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Flying Operations

FLIGHT TEST OPERATIONS PROCEDURES

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This instruction implements AFPD 11-2, *Aircraft Rules and Procedures*; AFPD 11-4, *Aviation Service;* and AFI 11-202V3, *General Flight Rules.* It applies to all AFMC units, as well as AFRC, ANG, and DCMA units under AFMC OPCON, and AFMC gained units and personnel conducting flying operations. Attachments to this instruction prescribe Mission Design (MD) specific operating procedures. Units will maintain all applicable attachments for assigned/possessed aircraft. Field units below MAJCOM level will forward copies of their proposed supplements to this publication to AFMC/A3V for review and approval. Keep supplements current by complying with AFI 33-360, *Publications and Forms Management*. See paragraph 1.2 of this instruction for guidance on submitting comments and suggesting improvements to this publication. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, Management of Records, and disposed of in accordance with the Air Force Records Disposition Schedule

(RDS) located at **https://www.my.af.mil/afrims/afrims/afrims/rims.cfm**. This instruction is affected by the Paperwork Reduction Act as amended in 1998. See Attachment 1 for a glossary of references and supporting information.

(96TW) This supplement applies to all 96 TW aircrew including 96th Operations Group and 96th Test Group. This supplement provides guidance for flying operations within the 96th Test Wing. Waivers to the basic guidance outlined in the AFI or this supplement will be submitted to 96 OG/OGV or 586 FLTS/DOV. The 96 OG/CC may waive provisions of this supplement for 96 OG units. The 96 TG/CC may waive provisions of this supplement for all 96 TG units. All waivers to either the basic guidance outlined in the AFI or this supplement will be submitted to the 96 OG/OGV or 586 FLTS/DOV on an AFMC Form 73, *AFMC Flight Operations Waiver Request*. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF 847, *Recommendation for Change of Publication*; route AF 847s from the field through 96 TW publications/forms manager. Ensure that all records created as a result of processes prescribed in this publication are maintained IAW Air Force Manual (AFMAN) 33-363, Management of Records, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS). The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in the publication does not imply endorsement by the United States Air Force. References to "all" personnel imply military personnel. Contractor personnel will participate in appropriate 96 TW flying related activities as directed by the Government Flight representative.

SUMMARY OF CHANGES

This AFI has been completely revised and shall be reviewed completely by units subject to its guidance.

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Chapter 1

GENERAL INFORMATION

1.1. Scope. AFMC produces a three-volume set of Flight Test (FT) instructions containing attachments for each weapon system flown in AFMC. These instructions are numbered AFI 11-2FT Volume 1, 2, and 3, and will contain the training, evaluation criteria, and operations procedures, respectively, for each weapon system. AFMC uses these instructions in lieu of AFI 11-2 MDS-specific Volumes for flying operations. In the absence of published guidance, AFMC units will coordinate with HQ AFMC/A3V for approval of locally developed guidelines. If possible, these guidelines should be consistent with similar guidance specified in the appropriate AFI 11-2 MDS-specific lead MAJCOM Volumes. In addition, aircraft on loan to AFMC undergoing short-term flight test programs will be flown according to the lead MAJCOM guidance if no AFMC guidance exists.

1.2. Recommended Changes. Send comments and suggested improvements to this volume on AF Form 847, *Recommendation for Change of Publication*, through channels to HQ AFMC/A3V. All correspondence can be emailed to the AFMC/A3V Workflow. HQ AF/A3/5 will approve all interim changes to this instruction.

1.2. (96TW)Recommend Changes. Send AF Form 847, *Recommendation for Change of Publication*, to 96 OG/OGV for coordination.

1.3. Waivers. Unless otherwise specified in this instruction, HQ AFMC/A3 is the waiver authority for this instruction. All waivers will be routed through appropriate channels to flying unit commanders, and OG/CCs prior to submission to HQ AFMC/A3V for processing. Use an AFMC Form 73, *AFMC Flight Operations Waiver Request*, to process the waiver.

1.3. (96TW)Waivers. Waivers to this supplement will be coordinated through 96 OG/OGV or 586 FLTS/DOV and approved by 96 OG/CC or 96 TG/CC as required prior to submission to HQ AFMC/A3V.

1.3.1. **(Added-96TW)** The 96 OG/CC or 96 TG/CC is the waiver authority for 96 TW Sup1. Waivers to the basic guidance outlined in the AFI or this supplement will be submitted to 96 OG/OGV. Waiver approvals will be documented in either the flight test cards, the remarks section of the AF Form 4327, Arms Fighter Flight Authorization, or in a separate memo for record.

1.4. Unit Supplements. Email unit supplements to the AFMC/A3V Workflow for review and approval prior to publication. Include AFMC/A3V and AFMC/A3O on the distribution list for approved supplements to AFI 11-2FT Volume 3.

1.5. Developmental Aircraft. Aircraft operations for developmental aircraft will be conducted in accordance with this instruction and approved test plans. New aircraft-specific attachments will be created when the aircraft reaches a maturity level that warrants inclusion.

1.6. Inter-fly. Inter-fly is the exchange or substitution of aircrew members and/or aircraft between AFMC operations groups, MAJCOMs, DoD services, or U.S. government organizations and agencies. Inter-fly does not apply to routine exchanges of aircraft such as depot input or output. Normally, inter-fly should be limited to specific test programs or other special circumstances. As a minimum, crews will be qualified in the aircraft design and series as well as systems or configurations required to fly the aircraft and mission. Crew members must thoroughly brief the procedural guidance of the operating MAJCOM, DoD service, U.S. governmental organization or agency. OG/CCs may authorize inter-fly agreements by mutual agreement with other participating units. Inter-fly involving the transfer of aircraft between MAJCOMs or higher must be coordinated and approved through HQ AFMC/A3O. Formalize agreements through a memorandum of understanding between participating organizations. A formal inter-fly agreement is not required for aircrew that occasionally act as “guest help” where the OG/CC has accepted the credentials of the guest aircrew. Formally designated Combined Test Force (CTF) organizations do not need inter-fly agreements for non-AFMC aircrews assigned to the CTF.

1.6.1. **(Added-96TW)** The 40th Flight Test Squadron (FLTS) is authorized to use 53rd Weapons Evaluation Group (WEG) (ACC) aircrew as guest help on test, test support and training missions. Guest help aircrew may be used in any capacity up to and including Instructor Pilot/WSO as documented by their assigned unit’s Letter of Qualification. If no directly comparable qualification exits, guest help aircrew may be upgraded by the 40 FLTS and placed on the Letter of Qualification.

1.6.2. **(Added-96TW)** The 413 FLTS regularly flies with AFSOC and/or AFRC primary aircrew members during testing. Authorization for interfly and the acceptance of AFMC, AFSOC, and AFRC qualification is governed by the AFMC/AFSOC/AFRC Memorandum of Agreement.

Chapter 2

MISSION PLANNING

2.1. General. Aircraft commanders and flight leads are ultimately responsible for ensuring all mission planning materials are current and command guidance is followed. All crewmembers and formation members must be present for mission planning unless released by the aircraft commander or flight lead.

2.2. Mission Planning Requirements. The unit commander must ensure that a flight operations area is available with adequate space for operations management, flight planning/briefing, and required publications. The unit commander will ensure that aircrews are provided the following:

2.2. (96TW)The 413 FLTS will use host unit facilities and procedures for mission planning.

2.2.1. Mission requirements and schedule of events.

2.2.2. Briefing facilities and aids described in paragraph 2.9.

2.2.3. Current Flight Information Publications (FLIP). Access to current FLIP may be via paper or electronic means. For electronic access to National Geospatial-Intelligence Agency (NGA) and National Aeronautical Charting Office (NACO) products, a computer with access to these sites must be readily available to aircrews. Aircrew must comply with any review requirement of electronic NGA products prior to flight. If using electronic products, units must develop a plan for aircrew access to FLIP publications in case of internet outage.

2.2.4. As a minimum, aircrew must have access to the following FLIP products and associated documents: General Planning, Area Planning - North and South America, other applicable Area Planning volumes, Instrument Flight Rules (IFR) Supplement, Visual Flight Rules (VFR) Supplement, applicable instrument departure and arrival procedures, applicable instrument approach volumes, applicable En Route and Navigational Charts, Flight Information Handbook, Airman's Information Manual.

2.2.5. Appropriate regulations and flight manuals (including Modification Flight Manuals) must be located in the unit. A current paper copy of all applicable flight manuals and technical orders is required in the FCIF library and readily available for aircrew. If a conventional paper copy of a flight manual is not available through distribution or local printing, then two independent methods of accessing the electronic flight manual must be available. The electronic flight manual must be verified to be current and operational. Refer to AFI 11-202 Vol 2 and AFMC Sup 1 for FCIF library requirements.

2.2.6. Commanders will ensure the Airfield Suitability and Restrictions Report (ASRR) is available to aircrews, mission planners, and other personnel as required. Also, will ensure procedures to ensure personnel can access and use the ASRR to include number of accounts and office of responsibility. To access the ASRR or Giant Report users must have a Global Decision Support System (GDSS) account. To establish a GDSS account, units must establish a Unit Program Account Manager (UPAM) or access (gdss2support.scott.af.mil) and follow the instructions under "GDSS Accounts."

2.2.7. Communications equipment for use in obtaining weather, local airfield conditions, notices to airman (NOTAM), and filing flight plans. All aircraft must have MAJCOM approval to operate aircraft using the Jeppesen Navigational Data Base, and, if approved, are directed to consult the Jeppesen Navdata Alerts/NOTAMS web site before each flight located at **www.jeppesen.com** (Aviation Resources).

2.2.8. There are several methods to obtain digital Terminal Procedures Publications (d-TPPs), previously referred to as Instrument Approach Procedures (IAPs) and printed in Flight Information Publications.

2.2.8.1. FAA (NACO) d-TPPs are available at: **http://www.naco.faa.gov** from any web enabled computer. DoD (NGA) d-TPPs are available at **https://www.geointel.nga.mil**/ from a computer that can access .mil domains. The d-TPPs from these sites can be used in-flight as long as the dates listed on the TPP are valid.

2.2.8.2. The DoD (NGA) has contracted with Jeppesen Sanderson, Inc. to provide access to Jeppesen's internet-based worldwide library of aeronautical terminal navigation charts and text documents. All members of the DoD may now access this information from any web-enabled computer. Guidance regarding the use of non-FAA (NACO), or non-DoD (NGA) procedures contained in AFI 11-202 Volume 3 still applies.

2.3. Mission Planning/Takeoff and Landing Data (TOLD) Software. If not manually computed using the flight manual data, mission planning and TOLD computations should be accomplished using the lead MAJCOM certified software for that MDS aircraft. If certified software does not exist or is unavailable, other mission planning programs (contractor-developed, DUATS, Jeppessen, etc.) can be used, but must be verified through manual calculations using certified data. If an AF approved mission planning system, such as AF Mission Support System (AFMSS) or Portable Flight Planning Software/Combat Flight Planning Software (PFPS/CFPS), is used to mission plan, any chart produced will satisfy chart requirements set forth in this instruction. The flight crew is responsible for ensuring current data bases (i.e. ECHUM, DAIFF) are loaded and that mission planning data is correctly entered.

2.4. Inflight Publications.

2.4.1. Carry sufficient maps, charts, and FLIP to navigate for both the planned IFR and VFR phases of flight. For local flights, detailed aircrew aids that contain this information are sufficient.

2.4.2. Inflight Manuals/Directives. The Pilot In Command (PIC) will ensure that applicable flight manuals, checklists, and mission related directives (if required) for all mission required crew positions are carried in flight. The OG/CC will determine required mission directives. All applicable technical orders will be carried aboard the aircraft or in the Remotely Piloted Aircraft (RPA) control station. If a conventional paper copy of a flight manual and/or checklist is not available through distribution or local printing, then two independent methods of accessing the electronic flight manual that have been verified to be current and operational must be available to the crew.

2.4.2.1. **(Added-96TW)** All 96 OG aircraft will carry the following FLIP/In-Flight Manuals on local sorties: IFR Supplement, Flight Information Handbook, Low 21/22 chart, High East, Low 14 (LA, MS, AL), and Low 19 (FL) approach plates. The primary diverts for Eglin based aircraft are Pensacola NAS (NPA), Tyndall AFB (PAM), Hurlburt

Field (HRT), Dannelly Field (MGM), Maxwell AFB (MXF), Gulfport (GPT), Moody AFB (VAD), Meridian (NMM), and MacDill AFB (MCF). **Note**: Aircrew are responsible for any additional FLIP that might be required due to various tests, low levels, and cross countries. Aircrew will ensure any additional requirements are aboard the aircraft. The Eglin in-flight guide (IFG) will include primary airfields for diverts and other optional airfields (military and civil) for situational awareness.

2.4.2.1.1. **(Added-96TW)** In addition to the above, Eglin-based fighter aircraft will carry: High 5/6, 7/8, 9/10 charts, appropriate CL-1 checklist and IFG.

2.4.2.1.2. **(Added-96TW)** In addition to paragraph 2.4.2.1. C-130 aircraft will carry the appropriate flight manual and Modified Flight Manual (if applicable), AFI 11-2FT Vol 3, AFI 11-202 Vol 3, IFG applicable to the airfield/squadron for which the aircraft is based (i.e., 413th aircrew carry the applicable IFG for the squadron they are flying with), and appropriate enroute charts and approach plates for the planned route of flight.

2.4.2.1.3. **(Added-96TW)** In addition to paragraph 2.4.2.1. UH-1 aircraft will carry: VFR Supplement, Atlanta, Jacksonville, and New Orleans Sectionals, complete and current DD Form 365-1 (Chart A), certified copy of the most current DD Form 365-3 (Chart C), T.O. 1H-1(U) N-5 and T.O. 1H-1(U)N-1.

2.4.2.1.4. **(Added-96TW)** In addition to paragraph 2.4.2.1. CV-22 aircraft will carry: T.O. A1-V22AC-AFM-000, A1-V22AC-AFM-500, A1-V22AC-AFM-510, Modified flight manual (as required), AFI 11-2CV-22 V3, AFI 11-2CV-22 V3 CL-1, IFG for the airfield the aircraft is based at, A-1/A-2 IFR Area Charts, High 5/6, 7/8, 9/10 charts and Low 17/18, 19/20, and 23/24 charts.

2.4.2.2. **(Added-96TW)** All 96 TG aircraft will carry FLIP/In-Flight manuals as appropriate for mission accomplishment. 96 TG T-38 aircraft can abide by para. 2.4.3. for local Holloman missions.

2.4.2.3. **(Added-96TW)** Aircraft possessed by AFMC in support of testing conducted by the 413 FLTS will carry publications IAW the guidance of the MAJCOM/unit losing possession. The 96 OG may direct additional publications be carried in-flight while the aircraft is possessed by AFMC, if deemed appropriate.

2.4.3. Aircraft with inadequate secure inflight publications storage. When mission requirements involve flight maneuvers that may create a FOD or safety hazard by the abruptness or intensity of maneuvers the OG/CC will specify the minimum required inflight publications and FLIP to be carried. However, aircraft checklists must be available for each crew position.

2.4.3. **(96TW)** The minimum in-flight publications/FLIP for fighter aircraft are: aircraft CL-1 checklist, IFG and HIGH approach book. Chase aircraft for test missions will carry required publications IAW paragraph 2.4.2.1.

2.4.4. On local sorties, OG/CCs may authorize aircrew to carry an abbreviated set of instrument approach procedures (IAPs) in lieu of carrying the entire FLIP approach plate book(s) for the local area. These IAPs must be current and obtained either from the NGA website or taken from the current FLIP IAP books. As a minimum, all pertinent approaches to the local area divert bases will be included in the abbreviated set of IAPs on board. This abbreviated set of approaches will be standardized by the OG/CC and explicitly authorized in unit supplements to AFI 11-2FT Vol 3. Procedures to ensure the most current approach procedures are included in the abbreviated set will be established and documented by the OG/CC.

2.5. VFR Low Altitude Charts. Low altitude charts are required for low-level operations. Charts will be updated from the chart update manual (CHUM) or produced by an approved mission planning system with a current Digital Aeronautical Flight Information File (DAFIF and ECHUM). Color reproduced charts are authorized provided it is a quality facsimile of the original chart containing essential terrain data and features. Aircrew members will supplement existing mission planning materials (e.g. CHUM, FLIP AP/1B, etc.) with either Sectional Aeronautical Charts or Air Force approved mission planning software with the following information printed on the charts used inflight: Airports/Heliports, Airspace Boundaries, Airways, Military Training Route (MTR), Parachute Jump, and Special Use Airspace (SUA) Boundaries. Use of Sectional Aeronautical Charts in flight is not required. Note: Helicopter aircrews conducting controlled burn, firefighting, and search and rescue operations are exempted from this requirement. If practical, conduct an area survey for obstructions prior to commencing these operations.

2.5.1. Required Annotations. Low level charts will contain the following, when applicable:

2.5.1.1. Location and dimensions of Class B/C/D airspace, civil/military airfields, and other potential high density traffic areas (e.g. parachute activity areas, ultra light/hang glider/glider sites, etc.) within 5 NM of any planned VFR route or MTR lateral boundary.

2.5.1.2. Applicable airfield approach control frequencies in the vicinity of Class B, C, or D airspace.

2.5.1.3. The intersection of other Visual Military Training Route/IFR Military Training Route (VR/IR) routes and any other possible areas of conflict.

2.5.1.4. Noise sensitive areas/no-fly areas.

2.5.1.5. Emergency airfields along the route of flight.

2.5.1.6. Route abort altitude (RAA) (N/A C-130, see the MDS attachment). Compute the RAA for the entire route or area at a minimum of 1,000 feet (500 feet for helicopters and tilt-rotor aircraft conducting operations in the CONV/VTOL mode) separation from the highest obstacle or terrain feature (rounded to the next highest 100 feet) within the lateral limits of the route or training area, but in no case less than 5 NM either side of planned route.

2.5.1.7. Minimum Safe Altitude (MSA). For night operations a MSA for each leg of the intended route of flight will be computed. The MSA is defined as an altitude of a route leg which provides 1,000 feet (500 feet for helicopters and tilt-rotor aircraft conducting operations in the CONV/VTOL mode) of clearance above the highest obstacle or terrain feature (rounded to the next highest 100 feet) within 5 NM of the planned course, or route boundary, whichever is greater. For C-130 specific guidance see this instruction's C-130 attachment.

2.6. Local Area Maps and In-flight Guides. Pilots and navigators will carry a local area map that depicts special use airspace, alternate airfields, jettison areas, and controlled bailout areas, as applicable to the aircraft and mission. The local area map is not required if the In-flight Guide is current and includes this information. Additionally, FLIP enroute charts may be used instead of maps on IFR navigation flights within areas adequately covered by these charts.

2.6. (96TW)Local Area Maps and In-Flight Guide. All rated aircrew (Pilot, WSO, Navigator) will carry an IFG as outlined in paragraph 2.4.2.1.2. Unit commanders will determine other mission-related products to be carried in flight, if required or not listed in 2.4.2.1.

2.7. Local Aircrew Aids. Aircrew aids should be tailored to aid the unit in performing its mission. Unit aircrew aids may be tailored for each MD as necessary. The following areas are recommended for inclusion:

2.7.1. Airfield diagrams.

2.7.2. Local radio channelization.

2.7.3. Takeoff and landing data.

2.7.4. Weight and balance data.

2.7.5. Impoundment procedures.

2.7.6. Emergency action checklists.

2.7.7. NORDO procedures.

2.7.8. Bailout and jettison areas.

2.7.9. Recovery procedures with weapons onboard and jettison areas.

2.7.10. Hot brake areas and procedures.

2.7.11. Divert procedures/alternate and emergency airfield information. Units need to document completion of an ORM analysis if using emergency airfields that have runway lengths less than that listed in Table 2.1 or in the flight manual for their respective aircraft.

2.7.12. Cross-country procedures.

2.7.13. Other information as deemed necessary (e.g. stereo flight plans, turnaround procedures, local training areas, instrument preflight, and maintenance brevity codes).

2.8. Test Cards. Flight test cards will be constructed according to local procedures and have the appropriate level of authorization. A copy of the test cards will be filed at the operations desk for supervisor reference.

2.8. (96TW)Test Cards. All ground test and flight test events will be conducted from approved test cards or written test procedures. Additional test card requirements, minimum information, and test conduct requirements are at the discretion of the 96 OG/CC and 96 TG/CC.

2.8.1. **(Added-96TW)** The 413 FLTS will follow squadron or host unit procedures as applicable. Each aircraft commander/flight lead will brief the squadron operations supervisor or, for flights at Holloman, the 586 FLTS dispatcher on the mission to be flown and mission-applicable special needs. At Holloman, the test coordinator will also be given a copy of the line-up card and test cards.

2.8.1.1. **(Added-96TW)** Flight test cards are prepared jointly by the project engineer and project pilot. Unmanned vehicle T.O. checklists may fulfill the flight test card requirement if approved by the appropriate flight test squadron commander. These cards will be prepared by the project engineer and project pilot equivalent.

2.8.2. **(Added-96TW)** The flight test card format is challenge-and-response whenever practical. At a minimum, safety-critical steps of test cards should be written in a challenge-and-response format that is clearly marked. Tailor the contents of the flight test cards to the exact nature and circumstances of the particular tests. In general, the flight test cards should not replace or be redundant to the technical order (T.O.) checklist. Unusual situations, such as an aircraft's first flight, may dictate that all or part of the T.O. checklist be made a part of the flight test cards. Flight test cards should cover test items critical to safety, such as:

2.8.2.1. **(Added-96TW)** Aircraft/vehicle limitations, such as Mach number, airspeed, angle of attack, sideslip angle, altitude, load factor, center of gravity limits, etc.

2.8.2.2. **(Added-96TW)** Aircraft/vehicle store loads and software configuration.

2.8.2.3. **(Added-96TW)** Test configurations, gear and flap settings, etc.

2.8.2.4. **(Added-96TW)** Fuel status and feed requirements.

2.8.2.5. **(Added-96TW)** Special test equipment use.

2.8.2.6. **(Added-96TW)** Special safety devices use.

2.8.2.7. **(Added-96TW)** Telemetry use.

2.8.2.8. **(Added-96TW)** Test conditions.

2.8.2.9. **(Added-96TW)** Data systems use.

2.8.2.10. **(Added-96TW)** Go/no-go decision criteria.

2.8.3. **(Added-96TW)** Flight test cards will be filed in a readily accessible location in the unit operations section for all test missions. Supervisory approval is not required for canned proficiency/Flight Test Technique (FTT) missions or TPS syllabus missions.

2.8.4. **(Added-96TW)** Test card approval authority is based on the test risk level designated by the ATR/SB chairman.

2.8.4.1. **(Added-96TW)** Test card approval authority for low risk testing is the flying unit commander and may be delegated no lower than the squadron ADO. Once signed, test cards remain valid for 30 days (i.e., do not perform low risk test cards that were signed more than 30 days prior). After this time, cards must be reviewed and re-signed.

2.8.4.2. **(Added-96TW)** Test card approval authority for medium risk testing is the 96 OG/CC or 96 TG/CC and may be delegated no lower than the 96 OG/CD or 96 TG/CD. Once signed, test cards remain valid for 14 days (i.e., do not perform medium risk test cards that were signed more than 14 days prior). After this time, cards must be reviewed and re-signed.

2.8.4.3. **(Added-96TW)** Test card approval authority for high risk testing is the 96 TW/CC and delegated no lower than the 96 TW/CV. Once signed, test cards remain valid for 7 days (i.e., do not perform high risk test cards that were signed more than 7 days prior). After this time, cards must be reviewed and re-signed.

2.8.5. **(Added-96TW)** The aircraft commander is ultimately responsible for proper checklist availability and use, to include flight test cards, when applicable.

2.8.6. **(Added-96TW)** The 96 TW has numerous aircraft with extensive Class II modifications. All aircrew must review and be familiar with the information contained in the Modification Flight Manuals (MFMs) before operating any modified aircraft, including non-test missions.

2.8.7. **(Added-96TW)** For Unmanned Aerial Vehicle flights, test challenge-and-response items should be performed between the test controller and the test pilot or equivalent. The same team member may start both the challenge and the response on certain items, but the other members will verbally verify the items.

2.9. Briefing/Debriefing Room Requirements. Briefing rooms will be private and of adequate size to seat required crewmembers and test team members. They may be multipurpose rooms, but privacy must be ensured during aircrew mission briefings. Briefing rooms will contain, electronically or otherwise:

2.9. (96TW)96 OG/OGV and 586 FLTS/DOV have oversight and will ensure their respective flying units' briefing rooms have all required up-to-date items. In conjunction with the technical order distribution office (TODO) and chief pilots, the squadron standardization/evaluation liaison officers (SELO) will ensure briefing room mission design series (MDS)-specific technical orders (TOs) are properly maintained. The SELO will also ensure that all items in AFI11-2FTV3, paragraph 2.9. are included in each briefing room for their respective squadron.

2.9.1. Briefing guides for applicable missions and supplemental material as locally determined, such as Emergency Procedure of the Day lists, etc.

2.9.2. A dry-erase board or suitable substitute.

2.9.3. Visual aids (such as slide display boards, charts, briefing books, viewgraphs, computer display, etc.) to adequately present, as applicable to each unit, the following:

2.9.3.1. Airfield diagrams depicting runways, taxiways, parking areas, and other special use areas as appropriate (for example, arm/de-arm areas, hot brake areas, hydrazine areas, etc.)

2.9.3.2. Training rules (air-to-air, air-to-ground, chase, intercept, low level, etc.), when appropriate.

2.9.3.3. Visual aids for air refueling procedures (when appropriate).

2.9.3.4. Local area charts depicting the local flying area; VFR patterns, including entry and departure procedures; special use airspace; alternate airfields; locally established air refueling areas/routes; controlled bailout areas; air-to-air, air-to-ground, Functional Check Flight (FCF), jettison, drop zone or salvo areas; and supersonic areas/ranges normally used by the unit.

2.10. Briefing/De-briefing.

2.10.1. Aircraft commanders or flight leaders are responsible for presenting a logical briefing that promotes safe, effective mission accomplishment. Use briefing guides to provide a reference list of items that may apply to particular missions. Items listed may be briefed in any sequence. In addition to requirements specified in AFI 11-202V3 and AFI 11-202V3 AFMC Sup. 1, brief crew members from a guide that contains, as a minimum:

2.10.1. **(96TW)** The 96 OG or 586 FLTS Briefing Guides will be used for all flight briefings except for 413 FLTS, which will use its associated AFSOC unit briefing guides or squadron developed guides when applicable. The briefer may alter portions of the flight briefing as necessary, as long as all items pertinent to the effectiveness and safety of the mission are briefed and understood by all participants. If a briefing guide is unavailable, refer to the briefing guide published in the In-Flight Guide. Procedures and techniques that are not normally performed on training missions will be emphasized in test mission briefings.

2.10.1.1. Airfield Status and Notice to Airman (NOTAMs).

2.10.1.2. Radar and visual search responsibilities.

2.10.1.3. Mid-air collision avoidance.

2.10.1.4. Interior/exterior aircraft lighting configuration for Night Vision Google (NVG) operations (if applicable).

2.10.1.5. Illumination conditions (moon illumination, depression angle, EENT, cultural lighting, etc) for NVG operations (if applicable).

2.10.1.6. Chase procedures (if required).

2.10.1.7. When aircraft are flown in formation, proper position (to ensure adequate wingtip clearance), responsibilities and aircraft-unique requirements will be briefed for each phase of flight.

2.10.1.8. Altitude Awareness (Warning Systems and Techniques). During the briefing for all low-level missions, emphasis will be placed on obstacle/ground avoidance, employment of all aircraft altitude warning features, pilot determination of low altitude comfort level, and human factors associated with low altitude flying such as proper task prioritization.

2.10.1.9. Alternate airfields.

2.10.1.10. Test hazard minimizing procedures/test plan flight restrictions.

2.10.1.11. Training rules.

2.10.1.12. Specific mission procedures.

2.10.2. Standards. Those briefing items understood by all participants may be briefed as "standard". Units may use standards as long as they are in a published document. However, during sorties where trainees or unassigned personnel are in the flight, all items will be briefed.

2.10.3. All crewmembers and required test support personnel will attend the flight briefing unless previously briefed and excused by the aircraft commander.

2.10.3. **(96TW)** Crewmember changes will be made and documented IAW AFI 11-401, *Aviation Management*, and associated supplements. When a change is required, the replacement crewmember will be adequately briefed, even at the expense of a mission delay. Personnel not qualified in the aircraft will receive an expanded briefing at the aircraft with proper demonstrations including hazards, operating handles and switches, emergency procedures and any other information needed to assure flight safety.

2.10.4. All aspects of test missions will be thoroughly briefed by the cognizant engineer or aircraft commander. Briefings will include actions to terminate the flight test profile if required. Each flight will brief an alternate mission, if applicable. The alternate mission should be less complex than the primary. Briefed mission elements and events may be modified and briefed airborne as long as flight safety is not compromised. Missions or events not briefed prior to mission execution will not be flown. Flight leads will ensure changes are acknowledged by all flight members.

2.10.4. **(96TW)** Unit/squadron commanders will determine flight lead status of all qualified pilots. Flight leads (designated on the flight authorization) will brief, lead, debrief and be responsible for the safe and efficient conduct of the entire mission. This policy is specifically applicable on test points, formation, intercepts and air combat maneuvering/tactics. If another person or aircraft instigates any unauthorized events, do not participate and continue with the planned mission by the most safe and expedient method.

2.10.5. If the flight briefing was conducted prior to the day of the flight, the aircraft commander or flight lead will ensure all members are briefed on current and forecast weather, NOTAMs, and any mission changes prior to stepping to the aircraft.

2.10.6. Aircrew will debrief all missions. The debriefing will be conducted in a location with suitable tools to accomplish, as a minimum, an evaluation of the mission objectives, test objectives, lessons learned, and execution errors. Aircrews should debrief weather conditions to weather personnel when weather encountered during the mission was not as forecast.

2.10.6. **(96TW)** Debriefing. Report unusual mission occurrences or significant test events to supervisory personnel as soon as possible. Perform maintenance debrief after every mission or ground abort due to maintenance. All test missions will be debriefed by the aircrew and test conductor or project engineer, as a minimum.

2.10.7. **(Added-96TW)** Aircraft commanders/flight leads are responsible for aircraft status reporting while operating away from home station. Aircraft movement information will be called to the home station duty desk squadron operations supervisor/dispatcher during duty hours and to the command post after duty hours. At Eglin, test mission information will be called in to the Joint Test & Training Operations Control Center (JTTOCC).

2.10.7.1. **(Added-96TW)** Aircraft movement information will include date, mission number, call sign, location, takeoff and landing times (Zulu), flight time, aircraft status and grounding write-ups, estimated time of departure, next destination, delays, deviations, and aircraft utilization code/mission symbol.

2.10.7.2. **(Added-96TW)** If this information is passed to the squadron operations supervisor/dispatcher, the operations supervisor/dispatcher will contact the command post and the JTTOCC (if applicable). Command Post/JTTOCC will then provide this information to the Maintenance Operations Control Center (MOCC). 413 FLTS aircrew will follow host unit procedures.

2.11. Passenger Briefing Guides. On passenger carrying aircraft, passengers will be provided a pre-printed passenger briefing guide. Use lead MAJCOM briefing guides where appropriate. If none exist, use the general briefing guide in Attachment 2.

2.12. Bird Avoidance. Generally, the hour before and after sunrise and sunset presents an increased threat of a bird strike, with migration seasons posing a significant hazard at different times. Pilots should follow locally developed BASH procedures as well as those outlined in AFPAM 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Techniques*, to minimize aircraft exposure to bird strikes. Additionally:

2.12. (96TW)Bird strike hazards and procedures will be emphasized during the flight brief. Aircrew will reference the most current Avian Hazard Avoidance System (AHAS) for all low-level portions of flight. Low level flight or weapon delivery training the hour after sunrise and the hour before sunset will be accomplished no lower than 1000 feet AGL unless required for mission accomplishment.

2.12.1. Aircrews operating within the continental U.S. will reference the most current Avian Hazard Avoidance System (AHAS) for all low altitude portions of flight, to include takeoff and landing, instrument approaches, low level operations, and range operations that occur less than 3,000 feet AGL. This information is available at **www.usahas.com**. Operations at bases with established BASH procedures do not require reference to AHAS during takeoff, landing, or instrument approaches. Best available AHAS information will be used. If AHAS information is not available for the operating location, attempt to use existing bird models to mitigate risk.

2.12.1. **(96TW)** The operations supervisor/dispatcher will provide the AHAS bird condition for the local airfields and the applicable range or low-level route as part of the aircrew step brief.

2.12.1.1. Flying operations are not restricted when AHAS bird strike risk rating is LOW.

2.12.1.2. AHAS bird strike risk rating of MODERATE is a warning to all aircrew to maintain a vigilant lookout for bird activity, particularly in the low altitude environment. Reducing speed and/or minimizing flight below 3,000 feet reduces the risk of bird strike. Low altitude, high speed events (low level navigation, air-to-surface weapons delivery, TF/TA) events below 3,000 feet will be limited to only those required for syllabus training, currency, or for approved flight test events if AHAS predicts or observes MODERATE status for the applicable time.

2.12.1.3. AHAS bird strike risk rating of SEVERE is a warning to aircrew to avoid this region. Aircrew will remain above 3,000 feet for all events in regions where the current AHAS bird strike risk is reported as SEVERE. All test and test support mission events requiring flight below 3,000 feet AGL in areas where the AHAS bird strike risk rating is SEVERE require OG/CC or TG/CC approval prior to execution.

2.12.2. **(Added-96TW)** All aircrew should attempt to avoid known location of currently observed relevant bird activity, as reported by the range control officer (RCO) or other source, by flexing to backup events or deleting events as necessary.

2.13. Normal/Minimum/Emergency Landing Fuel. See **Table 2.1** Plan to arrive on initial or downwind, as appropriate for aircraft type, or at the final approach fix with no less than Normal fuel, and land with no less than Minimum fuel. If it becomes apparent an aircraft will land with less than Minimum fuel, pilots shall declare minimum fuel with ATC. If it becomes apparent an aircraft will land with less than the Emergency fuel listed in **Table 2.1**, pilots shall declare an emergency with ATC.

2.14. Authorized Fuel Loads. Aircraft will be loaded with fuel according to requirements of T.O. 1-1B-50, the handbook of weight and balance data, and the MDS specific T.O. 1X-XXX-5-1. Units may develop alternate fuel loads to support modified aircraft or special mission requirements. These alternate fuel loads will be documented and approved in a Modification Flight Manual (MFM) IAW AFI 11-215, *Flight Manuals Program*, as supplemented.

2.15. Aircraft Movement on the Ground. Takeoffs are restricted to wet runway conditions or better. Pilots must account for the fact that taxiways and ramps typically have a lower RCR than reported for the Runway. Refer to the MDS flight and/or performance manual(s), and MDS-specific attachments to this instruction for further RCR restrictions. OG/CC has authorization to waive takeoff on runway conditions worse than wet but not to exceed flight and/or performance manual limits.

2.15. (96TW)AFMC minimums may not be sufficient for some test-specific stores/fuel loadings combined with local weather conditions. Project aircrew will determine local recovery options for heavyweight and unexpended/hung ordnance landing contingencies. When calculating landing data, aircrew will factor in real-time cable status and weather conditions (winds, wet/dry runway, need for an instrument approach resulting in a longer landing, restricted aerobrake, etc.), as well as landing technique, to ensure safe recovery on the selected runway.

2.16. Minimum Runway Lengths. Table 2.1 shows the minimum runway lengths that will be used for all planned airfield operations. Pilots are encouraged to use the entire runway length available for takeoff, mission permitting. Aircraft gross weight, performance and weather conditions may dictate longer runway requirements than the minimum prescribed in Table 2.1. If there are no explicit requirements outlined in the MD specific attachment, runway available for landing must exceed total planned landing distance by at least 1,000 feet. If applicable, inoperative systems (anti-skid, etc.) must be taken into account. For developmental aircraft, minimum runway length will be described in the aircraft-specific safety package.

2.16.1. Runway available (Fighter/Attack/Trainer). Unless further guidance is provided in this instruction's MD specific attachment, do not take off if the computed ground roll exceeds 80 percent of the runway available. Do not execute a formation takeoff if the ground roll exceeds 50 percent of the runway available.

2.16.2. Take Off and Landing Data (TOLD) (Fighter/Attack/Trainer). The following will be computed (if applicable): acceleration check speed, refusal/maximum abort speed, rotation speed, takeoff speed and distance, single engine takeoff speed, normal landing speed and distance, heavy weight landing speed, single engine landing speed. All computations should take runway condition and the possibility of drag chute failure into account if applicable.

2.16.3. Intersection Takeoffs (All aircraft). Intersection takeoffs are permitted if the runway remaining meets minimum length criteria specified in paragraph 2.16.1, and Table 2.1.

Table 2.1. Command Minimums Reference Chart.

See MD-specific attachments for additional restrictions or clarifying comments.							
	FUEL			MIN. RUNWAY LENGTH		MIN. WIDTH	
	NORM	MIN	EMER	WITH CABLE	NO CABLE	RWY	TAXI Way
AIRCRAFT	(Lbs.)	(Lbs.)	(Lbs.)	(Ft.)	(Ft.)	(Ft.)	(FT)
A-10	1,500	1,200	1,000	N/A	5,000	75	50
AL-1	28,000	23,000	17,000	N/A	7,000	147	75
B-1	20,000	16,000	12,000	N/A	10,000	148	75
B-2	18,000	14,000	10,000	N/A	10,000	148	75
B-52	25,000	20,000	15,000	N/A	10,000	200	175
B 707	12,000	10,000	8,000	N/A	7,000	148	
C-5	24,000	20,000	16,000	N/A	6,000 (2)	147 (45m)	75 (23m)
C-12 C/D	500	400	300	N/A	4,000	60	30
C-12W	400	350	300	N/A	4,000	60	30
C-12 F/J	800	600	400	N/A	5,000	60	30
C-17	20,000	16,000	12,000	N/A	3,500	90	50
C-20	5,000	4,000	3,000	N/A	5,000	75 (7)	50
CV-22	1,400	1,200	1,000	N/A	N/A	30 (8)	20
C/RC-26	600	400	300	N/A	N/A	TBD	TBD
C-130	6,000	5,000	4,000	N/A	3,000	80 (6)	30
C-135	12,000	10,000	8,000	N/A	7,000	147	65 (3,4)
C-208	200	150	100	N/A	2,000	TBD	TBD
Falcon 20 (F-20)	2400	1800	1200	N/A	5,000	75	50
Falcon 20 (HU-25)	2000	1500	1000	N/A	5,000	75	50
DHC-8-Q200/Q300	600	400	300	N/A	3,000 (6)	80/100	75
E-3	12,000	10,000	8,000	N/A	7,000	135	75
E-8	12,000	10,000	8,000	N/A	7,000	135	75
F-4	2,000	1,500	1,000	8,000	10,000	75	50
F-15(A-D)	2000	1,500	1,200	7,000	8,000	75	50
F-15E	2300	1,800	1,200	7,000	8,000	75	50
F-16, Blk 10-32	1,000	800	600	8,000	8,000	75	50
F-16 Blk 40+	1,200	1,000	800	8,000	8,000	75	50
F-22	2,500	1,800	1,200	8,000	8,000	75	50
F-35	IAW CFOPs	-	-	-	-	-	-
UH/TH-1	300	200	100	N/A	N/A	(1)	(1)
KC-10	16,000	14,000	12,000	N/A	7,000	148	75 (4)
MQ-1	50	40	25	N/A	3,000	75	50
MQ-9	400	300	200	N/A	3,000	75	50

PC-12/U-28	**350**	**200**	**150**	**N/A**	**2,500**	**50**	**25**
RQ-4	**1,150**	**1,000**	**750**	**N/A**	**8,000**	**148 (5)**	**75**
T-38	**800**	**600**	**400**	**N/A**	**8,000**	**75**	**50**
U-2	**200 gal.**	**150 gal.**	**100 gal.**	**N/A**	**5,000**	**147**	**100**

Note 1: As defined in the aircraft attachment.
Note 2: C-5: The OG/CC may approve operations on runways as short as 5000 ft or 1,525 meters. If a 180 degree turn is required, then 150 feet or 46 meters is required.
Note 3: Crews will not use taxiways less than 74' when it poses a FOD hazard to the engines (ex., taxing over loose gravel or sand).
Note 4: Stressed width
Note 5: As listed or in accordance with approved safety plans.
Note 6: See MDS attachment for additional guidance.
Note 7: 75 feet (23 meters) required to accomplish 180 degree turn.
Note 8: 35 feet required to complete a 180 deg turn at 70 degree nacelle.

2.17. AFMC Close Watch Mission/Unusual AFMC Flight Operations. For AFMC Close Watch missions or non-routine air operations of AFMC aircraft and/or AFMC aircrew members involving FCF, ferry, or deployment outside of the Continental United States, aircrew members will follow AF acknowledged reporting. Units will contact AFMC/A3O for notification policy and will consult AFMCI 11-207, AFMC Close Watch Mission Monitoring for guidance.

2.18. Minimum Equipment List (MEL). The MEL is a pre-launch document that list the minimum equipment/systems to operate the aircraft. It is impractical to prepare a list that will anticipate all possible combinations of equipment malfunctions and mission driven circumstances. Reference aircraft attachment, test planning, technical / safety review board, etc. for MEL guidance.

Chapter 3

MISSION GUIDANCE

3.1. General. This chapter contains guidance that applies to all AFMC aircraft. Guidance that is airframe specific is contained in this instruction's attachments. This chapter is divided into five sub-sections: Common, Tactical and Systems, Air-to-Air, Air-to-Surface and Low Altitude, and Flight Test Missions.

3.1.1. The test and safety review process does not have authority to grant exception to this or any other AFI. Nor do they grant exceptions to Technical Orders (T.O.s) or Preliminary T.O.s. AFMC/A3 is the approval authority for deviations for Flight Manual T.O.s. See AFI 11-215 for applicable Flight Manual T.O.s and further guidance.

3.2. Common Mission Operations.

3.2.1. Local Area Orientation (LAO). LAO flights will occur during the day as defined by AFI 11-202 Volume 3. MD specific guidance is provided in this instruction's attachments where required.

