Flight Managed missions, hold down fuel is annotated on the ACFP as "Fuel D" at the beginning of the ACFP and accounted for in the top of climb fuel block on the ACFP.

14.4.6.3. 618 AOC (TACC) and local missions add 15 Minutes (3,000 lbs) of early descent fuel for Andrews, Dover, Martinsburg, McGuire, Stewart, and Westover arrivals. **Note**: Early descent fuel is added as an arrival bias and is burned on the last leg. For Flight Managed missions, early descent fuel is annotated on the ACFP as "Fuel A" at the beginning of the ACFP and accounted for in the last leg fuel block on the ACFP.

14.4.6.4. Transition. Fuel for transition training at the destination. Compute at 7.5% of airplane gross weight per hour. This includes fuel for the initial approach. Crews should

consider terminating transition training when any main wing tank reaches 1,000 pounds of fuel remaining.

14.4.7. Depressurization Fuel. During all flight portions, crews will plan to exercise depressurization procedures in accordance with T.O.s and AFI 11-202V3, **paragraph 3.14.2**. Crews will verify ACFP calculated fuel required to a recovery airfield in the event of depressurization at the ETP, to determine if additional fuel must be added. **(T-2).** Crews should manually calculate ETP/decompression fuel required if ACFP in unavailable.

14.4.7.1. The ACFP calculates decompression fuel from the ETP at 10,000ft altitude. If additional fuel is required from the ETP, the ACFP automatically adds it to Block 10 of the ACFP. Plan to arrive at the recovery airfield with 0+30 minutes reserve fuel at optimal cruise speed for the depressurization transit altitude. Depressurization fuel is not cumulative with enroute reserve fuel or contingency fuel. Forecast weather conditions for the recovery airfields (ETA +/- 1 Hour) will meet or exceed minimums for the lowest compatible approach or 500/1 whichever is greater. **(T-2).**

14.4.7.2. Where weather conditions dictate, add only one of the following fuel corrections. Thunderstorm corrections are not cumulative. Use the highest applicable correction for the forecast conditions.

14.4.7.2.1. Flight managers will include 4 minutes (700 lbs) of fuel if forecast thunderstorms are isolated along the route of flight. **(T-2).**

14.4.7.2.2. Flight managers will include 8 minutes (1300 lbs) of fuel if forecast thunderstorms are few along the route of flight. **(T-2).**

14.4.7.2.3. Flight managers will include 15 minutes (2500 lbs) of fuel if forecast thunderstorms are scattered or numerous along the route of flight. **(T-2).**

14.4.7.3. Equal Time Point (ETP). First Suitable Airfield (FSAF) and Last Suitable Airfield (LSAF) are used in the ETP calculation. These are represented as the First Nearest and the Last Nearest airports in the ETP calculation. They are 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. **(T-2).** ACFP plans to arrive overhead at the recovery location with 0+30 minutes reserve fuel. Additional fuel (e.g., descent, approach, and landing) may be required, based on mission requirements.

14.4.7.3.1. ETP Calculation. Plan to land at the recovery location with 0+30 minutes reserve fuel. 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.

14.4.7.3.2. If the LSAF/FSAF is not on the flight plan course, ACFP uses a point 90 degrees perpendicular from the LSAF and/or FSAF to the flight plan course to determine the total distance between LSAF and FSAF. **Note**: The closer the LSAF and FSAF are to the flight plan course the more accurate the ETP solution provided by ACFP.

14.4.8. Descent, Approach and Landing. Plan an enroute descent whenever possible.

14.4.8.1. Minimum Planned Fuel at Begin Descent Point. Consists of fuel required for descent, approach and landing, alternate/missed approach, and holding/minimum landing fuel. Units may develop standard alternate fuel requirements for local training missions however; these fuel requirements will not be less than those specified in this manual. Unit local supplements will not dictate "IAF" or "Top of Descent Fuel". **(T-2).**

14.4.9. Alternate. Select alternate airports meeting the requirements of AFI 11-202V3, General Flight Rules. When selecting an alternate, suitable military airfields are preferred if within 75 nautical miles of destination. Plan a 45 minute fuel reserve at the alternate. **Note**: The practice of selecting an alternate in another weather system or selecting an alternate based on maintenance capability will no longer be used.

14.4.9.1. Plan fuel to an alternate only when AFI 11-202V3 requires an alternate to be filed. If two alternates are required, fuel plan to the more distant of the two meeting AFI 11-202V3 weather criteria.

14.4.10. Planned Landing Fuel. At no time will crews be planned to land with less than 13,000 pounds of fuel remaining. **(T-3).**

14.4.11. Minimum or Emergency Fuel Advisory. Declare "minimum fuel" to the appropriate controlling agency when the crew determines they can accept little or no delay upon reaching the destination. Crews will land prior to reaching 9,200 pounds of fuel remaining (4,400 ZFW + 4,800 Reserve). Crews should not hesitate to declare an emergency at any time the fuel remaining is in question.

# Chapter 15

# AIR REFUELING

**15.1. General.** This chapter establishes air refueling guidelines applicable to KC-135 aircraft and aircrews and is supplemental to those prescribed by the flight manual and other applicable directives.

**15.2. AAR Limitations.** The following limitations apply:

15.2.1. AAR altitudes. AAR operations will be conducted above 12,000 feet Mean Sea Level (MSL), or 10,000 feet AGL, whichever is higher. **(T-2).** Comply with Low Altitude Operations procedures/restrictions in aircraft Technical Order (Section V). **Exception:** C-130, C-17, and A-10 receivers may be refueled as low as 5,000 feet AGL, if mission requirements dictate.

15.2.1.1. AAR operations based at or above 12,000 feet MSL, which momentarily fall below 10,000 feet AGL, but no lower than 5,000 feet AGL, due to over flight of mountain ridges, peaks, etc., are permissible.

15.2.1.2. If refueling must be accomplished below 10,000 feet AGL, limit refueling time to the minimum required to meet operational requirements and then immediately recover to normal refueling altitudes. Crews must ensure thorough knowledge of terrain features when operating below 10,000 feet AGL. **(T-2).**

15.2.1.3. Pilots will fly no lower than an altitude that provides at least 5,000 ft. of clearance above the highest obstruction or terrain within 5 nautical miles either side of the planned course centerline. **(T-2).**

15.2.2. Refueling During Missions. AAR should not be accomplished during missions under the following conditions unless operational necessity dictates. **(T-2).**

15.2.2.1. Conditions result in marginal control of either aircraft or boom (in the opinion of either the PIC or BO).

15.2.2.2. Either tanker or receiver (except B-52) has less than the full number of engines operating.

15.2.2.3. Tanker aircraft is unable to retract the landing gear.

15.2.2.4. Pod Control Panel malfunction exists that cannot be resolved.

15.2.2.5. MPRS pod malfunction. If Pod Control Panel is operational and only one pod is malfunctioning, AAR is permissible with operational pod.