3.2.2. ILS Precision Runway Monitoring (ILS PRM). AFMC aircrew are prohibited from flying ILS approaches requiring PRM unless there is a mission need, and the pilots at the controls have accomplished ILS PRM training. MD specific guidance is provided in this instruction's attachments where required.

3.2.3. Theater Indoctrination. AFMC flying units conducting flying operations to and from deployed locations outside of the CONUS will ensure aircrews are thoroughly trained for specific theater operations. MD specific guidance is provided in this instruction's attachments where required.

3.2.4. Touch and Go Landings. Touch and Go landings are authorized in AFMC. See paragraph 5.25 and MD attachments for specific guidance.

3.2.5. Approach and Landing. Use reported RCR when computing landing ground roll. When the computed landing ground roll exceeds 80 percent of the available runway, land at an alternate if possible. In the absence of a reported RCR, land at an alternate, if possible, when the base of intended landing has worse than wet runway conditions. For tail-hook equipped aircraft, if an alternate is not available, an approach end or mid-field arrestment should be considered. Landing on runway with a reported conditions worse than wet runway (not to exceed flight and/or performance manual limits) require OG/CC authorization.

3.3. Tactical and Systems Mission Operations.

3.3.1. Air-to-Air Refueling Tanker. MD specific guidance is provided in this instruction's attachments where required.

3.3.2. Air-to-Air Refueling Receiver. Air refueling operations will be conducted in accordance with ATP-56(B) and the guidance provided below. Rotary wing and tilt-rotor air refueling operations will be in accordance with this instruction's MD specific attachments.

3.3.2.1. Do not conduct air refueling after known losses of tanker disconnect capability (including tanker manual operation without tanker disconnect capability, or manual boom latching) unless necessary to recover the aircraft.

3.3.2.2. Reverse air refueling and manual boom latching procedures training must be under direct instructor supervision. Brief procedures used for these events during mission planning. In-flight coordination between receiver pilot and boom operator must include briefing items as required by applicable air refueling technical orders. Both tanker and receiver air refueling system must be fully operable.

3.3.2.3. Do not accomplish practice emergency separation training from the contact position or boom limit demonstration unless the receiver signal system is in normal and the receiver and tanker have assured normal disconnect capability prior to initiating the maneuver. Tanker disconnect capability will not be verified on the same contact as the practice emergency separation, and will be verified with each receiver that accomplishes a practice emergency separation.

3.3.2.4. For practice emergency separation training, coordination between the tanker pilot, boom operator and the receiver pilot is mandatory and will occur prior to the event. In-flight coordination must include when the maneuver will occur and who will give the command of execution. Tanker pilot coordination with the boom operator may be accomplished over interphone.

3.3.2.5. For boom envelope demonstrations, the receiver pilot and the boom operator will discuss the maneuver prior to accomplishment. In-flight coordination must include the receiver pilot informing the boom operator when commencing the demonstration, the limit to be demonstrated, and when terminating the demonstration. Tanker disconnect capability must be verified by a boom operator initiated disconnect prior to receivers conducting limits demonstrations.

3.3.2.6. NVGs may be worn for night tanker rejoins to include flying in the observation position, but will be raised to the up and stowed position or removed prior to the pre-contact position. Goggles may be returned to the "on" position post-AAR, if not in the pre-contact or contact position. In all cases, pilots will assess tanker external lighting conditions to determine if using NVGs is appropriate.

3.3.3. Functional and Acceptance Check Flight (FCF/ACF).

3.3.3.1. FCFs and ACFs will be performed according to T.O. 1-1-300, T.O. 1X-XX-6CF-1, T.O. 1X-XX-1 *Flight Manual* and associated Partial/Modification Flight Manuals and applicable AFMC instructions. FCFs following programmed depot maintenance (PDM) will also follow the current work specification. In the absence of an applicable T.O. 1X-XX-6CF-1, AFMC/LG will develop FCF and maintenance action guidance for that aircraft. FCFs for other reasons, such as major aircraft repair, modification, or extended aircraft downtime (as defined by T.O. 1X-XX -6CF-1) can be tailored. The FCF aircrew, aircraft maintenance and sustaining engineering activity will determine which FCF procedures will be accomplished. An FCF or ACF using the O-8E mission symbol are aircraft defined as non-airworthy in accordance with T.O. 1-1-300 and are subject to all applicable restrictions. Systems affecting airworthy status are engines, flight controls, landing gear and instruments affecting instrument flight (IFR) capability.

All other FCF and ACF flights may use the O-8F mission symbol and follow the restrictions associated with that mission.

3.3.3.2. Modified aircraft. When an aircraft has original equipment modified or new equipment added that is not covered by USAF technical orders, the contractor or responsible test organization will provide ACF/FCF or airworthiness procedures. The need for FCF after a T-2 modification will be determined by the aircraft maintenance activity. These procedures will augment those already defined in the T.O. 1X-XX-6CF-1. Conduct of the first flight after a major T-2 modification requiring verification of system airworthiness will be part of an approved test plan. The aircraft manufacturer or contractor will define FCF procedures for developmental aircraft.

3.3.3.3. Tail hook equipped aircraft. Initial FCF (O-8E) flights will be conducted from a runway with compatible approach and departure end cables or barriers. Specific cable and barrier configuration for the runway will be determined by local guidance. If no such runway is available, then an initial FCF may still be accomplished if there is a suitable alternate airfield with compatible cables within 50 nautical miles and recovery fuel allows for the possible divert. The weather at the alternate airfield must meet FCF requirements.

3.3.3.4. Use of Check Flight Cards. Unit developed check flight cards may be used in lieu of the T.O. 1X-XX-6CF-1checklist provided they are derived from the applicable T.O. 1X-XX-6CF-1 checklist and are approved by the OG/CC.

3.3.3.5. Flight Conditions. Comply with restrictions published in T.O. 1-1-300 and the take-off weather minimums specified in Table 3.1. Preflight inspections for ACF/FCF flights will be accomplished during daylight hours. Additionally, the initial preflight inspection will not be conducted during periods of precipitation to prevent masking fluid leaks. All daylight-required flight operations must be terminated prior to official sunset.

3.3.3.6. Waivers. On a case-by-case basis, when operational requirements demand, and within the constraints specified in T.O. 1-1-300, flying wing commanders (or equivalent) may waive these night and weather restrictions for all types and models of AFMC assigned aircraft. Document approval on the flight authorization. For units without flying wing commanders, HQ AFMC/A3V is the waiver authority.

Table 3.1. ACF/FCF Take-off Minimums.

Type Aircraft	**Initial ACF/FCF (O-8E)**	**Subsequent ACF/FCF (O-8F)**
Fighter*, Attack, Trainer, and U-2	3000/3	1500/3
Bomber, Cargo, and Tanker	1500/3	1000/3
Helicopters	1000/3	1000/3
Tilt-rotor	1500/3	1000/3
*See MD- Attachments for additional restrictions that may apply.		

3.3.3.7. Combined FCF and ACF Flights. IAW T.O. 1-1-300, flying wing commanders (or equivalent) may authorize the combination of FCFs with other mission/training flights if the FCF is being conducted to evaluate auxiliary aircraft systems. For units without flying wing commanders, HQ AFMC/A3V is the waiver authority. The decision to approve a combined FCF and ferry flight is the responsibility of AFMC/A3V.

3.3.3.8. Aircraft Release. If a malfunction occurs during an FCF, which is not related to the condition generating the FCF, and the original condition operationally checks good, the aircraft may be released for flight pending resolution of the new malfunction. This does not apply to post PDM FCFs.

3.3.3.9. **(Added-96TW)** Practice FCFs. IAW AFI 11-2FT, Vol 1, and 96 TW Supplement, FCF-qualified crew must maintain FCF currency. On practice sorties, aircrew should concentrate on FCF specific maneuvers.

3.3.3.9.1. **(Added-96TW)** In order to minimize risk to the aircraft and/or aircrew during practice FCF profiles (does not apply to actual FCF or FCF upgrades), the following maneuvers will not be accomplished:

3.3.3.9.1.1. **(Added-96TW)** A-10: No actual engine shutdowns, no manual reversion.

3.3.3.9.1.2. **(Added-96TW)** F-15: No actual engine shutdowns.

3.3.3.9.1.3. **(Added-96TW)** UH-1: No oil-to-fuel-heat exchanger check or torque limiting check.

3.3.3.9.1.4. **(Added-96TW)** F-16 / C-130 / C-12/ CV-22 / T-38: All maneuvers allowed.

3.3.4. Advanced Handling Characteristics/Advanced Handling Maneuvers (AHC/AHM). AHC and AHM maneuver definitions are provided in AFTTP 3-3 v MDS. Further MD specific guidance is provided in this instruction's attachments where required.

3.3.5. Fighter/Trainer Formation and Flight Lead. These procedures apply to all fighter, attack and trainer aircraft. For all other aircraft, refer to MD specific attachments to this instruction. Formations and sub-elements will be led by a qualified flight lead. In all cases, wingmen are responsible for deconfliction unless otherwise briefed.

3.3.5.1. Formation Definitions. Formation definitions are in accordance with AFTTP 3-3.MDS or as briefed. Formation positions for dissimilar formations must be briefed by the flight lead.

3.3.5.2. Taxi.

3.3.5.2.1. Day. Minimum taxi interval is 150 feet if taxiing staggered, 300 feet if taxiing in trail (on the taxiway centerline). Spacing may be reduced when holding short of or entering the runway.

3.3.5.2.2. Night. Minimum taxi interval is 300 feet, and the aircraft will taxi on the taxiway centerline.

3.3.5.2.3. Runway/Taxiways with ice/snow/slush. Minimum taxi interval is 300 feet, and the aircraft will taxi on the taxiway centerline.

3.3.5.2.4. Do not taxi in front of aircraft being armed/de-armed with forward firing ordnance.

3.3.5.3. Takeoff.

3.3.5.3.1. Takeoff interval between aircraft or elements will be a minimum of 10 seconds. Fifteen seconds is the minimum separation when the previous aircraft uses afterburner. When executing a trail departure, in anticipation of a rejoin above the weather, the minimum takeoff interval will be 20 seconds. When the previous aircraft is carrying live or inert air-to-surface weapons, the minimum takeoff interval will be 20 seconds.

3.3.5.3.2. Flight lead will brief runway lineup and abort procedures. Flight lead will call for brake release over the radio during night formation takeoffs if approved, see paragraph

3.3.5.3.3. Wingmen will be positioned on the upwind side of the runway when crosswinds are greater than 5 knots. Minimum wingtip clearance will be 10 feet. Spacing between separated elements or flights on the runway must be at least 500 feet.

3.3.5.3.4. Formation takeoffs are restricted to elements of two like (same model and design) aircraft. Aircraft must be symmetrically configured if carrying air-to-surface ordnance and/or fuel tanks, and loaded such that a trim or control application to counter a heavy wing or yaw during takeoff is not required.

3.3.5.3.4.1. The runway must be at least 125 feet wide (140 feet A-10).

3.3.5.3.4.2. Ceiling and visibility must be at least 500 feet and 1 1/2 miles.

3.3.5.3.4.3. Formation takeoffs are prohibited if: slush, snow, ice, or standing water is on the runway; effective crosswind component or crosswind gust exceeds 15 knots or flight manual limits, whichever is lower; the computed takeoff roll exceeds 50% of the available runway; aircraft are loaded with live or inert full scale munitions (excluding air-to-air missiles and internal gun ammunition, or practice bombs).

3.3.5.3.4.4. Night formation takeoffs are prohibited unless waived for mission requirements by the OG/CC.

3.3.5.4. Rejoins.

3.3.5.4.1. Daytime. Weather minimums for rejoin underneath a ceiling are 1,000 feet and 3 miles visibility.

3.3.5.4.2. Night. Weather minimums for rejoin underneath a ceiling are 3,000 feet and 3 miles. During the rejoin, wingmen remain at least 1,000 feet AGL. The last aircraft will keep the anti-collision beacon and/or strobe on and position lights on unless otherwise directed by the flight lead.

3.3.5.5. Trail Departures. Trail departures can be unaided or aided. Unaided trail departures rely primarily on timing for separation. Aided trail departures rely on timing and air-to-air radar, or data link information to maintain separation. The term “tied” refers to aircrew that have achieved situational awareness on the preceding aircraft via air-to-air radar or data link information. The desired aircraft separation for all trail departures is 2-3 NM.

3.3.5.5.1. Takeoff spacing will be a minimum of 20 seconds. The flight lead must brief the initial power setting for takeoff and acceleration, climb power setting and airspeed, and level off airspeed.

3.3.5.5.2. Each aircraft (or element) will maintain 20 seconds, or 2-3 NM spacing using all applicable aircraft systems and navigational aids. Make all heading changes IAW standard instrument procedures not to exceed 30 degree of bank.

3.3.5.5.3. On departure, each aircraft (or element) will follow the No Radar Contact procedures until all aircraft/elements have called "tied."

3.3.5.5.4. Radar equipped aircraft (or elements) will call "tied" when radar contact is established with the preceding aircraft. Alternatively, aircraft equipped with a data link system that can display the relative position of the preceding aircraft will call "tied" when airborne with a valid data link. No further radio calls are required once all aircraft are "tied" unless contact is lost.

3.3.5.5.5. Each aircraft (or element) will maintain at least 1,000 feet vertical separation from the preceding aircraft during climbs, descents, and at level-off until "tied" with the preceding aircraft, except in instances where departure instructions specifically preclude compliance.

3.3.5.5.6. In the event a visual join-up cannot be accomplished on top or at level-off, the flight lead will request 1,000 feet of altitude separation for each succeeding aircraft (or element) that is not "tied" providing all aircraft can comply with MSA restrictions. If the MSA cannot be complied with, vertical separation may be reduced to 500 feet. The flight lead should request IFF squawks for wingmen that must remain in trail.

3.3.5.5.7. Do not sacrifice basic instrument flying when performing secondary trail tasks during trail departures. Strictly adhere to the briefed climb speeds, power settings, altitudes, headings, and turn points. First priority must be given to flying the aircraft, not operating the radar or data link. If task saturation occurs, cease attempts to maintain trail, immediately concentrate on flying the instrument departure, and notify the flight lead.

3.3.5.5.8. No Radar Contact Procedures. When an aircrew losses, or cannot gain situational awareness on the preceding aircraft (or element) via air-to-air radar or data link information the following procedures apply.

3.3.5.5.8.1. The flight lead will call initiating all turns and descents and passing each 5,000 feet altitude increment with altitude and heading until join-up, level-off or the non-"tied" aircraft calls "tied."

3.3.5.5.8.2. During climbs and descents, the aircraft (element) immediately preceding the aircraft that is not "tied" will call passing each 5,000 foot altitude increment with altitude and heading until join-up, level-off or the following aircraft (element) calls "tied." In addition, the aircraft immediately preceding the aircraft that is not tied will call initiating any altitude or heading change. Acknowledgments are not required.

3.3.5.6. Enroute Procedures and Working Area Operations.

3.3.5.6.1. Do not use exaggerated or rolling maneuvers to maintain or regain formation position below 5,000 ft. AGL or in airspace where aerobatics are prohibited.

3.3.5.6.2. In IMC, maximum flight size in close formation is four aircraft except when flying in formation with a tanker. Follow the guidance in ATP-56(B) when flying in formation with a tanker.

3.3.5.6.3. For rejoins from tactical formations, the wingman will join to the side of the formation occupied at the time the rejoin is directed. If in trail, join to the left side. In all cases, the trailing element will join to the side opposite the number two, unless otherwise directed.

3.3.5.6.4. Loss of Visual. If a flight member loses sight of his flight leader or other flight member at a time when he or she thinks they should be in sight, a "blind" call will be made. Losing sight during some types of tactical maneuvering is predictable, but reacquiring sight at the appropriate time is also predictable. When any flight member calls "blind," the other flight member will immediately respond with "visual" and a position report. When the other flight member is also "blind", the flight leader will take action to ensure altitude separation between flight members.

3.3.5.6.5. Three and Four-Ship Formations (or more). When flights of more than two aircraft are in tactical formation:

3.3.5.6.5.1. Formation visual signals performed by a flight/element leader pertain only to the associated element unless specified otherwise by the flight leader.

3.3.5.6.5.2. Trailing aircraft/element will maintain a sufficient distance back so that primary emphasis during formation maneuvering is on low altitude awareness and de-confliction within elements, not on de-confliction between elements.

3.3.5.6.6. Dissimilar Formation. Aircrew members in dissimilar formations must be knowledgeable of the procedures, visual references and limitations of the other aircraft types in the formation as required by the mission.

3.3.5.6.7. Ops Checks. Increase the frequency of ops checks during tactical maneuvering at high power settings. Ops checks should include but aren't limited to fuel status, instruments, engines, and life support systems.

3.3.5.7. Position Changes.

3.3.5.7.1. Day VMC. The minimum altitude for position changes within a formation is 500 feet AGL over land or 1,000 feet AGL over water, except for emergencies.

3.3.5.7.2. Night or IMC. The minimum altitude for position changes within a formation is 1,500 feet AGL, unless established on radar downwind. A radio call is mandatory when directing position changes at night or in IMC.

3.3.5.7.3. Do not initiate lead changes with the wingman further aft of normal fingertip, route, or greater than 30 degrees back from line abreast.

3.3.5.8. Formation Breakup. Formation breakup must be thoroughly briefed. Flight leads will maintain positive control and when necessary, issue instructions to ensure safe separation of participating aircraft.

3.3.5.8.1. Flight leaders will not break up formations until each pilot has a positive fix from which to navigate (visual, ATC, INS, TACAN, VOR, or other suitable system waypoint). Formation break-up should not be accomplished in IMC. If unavoidable, IMC break-up will be accomplished in straight and level flight. Prior to an IMC break-up, the flight lead will confirm position and transmit attitude, altitude, airspeed, and altimeter setting. Wingmen will acknowledge and confirm good navigational aids. During formation breakups (under VMC or IMC), the flight lead will clear off aircraft and elements individually. Departing aircraft will initially turn away from the formation and, in VMC conditions, establish visual contact with previously departing aircraft.

3.3.5.8.2. VMC drags on final below the weather are authorized if coordinated with ATC, the weather is at least 1500 ft and 3 NM, and the drag is accomplished in sufficient time that the trail formation is set, and all aircraft are configured for landing, prior to the FAF (in the case of an instrument approach), or 3 nm from the landing point (in the case of a visual approach). Minimum airspeed for any aircraft during the maneuver will be final approach speed.

3.3.5.9. Overhead Traffic Patterns.

3.3.5.9.1. Overhead patterns can be made with unexpended practice ordnance (e.g., BDU-33s) and live forward firing ordnance. Overhead traffic patterns will not be flown with live or inert unexpended air-to-surface ordnance, unless that ordnance is secure and within an internal weapons bay. Normal spacing between overhead breaks will be 5 seconds. Aircraft must be wings level on final at approximately 300 feet AGL and 1 mile from the planned touchdown point.

3.3.5.9.2. After landing clear aircraft to the exit side (cold side) of the runway when speed and conditions permit.

3.3.5.10. Formation Penetration and Approaches. Formation penetrations are restricted to two aircraft when the weather at the base of intended approach or landing is less than overhead traffic pattern minimums. Ceiling and visibility must be at least 500 feet and 1 1/2 miles. If flying a formation landing, the wingman should be positioned on the appropriate wing prior to weather penetration. Formation low approaches may be flown with dissimilar aircraft. Approach airspeed will be based on the higher approach speed of the two aircraft. Minimum altitude for formation low approaches is 100 feet during the day and 300 feet at night.

3.3.5.11. Formation Landings.

3.3.5.11.1. Normally accomplish formation landings from a precision approach, when available. If not available, the rate of descent should be similar to a normal precision approach.

3.3.5.11.2. Landing. When briefing formation landings, flight leads will brief missed approach and go-around procedures. Wingmen will be positioned on the upwind side of the formation when crosswinds are greater then 5 knots. Minimum wingtip clearance will be 10 feet.

3.3.5.11.3. Formation landings are restricted to elements of two like (same model and design) aircraft. Aircraft must be symmetrically configured with air-to-surface ordnance and/or fuel tanks, and loaded such that a trim or control application to counter a heavy wing or yaw during landing is not required. The runway must be at least 125 feet wide (140 feet A-10). Ceiling and visibility must be at least 500 feet and 1 1/2 miles.

3.3.5.11.4. Formation landings are prohibited if:

3.3.5.11.4.1. The runway is reported as "wet" and/or measured RCR is at or below 18 (or ice, slush, or snow is on the runway).

3.3.5.11.4.2. Effective crosswind component or crosswind gust exceeds 15 knots or flight manual limits, whichever is lower.

3.3.5.11.4.3. Night conditions exist.

3.3.5.11.4.4. Either aircraft has hung ordnance.

3.3.5.11.4.5. Loaded with live or inert full scale munitions (excluding air-to-air missiles, or internal gun ammunition, or practice bombs).

3.3.5.11.4.6. Arresting gear tape connectors extend onto the runway surface at the approach end of 125-feet-wide runways.

3.3.5.11.5. Touch-and-go formation landings are prohibited.

3.3.5.11.6. Pilots will maintain their respective landing side of the runway until both aircraft have decelerated to a safe taxi speed.

3.3.5.12. Trail Recovery. Trail recoveries are authorized for air-to-air radar and data link equipped aircraft that are capable of using these systems for formation position keeping. For all other aircraft, trail recoveries are authorized only if procedures are established in the applicable MD attachment.

3.3.5.12.1. ATC approval is required to fly a trail recovery. Flight leads must advise ATC of intentions to conduct non-standard formation. Flight leads must ensure that ATC understands that instructions to the lead aircraft will be for the entire flight, and ATC will provide radar flight following for the entire formation.

3.3.5.12.2. Trail recoveries are limited to a maximum of four aircraft. Prior to taking spacing the flight lead will ensure the requirements for formation breakup are accomplished. Complete any formation changes to effect trail recovery positions prior to the instrument approach Final Approach Fix (FAF).

3.3.5.12.3. Use pre-briefed airspeeds, geometry, radar, radio calls, etc. to effect the formation change and maintain flight members' situational awareness. Pilots will fly no slower than computed final approach speed to accomplish the spacing maneuver. Minimum spacing between flight members is 1 NM.

3.3.5.12.4. If radar contact, or data link situational awareness is lost with the preceding aircraft, the pilot will transmit "(Callsign) lost contact." The preceding aircraft will respond with altitude, airspeed and heading. Establish altitude de-confliction, if necessary, and coordinate a separate clearance with ATC. If contact is lost while established on a segment of a published approach, flight members may continue the approach, but must confirm separation via navigation aids. If separation cannot be confirmed, execute missed approach or climb-out as instructed by ATC.

3.3.5.12.5. Once established on a segment of a published approach, each aircraft must comply with all published altitudes and restrictions while maintaining in-trail separation. All aircraft must report the final approach fix.

3.3.5.12.6. Trail recoveries will not terminate in simultaneous Precision Approach Radar (PAR) or Airport Surveillance Radar (ASR) approaches. Recoveries to separate PAR/ASRs are authorized. Flight leads will coordinate with ATC and will split prior to PAR/ASR final.

3.3.5.13. Lost Wingman Procedures. In any lost wingman situation, immediate separation of aircraft is essential. Smooth application of control inputs is imperative to minimize the effects of spatial disorientation. Upon losing sight of the leader, the wingman will simultaneously execute the applicable lost wingman procedures and transition to instruments. The flight leader will acknowledge the lost wingman's radio call. Transmit attitude, heading, altitude, airspeed, and other parameters as appropriate. Permission to rejoin the flight must be obtained from the flight leader after lost wingman procedures have been executed.

3.3.5.13.1. Two or Three Ship Flights **(NOTE:** If in 3-ship echelon, refer to 4-ship lost wingman procedures.):

3.3.5.13.1.1. Wings-Level Flight (Climb, Descent, or Straight and Level). Simultaneously inform the leader and turn away using 15 degrees of bank for 15 seconds; then resume heading and obtain a separate clearance.

3.3.5.13.1.2. Turns (Climb, Descent, or Level):

3.3.5.13.1.2.1. Outside the Turn. Reverse the direction of turn using 15 degrees of bank for 15 seconds and inform leader. Continue straight ahead to ensure separation before resuming turn. Obtain a separate clearance.

3.3.5.13.1.2.2. Inside the Turn. Momentarily reduce power to ensure nose-to-tail clearance and inform the leader to roll out of the turn. Maintain angle of bank to ensure lateral separation and obtain a separate clearance. The leader may resume turn only when separation is ensured.

3.3.5.13.1.3. Precision and Non-precision Final Approach. The wingman will momentarily turn away to ensure separation and inform leader. Commence the published missed approach procedure and obtain a separate clearance from approach control.

3.3.5.13.1.4. Missed Approach. The wingman will momentarily turn away to ensure clearance and inform leader. Continue the published missed approach procedure and climb to 500 feet above missed approach altitude. Obtain a separate clearance from approach control.

3.3.5.13.2. Four Ship Flights. The number two and three aircraft will follow the procedures outlined above. Number four aircraft will follow the appropriate procedures listed below:

3.3.5.13.2.1. Wings-Level Flight. Simultaneously inform the leader and turn away using 30 degrees of bank for 30 seconds. Resume heading and obtain a separate clearance.

3.3.5.13.2.2. Turns:

3.3.5.13.2.2.1. Outside The Turn. Reverse the direction of the turn using 30 degrees of bank for 30 seconds to ensure separation from lead and number three aircraft. Obtain a separate clearance.

3.3.5.13.2.2.2. Inside The Turn. Momentarily reduce power to ensure nose-to-tail separation and increase bank angle by 15 degrees. Inform the leader to roll out of the turn. Obtain a separate clearance.

3.3.5.14. Severe Weather Penetration. Avoid flight through severe weather. If unavoidable, flights should break-up and obtain separate clearances prior to severe weather penetration.

3.3.6. Targeting Pod (TGP) Pilot. MD specific guidance is provided in this instruction's attachments where required.

3.3.7. Navigation Pod (Fighter Only). MD specific guidance is provided in this instruction's attachments where required.

3.3.8. Night Vision Goggle (NVG). Pilots must not become overly confident in the capabilities of NVGs. Many things can cause a pilot to lose outside visual references. Some examples are entering the weather (intentionally or inadvertently), NVG battery failure, flight into smoke or dust, flight into a shadowed area, sudden illumination of an incompatible light source inside or outside of the cockpit, etc. Pilots must ensure primary and secondary flight instruments are sufficiently illuminated to allow transition to instruments if outside visual references are lost.

3.3.8.1. NVGs must be preflight tested and focused for the individual aircrew using (in order of preference) the Hoffman ANV-20/20 Tester, a unit eye lane, or equivalent tester prior to NVG operations. See AFI 11-301 Volume 1, for specific procedures.

3.3.8.2. Use of NVGs during all takeoffs and landings are prohibited, unless authorized in the MD specific attachments.

3.3.8.3. NVGs will only be worn in-flight by NVG qualified aircrew or by upgrading aircrew under the supervision of a qualified NVG Instructor. Familiarization flights are authorized under the supervision of an NVG IP if appropriate ground training has been accomplished.

3.3.8.4. Goggles will be donned above the MSA and in level to climbing flight when possible. The NVGs will be removed a minimum of 5 minutes prior to landing, while above the MSA when possible, to allow enough time to regain adequate visual acuity to perform the approach and landing.

3.3.8.5. While conducting NVG formation procedures, the flight lead will brief when each flight member will don/doff their goggles. In single seat aircraft, only one flight member at a time will don goggles; other flight members will monitor the goggling member if able. In multi-seat aircraft, only one crew member at a time will don goggles; another crew member will monitor aircraft parameters if able. A "goggles on" or "goggles off" call will be made indicating the status of the aircrew in each aircraft. Wingman will fly no closer than route position while wearing NVGs.

3.3.8.6. NVGs will only be used in VMC with a discernable horizon. Flight leads or aircraft commanders (as appropriate) must brief a non-NVG plan to execute if flight conditions degrade.

3.3.8.7. (N/A C-130 and C-17. See the MDS attachment) The minimum altitude, when flying below the MSA and using only NVGs to clear terrain and obstacles, is 1,000 feet AGL. Flight below the MSA while using NVGs only, requires high illumination conditions, as defined by AFI 11-214. If another system, such as TF/TA, is used to clear terrain and obstacles the minimum altitude is defined by that system's capability.

3.3.8.8. Fly with NVGs only in production NVG compatible cockpits, or with a system described in the aircraft MFM, or as stipulated in an approved test plan. Aircrew must ensure that all control and performance instruments are sufficiently illuminated by an NVG compatible light source. Lighting must provide for immediate reference to the aircrew in the event they need to transition to instruments with loss of visual references.

3.3.8.9. All NVG incompatible interior light sources will be suppressed so that they do not degrade the aircrew's ability to see outside of the cockpit with NVGs. If an incompatible light source cannot be suppressed, pilots will terminate NVG operations.

3.3.8.10. During in-flight emergencies, NVGs may be retained unless they become a detriment to safely recovering the aircraft. In ejection seat equipped aircraft, NVGs will be removed and stowed as soon as an emergency begins to deteriorate into an ejection situation.

3.3.9. Helmet-Mounted Cueing System Guidance (HMCS). MD specific guidance is provided in this instruction's attachments where required.

3.3.10. HARM Targeting System (HTS). MD specific guidance is provided in this instruction's attachments where required.

3.4. Air-to-Air Operations. This section applies to Intercept, Basic Fighter Maneuvers (BFM), Low Altitude Training (LOWAT), and Air Combat Training (ACBT). ACBT includes both Air Combat Maneuvering (ACM) and Air Combat Tactics (ACT). AFMC invokes AFI 11-214 Air-to-Air training rules for air-to-air training missions with the additional restrictions detailed below. Developmental air-to-air testing will be conducted in accordance with test and safety review board guidance and may include AFI 11-214 training rules as appropriate.

3.4.1. Air-to-Air (A/A) Maneuvering restrictions. Intercept qualified aircrew can conduct intercepts in accordance with limited maneuvering training rules. Intercept and BFM qualified aircrew can conduct intercepts to unlimited maneuvering, in a 1 V 1 sortie, if both pilots are intercept and BFM qualified. Unlimited maneuvering, on sorties greater than 1 V 1 (e.g., 2 V 1, 2 V 2), requires an ACBT qualification. Flights can be made up of ACBT and Intercept qualified crews; however, special attention must be paid to AFI 11-214 maneuvering limitations.

3.4.1.1. Negative G guns jinks are prohibited.

3.4.2. Air-to-Air System Checks. Wingmen may complete their A/A system check during formation rejoins. Flight leads will strive to conduct A/A system checks within special use airspace. If this is not possible, flight leads will do their A/A system checks above 10,000 feet MSL.

3.4.3. Separation of Aircraft. Do not maneuver within 1,000 feet of an opposing aircraft during air-to-air engagements.

3.4.4. Simulated Gun Employment. To prevent inadvertent firings when simulating gun employment, ensure there is no ammunition loaded or safe the gun according to –34 Series T.O.s, and comply with AFTTP 3-3 v MDS specific attachment guidance or AFI 11-2MDS Volume 3 guidance. Perform a trigger check (trigger squeeze) before simulated gun employment.

3.4.4. **(96TW)** Configuration. When flying tactical intercepts with a gun that cannot be mechanically safed, follow AFI 11-214 procedures and do not maneuver inside of 6,000 feet from an opposing aircraft. Further restrictions for performing UNLIMITED category maneuvering:

3.4.4.1. **(Added-96TW)** Will not be conducted with Category I, II, or III ordnance as defined in EAFBI 11-201. No live munitions except safe guns w/live 20/30mm.

3.4.4.2. **(Added-96TW)** Must be approved by the 96 OG/CC if flown with test stores or non-96 TW aircraft. This requirement does not apply to 85th Test and Evaluation Squadron-owned aircraft flown under a joint-use agreement.

3.4.5. Maximum sortie and engagement size. Maximum sortie size is 4 V 4 for unlimited or limited maneuvering. Maximum visual engagement size is 4 aircraft. OG/CC's may approve participation in larger exercises on a case by case basis. Non-radar equipped aircraft are restricted to limited maneuvering in visual engagements larger than 2 V 1.

3.4.6. Battle Damage/Bomb Checks. Unless circumstances prevent, flight leads will direct a battle damage/bomb check prior to or during RTB. Formation spacing will be no closer than normal fingertip.

3.5. Air-to-Surface Weapons Delivery, Air Drop and/or Low Altitude.

3.5.1. Air-to-Surface Weapons Delivery. This section describes procedures for aircrew air-to-surface operations and is applicable to all AFMC aircraft. Weapons delivery operations will be IAW AFI 13-212, Volume 1, *Range Planning and Operations*, T.O. 1M-34, *Aircraft Weapons Delivery Manual*, and aircraft specific -34 T.O.s. AFMC invokes AFI 11-214 Air-to-Surface training rules for air-to-surface training missions with the additional restrictions detailed below. Developmental air-to-surface testing will be conducted in accordance with test and safety review board guidance and may include AFI 11-214 training rules as appropriate. Unless otherwise specified, all limits for tilt-rotor aircraft in APLN mode equal those cited for fixed wing aircraft. Tilt-rotor aircraft operating in CONV or VTOL mode are equal to those cited for helicopters.

3.5.1. **(96TW)** Procedures applicable to Eglin AFB and the Eglin range complex are contained in EAFBI 11-201 and the Range Users Guide. Procedures applicable to Holloman AFB and the Oscura/Red Rio range complex are contained in HAFBI 11-250.

3.5.1.1. Weapons Delivery Target Identification. Aircrew must positively identify the target and ensure correlation with the targeting system prior to weapons release. For example, a pilot may visually identify a target, but must ensure the sensor controlling the point of impact (targeting pod, radar, etc) will direct the weapon to the identified target. When delivering weapons via an INS and/or GPS solution (through an undercast, in IMC, at night, etc) target identification, and correlation is defined as verifying the target coordinates and navigation solution validity respectively, while airborne.

3.5.1.2. Weather Minimums. IMC deliveries or a VMC delivery through an undercast will be conducted in accordance with the applicable range rules. VMC level deliveries above 5,000 AGL feet with visual contact with the ground will be conducted in accordance with the applicable range rules.

3.5.1.3. Single Ship Operations. AFMC aircrew, qualified in air-to-ground employment, may fly single ship weapon employment missions with training or simulated ordnance.

3.5.1.3. **(96TW)** Phase II trainees may fly single-ship upgrades if an instructor is in the aircraft.

3.5.1.4. Minimum Altitudes. Minimum release and recovery altitudes are specified in AFI 11-214 and Table 3.2.

3.5.1.4. **(96TW)** The minimum recovery altitude for overwater diving deliveries is 1,000 feet or the altitudes in Table 3.2, whichever is greater.

Table 3.2. Weapons Employment Minimum Altitudes.

Event	**Dive Angle (Degrees)**	**Recovery Altitude (AGL)**
Low Angle High Drag (Class A Range)	< 30	100 ft
Low Angle High Drag (Over-water Range, Class B and C Ranges)	< 30	300 ft
Low Angle Low Drag	< 30	1000 ft (800 for OA-10)
Dive Bomb	≥ 30	1500 ft (1000 for OA-10)
High Altitude Dive Bomb	≥ 30	4500 ft
Low Angle, Long Range, Two Target Strafe	≤ 15	75 ft fixed wing 50 ft helicopter, Tilt Rotor in CONV/VTOL mode (N/A for hover fire)
High Angle Strafe	>15	1500 ft
Level or Pull up Deliveries	N/A	200 ft fixed wing 50 ft helicopters, Tilt Rotor in CONV/VTOL mode (N/A for hover fire)
Nuclear and Radar Events	Level ±2.5 degrees	200 ft

3.5.1.5. Flight Composition. Dissimilar aircraft may execute deliveries on the same range provided the delivery events are compatible with each type of aircraft and AFI 11-214 delivery spacing restrictions are followed.

3.5.1.6. Live Ordnance Procedures.

3.5.1.6.1. Conduct a thorough and complete verification of all target data.

3.5.1.6.2. No release system, indicator, or weapon bay door malfunction may exist.

3.5.1.6.3. Weapon Unlock/Release Enable/Master Arm to Arm will not be completed until the aircraft is within the designated bombing range.

3.5.1.6.4. If all weapons are expended and release is verified visually (pilot observation of impact, by the Range Control Officer, or other flight members) and internal indications are consistent with outside observations, aircrews may conduct additional training without restriction.

3.5.1.6.5. Do not make simulated weapon delivery passes on targets occupied by personnel.

3.5.1.7. Class B/C Ranges. When Ground Controllers are operating on Class B/C ranges the following procedures apply:

3.5.1.7.1. All pilots will be familiar with applicable range weapons delivery procedures, appropriate targets and weapons footprints.

3.5.1.7.2. Ground personnel locations will be briefed and acknowledged by all pilots.

3.5.1.7.3. Pilots will not expend ordnance if any doubt exists as to the ground personnel or intended target locations.

3.5.1.8. Battle Damage/Bomb Checks (Fighter/Attack/Trainer). Unless circumstances prevent, flight leads will direct a battle damage/bomb check prior to or during recovery to base. This check is mandatory following the expenditure of live ordnance including all types of gun ammunition. Formation spacing will be no closer than normal fingertip. Battle damage checks are not required during night or IMC, however they may be accomplished at night if wearing NVGs.

3.5.1.8. **(96TW)** Battle damage checks/bomb checks. Unless circumstances prevent, battle damage checks/bomb check will be accomplished prior to leaving the Restricted Airspace, Warning Area, or Military Operating Area (MOA).

3.5.1.9. Armament System Malfunctions. Aircrew will not attempt to expend ordnance using a delivery system with a known weapons release malfunction unless following hung ordnance procedures.

3.5.1.10. Inadvertent Release. Record switch positions and impact point (if known) at the time of inadvertent release and provide to armament and safety personnel. Check armament switches safe and do not attempt further release in any mode. Treat remaining stores as hung ordnance and obtain a chase aircraft during RTB, if practical. If remaining stores present a recovery hazard, jettison in a suitable area on a single pass, if practical.

3.5.1.11. Hung Ordnance. Note weapons switch settings and then safe the armament system. Crews experiencing a hung store may contact the RCO for permission to release or jettison the hung stores in a suitable area. If a hung store cannot be jettisoned or released, or if the crew elects not to jettison, the crew will accomplish any required checklists and recover to the most appropriate airfield while avoiding over-flight of populated areas. If practical, obtain a chase and have the aircraft visually inspected. Refer to local guidance for recovery procedures with hung weapons. Air refueling may be accomplished for safe recovery of the aircraft. Land from a straight in approach. If the crew is required to land at an airfield other than the base of operations with hung or unexpended weapons, advise the local authorities of the situation so that proper coordination can be accomplished with their safety office**.**

3.5.1.12. Hang Fire/Misfire - General.

3.5.1.12.1. A missile that fires but fails to depart the aircraft is a hangfire. If this occurs, the chase pilot (if available) should closely observe and safety check the missile. Follow the hung ordnance recovery procedures in accordance with local guidance.

3.5.1.12.2. A missile that fails to fire when all appropriate switches were selected is a misfire. If this occurs, safe the Master Arm switch and follow the hung ordnance recovery procedures.

3.5.1.13. On-Range NORDO Procedures.

3.5.1.13.1. Attempt contact with the RCO on the appropriate back-up frequency. If unable to establish contact, make a pass by the range control tower (over the target if flying on an unmanned range) on the attack heading while rocking wings, and turn in the direction of traffic. The flight leader will either rejoin the flight and RTB, or direct another flight member to escort the NORDO to a recovery base.

3.5.1.13.2. If the NORDO aircraft has an emergency, and conditions permit, make a pass by the range control tower, on the attack heading while rocking wings, turn opposite the direction of traffic, and proceed to a suitable recovery base. The flight leader will direct a flight member to join-up and escort the emergency aircraft.

3.5.1.13.3. Unexpended Ordnance. If radio failure occurs and circumstances preclude landing with unexpended ordnance, accomplish a safe jettison of the ordnance. The NORDO aircraft should join on another flight member that has radio contact with the RCO and the remainder of the flight if possible. Relay visual signals specified in AFI 11-205, *Aircraft Cockpit and Formation Flight Signals* to the NORDO aircraft to initiate stores jettison (hold fist at top of canopy and make several pumping motions).

3.5.2. Air Drop Operations. Units conducting aerial delivery operations will develop specialized training programs and operational procedures. Units will employ AFI 11-301 Volume 2, *Aircrew Life Support Equipment*, AFJI 13-210, *Joint Airdrop Inspection Records, Malfunction Investigations, and Activity Reporting*, AFI 11-402, *Aviation and Parachutist Service, Aeronautical Ratings and Badges*, FM 31-19 (US Army), and applicable T.O.s for all operations. Refer to MD specific attachment and or other MAJCOM instructions for guidance.

3.5.2.1. Airdrops will be conducted in VMC. IMC airdrops are permitted if aircraft is equipped with approved software/hardware and aircrew properly trained in its operation. Comply with airspace and DZ restrictions for blind DZ operations. For detailed information on DZ sizes, markings, types, and weather and wind limits, refer to AFI 13-217. For information on aerial delivery airspeeds and altitudes, refer to AFI 11-231.

3.5.2.2. Jumpmaster directed personnel airdrops require OG/CC approval (not required for rotary-wing aircraft). The OG/CC can approve these airdrops on a case by case basis, or may approve multiple airdrops from a test plan or support mission program. Document with a memorandum for record. If approved, the user accepts all responsibility for airdrop accuracy and damage to equipment or injury to personnel.

3.5.2.3. Approved computer-aided computed air release point (CARP) and high-altitude release point (HARP) programs may be used but results must be verified. The following information must be checked/verified: DZ impact coordinates; load information to include number and type parachute, load weights, sequence of extraction, and load position.

3.5.2.4. Crews will not make airdrop using parachutes for which AFI 11-231, *Computed Air Release Point Procedures*, does not list ballistics unless the user provides approved ballistic data. This does not apply to formal test missions where the purpose of the test is to derive ballistic data for a specific load.

3.5.2.5. The primary aircrew will review the DZ survey during mission planning.

3.5.2.6. ADD Form 1748, **Joint Airdrop Inspection Report**, will be accomplished prior to all equipment airdrops. Completion, retention, and disposition of the form will be in accordance with AFJI 13-210 and the AF Records Disposition Schedule. EXCEPTION: A-71 and A-21 containers rigger for door bundles.