15.2.2.6. Reduced visibility due to fluid accumulation on the sighting window at the discretion of the boom operator.

15.2.3. Tanker Autopilot. Tanker pilots should ensure the boom operator notifies receiver pilots when any axis of the autopilot is not used. If a tanker pilot or receiver pilot is required to fly autopilot-off for qualification training, the pilot flying the opposing aircraft will be qualified. **(T-3).** Verbal notification and acknowledgement should take place between the tanker and receiver prior to conducting autopilot-off training. **Note**: This restriction does not

apply during FTU training provided the student receiver pilot and the student tanker pilot are under direct IP supervision.

15.2.4. AAR Without Tanker Disconnect Capability. Without tanker disconnect capability means the BO cannot trigger an immediate disconnect. After a known loss of tanker disconnect capability with a particular receiver, do not attempt further contacts with that receiver. **(T-2).** If the tanker signal system (signal coil) checks good, contact attempts with other receivers are permitted. If an immediate disconnect cannot be triggered on two successive receiver systems, no further contacts will be attempted. **(T-2).** Receiver pilots may attempt a contact with another tanker; however, after two successive failures to disconnect from multiple tankers, no further contacts will be attempted with that receiver. **(T-2). Exception:** Fuel emergency situations, OPLAN 801X missions, contingency missions, JCS alert, receiver over water deployment or re-deployment, operational reconnaissance missions, Prime Nuclear Airlift Force support missions under normal conditions when the refueling is essential for home base recovery, or when authorized in the mission directive. AAR without tanker disconnect capability, will only be accomplished under the following circumstances: **(T-2).**

15.2.4.1. Limit contacts to the minimum number necessary to complete mission requirements.

15.2.4.2. Limit duration of contacts to minimum required to offload fuel needed for mission accomplishment.

15.2.4.3. Do not accomplish boom limit demonstrations, or practice emergency separations while in contact.

15.2.5. Manual Boom Latching [also referred to as Emergency Boom Latching]. Normal tanker disconnect capability and automatic disconnect limits are inoperative. When accomplishing these procedures for training and evaluation the following conditions apply: **(T-3).**

15.2.5.1. Direct IP supervision on board receiver aircraft (if other than fighter type).

15.2.5.2. Limit contacts to minimum required.

15.2.5.3. Receiver and tanker AAR systems must be fully operable.

15.2.5.4. Demonstrated receiver pilot initiated disconnect capability must exist.

15.2.5.5. Do not accomplish boom limit demonstrations, or practice emergency separations. **Note**: The BO and receiver pilot must coordinate all actions required by applicable directives and checklists when making AAR contacts during the situations listed above.

15.2.6. Reverse AAR will be accomplished only in an emergency or for operational necessity, or IAW FTU or USAFWS syllabus training. **(T-2).**

15.2.7. Practice Emergency Separations.

15.2.7.1. Prior to actual accomplishment of a practice emergency separation, coordination between the tanker pilot, BO, and receiver pilot is mandatory. **(T-2).** Coordination must include information on when the separation will occur and who will give the command of execution. Tanker pilot coordination may be accomplished over interphone with the BO.

15.2.7.2. A practice emergency separation will not be called during the first contact event with each receiver. **(T-2).** A contact event is defined as a contact, boom operator initiated disconnect, and return to astern. If separation is initiated from contact, the tanker disconnect capability must first be verified.

15.2.7.3. May be accomplished with passengers on board. Ensure all passengers are seated with seat belts fastened. **(T-2).**

15.2.8. Limits Demonstration. KC-135 tanker disconnect capability must be verified by a BO initiated disconnect prior to receivers conducting limits demonstrations. **(T-2).**

15.2.9. Boom Operator Qualification or Training. Unqualified and non-current boom operators must be under direct instructor supervision to conduct AAR operations. **(T-2).** Instructor boom operators supervising AAR must have immediate access to the ruddevator control stick, and have immediate communication capability with receiver pilot. **(T-2).**

15.2.10. Operator Fatigue. If BO or receiver pilot fatigue becomes a factor during AAR operations, the receiver will maintain well clear until fatigue is no longer a factor (operator judgment).

15.2.11. Weather limitations:

15.2.11.1. Terminate refueling if moderate turbulence is encountered.

15.2.11.2. Discontinue refueling if in-flight visibility is insufficient to continue safe refueling operations.

**15.3. Search and Rescue (SAR) Procedures.** Accomplishing SAR procedures IAW AFI 11-207. In an emergency, the flight leader immediately notifies the tanker commander. The tanker aircrew notifies ATC. In the event of a downed or ditched receiver, ATC notifies the Rescue Coordination Center, which in turn alerts the nearest SAR assets. The tanker provides On-Scene Commander responsibilities as long as fuel reserves allow. Remaining receivers proceed unescorted to the nearest abort base or continue the mission with remaining tankers.

**15.4. Opportune Air Refueling.**

15.4.1. PICs must receive permission from controlling authority (OG/CC, 618 AOC (TACC), etc.) prior to accomplishing opportune AAR with US receivers. **(T-2).**

15.4.2. The tanker and receiver aircraft must be technically compatible IAW ATP-3.3.4.2, *Air-to-Air Refueling,* and US Standards Related Document (SRD).

**15.5. Emergency AAR Tasking.** When an emergency AAR requirement arises, units tasked should attempt to fill the requirement from available unit resources. Use unit training sorties as first priority and generated alert sorties as second priority. If no capability exists, notify the controlling agency of the requirement and unit shortfall.

**15.6. Air-to-Air Refueling with Foreign Aircraft.** ATP-3.3.4.2 and the US SRD serve as the source documents for air refueling information among participating countries and is no longer limited to NATO countries only.

15.6.1. Tankers will only refuel those aircraft listed in ATP-3.3.4.2 and the US SRD or specifically authorized by MAJCOM/A3V, Air Tasking Order, Operational Order (OPORD), Exercise Order, or on approved flying schedule. Receiver aircraft not previously certified for

refueling operations (includes foreign variants of US-produced aircraft) must be certified for technical and operational compatibility in accordance with ATP-3.3.4.2 prior to refueling (N/A AFMC).

15.6.2. AAR of foreign aircraft must be tasked by proper C2 authority. Opportune AAR of foreign aircraft is prohibited. **(T-2).**

**15.7. Coronet East Mission Over Flights in France.** Aircrews must explicitly follow pre-coordinated mission profiles on missions that transit French airspace. Although Altitude Reservations (ALTRVs) are not formally recognized in the French ATC system, pre-coordinated Coronet East Missions are afforded a certain degree of additional protection while in French airspace. In exchange for this special handling, it is absolutely essential aircrews adhere to pre-coordinated routes and altitudes to avoid problems (including the portion of the flight to/from the ALTRV). Failure to do so creates difficult diplomatic situations and jeopardizes future authorization for US Military over flights of France. Aircrews should not request any maneuvers that have not been coordinated in advance with French ATC. Examples of these maneuvers include formation split up and rejoin (unless pre-coordinated). During the portion of the flight to/from the ALTRV, tanker and receivers must remain in formation at a single altitude while in French airspace. If a request (even if pre-coordinated) is denied by the controller, follow their instructions.

# Chapter 16

# MISSION PLANNING

**16.1. General.** This chapter standardizes procedures for planning, briefing, and reviewing all missions. The PIC is ultimately responsible for the accuracy of the mission materials. Unit mission planning facilities should possess essential mission planning material.

16.1.1. Mission planning is normally conducted the day before the mission. Operations group commanders may elect to use a "same day mission plan" option.

16.1.2. Mission Commander. Refer to AFMAN 11-202V3 AMC SUP for specific mission commander requirements and qualification criteria. AFTTP 3-3.KC-135 contains a mission commander's checklist that is intended to assist mission commanders with their duties and responsibilities.

16.1.3. Theater Indoctrination Folders (Part IV of Flight Crew Information File (FCIF)) should provide additional information for aircrew and planning staff review (Not applicable for ANG or AFRC).

**16.2. Pre-Deployment Briefing.** Prior to deployments, the operations officer, mission commander, or designated representative should assemble the crew and brief description and purpose of the mission, tentative itinerary, aircraft configuration, special equipment, fuel load, clothing required, anticipated housing and messing facilities, sufficient money to defray individual's anticipated expenses, personal equipment/field equipment requirements, special clearance requirements, and flying safety.

**16.3. Mission Debriefings.** Hold immediately after the mission if practical. In addition to the requirements in **Chapter 6** of this manual, include the following:

16.3.1. Aircrews will attend the operations and maintenance debriefings as directed by unit or mission commander. Maintenance debrief should be conducted as soon as possible after flight. **(T-3).**

16.3.2. Intelligence debriefings will be accomplished IAW the Mobility Intelligence Reporting Directive. **(T-2).**

16.3.3. Aircrew Debrief. Mission critiques and debriefings are perhaps the most important learning tool available to aircrews and should be done after each mission. Use this time to review the entire mission utilizing the AMC debriefing guide.

# Chapter 17

# EMPLOYMENT

**17.1. General.** Refer to AFTTP 3-3.KC-135 for additional guidance on tactics training, specific maneuver descriptions, and tactical maneuver procedures. All crewmembers must complete tactics certification IAW AFI 11-2KC-135V1. **Note**: Certain technical information was intentionally omitted or generalized to keep this chapter unclassified. Users should be aware that written additions to any portion of this document could cause the manual to become classified.

**17.2. Responsibilities.** The tactics training program is a coordinated effort between the unit's intelligence office, wing/group training office, and wing/group weapons and tactics flight, in order to ensure continuity and the unit's specific mission tasking is addressed. The unit tactics officer is responsible for developing procedures for timely dissemination of tactical information to unit aircrew members. See AMCI 11-207, *Weapons and Tactics Program*, for the Tactics Reference Library and Tactic Read File.

**17.3. Tactics Flight Training.**

17.3.1. Tactical Maneuvers. Accomplish tactical maneuvers IAW procedures provided in AFTTP 3-3.KC-135. Once certified, tactical maneuvers may be flown on continuation training and operational missions with passengers on board. Notify passengers prior to conducting tactics maneuvers training.

17.3.2. Objectives. Accomplish all flight maneuvers with strict adherence to aircraft limitations as defined in KC-135 tech orders and this manual.

17.3.3. Flight Training Limitations and Restrictions:

17.3.3.1. Limitations. The following limitations apply to all in-flight tactics training.

17.3.3.1.1. Aircraft tactical arrival and departure training is limited to VMC, three aircraft or less if in formation, a maximum of 45 degree angle of bank, and ingress/egress altitudes of 500ft AGL minimum. **Exception:** Formation overhead arrivals and departures using Minimum Interval Takeoff (MITO) or flush procedures may exceed the three aircraft limitation.

17.3.3.1.2. Aircraft scram training is limited to VMC, a maximum of 45 degrees angle of bank, and 10,000ft AGL minimum altitude. Scatter turns are limited to two-ship formations. **Exception:** Three-ship formation IMC scatter/scram authorized for USAFWS.

17.3.3.1.2.1. Combat descents done in conjunction with formation scram training require IP supervision on one of the aircraft for the purpose of managing formation de-confliction. **Note**: When accomplishing a turning combat descent as single ship or formation, conduct in VMC under IP supervision. **Exception:** IMC combat descent authorized for USAFWS.

17.3.3.1.3. Limit formation in-place turns to a maximum of 30 degrees of bank and 90 degrees of turn. **Exception:** Up to 180 degrees of turn and 45 degrees of bank angle for USAFWS.

17.3.3.2. Intercept Training Restrictions/Procedures. See AFI 11-214, *Air Operations Rules and Procedures*, for specific guidance.

**17.4. Emergency Airlift of Personnel.** Reference T.O. 1C-135-9.

17.4.1. One small carry-on bag placed in passenger's lap is permitted.

17.4.2. The maximum altitude for emergency airlift will not exceed FL250. **(T-2).**

17.4.3. For airlift of patients, see **Chapter 20** of this manual.

## Chapter 18

## AIRCRAFT FORMATION

**18.1. General.** This chapter covers basic formation procedures and operations. All procedures described apply to all KC-135, KC-46, and KC-10 aircraft. The broad term "formation" as used does not differentiate between specific tactics of enroute formation or visual formation. Specific references to each tactic must be made to ensure complete understanding. **(T-3).**

18.1.1. All formation flights will be planned, briefed, and critiqued in accordance with the applicable flight manuals, this manual, ATP-3.3.4.2 and AFTTP 3-3.KC-135. **(T-2).**

18.1.2. Dissimilar aircraft formation (KC-135 vs non-B767 type aircraft) may be conducted with participating OG/CC (or equivalent) approval. Dissimilar formations tasked by an AOC with execution authority assumes this authority. At a minimum, comply with this manual, AFTTP3-1/3, and ATP3.3.4.2 (and appropriate National SRDs).