3.5.2.7. Radio transmissions with the DZ are limited to those required for safety of flight considerations. This includes ATC directions, range clearance, unsafe surface conditions, or mission changes. Radio silence/no communications procedures will be coordinated prior to mission execution.

3.5.2.8. Drop clearance is normally inherent with mission clearance to unmanned DZs. The aircrew observing the proper briefed authentication confirms drop clearance in VMC. Drop clearance is confirmed via radio call or beacon acquisition in IMC. Absence of the prebriefed marking, jumbled block letter, the letter X, or red light/smoke/flare is considered a no-drop call.

3.5.2.9. No-Drop Decisions.

3.5.2.9.1. Prior to the 1-or 2-minute warning, notify the AC when any condition exists that could jeopardize a safe drop.

3.5.2.9.2. After the 1- or 2-minute warning, any crewmember observing a condition that would jeopardize a safe drop will transmit “NO DROP” on the interphone.

3.5.2.9.3. A “NO DROP” will be called if checklists items required prior to the 10/5 second call have not been completed.

3.5.2.9.4. The non-flying pilot, the navigator (if applicable) and the loadmaster will acknowledge the "NO DROP" call. All applicable aircrew will immediately configure any automatic airdrop switches to prevent automatic release of the load. The AC will immediately instruct the crew to follow the appropriate procedures.

3.5.3. Low Level Navigation Operations. AFMC invokes AFI 11-214 Low Altitude training rules for low altitude missions with the additional restrictions detailed below. Developmental testing in the low level structure will be conducted in accordance with test and safety review board guidance.

3.5.3.1. Low level environment. Between sunrise and sunset, the low level environment defined by this instruction is at or below 2000 feet AGL. For IMC or night operations the low level environment is defined as below the MSA.

3.5.3.2. Minimum Altitudes. (N/A C-130 and C-17. See the MDS attachment).

3.5.3.2.1. Day VMC. Fixed wing pilots will not conduct low level flight below 500 feet AGL unless current and qualified (or in an approved training program) in Low Altitude Step Down Training (LASDT). Helicopter and tilt rotor operations in the CONV/VTOL mode will not be conducted below 100 feet above the highest obstacle (AHO). This altitude restriction does not apply to flight test techniques, such as tower flybys, performed within Edwards AFB class D airspace, or FCF missions.

3.5.3.2.2. Night and IMC. Aircraft will not fly lower than the MSA (or RAA when operating in Special Use Airspace (SUA) vice a MTR) unless using an approved Terrain Following (TF), Terrain Avoidance (TA), or other system. The pilots must be qualified in the system used, and the system must be fully operative.

3.5.3.2.3. Night VMC. Pilots using NVGs can fly lower than the MSA (or RAA when operating in a SUA vice a MTR) in VMC conditions under high illumination conditions as defined in AFI 11-214 . The aircrew must be current and qualified in below MSA NVG operations, or in the upgrade program and under the supervision of an IP per the training program. Also, the aircraft must have an operable radar altimeter unless executing a test plan. During NVG low level operations, altitude warning will be set to the minimum altitude planned during the low level route. Rotary wing and tilt-rotor pilots must refer to their specific attachments for guidance.

3.5.3.3. Visual Procedures. Weather minimums for visual low level operations will be 1,500 feet (1000 for helicopters and tilt-rotor aircraft in CONV/VTOL mode) ceiling and 3 miles visibility for any route or area, or as specified in FLIP for MTRs, unit regulations or national rules, whichever is higher.

3.5.3.3.1. At altitudes below 1,000 feet AGL, wingmen will not fly at a lower AGL altitude than lead.

3.5.3.3.2. When crossing ridges, high or hilly terrain, maintain positive G on the aircraft and do not exceed 120 (60 for helicopters) degrees of bank. Maneuvering at less than 1 G is limited to upright (less than 90 degrees of bank) bunting maneuvers.

3.5.3.3.3. If unable to visually acquire or ensure lateral separation from known vertical obstructions which are a factor to the route of flight, flight leads will direct a climb no later than 3 NM (1 NM for helicopters and tilt-rotor aircraft in

CONV/VTOL mode) prior to the obstacle to an altitude that ensures vertical separation.

3.5.3.3.4. Military Training Route (MTR) Transition**.** Radar services and on-board radar systems will be used to the maximum extent practical to assist with visual look-out. Unless a faster minimum safe maneuvering speed is required by the aircraft T.O., delay acceleration to airspeeds authorized in FLIP until established inside the confines of the MTR and decelerate back to low altitude cruise speed prior to route exit. If an unplanned route exit occurs (e.g. route abort, Terrain Flowing Radar (TFR) fly-up, etc.), slow to low altitude cruise speed after terrain or obstacle clearance is assured. Avoid Class A/B/C/D airspace. Limit time in Federal Airways to that required to cross them.

3.5.4. Low Altitude Step Down Training (LASDT) Operations (N/A C-130 and C-17. See MD attachments). LASDT applies to fixed wing operations below 500 feet AGL, except for takeoff and landing, and weapons delivery minimum recovery altitudes. LASDT applies to rotary-wing enroute cruise operations below 300 feet AGL, except for takeoff and landing and remote operations. LASDT fixed wing aircrew will not fly lower than 200 feet AGL during training and will not fly lower than 100 feet AGL during test unless approved by the safety and test review boards. LASDT rotary wing aircrew will not fly lower than 50 feet AHO during training or during test unless approved by the safety and test review boards. MD specific guidance is provided in this instruction's attachments if necessary.

3.5.5. Terrain Following/Terrain Avoidance (TF/TA). TF/TA operations are prohibited unless the crew is current and qualified in TF/TA operations as defined in AFI 11-2FT Volume 1. Alternatively, qualified FCF/ACF/OCF aircrew may conduct day VMC TF/TA operations in accordance with T.O. -6 procedures. Flights will only be conducted in approved airspace. TF operations specified in an approved test plan will operate within the guidelines of the test plan and any restrictions imposed by the safety review board. Annotate low-level charts with TF Start/Termination areas. Minimum altitude for TF/TA operations will be no lower than aircrew qualification for Low Level Navigation or LASDT.

3.5.5.1. Negative Altitude Variations on IR routes. Excessive negative altitude variations will not ensure safe terrain clearance at your MSA. Aircrews will use altitude variations from Pilot to Metro Service (PMSV) (or compute using PMSV altimeter settings and D values) to determine which route segments are affected by excessive altitude variations. This information should be obtained as close as possible to the planned entry time. Crews unable to contact a PMSV station may enter using information from the preflight weather briefing.

3.5.5.1.1. NVGs may be used to clear terrain visually during night VMC. TF equipped aircraft may continue to TF in an area of excessive negative altitude variation. However, in the event of a fly-up, TF malfunction, or any required climb to MSA, you must abort the route. If any of the following situations occur during IMC or at night and the crew is unable to clear terrain visually, abort the route:

3.5.5.1.1.1. The difference between aircraft system altitude and the Mean Sea level (MSL) altitude as indicated with the most current altimeter setting exceeds -400 feet. This can be measured directly by taking an altitude calibration (for example, a 2420 MSL pressure altimeter reading and a 2000ft system (true) altitude would yield a -420 ft altitude variation).

3.5.5.1.1.2. The aircraft radar altimeter indicates less than a 600 ft terrain clearance while at the MSA.

3.5.5.1.1.3. Flying and maintaining TF clearance plane settings and the aircraft pressure altimeters indicate at or above the route MSA.

3.5.5.2. Crews may enter the route in IMC conditions and fly MSA up to the area of excessive altitude variation. Prior to entering the area of excessive altitude variation, crews must be able to visually clear terrain or fly TF, in order to continue low level operations. Once the forecast/observed area(s) of excessive altitude variation is over-flown, subsequent portions of the low level route may be flown.

3.6. Flight Test Mission Operations.

3.6.1. Flight Test Orientation. For specific guidance see the MD attachment.

3.6.2. Target. Target operations refer to direct support missions that do not involve chase events. A chase qualification is not required to fly target events. In the absence of test or safety review board restrictions follow the guidance in this instruction's paragraph 3.4 Air-to-Air Operations.

3.6.3. Chase. This section describes general procedures for planning, briefing and flying chase formations. This guidance is not intended for test support aircraft being employed in a "target" role.

3.6.3.1. General. In addition to specific flight test requirements, the test aircrew are often concentrating on items not generally associated with normal formation operations. The chase aircrew must be aware of the test point requirements, monitor parameters, ensure safe separation and clear for the formation. To optimize the contribution chase assets provide, test aircrew will brief specific chase procedures for each test point to include description of the test maneuver, expected chase position, expected parameters, expected radio calls, and rejoin procedures.

3.6.3.1. **(96TW)** All chase procedures must be fully documented in the Risk Management Board/Airborne Test Review/Safety Board (RMB/ATR/SB) minutes and included in the test cards to ensure all aircrew (especially those unfamiliar with the test planning) will understand the chase requirements and restrictions during mission briefings. Approved chase procedures will not be deviated from unless approved by the RMB/ATR/SB process.

3.6.3.2. Types of Chase. The test team will clearly brief the chase crew's objectives in accordance with test and safety review board stipulations. Flight leads will cover chase aircrew positions and responsibilities during the flight briefing. The flight lead will direct chase positions in flight as required by test objectives.

3.6.3.2.1. Safety Chase. Visual formation that maximizes the briefed chase duties. Chase duties include but are not limited to, deconfliction, clearing, observing test point execution, monitoring altitudes, airspeeds, limits and other flight parameters and periodic checks of aircraft and store condition.

3.6.3.2.1. **(96TW)** Except during delivery of explosive munitions, the normal fighter safety chase position is similar to a fighting wing. Avoid the 30-degree cone immediately behind and below lead's flight path in case of inadvertent store release. Chase will stack slightly high when the mission requires flight below 500 feet AGL. On any release of an explosive munition, the chase pilot must ensure his position will keep him safe from fragmentation, to include premature weapon function. During compatibility flight maneuvers, fly a normal chase position except during sustained high-speed test points, where the chase will assume a position to keep lead in sight while conserving fuel.

3.6.3.2.2. Area Chase. The chase aircraft need only remain in the designated test area and maintain radio contact with the test aircraft. The chase pilot should maintain situation awareness of the test aircraft's location via use of data link information, radar, air-to-air TACAN, and/or ground controllers, as required and should de-conflict his flight path from all other airborne elements of the mission. Area chase should remain in a position where an expeditious intercept to rejoin with the test aircraft can be accomplished, if required.

3.6.3.2.3. Photo Chase. Position is dictated by the photo requirements of the test and photographic equipment. Flight planning and briefing shall include formation positions during various phases of flight or test points as well as radio terminology. Pilot and photographer will discuss camera communications, maneuvers to be performed, disposition and stowage of photographic equipment in the event of emergency egress and ejection. Regardless, maintaining the briefed minimum safe distance from the test aircraft, test items, or the terrain remains a primary responsibility of the chase pilot.

3.6.3.2.3. **(96TW)** When there is no requirement to practice or maintain a photo-chase position, chase will move to a normal safety chase position.

3.6.3.2.4. Instructor Pilot/Standardization Evaluation Flight Examiner (IP/SEFE) Chase. IP/SEFE chase is close formation to route formation so as to evaluate maneuvering parameters. In-flight nose-tail separation will be maintained.

3.6.3.3. Requirements and Restrictions. Any pilot may chase an aircraft under emergency or impending emergency conditions. Pilots who have completed an Instrument/Qualification evaluation may chase as safety observer for aircraft performing simulated instrument flight or hung ordnance patterns. Pilots that have completed the chase upgrade training may chase test events. Only, an instructor or evaluator may fly IP/SEFE chase.

3.6.3.3.1. Missions Requiring Chase Support. The following types of test missions will include a chase aircraft, unless a test safety review board specifically assesses otherwise: first flights on new aircraft; performance testing of new/modified test aircraft, stability & control and/or flying qualities evaluations of modified or new aircraft configurations; structural integrity tests; dispensing, separation, functional and/or jettison tests of modified or new munitions (live or inert) and suspension equipment; captive compatibility flights (except baseline flights); and missions which prevent the test aircrew from clearing their flight path in "see and avoid" airspace. Chase pilots must continue to fulfill briefed responsibilities until the test aircraft either lands or reverts to a non-chase required configuration or mission (for example, following release of a test weapon).

3.6.3.3.1. **(96TW)** In addition to AFI11-2FTV3, paragraph 3.6.3.3.1., a safety chase is required for the following:

3.6.3.3.1.1. **(Added-96TW)** All Cat I (live) ordnance deliveries.

3.6.3.3.1.2. **(Added-96TW)** All missions exceeding 600 KCAS below 3,000 feet AGL or 6 Gs below 3,000 feet AGL.

3.6.3.3.1.3. **(Added-96TW)** Any other mission deemed unusually hazardous by the 96 OG/CC, 96 TG/CC, SQ/CC, or ATR/SB. All exceptions to chase requirements will be approved by the ATR/SB.

3.6.3.3.2. Briefing. To the maximum extent possible, briefings between chase and test aircrew will be conducted face-to-face. Mission briefings at a minimum will include telephonic coordination with test aircrew. Chase briefings will specifically cover relevant test hazards and risk minimizing procedures, separation of aircraft, minimum and abort altitudes, chase positions, minimum safe distances from test aircraft and test items, control-room and flight communication, mission, photo, and safety-related radio calls and terminology.

3.6.3.3.3. Test/Chase Aircraft Configuration. Chase aircrew should assist with preflight of the test aircraft and munitions to observe and become familiar with configurations, lanyards, panels, airframe scratches, etc.. This is not required where there is no external test item and there is no additional risk of structural failures due to the flight test such as avionics or software tests.

3.6.3.3.4. Communications. Primary test and chase aircraft will maintain radio contact during the mission. To maximum extent possible, the chase aircraft will monitor Guard radio frequency. The chase pilot will issue immediate advisories to lead if lead deviates significantly from intended maneuvers or pre-briefed flight profile. Chase will relay all "terminate," "abort," or "knock-it-off" calls.

3.6.3.3.5. Fuel. Fuel planning should account for test mission accomplishment and contingencies. When safety chase is required for recovery, fuel planning must permit chase aircrew to chase the test aircraft to a full stop landing, followed by another approach to a full stop by the chase aircraft.

3.6.3.3.6. Weather. Weather for safety chase formation is a discernable horizon, 3 NM of visibility, and clear of clouds.

3.6.3.3.7. Minimum altitudes/airspeeds. Excluding airborne pickups, pattern and landing chase, or unless specifically permitted by the technical/safety review boards, the chase minimum altitude is 500 ft. AGL. The chase will not stack lower than lead when operating below 1,000 feet AGL. Exaggerated rolling or vertical maneuvers below 5,000 ft. AGL are prohibited.

3.6.3.3.7.1. Airborne Pickup. When performing an airborne pickup chase will fly no slower than final turn / final approach speed and no lower than 200 feet AGL. This procedure may be modified by specific test mission requirements if approved by test and safety review boards.

3.6.3.3.7.1. **(96TW)** Airborne chase pickups of an aircraft on takeoff roll will be accomplished only when essential to mission accomplishment or required training. Notify ground control of intention when calling for taxi.

3.6.3.3.7.2. In the traffic pattern, IP/SEFE chase aircraft may maneuver as necessary to observed performance, but go no lower than 50 feet AGL. All other chase aircrew must initiate go around by 200 feet AGL, unless an emergency requires a lower altitude or specifically approved by a test safety review board to support test requirements. However, 50 feet AGL is an absolute minimum.

3.6.3.3.7.2. **(96TW)** Minimum Altitude. If required to chase below 200 feet AGL, chase pilots will use extreme caution for airfield obstructions near the runway, which typically are not shown on approach plates (e.g., ILS antennas, etc). TERPS criteria allows a 50' obstacle to be as close as 350 feet from the runway centerline. If chasing below 200 feet AGL, aircrew should plan to chase on the opposite side of known obstructions or remain within 250-300 feet from the runway centerline.

3.6.3.3.7.3. Planned recovery and abort altitudes and g-loadings following dives will be based on available aircraft performance, and should account for the chase aircraft worst cast condition. Normally, aircrew should plan on a wings-level 4g pull-out. Higher load factors may be flown, if within aircraft limits, to provide increased margins of safety.

3.6.3.3.7.4. The chase pilot must be able to fulfill chase responsibilities while remaining at or above approach speed for the power approach configuration as a minimum. If the chase event requires a slower airspeed, a different type of chase aircraft should be selected for the planned test maneuvers or a solution based on geometry while maintaining chase approach speed or higher.

3.6.3.4. Separation from Test Aircraft/ Air Vehicles/Munitions:

3.6.3.4.1. Manned Aircraft: Fly no closer than route formation during test maneuvering unless performing briefed photo chase duties or "battle-damage"/"clean and dry" checks.

3.6.3.4.2. RPA/SUAS: Fly no closer than the test and safety board approved minimum distance.

3.6.3.4.3. Munitions: The chase aircrew will maneuver and position themselves so that if the munition or store being tested separates unexpectedly no undue hazard is created. When chasing an item with an armed flight termination system, adjust maneuvers and position to avoid the associated blast and fragmentation zone to the maximum extent possible. When chasing live ordnance missions, the chase pilot must ensure safe separation in case of early fuse function, as well as safe escape.

3.6.3.5. Terminate test and chase events for any of the following: exceeding limits, loss of situation awareness, other air vehicles become a safety risk to the flight, a dangerous situation is developing, radio failure is recognized, airspace boundaries are violated, or visual contact with the test aircraft is lost (area chase excepted). Termination of a test event does not relieve the chase aircraft of the responsibility to de-conflict from the test aircraft and to provide see and avoid clearing. If chase is unable to perform these duties due to loss of situational awareness or malfunction, chase must immediately notify the flight lead, test director, and other participating aircraft.

3.6.3.6. Cargo and Bomber Model Aircraft Restrictions.

3.6.3.6.1. Cargo and bomber model aircraft may chase like aircraft (same MD) if the aircrew are visual formation trained. In this case, a chase qualification is not required. At no time will the chase aircraft come within 200 feet of the test aircraft.

3.6.3.6.2. Cargo and bomber series aircraft may chase dissimilar aircraft (different MD) if the aircrew are chase qualified. At no time will the chase aircraft come within 200 feet of the test aircraft. Exception: See MD attachment for C-12 chase minimum spacing.

3.6.4. Ordnance Release Test. All weapons delivery guidance applies. For specific guidance see the MD attachment.

3.6.5. Hi Angle of Attack (Hi AoA). For specific guidance see the MD attachment.

3.6.6. Compatibility Flight Profile (CFP). Fly training CFP events to no greater than 90 percent of actual aircraft or store limits. For specific guidance see the MD attachment.

3.6.7. Loads. Fly training loads profiles to no greater than 90 percent of actual aircraft or stores limits. For specific guidance see the MD attachment.

3.6.8. Flutter. Fly training flutter profiles to no greater than 90 percent of actual aircraft or stores limits. For specific guidance see the MD attachment.

3.6.9. Airstart (Single-Engine Aircraft). For specific guidance see the MD attachment.

3.6.10. Test Pilot School (TPS) Curriculum. This section applies to qualifications for non-TPS assigned aircrew to instruct various TPS curriculum events in non-TPS assigned aircraft. Examples include, but are not limited to, F-15 Asymmetry, C-130 performance evaluations, and systems evaluations. Guidance is provided either in this instruction's MD attachments, or in the unit's supplement to this instruction.

3.6.11. Air-to-Air Refueling Tanker Test. For specific guidance see the MD attachment.

3.6.12. Airdrop Test. For specific guidance see the MD attachment.

3.6.13. Qualitative Evaluations.

3.6.13.1. Pilots. TPS graduates or TPS students performing qualitative flying evaluations in conjunction with a TPS syllabus or short term qualitative evaluations may, under the direct supervision of an instructor, operate the aircraft during critical phases of flight per AFI 11-202v3 AFMC Sup 1.

3.6.13.2. Navigators/WSO/CSO, non-rated aircrew and CEAs. TPS graduates or TPS students performing qualitative flying evaluations in conjunction with a TPS syllabus event or short term qualitative evaluations; may, under the direct supervision of an instructor operate the aircraft during all non-critical phases of flight and the following critical phases of flight: Low Level above 1000 feet AGL (300 ft AGL for helicopters), non diving level Weapons Delivery above 1000 feet AGL, and Instrument/VFR approaches and patterns above 500 feet AGL.

3.6.13.3. Non-TPS graduate TPS staff instructors performing curriculum mission familiarization flights; may, under the direct supervision of an instructor pilot, operate the aircraft during all non-critical phases of flight and the following critical phases of flight: Low Level above 1000 feet AGL, non diving level Weapons Delivery above 1000 feet AGL and Instrument/VFR approaches and patterns above 500 feet AGL.

Chapter 4

INSTRUMENT PROCEDURES

4.1. Weather Requirements.

4.1.1. All Fighter, Attack, Trainer or any other single pilot mandatory crew position aircraft may fly approaches to published minimums or 300 feet and 1 mile, whichever is higher. Exception UH-1, comply with 4.1.2.

4.1.2. All multi-pilot mandatory crew position aircraft may fly approaches to published minimums unless limited by MDS attachment or OG/CC.

4.1.3. **(Added-96TW)** Envelope expansion missions and missions involving the carriage or release of experimental/unfielded Category I, II, or III external air-to ground ordnance as defined in EAFBI 11-201 require 1,500 feet and 3 miles for takeoff and landing. Intermittent forecast conditions are restrictive. The 96 OG/CC or 96 TG/CC may approve specific missions to 500 feet and 1 mile on the day of the mission or during the ATR/SB.

4.1.4. **(Added-96TW)** Do not designate Hurlburt, Duke, or Eglin as weather alternates for each other, due to their close proximity. The 413 FLTS will follow host/supported unit procedures.

4.2. Approach Category. Refer to MD specific attachments for aircraft approach categories.

4.2.1. Approach Category E Aircraft.

4.2.1.1. Approach speeds equal to or greater than 166 knots, no matter the configuration or type of approach (i.e. straight-in, side-step, circling).

4.2.1.2. Approach Category D minimums may be used at an emergency divert airfield where no Category E minimums are published. Airfields with Category D minimums may be designated as an alternate airfield, and practice instrument approaches may be flown using Category D minimums if VMC can be maintained throughout the procedure provided:

4.2.1.2.1. A straight-in approach is flown.

4.2.1.2.2. The aircraft is flown at a final approach airspeed of 165 KCAS or less.

4.2.1.2.3. The aircraft is flown at 255 KTAS or less for the missed approach segment of the approach. At high pressure altitudes and temperatures, 255 KTAS may not be compatible with published missed approach airspeeds and Category D approaches should not be flown.

4.2.2. Approach Category D Aircraft.

4.2.2.1. Approach speeds of 141 knots to 165 knots.

4.2.2.2. If approach speed exceeds 165 knots, no matter the configuration or type of approach (i.e. straight-in, side-step, circling), the minimums for category E will be used.

4.2.2.3. Approach Category C minimums may be used at an emergency divert airfield where no Category D minimums are published. Airfields with Category C minimums may be designated as an alternate airfield, and practice instrument approaches may be flown using Category C minimums if VMC can be maintained throughout the procedure provided:

4.2.2.3.1. A straight-in approach is flown.

4.2.2.3.2. The aircraft is flown at a final approach airspeed of 140 KCAS or less.

4.2.2.3.3. The aircraft is flown at 240 KTAS or less for the missed approach segment of the approach. At high pressure altitudes and temperatures, 240 KTAS may not be compatible with published missed approach airspeeds and Category C approaches should not be flown.

4.2.3. Approach Category C Aircraft.

4.2.3.1. Approach speeds of 121 knots to 140 knots.

4.2.3.2. If approach speed exceeds 140 knots, no matter the configuration or type of approach (i.e. straight-in, side-step, circling), the minimums for the appropriate category will be used.

4.2.4. Approach Category B Aircraft.

4.2.4.1. Approach speeds of 91 knots to 120 knots.

4.2.4.2. If approach speed exceeds 120 knots, not matter the configuration or type of approach (i.e. straight-in, side-step, circling), the minimums for the appropriate category will be used.

4.2.5. Approach Category A Aircraft.

4.2.5.1. Approach speeds of 90 knots or less.

4.2.5.2. If approach speed exceeds 90 knots, no matter the configuration or type of approach (i.e. straight-in, side-step, circling), the minimums for the appropriate category will be used.

4.3. Weather Avoidance.

4.3.1. Plan and fly all missions to avoid areas of known or forecast severe weather including severe icing or severe turbulence. These restrictions do not apply to planned severe weather penetration as part of an approved test plan.

4.3.2. During flight, attempt to avoid thunderstorms by at least the following unless further restricted in MD attachment:

4.3.2.1. 20 NMs laterally at or above flight level (FL) 230.

4.3.2.2. 10 NMs laterally below FL 230.

4.3.2.3. 5 NMs for operations below 5000 feet.

4.3.2.4. Avoid gust fronts and winds preceding a rapidly moving thunderstorm. Avoid areas of high lightning potential; i.e. clouds within plus or minus 5000 feet of the freezing level.

4.3.3. Do not fly directly above (within 2,000 feet) thunderstorms or cumulonimbus clouds. If unable to vertically clear thunderstorms or cumulonimbus clouds by at least 2000 feet vertically, you must avoid them using the above criteria.

4.3.4. Do not fly into an area of known or forecast moderate or greater mountain wave turbulence. The OG/CC may allow the following aircraft to fly in areas of forecast or known moderate mountain wave turbulence: T-6, A-10, F-15, F-16, F-22, F-35, T-37, A/T-38 aircraft.

4.4. Advisory Calls (N/A C-130). The following procedures are applicable to multi-place aircraft that do not have guidance defined in Technical Orders. See MD attachment for C-130 Operations. Fighter-Trainers are considered single-place aircraft and exempt from these requirements.

4.4.1. Advisory Calls. The pilot flying will periodically announce intentions during departures, arrivals, approaches, and when circumstances require deviating from normal procedures. Mandatory advisory calls are: (The pilot not flying the aircraft will make these calls except those designated for any crewmember).

4.4.2. Altitude Calls, unless announced by an aircraft system.

4.4.2.1. 1,000 feet above IAF (or holding) altitude.

4.4.2.2. Transition altitude/level.

4.4.2.3. 1,000 feet above or below assigned altitude.

4.4.2.4. During instrument approaches call 100 feet above procedure turn, FAF, MDA, or Decision Height (DH) altitude.

4.4.2.5. Non Precision Approaches. The pilot not flying will state “MDA” when reaching MDA and “Runway in Sight” when the runway environment is in sight. The pilot flying will state intentions (i.e. “Continue” or “Land”) and continue the approach below the MDA only if the aircraft is in a position to make a normal approach to the runway of intended landing and the pilot flying clearly sees the approach threshold of the runway, approach lights, or other markings identifiable with the approach end of the runway. Otherwise, either pilot will state “Go Around” at the MAP and the pilot flying will execute the appropriate missed approach procedure, ATC issued climbout instructions, or ATC clearance.

4.4.2.6. Precision Approaches. The pilot not flying will state “DH” when reaching DH. At DH the pilot flying will state intentions (i.e. “Continue”, “Land” or “Go Around”). The pilot flying may continue the approach below DH only if the aircraft is in a position to make a normal approach to the runway of intended landing and the pilot flying clearly sees the approach threshold of the runway , approach lights, or other markings identifiable with the approach end of the runway. Otherwise, the pilot flying will execute the appropriate missed approach procedure, ATC issued climbout instructions, or ATC clearance.

4.4.3. Deviations. The pilot not flying the aircraft will tell the other pilot when heading or airspeed deviations are observed or altitude is more than 100 feet from desired and no attempt is being made to correct the deviation.

4.4.3.1. Any crewmember seeing a variation of 200 feet altitude, a deviation of +/- 10 knots in airspeed or a potential terrain or obstruction problem will immediately tell the pilot. Deviations from prescribed procedures for the approach being flown will also be announced.

4.5. Instrument Approach Briefings/Checklists. Multi-place aircraft that do not have guidance defined in Technical Orders will ensure the following items are set or checked and briefed prior to the IAF: heading and attitude systems, navigation and communication radios, TACAN/VOR select switch, the final approach course and altimeters. In addition, review the approach and the aerodrome sketch and brief the following items: sector altitude, DH or MDA, field elevation, weather required for approach, missed approach point, climbout, and intentions, terrain/obstacle hazards, crew duties and responsibilities, lost communication intentions, and backup approach and frequencies.

Chapter 5

OPERATING PROCEDURES AND RESTRICTIONS

5.1. General. These procedures do not supersede flight manual guidance. Refer to MD attachments for additional aircraft specific operational limits and restrictions.

5.2. Technical Orders. All aircraft will be operated IAW the applicable technical orders. In the case where technical orders do not yet exist personnel will not operate new equipment or modified aircraft without properly validated and verified tech data in accordance with 00-5 series T.O.s. Once validated by flight test, new equipment can be operated using test cards derived from an approved test plan if other tech data does not yet exist. Modified aircraft will be operated in accordance with the aircraft modification flight manual.

5.3. Developmental Software. The aircraft chief of engineering or aircraft System Program Director (SPD) must certify developmental software, including mission planning software for flight outside a test program. Under no circumstances will a flight outside of a test program take place with software that has not passed a safety of flight evaluation.

5.4. New/Modified Aircraft Equipment/Weapons. Aircrew members not qualified in the operation of new or modified aircraft equipment are restricted in aircrew duties. They will not operate that equipment on any flight unless under the supervision of a current and qualified instructor of like specialty qualified in that equipment. This restriction does not apply to aircraft and aircrew under a formal test plan.

5.5. Wind and Sea State Restrictions (Ejection Seat Aircraft). Normal flying operations will not be conducted when surface winds along the intended route of flight exceed 35 knots steady state or when the sea state exceeds 10 feet wave height. This is not intended to restrict operations when only a small portion of the route is affected. If possible, alter mission plan to avoid the area. The unit OG/CC is the waiver authority for this paragraph.

5.5. (96TW)If steady state surface winds exceed 25 knots (or gusts exceed 35 knots) 96 OG/CC or TG/CC approval is required to fly missions in ejection-seat aircraft. Do not fly training missions during these conditions. Non-ejection seat aircraft refer to AFI 11-2FT, Vol 3, MDS-specific sections for any applicable wind restrictions.

5.6. Aerial Demonstration/Show Formation. Refer to AFI 11-209, *Aerial Event Policy and Procedures*, AFI 11-246, *Air Force Aircraft Demonstrations*, and applicable MAJCOM directives for specific rules and appropriate approval levels to participate in static displays and aerial events.

5.7. Aerial Photography and Equipment.

5.7.1. Personnel authorized to use photographic equipment. Per AFI 33-117, *Multimedia (MM) Management*, only qualified aerial photographers (Air Force Specialty Code 3VOXX) are authorized to carry and operate photographic equipment in flight for mission related requirements. Non-aerial photographer qualified personnel will not carry or use photographic equipment under the following conditions (OG/CCs may waive this requirement on a case by case basis for small single unit cameras that can be readily stowed for ejection or egress purposes): when flying in ejection seat aircraft; when occupying a crew station with a set of flight controls.

5.7.2. Approved equipment. Equipment used during flight must meet the requirements of AFI 11-202V3.

5.7.3. Fighter/Trainer Aircraft. Due to limited space and safety considerations, do not take more than two camera systems on board the aircraft. A mission requiring more than two cameras requires OG/CC approval. Equipment size must be small enough to take out and/or stow quickly without interfering with flight controls or throttles. Keep equipment stored until needed. Remove straps and lens caps before departing for the aircraft. Cords must be coiled, not rigid. Inventory equipment before and after each mission. Notify crew chief of FOD, if applicable. Do not lay professional gear on bare consoles, instead, place gear inside helmet bag. Equipment must remain clear of the control stick/yoke, throttles and any other cockpit controls or displays that are critical to flight safety. If time permits, store all gear prior to ejection.

5.8. Flight Duty Period (FDP). Observe guidance contained in AFI 11-202 Vol 3 Chapter 9, AFI 11-202 Vol 3 AFMC Sup 1, and specific MD attachments to this instruction.

5.8.1. USAF TPS students will not be scheduled for events which would deny them 12 hours of crew rest. However, students may elect to use school facilities (i.e. computers, data reduction equipment and audio-visual equipment) so long as it does not interfere with the opportunity for at least 8 hours of uninterrupted rest. To ensure this happens, students will depart the USAF TPS no later than 1 hour before the 8 hour window for uninterrupted rest begins. The additional hour is allotted for activity such as transportation, meals and hygiene related events.

5.9. Checklists. A checklist is not complete until all items have been accomplished. Notes amplifying checklist procedures or limitations may be added to the checklists. Checklist items that do not apply to the unit's aircraft or mission may be lined out.

5.10. Preflight/Ground Operations. When an aircraft gas turbine compressor or auxiliary power unit is being operated during preflight or other ground operation, a person qualified in its operation must be in a position to monitor audible and/or visual warning systems.

5.11. Seat and Safety Belt Requirements. PICs must ensure each occupant over two years old has an approved seat equipped with a safety belt. Seat belts must be worn:

5.11.1. When an ejection seat is occupied.

5.11.2. In the pilot and copilot positions.

5.11.3. As directed by the PIC.

5.11.4. During taxi, takeoff, landing, and air refueling except for crewmembers (including test personnel conducting official test points) performing official flight duties or cockpit observation when wearing the seat belt is impractical.

5.11.5. By each passenger and crewmember to avoid injury in the event of turbulence, unless crew duties dictate or the PIC has authorized otherwise. The PIC will direct all occupants to fasten seatbelts securely when turbulence is encountered or expected.

5.11.6. If a shoulder harness is installed, it must be worn with the seat belt during each taxi, and takeoff, landing and critical phases of flight. Instructors and Flight Engineers (FEs) need not wear the shoulder harness if it interferes with performing duties. OG/CCs may waive this requirement for other selected crew positions if the shoulder harness interferes with crew duties.

5.12. High Speed Taxi Checks. A high speed taxi check is a maintenance operational check which requires the aircraft to be moving at higher than normal taxi speed. Brake energy limits and cooling must be considered when planning high speed taxi checks. High speed taxi checks, to include barrier certifications, will be accomplished according to an approved test plan or established FCF profile. In the absence of a test plan or FCF profile, these checks will be approved by the OG/CC and accomplished by a qualified IP or FCF pilot. In multi-place aircraft, both pilots must be qualified in the aircraft. High-speed taxi checks will be documented on a flight authorization form.

5.13. Aircraft Malfunctions and Damage. Do not taxi aircraft with malfunctions that affect the nosewheel steering or brake systems. Do not use a malfunctioning system unless it is required for safe recovery of the aircraft. Do not continue in-flight trouble shooting of a malfunction after completing flight manual emergency procedures. If structural damage occurs or is suspected, the mission will be aborted and a landing will be made as soon as practical, regardless of apparent damage.

5.13. (96TW) When time and conditions permit, fighter aircraft will contact the SOF/dispatcher for assistance after declaring an emergency with the controlling air traffic control agency.

5.14. Duty Station (multi-place aircraft). A qualified pilot will be at a set of controls of the aircraft at all times during flight. All primary aircrew members will be at their duty stations during critical phases of flight. During other phases of flight, crewmembers may leave their duty station for brief periods to meet physiological needs and to perform normal crew duties. Only one pilot may be absent from their duty station at a time. Notify the aircraft commander before departing assigned primary duty station. The aircraft commander is the final authority for allowing personnel to move about the aircraft during flight. Reference Table 4.1 AFI 11-202V3 AFMCSUP for further restrictions and exceptions.

5.15. Transfer of Aircraft Control. Both pilots of crew aircraft or pilots in two-seat aircraft must know at all times who has control of the aircraft. Transfer of aircraft control will be made with the statement "You have the aircraft (controls)." The pilot receiving control of the aircraft will acknowledge "I have the aircraft (controls)." Once assuming control of the aircraft, maintain control until relinquishing it as stated above. For fighter and trainer aircraft, if the intercom fails, the pilot in the front cockpit (if not in control of the aircraft) will rock the wings and assume control of the aircraft, radios and navigational equipment unless pre-briefed otherwise. In fighter, trainer, attack aircraft either person flying can pump the stick ("pump to pass") to pass control to the other, who should then rock the wings ("shake to take") to acknowledge transfer of aircraft control.

5.16. Takeoff Aborts. Prior to flight, all aircrew (pilots, flight engineers, etc) on the flight deck or in the cockpit will review and understand takeoff data. Place particular emphasis on takeoff and abort factors during abnormal situations such as short/wet runway, heavy gross weights, and abort sequence in formation flights. Anytime an aircraft experiences a high speed abort, hot brakes should be suspected. If confirmed, declare a ground emergency and taxi the aircraft to the designated hot brake area and perform hot brake procedures. If an abort occurs during a takeoff roll, the pilot will focus on maintaining directional control and slowing or stopping the aircraft as appropriate. Following members of a formation will ensure clearance from an aborting aircraft or will abort their takeoff if unable to maintain adequate clearance

5.17. G-Awareness. Perform a G-awareness exercise whenever 5 Gs or greater are expected during the sortie. If available, select Positive Pressure Breathing (PPB) on all sorties regardless of anticipated g-loading. The wearing of the Combat Edge vest in the F-15 and F-16 is optional. If the vest is not worn, the CRU-94/120 port plug should be installed to ensure full pressure is available to the mask. F-22 pilots will wear the Combat Edge vest on all sorties where g-loading above 6 gs is anticipated, or if flight above 44,000 ft MSL is anticipated.

5.17.1. Maintain a minimum of 6,000 ft spacing between aircraft during the G-awareness exercise. The G-awareness exercise will consist of two turns with at least 90 degrees of heading change. The second turn of the G-awareness exercise for air-to-air sorties will be a minimum of 180 degrees of turn. The first turn will be a smooth onset rate to approximately 4 Gs. Pilots will use this turn to ensure proper G-suit operation and to practice their anti-G straining maneuver. Regain airspeed and perform another 90-180 degree turn at up to 6-7 Gs. If aircraft limits preclude either of the above, turns should be performed so as not to exceed aircraft limits.

5.17.2. Flight/element leads will ensure airspace intended for conducting the G-awareness exercise is free from potential traffic conflicts. Use air traffic control services to the maximum extent practical to ensure the airspace is clear. Conduct the G-awareness exercise in the following airspace with preference to the order as listed:

5.17.2.1. Special Use Airspace (e.g. restricted/warning areas, ATCAAs, MOAs, and MAJCOM approved special mission areas).

5.17.2.2. Above 10,000 ft MSL outside of Special Use Airspace.

5.17.2.3. Inside the confines of Military Training Routes.

5.17.2.4. Below 10,000 ft MSL outside of Special Use Airspace.

5.18. Unusual Attitude and Training Maneuvers (non-aerobatic). Do not perform unusual attitude recoveries in single seat aircraft, at night or in IMC, and anytime the safety observer is not qualified in the aircraft. Abrupt training maneuvers (intentional maneuvers involving an abrupt change in aircraft attitude, an abnormal attitude, or abnormal accelerations or decelerations not necessary for normal flight) are prohibited at night or in IMC and any time the safety observer is not qualified in the aircraft. Initiate such maneuvers at an altitude that will allow recovery no lower than 5,000 (500 for helicopters) feet AGL. These type maneuvers must be performed in Special Use Airspace, ATC-Assigned Airspace (ATCAA), MTRs or host nation approved airspace. For units without SUA, ATCAA, etc, OGs will pre-coordinate and establish repeatable consistent routing and maneuver locations with Air Traffic Control for unit mission accomplishment. Aircraft deployed or based at overseas locations will operate IAW applicable host nation agreements or ICAO SARPs. If the aircraft operating requirements (altitude requirements, maximum airspeeds, dropping of objects, etc) dictated in the host nation agreement are less restrictive than USAF/MAJCOM guidance, the most restrictive guidance shall be used.

5.19. Simulated Emergencies. Do not practice emergency procedures that degrade aircraft performance or flight control capabilities unless specifically authorized by an approved training syllabus, test plan or in accordance with applicable AFIs. In addition to the restrictions in AFI 11-202 Vol 3, the following restrictions apply:

5.19.1. Fighter, Attack, Trainer, and U-2.

5.19.1.1. During initial qualification or re-qualification sorties in single seat aircraft, the IP or EP will be in a chase aircraft (U-2 see MD attachment) and in a position to direct a go-around, if needed.

5.19.1.2. Day VMC only.

5.19.1.3. Gross weight must not exceed basic weight plus weight of full internal fuel or flight manual limits, whichever is less.

5.19.1.4. No external ordnance, except training ordnance, may be carried.

5.19.1.5. Simulated Single Engine (SSE). All engines will be used for unplanned go-arounds. Initiate SSE go-around above 200' AGL. SSE climb out is not authorized.

5.19.1.6. No Flap full stop landings are prohibited unless required in an approved training syllabus or considered a normal procedure in the flight manual.

5.19.1.7. Simulated Flameout (SFO) patterns. Specific procedures for conduct of SFO training will be established in letters of agreement with appropriate agencies and published in appropriate local publications. The ceiling may be no lower than 500' above the highest portion of prescribed pattern. The SFO pattern may be entered from any direction or altitude that will ensure the aircraft is properly configured prior to base key and in a position to safely complete the approach. An SFO will not be initiated or continued if a potential traffic pattern conflict exists which would require that the pilot divide attention between the SFO and sequencing with traffic. In addition, SFOs should be discontinued whenever excessive maneuvering is required, whether as a result of a traffic conflict or when making corrections. Once discontinued, a go-around will be initiated and no attempt will be made to re-enter or complete that pattern/approach. If flown to a dry lakebed, go-around must be started to descend no lower than 50 ft AGL. Full stop and touch-and-go landings may be flown by fully qualified pilots or by students under the direct supervision of an IP or EP. From the rear cockpit, only qualified IPs or upgrading IPs may fly SFOs and continue to touchdown. The aircraft must rollout wings level at a point no lower than 200 feet AGL on final. Airspeed must be no slower than technical order minimum landing gear down airspeed until the sink rate is under control and landing is assured. If these parameters are not met perform a go-around.

5.19.1.7. **(96TW)** Practice SFOs are authorized only at Eglin and Duke airfields for 96 OG aircraft IAW EAFBI 11-201 unless procedures and authorization are outlined in another AFI or MOA. Practice SFOs may also be flown at Edwards AFB IAW applicable Edwards AFB regulations.

5.19.1.8. For all simulated emergency patterns include the type of simulated emergency in the "gear down" radio transmission.

5.19.2. Bomber, Cargo, Tanker.

5.19.2.1. Before initiating any simulated emergency, the PIC/IP/EP will brief the cockpit crew on the condition to be simulated and state "simulated" over the interphone communication system prior to accomplishment of each simulated emergency condition or as the simulated condition is established.

5.19.2.2. Refer to Table 5.2 for additional restrictions. See attachment 11 for C-130 restrictions and attachment 21 for UH-1 restrictions.

Table 5.1. Simulated Emergency Restrictions – Bomber, Cargo, Tanker (C-130: see MD attachment.).

Event	IP or EP at a Set of Controls	No IP or EP
Simulated Emergency Procedures Other Than Simulated Engine Out Operations	1. Weather is at or above circling minimums during daylight and 1000' ceiling and 2 miles visibility or circling minimums (whichever is higher) at night 2. No passengers	1. Day VFR (1500' & 3) 2. No passengers
Simulated Engine Out Takeoff (Except C-130. See Attachment 11 For Guidance.)	B-52 may simulate single engine loss above 100 KIAS during touch and go landings. Prohibited for all other aircraft.	Prohibited
Simulated Engine Out Climb Out	Simulate engine failure after a positive rate of climb is established	Simulate engine failure above 200' AGL
Simulated Engine Out Approach & Go-around	Ensure adequate obstacle clearance is maintained	1. Ensure adequate obstacle clearance is maintained 2. Initiate no lower than 200' AGL
Simulated Engine Out Landing	Crosswind corrected for RCR must be in the recommended zone of the aircraft's landing crosswind chart	Prohibited
Practice Engine Shutdown	1. VMC with a discernable horizon 2. Shutdown & restart must be accomplished above 5000' AGL (2500’ AGL for C-130)	1. Prohibited, except for FCF qualified pilots during FCF proficiency training under the following conditions: - VMC with a discernable horizon - Shutdown & restart must be accomplished above 5000' AGL (2500’ AGL for C-130)
No Flap	IAW flight manual or AFI 11-2FT Volume 3 MD Attachment	Prohibited for all aircraft except C-12

5.20. Fuel Jettisoning/Dumping. Fuel jettisoning will be conducted only to reduce aircraft gross weight in an emergency, for operational necessity, or as required for flight test or FCF. When circumstances permit, jettison fuel over unpopulated areas at an altitude above 5,000 AGL, when feasible. Advise the appropriate air traffic control agency of intention, altitude, and location when fuel is jettisoned and when the operation has been completed. Units will establish jettison areas and procedures to minimize the impact of fuel jettisoning into the atmosphere. Use designated jettison areas and local area procedures to the maximum extent possible, except when safety of flight would be compromised. Refer to specific MD attachments for additional guidance.

5.21. Fuel Conservation. In addition to AFI 11-202 Volume 3 guidance, all AFMC aircrew will utilize fuel conservation techniques in the conduct of their missions. Aircrew should consider safety-of-flight first and maximize mission accomplishment while conserving fuel to the maximum extent possible. Actions to consider include executing mission tasks at fuel efficient airspeeds (such as maximum range or endurance), completing training events in conjunction with test sorties, flying at lower gross weights, deleting unnecessary mission items, etc..

5.22. Dropped Objects. If an object inadvertently departs the aircraft, the flight crew will notify the controlling agency as soon as practical; include details of routing, altitude, winds aloft, etc. After landing, notify maintenance and initiate appropriate safety processes.

5.23. Hazardous Conditions. Relay any safety hazard (e.g. icing, turbulence, thunderstorms, bird concentrations etc.), through a Pilot Weather Report (PIREP) to the controlling agency.

5.23.1. **(Added-96TW)** Hot Weather Procedures. The following procedures will be implemented during Fighter Index of Thermal Stress (FITS) condition Caution or Danger.

5.23.1.1. **(Added-96TW)** During FITS Caution: a. Limit ground period to a maximum of 90 minutes. b. A minimum of 30 consecutive minutes in an air-conditioned environment is required between flights.

5.23.1.2. **(Added-96TW)** During FITS Danger: a. Limit ground period to a maximum of 45 minutes. b. A minimum of 30 consecutive minutes in an air-conditioned environment is required between flights.

5.23.1.3. **(Added-96TW)** Ground period starts when the aircrew leave the air-conditioned facility and ends when the canopy is down (if applicable) and the environmental system is functioning correctly. A new ground period starts after the aircrew has had a minimum of 30 consecutive minutes in an air-conditioned environment.

5.23.1.4. **(Added-96TW)** Operations Supervisor will brief aircrew on the current FITS condition and any restrictions.

5.23.1.5. **(Added-96TW)** Operations Officers are the waiver authority to the above restrictions after considering FITS condition along with other ORM factors.

5.23.2. **(Added-96TW)** The 96 MXG/CC or designated representative is the only approval authority for authorizing maintenance personnel to conduct maintenance action on the flight line, to include shutdown, taxi, towing, or end of runway (EOR), when there is lightning within 5NM of Eglin AFB.

5.23.2.1. **(Added-96TW)** For Eglin based aircraft, when aircraft land under lightning within 5NM, the aircrew will advise the SOF/ Squadron Operations Supervisor of the fuel remaining before reaching a critically low fuel level. Aircrew will not allow an engine to flameout because of a low fuel state. When directed to taxi or shutdown, aircrew will complete the required actions as quickly as safety allows, exposing the minimum number of personnel to these weather conditions.

5.23.2.2. **(Added-96TW)** The following procedures will be accomplished when aircraft shutdown has been approved by the 96 MXG/CC or designated representative: Chock the tires (no rollover), install external safety pins, shut down engine(s) with fuel catchers (if applicable), ground aircraft, and close the canopy.

5.24. Back Seat Landings. Only qualified or upgrading instructor pilots may conduct back seat landings.

5.25. Touch-and-Go Landings – All Aircraft.

5.25.1. Designated First Pilot (FPs) or MPs may perform touch-and-go landings at OG/CC designated airfields. IPs and EPs and MP/FPs under IP/EP supervision (on board the aircraft) may perform touch-and-go landings at any airfield that meets aircraft landing requirements. Only pilots touch and go qualified may perform touch and go landings.

5.25.1. **(96TW)** Regardless of type of aircraft, qualified mission pilots may perform touch-and-go landings at any military/joint-use airfield as long as it meets requirements for aircraft specific directives. 96 TG aircraft are authorized touch-and-go landings at any civilian field that meets requirements for aircraft specific directives.

5.25.2. Touch-and-go landings will not be flown with passengers onboard the aircraft.

5.25.3. All engines will be set to military power or as specified in flight manual or MD attachment.

5.25.4. Fighter and Attack. Touch-and-go landings will not be performed when configured with air-to-air missiles with live rocket motors or air-to-surface ordnance (live or inert) that is carted for release. Touch-and-go landings may be performed with live gun ammunition on board and the master arm in safe.

5.25.5. Bomber, Cargo, Tanker. A current and qualified IP or touch-and-go certified MP must have access to the flight controls and brief the crew on procedures to be followed prior to executing the first touch-and-go landing of a training mission. Refer to Table 5.2 for additional restrictions.

5.25.6. Unimproved Landing Surfaces. Touch and go landings will comply with flight manual and MD attachment procedures. Unless authorized by local procedures, touch and go landings on the lakebeds are prohibited.

5.25.7. NVG Touch and Go. See MD attachments.

Table 5.2. Touch-and-Go Landing Restrictions – Bomber, Cargo, and Tanker (C-130: see MD attachment).

IP or EP at a Set of Controls	No IP or EP
1. Weather is at or above the minimums for the approach being flown but no lower than 300' & 1. 2. Wet runway or better 3. Crosswind corrected for RCR must be in the recommended zone of the aircraft's landing crosswind chart	1. Weather is at or above the minimums for the approach being flown, but no lower than 1000' & 3 2. Day = Same; Night = Dry runway 3. Crosswind component 10 knots or less

5.26. Post Arresting Gear Engagement Procedures: Do not shut down the engine unless fire or other conditions dictate or directed to do so by the arresting gear crew. Do not raise the tailhook or taxi until directed to do so by the arresting gear crew. Further procedures will be conducted IAW local unit directives (if applicable).

5.27. Reduced Runway Separation (RRS). Local commanders are authorized to implement RRS IAW AFI 13-203, *Air Traffic Control*, and minimum criteria established by HQ AFMC/A3O. If implemented, local RRS criteria and procedures should be published in the local flying (11-series) directives. Questions regarding AFMC minimum RRS standards should be directed to HQ AFMC/A3O.

5.28. Search and Rescue (SARCAP) Procedures. In the event an aircraft is lost in flight, actions must begin to locate possible survivors and initiate rescue efforts. When establishing SARCAP, care should be taken to not endanger the aircraft searching for the survivor(s) by flying too low or slow in an attempt to visually acquire the survivor. Pilots should know their aircraft limits and not unnecessarily place the aircraft so close to airspeed and power limits that an unexpected encounter with a bird or civilian traffic could cause another accident. Safety of the searching aircraft is paramount as channelized attention, target (wreckage) fixation, or marginal weather conditions may expose the searching aircraft to unacceptable risks. The following procedures are by no means complete and should be adjusted to meet each unique search and rescue situation.

5.28.1. Squawk. Immediately terminate maneuvering using appropriate Knock-It-Off procedures. Establish a SARCAP on-scene commander (OSC). IFF should be placed to EMER to alert ATC/GCI of the emergency situation.

5.28.2. Talk. Communicate the emergency situation and aircraft intentions immediately to applicable control agencies. Broadcast an emergency distress call on GUARD. Establish communications with survivors on GUARD frequency or 282.8.

5.28.3. Mark. Mark the last known position of survivor or crash site using any means available. TACAN, INS/GPS position, ATC/GCI positioning, targetting pod, or ground references should be used to identify the immediate area for subsequent rescue efforts. Transmit crash site location and the downed aircraft's call sign and type to controlling agencies. Pass on other pertinent information to rescue forces: number and condition of survivors, ordnance at crash site, weather conditions, signaling devices, etc.

5.28.4. Separate. Remain above the last observed parachute altitudes until position of all possible survivors is determined. The OSC will de-conflict other aircraft assisting in the SARCAP by altitude to preclude midair collision. Direct non-essential aircraft to clear the area. Establish high and low CAPs as necessary to facilitate communication with other agencies.

5.28.5. Bingo. Revise BINGO fuels or recovery bases as required to maintain maximum SARCAP coverage over survivors/crash site. Do not over-fly BINGO fuel. Hand off OSC duties, if needed. Relinquish SARCAP operation to designated rescue forces upon their arrival.

5.29. Flight Test Technique Restrictions. The minimum altitude for all FTTs is 1,000 feet AGL, except for FTTs required to be performed at low-altitude (tower flyby, low altitude speed course, speed soak, etc.) or an FTT approved by the safety and test review boards.

5.29.1. Test Planning for Diving Maneuvers. For test points involving descents/dives that involve maneuvers which are not operationally representative or described in AFTTP 3-1 and AFTTP 3-3 series publications, or the sections of AFI 11-214 invoked by this AFI; test teams should consider Time Safety Margins (TSM). TSM is defined as the time in seconds to directly travel from the worst case vector (i.e. worst case combination of parameters: dive angle, attitude, airspeed, and available g that includes both planned and maximum allowed deviation/tolerance) to an unrecoverable condition.

5.29.1. **(96TW)** Test teams will use the procedures outlined in Table 5.3 to minimize the risk of controlled flight into terrain (CFIT). Dive recovery planning and RMB/ATR/SB requirements will be dependent upon the TSM. See Figure 5.1 for examples of TSM.

Figure 5.1. (Added-96TW) TSM Diagram

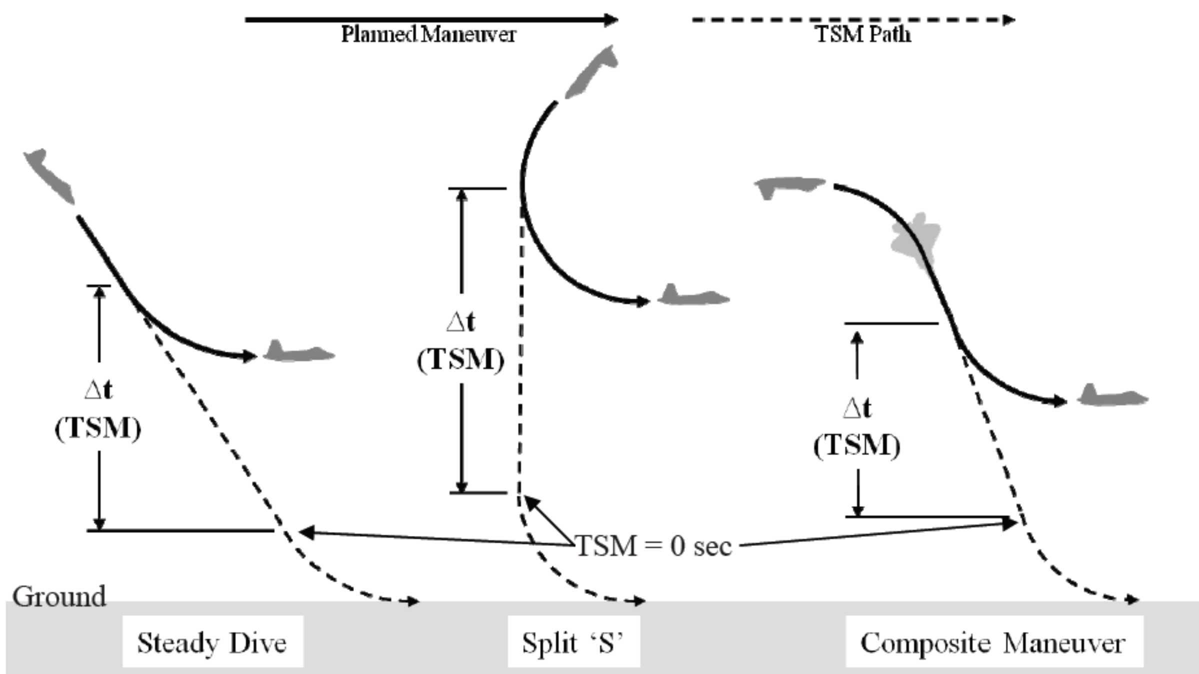

Table 5.1. (Added-96TW) TSM Planning Matrix

	Routine (TSM ≥ 8)	Focused (8 > TSM ≥ 4)	Aided (4 > TSM ≥ 2.5)	Redundantly Aided (2.5 > TSM ≥ 1.5)	Automatic (1.5 > TSM ≥ 0)
Minimum Planning Fidelity[1]	Flight Manual	M&S	Best available M&S	Best available M&S	Test will not be conducted
Recovery Procedure[1,2]	Routine[3]	Defined and Documented[4]	Defined and Documented[4]	Defined and Documented[4]	N/A
Minimum Training/Buildup[5]	Not Required	In-Flight Buildup	Sim Rehearsal[6] & In-Flight Buildup	Sim Rehearsal[6,7] & In-Flight Buildup	N/A
Recovery Initiation[8]	Pilot	Pilot	Back-up for Pilot[9]	Two back-ups for Pilot[10]	N/A
Presumed Risk Assessment	Low	Low	Medium	High	N/A

Notes:

1. RMB/ATR/SB will validate both the dive planning modeling and simulation (M&S) and the planned recovery procedure for all recoveries other than routine.
2. The recovery procedure will be planned not to exceed 80% of available aircraft limits at flight conditions and to minimize any combination of high-g, g dwell time, high-g onset, and rapid transition from negative to positive g.
3. Immediately initiate recovery after test point is complete.
4. Test team will document the planned test parameters, abort parameters and recovery procedure on flight test cards.
5. In-flight buildup maneuvers will be accomplished with a minimum computed TSM of 8 seconds. Test teams will validate predictions via buildup points before proceeding to test points.
6. Simulator rehearsal requirements will include practicing the complete recovery procedure. RMB/ATR/SB simulator rehearsal requirements may be waived on a case by case basis by the test safety appendix approval authority.
7. Currency for the pilot flying the maneuver and critical test team members will be determined by RMB/ATR/SB, but no longer than 6 days for TSMs less than 2.5 seconds.
8. All available onboard altitude awareness devices will be briefed and used.
9. The recovery initiation back-up may be provided by an on-board safety crewmember, a chase aircrew, or control room personnel.
10. At least one of the two recovery initiation back-ups must be external to the test aircraft.
11. Human action (e.g., “abort” calls, pilot input, etc.) may not be considered “risk mitigating.”

5.29.1.1. The following sub-paragraphs describe general planning factors and limits that should be considered using TSM calculations.

5.29.1.2. Abort/Recovery procedures will be based on no more than 90% of available aircraft limits at flight conditions, or 90% flight clearance authorized Nz loading, whichever is less. Also, no more than 90% of achievable roll rate will be used when calculating TSM.

5.29.1.3. Normal g-onset rate will be in accordance with aircraft capabilities at the test conditions.

5.29.1.4. All Normal g levels, roll rates and other assumptions used to calculate maneuver TSM will be briefed to the technical and safety review boards.

5.29.1.5. Risk mitigation tools include: flight manual tabular data and modeling and simulation of dive recoveries to improve planning fidelity, defined and documented recovery procedures, simulator or in-flight recovery procedure practice, recovery initiation back-up, etc. OGs will establish risk mitigation guidance for test planning that addresses the following TSM increments.

5.29.1.5.1. TSM ≥ 8 seconds. Operations in this area are considered routine. Normal aircrew qualification is sufficient to mitigate the risk of CFIT. However, test teams must be alert for situations that may require additional risk mitigation. For example, maneuvers with high Nz loadings may delay a pilot’s response to where TSMs greater than 8 seconds require significant risk mitigation.

5.29.1.5.2. 8 > TSM ≥ 4 seconds. The risk of CFIT in this area requires the test team’s attention. Risk mitigation procedures should be tailored to the test requirements.

5.29.1.5.3. 4 > TSM ≥ 2.5 seconds. The risk of CFIT in this area is elevated. Test teams should use aggressive risk mitigation.

5.29.1.5.4. 2.5 > TSM ≥ 1.5 seconds. The risk of CFIT in this area is high. Test teams should use all reasonable tools to mitigate risk.

5.29.1.5.5. TSM<1.5 seconds. Test operations in this area will not be conducted.

5.29.2. High-G Guidance. The following guidelines are to be used when flying test missions involving high-G maneuvers (defined as 7.0 Gs or greater). The term “sustained high- G” applies to a high-G loading duration longer than 5 seconds. The term “short duration high-G” applies to a high-G loading duration of 5 seconds or less. Adhere to the following limits when performing multiple high G test points:

5.29.2.1. Sustained high-G test points: No more than eight sustained high-G test points per sortie.

5.29.2.2. Short duration high-G test points: No more than 16 short duration high-G test points per sortie.

5.29.2.3. When short duration and sustained test points are combined, the limits will be prorated. For example, one sortie may contain two sustained high-G test points (25% of the limit) and 12 short duration, high-G tests points (75% of the limit).

5.29.2.4. The symmetric pull-up (lift vector above the horizon) FTT will be used, in lieu of maneuvering flight, when attempting to achieve load factors greater than 7.0 Gs below 10,000 feet AGL.

5.29.3. **(Added-96TW)** Structural Test. Aircrew flying compatibility flight profiles, flutter or loads missions must be graduates of established Test Pilot School courses. The 96 OG or the ATR/SB may waive this requirement for sorties that only involve vibration and endurance testing (speed soak).

5.29.3.1. **(Added-96TW)** Aircrew will ensure buildup techniques are employed as part of test point progression and maintained throughout test sorties.

5.29.3.2. **(Added-96TW)** Both test aircraft and chase crew must remain aware of potential situations, techniques or foreseeable malfunctions that may induce exceeding listed flight manual or flight clearance aircraft limitations. If the flight clearance includes a transient overspeed/over-g limit, aircrew will minimize time at parameters outside normal limits.

5.29.3.3. **(Added-96TW)** During both preflight and post flight, aircrew will visually examine the aircraft and any test stores for unmarked dents/scratches, damage, failures, cracks, looseness, popped rivets, etc.

5.29.4. **(Added-96TW)** Start longitudinal short period and lateral-directional dynamic analysis with stability and control augmentation ON. If response is acceptable, and if necessary for analysis, perform the same event with augmentation OFF to determine response.

5.29.5. **(Added-96TW)** The bank-to-bank FTT (45 deg to 45 deg or less) will be used to achieve roll performance below 5,000 feet AGL, and in all power approach configurations.

5.30. (Added-96TW) After Landing. 96 OG aircrew will follow host unit procedures.

5.30.1. **(Added-96TW)** Prior to engine shutdown, pilots will call squadron operations with aircraft landing time and maintenance code definitions are as follows.

5.30.1.1. **(Added-96TW) CODE 1** - Aircraft is operational with no discrepancies.

5.30.1.2. **(Added-96TW) CODE 2** - Aircraft has minor discrepancies but is capable of further mission assignment within normal turnaround flight.

5.30.1.3. **(Added-96TW) CODE 3** - Aircraft has major discrepancies in essential equipment, and/or safety of flight items, and requires corrective action prior to further flight. **This paragraph does not apply to 413 FLTS aircrew as they will use host unit procedures.**

5.30.2. **(Added-96TW)** Debrief the SOF/dispatcher and/or ops supervisor with any unusual occurrences, and write a brief description of the occurrence in the Unusual Occurrence log.

5.30.3. **(Added-96TW)** Maintenance Debrief. Aircrew will debrief maintenance personnel immediately after landing. For specific system failures, attempt to talk to the appropriate specialist. If in doubt whether the aircraft requires impoundment, consult the maintenance production supervisor and debrief Quality Assurance.

5.31. (Added-96TW) Aircraft Delivery. On delivery flights flown by 96 TW aircrew in an aircraft which has never been operated and maintained by the 96 TW, or which has undergone maintenance such as modernization, programmed depot maintenance, modification, or major repair since last operated by the 96 TW, the following restrictions apply:

5.31.1. **(Added-96TW)** Only mission-qualified, mission-essential aircrew and operational support personnel will fly on these flights.

5.31.2. **(Added-96TW)** The first flight will be conducted during daylight hours only.

5.32. (Added-96TW) Night Operations. 96 OG aircrew will follow host unit procedures. Test missions will not be flown at night unless specifically briefed and approved at the ATR/SB. Reduced or lights-out operations will be briefed and approved at the ATR/SB for each specific test mission requiring these operations.

5.33. (Added-96TW) Use of tapes and/or recording devices on local sorties. All aircrew will fly with a tape or other applicable recording device (e.g., digital recorders) on all local sorties if the aircraft is so equipped. If the length of the sortie permits, turn the tape on taking the runway and leave it on until clearing the runway after landing roll out.

HERBERT J. CARLISLE, Lt Gen, USAF
DCS, Operations, Plans and Requirements

(96TW)

MICHAEL R. CONTRATTO, Col, USAF
Vice Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

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Abbreviations and Acronyms

A/A—Air to Air

AAC—Air Armament Center

AAI—Air to Air Intercept

AB—Afterburner

AC—Aircraft Commander

ACBT—Air Combat Training

ACF—Acceptance Check Flight

ACC—Air Combat Command

ACCI—Air Combat Command Instruction

ACCMAN—Air Combat Command Manual

ACCR—Air Combat Command Regulation

AC2ISRC—Aerospace Command and Control & Intelligence, Surveillance and Reconnaissance Center

ADI—Attitude Director Indicator

ADS—Aerial Delivery System/Support

AFAC—Air Forward Air Controller

AFFTC—Air Force Flight Test Center

AFI—Air Force Instruction

AFJI—Air Force Joint Instruction

AFM—Air Force Manual

AFMC—Air Force Materiel Command

AFMCI—Air Force Materiel Command Instruction

AFMSS—Air Force Mission Support System

AFPAM—Air Force Pamphlet

AFR—Air Force Regulation

AFRC—Air Force Reserve Command

AFSATCOM—Air Force Satellite Communication

AFTO—Air Force Technical Order

AFTTP—Air Force Tactics, Techniques, and Procedures

AGL—Above Ground Level

AGM—Air to Ground Missile

AHC—Aircraft Handling Characteristics

AHRS—Attitude Heading Reference System

AIM—Air Intercept Missile

AIRMET—Airman's Meteorological Information

ALCM—Air Launched Cruise Missile

ALTRV—Altitude Reservation

AMC—Air Mobility Command

AOA—Angle of Attack

APU—Auxiliary Power Unit

AR—Air—Refueling

ARA—Airborne Radar Approach

ARCP—Air Refueling Control Point

ARCT—Air Refueling Control Time

ARDA—Airborne Radar Directed Approach

ARIP—Air Refueling Initial Point

ARMS—Automated Records Management System

ARTCC—Air Route Traffic Control Center

ASL—Above Sea Level

ASR—Airport Surveillance Report

ATC—Air Traffic Control

ATD—Aircrew Training Device

AVTR—Aircraft Video Tape Recorder

AWACS—Airborne Warning and Control System

BASH—Bird Aircraft Strike Hazard

BFM—Basic Fighter Maneuver

BIT—Built-in Test

BMC—Basic Mission Capable

BRA—Bomb Rack Assembly/Bearing-Range-Altitude

BRL—Bomb Release Line

BW—Bomb Wing

BQ—Basic Qualified

CADC—Central Air Data Computer

CAPS—Critical Action Procedures

CARA—Combined Altitude Radar Altimeter

CATM—Captive Air Training Missile

CBI—Computer Based Instruction

CC—Commander

CCB—Configuration Control Board

CCP—Command Chief Pilot

CDS—Container Delivery System

CE—Combat Edge

CFIC—Central Flight Instructor Course

CFL—Critical Field Length

CFP—Compatibility Flight Profile

CFPS—Combat Flight Planning System

CFT—Cockpit Familiarization Trainer

CFTR—Combined Force Training

CG—Center of Gravity

CHUM—Chart Update Manual

COMSEC—Communications Security

CONV/VTOL CV-22—Conventional airplane mode/Vertical Takeoff/Landing mode

CPT—Cockpit Procedures Trainer

CRM—Crew Resource Management

CSS—Control Stick Steering

CT—Continuation Training

CTP—Companion Trainer Program

CW—Chemical Warfare

CX—Communications Operator

DACBT—Dissimilar Air Combat Training

DACT—Dissimilar Air Combat Tactics

DAFIF—Digital Aeronautical Flight Information File

DCPPI—Displaced Center Plan Position Indicator

DH—Decision Height

DMPI—Designated Mean Point of Impact

DNIF—Duties Not Involving Flying

DO—Director of Operations

DOD—Department of Defense

DR—Dead Reckoning

DSO—Defensive Systems Officer

DTC—Data Transfer Cartridge

DT&E—Developmental Test and Evaluation

DTUC—Data Transfer Unit Cartridge

DTU—Data Transfer Unit

d-TPP—Digital Terminal Procedures Publication

DZ—Drop Zone

EA—Electronic Attack

EADI—Electronic Altitude Director Indicator

EC—Electronic Combat

ECM—Electronic Countermeasures

EEFI—Essential Elements of Friendly Information

EMCON—Emission Control

EMI—Electromagnetic Interference

EO—Electro-Optical

EOD—Explosive Ordinance Disposal

EOR—End of Runway

EP—Evaluator Pilot/Emergency Procedure

EPE—Emergency Procedures Evaluation

EPR—Exhaust Pressure Ratio

EPU—Emergency Power Unit

ERCC—Engine Running Crew Change

ESA—Emergency Safe Altitude

ETA—Expected Time of Arrival

EVS—Electro-Optical Viewing System

EWO—Electronic Warfare Officer

FAA—Federal Aviation Administration

FAAH—Federal Aviation Administration Handbook

FAF—Final Approach Fix

FAR—Federal Aviation Regulation

FENCE—Fuel, Emissions, Navigation, Communications, Expendables

FCD—Flight Characteristic Demonstration

FCF—Functional Check Flight

FCIF—Flight Crew Information File

FCS—Flight Control System

FE—Flight Engineer

FEB—Flight Evaluation Board

FIC—Flight Instructor Course

FIE—Fighter Inceptor Exercise

FL—Flight Level; Flight Lead

FLIP—Flight Information Publications

FLIR—Forward Looking Infrared

FM—Field Manual/Frequency Modulation

FOD—Foreign Object Damage/Debris

FQIS—Fuel Quantity Indicating System

FRL—Fuselage Reference Line

FSS—Flight Service Station

FTT—Flight Test Technique

FTU—Formal Training Unit

FVR—Flight Vector Reference

FWS—Fighter Weapons School

GCAS—Ground Collision Avoidance System

GCC—Graduated Combat Capability

GCI—Ground Control Intercept

GFAC—Ground Forward Air Controller

GFR—Government Flight Representative

GPS—Global Positioning System

GCS—Ground Control Station (LRE or MCE)

GSS—Gyro Stabilization System

GRM—Gate Release Mechanism

HA—Absolute Altitude

HAA—Height Above Aerodrome

HAHO—High Altitude High Opening Technique

HALO—High Altitude Low Opening Technique

HAT—Height Above Touchdown

HDBK—Handbook

HF—High Frequency

HHD—Higher Headquarters Directed

HHQ—Higher Headquarters

HQ—Headquarters

HUD—Heads-up Display

IAF—Initial Approach Fix

IAW—In Accordance With

ICAO—International Civil Aviation Organization

ID—Identification

IFF—Identification Friend or Foe

IFR—Instrument Flight Rules

ILS—Instrument Landing System

IMC—Instrument Meteorological Conditions

INS—Inertia Navigation System

INU—Initial Navigation Unit

IOS—Instructor Operator Station

IP—Instructor Pilot or Initial Point

IQC—Initial Qualification Course

IQT—Initial Qualification Training

IR—IFR Military Training Route

IRC—Instrument Refresher Course

JDAM—Joint Direct Attack Munition

JOAP—Joint Oil Analysis Program

KCAS—Knots Calibrated Airspeed

KGS—Knots Ground Speed

KIAS—Knots Indicated Airspeed

KTAS—Knots True Airspeed

LAAF—LANTIRN Altitude Advisory Function

LANTIRN—Low Altitude Navigation and Targeting Infrared for Night

LASTD—Low Altitude Step Down

LASTE—Low Altitude Safety and Targeting Enhancement

LAWS—Low Altitude Warning System

LC—Lost Communications

LG—Logistics Group

LIS—Line in the Sky

LOS—Line of Sight

LOWAT—Low Altitude training

LPU—Life Preserver Units

LRE—Launch and Recovery Element

LZ—Landing Zone

MAC—Mean Aerodynamic Chord

MAJCOM—Major Command

MAP—Missed Approach Point

MARSA—Military Assumes Responsibility for Separation of Aircraft

MAU—Miscellaneous Armament Unit

MC—Mission Capable/Mission Commander

MCE—Mission Control Element

MCH—Multi-Command Handbook

MCM—Multi-Command Manual

MCOPR—MAJCOM Office of Primary Responsibility

MCR—Multi-Command Regulation

MD—Mission Design

MDA—Minimum Descent Altitude

MDS—Mission Design Series

MEA—Minimum Enroute Altitude

MEL—Minimum Equipment List

MEP—Mission Essential Personnel

MESP—Maintenance Engineering Support Personnel

MFC—Multifunction Control

MFD—Multi-Functional Display

MFM—Modification Flight Manual

MIL—Military

MITO—Minimum Interval Takeoff

ML—Mission Lead

MLG—Main Landing Gear

MOA—Military Operating Area

MP—Mission Pilot

MQT—Mission Qualification Training

MRR—Minimum Runway Required

MS—Mission Support

MSA—Minimum Safe Altitude

MSL—Mean Sea Level

MT—Mission Trainer

MTR—Military Training Route

MP—Mission Pilot

MPS—Mission Planning Software/Mission Planning System

MVR—Maneuver

N/A—Not Applicable

NACO—National Aeronautical Charting Office

NDI—Non-Destructive Inspection

NGA—National-Geospatial-Intelligence Agency

NM—Nautical Miles

NMR—Non Mission Ready

NORDO—No Radio

NOTAM—Notice to Airmen

NSS—Navigation System

NVG—Night Vision Goggles

NVIS—Night Vision Imaging System

OAS—Offensive Avionics System

OFP—Operational Flight Program

OG **O**—Operations Group

OG/CC—Operations Group Commander

OMR—Optical Mark Reader

ONC—Operational Navigation Charts

OPR—Office of Primary Responsibility

OPSEC—Operations Security

OSO—Offensive Systems Officer

OSS—Operations Support Squadron

OT&E—Operational Test and Evaluation

OWS—Overload Warning System

PAR—Precision Approach Radar

PIC—Pilot in Command

PDM—Programmed Depot Maintenance

PDS—Parachute Deployment System

PECP—Primary Entry Control Point

PF—Pilot Flying

PFPS—Portable Flight Planning Software

PIC—Pilot in Command

PIREP—Pilot Report (Weather)

PMSV—Pilot to Metro Service

PNF—Pilot Not Flying

POC—Point of Contact

PPI—Plan Position Indicator

PPG—Positive Pressure Breathing

PTA—Planned Time of Arrival

PTAIP—Primary Terrain Avoidance Initiation Point

QC—Quality Control

RAA—Route Abort Altitude

RAPCON—Radar Approach Control

RCO—Range Control Officer

RCR—Runway Conditions Reading

RCS—Radar Cross Section

RDT&E—Research Developmental Test and Evaluation

RIA—Recovery Initiation Altitude

RLA—Rotary Launcher Assembly

RNAV—Enroute Area Navigation

ROE—Rules of Engagement

RPA—Remotely Piloted Aircraft

RPI—Rated Position Identifier

RPM—Revolutions Per Minute

RQC—Requalification Course

RTB—Return to Base

RVR—Runway Visual Range

RWR—Radar Warning Receiver

RZ—Rendezvous

SA—Situational Awareness or Surface Attack

SAR—Search and Rescue or Synthetic Aperture Radar

SARCAP—Search and Rescue Combat Air Patrol

SAT—Surface Attack Tactics

SCA—Self Contained Approach

SD—Spatial Disorientation

SEFE—Stan/Eval Flight Examiner

SELO—Stan/Eval Liaison Officer

SFO—Simulated Flame Out

SIF—Selective Identification Feature

SIGMET—Significant Meteorological Information

SILS—Synthetic Instrument Landing System

SKE—Station Keeping Equipment

SMA—Start Maneuver Area

SOF—Supervisor of Flying

SPINS—Special Instructions

SPD—System Program Director

SPR **S**—Single Point Refueling

SQ—Squadron

SRB—Safety Review Board

SSE—Simulated Single Engine

SSM—System Support Manager

STAN/EVAL—Standardization & Evaluation

STV—Steerable Television

SUA—Special Use Airspace

SUAS—Small Unmanned Aerial System

SUU—Bomb Suspension and Release Unit

TA—Terrain Avoidance

TACAN—Tactical Air Navigation

TAL—Transfer Alignment

TAS—True Air Speed

TBD—To Be Determined/Developed

TDY—Temporary Duty

TDZ—Touch Down Zone

TERPS—Terminal Instrument Procedures

TF—Terrain Following

TFR—Terrain Following Radar

TOLD—Take Off Landing Data

TOT—Time Over Target

TPC—Tactical Pilotage Chart

TPS—Test Pilot School

TR—Transit Route

TRB—Technical Review Board

TSM—Time Safety Margin

TSO—Target Study Officer

TTR—Tactics and Training Range

UDLM—Unscheduled Depot Level Maintenance

UHF—Ultra High Frequency

UMD—Unit Manning Document

USAF—United States Air Force

USAFTPS—United States Air Force Test Pilot School

UTD—Unit Training Device

VASI—Visual Approach Slope Indicator

VDP—Visual Descent Point

VOR—VHF Omni Range

VFR—Visual Flight Rules

VHF—Very High Frequency

VLD—Visual Level Delivery

VMC—Visual Meteorological Conditions

VR—VFR Military Training Route

VRD—Vision Restricting Device

VTR—Video Tape Recorder

WSO—Weapons Systems Officer

WST—Weapons Systems Trainer

Terms

Airlift—Aircraft is considered to be performing airlift when manifested passengers or cargo are carried.

Allowable Cabin Load (ACL)—The maximum payload that can be carried on a individual sortie.

Alternate Entry Control Point (Alternate Entry Fix)—The route point(s) upon which a control time for an alternate entry into the route is based.

Assault Landing Zone (ALZ)—A paved or semi-prepared (unpaved) airfield used to conduct operations in an airfield environment similar to forward operating locations. ALZ runways are typically shorter and narrower than standard runways.

Augmented Crew—Basic aircrew supplemented by additional qualified aircrew members to permit in-flight rest periods.

Bingo Fuel—The computed fuel remaining at a point in flight that will allow safe return to the point of intended landing with required fuel reserve.

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.

Category I Route—Any route that does not meet the requirements of a category II route, including tactical navigation and over-water routes.

Category II Route—Any route on which the position of the aircraft can be accurately determined by the overhead crossing of a radio aid (NDB, VOR, TACAN) at least once each hour with the positive course guidance between such radio aids.

Circular Error Average (CEA)—Indicator of the accuracy of an airdrop operation. It is the radius of a circle within which half of the air-dropped personnel and items or material have fallen.

Combat Control Team (CCT)—A small task organized team of Air Force parachute and combat diver qualified personnel trained and equipped to rapidly establish and control drop, landing, and extraction zone air traffic in austere or hostile conditions. They survey and establish terminal airheads as well as provide guidance to aircraft for airlift operation. They provide command and control, and conduct reconnaissance, surveillance, and survey assessments of potential objective airfields or assault zones. They also can perform limited weather observations and removal of obstacles or unexploded ordinance with demolitions. Also called CCT.

Command Chief Pilot—An aircrew assigned to HQ AFMC/A3V or an appointee that assists the HQ Stan/Eval team and conducts flight evaluations on behalf of the headquarters

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

Critical Phase of Flight—For the purposes of this AFI, this term shall include: Terminal Area operations including takeoff and landing, Low-level flight, Air Refueling, Airdrop, weapons employment, low level flight using NVGs, tactical/air combat operations and envelope expansion test points or any aerial demonstration.

Deadhead Time—Duty time for crewmembers positioning or de-positioning for a mission or mission support function and not performing crew duties.

Deviation—A deviation occurs when takeoff time is not within –20/+14 minutes of scheduled takeoff time.

Difference (conversion) Evaluation—An evaluation administered to an aircrew qualified in a variant of a particular aircraft. For example, variants of the B-707 airframe, different series of a particular M/D, or different block versions. Difference training is considered Phase I (initial qualification) training.

Digital Terminal Procedures Publication—Airfield approach plates that are published by NACO and the NGA. They are available online at **http://www.naco.faa.gov** and **https://www.geointel.nga.mil**/.

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).

Drop Zone (DZ)—A specified area upon which airborne troops, equipment, or supplies are air-dropped.

Due Regard—Operational situations that do not lend themselves to International Civil Aviation Organization (ICAO) flight procedures, such as military contingencies, classified missions, politically sensitive missions, or training activities. Flight under "Due Regard" obligates the military aircraft commander to be his or her own air traffic control (ATC) agency and to separate his or her aircraft from all other air traffic. (See FLIP General Planning, section 7).

DZ Entry Point—A fixed point on DZ run-in course where an aircraft or formation or aircraft may safely begin descent from IFR en route altitude to IFR drop altitude. The DZ entry point is a maximum of 40 NM prior to the DZ exit point according to Federal Aviation Administration FAR exemption 4371C. Formation descent will not begin until the last aircraft in formation is at or past the DZ entry point.

DZ Exit Point—A fixed point on the DZ escape flight path centerline, established during pre-mission planning, at which the formation will be at the minimum IFR en route altitude. Calculate the exit point based upon three-engine performance at airdrop gross weight. This point will be planned no less than four NM track distance beyond the DZ trailing edge.

Earliest Descent Point (EDP)—Earliest point in the DZ run-in course where the lead aircraft may begin IFR descent to IFR drop altitude and be assured of terrain clearance for the entire formation. Compute EDP by subtracting formation length from the computed DZ entry point.

Equal Time Point—Point along a route at which an aircraft may either proceed to destination or first suitable airport or return to departure base or last suitable airport in the same amount of time based on all engines operating.

End Maneuver Area (EMA)—A control point terminating the bomb run area.

Entry Control Time—The scheduled time over the Primary/Alternate Entry Control Point.

Entry Track—A track, usually associated with a bomber IR and beginning at the Primary or alternate Entry Point, along which decent is made to the low altitude portion of the route.

Estimated Time In Commission (ETIC)—Estimated time required to complete required maintenance.

Evaluation Form—Worksheet used to document any evaluation to prepare the AF Form 8.

Execution—Command-level approval for initiation of a mission or portion thereof after due consideration of all pertinent factors. Execution authority is restricted to designated command authority.

Familiar Field—An airport in the local flying area at which unit assigned aircraft routinely perform transition training. Each operations group commander will designate familiar fields within their local flying area.

Fix—A position determined from terrestrial, electronic, or astronomical data.

Fuel—

Normal Fuel—Fuel state on initial or at the final approach fix such that the aircraft can land with the fuel reserves specified in AFI 11-202V3.

Minimum Fuel—Fuel state, where, upon reaching the destination, the aircraft can accept little or no delay. This is not an emergency situation but merely indicates an emergency situation is possible should any undue delay occur.

Emergency Fuel—Fuel state requires immediate traffic priority to safely recover the aircraft. An emergency will be declared and the aircraft immediately recovered at the nearest suitable field.

Global Decision Support System (GDSS)—AMC primary execution command and control system. GDSS is used to manage the execution of AMC airlift and tanker missions.

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.).

Initial Cadre—Those personnel assigned to conduct flight testing of experimental, developmental, or new aircraft for which there are no established formal training programs nor standardized evaluation criteria. Initial Cadre designations are appropriate through Initial Operational Capability.

Instructor Supervision—Supervision by an instructor of like specialty (see also Direct Instructor Supervision).

Inter-fly—The exchange and/or substitution of aircrews and aircraft between other MAJCOMS and AFMC. These forces are not gained by AFMC.