**18.2. Formation Sequence of Events (SOE).** The formation leader determines the SOEs and mission times based on mission requirements. Local SOEs for formation training missions may be established for use at home station. Changes in briefing or mission timing should be relayed to all formation members at the earliest opportunity.

18.2.1. Formation Briefing. The formation leader will conduct a detailed briefing for all crewmembers covering the planned activities, procedures, techniques, specific Emission Control (EMCON) procedures, and division of formation responsibilities. **(T-3).** PICs may excuse crewmembers from the formation briefing to perform preflight duties, however the PIC will back brief all appropriate items. **(T-3).** If lead changes are planned, each formation lead will brief their portion of the mission. **(T-3).** The formation leader will ensure all crewmembers thoroughly understand their responsibilities, to include assumption of formation leadership. **(T-3).**

18.2.1.1. Non-co-located Units. If aircraft depart from separate bases and then rendezvous for formation activity, the formation lead should make every effort to conduct a telephone briefing with joining tanker and receiver formation leaders. If this is not possible, after detailed sortie study, the coordination and briefing between the appropriate lead planning agencies or mission commanders will satisfy formation briefing requirements. At a minimum, radio contact should be established between all formation aircraft NLT 15 minutes prior to join up. The formation lead will ensure altitude separation for aircraft in the formation or joining the formation. Coordination of these formations will include designation of mission commander responsibilities for all phases of the formation operation. **(T-3).**

18.2.1.2. Unit Responsibilities. Each unit should develop post takeoff separation procedures and departure separation plans with the local controlling agency. Each plan must consider emergency aspects, aircraft performance capabilities, terrain features, penetration of weather after takeoff, and local ATC restrictions. Procedures should also be developed for items such as aborts, lost communications, EMCON, and the recovery of formation aircraft.

18.2.2. Filing Procedures. Formation flights which do not consist of all RVSM aircraft will be considered non-RVSM compliant and will have 2,000 ft vertical separation standards applied in RVSM airspace. **(T-0).**

**18.3. Ground Operations.** The formation leader should accomplish radio checks and copy ATC clearance in the chocks. All formation members should make every effort to accomplish HAVE QUICK and SECURE VOICE radio operations on all local formation training missions. All participating crews should accomplish as much of the pre-takeoff checklists as possible prior to taxi. Lead should obtain engine start, taxi, and takeoff clearance for the formation.

**18.4. Communications and Radio Procedures.** Radio and interphone discipline are critical factors in maintaining formation integrity. The formation leader will ensure all formation members have a complete understanding of the radio communication plan. **(T-3).**

18.4.1. Formation will not be flown on training sorties without inter-plane voice communications capability. **(T-3).** All radios are not required to be operable provided formation members have direct communication ability.

18.4.2. When radio silent operations are required, the formation leader will pre-brief all formation members on specific procedures for frequency changes (i.e., timing, visual signals, etc.). **(T-3).**

18.4.3. The flight lead will initiate all frequency changes. Lead will allow enough time for frequency change to be accomplished before initiating check-in. Lead must ensure all flight members are on frequency before initiating any action or making any radio calls to ARTCC, etc. **(T-3).** If a flight member does not respond, interplane frequency, a tertiary frequency, or guard may be used to direct the wingman to the proper frequency. Specific procedures should be pre-briefed by the flight lead. Crews should maintain non-primary radios during silent operations; however, planned frequency changes may be performed on briefed timing or visual signals. All flight members must be on a common frequency. **(T-3).**

**18.5. Launch, Departure, and Level-Off.**

18.5.1. Takeoff Timing Interval. Defined as the time between initiation of takeoff power for each successive aircraft in the formation. Use of takeoff power radio calls is not recommended. Minimum takeoff timing interval is 60 seconds between KC-135 and other non-KC-135 aircraft in the formation. Normal timing interval between KC-135s is 30 seconds. Takeoff interval may be extended and sequence may be varied as necessary depending on aircraft acceleration and performance, training requirements, weather, airfield conditions, and mission requirements. **Exception**: USAFWS and crews who have completed MAJCOM-approved MITO training and certification are authorized to perform reduced takeoff departure intervals between KC-135 aircraft.

18.5.2. Departure. (N/A Fighter Buddy Departure) Planned climb speed will not be less than the heaviest aircraft's three-engine Climbout + 50kts. Above 10,000 feet MSL the normal planned climb speed is 285 KIAS. Above 10,000 feet MSL, for mixed KC-10/KC- 135 cell formation departures, the normal planned departure speed is 295 KIAS (**Note**: this equates to 290 knots in the KC-10) for formations with KC-10s less than 500,000 pounds gross weight and 315 KIAS (**Note**: this equates to 310 KIAS in the KC-10) for formations with KC-10s equal to or greater than 500,000 pounds gross weight. Planned climb speeds apply to the lead aircraft only. Following aircraft may exceed/lag these speeds as necessary to accomplish the

rejoin and maintain proper formation position. Climb speed schedules which result in KC-10s climbing with slats extended will be avoided. If visual, radar, A/A TACAN, TCAS, and radio contact are all lost, and altitude separation cannot be ensured, lost wingman and locally developed abort procedures will be accomplished. **(T-3).**

18.5.2.1. Formation Join-Up. The use of visual cut-off is restricted to day/VMC operations only and requires approval from ATC.

18.5.2.2. Buddy Departures (Tanker Snake/Formation Climb Procedures). Reference ATP-3.3.4.2.

18.5.2.2.1. VMC Procedures. VMC procedures may be used when weather (ceiling and visibility) is 3000/5 or greater.

18.5.2.2.2. IMC Procedures. Under IMC or when weather is less than 3000/5, plan to rendezvous the formation at an orbit point along the route of flight.

18.5.3. Level-Off. An altitude block will be obtained for all intermediate and final level-off altitudes. Block altitudes will provide a minimum of 500-foot separation between aircraft. If ARTCC will not approve a block altitude, then request IFR separation or hard IFR altitudes for each aircraft in formation. **(T-3).**

18.5.4. Visual Station-Keeping. Refer to AFTTP 3-3.KC-135 for recommended formation position and visual station-keeping techniques.