Jumpmaster—The assigned airborne qualified individual who controls parachutists from the time they enter the aircraft until they exit.

Knock-it-Off—A term any crewmember may call to terminate a training maneuver. Upon hearing "knock-it-off" the crew should establish a safe altitude, airspeed and return the aircraft power and flight controls to a normal configuration.

Landing Zone (LZ)—An area of sufficient size to allow discharge or pickup of passengers or cargo by touchdown or low hover.

Latest Descent Point—Latest planned point on the DZ run-in course where the formation plans to initiate descent to drop altitude. This is planned to ensure all aircraft in the formation are stabilized (on altitude and airspeed) prior to the drop.

Lead Crew—A crew consisting of a lead qualified aircraft commander and a lead qualified navigator.

Letter of "X"s—A document used in AFMC, signed by appropriate authority, that lists each assigned/attached aircrew's aircraft designation, crew position, and mission qualifications.

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.

Low Altitude Navigation Leg—The low altitude navigation leg is that portion of the route designed primarily for low altitude flight; does not include segments intended for descent into and climb-out from the route.

Maintenance Status—

Code 1—No maintenance required.

Code 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, 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).

Code 3 (Plus Noun)—Major maintenance. Delay is anticipated. Affected units or systems are to be identified as in Code 2 status above.

Manmade Obstructions. Structures which present a hazard to flight. Structure height is measured from the ground—base.

Mark—The time when an aircraft passes over the landing zone or ground party.

Maintenance/Engineering Support Personnel—The MESP program is intended to allow personnel to perform airborne duties in support of test programs or depot operations (observation, data collection, etc.) when full-time crewmember support isn't possible or practical. Flying by MESPs should be on a short duration, infrequent basis and must be approved by the DFO.

Minimum Safe Altitude—The MSA is defined as an altitude of a route leg which provides 1,000 feet (500 feet for helicopters and tilt-rotor aircraft conducting operations in the CONV/VTOL mode) of clearance above the highest obstacle or terrain feature (rounded to the next highest 100 feet) within 5 NM of the planned course, or route boundary, whichever is greater.

Mission Essential Personnel—Personnel who are required for the execution of the aircraft or unit mission, to include follow-on missions. Includes additional aircrew members required for follow-on missions (may be further defined in MAJCOM supplements to this instruction) and personnel not authorized AOs who are tasked to perform ground support duties at en-route locations or destination points that are directly related and essential to accomplishment of the aircraft or unit mission, e.g. a specialist or technician required to provide aircraft support or a security team required to guard the aircraft. MEP may include military staff personnel and U.S. Government employees when those individuals are required for the mission. The OG/CC (or equivalent) with operational control of the aircraft grants MEP status.

Mission Contributing (MC)—Any degraded component, system, or subsystem which is desired, but not essential to mission accomplishment.

Mission Essential (ME)—An degraded component, system, or subsystem which is essential for safe aircraft operation or mission completion.

Modified Contour—Flight in reference to base altitude above the terrain with momentary deviations above and below the base altitude for terrain depressions and obstructions to permit a smooth flight profile.

Off Station Training Flight—A training flight that originates or terminates at other than home station that is specifically generated to provide the aircrew experience in operating away from home station. Off station training flights will not be generated solely to transport passengers, cargo, or position/deposition crewmembers.

Operational Risk Management (ORM)—A logic-based common sense approach to making calculated decisions based on human, machine, mission, and media 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 appropriated for all personnel and Air Force functions.

Operational Site—An LZ that has (1) been surveyed by an instructor pilot (IP) experienced in remote operations to ensure no hazards exist, (2) a photograph available for aircrews to study the site prior to landing and (3) approval from the OG/CC to be designated an operational site. Whenever practical, operational sites should have permanently installed and properly maintained wind indicators (wind sock, streamer, etc.).

Opportune Airlift—Transportation of personnel, cargo, or both aboard aircraft with no expenditure of additional flying hours to support the airlift.

Originating Station—Base from which an aircraft starts on an assigned mission. May or may not be the home station of the aircraft.

Over Water Flight—Any flight that exceeds power off gliding distance from land.

Primary /Alternate Exit Point—The final way-point published in FLIP for the primary or alternate exit route. For bomber IR, the final point on the climb-out track. For other routes, may coincide with the final TA Termination Point.

Primary/Alternate TA Initiation Point (Initial/Start TA)—The way-point at which aircrew are authorized to begin TA operations.

Primary/Alternate TA Termination Point (Final/End TA)—The point which denotes the end of TA operations.

Primary Entry Control Point (PECP)—Referred to as the Entry Fix. The route point upon which a control time for route entry is based.

Provisions—A statement on the front of the AF Form 8 indicating conditions for which the evaluation may satisfy recurring evaluation requirements, usually used for no-notice or out-of-the-eligibility-period evaluation. For example: "Provision: Open and closed book exams due NLT 30 Apr 97."

Reentry Track—A track, commencing at the end of a Maneuver Area, on which low altitude re-entry to the route can be achieved to execute additional bomb/ECM/AGM runs.

Remotely Piloted Aircraft—Full scale (e.g. MQ-1/9, RQ-4) pilotless aircraft.

Restriction—A statement on the front of the AF Form 8 that places limitations on the duties that may be performed by an aircrew, usually as a result of a failed ground or flight phase event. For example, "Restriction: Examinee will not fly unless under the supervision of an instructor pilot, Day Only, Conus Only".

Route Abort Altitude—The Route Abort Altitude provides a minimum of 1,000 feet (500 feet for helicopters and tilt-rotor aircraft conducting operations in the CONV/VTOL mode) separation from the highest obstacle or terrain feature (rounded to the next highest 100 feet) within the lateral limits of the route or training area, but in no case less than 5 NM either side of planned route.

Route Width (Route Perimeter)—The route boundary limits within which aircraft are restricted to conduct operations.

Senior Flight Examiner—A commander authorized to conduct SPOT evaluations for assigned/attached aircrews.

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, sever and extreme turbulence, severe icing, and widespread dust or sand storms. SIGMET frequently covers a large geographical area and vertical thickness. They are prepared for general aviation and may not consider aircraft type or capability.

Small Unmanned Aerial System—Miniature (e.g. Raven, Hunter) operator controlled aircraft.

Special Use Airspace—As defined by Flight Information Publication General Planning: Airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Types of Special Use Airspace include: alert areas, controlled firing areas, MOAs, prohibited areas, restricted areas and warning areas.

Squadron Top 3—Squadron ADO, DO, CC.

Stabilization Point—Point on the DZ run-in course at which the lead aircraft should plan to be stabilized at drop altitude and airspeed. This point will be planned to be at least 6 NM prior to the point of impact.

Station Time—In air transport operations, the time at which crews, passengers, and cargo are to be on board and ready for the flight.

Start Maneuver Area (SMA)—The point that defines the start of the bomb run area. Timing control must be within applicable tolerances.

Suitable Airfield (C130)—Normally, suitable airfields are those which meet C-130 weather, fuel, and runway requirements (chapter 6) are within 50 NM of flight plan course centerline.

Temporary 2 (T-2) Modification—T-2 modifications are temporary modification required to support research, development, test, and evaluation (RDT&E), in service testing of potential replacement items (form, fit, and function), and for aircraft/stores compatibility testing.

Tactical Event (C-130)—Airdrop, low level, formation, and threat avoidance approaches/ departures.

TA Visual Conditions (B-52)—Weather conditions that permit aircraft operations clear of clouds, provide the pilots visual contact with the ground, and three miles forward visibility.

Terminal Fuel Flow (TFF) (C-130)—The fuel flow rate expected during the last hour at cruise altitude. It is the difference between the fuel required for en-route time plus one hour and fuel required for en-route time. TFF may also be computed using the T.O. 1C-130X-1-1 fuel flow table and the estimated aircraft weight at destination. Estimated gross weight is determined by subtracting fuel burn off from takeoff gross weight.

Terrain Avoidance (TA) (B-52)—Method of maintaining ground clearance by Terrain Trace, EVS, or Radarscope Interpretation as close to the terrain as equipment, command directives, and crew judgment allow.

Time Out—See definition for "Knock it Off."

Time Safety Margin—The time required to progress from the worst-case aircraft attitude and vector to an unrecoverable condition.

Training Mission—Mission executed at the unit level for the sole purpose of aircrew training for upgrade or proficiency. Does not include operational missions as defined in this AFI.

Unilateral—Operations confined to a single service.

Visual Contour Flight—Operation at a predetermined altitude above the ground, following contours visually using the radar altimeter to crosscheck altitude. An operating radar altimeter is required.

Visual Reconnaissance—Aerial survey of areas, routes, or LZs.

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.

Attachment 1 (96TW)

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 11-2FTV3, *Flight Test Operations Procedures*, 16 Nov 2011

AFI 11-202V3, *General Flight Rules*, 22 Oct 2010

AFI 11-401, *Aviation Management*, 10 Dec 2010

AFI 11-2FTV1, *Flight Test Aircrew Training*, 20 Sep 2011

AFI 11-214, *Air Operations Rules and Procedures*, 22 Dec 2005

Adopted Forms

AFMC Form 73, *AFMC Flight Operations Waiver Request*, 7 Nov 2006

AF Form 847, *Recommendation for Change of Publication*, 22 Sep 2009

AF Form 4327, *ARMS Flight Authorization (FA)*, 24 Oct 2003

DD Form 365-1, *Chart A – Basic Weight Checklist Record*, Aug 1996

DD Form 365-3, *Chart C – Basic Weight Checklist Record*, Aug 1996

Attachment 2

PASSENGER BRIEFING GUIDE

A2.1. Egress Procedures.

A2.1.1. **- Ground Egress**

A2.1.1.1. - General methods (normal and emergency)

A2.1.1.2. - Emergency signals

A2.1.1.3. - Location of primary and alternate exits, slides, escape ropes, etc.

A2.1.1.4. - Activation of hatches, exits, and slides

A2.1.1.5. - Egress direction and safety precautions

A2.1.2. **- Inflight Egress/Bailout**

A2.1.2.1. - Donning of required equipment

A2.1.2.2. - Location of primary and alternate exits

A2.1.2.3. - Emergency signals

A2.1.2.4. - Exiting aircraft

A2.1.3. **- Ditching (ground and water)**

A2.1.3.1. - Location and use of primary and alternate exits

A2.1.3.2. - Donning of equipment and floatation devices

A2.1.3.3. - Activation of hatches, exits, life rafts, and floatation devices

A2.1.3.4. - Emergency signals and crash position

A2.1.4. **- Location and use of:**

A2.1.4.1. - Fire extinguishers

A2.1.4.2. - Walk around bottles

A2.1.4.3. - Crash axes

A2.1.4.4. - first aid kits

A2.2. Aircrew and Passenger Flight Equipment/Systems Usage Information.

A2.2.1. - Use of oxygen system/quick dons

A2.2.2. - Location and use of parachutes/associated equipment

A2.2.3. - Location and use of POK/EPOS, smoke masks/Personal Breathing Equipment, EEBDs

A2.3. Safety Precautions and Restrictions.

A2.3.1. - Seat and safety belt requirements

A2.3.2. - FOD Hazards

A2.3.3. - Hearing Protection

A2.3.4. - Portable electronic transmitting devices (Cell phones, CB radios, etc.) not authorized for ground or flight operations

A2.3.5. - Portable no-transmitting devices authorized above 10,000 ft AGL: AV recorders/playback, computers and peripherals, electronic entertainment devices, radio receivers.

A2.3.6. - Devices authorized anytime: hearing aids, pacemakers, electronic watches, hand-held nonprinting calculators, portable tape player w/o record capability such as Walkmans, etc, electric shavers.

A2.3.7. - Portable GPS Units, Cameras

A2.3.8. - Hazardous Cargo

A2.3.9. - Smoking

A2.4. Special Procedures

A2.4.1. - Passenger loading and unloading

A2.4.2. -Special procedures and instructions for use during training, formation, or operational missions.

Attachment 3

A-10 OPERATING PROCEDURES

A3.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the A-10 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of A-10 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A3.2. Mission Planning: No additions.

A3.3. Common Mission Guidance.

A3.3.1. Ground/Taxi Operations.

A3.3.1.1. Pilots will be cleared by the crew chief prior to starting the Auxiliary Power Unit (APU), engines or actuating flight controls.

A3.3.1.2. All flights require the bleed air function of the APU.

A3.3.1.3. Aircraft stall warning devices will be fully operational for all flights.

A3.3.2. Takeoff.

A3.3.2.1. If RCR waived to 10, the following restrictions apply. When the RCR is less than 12, a run-up check will not be performed prior to brake release, the takeoff roll will not be started until the preceding aircraft is airborne, and if the crosswind component exceeds the RCR, takeoffs are prohibited.

A3.3.2.2. If a VFR takeoff is required for mission accomplishment, the aircraft must be capable of achieving a minimum single-engine climb rate of 150-feet/minute (gear up, failed engine wind-milling, and all jettisonable stores-jettisoned), unless a higher rate of climb is required for unique obstacle clearance requirements. IFR takeoffs will be conducted IAW AFI 11-202V3. Aircraft operating under IFR that are unable to comply with the required minimum climb gradients may be required to reduce fuel and ordnance loads, cart all stores (except electronic countermeasures pods), or wait for environmental conditions to change. If operational requirements dictate, takeoffs may be made without a positive single-engine climb rate when approved by wing/group commander.

A3.3.2.3. Join-up/Rejoin. Flight leaders will maintain 200 KIAS until join-up is accomplished unless briefed otherwise.

A3.3.3. Formation Instrument Trail Departure Procedures.

A3.3.3.1. Each aircraft/element will accelerate to 200 KIAS. Climb speed will be 200 KIAS and power setting will be 800 degrees ITT unless specifically briefed otherwise.

A3.3.3.2. Each aircraft/element will climb on takeoff heading to 1,000 feet AGL and accelerate to 200 KIAS before initiating any turns, except when departure instructions specifically preclude compliance.

A3.3.4. Formation Approaches and Landings. Do not perform practice formation approaches above 40,000 pounds gross weight.

A3.3.5. Maneuvering Limits.

A3.3.5.1. Confidence Maneuvers: Entry will be made at a minimum of 10,000 feet AGL.

A3.3.5.2. Do not perform aerobatics below 5,000 feet AGL

A3.3.5.3. Perform Stalls to recover above 5,000 feet AGL.

A3.3.6. Air-to-Air / Air-to-Surface Weapons Employment.

A3.3.6.1. Simulated, off range air-to-air and air-to-ground attacks requiring activation of the weapons release button with expendable training ordnance and/or suspension equipment are allowed if the following conditions are met: (1) MASTER ARM switch is in TRAIN, (2) Flight lead verbally confirmed training mode ("TRN" in the HUD or "TRAIN" on the MFCD) and acknowledge throughout the flight, and (3) cold pickle check accomplished and acknowledged throughout the flight.

A3.3.6.2. Simulated, off-range air-to-air and air-to-ground attacks (with 30mm TP loaded) requiring activation of the gun trigger are allowed if the following conditions are met: (1) MASTER ARM switch is in TRAIN, (2) GUN/PAC ARM switch is in SAFE, (3) flight lead verbally confirmed training mode ("TRN" in the HUD or "TRAIN" on the MFCD) and acknowledged throughout the flight, and (4) cold trigger check accomplished and acknowledged through the flight (NOTE: With MA switch in TRAIN and GUN/PAC ARM switch in SAFE, pilots will have BATA but not PAC).

A3.3.6.3. Refer to AFI 11-2A-OA-10 Volume 3 Chapter 5 for A-10A training switchology.

A3.3.7. Air-to-Air Maneuvering Limits.

A3.3.7.1. Pilots will not maintain an angle of attack (AOA) that triggers the chopped stall warning tone.

A3.3.7.2. The minimum maneuvering airspeed during LOWAT is 240 KIAS.

A3.3.7.3. Flaps will not be used as an aid to slow speed maneuvering.

A3.3.8. Air-to-Surface Training Rules.

A3.3.8.1. If airspeed decreases below 210 KIAS in a pop-up attack, abort the maneuver. Base this airspeed on typical training weights and configurations. At heavy gross weight, adjust abort airspeed upward to provide sufficient G and turning room to recover from an adverse flight condition.

A3.3.8.2. Pave Penny Procedures. Pave Penny employment utilizes the concepts of a safety and optimum attack zones.

A3.3.8.2.1. The safety zone is a 20-degree fan whose apex is at the target and extends 10 degrees either side of the target-to-laser designator line.

A3.3.8.2.2. The optimal attack zone is a 120-degree fan whose apex is at the target and extends to 60 degrees either side of the target-to-laser designator line, excluding the safety zone.

A3.3.8.2.3. Pave Penny will not be used as a sole source for target identification. In some situations, laser spots shift from the designated target to the laser source while operating in the optimal attack zone - precluding total reliance on the laser spot.

A3.3.8.2.4. Attack heading should avoid the target-to-laser designator safety zone to preclude false target indications.

A3.4. Instrument Procedures.

A3.4.1. The A-10 is Approach Category D. Accomplish missed approach in accordance with the flight manual procedures.

A3.4.2. If using category C approach criteria, use 200 to 210 KIAS to meet missed approach airspeed.

A3.4.3. Use of the Heads-Up Display. The HUD may be used as an additional instrument reference in night/IMC conditions; however, do not use it as the sole instrument reference in these conditions. In addition, do not use the HUD to recover from an unusual attitude or when executing lost wingman procedures except when no other reference is available.

A3.5. Operating Procedures and Restrictions.

A3.5.1. Abnormal Operating Procedures

A3.5.1.1. Fuel Imbalance: IAW flight manual guidance. Terminate the mission if fuel imbalance cannot be corrected. Instruments, navigation above 2,000 ft AGL, deployment missions, and level weapons deliveries above 2,000 ft AGL are authorized profiles to reduce gross weight.

A3.5.1.2. Aircraft operating in the low altitude environment will climb to a prebriefed safe altitude (minimum 1,000 feet AGL) when a Knock-It-Off is called.

A3.5.2. Practice of Emergency Procedures.

A3.5.2.1. Accomplish all practice and/or training related to aborted takeoffs in the Cockpit Familiarization Trainer (CFT), Full Mission Trainer (FMT), or a static aircraft (if trainers unavailable).

A3.5.2.2. Practice in-flight engine shutdown is prohibited (except during FCF profiles).

A3.5.2.3. While airborne, simulated loss of both engines is prohibited.

A3.5.3. Practice of emergency landing patterns at active airfields is authorized provided that:

A3.5.3.1. Adequate crash rescue and air traffic control facilities are available and in operation.

A3.5.4. Simulated Single Engine (SSE) Approach/ Landing.

A3.5.4.1. Do not initiate simulated single engine failure below 1,000 feet AGL and terminate if the aircraft descends below 800 feet AGL prior to base leg.

A3.5.4.2. Follow procedures in the flight manual for emergency landing patterns. Pilots will engage anti-skid prior to landing.

A3.5.4.3. Pilots will plan approaches to avoid turns into the simulated dead engine when practical. If turns into the simulated dead engine are necessary, plan patterns to minimize bank angle.

A3.5.4.4. SSE approaches will be discontinued if the airspeed decreases below computed single engine final approach speed.

A3.5.5. Manual Reversion.

A3.5.5.1. A thorough review of manual reversion procedures in the Dash-1 and/or Dash-6 will be accomplished before any flights where manual reversion is a mandatory part of the flight profile.

A3.5.5.2. Other than actual emergencies requiring manual reversion, pilots will only go into manual reversion when on a dedicated FCF, FCF upgrade sortie, qualification training sortie, or during an approved test sortie via an approved test plan.

A3.5.5.3. Manual Reversion Operations: If aircraft will not go into Manual Reversion or the pitch trim does not work, return Manual Reversion switch to NORM.

A3.5.5.4. Manual Reversion Approach and Landing. Factors to consider are pilot proficiency, instrument approach facilities, runway conditions, weather at the recovery field, and any accompanying aircraft malfunctions. Controlled bailout is recommended any time existing conditions may preclude a safe recovery or during single engine operations.

Attachment 4

B-1 OPERATING PROCEDURES

A4.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the B-1 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of B-1 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A4.2. Mission Planning.

A4.2.1. Chart/Map Preparation. On low altitude training flights, one member of the pilot team, and both the Offensive Systems Officer (OSO) and Defensive Systems Officer (DSO) will carry a chart. Annotate headings and maximum/minimum route structure altitudes. The chart will be of scale and quality that terrain features, hazards, noise sensitive areas, and chart annotations are of sufficient detail to allow navigation and safe mission accomplishment. Review pilot's and OSO/DSO low altitude charts for compatibility and accuracy.

A4.2.2. Fuel Requirements. When overhead a remote island with no alternate required, aircrew will use 40,000lbs as “minimum” fuel for planning purposes. Overhead a remote island with an alternate required, use 60,000lbs for “minimum” fuel.

A4.3. Common Mission Guidance.

A4.3.1. Traffic Pattern Limitations.

A4.3.1.1. See Table A4.1. for limitations and restrictions.

A4.3.1.2. Practice no-flap or slat full stop landings are prohibited.

A4.3.1.3. Practice pattern operations are prohibited under the following conditions:

A4.3.1.3.1. Any engine shut down.

A4.3.1.3.2. Unable to set military power on all four engines using normal throttle.

A4.3.1.3.3. Any flight control problem

A4.3.1.4. SCAS Failure. Normal touch-and-go landings or low approaches are permitted with a PITCH AUG 1, ROLL AUG 1, YAW AUG 1, and/or SPOILER 1 caution light illuminated.

A4.3.1.5. Loss of all radar altimeter does not prevent transition work during day VMC.

A4.3.2. FCF Operating Guidelines. The minimum crew for an FCF/Test mission consists of two pilots, an Offensive Systems Officer, and one person trained in CITS/EMUX operation. A qualified DSO/WSO must be on board if ECM systems are to be tested during the FCF.

A4.3.3. Advanced Handling Characteristics/Advanced Handling Maneuvers (AHC/AHM).

A4.3.3.1. Approach to Stall. Due to the increased stress placed on engines, approaches to stall will only be accomplished when required for FCF checks, instructor proficiency, upgrade training, or when required as part of a formal test program. The number of times the maneuver is repeated should be kept to a minimum. Terminate by 8,000 feet AGL to recover by 5,000 feet AGL.

A4.3.4. NVG Restrictions. Do not use NVGs at night during low altitude operations without the TF system engaged, unless operating at MSA/RAA.

A4.3.5. Air to Surface Weapons Delivery

A4.3.5.1. Weapons release is prohibited if:

A4.3.5.1.1. An in-flight emergency procedure is being accomplished or when an engine is shut down.

A4.3.5.1.2. When release exceeds aircraft T.O. limits or CG limits unless specifically approved in a test/safety package.

A4.3.5.1.3. If briefed track/timing tolerances or fragmentation deconfliction cannot be met.

A4.3.5.2. The following maneuvers are prohibited while carrying live or inert weapons: simulated bomb runs, simulated missile runs, approach to stalls/unusual attitudes (unless part of authorized test plan), touch and go landings (touch and go landings with un-carted inert weapons are authorized), or any other potentially hazardous activity.

A4.3.5.3. The following maneuvers are permitted while carrying live or inert weapons; intercept training with fighter aircraft, air refueling, transition, low altitude training and Electronic Attack (EA) (provided targets are not selected or designated)

A4.3.5.4. Do not open weapon bay doors during flight with weapons on board other than for intentional release/jettison or during approved weapons testing.

A4.3.6. Air Expendable Employment. Units must ensure that all personnel concerned are familiar with CJCSM 3212.02, *Performing Electronic Attack in the United States and Canada* and AFI 11-214. In case of an inadvertent flare drop, contact the applicable airspace controller and advise them of the incident.

A4.3.7. Low Level Navigation Operations. Do not initiate the penetration to low level or continue low level training if any of the following conditions exist:

A4.3.7.1. Any flight control system malfunction that denies the pilot a safe margin of control.

A4.3.7.2. Loss of Real Beam Ground Map (RBGM) or High Resolution Ground Map (HRGM), during night/IMC. RBGM or HRGM off/out operations are authorized during day VMC only.

A4.3.7.3. Loss of INS(s) during night/IMC. INS(s) off/out operations are authorized during day VMC.

A4.3.7.4. Loss of Avionics Control Unit Complex (ACUC) during night/IMC. ACUC off/out low level operations are authorized during day VMC while attempting to recycle the ACUC.

A4.3.7.5. Loss of all MFD's at either the OSO or DSO position.

A4.3.7.6. Loss of all attitude reference systems (Gyro Stabilization System (GSS) and INS).

A4.3.7.7. Loss of all radar altimeter. Low level activity may be continued at MSA/RAA in VMC conditions.

A4.3.7.8. Loss of all aft station ADI's.

A4.4. Instrument Procedures.

A4.4.1. The B-1 is approach category E.

A4.5. Operating Procedures and Restrictions.

A4.5.1. Unusual Attitudes. Do not intentionally place the aircraft in an unusual attitude for the purpose of practicing recoveries.

A4.5.2. Navigation Equipment**:**

A4.5.2.1. An INS must be operational for takeoff on all missions except for flight in the local area during day VMC. Specific pre-designated missions requiring INS in-flight alignment may launch, provided VMC can be maintained until INS is aligned.

A4.5.2.2. Do not takeoff with the GSS inoperative (steady illumination of the GSS caution light) unless day VMC can be maintained.

Table A4.1. Operating Limitations.

Event	Restriction
SCAS Off Low Approach (Note 1)	1. 275,000 lbs. Maximum 2. IP on Board
SCAS Off Full Stop (Notes 1, 2)	1. 275,000 lbs. Maximum 2. IP on Board 3. 10 knot maximum crosswind 4. Day Only
Simulated Engine Failure Low Approach (Note 1)	1. 275,000 lbs. Maximum 2. IP on Board 3. Initiate Go-Around no lower than 200 ft HAT
Simulated Engine Failure Touch & Go / Full Stop (Notes 1, 2)	1. 275,000 lbs. Maximum 2. IP on Board 3. 10 knot maximum crosswind 4. Unplanned go around/takeoff portion of maneuver requires symmetrical thrust
25 Wing Approach (Notes 1,2,3)	1. 250,000 lbs. Maximum 2. IP on Board 3. Touch & Go or Low Approach Only
Slat Only Approach (Notes 1,2,3)	1. 230,000 lbs. Maximum 2. IP on Board 3. Touch & Go or Low Approach Only
Partial Flap Approach (Notes 1,2,3)	1. 250,000 lbs. Maximum 2. IP on Board 3. Touch & Go or Low Approach Only
No-Flap Approach	1. 250,000 lbs. Maximum

(Notes 1,2,3)	2. Touch & Go or Low Approach Only
Normal Approach (Note 4)	1. Authorized to approach minimums 2. Min RCR = 9 3. Crosswind = tech order limits 4. 300,000 lbs. Maximum for Full Stops and Touch & Go
All simulated emergency procedures require notes 1-4: Note 1: Wx (1000-2) or circling minimums whichever is higher Note 2: Dry runway Note 3: 15 knot maximum crosswind component Note 4: Touch-n-go authorized with un-carted, inert weapons	

Attachment 5

B-2 OPERATING PROCEDURES

A5.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the B-2 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all B-2 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A5.2. Mission Planning.

A5.2.1. Mission Briefing. If the interval from the initial briefing to takeoff exceeds 72 hours, a complete review and briefing must be re-accomplished.

A5.2.2. Personal Equipment. Crewmembers will wear gloves during engine start, takeoff, and landing.

A5.3. Common Mission Guidance.

A5.3.1. Preflight.

A5.3.1.1. For normal training missions, aircrew step to the aircraft should occur when the aircraft is crew ready, ideally no later than one hour thirty minutes prior to scheduled takeoff. Test mission pre-flights will be performed as required. Ensure all FLIP and classified materials are present, current, and complete.

A5.3.1.2. Flight control BITs (ABIT). Pilots will complete an ABIT of the FCS after performing any flight control (FC) memory reads.

A5.3.2. Ground/Taxi.

A5.3.2.1. Induction Icing Ground Operations. If the ice detection system indicates ice and/or ice is noticed on the inlet areas, shutdown the engines as soon as possible minimizing throttle movement. The risk of engine FOD increases during continued operation in icing conditions longer than 5 minutes. If an ICING advisory occurs after brake release, crews may continue the takeoff and follow in-flight icing procedures.

A5.3.2.2. Minimum taxi interval is 500 feet.

A5.3.2.3. Taxi over cables from BAK-9/BAK-12 as slow as possible not to exceed 10 knots ground speed.

A5.3.3. Takeoff.

A5.3.3.1. Unless a flight test requirement exists, do not takeoff if any of the following conditions exist:

A5.3.3.1.1. Standing or pooled water on the runway.

A5.3.3.1.2. The computed takeoff roll exceeds 80% of the available runway (can be waived by OG/CC).

A5.3.3.1.3. The tailwind exceeds 10 knots (can be waived by OG/CC).

A5.3.3.1.4. Any attitude indicator, heading indicator, or standby instrument is inoperative.

A5.3.3.1.5. One or more engines are inoperative from the start of takeoff roll. During emergency evacuations and at the discretion of the wing commander or with higher headquarters approval, aircraft may takeoff with one or more engines inoperative. Under no circumstances should a crew take off with a computed takeoff distance that exceeds 95 percent of runway available.

A5.3.3.1.6. Over any raised web barrier (MA-1A or 61QS11). Do not start takeoff roll prior to approach end cables. Takeoffs accomplished beyond approach-end cables are permitted provided at least the minimum runway length specified in Chapter 2 is available beyond the cable.

A5.3.3.2. If CFL is computed to be greater than 80% of the available runway, aircrew will use full available thrust on takeoff (TRT) and have OG/CC approval for operations.

A5.3.4. Formation. Because B-2 formation flight within AFMC is uncommon, users will refer to AFI 11-2B-2 Volume 3, *B-2 Operations Procedures*.

A5.3.5. Chase Procedures. A safety chase is not required for flights that primarily occur under IFR control or in exclusive use airspace. A safety chase is not required for flights within the R2508 complex outside of high traffic areas (at or above FL350). A safety/photo chase will be used as required on test flights per the approved safety package.

A5.3.6. Air Refueling.

A5.3.6.1. Do not conduct air refueling with control stick steering engaged.

A5.3.6.2. Do not conduct air refueling with an FCS CAUTION, except when necessary for safe recovery of the aircraft.

A5.3.6.3. Do not conduct air refueling with less than four engines operating, except when necessary for safe recovery of the aircraft. Simulated engine out air refueling is permitted under IP supervision. Pilots will place no more than one throttle to idle to simulate the loss of one engine.

A5.3.6.4. Do not conduct air refueling when the tanker has less than all engines operating, unless required for safe recovery of the aircraft.

A5.3.6.5. Do not conduct air refueling when tanker aircraft is unable to retract landing gear.

A5.3.6.6. Discontinue air refueling after loss of all tanker disconnect capability, except during the following conditions:

A5.3.6.6.1. Emergency fuel situation or emergency evacuation. Limit contact time to that required to obtain fuel.

A5.3.6.6.2. Flight test mission warranting the increased risk as agreed upon by the test director and aircraft commander. It must be accomplished under IP supervision. Limit contact time to that required to obtain fuel.

A5.3.6.7. Do not accomplish breakaway training while in contact.

A5.3.6.8. Boom envelope demonstrations require IP supervision.

A5.3.6.9. Visual Observation Position. Using quick-flow procedures from the ATP 56(B), the route/visual observation position may be used to expedite day, VMC AR operations. The position is defined as a 30-70 degree cone aft of tanker's 3/9 line, no closer than 150 feet (wing tip spacing) and no farther than 1,000 feet. Use of the position requires clearance by the tanker.

A5.3.7. Landing.

A5.3.7.1. Do not land prior to approach end cables. Landing beyond approach-end cables is permitted provided at least the minimum runway length specified in Chapter 2 is available beyond the cable.

A5.3.7.2. See Table A5.1. for traffic pattern limitations.

Table A5.1. Traffic Pattern and Landing Limitations and Restrictions.

Approach Type	***Notes***	***Maximum Gross Weight***	***Maximum Crosswind***	***Minimum Weather***	***IP Required***	***Night***	***Min RCR***
Low Approach		311,500	N/A	Approach Mins	No	Yes	N/A
Touch & Go	1,2,3	311,500	20 30 w/ IP	500/1½ or non-prec minima 300/1 w/ IP	No	Yes	9
Sim Eng Out Low Approach & Go	2,4,5, 6	311,500	N/A	1000/2 or circling minima	No	Yes	N/A
Sim Eng Out Touch & Go / Full Stop	1,2,5, 7	311,500	25	1000/2 or circling minima	Yes	Yes	13

Notes:

1. Do not accomplish touch and go landings with any of the following:
   a) Any landing gear malfunction (including gear door malfunctions and nose wheel steering malfunctions)
   b) Any brake or anti-skid failure indications, any flight control caution or warning
   c) Center of gravity outside landing limits
   d) Runway length insufficient to abort a touch-and-go and stop in the remaining runway
2. Minimum weather: Whichever is higher.
3. Normal Master Mode Touch & Go landings with the speed brakes intentionally retracted require an IP and should only be accomplished as a part of a formal training syllabus.
4. Initiate low approach/go-around no lower than 200 feet height above touchdown.
5. Use four engines for non-briefed/unplanned go-arounds.
6. Use of MCT or TRT for the low approach/go-around is at the discretion of the aircraft commander.
7. Use all 4 engines for the "go" portion of the Touch & Go.

A5.3.8. Air-to-Surface Weapons Employment.

A5.3.8.1. Do not release weapons if a release system, indicator, or weapon bay door malfunction exists, unless the malfunction is only a loss of redundancy which does not affect weapons accuracy or normal weapons release (e.g., single power drive unit controller failure).

A5.3.8.2. While carrying weapons, do not conduct simulated bomb runs, unusual maneuvers (unless necessary for flight test), or other potentially hazardous activity. Carrying weapons does not preclude accomplishing air refueling. Touch and go's may be accomplished with inert weapons that are un-carted/pinned/inert separation nuts installed(all that are possible).

A5.3.8.3. Do not complete weapon unlock/release enable/release consent for live or inert weapons until the aircraft is on the range, cleared HOT by the controlling authority, and weapons impact would be in the range danger area.

A5.3.8.4. Do not open weapon bay doors during flight with weapons on board other than for intentional release, jettison, or if necessary for flight test (e.g. captive carry).

A5.3.8.5. Do not practice simulated emergency procedures when weapons are loaded on the aircraft.

A5.3.8.6. Do not perform partial simulated mode bombing with RLA weapons unless an RLA is in the weapons bay and as part of a syllabus directed training event. Do not "manually" rotate RLAs in partial SIM without RLAs installed.

A5.3.8.7. Weather Minimums/IMC Weapons Deliveries. If range procedures permit, B-2 pilots may release live or inert weapons in IMC. Unless further restricted by range guidance, B-2 aircrews will adhere to the following when conducting IMC operations or dropping through an undercast:

A5.3.8.7.1. GPS FOM greater than or equal to 4 requires one OAP or target direct aiming on a 0.8 NM CM map. Without GPS and system buffers greater than 250 ft, one OAP within 5 minutes of release (or target direct aiming) on a 0.8 NM CM map is required.

A5.3.8.7.2. For Coordinate only releases: Do not release if GPS FOM greater than or equal to 4. For non-GPS integrated releases, do not release if navigation system buffers are greater than or equal to 250 ft and buffer values have been verified via a 0.8 NM CM map within 10 minutes of release.

A5.3.8.8. Hung weapons procedures.

A5.3.8.8.1. If pilots receive hung munitions indications, they will accomplish abort/post release checklist actions to safe the weapons, terminate all subsequent bombing activity scheduled for the sortie, and return to base or other suitable landing base, avoiding over-flight of populated areas.

A5.3.8.8.2. Pilots will jettison weapons only if, in the opinion of the pilot in command, the retention of stores would adversely affect the safe recovery of the aircraft. After a successful jettison with suspected or known hung munitions, do not accomplish any further weapons delivery activity.

A5.4. Instrument Procedures.

A5.4.1. The B-2A is designated as an approach category D aircraft.

A5.4.2. Synthetic ILS (SILS) and Synthetic TACAN (STACAN) approaches require VMC. Visual glide path guidance is required at night.

A5.4.3. Flight in Precipitation/Icing Procedures.

A5.4.3.1. Lightning Strike/Static Discharge. In the event of a known or suspected lightning strike or static discharge, terminate the mission and maintain below 250 KCAS when practical.

A5.4.3.2. Avoid thunderstorms laterally by 20 NM when below FL 200.

A5.4.3.3. Avoid thunderstorms laterally by 40 NM when at or above FL 200.

A5.4.3.4. When at or above FL 200, stay VMC when within 40 NM of any convective activity, not just thunderstorms, which have built above FL 200.

A5.4.3.5. Avoid cruising at altitudes in IMC, or in areas of precipitation, that are within +/- 5,000 feet or +/- 10 degrees Celsius of the forecast or actual freezing level. Climb or descend through these areas as rapidly as is safely possible.

A5.4.3.6. Do not climb or descend through forecast or reported icing conditions greater than light.

A5.4.3.7. Do not cruise in any forecast or actual icing conditions.

A5.4.3.8. Maintain Mach .65 or greater to minimize amount of ice accumulated (in icing conditions).

A5.4.3.9. Minimize throttle movements with anti-ice/rain removal operating

A5.4.4. INS/GPS/RVSM Flight.

A5.4.4.1. RNAV and GPS approaches are not authorized.

A5.4.4.2. Reduced Vertical Separation Minimum (RVSM) Airspace. Airspace where RVSM is applied is considered special qualification airspace. Both the aircrew and the specific aircraft must be approved for operations in these areas. All B-2As are approved for restricted operation within RVSM airspace as documented in Figure A5.1 B-2A RVSM Envelope Limitations. Refer to FLIP GP and the following guidance for additional RVSM requirements:

A5.4.4.3. Required RVSM Equipment. Both altimeters (MDUs, one display before each pilot, and the standby altimeter), the autopilot altitude hold function, the IFF transponder altitude reporting (Mode C), and the flight control system (to include the air data ports and their heaters) must be fully operational (defined as not more than single channel failed) before entry into RVSM airspace. Should any failures of this equipment beyond the allowable single channel failure occur, immediately notify ATC and coordinate further clearance. If failure occurs before entering RVSM airspace, request a new clearance so as to avoid this airspace, or request ATC special handling as a non-equipped aircraft.

A5.4.4.3.1. Autopilot. The altitude hold function of the autopilot shall be engaged throughout level cruise periods in RVSM airspace, except when special circumstances dictate, such as when turbulence procedures require disengagement. Report any aircraft deviations greater than 130 ft from the commanded altitude to maintenance.

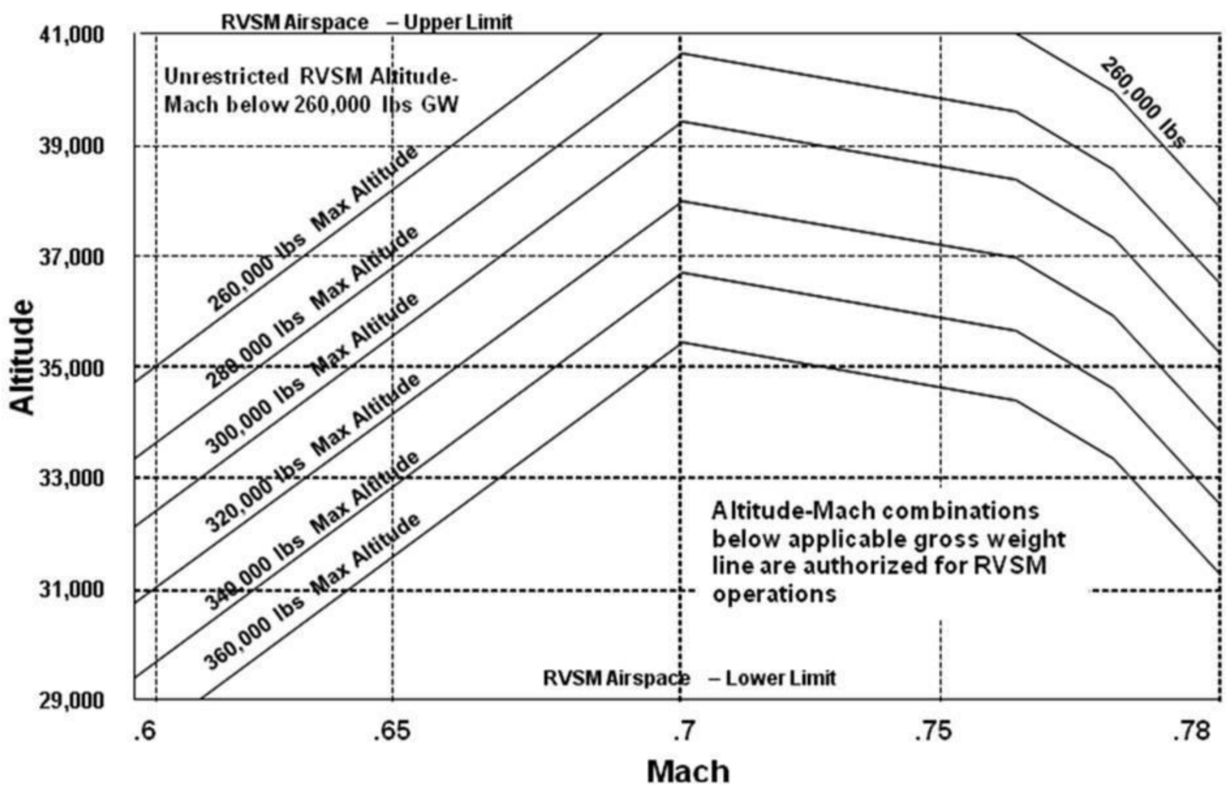
A5.4.4.3.2. Altimeters. Crosscheck primary altitude displays with standby altimeter, before or immediately upon entry to RVSM airspace.

A5.4.4.4. RVSM Operations. Monitor systems and crosscheck altimeters on primary displays to ensure they agree +/- 10 ft.

A5.4.4.4.1. Aircrews should limit climb and descent rates to a maximum of 1,000 feet per minute when operating in RVSM airspace to reduce potential effects on other aircraft's Traffic Alert and Collision Avoidance System (TCAS) operations, and to minimize risk of overshooting desired altitude during level-off.

A5.4.4.5. Post Flight. Document (in the AFTO Forms 781) malfunctions or failures of RVSM required equipment, including the failure of this equipment to meet RVSM tolerances.

Figure A5.1. B-2A RVSM Envelope Limitations.



A5.4.5. B-2 BRNAV, RNP-10, MNPS RNP-12.6. The B-2 aircraft is cleared for operations in Basic Area Navigation (BRNAV), Required Navigation Performance-10 (RNP-10), and North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS) airspace.

A5.5. Operating Procedures and Restrictions.

A5.5.1. Brief all practice maneuvers or emergency procedures before the maneuver (either in-flight or during mission planning).

A5.5.2. Do not practice compound simulated emergencies during critical phases of flight.

A5.5.3. After taking the appropriate action to rectify a malfunction, resume training only if the designated pilot in command determines no hazard to safe aircraft operations exists. In an actual emergency, terminate all training and emergency procedures practice.

A5.5.4. Brake and nose wheel steering malfunctions. Do not taxi the aircraft with a brake system malfunction. Do not taxi with a nose wheel steering malfunction with the exception of using nose wheel steering override, or differential braking to clear the active runway. After clearing the runway, the pilots will stop until the malfunction can be cleared. If nose wheel failure occurs in-flight and cannot be cleared or reset, aircrews may taxi the aircraft clear of the runway using NWS Override or differential braking and stop until the malfunction can be cleared.

A5.5.5. Practice unusual attitude recoveries are prohibited in flight.

A5.5.5.1. Nose High Recovery Procedure. To recover from a nose high attitude, add power as required, establish a bank angle of no more than 60 degrees, lower the nose to a minimum minus three degree pitch attitude, then return the aircraft to level flight in both pitch and bank.

A5.5.5.2. Nose Low Recovery Procedure. Recover from a nose low attitude by reducing power and extending speed brakes as required, rolling wings level, then increasing stick back pressure to return the aircraft to level flight.

Attachment 6

B-52 OPERATING PROCEDURES

A6.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the B-52 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all B-52 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A6.2. Mission Planning.

A6.2.1. Low Altitude Charts. Each pilot team and each navigator team will carry a low altitude chart if the crew will conduct low altitude operations.

A6.2.2. Takeoff Planning Criteria. A minimum of 1,000 feet overrun must be available in addition to the minimum runway required (MRR). When 1,000 feet of overrun is not available, reserve a portion of the runway to satisfy the minimum overrun requirements. Runway available for takeoff planning must be actual runway length minus any portion of the runway used to satisfy overrun requirements at the departure end of the runway.

A6.3. Common Mission Guidance.

A6.3.1. Traffic Pattern Limitations.

A6.3.1.1. Touch-and-go landings are authorized only under the following conditions:

A6.3.1.1.1. Use a runway of sufficient width and length to permit a safe, normal full stop landing without the drag chute. Make the actual touchdown in the designated TDZ of the runway at a point and speed which would enable a safe full stop landing on the remaining runway. Initiate a go-around if this is not possible.

A6.3.1.1.2. Non-IP aircraft commanders are limited to a maximum of 4 degrees crosswind crab.

A6.3.1.1.3. Instructor pilots or aircraft commanders will brief (either in-flight or during mission planning) the individual being supervised on the following items prior to supervising touch-and-go landings.

A6.3.1.1.3.1. Flight manual procedures.

A6.3.1.1.3.2. The importance of smooth power application and stabilizing power before advancing throttles.

A6.3.1.1.3.3. Compressor stalls, including proper preventive action, recognition, and corrective action.

A6.3.1.1.3.4. Emergency jettison of drag chute.

A6.3.1.1.3.5. Proper use of airbrakes and stabilizer trim.

A6.3.1.1.3.6. Instructor Pilot (IP) or Aircraft Commander (AC) taking control of aircraft when necessary.

A6.3.1.1.3.7. Unplanned go-around using all throttles.

A6.3.1.2. Do not practice landings with less than 100 percent flaps, except where noted.

A6.3.1.3. Normally, deploy the drag chute on all full stop landings. Should operational requirements dictate a full stop landing be made without a drag chute, comply with flight manual taxi back limitations.

A6.3.1.4. Do not perform taxi back landings on wet runways.

A6.3.1.5. See Table A6.1. for in-flight and traffic pattern limitations.

A6.3.2. Flare Drop Activity.

A6.3.2.1. Conduct live flare drop activity only in authorized special use airspace contained in current FLIP planning documents and over water firing areas.

A6.3.2.2. Do not power the flare ejector system until within the approved flare drop area.

A6.3.2.3. Do not accomplish low approaches or touch-and-go landings after making or attempting a flare drop. Touch-and-go's are authorized after munitions specialists confirm all flares were dispensed (none remaining). Do not attempt a taxi-back sortie with confirmed hung, retained, or misfired flares.

A6.3.2.4. In case of an inadvertent flare drop, take the following actions:

A6.3.2.4.1. Immediately safe the flare ejector system.

A6.3.2.4.2. Record time and geographic coordinates of the inadvertent release.

A6.3.2.4.3. Contact the applicable airspace controller and advise them of the incident, approximate location and estimated damage.

A6.3.2.4.4. Units will develop local procedures to handle hung/hot flare situations if flares will be carried and/or expended in flight.

A6.3.3. NVG Procedures.

A6.3.3.1. The pilot flying the aircraft will use TA procedures, radar altimeter, and visual inputs gained from the NVG to maintain the proper terrain clearance. NVGs will not be used for visual contour low level or visual formation.

A6.3.3.2. Cockpit Lighting. AFTTP 3-3.B-52 will be used as the baseline for proper NVG cockpit setup. Units may supplement this information. Approved lighting systems include the indigenous NVG cockpit lighting (C+ modification), cyalume light sticks, and an approved battery powered LED light bar. Always carry cyalume light sticks as a backup as they remain the most reliable means of cockpit lighting. Unless on an approved test plan, do not use NVGs without one of the cockpit lighting systems mentioned above.

A6.3.4. Air-to-Surface Employment

A6.3.4.1. The radar navigator/navigator is responsible for ensuring the proper ballistics are loaded for the target and the proper bomb code (B-XX) is input into Format 10 for the target destination.

A6.3.4.2. Do not open bomb bay doors during flight with internal weapons on board other than for intentional release, jettison or if directed in an approved test plan.

A6.3.4.3. While carrying internal weapons, do not simulate internal weapons release and while carrying external weapons, do not simulate external weapons release. Carrying weapons does not preclude accomplishing fighter intercept exercise, air refueling, and transition excluding touch-and-go landings and simulated engine-loss. Furthermore, it does not preclude accomplishing simulated external weapons or missile runs, with SMO simulations, while in "full sim" with actual weapons carried internally.

A6.3.4.4. If all weapons were loaded externally in positions visible to the aircrew, releases may be visually confirmed by the aircrew in lieu of confirmation by an RCO. Internal light indications must be consistent with visual observation. Do not rely on visual inspections by other aircraft or non-range personnel to clear the aircraft for subsequent training activity.

A6.3.4.5. If RCO confirmation of internal release is not possible, crews must perform a visual bomb bay check prior to conducting any additional training.

A6.3.4.6. Any crewmember entering the bomb bay must be qualified and must avoid inadvertent contact with the release mechanisms.

A6.3.4.7. Crewmembers will not enter the bomb bay to release bombs or to perform maintenance on release equipment.

A6.3.4.8. Observe the following safety precautions for continued activity with retained weapons:

A6.3.4.8.1. No weapons will be programmed against any target that is not within an approved training or test area.

A6.3.4.8.2. Accomplish post release/abort checklist before conducting any subsequent training activity.

A6.3.4.8.3. No release system, indicator, or weapon bay door malfunction may exist.

A6.3.4.9. If release is verified by the RCO and internal light indications are consistent with RCO observations, aircrews may conduct additional training without restriction provided no weapons remain on the aircraft. The RCO must positively confirm the exact number of weapons programmed for release.

A6.3.4.10. For internal weapons, aircrews will visually inspect the bomb bay if a hung weapon is suspected. If there are no weapons remaining on the aircraft, the aircrew may conduct additional training without restriction.

A6.3.5. Low Altitude Operations.

A6.3.5.1. Icing. Do not conduct low altitude flight in areas of forecast severe icing or in areas of reported moderate or severe icing conditions. If moderate or severe icing is encountered, abort the low altitude area.

A6.3.5.2. Turbulence. Do not fly low level in areas of forecast severe turbulence. Do not fly low level with forecast moderate turbulence associated with mountain wave effects, or with moderate or severe turbulence reported by military aircraft. If aircraft type (military or civilian) reporting turbulence is unknown, contact appropriate ARTCC for advisory. If moderate or severe turbulence is encountered, abort the low level area.

A6.3.5.3. Visibility/Cloud Clearance Requirements. Weather for TA operations on IR routes must be at or better than TA Visual Conditions (clear of clouds with 3 miles forward visibility). If TA Visual Conditions cannot be maintained, climb to MSA/IFR as soon as practical. Weather conditions for operations on VR routes must be 1500/3. If these weather conditions cannot be met, abort the route. For night operations, weather must meet the applicable day criteria. In addition, sufficient light and visibility must exist to recognize major changes in terrain elevations such as mountain peaks, ridgelines, valleys, and sloping terrain (NVGs may be used to satisfy visibility requirement).

A6.3.5.4. Equipment Restrictions:

A6.3.5.4.1. Mapping Radar Failure (Scope Blank or Inadequate for Navigation). Do not fly low level, during day IMC or night, with mapping radar failure. Aircraft without mapping radar may penetrate to low altitude during daylight hours provided TA Visual Conditions can be maintained and the RN or Nav station has an operating FLIP or STV display. Abort the route if weather conditions fall below TA Visual Conditions at any time.

A6.3.5.4.2. OAS Processors. Do not fly low level without an operating OAS processor during night or IMC. Crews may penetrate to low level and fly the route as long as day TA Visual Conditions can be maintained.

A6.3.5.4.3. Multi-Function Displays (MFDs). Do not fly low level unless there is at least one operable MFD at the RN or Nav station.

A6.3.5.4.4. Attitude Heading Reference System (AHRS). Do not fly low level with a malfunctioning AHRS. Exception: The AHRS does not need to be fully operational if one Inertial Navigation System (INS) is providing accurate heading and there is accurate MD-1 gyro stabilization for the pilot's attitude director indicator (ADI) (this exception applies for day TA Visual Conditions only).

A6.3.5.4.5. Radar Altimeter. TA or EVS/visual contour flight without a properly operating radar altimeter is prohibited.

A6.3.5.4.6. Additional Night Equipment Restrictions. The following equipment must be fully operational for night TA operations, with or without NVGs:

A6.3.5.4.6.1. Mapping radar (for any night low level operation).

A6.3.5.4.6.2. Terrain avoidance system.

A6.3.5.4.6.3. Doppler/INS. Either Doppler or INS ground speed and drift information may be used.

A6.3.5.4.6.4. EVS. Either Steer-able TV (STV) or Forward Looking Infrared (FLIR) must be operational for night TA operations.

A6.3.5.4.6.5. Do not fly night TA if the aircraft performance is significantly degraded; for example, engine out or main gear extended.

A6.3.6. Low Altitude Limitations.

A6.3.6.1. Low altitude weight restriction is 230,000 to 420,000 pounds. These restrictions apply whenever the aircraft is operated at or below 5,000 feet above ground level or during ocean surveillance/reconnaissance operations at or below 5,000 feet MSL. The minimum low altitude weight restriction does not apply to en route, cruise or traffic pattern operations.

A6.3.6.2. Use of the autopilot non-steering modes, other than second station, is not recommended for low altitude operations. Do not use non-steering modes of the autopilot below 1,000 feet AGL except for the stab modes comparison check.

A6.3.6.3. Bank angles during low level or operations below 1,000 feet AGL/ASL are limited to 30 degrees maximum. Use steep turn guidance as applicable for higher altitudes.

A6.3.6.4. Normal minimum clearance plane settings: 300 feet day and 500 feet night. However, 200 feet clearance plane may be flown if necessary for the accomplishment of a test point or FCF. The time spent at this altitude will be kept to a minimum. The determining factor will be crew judgment, based on evaluations of aircraft equipment, weather conditions, aircrew capabilities, proficiency, and fatigue.

A6.3.6.5. Do not conduct TA or EVS/visual contour flight without a properly operating radar altimeter.

A6.3.7. TA Procedures.

A6.3.7.1. Crewmembers must use all means available to clear terrain, including EVS equipment. Sound crew judgment must be used to determine whether current conditions warrant TA flight. If there is any doubt, the crew should climb to a safe altitude immediately.

A6.3.7.2. Descent from IFR altitude must be accomplished in TA Visual Conditions. The PTAIP, or Start TA Point, is not a mandatory start descent point. The OAS radar will be in full scan TA (Plan Position Indicator {PPI} display or Displaced Center Plan Position Indicator {DCPPI} display) for all descents to TA altitudes. Range marks will be displayed to the maximum extent possible (N/A day Visual Flight Rules {VFR}).

A6.3.7.3. TA flying under a cloud deck can be extremely hazardous, particularly under conditions of rising terrain or decreasing ceiling. In this case, climb immediately to MSA/IFR.

A6.3.7.4. Attempt to maintain route centerline when flying at IFR altitudes without visual terrain clearance. Crews are not authorized to deviate from published route corridor except when aborting the route. **NOTE:** If a conflict arises between the pilot's and navigator's information, climb to a safe altitude and resolve it; obtain further flight clearance if necessary. If differences are resolved resume scheduled training activity.

A6.3.7.5. If aircraft position is unknown, immediately climb to MSA/IFR altitude. If position cannot be determined after climbing to MSA/IFR altitude or any time route corridor has been exceeded, abort the route.

A6.3.7.6. Whenever bank angle exceeds 15 degrees the pilot flying the aircraft will make the turn visually or, if at night, initiate a climb to a safe altitude before executing the turn.

A6.3.7.7. Crews may omit the circled items of the Descent, After Descent, and TA Compensation checklist when weather conditions or time constraints prevent accomplishment of the comparison/FRL compensation. During night mountainous conditions, crews will accomplish the entire checklist unless the TA set has been previously compensated.

A6.3.7.8. Do not practice radar silent operations in IMC or at night.

A6.3.8. Chase Operations.

A6.3.8.1. It is unsafe to fly in close vertical proximity to another aircraft due to the interrelated aerodynamic effects. Never fly directly over or under another aircraft. The chase position for fighter/trainers chasing the B-52 is defined as:

A6.3.8.2. Wings level position - at least 100 feet between wing tips or;

A6.3.8.3. Stern position - approximately 1/4 mile behind and 100 feet below lead.

A6.3.8.4. The normal chase position will be on the right wing of lead.

A6.3.8.5. The lead aircraft must inform the chase aircraft and receive acknowledgment prior to initiating turns, climbs and descents, airspeed changes, or configuration changes (e.g. flaps, gear, airbrakes, etc.).

A6.4. Instrument Procedures.

A6.4.1. Approach Category. The B-52 is normally approach category D. Category E is applicable when best flare plus ten knots or approach speed exceeds 165.

A6.5. Operational Limits And Restrictions.

A6.5.1. Steep Turns. Except when otherwise required by an approved test plan, limit the maximum target bank angle to 45 degrees (not to exceed 60 degrees). The aircraft must remain clear of clouds throughout the maneuver. Do not perform steep turns during traffic pattern operations. For steep turns at or below 5,000 feet AGL/ASL, the following restrictions apply:

A6.5.1.1. Weather must be day VFR.

A6.5.1.2. Maneuver must be accomplished at or above 1,000 feet AGL/ASL with the flaps up. The aircrew will maintain at or above the minimum recommended airspeed or Mach for the planned bank angle throughout the maneuver.

A6.5.2. Initial Buffet.

A6.5.2.1. Perform initial buffet practice as prescribed in the flight manual and under instructor pilot supervision.

A6.5.2.2. Pilots must review and discuss the correct recovery procedures and limitations for accomplishing initial buffet with the crew during mission planning.

A6.5.2.3. Practice recovery from initial buffet at a minimum altitude of 20,000 feet above the terrain. If clouds exist between the aircraft and the terrain, the aircraft must be at least 10,000 feet above the tops of the clouds. Do not practice recovery from initial buffet above FL 300 or at gross weights above 300,000 pounds.

A6.5.2.4. Perform the entire initial buffet maneuver with wings level.

A6.5.2.5. Do not practice initial buffet with weapons or missiles loaded.

A6.5.3. Fuel Minimums. In addition to the fuel requirements of chapter 2, the minimum fuel reserve for remote or island destination is 34,000 pounds. If weather conditions are such that an alternate airfield is required in accordance with AFI 11-202V3, then minimum fuel reserve is 54,000 pounds. The definition of a remote or island airfield is contained in AFMC Supplement 1 to AFI 11-202V3.

A6.5.4. Air Refueling Limitations and Restrictions. Do not accomplish air refueling during training missions when two or more engines are shut down or when any engine has been shut down due to fire or fire indication. Also do not accomplish air refueling when the aircraft gross weight is less than 230,000 pounds .

A6.5.5. Emergency Limitations.

A6.5.5.1. If it becomes necessary to shut down two or more engines or one engine for fire or fire indication, abort the mission.

A6.5.5.2. Refueling is not authorized with two or more engines inoperative or when any engine is shut down due to fire or fire indication, except when fuel is required to safely recover the aircraft.

A6.5.5.3. Compute performance with one or more engines inoperative assuming the loss of another engine.

A6.5.5.4. Aircraft with confirmed or suspected fuel leaks will abort the mission. Remain in the local area or proceed to the departure base or destination base by the most direct route. If circumstances permit, reduce to routine landing weight. Do not allow the center of gravity to exceed safe limitations or attempt any training activity, which would jeopardize safe recovery of the aircraft.

A6.5.6. Fuel Quantity Indication System Failure. Normally, each fuel quantity indicator for each fuel tank must be fully operational. If a fuel quantity indicating system failure is discovered prior to flight, the following exceptions apply:

A6.5.6.1. When a standard fuel load results in one or more empty tanks, the respective fuel quantity indicator for the empty tank need not be fully operational provided:

A6.5.6.1.1. The tank will remain empty throughout the flight, including in-flight refueling.

A6.5.6.1.2. The fuel quantity gauge indicates zero.

A6.5.6.1.3. The circuit breaker for the respective indicator is pulled and a safety clip installed to prevent inadvertent resetting.

A6.5.6.2. Aircraft may be flown with either one external or one outboard, but not more than one, wing tank gauge inoperative or malfunctioning, provided the following procedures are adhered to:

A6.5.6.2.1. The aircraft is loaded with a standard fuel load.

A6.5.6.2.2. The circuit breaker for the inoperative or malfunctioning gauge is pulled and a safety clip installed to prevent inadvertent resetting. In this situation, the pilots must realize that regardless of the gauge indication, the total fuel quantity indicator will be receiving indications that the tank is empty. Therefore, there will be a discrepancy between the total fuel quantity indication and the actual amount of fuel on board.

A6.5.6.2.3. The fuel flow indicator for that tank is fully operational.

A6.5.6.2.4. Pilots must be particularly watchful when using fuel from a tank having an inoperative or malfunctioning fuel gauge since the only indication of fuel flow will be the fuel flow indicator light, lateral trim indications, and balance of fuel between main tanks one and four. The Fuel Quantity Indicating System (FQIS) sends a voltage to the total fuel quantity gauge rather than a restrictive value. When the circuit breaker is pulled, the indication to the total fuel quantity indicator from that gauge will be zero.

A6.5.7. Aircraft/Aircrew Limitations

A6.5.7.1. In B-52 aircraft, personnel occupying ejection seats may unstrap their parachute during non-critical phases of flight provided the ejection seat pins are installed (trigger ring stowed), seat belts remain fastened and adverse weather/turbulence is not expected. This does not preclude briefly vacating/swapping seats at safe clearance altitudes, pattern altitudes, or safe distance from tanker at the discretion of the PIC. Personnel not occupying ejection seats may unstrap their parachute during non-critical phases of flight. Instructors/evaluators not occupying ejection seats are exempt from wearing parachutes when performance of their essential duties makes wearing the parachute impractical. All crewmembers will wear helmets during initial takeoff/climb out, air refueling from 1/2 mile through termination of actual refueling operations, low altitude training routes, flight characteristics demonstration, flight below 10,000 feet MSL and any time an armed ejection seat is occupied. Pilots will have a visor down during any operations exceeding 300 KIAS below 10,000 feet MSL. If the visor interferes with the ability to see the instruments or terrain, minimize the time spent with the visor up.

A6.5.7.2. Only the following compound practice emergencies are authorized with an IP in the seat.

A6.5.7.2.1. Single Engine Loss on Takeoff following a Six Engine Landing see note 3 Table 6.1

A6.5.7.2.2. Six Engine Approach, Go-Around, or Landing in conjunction with an ARDA see applicable notes Table 6.1.

Table A6.1. In-flight and Landing Limitations

Maneuver	Max Wt	Weather	IP Supervision	Additional Restrictions	Remarks
Simulated Engine Loss on Takeoff	290,000 lbs	Note 1	Required	Note 4	Limited to one engine simulated inoperative above S-1 speed or 100 KIAS, whichever is higher.
Simulated Six Engine Approach	290,000 lbs	Note 1	Required for other than day VFR		
Simulated Six Engine Landing	290,000 lbs	Note 1	Required	Note 3 &4	
Simulated Six Engine Approach and Go-Around	250,000 lbs	Note 1	Required for other than day VFR	Symmetric	
Flaps Up Approach	290,000 lbs	Note 1	Required for other than day VFR	Note 5	
Flaps Up Touch-and-go Landings	250,000 3°approach; 270,000 2.5°approach	Note 1	Required	Note 4 & 5	
Low Approaches with One Engine Shut Down	290,000 lbs	Note 1	Required for other than day VFR	Note 2	Prohibited if engine(s) was shut down for fire, fire indication, or fuel leak.
Traffic Pattern Operations	325,000 lbs				
Landing Attitude Demonstration	290,000 lbs	Day/Night	Note 6	Note 6	Required Flaps down, touch-and-go limitations apply

Notes:
1. Day/Night. No lower than circling minimums or 1,000 feet ceiling and 3 miles visibility (2 miles if under radar contact), whichever is higher.
2. 200 feet Height Above Touchdown (HAT) or Decision Height (DH)/Minimum Descent Altitude (MDA) for the approach being flown, whichever is higher.
3. Comply with the following if a touch-and-go is to be accomplished: Touch-and-go limitations apply. Rudder trim must be centered when decision is made to land. If performing a single loss

on takeoff, following the 6 engine landing, comply with restrictions for the single engine loss on takeoff in this table. If unplanned go-around is executed, symmetrical thrust will be established on all engines. 4. Dry runway crosswind component is 10 knots maximum. Touchdown must be made in the first third of the runway or go-around will be initiated. 5. 200 feet AGL to make decision to land or go-around. 6. Discernible horizon and the end of the runway visible.

Attachment 7

E-3/E-8/B707 OPERATING PROCEDURES

A7.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the E-3/E-8/B707 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all E-3/E-8/B707 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A7.2. Mission Planning.

A7.2.1. Melbourne Intl, (KMLB), performance data may be calculated using RCR 16 in lieu of RCR 10 per performance manual with a runway condition reported as "wet" without standing water. Use actual MU or RCR if reported by ATC, for performance calculations.

A7.3. Common Mission Guidance.

A7.3.1. Crew Complement. Minimum aircrew complement will be commensurate with Flight Manual and /or mission specific requirements.

A7.3.2. Maneuver Restrictions.

A7.3.2.1. In-flight, prior to simulating emergency procedures (EP), the pilot will notify all crewmembers.

A7.3.2.2. In the event of an actual emergency, all student training and simulated EPs will be terminated. Training will resume only when the pilot in command (PIC) has determined that no hazard to safe aircraft operations exist.

A7.3.3. Prohibited Maneuvers.

A7.3.3.1. This section adds aircraft limitations and restrictions to those already specified in flight manuals and applies to all aircrew. Unless on an approved test plan or an actual emergency exists, deviations from the aircraft flight manual are prohibited. The following maneuvers are prohibited:

A7.3.3.1.1. Stalls

A7.3.3.1.2. Zero Flap Landings

A7.3.3.1.3. Dutch Roll (unless in approved lesson plan)

A7.3.3.1.4. Simulated Emergency Descent

A7.3.3.1.5. Simulated 3 engine, rudder power-off landings are prohibited

A7.3.3.1.6. Simulated Compound Emergencies. (Excludes 3-engine, 25 degree flaps landing).

A7.3.3.1.7. Actual practice engine shutdown (unless in approved lesson plan)

A7.3.4. Landing Limitations. The following landing limitations apply to both touch-and-go and full stop landings:

A7.3.4.1. All pilots will plan to land on centerline within the touchdown zone.

A7.3.4.2. All touchdowns will be at a gross weight and at a point and speed that will permit a safe, full stop landing in the remaining runway. If this is not possible, initiate a go-around.

A7.3.5. Engine Running Crew Changes. Unless otherwise published, use the following procedures. A crewmember should be positioned at the point of entry to act as a safety observer. Crewmembers should approach and depart the aircraft from the nose. Crewmembers should ensure that all loose items are secure prior to entering and exiting the aircraft. Pilot in Command (PIC) will ensure that the aircraft is clear prior to taxi.

A7.3.6. Air Refueling Limitations.

A7.3.6.1. Do not accomplish AR operations when:

A7.3.6.1.1. Conditions are encountered which, in the opinion of either aircraft commander or the boom operator result in marginal control of either aircraft.

A7.3.6.1.2. Either the tanker or the receiver has less than the full number of engines operating.

A7.3.6.1.3. The tanker aircraft is unable to retract the landing gear.

A7.3.6.2. Tanker Autopilot. Conduct AR using all axes of the tanker autopilot except when either the tanker or receiver requires training with the tanker autopilot off or when the tanker autopilot is inoperative. Tanker pilots must notify the receiver pilot when any axis of the autopilot is not being used. For autopilot off tanker must have normal disconnect capability, unless fuel emergency exists.

A7.3.6.3. AR without Tanker Disconnect Capability. AR without tanker disconnect capability means the boom operator is unable to get an immediate disconnect by triggering the disconnect switch. After a known loss of tanker disconnect capability with a particular receiver, no further contacts will be attempted with that receiver. The inability to get an immediate disconnect from one receiver by triggering a disconnect does not prohibit contact attempts with other receivers, if the tanker system (signal coil) checks good. However, if disconnects cannot be triggered on two successive receivers, no further contacts will be attempted unless required for the safe recovery of the aircraft.

A7.3.6.4. Practice Maneuvers.

A7.3.6.4.1. Restrictions. Practice emergency separations while in the contact position and demonstration of boom envelope limits are prohibited when the tanker has lost disconnect capability or during manual/emergency boom latching.

A7.3.6.4.2. Maneuvers initiated from the contact position require that the tanker AR system be in normal, and a disconnect capability with the receiver must have been previously determined by a boom operator initiated disconnect

A7.3.6.5. Practice Emergency Separation. Prior to the actual accomplishment of a practice emergency separation, coordination between the tanker pilot, boom operator, and the receiver pilot is mandatory. Coordination must include when the maneuver will occur and who will give the command of execution. Tanker pilot coordination may be accomplished over interphone with the boom operator. All crewmembers will be briefed on interphone prior to the practice emergency separation.

A7.3.6.6. Air Refueling Envelope Limits Demonstration. Prior to a limits demonstration, a disconnect capability must have been previously determined by a boom operator initiated disconnect.

A7.3.6.7. Receiver AR Training. A qualified receiver IP will conduct training. The receiver pilot must inform and obtain acknowledgment from the tanker pilot and boom operator when an unqualified receiver pilot is receiving AR training. During this time, a boom operator qualified for the applicable category receiver must operate the boom controls, and if the tanker autopilot is off, the tanker must be flown by a pilot current and qualified in tanker AR.

A7.3.7. Formation Flying. Formation is authorized IAW applicable technical order.

A7.4. Instrument Procedures.

A7.4.1. The E3/E8/B707 is instrument category D.

A7.5. Operating Procedures and Restrictions.

A7.5.1. Simulated Loss of Engines.

A7.5.1.1. Perform practice or simulated loss of engines IAW this instruction, the applicable flight manual, and the following:

A7.5.1.2. Simulated engine-out approaches may end in a missed approach, a full-stop landing, or a touch-and-go landing using all engines during the takeoff phase. A planned three-engine go-around may be started at any time before the power is reduced in the flare. If no IP or EP is onboard, the go-around will be initiated no lower than 200 feet AGL. Use all four engines as soon as safe and practical

A7.5.1.3. Simulated two-engine approaches and landings will be practiced under IP supervision only. Simulated two-engine approaches can be practiced using two symmetric engines or three engines using two-engine procedures. Two-engine approaches and landings will not be practiced in an extensively modified aircraft. (Simulator only)

A7.5.1.4. Simulated engine-out, rudder-power-off approach and go-around will not be accomplished unless an IP has briefed the maneuver prior to flight and an IP has access to a set of flight controls. The go-around will be started no lower than 200 AGL. For an unplanned go-around, use all four engines as soon as safe and practical. (Simulator only)

A7.5.2. Practice Emergency Gear and Flap Operation. Accomplish day or night, clear of clouds.

A7.5.3. Zero-Degree Flap Approach. Do not practice zero-degree flap approaches unless an instructor pilot has access to a set of flight controls and no emergencies (actual or simulated) exist. The approach will be terminated no lower than 200 feet AGL.

Attachment 8

C-5 OPERATING PROCEDURES

A8.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the C-5 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of C-5 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A8.2. Mission Planning.

A8.2.1. Obstacle Clearance Planning. Use AFI 11-202V3, AFMAN 11-217V1, and this instruction when planning an IFR departure. The Aircraft Commander shall provide the engineer with the following; planned IFR departure procedure, takeoff runway direction, length, slope, RCR/RSC, screen height, the height and distance of any known obstacles affecting departure path, and climb gradients (OEI and four engine).

A8.2.2. Fuel Planning. On flights where a test plan does not dictate required fuel load, fuel planning is the responsibility of the aircraft commander.

A8.3. Common Mission Guidance.

A8.3.1. Taxi Procedures. Refer to Table A8.1 for taxi clearance criteria.

Table A8.1. Minimum Taxi Clearance Criteria

Lateral clearance of component	To an obstacle	Without Wing Walker	With Wing Walker
Main Gear Pod	Less than 3 feet high	25 feet	10 feet
Outboard Nacelle	3 feet high, but less than 6 feet high	25 feet	10 feet
Wing Tip	6 feet or higher	25 feet	10 feet

A8.3.2. Aircrew Engine Running On-load/Offload/Crew change (ERO/ERCC). Aircrew will apply these procedures when conducting ERO/ERCCs through the crew entrance door. Crews should spend a minimum amount of time on the ground when accomplishing an ERO or ERCC. Aircraft commanders will brief crewmembers on the intended ERO/ERCC operation. The parking brake will be set and at least one pilot in the seat will monitor brakes, aircraft systems, interphone, and command radio. As a technique, operate engines in the lowest thrust setting necessary. Prior to landing, the loadmaster or scanner will brief personnel in the cargo compartment regarding their locations, duties, and responsibilities during the ERO/ERCC. During enplaning or deplaning, station a crewmember on interphone (cord held taut) at approximately 20-30 feet and 45 degrees from the aircraft axis to establish a visual reference between personnel and the running engines. No deplaning/enplaning personnel should approach the airplane until this crewmember is in place. Brief deplaning/enplaning personnel to remain forward of the interphone cord and ensure hearing protection is used. Use wing leading edge lights, taxi lights, and landing lights to enhance safety at night as the situation dictates.

A8.3.3. Observer. Use available crewmembers to assist in outside clearing during all taxi operations and any time the aircraft is below 10,000 feet MSL.

A8.3.4. Landing Gear and Flap Operating Policy. The pilot flying (PF) will command configuration changes. The pilot monitoring (PM) will verify appropriate airspeed and configuration prior to echoing the gear or flap actuation command. All gear operation will be activated by the pilot in the right seat and all flap operation will be activated by the PM.

A8.3.5. Flight Engineer Procedures. All flight engineers assigned to AFMC will use the following guidance when operating C-5s, regardless of location. This guidance contains normal procedures for flight engineers (FE) not contained in the flight manual or applicable technical orders (TO).

A8.3.5.1. Authority to Clear Red X Symbols in the AFTO Form 781A, *Maintenance Discrepancy and Work Document*. A first engineer or above may clear red Xs for fan stops, pitot covers, gear pins, engine cowlings, exterior panels and single-point refueling (SPR) drains when qualified maintenance personnel are not available.

A8.3.5.2. Aircraft Servicing.

A8.3.5.2.1. Refueling and De-fueling. Flight Engineers are authorized to refuel and de-fuel when maintenance personnel are not available. The applicable refueling and de-fueling checklist shall be used during all refueling and de-fueling operations. If ground support personnel are not available, the aircraft commander will designate other crewmembers to assist the FE. Aircrews will not refuel at bases with AMC support except in isolated cases when maintenance support is not readily available and the mission would be delayed.

A8.3.5.2.2. Refueling at Nonsupport Stations. When crewmembers are required to refuel due to lack of maintenance support, two refueling qualified personnel and an additional individual for scanner or safety duties are required. The additional individuals will be briefed on duties by the refueling team supervisor. *EXCEPTION*: If left and right SPRs are used, two qualified personnel and two additional individuals are required.

A8.3.5.3. Weight and Balance. The flight engineer performing scanner duties is responsible for completing the DD Form 365-4, *Weight and Balance Clearance Form F*, when loadmasters are not on board and/or one has not been done through other means (i.e.- Canned DD Form 365-4, etc.).

A8.3.5.4. Aircraft Structural Integrity Program. The purpose of this program is to provide a reliable system for predicting potential or impending failures based on historical records of the aircraft's exposure to those actions contributing to fatigue failures.

A8.3.5.4.1. The program is monitored through the use of AF IMT 4097, *Aircraft Identification*.

A8.3.5.4.2. Flight engineer will:

A8.3.5.4.2.1. Ensure all applicable sections of AF IMT 4097 are completed according to procedures in paragraph A8.3.5.4.3.

A8.3.5.4.2.2. Always leave a newly initiated form on the aircraft.

A8.3.5.4.2.2.1. Initiate a new form by completing section I.

A8.3.5.4.2.2.2. Place all completed AF IMT 4097s in aircraft stowage pouch along with newly initiated form.

A8.3.5.4.2.2.3. Ensure all completed AF IMT Forms 4097 accompany the aircraft back to home station with its records and turn into maintenance at debrief.

A8.3.5.4.3. AF IMT 4097 instructions.

A8.3.5.4.3.1. The AF IMT 4097 will be closed out after each sortie, runway abort, or landing on a substandard runway. The criteria in AFI 11-401, and MAJCOM supplement, pertaining to sorties, landing, and flying time entries made in the AFTO 781 by the pilot in command apply, with the following exceptions:

A8.3.5.4.3.1.1. Do not start a new log for in-flight mission symbol changes.

A8.3.5.4.3.1.2. Do not start a new log for practice full stop landings at a point other than the point of takeoff.

A8.3.5.4.3.1.3. Start a new log when the aircraft remains on the ground more than 20 minutes after touchdown, regardless of circumstances.

A8.3.5.4.3.2. Weights. Except for section VI, enter weights to the nearest thousand pounds. Always right adjust the three columns. For example, enter a weight of 94,500 pounds as 095. For section VI, enter values in thousands and tenths of thousands, such as 94.5 for the above example.

A8.3.5.4.3.3. Altitudes. Enter altitude to the nearest thousands of feet in section III. Enter altitude as thousands and tenths of thousands of feet in section V. The decimal point is on the form. (***EXAMPLE:*** Enter 24,600-feet as 24.6 in section V.)

A8.3.5.4.3.4. Accuracy and neatness are essential. All numbers and letters must be legible. Do not use diagonal marks (/) on zeroes.

A8.3.5.4.3.4.1. Section I, Aircraft Identification. Complete an AF IMT 4097 for each sortie or condition as defined in paragraph A8.3.5.4.3.1. Do not complete a log for any ground operation or sortie that does not involve an attempted takeoff. This includes ground aborts for maintenance, operations, weather, and on-load or off-load exercises. When a sortie is terminated before an attempted takeoff, transcribe the section I information contained on the log to a new AF IMT 4097. Use the same log number.

A8.3.5.4.3.4.1.1. Effective Date. The Zulu date the form is started. For each mission departure from home station, the AFTO 781J, *Aerospace Vehicle-Engine Flight Document*, will contain the correct information for the effective date and columns 1-20 in a special block. This information will be used for confirmation. All discrepancies on the AF IMT 4097 will be corrected to agree with the AFTO 781J.

A8.3.5.4.3.4.1.2. Columns 1-3. Aircraft tail number: Enter the last 3 numbers of the aircraft's serial number.

A8.3.5.4.3.4.1.3. Columns 4-8. Log number: Only one log number will be used for each sortie flown. Place the year in columns 4-5. Right adjust the remaining three digits, ending in column 8. Unused columns should contain zeroes. No dashes are permitted. ***EXAMPLE:*** The ninth log of the calendar year 2005 would be entered as 05009.

A8.3.5.4.3.4.1.4. Column 9. Normally, the letter "A" will be entered in this column. (***EXCEPTION***: Enter C when ALDCS is off; enter D when air refueling with a KC-10 tanker and ALDCS is off; enter E when air refueling with KC-10 tanker and ALDCS is on.) In instances when additional AF IMT 4097s are needed (i.e. aborted takeoff, aircraft remaining on the ground more than 20 minutes after an intermediate landing, landings on substandard runways), add a suffix letter beginning with B through Z with the exception of C, D, and E explained above. (***EXAMPLE***: Initial log number 05011A, aircraft aborts takeoff for a door warning light on--initiate new log with number 05011B. Aircraft makes a full stop landing with taxi back for another takeoff, but is delayed on the ground over 20 minutes--initiate a new log with number 05011F. The mission is then completed after further flight. The aircraft has flown one sortie and has used one log number although three AF IMT 4097s are completed.) ***NOTE:*** When an AF IMT 4097 is initiated for a flight that is aborted on the runway during an attempted takeoff resulting in mission termination, the form will be completed as much as possible. Include the reason for the abort in the remarks section.

A8.3.5.4.3.4.1.5. Columns 10-12. No entries will be made in these columns.

A8.3.5.4.3.4.1.6. Columns 13-17. Airframe hours: To nearest hour. Decimal and tenth of hour omitted.

A8.3.5.4.3.4.1.7. Columns 18-20. AGS: Aircraft Generation Squadron. (***EXAMPLE***: 60 AGS would be entered as 060.)

A8.3.5.4.3.4.2. Section II, Initial Takeoff and Final Landing Data. Complete section II as follows: FE -- enter rank, last name, and flying organization of FE at panel for takeoff.

A8.3.5.4.3.4.2.1. Initial Takeoff Data.

A8.3.5.4.3.4.2.1.1. Columns 21-24. Date: Enter the takeoff Zulu date as day and month.

A8.3.5.4.3.4.2.1.2. Columns 25-27. Gross weight: Aircraft gross weight at brake release. (Zero fuel weight plus columns 30-32, fuel weight at takeoff) Entry will be to the nearest thousand pounds. (See paragraph A8.3.5.4.3.2.)

A8.3.5.4.3.4.2.1.3. Columns 28-29. CG: Takeoff center of gravity to the nearest whole percent.

A8.3.5.4.3.4.2.1.4. Columns 30-32. Fuel weight: Fuel weight at brake release to the nearest thousand pounds. (See paragraph A8.3.5.4.3.2.)

A8.3.5.4.3.4.2.1.5. Columns 33-36. Time Z: Sortie takeoff time to agree with the takeoff time as recorded on the AFTO 781. (See EXCEPTIONS at paragraph A8.3.5.4.3.1.)

A8.3.5.4.3.4.2.1.6. Columns 37-40. Airfield ICAO code: ICAO designation (4 letters) for the airfield at which the takeoff occurred. If no ICAO code is listed for an airfield, leave blank and annotate the name of the airfield of takeoff in the remarks section.

A8.3.5.4.3.4.2.1.7. Column 41. Substandard runway: Enter an "X" if the runway is not asphalt or concrete.

A8.3.5.4.3.4.2.2. Final Landing Data.

A8.3.5.4.3.4.2.2.1. Columns 42-44. Fuel weight: Fuel weight at engine shutdown or 5 minutes after final touchdown, whichever comes first, to the nearest thousand pounds. ***NOTE:*** This entry and the fuel entry (columns 30-32) are extremely important and must be accurate. The chronological event (cruise periods, touch-and-go (T&G), intermediate full stops and takeoffs) fuel weight is computed using the initial takeoff and final landing fuel weight.

A8.3.5.4.3.4.2.2.2. Columns 45-48. Time Z: Sortie landing time as recorded on the AFTO 781. (See EXCEPTIONS at paragraph A8.5.8.4.3.1.)

A8.3.5.4.3.4.2.2.3. Columns 49-52. Airfield ICAO code: ICAO designation (4 letters) for the airfield at which the final landing occurred. If no ICAO code is listed for an airfield, leave blank and annotate the name of the airfield of landing in the remarks section.

A8.3.5.4.3.4.2.2.4. Column 53. Substandard runway: Enter an "X" if the runway is not asphalt or concrete.

A8.3.5.4.3.4.2.2.5. Column 54. Fuel sequencing: Enter "S" for standard fuel sequence; enter "N" for nonstandard fuel sequence. When "N" is entered, make an entry in the remarks block to indicate fuel quantity in each tank containing fuel, and the total flight time spent in nonstandard configuration.

A8.3.5.4.3.4.3. Section III , Flight Profile Data.

A8.3.5.4.3.4.3.1. This section allows for four separate cruise periods. Do not enter temporary cruise periods of less than 15 minutes (due to clearance changes, weather, etc.). Entries are required for low-level clean configuration events where a cruise period time and altitude is held longer than 5 minutes at 6,000-feet mean sea level (MSL) or lower. Neither traffic nor the climb or descent portions of the sortie are to be entered. These entries are to be made left-to-right in chronological time sequence as they occur. The first cruise period start time should begin after the initial climb and cruise is stabilized. Cruise period stop times should be entered when one of the following events occur:

A8.3.5.4.3.4.3.1.1. Climb or descent in excess of 4,000-feet from recorded altitude is initiated.