**18.6. Non-standard Formation.** Most KC-135 formations are non-standard and should be so indicated in the remarks section of the filed flight plan. Flight leaders are required to advise ARTCC on initial contact, and each sub-sequent controller or controlling agency, of separation being used. Advisories are not required when operating within an ALTRV or airspace specifically designed for formation flight activity.

# Chapter 19

# Chapter 20

# AEROMEDICAL EVACUATION

**20.1. General.** This chapter applies to Air Force KC-135 Aircrews, Aeromedical Evacuation Aircrew Members (AECM) and all management levels concerned with aeromedical evacuation (AE) operations of KC-135 aircraft. All operators involved will use this chapter in conjunction with AFI 11-2AEV3, *Aeromedical Evacuation (AE) Operations Procedures* and AFI 11-2AEV3 Addenda A, *Aeromedical Evacuation Operations Configuration/Mission Planning* for all KC-135 AE missions. **(T-2).**

**20.2. Ground Operations.**

20.2.1. Teach LL03C – Egress training to AECMs. IAW AFMAN 11-2AEV1, *Aeromedical Evacuation Aircrew Training*, qualified BOs may teach emergency egress training for AECMs prior to flight or prior to enplaning patients, provided that the training is "hands-on," covers all requirements of LL03 and is documented on AF Form 1522.

20.2.2. Temperature. Be cognizant of high cabin temperatures during ground operations. The PIC needs to consider cabin temperature control during preflight, taxi, and flight when determining the need to request AIREVAC priority handling throughout all phases of the mission.

20.2.3. The PIC/BO should request an air conditioning cart whenever patients/AE crew are on board and the ambient temperature may exceed a comfortable level.

**20.3. Refueling Operations.** Concurrent servicing with patients onboard is not authorized.

**20.4. Aircraft Configuration.**

20.4.1. On opportune or dedicated AE missions, configure the aircraft prior to departure.

20.4.2. Litter Support Provisions are not available on the aircraft. Modular Stanchion Litter System will be provided by AE.

20.4.3. Floor Loading. Litter patients may be floor loaded using standard cargo tiedown straps to secure the litter to the floor. Shoring is required to prevent damage to the aircraft floor.

20.4.3.1. Do not place litters in front of exits or on top of landing gear inspection window covers (marked in red, yellow, or black).

20.4.3.2. Maximum floor loaded litter capacity is eight patients.

20.4.3.2.1. Maximum ambulatory capacity depends on aircraft configuration.

20.4.4. Configure seats IAW AFI 11-2AEV3, Addenda A. Aft facing stud mounted seats are the only approved seats for use on the KC-135.

20.4.4.1. For AE-3 configurations install only four aft tandem seats (8-seats total) from Body Stations 860-920.

20.4.4.2. Aircraft will depart home station with airline seats installed. Coordination is required when airline seats are located at the staging point. AECMs will ensure seats do not block emergency exits and will notify the BO if exits are blocked. **(T-2).**

20.4.5. Coordinate with the BO prior to securing excess AE equipment and in-flight kits.

20.4.5.1. During preflight, the Charge Medical Technician (CMT) provides the BO with equipment weights using AMC Checklist Insert Guide and provide weights per pallet.

20.4.6. Enplaning/Deplaning. Air stairs are the preferred method to enplane/deplane ambulatory patients. If litter patients are on board, use the High Deck Patient Loading Platform (HDPLP) or the Patient Loading System (PLS) to enplane/deplane all litter and ambulatory patients. Maximum PLS weight capacity is 1500 lbs. If the HDPLP or PLS is not available, request MHE support (Halverson Lift, Tunner, Hi-lift truck). Planning must take into consideration the limitation of MHE platforms, i.e., exposure to weather, loading time, loading considerations.

20.4.7. Pressurization. Aircrew will ensure the automatic pressurization system altitude is coordinated with the AECM. **(T-3).** Set rate knob to one-half to two-thirds open to avoid exceeding cabin altitude differential limit during takeoff and climb.

**20.5. Passengers and Cargo.**

20.5.1. The PIC, with the concurrence of the Medical Crew Director (MCD), should ensure maximum aircraft utilization for passengers. Passenger restrictions based upon patient considerations should be identified when seats are released. Maximum souls on board will not exceed 40. **(T-2).** At no time will there be more personnel on board than seatbelts available. **(T-2).**

20.5.2. When the load consists of palletized netted cargo or is secured with straps, a 30-inch space will be maintained between the cargo and the nearest forward occupied litter or occupied seat. **(T-2).** When cargo, either palletized or non-palletized, is secured with chains, the 30- inch spacing is not required.

20.5.3. Maintain 30 inch spacing between all litters and cargo on AE missions, when carrying occupied litters.

20.5.4. Do not move ambulatory patients to litters in order to provide seating for additional patients or passengers.

20.5.5. For patient comfort and to permit inflight rest for patients use the following for missions over 4 hours in duration:

20.5.5.1. Minimum of 2 litters must be available for ambulatory patients.

20.5.5.2. One seat must be reserved for every 3 litter patients.

20.5.6. An emergency litter will be set up on all AE missions. **(T-3).**

20.5.7. Next Generation Portable Therapeutic Liquid Oxygen may be transported for positioning and de-positioning of Operational/contingency support AE Missions.

20.5.8. Hazardous cargo will not normally be transported aboard AE missions. **(T-2).**

**20.6. Crash/Fire/Rescue (CFR).** Do not use MHE or PLS during ground evacuations as they may interfere with CFR.

**20.7. Load Message.** At military bases, the flight crew should pass inbound load messages to the proper command and control personnel. At civilian airfields, notify ground control.

**20.8. ERO Procedures.** Not authorized. **(T-2).**

**20.9. Aircraft Systems and Equipment.**

20.9.1. Electrical. Electrical power for 400 Hz medical equipment is provided by an approved KC-135, 400 Hz pigtail adaptor (P/N 8564034-135) located in the Electrical Cord Assembly Set (ECAS). Electrical power for 60 Hz medical equipment is provided by the portable Avionics or Unitron Frequency Converter using the Frequency Converter Adapter Adaptive Electrical Pigtail (P/N 8564034-140).

20.9.1.1. Secure all ECAS connections with plastic tie-straps, including medical equipment plugs at the terminal end of the ECAS and AC electrical extension cord. To ensure stability of wires, secure the portion of the ECAS cord closest to the pigtail to a non-moving aircraft part. **(T-3).**

20.9.1.1.1. Plastic tie-straps should be 15 inches in length to adequately cover all circumferences.

20.9.1.1.2. Use only "modified" Avionics Frequency Converters which are easily identified with a black on orange placard on the top of the unit with the statement: "Approved for Use in a Fuel Vapor Environment, Contract No. F41622-01-D-0001, DO 5010."

20.9.1.2. On KC-135R and T model aircraft, utilize the galley outlet receptacle or the three additional electrical outlets on the KC-135 R/T block 40 aircraft. Any or all of the outlets may be utilized on AE missions. However, do not exceed the 30 amp capability of the frequency converter at individual outlets. For AE missions, utilization of the Avionics or Unitron Frequency Converter and/or KC-135 ECAS adapter(s) is authorized.

20.9.1.3. Coordinate with BO for galley disconnect and pulling of circuit breakers before connecting the pigtail adaptor to the aircraft. When connecting the pigtail adaptor to the galley plugs, ensure both circuit breakers marked GALLEY PWR and Station 445 are pulled. **(T-3).** station maintenance group should lock out/tag all incompatible power receptacles and document on AFTO 781A.

20.9.1.4. Once the AECM has secured all electrical connections, coordinate with the BO to reset circuit breakers prior to powering on any medical equipment.

20.9.2. Ensure equipment is turned-off before disconnecting any plugs from ECAS extension outlets in-flight. **(T-3).**

20.9.3. Emergency Oxygen for patients is provided by EPOS.

20.9.4. Flight crews will ensure AFE is configured IAW AFMAN 11-2KC-135V3, Addenda A. **(T-3).**

20.9.5. AE Crew Oxygen: MA-1 portable oxygen bottles provide AECMs emergency oxygen. AECMs need not preflight personal oxygen equipment on a pressure demand regulator if they are assigned an MA-1 portable oxygen bottle.

20.9.6. The aircraft should be configured at home station with 5 extra MA-1 portable walk around bottles with harnesses (if available). In the event MA-1 walk-around bottles are not available and the preplanned flight level is below 350, a PBE should be used. If a PBE is not available and the EPOS is the only available source, the AECM should cease crew duties and be seated until the PIC has directed crew members to remove emergency oxygen.

20.9.7. Latrine. The latrine capacity is limited. This should be taken into consideration for planning procedures. Aircraft will depart home station with an operable latrine and a minimum of two urine tubes and two latrine cartridges (N/A when equipped with TCTO 1596) (see **Table 13.3**, Latrine Capacity vs. Personnel Loading chart). **(T-2).** Missions on aircraft with the Improved Toilet Assembly (TCTO 1C-135-1596) are not required to depart home station with a minimum of two urines tubes and two latrine cartridges.

20.9.7.1. AECMs should escort patients to the latrine. Same sex AECM will accompany mental health patients to the latrine to provide supervision.

**20.10. Aerial Refueling.**

20.10.1. Aerial refueling may be required when patients are on board. Unplanned aircraft attitudes can take place during AAR, which can affect patient care. Prior to a planned AAR, all patients should be screened by a validating flight surgeon to ensure they can tolerate AAR. **(T-3).**

20.10.2. All personnel will be seated with seat belts fastened during AAR. **(T-3).** If urgent patient care is necessary, AECMs may stand to resolve the situation.

20.10.3. Practice emergency separations are prohibited on AE missions while patients are on-board.

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## Attachment 1

## GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

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AF Form 8, *Certificate of Aircrew Qualification*

AF Form 664, *Aircraft Fuels Documentation Log*

AF Form 673, *Request to Issue Publication*

AF Form 847, *Recommendation for Change of Publication*

AF Form 1522, *ARMS Additional Training Accomplishment Report*

AF Form 3578, *Tanker Activity Report*

AF Form 4044, *KC-135 Cargo/Passenger Planning Data*

AF Form 4075, *Aircraft Load Data Worksheet*

AF Form 4100, *KC-135 Load Planning Worksheet*

AF Form 4112, *KC-135 Restraint Computation Worksheet*

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

AMC Form 97, *AMC In-Flight Emergency and Unusual Occurrence Worksheet*

AMC Form 148, *Boarding Pass/Ticket/Receipt*

AFTO Form 781, *ARMS Aircrew/Mission Flight Data Document*

AFTO Form 781A, *Maintenance Discrepancy and Work Document*

AFTO Form 781H, *Aerospace Vehicle Flight Status and Maintenance Document*

CBP Form 6059B, *US Customs and Border Protection Declaration Form*

CBP Form 7507, *General Declaration (Outward/Inward)*

DD Form 175-1, *Flight Weather Briefing*

DD Form 791, *In-Flight Issue Log*

DD Form 1385, *Cargo Manifest*

DD Form 1854, *US Customs Accompanied Baggage Declaration*

DD Form 1907, *Signature and Tally Record* (DoD 4500 32.R)