A8.3.5.4.3.4.3.1.2. Altitude increases by more than 4,000 from the last recorded value. This may occur when multiple step-climbs (less than 4,000-feet each) are performed.

A8.3.5.4.3.4.3.1.3. Cruise Mach number is stabilized at 0.10 from the last recorded value. ***NOTE:*** Climb and descent criteria will normally govern when to close out a cruise period. The Mach number change criteria is possible during aerial refueling operations and turbulence encounters.

A8.3.5.4.3.4.3.2. Subsequent cruise periods should begin when Mach/altitude conditions are stabilized. The stop time for the last chronological cruise entry indicates scheduled cruise has ended and descent for landing follows. ***NOTE:*** Cruise entries are not required if the entire flight remains in the initial takeoff airfield's traffic pattern. (See section II, columns 37-40.) However, a cruise entry will be required when:

A8.3.5.4.3.4.3.2.1. The traffic pattern altitude (6,000-feet MSL) is exceeded, regardless of time duration.

A8.3.5.4.3.4.3.2.2. Each time an aircraft departs from one base traffic pattern and flies to another base regardless of altitude or time duration.

A8.3.5.4.3.4.4. Section IV, Transition Training—Touch-and-go Landings, Additional Full Stops, and Takeoffs.

A8.3.5.4.3.4.4.1. Columns 10-11. Sequence number: Keypunch instructions, no entry required.

A8.3.5.4.3.4.4.2. Columns 12-55. T&G: There is space to record 22 touch-and-go landings. Enter additional T&Gs in remarks column, if required. Enter the Zulu time at touchdown for each T&G. Enter T&Gs left to right on the first line as they occur. After the 11th T&G entry, begin second line and enter 12th and subsequent T&Gs left to right as they occur. Leave unused portion blank. Do not skip any entries. Time entries should always be ascending in chronological order (allowance is made for passing through 2400Z).

A8.3.5.4.3.4.4.3. Columns 56-59. Full stop: There is space to record two practice full stop landings. Enter additional full stop landings in the *remarks* section. Enter the Zulu time at touchdown for the first practice full stop on the first line. Leave unused portion of section IV blank. ***NOTE:*** Do not enter practice landings on substandard runways. A new log must be accomplished for each substandard runway practice landing.

A8.3.5.4.3.4.4.4. Columns 60-63. Takeoff: There is space to record two additional takeoffs. Enter additional takeoffs in remarks section. Enter the Zulu time at takeoff for the additional takeoffs as they occur. Leave unused portion blank.

A8.3.5.4.3.4.5. Section V, In-flight Operations.

A8.3.5.4.3.4.5.1. Columns 10-11. Sequence numbers: Keypunch instructions, no entry required.

A8.3.5.4.3.4.5.2. Columns 12-16. Event: Place an "X" in the appropriate column.

A8.3.5.4.3.4.5.3. Column 12. Terrain Following (TF)/Low Level (LL).**

A8.3.5.4.3.4.5.4. Column 13. Aerial Refueling (R).*

A8.3.5.4.3.4.5.5. Column 14. Airdrop (A).*

A8.3.5.4.3.4.5.6. Column 15. Cargo Jettison (CJ).*

A8.3.5.4.3.4.5.7. Column 16. Fuel Jettison (FJ). *Simulated events will be recorded. **Usually applies during tactical VFR training (TVT) sorties. Use LL when flying a clean configuration event at or below 2,000-feet AGL for longer than 5 minutes.

A8.3.5.4.3.4.5.8. Columns 17-20. Event start time (Zulu time): For airdrop or cargo jettison, the start time is when the aerial delivery system (ADS) doors start to open. For AR, start time is when the aircraft enters tanker wake turbulence or the aircraft is within approximately 500-feet of the tanker.

A8.3.5.4.3.4.5.9. Columns 21-24. Event stop time (Zulu time): For airdrop or cargo jettison, stop time is when the ADS doors are closed. For AR, time ends when the aircraft leaves the tanker wake turbulence or the aircraft is approximately 500-feet from the tanker.

A8.3.5.4.3.4.5.10. Columns 25-27. Incremental weight: Enter the weight onloaded or offloaded for the event "X-ed" in columns 12-16. Enter "000" for simulated events.

A8.3.5.4.3.4.5.11. Columns 28-31. Altitude or clearance plane setting: Enter the altitude in thousands and tenths of thousands of feet. A decimal point has been provided on the form. For terrain following and low-level, enter the altitude in feet AGL.

A8.3.5.4.3.4.5.12. Columns 32-39. Terrain following and low-level: If an "X" was placed in column 12, make the following entries:

A8.3.5.4.3.4.5.12.1. Columns 32-33. Route code: Enter the code number of low-level route flown.

A8.3.5.4.3.4.5.12.2. Columns 34-35. Mode: Place an "X" in the appropriate column, "A" for automatic, "M" for manual.

A8.3.5.4.3.4.5.12.3. Column 36. Ride setting: Enter a "0".

A8.3.5.4.3.4.5.12.4. Columns 37-39. Mach: Enter the 3-digit Mach number being flown for terrain following. (Decimal is assumed.) ***NOTE:*** An altitude entry is required for all events. Columns 17-31 must be completed for each event. Columns 32-39 must be completed for terrain following and low level only. Do not place decimal points in any columns. All allowed decimal points are preprinted on the form.

A8.3.5.4.3.4.6. Section VI, Sortie Time and Takeoff Weight Computation.

A8.3.5.4.3.4.6.1. Flight Duration:

A8.3.5.4.3.4.6.1.1. Landing time: Enter the ending Zulu landing time.

A8.3.5.4.3.4.6.1.2. Takeoff time: Enter the initial Zulu takeoff time.

A8.3.5.4.3.4.6.1.3. Total time: Enter the total flight time in hours and minutes.

A8.3.5.4.3.4.6.1.4. Total time: Enter the total flight time in hours and tenths. ***NOTE:*** The takeoff and landing time entries in sections II and VI should be identical and should be the same as recorded in the AFTO 781 for the sortie being reported. (See paragraph A8.3.5.4.3.1. for exceptions.)

A8.3.5.4.3.4.6.2. Takeoff Weight Computation. Complete the takeoff weight computation portion when computing takeoff requirements. The operating weight and cargo, passenger, and miscellaneous weight entries should not change. The fuel weight at brake release is subject to change due to unforeseen delays. The FE need not readjust section VI entries in case of delays. The FE should always enter the corrected fuel weight and gross weight at takeoff in section II. ***NOTE:*** LN2 weight will be included in the aircraft operating weight.

A8.3.5.4.3.4.6.3. Remarks: Enter any appropriate comments that could influence aircraft fatigue factors. Examples are: severe turbulence encountered, hard landing, nonstandard fuel sequence, high load maneuvers, unpressurized flight, and in-flight thrust reverser operation. If active lift distribution control system (ALDCS) is off or inoperative in flight, record the conditions and flight duration. Record the appropriate sequence number from section V, In-flight Operations Data, of any AR event occurring behind the KC-10. ***EXAMPLE:*** "KC-10 A/R, seq XX" where "XX" is the sequence number. Other required remarks are mentioned in the various section instructions. ***NOTE:*** If all blocks for a specific maneuver are completed and additional blocks are needed, use another AF IMT 4097 for continuation. Use same log number and annotate in the remarks section of the continuation form**, "Continuation of log number XXXXX."**

A8.3.5.5. Fault Code Reporting Procedures:

A8.3.5.5.1. The Fault Reporting Method (FRM) is used to isolate system malfunctions with a minimum amount of troubleshooting and provide a description of the malfunction for maintenance.

A8.3.5.5.2. System malfunctions, whether monitored by Malfunction Analysis Detection and Recording (MADAR) (auto or manual) or observed by a crewmember, will be troubleshot using the fault reporting method (FRM) or fault isolation manual (FIM) procedures contained in MADAR to the maximum extent possible.

A8.3.5.5.3. The manual fault code (FC) from the troubleshooting routine and the auto fault code reported by MADAR will be recorded in AFTO Form 781A, *Maintenance Discrepancy and Work Document,* along with the description of the malfunction. Include any additional information required for clarification of the discrepancy.

A8.3.5.6. Monitoring Primary Radios. The FE will monitor the primary radio for flight clearances, altitudes, heading changes, and radio frequencies. The FE is not required to copy departure clearances.

A8.3.5.7. Scanner Duties. After takeoff, the scanner will normally make a walk-around when flaps are retracted, the after-takeoff climb checklist has been initiated, and the airplane is clear of turbulence. The walk-around should be completed by 10,000 feet. EXCEPTION: When the scanner is sitting in the jump seat, he or she will remain there until 10,000 ft., unless coordinated with the pilot to clear off earlier for the after takeoff climb scan.

A8.3.5.8. Wheel and Brake Procedures. If dragging wheels or brakes are suspected during taxi, or after the Anti-Skid check, deplane the scanner and another crewmember, if available, and proceed as follows.

A8.3.5.8.1. Maintain interphone contact throughout the inspection.

A8.3.5.8.2. To inspect, approach directly from the front or rear of the tire, touch main landing gear tire and cautiously move the hand toward the wheel. Then place the hand near the brake to determine excessive heat without touching the brake surface. Repeat for each main landing gear (MLG) wheel and brake assembly.

A8.3.5.8.3. If any brake is significantly hotter than the majority, advise maintenance that corrective action is required. If an obviously dangerous overheated condition is observed, do not taxi the airplane.

A8.3.5.8.4. If no brake is found significantly hotter than the majority of brakes, the brake check is satisfactory.

A8.3.6. Runway, Taxiway, and Airfield Requirements. In all cases ensure obstacle clearance requirements are met. Computed landing distance will not exceed runway available.

A8.3.6.1. Runway Length for Takeoff/Intersection Takeoffs. Normally, takeoffs will be initiated from the beginning of the approved usable portion of the runway. Decision to make intersection takeoffs rests solely with the AC. Intersection takeoffs may be accomplished provided the operating environment (i.e. gross weight, obstructions, climb criteria, weather, etc.) will allow safe takeoff and departure. When less than the entire runway is used, takeoff and landing data (TOLD) card computations will be based on actual runway remaining from the point at which takeoff is initiated.

A8.3.7. Arresting Cables.

A8.3.7.1. Do not land on (touchdown on) approach end arresting cables (does not include recessed cables). If the aircraft lands before the cable, the crew should contact the tower to have the cable inspected.

A8.3.7.2. Do not takeoff or land over an approach end cable that has been reported as slack, loose, or improperly rigged by NOTAM, automated terminal information service (ATIS), or ATC.

A8.3.8. Aircraft Recovery from Unprepared Surfaces. Aircrews will not normally attempt to recover an aircraft after inadvertent entry onto unprepared surfaces not suitable for taxi; ground crews will accomplish aircraft recovery.

A8.4. Instrument Procedures.

A8.4.1. Aircraft Category. The C-5 is approach Category D.

A8.4.2. Data Insertion. Another pilot will verify flight plan or waypoint data inserted into the FMS/MCDU. Check both the coordinate information and the distances between waypoints against the route of flight.

A8.4.3. Use of Automation.

A8.4.3.1. In flight, the PF will determine the most desirable level of automation for the given situation. However, the PIC still has the ultimate responsibility and authority for the safe operation of the aircraft.

A8.4.3.2. One pilot should always remain heads up. One technique is to announce “pilot heads down” or “copilot heads down” when the task requires focusing significant attention on the FMS/MCDU in flight.

A8.4.3.3. Extensive programming of the FMS/MCDU below 10,000 feet and during critical phases of flight should be avoided, especially during times of increased workload.

A8.4.3.4. To maximize situational awareness, the PF should verbalize automation mode and level changes to the crew. Confirm inputs by observing the desired result.

A8.4.3.5. Any system which increases situational awareness, such as EGPWS, TCAS or WX radar, should be operated by the PM at the direction of the PF.

A8.4.4. FMS 800 Operations.

A8.4.4.1. Normally the PM will make FMS inputs, especially at low altitudes (e.g. below 10,000 feet). When work load and phase of flight permit, the PF may make FMS inputs. Coordinate route changes between pilots to ensure accuracy.

A8.4.4.2. Autopilot. When the autopilot is engaged, the PF should operate the autopilot. The PM should only make inputs as directed by the PF.

A8.4.5. AMP Operations.

A8.4.5.1. Normally the PM will make MCDU inputs, especially at low altitudes (e.g. below 10,000 feet). Changes which alter the flight path should be verified by the PF prior to execution.

A8.4.5.2. AFCS operation is governed by the autopilot status with consideration given to aircraft altitude.

A8.4.5.2.1. With the autopilot engaged, the PF should make all changes to AFCS modes and settings. EXCEPTION: The Altitude Select Window is set by the PM. In all cases the new altitude setting will be verbally confirmed with the PF.

A8.4.5.2.2. With the autopilot disengaged, the PM should make all AFCS inputs at the direction of the PF. However, when receiving ATC vectors or altitude change clearances, the PM should set assigned headings or set the new altitude and await the PF's instructions to engage HDG SEL mode or a vertical mode.

A8.4.5.3. The following standard terminology will be used:

A8.4.5.3.1. SELECT, SET or ENGAGE directs the selection of a value and/or a mode on the AFCS panel which results in the value being placed in the "engaged" (top green) portion of the FMA. SELECT or SET is normally used with rotary knobs, however ENGAGE is acceptable.

A8.4.5.3.2. ARM directs the selection of a mode on the AFCS panel which results in the value being in the "armed" (bottom, cyan) portion of an FMA.

A8.4.5.3.3. ENGAGE should be used to request autopilot or autothrottle engagement.

A8.4.5.3.4. UP or DOWN should be used to indicate a change in vertical speed.

A8.4.5.3.5. EXECUTE should be used by the PF to indicate agreement with a programmed change to the flight path.

A8.4.5.3.6. PRESET or PRESELECT should be used to change an AFCS value without changing the engaged or armed mode

A8.4.5.4. The Altitude Select Window is set by the PM. The commanded altitude depends on the vertical mode to be used for the climb/descent. If using VNAV, the PF may elect to call for the highest level cleared in a climb or the lowest level cleared in a descent. This will allow VNAV management of the climb profile for intervening altitude restrictions. If not using VNAV, set current altitude clearance. Do not preselect a subsequent altitude until an altitude hold or altitude capture FMA is displayed and clearance to that altitude has been issued. At no time should an expected ATC clearance be set in the Altitude Select Window.

A8.4.6. Autopilot and Auto-throttle Use. C-5 AMP aircraft auto-throttles are approved for use during climb, cruise, descent, and approach. C-5 FMS-800 aircraft auto-throttle use is restricted to the approach phase only.

A8.4.6.1. The autopilot will be disconnected no later than DH, departing the MDA, or 300' for visual approaches.

A8.4.6.2. The auto-throttles will be disconnected no later than DH or 100' at all other times.

A8.5. Operational Procedures and Restrictions.

A8.5.1. Passenger Procedures. The aircraft commander has the discretion to release seats for passenger accommodations. Passengers can be carried on the flight station (jump seat or navigator's seat), in the relief crew area, or in the courier compartment. Any additional members on the aircraft must have an oxygen source and a seat/seat belt for all phases of flight and ground operations. One additional current and qualified C-5 crewmember must be on board when carrying passengers other than on the flight deck. This crewmember will perform only passenger-related duties. Passengers will not normally be carried in the troop compartment. If passengers are carried in the troop compartment, obtain qualified loadmasters and reference AMC guidance contained in AFI 11-2C-5, Volume 3 for any specific requirements.

A8.5.2. Cargo procedures. Cargo will not normally be carried. If cargo is carried, obtain qualified loadmasters and reference AMC guidance contained in AFI 11-2C-5, Volume 3 for any specific requirements. Parachute racks, survival equipment and a single B-1 stand are not considered cargo. Ballast for SCM-modified aircraft is not considered cargo. Small items capable of being hand-carried up the crew entrance ladder are also not considered cargo.

A8.5.3. Wind Restrictions. Airfields will be considered below minimums for takeoff and landing when winds (including gusts) are greater than: Maximum wind (any direction)—50 knots; Maximum tailwind component—10 knots; Maximum crosswind components, corrected for RCR, are specified in TO 1C-5A-1-1.

A8.5.4. Prohibited Maneuvers. The following maneuvers are prohibited in the aircraft unless they are part of an approved test plan or aircraft recovery plan:

A8.5.4.1. Simulated/actual engine out takeoffs.

A8.5.4.2. Aborted takeoffs.

A8.5.4.3. Two engine out landings and missed approaches.

A8.5.4.4. Stop and go landings.

A8.5.4.5. No slat landings.

A8.5.4.6. Full stalls.

A8.5.4.7. Dutch rolls.

A8.5.4.8. Unusual attitudes / spatial disorientation training.

A8.5.4.9. Simulated runaway pitch trim malfunctions.

A8.5.5. Training Restrictions.

A8.5.5.1. No Flap Landing. Perform no flap landings to a full stop only. Maximum crosswind component will not exceed 15 knots. Limit gross weight to 525,000 lbs or less.

A8.5.5.2. Stallimeter Training. All practice approach to shaker onset/audible warning must be done in day, VMC only conditions at an altitude greater than 10,000 ft AGL with an instructor pilot in the left or right seat.

A8.5.5.2.1. For practice approach to shaker onset, recover the airplane at shaker onset or the lowest acceptable computed shaker onset airspeed, whichever occurs first.

A8.5.5.2.2. For practice approach to audible warning, recover the airplane at audible warning or the highest acceptable computed audible warning AOA, whichever occurs first.

Table A8.2. Additional Training Restrictions.

MANEUVER	RESTRICTIONS	REMARKS
Simulated Engine Failures	Initiate above 500 ft AGL	Do not initiate at less than 2 engine Vmca. Do not practice when any actual emergency exists or during no flap landings. Simulate the use of “MIN Q.”
Go Around/Missed Approach (4 engine)	Initiate above 100 ft AGL	
Go Around/Missed Approach (3 engine)	Initiate above 200 ft AGL	Use all engines for unplanned go arounds below 200 ft AGL
Touch and Go	7000 ft runway length, 150 ft width,	

A8.5.6. Equipment Limitations.

A8.5.6.1. Objective. Redundant systems may allow crews to safely perform some missions when a component/system is degraded. The Pilot in Command (PIC) is the final authority in determining the overall suitability of an aircraft for the mission. The PIC will ensure a detailed explanation of the discrepancy is entered in the AFTO Form 781A, *Maintenance Discrepancy and Work Document*; include the following maintenance identifiers to effectively communicate aircraft status:

A8.5.6.1.1. Mission Essential (ME). The PIC will designate an item, system, or subsystem component essential for safe aircraft operation or mission completion as ME.

A8.5.6.1.2. Mission Contributing (MC). The PIC will designate an item, system, or subsystem component, which is not currently essential for safe aircraft operation as MC. These discrepancies should be cleared at the earliest opportunity. If circumstances change or mission safety would be compromised, re-designate as ME. Do not delay a mission to clear a MC discrepancy.

A8.5.6.1.3. Open Item (OI). The PIC will designate discrepancies not expected to adversely impact the current mission or any subsequent mission as an OI. These items are normally cleared at home station.

A8.5.6.2. Minimum Equipment List (MEL) Policy. The MEL is a pre-launch document listing the minimum equipment/systems to operate the aircraft. It is impractical to prepare a list that anticipates all possible combinations of equipment malfunctions and contingent circumstances. Consider equipment/systems with no listed exceptions as grounding items. A PIC who accepted an aircraft with degraded equipment/systems is not committed to subsequent operations with the same degraded equipment. PICs are not committed to operations with degraded equipment accepted by another PIC.

A8.5.6.2.1. The PIC shall account for the possibility of additional failures during continued operation with inoperative systems or components. The MEL is not intended for continued operation over an indefinite period with systems/subsystems inoperative.

A8.5.6.2.2. All emergency equipment will be installed unless specifically exempted by mission requirements/directives.

A8.5.6.3. *Hydraulic Systems*. The aircraft will not be flown with more than one hydraulic pump on two nonadjacent engines inoperative. If flown in this configuration, all PTUs shall be operative, and system filters shall be checked to ensure the system is not contaminated. All pumps shall have positive depress capability.

A8.5.6.4. *Landing Gear*. If a gear-down flight becomes necessary, make an AFTO Form 781 entry after the flight requiring inspection of the extended gear(s) prior to the next flight to include the associated gear-well areas, LN2 servicing panel and doors. Nose landing gear inspections include the kneeling door supporting actuators, brackets, and bulkhead assembly.

A8.5.6.5. *Fuel System*.

A8.5.6.5.1. If a main tank boost pump is inoperative, cross-feed and isolation valves shall be operational.

A8.5.6.5.2. Auxiliary tank boost pumps, one pump per tank may be inoperative. Both pumps may be inoperative in each tank if the tank is not serviced with fuel and/or the refuel valve is not leaking fuel back into the associated tank.

A8.5.6.5.3. Extended range tank boost pumps, one pump per tank may be inoperative. Both pumps may be inoperative in each tank if the tank is not serviced with fuel and/or the refuel valve is not leaking fuel back into the associated tank.

A8.5.6.5.4. The aircraft will not be flown with more than one inoperative fuel quantity indicator for each wing (symmetrically opposite indicator in the other wing shall be operative).

A8.5.6.6. *Electrical System.*

A8.5.6.6.1. One engine driven generator may be inoperative provided the bus tie system is operative.

A8.5.6.6.2. One Constant Speed Drive (CSD) may be inoperative and disconnected, provided the bus tie system is operative. The oil level of the disconnected CSD will be checked for proper oil quantity prior to flight and during all subsequent en route stops. Do not fly more than 50 hours with a disconnected CSD (non-waiverable).

A8.5.6.6.3. *Central Air Data Computer (CADC)*. CADC Replacement – These procedures apply when one CADC system has not been disturbed. If computer failure, as opposed to a pitot static system failure, is confirmed and a new CADC is installed, a leak check is not required. Crosscheck pilot and copilot airspeed indicators at 80 knots on takeoff roll. Abort the takeoff if airspeed differs by five knots or more. Exception: Maintenance leak and accuracy checks are required before flights in RVSM airspace.

A8.5.6.6.4. *Micro Inertial Reference System (Micro IRS)*. May be inoperative as long as there are three sources of attitude. Both EGIs and standby attitude indicator (SAI) shall be operational. Shall be repaired at next repair capable station.

A8.5.6.6.5. *Embedded Global Positioning System/Inertial Navigation System (EGI)*. Three sources of attitude required. Micro IRS and standby attitude indicator (SAI) shall be operational. Shall be repaired at next repair capable station. GPS function may be inoperative.

A8.5.6.6.6. *Inertial Navigation Systems (INS)*. One INS may be inoperative for navigation provided the attitude function is operative. The fully operational units should be installed in the number 1 and 3 positions.

A8.5.6.6.7. *MADAR*. One SAR channel indicating a vibration (fan or core) out of limits and one SAR channel indicating within limits suggests an indicating system malfunction. To determine if an indication malfunction exists apply the following:

A8.5.6.6.7.1. If channel 08 mil value is more than 2.5 times greater than the channel 09 mil value or the channel 09 value is more than 1.1 times greater than the channel 08 value, an indicating system malfunction exists.

A8.5.6.6.7.2. If an indicating system malfunction exists, the usable channel indicating vibration within limits will be used. Record the system malfunction as a discrepancy as in the AFTO Form 781A.

A8.5.6.6.7.3. If an indicating system malfunction does not exist, the usable channel indicating the highest values will be used to determine vibration levels.

A8.5.7. Minimum Equipment List.

A8.5.7.1. **Flight Station**

A8.5.7.1.1. Crash Axe 1

A8.5.7.1.2. Fire Extinguisher 1

A8.5.7.1.3. Fire Fighter Gloves 1 pr

A8.5.7.1.4. Oxygen Bottles 3

A8.5.7.1.5. First Aid Kits 2

A8.5.7.1.6. Observer Jump Seat 1

A8.5.7.1.7. Head Rests All primary crew

A8.5.7.1.8. Seat Cushions All primary crew

A8.5.7.1.9. Back Cushions All primary crew

A8.5.7.1.10. Quick-Don w/Goggles 5

A8.5.7.1.11. Flight Safety Harness/Strap 1

A8.5.7.1.12. Emergency Exit Lights 2

A8.5.7.1.13. TO 1C-5A-102-1 1 set (AMP only)

A8.5.7.2. **Relief Crew Compartment**

A8.5.7.2.1. Fire Extinguishers 2

A8.5.7.2.2. Oxygen Bottles 3

A8.5.7.2.3. Emergency Exit Lights 2

A8.5.7.2.4. Escape Slide No.5 Service Door 1

A8.5.7.2.5. Service Door Restraint Gate 1

A8.5.7.2.6. Water Jug w/Cups 1

A8.5.7.2.7. Seats: Two-man & Three man 2 & 1

A8.5.7.3. **Courier Compartment**

A8.5.7.3.1. Fire Extinguisher 1

A8.5.7.4. **Troop Compartment**

A8.5.7.4.1. Crash Axe 1

A8.5.7.4.2. Fire Extinguishers 5

A8.5.7.4.3. Oxygen Bottles 4

A8.5.7.4.4. Emergency Exit Lights 5

A8.5.7.4.5. Service Door Restraint Gate 1

A8.5.7.5. **Cargo Compartment**

A8.5.7.5.1. Oxygen Bottles 6

A8.5.7.5.2. Fire Extinguishers 8 (A-6)

A8.5.7.5.3. First Aid Kits 2

A8.5.7.5.4. Emergency Exit Lights 3

A8.5.7.5.5. 10,000 lb Chains 10

A8.5.7.5.6. 25,000 lb Chains 10

A8.5.7.5.7. Small Tie Down Devices 10

A8.5.7.5.8. Large Tie Down Devices 10

A8.5.7.5.9. Tie Down Straps 10

A8.5.7.5.10. 2 inch Kneeling Collars 2

A8.5.7.5.11. 4 inch Kneeling Collars 2

A8.5.7.5.12. Landing Gear Pins 5

A8.5.7.5.13. NLG Strut Limiter 1

A8.5.7.5.14. Kneeling Pad Extend pin 1

A8.5.7.5.15. Fan Blockers 4

A8.5.7.5.16. Fan Stoppers 1

A8.5.7.5.17. Pallet Stops 4

A8.5.7.5.18. Forward Ramp Lock Pins 8

A8.5.7.5.19. Aft Ramp Lock Pins 14

A8.5.7.5.20. Chocks 4

A8.5.7.5.21. Fan Stoppers 1

A8.5.7.5.22. Pallet Stops 4

A8.5.7.5.23. Forward Ramp Lock Pins 8

A8.5.7.5.24. Aft Ramp Lock Pins 14

A8.5.7.5.25. Chocks 4

Attachment 9

C-12 OPERATING PROCEDURES

A9.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the C-12 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of C-12 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A9.2. Mission Planning.

A9.2.1. Briefing/Debriefing.

A9.2.1.1. C-12 Paradrop mission briefings will be conducted with a qualified jumpmaster and will begin NLT 1 hour prior to scheduled takeoff. C-12J will not conduct actual Paradrop missions.

A9.3. Common Mission Guidance.

A9.3.1. Taxi. Instructor pilots may run engines and taxi the aircraft, as a single pilot.

A9.3.2. Reverse Taxi.

A9.3.2.1. The pilot will coordinate reverse taxi directions and signals with the crew chief, marshaller or scanner (any qualified C-12 aircrew member).

A9.3.2.2. The crew chief or scanner will be outside the aircraft and positioned to effectively direct the reverse taxi.

A9.3.2.3. The reverse motion should be stopped using forward thrust before the brakes are applied in order to prevent the aircraft empennage from contacting the ground.

A9.3.3. Takeoff/Landing Requirements.

A9.3.3.1. Compute takeoff and landing data for all flights. OG/CC-approved tab data may be used when available.

A9.3.3.2. Minimum runway length. In no case will a takeoff be performed if the runway available is less than ACCL/STOP distances adjusted for RCRs. Minimum runway for touch and go’s is 5000 ft for the C-12C/D and MC-12 and 6000 ft for the C-12J.

A9.3.4. Chase Operations. Chase operations are defined as flights involving similar or dissimilar aircraft performing maneuvers with a “non-cooperative” lead aircraft (i.e. moderate banked turns, shallow climbs, and descents) from a route or trail position

A9.3.4.1. Chase Restrictions.

A9.3.4.2. Day VMC only.

A9.3.4.3. No wing takeoff or landings.

A9.3.4.4. Minimum ATC wake turbulence criteria applies when chasing larger aircraft.

A9.3.4.5. Minimum lateral spacing is one-half the wingspan of the largest participating aircraft.

A9.3.5. Airdrop Procedures. The C-12J is prohibited from airdrop operations. The C-12C is authorized to airdrop personnel out of the rear main cabin entry door. The following guidelines apply:

A9.3.5.1. Maximum airspeed is 205 knots with the airstart door removed.

A9.3.5.2. Airdrop configuration is 40% flaps or 100% flaps and gear as necessary.

A9.3.5.3. Minimum airspeed is 100 knots with flaps 40% or 90 knots with flaps 100%.

A9.3.5.4. A loadmaster is not required to be on board the aircraft when the jumpmaster is from the AFFTC test parachute program.

A9.3.5.5. The minimum exit altitude for free fall is 2500 ft AGL.

A9.3.5.6. The minimum emergency exit altitude is 1000 ft AGL.

A9.3.5.7. Below 1000 feet AGL all airdrop personnel will have lap belts securely fastened.

A9.4. Instrument Procedures.

A9.4.1. Approach Category. The C-12 is approach category C.

A9.5. Operating Procedures and Restrictions.

A9.5.1. Maneuvering Parameters.

A9.5.1.1. Unusual Attitudes. Perform unusual attitudes at an altitude that will allow recovery not lower than 5,000 ft AGL and avoid exceeding bank angles of 60 degrees and pitch attitudes of + 25 degrees.

A9.5.1.2. Stall Characteristics. Recover the aircraft at the first indication of stall warning or actual stall during stall demonstrations. During stall training under an approved syllabus, instructor pilots may allow the trainee to recover the aircraft at the first indication of aerodynamic stall. Perform all practice stalls and stall recoveries above 5,000 ft AGL.

A9.5.1.3. Practice Engine Shutdown/Restarts. Actual engine shutdowns and restarts for practice will only be accomplished during training under an approved training syllabus or during FCF proficiency training with the restrictions imposed by table 5.2. Prior to engine shutdown, the pilot in command will verify that the altitude for the planned engine shutdown does not exceed the single engine service ceiling.

A9.5.1.4. Engine Failure Immediately After Takeoff. Simulated engine failures immediately after takeoff may only be performed after a positive rate of climb is attained, the aircraft is above the safe single engine airspeed defined in the appropriate flight manual, and the aircraft is capable of meeting the published climb gradient or at least a 3.3% single engine climb gradient (200 ft/nm), if not published.

A9.5.1.5. No Flap Landings/Touch and Go's. C-12s have no restrictions on No Flap landings or touch and goes. This is a normal flap setting and may be accomplished without an IP or EP.

A9.5.1.6. Touch and Go's. Without a C-12 qualified IP or EP onboard, both MPs must be MP Touch and Go certified in order to perform actual touch and go events in the aircraft.

Attachment 10

C-17 OPERATING PROCEDURES

A10.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the C-17 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of C-17A aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A10.2. Mission Planning.

A10.2.1. Aircrew Publication Requirements In Flight. In accordance with Table A10.1.

Table A10.1. Aircrew Publications Requirements in Flight

PUBLICATION	PILOT	LM	AIRCRAFT PUBS KIT
TO 1C-17A-1			X
TO 1C-17A-1-1			X
TO 1C-17A-1-2			X
TO 1C-17A-1-4			X
Abbreviated Checklist	X	X	X
AFI11-2FTV3 (w/ A10 only)			X
TO 1C-17A-9			X
TO 1C-17A-1(-9,-5-1,-5-2) Modification Flight Manual			X

A10.3. Common Mission Guidance.

A10.3.1. Functional/Acceptance Check Flights. FCFs and ACFs will be performed according to T.O. 1-1-300 and applicable MAJCOM instructions (i.e., 21-XXX series). Additional guidance can be found in T.O.s 00-20-6, 1C-17A-6CF-1 and 1C-17A-1.

A10.3.2. Formation Procedures. Visual formation, to include chase and target support, is authorized with similar and dissimilar aircraft. Station Keeping Equipment (SKE)/Formation Flight System (FFS) formation will be flown in accordance with lead-command guidance to the maximum extent possible.

A10.3.3. NVG Procedures

A10.3.3.1. Aircraft/Aircrew Preparation. Test aircraft T-1 requires significant cockpit preparation for flight with NVGs. During the walk-around inspection, a pilot will ensure all wheel well inspection lights are turned off.

A10.3.3.2. NVG Donning/Doffing. Donning and doffing of NVGs will be initiated by the aircraft commander as briefed. For non-NVG landings, cease NVG usage 5 minutes prior to activity to regain adequate night visual acuity.

A10.3.3.3. Takeoff and Landing Requirements. Use airfield marking patterns IAW AFI 13-217 appropriate to runway conditions. Preflight study of the airfield environment is key for successful NVG visual approaches.

A10.3.3.4. Slowdown through Escape (airdrop only). If either pilot's NVGs fail, continuing the airdrop will be at the aircraft commander's discretion. As a guide, if the DZ is in sight and CARP alignment has been confirmed between the PF and PM, the airdrop may be continued.

A10.3.3.5. Takeoff, Approach and Landing. During an NVG takeoff, if the PF experiences NVG failure, takeoff may be continued at the discretion of the aircraft commander; otherwise an abort will be initiated. If NVG malfunctions occur after Vgo, takeoff will be continued with the other pilot assuming control of the aircraft if necessary. If either pilot's NVGs fail after takeoff, continue the climbout and transfer aircraft control to the pilot with operable NVGs. Strong consideration should be given to continuing the flight on autopilot. During an approach, if either pilot experiences NVG failure below 500' AGL, perform a go-around. If the PF's NVGs fail during or after touchdown, transfer control to the PM for the landing rollout.

A10.3.4. Air Drop. Unless used in conjunction with drop execution, avoid use of the word GREEN after the Combat Entry Checklist and until completion of the Combat Exit Checklist. "GREEN LIGHT" will be seen or heard by the loadmaster for all drops.

A10.3.4.1. NVG airdrop operations can include drops into unmarked drop zones. Mission requirements will dictate the release method used.

A10.3.4.2. Jumpmaster directed and pilot directed airdrop without logic may be accomplished provided the drop zone is visually acquired and the jumpmaster or both pilots determine that the load will land within the confines of the drop zone.

A10.3.5. Low Level Navigation

A10.3.5.1. Ground Proximity Warning System (GPWS) / Terrain Alert Warning System (TAWS).

A10.3.5.1.1. For operations in day VMC conditions, with terrain and obstacles clearly in sight, the PF will call runway and/or terrain in sight, state intentions and visually clear terrain.

A10.3.5.1.2. For operations at night or in IMC, if an aural warning is heard, immediately and simultaneously rotate the aircraft to establish a climb while rolling wings level, and add power until the warning has ceased and adequate terrain clearance is verified. *WARNING:* Do not delay pull-up for diagnosis of the low altitude warning. Failure to roll wings level during the maneuver described above will decrease stall margin at heavy aircraft gross weights.

A10.3.5.1.3. Ensure the mode of the GPWS/TAWS is commensurate with the aircraft's phase of flight.

A10.3.6. Flight Test Mission

A10.3.6.1. TPS Curriculum. TPS qual eval flights will be conducted under the guidelines in the Qual Eval Review Board (QRB) documentation. Normal mission elements may be conducted under the supervision of an IP. All other mission elements and FTTs will be conducted under the supervision of an IP who is a TPS graduate.

A10.4. Instrument Procedures.

A10.4.1. The C-17 is approach category D.

A10.4.2. Simulated Instrument Flight. Artificial vision restricting devices are not authorized for any phase of flight. Simulated instrument flight may be flown and logged without the use of a vision-restricting device.

A10.4.3. Approaches. Crews are cleared at any time to fly approaches to published minimums (or unit specified minimums, whichever is higher) using raw data, flight director, or autopilot/auto-throttles. ***EXCEPTION:*** Mission Computer (MC) approaches are cleared for day/night VMC. For MC approaches in IMC refer to AFI 11-2C-17 Vol 3 for guidance.

A10.5. Operating Procedures and Restrictions.

A10.5.1. Minimum Equipment List.

A10.5.1.1. Due to the unique requirements of the test mission, the aircraft commander, in concert with inputs from maintenance, engineering, instrumentation, etc., will be the final authority on mission status.

A10.5.1.2. It would be impractical to prepare a list that would anticipate all possible combinations of equipment malfunction and contingent circumstances. This section lists the equipment and systems considered essential for routine as well as test operations. The list does not necessarily include all equipment or systems essential to airworthiness (e.g. rudder, ailerons, elevators, flaps, tires, etc.). For this MEL, a local area departure is defined as a planned full stop landing outside the local Edwards AFB flying area.

A10.5.1.3. The aircraft commander is responsible for exercising the necessary judgment to ensure no aircraft is dispatched with multiple items inoperative that may result in an unsafe degradation and/or an undue increase in crew workload. The possibility of additional failures during continued operation with inoperative systems or components shall also be considered. This section is not intended to allow for continued operation of the aircraft for an indefinite period with systems/subsystems inoperative.

A10.5.1.4. Engine performance, aircraft attitude, vertical velocity indications, altitude, speed, and heading instruments should be operative in both pilot positions.

A10.5.1.5. Aerial Delivery Systems. The PDM, TRM, Rail Bridge Assembly and Ramp Edge Cover will be operational for equipment airdrop missions. The retrieval winch(es), GRMs and BSA will be operational for CDS airdrop missions.

A10.5.1.5.1. The retrieval winch(es), Canadian Retrieval System, paratroop door(s), and air deflector door(s)/pod fairing(s) will be operational for personnel airdrop missions.

A10.5.1.5.2. The ADSC, LFCP, LACP, PADS, and all proximity sensors and indicating systems associated with these items will be fully operational for all airdrop missions.

A10.5.1.6. AFCS Panel. AFCS panel will be operational for all departures. If the autopilot or auto-throttles are inoperative, comply with a 12 hour crew duty day limit.

A10.5.1.7. Air Conditioning, Pressurization, and Environmental Systems.

A10.5.1.7.1. One air conditioning pack will be operational for avionics cooling.

A10.5.1.7.2. If the wing isolation valve fails closed en route, all engine pneumatic supply SOVs will be operational, and all en route stops will have the capability to manually reposition the wing isolation valve (i.e. open for engine start and close for takeoff). If a pneumatic supply SOV fails en route, do not plan flight through any area of forecast icing. ***CAUTION:*** T-1 (A/C #870025) should not plan sustained flight in forecast icing due to inoperative wing anti-icing.

A10.5.1.8. Air Data Computer. At least three channels are required before a local area departure. The aircraft will be flown on a onetime flight to a station with repair capability with only two channels. (At least one channel of ADC1 must be operational).

A10.5.1.9. APU. The APU will be operational for any mission departure into a field without alternate electric/air sources when engine shutdown is planned. Only one loop A or Loop B light/detector system may be inoperative for operation.

A10.5.1.10. Cargo Mission Systems. The following door and ramp systems will be operational for flight:

A10.5.1.10.1. All cargo ramp latches and electrical safety locks.

A10.5.1.10.2. Both cargo door down-latches, 34 sidewall jamb spindles, all ditching locks, and both cargo door up-lock assemblies.

A10.5.1.10.3. All proximity sensors and indicating systems associated with the cargo door system.

A10.5.1.10.4. The crew entrance door and all indicating systems will be operational for all flights.

A10.5.1.10.5. Cargo door, ramp, and ditching locks will be operational for heavy equipment, CDS, Dual Row, and other missions which require the in-flight use of the cargo door and ramp.

A10.5.1.10.6. Cargo Rail System Locks. A minimum of one lock per pallet per side is required for air-land pallets/platforms.

A10.5.1.11. Communications and Navigation Systems.

A10.5.1.11.1. Both CCUs and both CNCs will be operational for a local area departure. En route, if a CCU or CNC fails, a one-time flight to a facility with repair capability is authorized.

A10.5.1.11.2. Intercom is required at all primary crew positions for all departures.

A10.5.1.11.3. PA System. Required for passenger missions. No three adjacent speakers may be inoperative.

A10.5.1.12. Electrical Systems.

A10.5.1.12.1. AC System:

A10.5.1.12.2. Generators. A minimum of three engine driven generators will be operational for a local area departure. En route, a minimum of two engine driven generators are required before departure on a one-time flight to a facility with a repair capability.

A10.5.1.12.3. The AC X-TIE and all AC bus ties will be operational for a local area departure. If the AC X-TIE fails en route, continue the mission to a station with a repair capability, provided four engine driven generators and all AC bus ties are operational. If the AC X-TIE fails en route, and only three engine-driven generators are operational (or all AC bus ties are not operational), a one-time flight to a facility with repair capability is authorized.

A10.5.1.12.4. DC System:

A10.5.1.12.4.1. A minimum of two transformer rectifiers (TR) will be operational before flight. The DC X-TIE and both DC bus ties will be operational.

A10.5.1.12.4.2. Emergency Power System. Both batteries, the static inverter, both transfer buses, and the emergency power relays will be operational for flight (i.e. the emergency power check will be satisfactory). The following components are required for flight: ADC1, FCC1 and FCC4, SCEFC1, SED, COM1, and WCC1. NOTE: Redundant components, except FCC and SCEFC, may be swapped into these positions.

A10.5.1.13. Electronic Displays/Flight Instruments.

A10.5.1.13.1. Both BDHIs will be operational for a local area departure. En route, if a BDHI fails, continue the mission to a facility with a repair capability.

A10.5.1.13.2. Standby Instruments. Both attitude indicators, and altimeter set functions of the standby air-speed/ altimeters will be operational for a local area departure. En route, one complete set of standby instruments (pilot or copilot) will be operational before flight.

A10.5.1.13.3. Five of the six displays (HUD/MFDs) will be operational before a local area departure. The HUD used by the pilot flying will be fully functional for modified contour low-level operations. Both HUDs will be operational for ALZ or NVG operations.

A10.5.1.13.4. Both Multifunction Controls (MFC) will be operational before a local area departure. En route, if one MFC fails, continue the mission to a station with a repair capability.