DD Form 2131, *Passenger Manifest*

DD Form 2133, *Joint Airlift Inspection Record*

***Abbreviations and Acronyms***

**AAR**—Air Refueling

**AC**—Aircraft Commander

**ACARS**—Aircraft Communications Addressing and Reporting System

**ACC**—Air Combat Command

**ACFP**—Automated Computer Flight Plan

**ACO**—Airspace Control Order

**AE**—Aeromedical Evacuation

**AECM**—Aeromedical Evacuation Aircrew Member

**AFE**—Aircrew Flight Equipment

**AFGSC**—Air Force Global Strike Command

**AFI**—Air Force Instruction

**AFMC**—Air Force Materiel Command

**AFPD**—Air Force Policy Directive

**AFRC**—Air Force Reserve Command

**AFSOC**—Air Force Special Operations Command

**AFTO**—Air Force Technical Order

**AFTTP**—Air Force Tactics Techniques and Procedures

**AGE**—Aircraft Ground Equipment

**AGL**—Above Ground Level

**ALTRV**—Altitude Reservation

**AMC/A3V**—Air Mobility Command Stan/Eval

**AMD**—Air Mobility Division

**AME**—Air Mobility Element

**AMT**—Air Movement Table

**ANG**—Air National Guard

**AOC**—Air Operations Center

**AOR**—Area of Responsibility

**APU**—Auxiliary Power Unit

**APCC**—Aerial Port Control Center

**ATC**—Air Traffic Control

**ATOC**—Air Terminal Operations Center

**ATTLA**—Air Transportability Test Loading Activity

**BO**—Boom Operator

**C2**—Command and Control

**CARF**—Central Altitude Reservation Function

**CARU**—Canadian Altitude Reservation Unit, Combined Center/Approach Control

**CBRN**—Chemical, Biological, Radiological, Nuclear

**(CBRNE)**—Chemical, Biological, Radiological, and Nuclear Threat Environment

**CCA**—Contamination Control Area

**CDT**—Crew Duty Time

**CFR**—Crash/Fire/Rescue

**CG**—Center of Gravity

**CMT**—Charge Medical Technician

**COE**—Certification of Equivalency

**CRM**—Crew Resource Management

**CVR**—Cockpit Voice Recorder

**DAFIF**—Digital Aeronautical Flight Information File

**DBF**—Delayed Braking Factor

**DCS**—Defense Courier Service

**DIRMOBFOR**—Director of Mobility Forces

**DOD**—Department of Defense

**EAL**—Entry Access List

**ECAS**—Electrical Cord Assembly Set

**ED**—Engineering Disposition

**EFB**—Electronic Flight Bag

**EMCON**—Emission Control

**EPOS**—Emergency Passenger Oxygen System

**ETA**—Estimated Time of Arrival

**ETE**—Estimated Time Enroute

**ETP**—Equal Time Point

**EUCARF**—European Central Altitude Reservation Facility

**FB**—Flight Boom

**FCG**—Foreign Clearance Guide

**FCIF**—Flight Crew Information File

**FDP**—Flight Duty Period

**FDR**—Flight Data Recorder

**FLIP**—Flight Information Publications

**FMAC**—Fuel Management Advisory Computer

**FMC**—Flight Management Computer

**FMS**—Flight Management System

**FOL**—Forward Operating Location

**FSAF**—First Suitable Airflield

**FSO**—Flying Safety Officer

**GP**—General Planning

**GPS**—Global Positioning System

**HATR**—Hazardous Air Traffic Report

**HDPLP**—High Deck Patient Loading Platform

**IAW**—In Accordance With

**IB**—Instructor Boom

**IFF**—Identification Friend or Foe

**IFR**—Instrument Flight Rules

**INS**—Inertial Navigation System

**IP**—Instructor Pilot

**JA/ATT**—Joint Airborne/Air Transportability Training

**LPU**—Life Preserver Unit

**LRC**—Long Range Cruise

**LSAF**—Last Suitable Airfield

**MAF**—Mobility Air Forces

**MAJCOM**—Major Command

**MAJCOM/A3**—Major Command Operations Directorate

**MC**—Mission Contributing

**MCD**—Medical Crew Director

**MDS**—Mission Design Series (e.g., KC-135)

**ME**—Mission Essential

**MEL**—Minimum Equipment List

**MEP**—Mission Essential Personnel

**MFD**—Multi-Functional Display

**MHE**—Material Handling Equipment

**MMR**—Multi-Mode Receiver

**MNPS**—Minimum Navigation Performance Specifications

**MOB**—Main Operating Base

**MSL**—Mean Sea Level

**MR**—Mission Ready

**NGB**—National Guard Bureau

**NM**—Nautical Mile

**NOTAM**—Notice to Airmen

**NVD**—Night Vision Device

**OCF**—**–**Operational Check Flight

**OG/OGV**—Operations Group Stan/Eval

**OIS**—**-**Obstacle Identification Surface

**OPLAN**—Operations Plan

**OPORD**—Operations Order

**ORM**—Operational Risk Management

**PACAF**—Pacific Air Forces

**PACMARF**—Pacific Military Altitude Reservation Facility

**PDO**—Publication Distribution Office

**PF**—Pilot Flying

**PIC**—Pilot In Command

**PLS**—Patient Loading System

**PLZT**—Polarized Lead-Lanthanum-Zirconate-Titanate Ceramic Materials

**PMC**—Power Management Control

**PMSV**—Pilot to Meteorologist Service

**PM**—Pilot Monitoring

**PPS**—Precise Positioning Service

**PSN**—Proper Shipping Name

**RCR**—Runway Condition Reading

**RNP**—Required Navigation Performance

**RRFL**—Required Ramp Fuel Load

**RVR**—Runway Visual Range

**RVSM**—Reduced Vertical Separation Minimum

**SAAM**—Special Assignment Airlift Mission

**SAR**—Search and Rescue

**SDP**—Special Departure Procedure

**SID**—Standard Instrument Departure

**SIGMET**—Significant Meteorological Information

**SOAR**—Special Operations Air Refueling

**SOE**—Sequence of Events

**SPR**—Singe Point Refueling

**SQ/CC**—Squadron Commander

**SRD**—Standards Related Document

**SSR**—System Support Respresentative

**STAR**—Standard Terminal Arrival

**STM**—Supplemental Training Mission

**TEM**—Threat and Error Management

**TEMS**—Turbine Engine Monitoring System

**T.O.**—Technical Order

**TOLD**—Takeoff and Landing Data

**USAFE-AFAFRICA**—United States Air Forces Europe – Air Forces Africa

**VFR**—Visual Flight Rules

***Terms***

**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**.

**Automated Computer Flight Plan (ACFP)**—An Air Force level system which is the follow on replacement for the Optimized AMC Flight Plan (formerly Jeppesen®). The system brings an improved user interface to the customer, runs in Microsoft Windows, and communicates with a mainframe located at Scott AFB IL. Once the optimized flight plans are produced on the mainframe, they are transmitted back to the Window's PC.

**Aeromedical Evacuation (AE)**—Movement of patients under medical supervision between medical treatment facilities (MTFs) by air transportation.

**Aeromedical Evacuation Crew member (AECM)**—Qualified Flight Nurse (FN) and Aeromedical Evacuation Technician (AET) performing AE crew duties.

**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 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 position with respect to the assigned tanker.

**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 enroute 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, Biological, Radiological, Nuclear Equipment (ACBRN)**—Individually fitted aircrew unique chemical protective equipment for the sole purpose of protecting aircrew while flying into and out of a chemically contaminated environment.

**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 to15 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.

**Chalk Number**—Number given to a complete load and to the transporting carrier.

**Charge Medical Technician (CMT)**—CMT is responsible for the supervision and management of AETs assigned to perform duties on the mission.

**Class I Route**—Any route which either lies within the operational service volume of the facilities defining the airways or off-airway routing, and the airway navigation facilities must be used as the primary reference, or be flown using an RNAV system, provided the airplane's position can be determined at least once each hour using navigational facilities.

**Class II Route**—Any route which is not a Class I route.

**COIN ASSIST**—Nickname used to designate dependent spouses accompanying dependent children and dependent parents of military personnel reported missing or captured who may travel space available on military aircraft for humanitarian purposes on approval of the Chief of Staff, United States Army; Chief of Staff, United States Air Force; Chief of Naval Operations; or the Commandant of the Marine Corps.

**Command and Control (C2)**—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 manual, C2 centers include operations centers, local AMC C2s, air mobility elements, air mobility control centers, unit command posts, and tanker task forces.

**CONFERENCE SKYHOOK**—Communication conference available to help aircrews solve in-flight problems that require additional expertise.

**Contingency Mission**—Mission operated in direct support of an OPORD, OPLAN, disaster, or emergency.

**Crew Resource Management (CRM)**—The effective use of all available resources--people, weapon systems, facilities, and equipment, and environment -- by individuals or crews to safely and efficiently accomplish an assigned mission or task.

**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.

**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, Mobility Forces (DIRMOBFOR)**—Individual responsible for theater mobility force management. The Air Force component commander exercises operational control of assigned or attached mobility forces through the DIRMOBFOR. The DIRMOBFOR monitors and manages assigned mobility forces operating in theater. The DIRMOBFOR provides direction to the Air Mobility Division in the AOR to execute the air mobility mission and will normally be a senior officer familiar with the AOR.

**Distinguished Visitor (DV)**—Passengers, including those of friendly nations, of star or flag rank or equivalent status, to include diplomats, cabinet members, members of Congress, and other individuals designated by the DoD due to their mission or position (includes BLUE BARK and COIN ASSIST).

**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.

**Electronic Flight Bag (EFB)**—An electronic information management device intended to help aircrews perform in-flight and mission management tasks more quickly, easily and efficiently with less paper and consequently less weight. The EFB is a general-purpose computing platform intended to replace paper-based reference materials. It is individually issued to aircrew members for the use and display of ePubs/eFLIP, perform necessary aircrew functions such as calculate takeoff and landing data, manage patient care, and exchange information with operations information systems.

**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.

**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.

**Flight Path Management (FPM)**—The planning, execution, and assurance of the aircraft's guidance, trajectory, and energy state--in flight or on the ground.

**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 intertheater and inside continental United States patient movement requirements with the appropriate transportation component commands of US Transportation Command.

**Ground Time**—Interval between engine shut down (or arrival in the blocks if engine shutdown is not scheduled) and next takeoff time.

**Hazardous Cargo or Materials (HAZMAT)**—Articles or substances that are capable of posing significant risk to health, safety, or property when transported by air and classified as explosive (class 1), compressed gas (class 2), flammable liquid (class 3), flammable solid (class 4), oxidizer and organic peroxide (class 5), poison and infectious substances (class 6), radioactive material (class 7), corrosive material (class 8), or miscellaneous dangerous goods (class 9). Classes may be subdivided into divisions to further identify hazard, i.e., 1.1, 2.3, 6.1, etc.

**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-AFAFRICA, and AMC-gained ANG and AFRC forces.

**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**—See Below

**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)**—Ensures the aircraft is acceptable and configured for the assigned mission. Supervises the nursing care and management of patients and is responsible for managing the AEC assigned to the mission. Advises and/or coordinates all pertinent aspects of the mission with the pilot.

**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 Fragmentary Order.

**Mobility Air Force (MAF)**—Forces assigned to mobility aircraft or MAJCOMs with operational or tactical control of mobility aircraft.

**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 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 in which the real world consequences of mission failure justify the increase risk of damage to or loss of aircraft and crew.

**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. Operational missions termed "CLOSE WATCH" include CORONET missions and AFI 11-221, *Air Refueling Management (KC-10 and KC-135)*, priority 1, 2, and 3 missions tasked by the 618 AOC (TACC). Other operational missions such as deployment, re-deployment, reconnaissance operations, operational readiness inspections (ORI), AMC channel or SAAM, and JA/ATT missions may be designated "CLOSE WATCH" as necessary.

**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.

**Opportune Air Refueling**—Refueling uncoordinated receiver aircraft.

**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**—See Below

**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.

**Pilot Flying (PF)**—The pilot at the flight controls who is in direct maneuvering control of the aircraft. The PF is primarily responsible to control and monitor the aircraft's current/projected flight path and energy state (including autoflight systems, if engaged).

**Pilot Monitoring (PM)**—The pilot at the flight controls who is not in direct maneuvering control of the aircraft, yet is primarily responsible to actively monitor the aircraft's current/projected flight path and energy state, intervening if necessary.

**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 enroute 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.

**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 Air Refueling Control Time. 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).

**Secure Communications**—Voice and/or data communications, encrypted for exchange of up to SECRET information between the aircraft and external entities, via both line of sight and beyond line of sight radio frequencies. Secure communications is distinct from communications security (COMSEC), in that COMSEC is associated with the process of protecting voice and data links, to include obtaining and handling crypto devices and keying materials.

**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, 30 minutes prior to takeoff time for the KC-10, KC-135, C-130, and OSA aircraft (45 minutes for C-5 and C-17). Aircrews will have completed their preflight duties and be at their crew positions. Passengers will be seated and cargo will be secured.

**618 Air Operations Center 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 Contingency Airlift, SAAM/Channel Airlift, and Tanker 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 Approaches/Departures and Formation Tactics (i.e., tanker formation operations in a threat environment where defensive maneuvers might be employed).

**Threat and Error Management (TEM)**—A systems approach that builds multiple layers of defense logically designed to identify, prevent and trap threats and/or mitigate inevitable threats, errors, and undesired aircraft states.

**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 intratheater patient movement management. A TPMRC provides command and control for patient movement management operations in its theater of operations, as directed by its Combatant Commander's operational policy, and in coordination with USTRANSCOM, acting as a supporting combatant command, responsible for intertheater and CONUS patient movement.

**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 manual.

**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, or airlift unit deployment bed down locations, airlift unit level mission planning expenses, and support or contract costs for deployed TWCF units/personnel.

**Undesired Aircraft State**—Operational conditions where an unintended situation results in a reduction of safety margin. A UAS is a result of ineffective Threat and Error Management practices.

**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.

**Verbalize, Verify, and Monitor (VVM)**—A proven monitoring and cross-checking CRM/TEM technique. Using VVM, aircrew members, 1) verbalize their intentions prior to acting on them, (2) verify that the intended actions have been made, and (3) monitor those actions to ensure the intended outcome(s) have occurred, thereby mitigating threats and trapping errors. VVM is typically a closed-loop system of communication designed to significantly reduce automation selection errors between the PF and the PM, however all crewmembers are encouraged to actively participate.

**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.