A10.5.1.13.5. Three mission computer displays (MCD) and both mission computer keyboards (MCK) will be operational before a local area departure. En route, two MCDs (one on each side) and one MCK will be operable before flight.

A10.5.1.13.6. Emergency Location Transmitter (ELT)/Cockpit Voice Recorder (CVR)/Standard Flight Data Recorder (SFDR). The ELT, CVR and SFDR will be operational for all departures. ***NOTE:*** SFDR and CVR are not required for local area flight if telemetry is available and used. If either the SFDR or CVR system fails en route, a onetime flight to a facility with repair capability is authorized. NOTE: If involved in a mishap/incident, after landing and the emergency is terminated, open the CVR power circuit breaker.

A10.5.1.14. Engines. Three engine ferry flights must be approved per AFI 11-202 Vol.3, AFMC Sup. 1.

A10.5.1.14.1. All engines will be operating in EPR mode before a local area departure. En route, if one engine drops to N1 mode and cannot be reset to EPR mode with a subsequent ground restart, continue the mission to a facility with a repair capability. If two or more engines are degraded to N1 mode, or any engine degrades to N2 mode, a onetime flight to a facility with a repair capability is authorized.

A10.5.1.14.2. Both engine ignition channels will be operable before a local area departure. En route, if a channel fails, continue the mission to a facility with a repair capability. One engine ignition exciter/igniter per engine is required for all departures. NOTE: If Channel A is inoperative, ignition will not be available to the engine with emergency power.

A10.5.1.14.3. Both electronic engine control (EEC) channels will be operable before a local area departure. En route, if one channel on one engine fails, a one-time flight to a station with repair capability is authorized.

A10.5.1.15. Flight Controls. Aircraft will not be flown with a FAIL OP condition or if any EFCS FAIL lights are illuminated. All FCCs and both SC/EFCs will be operational for flight.

A10.5.1.16. Fuel System.

A10.5.1.16.1. At least two of the following valves will be operational for a local area departure: L MASTER valve, R MASTER valve, center SEPARATION valve. NOTE: Failure of the SEPARATION valve closed with a subsequent failure of an inboard tank transfer pump will result in trapped fuel in the inboard tank. In addition, use caution during air refueling to pre-vent an out of balance condition. The cross-feed valves will not open with a MASTER valve open.

A10.5.1.16.2. One boost pump per wing may be inoperative if inboard transfer pumps and cross-feed valves are operational.

A10.5.1.16.3. Both fuel quantity indicating channels and all fuel quantity displays will be operational for local area departures. En route, a maximum of one fuel quantity display, including the totalizer, may be inoperative.

A10.5.1.16.4. One ground refuel valve must be operational for all local area departures. One fuel jettison valve must be operational for all departures.

A10.5.1.17. Hydraulics.

A10.5.1.17.1. Six of eight engine driven hydraulic pumps must be operational. Each engine must have at least one engine driven pump and the auxiliary pump operable for flight. Only one engine driven pump on systems 2 and 3 (combined) may be inoperative provided the transfer pump and auxiliary pumps are operable.

A10.5.1.17.2. The transfer pump will be operational for local area departures. If the transfer pump fails en route, the mission may be continued to a facility with a repair capability as long as all system #2 and #3 pumps are operational.

A10.5.1.17.3. All auxiliary pumps are required for a local area departure. En route, continue the mission with one inoperable auxiliary pump to a station with repair capability (all engine driven pumps/transfer pump for the affected system must be operational).

A10.5.1.17.4. Ram Air Turbine (RAT). The RAT will be operational and stowed before all departures.

A10.5.1.18. Inertial Reference Units (IRU). All IRUs will be fully operational for a local area departure. En route, if a single failure occurs, the mission will continue to a station with repair capability. NOTE: Three IRUs are required for flight above 25,000', and 2 of the 3 must be IRUs #1 and #4 which are required for yaw damping requirements on emergency power.

A10.5.1.19. Lighting. For night ALZ landings, at least one landing light on each side of the aircraft (wingtip or nose) must be operational. NOTE: Both nose landing lights will be operable on T-1 for night ALZ landings (wingtip landing/taxi lights are inoperative on T-1). All emergency exit lighting will be operational for all departures.

A10.5.1.20. Core Integrated Processor (CIP). Both CIPs will be operational for flight. OG/CC approval required for flight with only one operational CIP. NOTE: Record predicted landing data in case a subsequent failure occurs.

A10.5.1.21. Radar Altimeters. One radar altimeter is required for all IFR departures and arrivals.

A10.5.1.22. Warning Systems.

A10.5.1.22.1. Both WACS and the Central Aural Warning System (CAWS) will be fully operational before flight.

A10.5.1.22.2. The GPWS will be operational before a local area departure. En route, if the GPWS fails, turn it off, and continue the mission to a facility with a repair capability.

A10.5.1.22.3. Stall Warning System. Both channels will be operational before a local area departure. En route, if one channel fails, continue the mission to a facility with a repair capability. Without a stall warning system, a one-time flight to a repair facility is authorized. A 3/4 flap landing with CG forward of 32% MAC is advised.

A10.5.1.22.4. All proximity sensors affecting AFCS operation (landing gear, slats, doors/access hatches, etc.) will be operational for a local area departure and for all airdrop missions.

A10.5.1.22.5. Fire/Smoke Detectors. Only one loop A or Loop B light/detector system for one engine may be inoperative. The following are the minimum smoke detectors required for flight: One AV; all 4 IRU; CAR 9, 10, 13, 14 plus two others in the cargo compartment.

A10.5.1.22.6. Weather Radar. Radar is required for overseas deployments, night IMC flight, and when possible imbedded thunderstorms are forecast or a coverage greater than "few" is expected for the planned route of flight.

A10.5.1.22.7. Wheel Brakes. Ten operative brakes are required for all departures.

A10.5.1.23. Oxygen Requirements. The minimum quantity of oxygen aboard the aircraft before takeoff must be sufficient to accomplish the planned flight to a suitable recovery base, should oxygen be required. Crewmembers occupying a crew station will have an oxygen mask connected and readily available for use from engine start until engine shutdown.

A10.5.2. Aircraft T-1 (Tail # 870025) Restrictions.

A10.5.2.1. Icing. T-1 is restricted from cruising in areas of known or forecast icing conditions due to inoperative wing anti-ice systems. Intermediate climbs and descents through light icing are approved.

A10.5.2.2. Steep Approach/Austere Airfield Operations. For T-1, limit gross weight to 428,000 pounds when crosswinds are greater than 20 knots due to 80 percent loads restriction.

A10.5.3. Restrictions.

A10.5.3.1. Simulated engine out approaches may be flown with an IP or flight examiner in one of the pilot seats, except for IP candidates under the supervision of a flight examiner during initial or re-qualification upgrade evaluation to IP. One throttle may be retarded to idle under the following conditions: airspeed not less than VMCA; positive rate of climb established during takeoff and climb out; and no lower than 500 ft AGL on approach to land. Rudder pedals are not active with the autopilot engaged.

A10.5.3.2. Abnormal flap/slat configuration approaches will not be flown in the aircraft for training.

A10.5.3.3. Approach to stall training will be performed no slower than stick shaker onset speed and with an instructor pilot in one of the seats.

A10.5.3.4. Checklists. All checklists are initiated by the pilot flying; however, individual items may be accomplished prior to starting the respective checklist.

A10.5.3.5. Unusual Attitudes. Practice unusual attitude recoveries are prohibited at night or in IMC and any time the safety observer is not qualified in the aircraft. Initiate practice unusual attitude recoveries at an altitude of at least 10,000 feet above the ground level (AGL) and complete no lower than 5,000 feet AGL.

Attachment 11

C-130 OPERATING PROCEDURES

A11.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the C-130 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of C-130 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A11.1.1. Crew Complement and Management

A11.1.1.1. Non-Currency and Qualification Training. Non-current or unqualified crewmembers may perform in their primary crew position when supervised by an instructor of like specialty. For pilots, the instructor must occupy the other pilot seat. Crewmembers may instruct across like specialty lines for the purposes of scanner duties. (i.e. an instructor pilot qualified as a scanner may instruct a flight engineer during scanner upgrade and log instructor flight time on the AFTO Form 781)

A11.1.1.2. Crew Complement. Minimum crew complement for the C-130 is IAW Table A11.1.

A11.1.1.2.1. The minimum crew in AFMC C-130 aircraft will consist of the following: pilot; copilot; and flight engineer, or as directed in the applicable aircraft T.O. For C-130J aircraft, minimum crew is pilot, copilot, and loadmaster.

Table A11.1. Crew Complement.

<table>
<tr><td>Crew Position</td><td>Basic</td><td>Mission</td><td>FCF</td></tr>
<tr><td>Aircraft Commander</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Copilot</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Navigator</td><td>A/R (note 1)</td><td>A/R (note 1)</td><td>A/R (note 1)</td></tr>
<tr><td>Flight Engineer</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Scanner/Loadmaster</td><td>A/R (note 2,3)</td><td>1/2 (note 4)</td><td>1</td></tr>
<tr><td>Other Aircrew</td><td>A/R (note 1)</td><td>A/R (note 1)</td><td>N/A</td></tr>
<tr><td colspan="4">NOTES:
1. When required for mission accomplishment. Required for low level navigation unless waived by OG/CC. For over-water missions, see FLIP AP.
2. An additional qualified aircrew member may perform scanner duties as authorized and required by the mission.
3. Two loadmasters or one loadmaster and another qualified crewmember are required if more than 40 passengers are scheduled to be carried. Both crewmembers must remain in the cargo compartment, one forward and one aft for takeoffs and landings. Qualified crewmembers may perform these duties on missions where 15 passengers or less are carried, and floor loaded cargo weight does not exceed 500 pounds.
4. Only one loadmaster is required for airdrop missions if:
a. Using only one paratroop door for personnel or door bundle (less than 100 lbs.) drops.</td></tr>
</table>

b. High altitude (up to 10,000 feet MSL) non-static line personnel are dropped fro m the ramp and door or, only one paratroop door is opened. c. Dropping only simulated airdrop training bundles (SATBs). d. A no-drop (dry pass) is planned. e. Ground time is sufficient to permit on-load or offload by one loadmaster.

A11.1.1.3. Pilot Qualification Training. Pilot mission qualification training may be conducted on missions with passengers onboard only if the individual in training is qualified (completed aircraft checkride with a valid AF Form 8) for the seat position occupied.

A11.1.1.3.1. Maintenance and civilian employees under direct contract to the DoD, engaged in official direct mission support activities, are considered mission essential and may be onboard when touch-and-go or stop-and-go landings are performed.

A11.2. Mission Planning.

A11.2.1. Minimum Altitudes. See Section A11.3.7. Minimum Altitudes, for guidance to compute all low Level related altitudes.

A11.2.2. Departure Planning. Use AFI 11-202V3, AFMAN 11-217V1, and this instruction when planning an IFR departure.

A11.2.2.1. IFR Departures.

A11.2.2.1.1. Takeoff gross weight (GW) must not exceed that which would, in the event of an engine failure, lower the rate of climb to less than a 2.5 percent climb gradient (152 ft/nm).

A11.2.2.1.2. Critical Field Length (CFL). Takeoff GW must never exceed that which would require CFL in excess of the runway available for a normal takeoff. If a DER crossing requirement exceeds 50 feet, use the correction chart in the performance manual for balanced critical field length for the first 50 feet, and add 50 feet to balanced critical field length for every foot of altitude above 50 feet. Example: 55 feet DER crossing requires the full correction on the balanced critical field length chart plus 250 additional feet of balanced critical field length. Required screen heights depend on the agency that wrote the standard instrument departure (SID).

A11.2.2.1.3. If unable to determine the DER altitude required, use 35 feet for planning purposes.

A11.2.2.1.4. If the requirements of AFI 11-202V3 paragraph 8.7.2.2. have been complied with (note: fuel dumping does not meet the requirements of immediate jettison to reduce weight) then use the following guidance for departure planning. If no minimum climb gradient is published, use 200 ft/NM with all engines operating and 152 ft/NM with one engine inoperative. If a higher climb gradient is published or required for radar vectors, use that climb gradient as the minimum with all engines operating and the required climb gradient minus 48 ft/NM as the minimum with one engine inoperative. If the departure airfield does not have an instrument approach, then an obstacle survey has not been completed. Therefore an IFR departure is not authorized. If the published IFR departure procedure does not include either routing or a minimum climb gradient (weather mins. only) then an IFR departure using those procedures is not authorized.

A11.2.2.1.5. If the airport does not have an authorized IFR departure method, the weather at takeoff must permit a VFR climb to an IFR MEA, an appropriate IFR cruising altitude, or an altitude where radar vectors can be provided.

A11.2.2.2. VFR Departures. VFR Departures will not be flown in lieu of proper obstacle clearance planning.

A11.2.2.2.1. VFR departures require detailed planning to ensure obstacles and high terrain is avoided. Conduct VFR operations only when required for mission accomplishment.

A11.2.2.2.2. The minimum climb gradient on four engines must ensure obstacles clearance along the planned departure route. Note: Use the climb-out flight path -4 engines charts for this calculation.

A11.2.2.2.3. Engine-out climb gradient capability ensures that in the event of an engine failure, the planned departure or emergency return route provides obstacle avoidance. Even when obstacles are not a factor, the aircraft must be capable of climbing at a rate of at least 300 feet per minute (or vertical velocity corresponding to 152 feet per NM whichever is greater) on three engines at obstacle clearance speed. Use the takeoff gross weight limited by 3 engine climb performance charts for this calculation. The pilot shall ensure predeparture planning includes emergency return routing (if applicable) and a gross weight reduction plan (fuel dumping and/or cargo jettison) if applicable.

A11.2.3. Flight Data Calculations.

A11.2.3.1. Computer Flight Plans. The authorized flight planning software for most C-130 variants is PFPS. If your aircraft is not supported by PFPS, use a contractor-developed equivalent or compute the flight plan manually.

A11.2.3.2. Navigators will refer to Chapter 11 guidance in 11-2C130V3 for fuel planning.

A11.2.3.3. A pilot crewmember, or additional flight engineer, will crosscheck the AF Form 4063, *Mini C-130 TOLD Card*, for accuracy by using the performance manual or approved tab data. As a minimum, the person checking the data will:

A11.2.3.3.1. Verify gross weight independently from the AF Form 4063.

A11.2.3.3.2. Review and compare the computed distances or ground roll with the actual conditions and runway available.

A11.2.3.3.3. Crosscheck minimum control, takeoff, and landing speeds.

A11.2.3.4. A C-130J pilot will crosscheck the CNI-MU TOLD information for accuracy using the performance manual or approved tab data. As a minimum the person checking the data will:

A11.2.3.4.1. Verify gross weight independently from the entered value.

A11.2.3.4.2. Verify the entered parameters and configurations.

A11.2.3.4.3. Verify Minimum Control, Rotate, and Landing speeds.

A11.2.3.4.4. Verify the correct speeds have been entered into the V SPEEDS page.

A11.2.3.4.5. Review and compare the computed distances or ground roll with the actual conditions and runway available.

A11.2.3.5. The guidance for completing a takeoff found in TO 1C-130H-1-1 Change 6 Minimum Control Speeds requires the pilot to maintain continuous input into the nosewheel steering until Vrot or VMCG. This guidance is in conflict with the published guidance found in the C-130 Dash-1. The guidance published in the C-130 Dash-1, Section 2 will continue to apply with respect to the use of nosewheel steering during normal takeoffs. The guidance published in the C-130 Dash-1, Section 3, Directional Control Problems will continue to apply with respect to the use of nosewheel steering for all cases. Over controlling through the use of nose wheel steering could result in a pilot induced directional control problem.

A11.2.4. Runway and Taxiway Minimums. Minimum dimensions for aircraft operations are shown in Table A11.2.

Table A11.2. Minimum Dimensions

Parameter:	Requirement:
Minimum Taxiway width:	30 ft
Minimum Runway width:	80 ft for normal or tactical operations (non-assault qualified crews). 60 ft for tactical and assault operations (assault qualified crews)
Minimum runway length for Normal takeoff:	Balanced or Unbalanced Critical Field Length, or IAW Table 2.1, whichever is longer.
Minimum runway length for Normal landing:	Landing distance from 50 ft over the threshold, plus 500 ft* *For RVR(Vis.) less than 4000m (3/4 mile): Add 1000 ft to ldg. distance
Minimum runway length for Tactical/Assault Landing:	Ground roll plus 500 ft, but not less than 3000 ft Compute landing performance with two engines in reverse, two engines in ground idle, and full brakes
Minimum runway length for Tactical/Assault Takeoff:	Assault Qualified Crews: Charted Minimum Field Length for Maximum Effort Takeoff (MFLMETO) (corrected for one-engine Vcma, if applicable), but not less than 3000 ft. Takeoff at Vmca in ground effect or Vmeto, whichever is greater, unless actual obstacles are a factor

	Non-Assault Qualified Crews: Charted Minimum Field Length for Tactical Takeoff (MFLTTO) (correct MFLMETO using normal takeoff speed) Vmca corrections may be disregarded while conducting approved test plan operations or while conducting approved assault takeoff/landing upgrade training See Note 1
NVG Takeoff	Comply with Normal or Tactical/Assault T/O requirements as appropriate
NVG Landing (Normal)	Comply with Normal Landing Requirements as stated above
NVG Landing (Assault)	Ground Roll plus 500 feet for marked touchdown (500 ft) zones. Use Ground Roll plus 1000 feet for unmarked zones or 1000 ft marked zones.
Note 1: The OG/CC may authorize the use of tactical takeoff criteria for both assault and non-assault qualified crews. Comply with performance manual calculation procedures. Document approval on the flight authorization.	

A11.2.5. Operations over Runway cables.

A11.2.5.1. Do not land on (touchdown on) approach end arresting cables (does not include recessed cables). If the aircraft lands before the cable, contact the tower to have the cable inspected.

A11.2.5.2. Do not takeoff or land over an approach end cable that has been reported as slack, loose, or improperly rigged by NOTAM, automated terminal information service (ATIS) or ATC.

A11.2.5.3. Operations are authorized on runways where BAK-12 systems are installed, with a minimum of a six-point cable tie-down system, without regard to the Dash-One Restriction. The aircraft must cross the cable within the lateral dimension of the tie down system to avoid damage. When operating from runways equipped with other types of systems, or if it is unknown if the BAK-12 system includes six point tie-downs, aircrews should recognize the increased risk of damage to the aircraft.

A11.2.6. LZ Markings. Refer to AFI 13-217. The markings must be firmly established during mission planning and included in the aircrew briefing.

A11.2.7. Minimum Runway Condition Report (RCR). Refer to paragraph 2.15 and 3.2.5. When no RCR is available, refer to the flight manual for standard ICAO conversions based on general runway condition.

A11.2.8. Crash Fire Rescue (CFR). Up to four takeoffs and landings within 14 consecutive days may be accomplished at airfields without appropriate CFR readily available.

A11.2.9. Reduced Power Operations. Reduced power operations are intended to prolong engine service life.

A11.2.9.1. During proficiency flights, TIT will not be less than 900 degrees C for takeoff, not to exceed 19,600 in-lbs of torque.

A11.2.9.2. Reduce power for formation takeoffs to a torque corresponding to a TIT of no less than 970 degrees C for takeoff and climb. Higher power settings may be used, if needed, and will be briefed by the formation commander.

A11.2.9.3. Climb power to cruise altitude will be 970 degrees C TIT for -15 engines and 932 degrees C TIT for -7 engines, unless mission requirements dictate otherwise, not to exceed 19,600 in-lbs of torque.

A11.2.9.4. Use maximum power for max effort takeoffs (actual or simulated), not to exceed 19,600 in-lbs of torque.

A11.3. Common Mission Guidance. Note: Aircrew attached to AFSOC or AFSOC gained flying organizations will comply with AFSOC published guidance.

A11.3.1. Air Refueling. The C-130 can fulfill roles as a tanker during Helicopter Air Refueling (HAR) or Tiltrotor Air Refueling (TAR). Special Mission C-130 variants may also be capable or Air-to-Air Refueling (AAR) as a receiver. Contact AFMC/A3V for guidance when/if these mission elements are required. N/A for AFMC aircrew attached to AFSOC or AFSOC gained flying organizations.

A11.3.2. **Formation.** All tactical and special formation procedures will be flown in accordance with AFI 11-2C-130V3 or AFI 11-2C-130JV3. For the most current guidance, download that instruction from the AF publications web site.

A11.3.2.1. The most probable formation flown in AFMC is visual fluid trail. Spacing will be as briefed/required but will be flown to assure nose/tail and wing tip separation.

A11.3.3. NVG Operations. NVGs are approved for use during takeoffs and landings for properly qualified aircrew.

A11.3.3.1. NVG Altitudes. Aircrew may use NVGs to maintain situational awareness and to visually clear at any altitude. NVG Low Level operations flown by qualified aircrew may be conducted at 300 ft contours for level/rolling terrain and 500 ft contours in mountainous terrain.

A11.3.4. Airdrop Procedures. AFMC aircrew will reference AFI 11-2C-130V3 and/or AFI 11-2MC-130V3 for additional guidance for the various airdrop operations capable on the C-130. AFMC aircrew attached to AFSOC or AFSOC gained flying organizations will comply with AFI 11-2MC-130V3.

A11.3.4.1. Specialized airdrop equipment (test articles, etc) will be operated in accordance with test plans and/or locally approved procedures.

A11.3.5. Low Level Navigation. The low level environment is defined in Chapter 3, Para A3.5.1. Low Level environment. C-130 low level operations are not held to LASDT constraints. Instead, if the crew member has received an AF Form 8 documented low level evaluation from a formal school qualification program, that individual is low level qualified to the altitudes outlined in this attachment. For all others, gain low level qualification by completing the AFMC published low level training plan. Except for navigation profiles flown as part of approved test plans or in conjunction with FCF profiles, do not operate the aircraft lower than the altitudes shown below.

A11.3.6. Minimum Altitudes.

A11.3.6.1. Day VMC Enroute. Plan a minimum of 500 feet AGL (300 AGL on approved routes) modified contour altitude above the terrain using visual references and radar altimeter. Aircrews may fly lower to perform system checks (OCF/FCF/Test etc.). However limit time below 300 feet to the minimum required for system checks.

A11.3.6.2. Night VMC Enroute. Plan enroute legs at an indicated altitude of 500 feet above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation), or 400 feet plus one chart contour interval above the highest depicted terrain contour, whichever is highest, within 5 NMs of route centerline to include the aircraft turn radius over each turn point. If the altitude for the next leg is higher than the current leg altitude, climb will be completed prior to the turn point. If the altitude for the next leg is lower than the current leg, do not initiate descent until over the turn point. Legs may be divided into segments for night altitude computations, depending on terrain differential or threats in order to allow flight closer to the ground. Once the obstacle or terrain feature is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segmented altitude, if lower. ***NOTE:*** Planning a route on a JOG chart, if available, significantly reduces night enroute altitudes. If the route has been planned on a JOG and night altitudes are verified, the route may be flown with the lower altitudes when flying with reference to a tactical pilotage chart (TPC).

A11.3.6.3. Minimum Safe Altitude (MSA). MSA is an initial VFR altitude that provides additional terrain clearance while the aircrew analyzes situations that require interruption of low-level operations (route disorientation and equipment malfunctions or when either pilot must leave the seat during low-level operations, etc. Climb to the 500 set clearance plane if a pilot must leave the seat during TF operations.). An MSA will be computed for each leg, route segment, or entire low-level route. Compute MSA the same as night altitudes above.

A11.3.6.4. Minimum IFR Enroute Altitude. Compute minimum IFR enroute altitude by adding 1,000 feet (2,000 feet in mountainous terrain) above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation) within 5 NMs of route centerline. Round this altitude to the next 100-foot increment.

A11.3.6.4.1. Minimum altitudes for IFR operations within published Military Training Routes (MTRs) in US sovereign airspace will be the computed leg MSAs unless a higher altitude is required by FLIP AP/1B.

A11.3.6.5. Emergency Safe Altitude (ESA). ESA is designed to provide positive IMC terrain clearance during emergency situations that require leaving the low-level structure. Several ESAs may be computed for route segments transiting significant terrain differentials, or a single ESA may be computed for the entire low-level route. To compute ESA, add 1,000 feet (2,000 feet in mountainous terrain) to the elevation of the highest obstruction to flight within 22 NMs either side of the planned route centerline.

A11.3.6.5.1. Climbing to the ESA may put the aircraft in a controlled (i.e., IFR) altitude structure requiring coordination with air traffic control agencies.

A11.3.6.6. Pressure altimeters are calibrated to indicate true altitudes under international standard atmospheric (ISA) conditions. Any deviation from these standard conditions will result in erroneous readings on the altimeter. This error becomes important when considering obstacle clearances in temperatures lower than standard since the aircraft's altitude is below the figure indicated by the altimeter. Refer to the flight information handbook to determine correction.

A11.3.7. Chase Operations. C-130 aircrew are not normally required to maintain chase qualification.

A11.3.7.1. If the C-130 is required to fly as a test mission chase, the following restrictions apply:

A11.3.7.1.1. The C-130 acts as chase for another C-130.

A11.3.7.1.1.1. The aircrew will be C-130 visual formation qualified.

A11.3.7.1.1.2. All formation procedures will be IAW this Instruction. Formation spacing will be no closer than 200ft.

A11.3.7.1.2. If the C-130 aircrew is required to chase any other aircraft, Chase qualification training will be completed IAW 2FT Vol 1 and the Procedures in Chap 3 of this Instruction will be complied with.

A11.3.7.1.2.1. Chase spacing will be no closer than 200ft.

A11.3.7.2. If a specific test mission requires an aircraft to chase the C-130, the following restrictions apply:

A11.3.7.2.1. Prior to each chase sortie, supervisory personnel will ensure the C-130 PIC and chase pilots are briefed on the mission content, restrictions, and responsibilities.

A11.3.7.2.2. The C-130 and chase aircraft must maintain radio contact throughout the chase operation.

A11.3.7.2.3. It is unsafe to fly in close vertical proximity to another aircraft due to the interrelated aerodynamic effects. Never fly directly over or under another aircraft. The chase position is will be defined I the test plan, but will be no closer than 200ft.

A11.3.7.2.4. The normal chase position will be dictated by the test plan requirements.

A11.3.7.2.5. The C-130 aircraft must inform the chase aircraft and receive acknowledgment prior to initiating turns, climbs and descents, airspeed changes, or configuration changes (e.g. flaps, gear, etc.).

A11.3.8. Test Pilot School (TPS) Curriculum. Any curriculum profile will be flown IAW the procedures and limitations of the applicable C-130 and IAW all guidance in this Instruction. An IP will be in the seat for all TPS curriculum events.

A11.4. Instrument Procedures.

A11.4.1. Instrument Approach Procedures.

A11.4.1.1. The C-130 is normally a category C aircraft. If approach speeds exceed 140 knots, the minimums for category D will be used.

A11.4.1.2. Circling Approach. If the circling minimums are not published by category, ensure the HAA and visibility are not less than the following:

A11.4.1.2.1. Category C - 500 feet – 1 ½ miles.

A11.4.1.2.2. Category D - 600 feet - 2 miles.

A11.4.1.3. If full flight instrumentation is not available and operational, base DH or MDA on a minimum HAT or HAA of 300 feet and RVR 40, or visibility ¾ mile if RVR is not available. Full flight instrumentation for all approaches includes barometric altimeters, airspeed indicators, vertical velocity indicators, heading indicators, and attitude indicators, in the pilot and copilot positions. For an ILS/MLS full flight instrumentation also includes dual flight displays. One flight director for the pilot flying the approach, plus ADI repeat (C-130J: same sources for the Primary Flight Display) for the pilot monitoring the approach satisfies this requirement. MC-130H standby instruments do not satisfy this requirement.

A11.4.1.4. For precision radar approaches, visibility will be no lower than RVR 24 or ½ mile if RVR is not available. DH will be based on an HAT of no less than 200 feet.

A11.4.1.5. Fly a precision approach, if available, at night and during marginal weather. If PAR, MLS, or ILS is not available, fly any available approved instrument approach. On training and evaluation flights, or flights at familiar airfields, pilots may fly nonprecision approaches or VFR patterns to accomplish required training or evaluation requirements.

A11.4.2. Advisory Calls. C-130 crews will use the guidance below versus that listed in AFI 11-2FTV3 Chap 4. The pilot flying will periodically announce intentions during departure, arrivals, approaches, and when circumstances require deviating from normal procedures. Mandatory advisory calls are: (The pilot not flying the aircraft will make these calls except those designated for any crewmember).

A11.4.2.1. Takeoff. State "GO" at refusal speed or takeoff speed, whichever is lower. If refusal speed is lower than takeoff speed, state “”Rotate” at takeoff speed. Any crewmember noting a safety of flight malfunction before hearing “GO” will state “REJECT” and a brief description of the malfunction.

A11.4.2.2. Takeoff Aborts and Landings: The Flight Engineer (non-flying pilot for C-130J) will state which throttles / power levers may be brought into reverse: “All 4”; “Inboards”, or “Outboards” as appropriate.

A11.4.2.3. Altitude calls:

A11.4.2.3.1. 1000 feet above initial approach fix (IAF) (or holding) altitude.

A11.4.2.3.2. Transition altitude/level.

A11.4.2.3.3. 1000 feet above/below assigned altitude.

A11.4.2.4. Approaches:

A11.4.2.4.1. Call 100 feet above procedure turn, final approach fix (FAF), MDA, or DH altitude.

A11.4.2.4.2. Non-precision approaches.

A11.4.2.4.2.1. "Minimums" when reaching MDA.

A11.4.2.4.2.2. "Runway in sight." Call when sufficient visual reference with the runway environment is established and the aircraft is in a safe position to land. Do not call too soon when obstructions to vision, such as fog, haze, low stratus clouds, etc., are present.

A11.4.2.4.2.3. "Go-around." Call at missed approach point when visual reference with the runway environment is insufficient to continue the approach, or if the aircraft is not in a position for a safe landing.

A11.4.2.4.3. Precision approaches.

A11.4.2.4.3.1. "Continue." Call at DH if only the approach lighting system is in sight and a determination cannot yet be made that the aircraft is in a position for a safe landing. If an approach is continued below DH based on seeing the approach lights only (an approach to visibility minimums), "Go-around" must be called by 100 feet if a determination to land cannot be made.

A11.4.2.4.3.2. "Land." Call at DH if runway environment is in sight and the aircraft is in a position for a normal landing.

A11.4.2.4.3.3. "Go-around." Call at DH or later if the runway environment is not in sight or if the aircraft is not in a position for a safe landing. If an approach is continued below DH based on seeing the approach lights only (an approach to visibility minimums), "Go-around" must be called by 100 feet if a determination to land cannot be made.

A11.4.2.5. Deviations.

A11.4.2.5.1. The pilot not flying the aircraft will tell the other pilot when heading or airspeed deviations are observed or altitude is more than 100 feet from desired, and no attempt is being made to correct the deviation.

A11.4.2.5.2. Any crewmember seeing a variation of 200 feet altitude, a deviation of ±10 knots or a potential terrain obstruction problem will immediately notify the pilot. Deviations from prescribed procedures for the approach being flown will also be announced.

A11.5. Operating Procedures and Restrictions.

A11.5.1. Flight Duty Period (FDP). Observe restrictions and guidance of AFI 11-202 Vol. 3 and this instruction and the following: Limit crew day to 12 hours with an inoperative autopilot. If the autopilot fails after departure, continue to the next scheduled stop and then comply with the 12-hour duty limitation. Engines Running On-load/Offload (ERO) are not limited in the three-sortie maximum.

A11.5.2. Duty Station. Only one pilot, or the flight engineer, may be absent from their duty station at a time. Notify the aircraft commander prior to departing assigned duty station.

A11.5.3. Flight Deck Access. Aircraft commanders may authorize passengers access to the flight station during any phase of flight. Passengers will not be permitted access to any pilot position.

A11.5.4. Personal Equipment Requirements.

A11.5.4.1. Parachutes and Survival Kits. AFMC aircraft will be configured with parachutes and ML-4 survival kits for contingency, crash damage recovery flights, airdrop tests, refueling tests, hazardous acceptance/test, research flights to certify airworthiness, or O8E coded functional check flights. In addition to these missions, OG/CCs retain the option of requiring parachutes and survival kits on any other mission. Survival Vests may be used in lieu of Survival Kits.

A11.5.4.2. Helmets and Oxygen Masks. Carry a personal helmet and oxygen mask anytime parachutes are required aboard the aircraft (to avoid head injuries during bailout).

A11.5.5. Cockpit Congestion and Loose Objects.

A11.5.5.1. During the flight, the number of persons on the flight deck will be the minimum commensurate with mission requirements.

A11.5.5.2. Ensure helmet bags and other personal gear is properly stowed to prevent obstruction of egress routes during emergencies.

A11.5.6. Outside Observer. When available, use a crewmember to assist in outside clearing any time the aircraft is below 10,000 feet MSL and during all taxi operations.

A11.5.7. Aircraft Lighting.

A11.5.7.1. Unless otherwise directed the aircraft strobe lights will be operated as follows:

A11.5.7.1.1. "Before Starting Engines" Checklist, "red" position.

A11.5.7.1.2. "Lineup" Checklist, "white" for day, night single-ship, and day formation. "Red" for night formation.

A11.5.7.1.3. "After Landing" Checklist, "red" position.

A11.5.8. Aircraft Servicing and Ground Operations.

A11.5.8.1. Aircraft Refueling. Non-essential crewmembers and passengers are not allowed on board.

A11.5.8.1.1. Simultaneous fuel and oxygen servicing is not authorized.

A11.5.8.1.2. For aeromedical evacuation, refer to AFI 11-2C-130V3 or 11-2C-130JV3.

A11.5.8.1.3. Concurrent qualified ground crews may perform simultaneous refueling and cargo loading.

A11.5.8.1.4. SCNS/INS and/or mission computers may be on and may have data inserted during refuel. Do not turn on or off during refuel operations.

A11.5.8.1.5. Use primary fuel management IAW the aircraft flight manual whenever practical.

A11.5.8.2. Fire Protection.

A11.5.8.2.1. The aircraft engine fire extinguisher system fulfills the minimum requirements for fire protection during engine start.

A11.5.8.2.2. A fire guard is required for all engine starts. In the absence of additional ground personnel, the ground controller may act as the fire guard.

A11.5.9. Life Support/Aircrew Flight Equipment Requirements.

A11.5.9.1. Oxygen. Oxygen on board for takeoff must be sufficient to accomplish the planned mission from the equal time point (ETP) should oxygen be required (minimum 5 liters or 300 PSI).

A11.5.9.1.1. On missions carrying passengers, distribute supplemental oxygen to each passenger regardless if planned flight altitude is above FL 250. If POKs are used, the kits need only be positioned on the aircraft and distributed to each passenger for scheduled flights above FL 250. Demonstrate proper use prior to climbing through FL250

A11.5.9.1.2. Crewmembers occupying a crew station will have an oxygen mask (helmet or quick-don) connected and readily available for use on all flights, from before engine start until engine shutdown.

A11.5.9.1.3. Aircrews required to fly un-pressurized missions from18,000 feet to FL 249 will pre-breathe 100 percent oxygen for thirty minutes. Crews are restricted to one sortie per 24 hour period and a maximum of 2 hours exposure per sortie. For any flight above FL 249, refer to lead command guidance.

A11.5.9.1.4. Life preserver units (LPUs). The loadmaster/scanner will place an LPU within easy reach of each seated passenger and aircrew member for over-water flights. Crewmembers will fit and adjust LPUs for over-water flights and will wear them on over-water missions below 2000 feet. (LPUs need not be worn for takeoffs, landings, or approaches).

A11.5.10. Communications Policy.

A11.5.10.1. Sterile Cockpit. Limit conversation to that essential for crew coordination and mission accomplishment during taxi, takeoff, approach, landing, and any flight below 10,000 feet MSL (except cruise).

A11.5.10.2. Aircraft Interphone. Primary crewmembers will monitor interphone during critical phases of flight. All C-130J crewmembers will monitor VOX in addition to Interphone during critical phases of flight. Crewmembers will advise the aircraft commander prior to checking off interphone.

A11.5.10.3. Command Radios:

A11.5.10.3.1. The pilot not flying the aircraft normally makes all air traffic control (ATC) radio calls.

A11.5.10.3.2. The pilot operating the radios will announce which radio is primary, and advise the crew when the primary radio changes.

A11.5.10.3.3. One pilot will record and acknowledge all ATC clearances. Another crewmember should monitor the read back and ensure compliance.

A11.5.10.3.4. Both pilots will monitor UHF guard (or VHF guard when appropriate) regardless of primary radio.

A11.5.11. Reverse Taxi.

A11.5.11.1. The pilot will coordinate reverse taxi directions and signals to be used with the scanner or loadmaster.

A11.5.11.2. Secure all cargo and ensure all passengers are seated.

A11.5.11.3. Open the aft cargo door and lower the ramp to approximately 12 inches above horizontal.

A11.5.11.4. The scanner or loadmaster will be on the aircraft ramp in the best position to direct reverse taxi, report any hazards, and to provide the pilot with timely interphone instructions on turns, distance remaining, conditions of the maneuvering area, and stopping point.

A11.5.12. Engine Running On-load and Offload (ERO). Use ERO procedures when necessary to expedite aircraft movement or permit the exchange of crewmembers. ERO procedures may be used for any mix of personnel or cargo. Material handling equipment should be used if palletized cargo is to be on-loaded or offloaded. Aircraft commanders must assess prevailing weather, lighting and parking location to ensure safe operations. WARNING: Do not on-load or offload through the crew entrance door and cargo ramp and door at the same time. Paratroop doors will not normally be used. *NOTE:* At their discretion, aircraft commanders may ERO any category of passenger. The number of passengers and amount of baggage to be on-loaded or offloaded should be taken into consideration.

A11.5.12.1. General Procedures.

A11.5.12.1.1. Aircraft commanders will brief crewmembers on the intended ERO operation.

A11.5.12.1.2. The parking brake will be set and at least one pilot in the seat will monitor brakes, interphone, and radio.

A11.5.12.1.3. Use wing leading edge and taxi lights to enhance safety at night as the situation dictates.

A11.5.12.1.4. Station another crewmember on interphone or public address (PA) in the cargo compartment as safety observer. Safety observers will remain forward of all cargo.

A11.5.12.1.5. C-130 J crews should consider using HOTEL mode for the propellers. If this is utilized, select Emergency Brakes prior to selecting HOTEL mode on engines 1 and 2. While down-sped, the hydraulic pumps are also turning at 29% and may not deliver enough pressure to maintain normal brakes under certain circumstances.

A11.5.12.2. Offload Preparation/Procedures. Aerial delivery support (ADS) arms will remain connected in flight. Prior to landing, the loadmaster will brief all personnel in the cargo compartment regarding their locations, duties, and responsibilities during the ERO.

A11.5.12.2.1. One tie-down device forward and aft will remain connected to vehicles until the aircraft is parked.

A11.5.12.2.2. Vehicles and passengers will proceed directly aft of the aircraft at least 50 feet before turning and/or 300 feet before stopping.

A11.5.12.3. Personnel on/offload through the aft cargo door and ramp.

A11.5.12.3.1. Passengers will be escorted by a crewmember when enplaning or deplaning through the aft door and ramp.

A11.5.12.3.2. Auxiliary ground loading ramps should be used.

A11.5.12.3.3. Unless cargo size and location dictate otherwise, deplane passengers before cargo, and enplane after cargo.

A11.5.12.4. Personnel on-load and offload through the crew entrance door:

A11.5.12.4.1. Station a crewmember on interphone with cord held taut at approximately 20 feet at an angle of 45 degrees from the aircraft axis.

A11.5.12.4.2. Brief deplaning personnel to secure loose articles and remain forward of the interphone cord.

A11.5.12.4.3. No enplaning personnel should approach the airplane until the crewmember is in place.

A11.5.13. Takeoff and Landing Policy. An aircraft commander or higher (IP/EP) will occupy either the left or right seat during all takeoffs, landings, and critical phases of flight. The designated PIC (A-Code) is not required to occupy a primary position, but still retains overall authority for the conduct of the mission. Pilots (MP/FP) or Instructor pilots may takeoff or land from either seat. Copilots (MC) will only takeoff or land from the right seat unless in upgrade status to MP/FP and under the direct supervision of an IP.

A11.5.13.1. An instructor qualified pilot or aircraft commander will make all takeoffs and landings during:

A11.5.13.1.1. Aircraft emergencies.

A11.5.13.1.2. Tactical/Assault or substandard airfield operations. EXCEPTION: Instructors providing upgrade training, receiving an evaluation, gaining currency, or proficiency.

A11.5.13.1.3. Situations when in the opinion of the aircraft commander, marginal conditions exist.

A11.5.14. Simulated Emergency Procedures.

A11.5.14.1. Emergency procedures which require simulating an engine(s) shutdown, or placing switches in other than their normal positions, or an abnormal configuration, only during training, evaluation, or currency flights when an instructor or flight examiner is in one of the pilot seats. Instructor pilot candidates who occupy a pilot seat and are under the supervision of a flight examiner pilot (not in a pilot seat) may practice simulated emergency procedures during initial or re-qualification upgrade evaluations. Preface all simulated emergencies with the word "simulated" and terminate simulated emergencies when an actual emergency arises.

A11.5.14.2. When conducting simulated engine(s) out training, the flight engineer will post actual charted minimum control speed on the TOLD card. Comply with Dash -1 guidance for Simulated Engine Failure adjustments to Vmca. (Chap 3). During simulated 3-engine takeoff operations, takeoff speed will be adjusted for minimum control speed. The instructor pilot should strive to maintain zero torque on the simulated shutdown engine(s). More detailed information is contained in chapter three of the applicable -1. C-130J pilots will reference the minimum control speeds through Tab data or the CNI. Turns unto the simulated inoperative engine(s) should be minimized when possible.

A11.5.15. Prohibited In-flight Maneuvers. The following maneuvers will not be practiced or demonstrated in-flight:

A11.5.15.1. Rudder force reversals (fin stalls).

A11.5.15.2. Spins.

A11.5.15.3. Simulated runaway trim malfunctions.

A11.5.15.4. Simulated hydraulic system loss by turning engine driven hydraulic pumps off.

A11.5.16. Flight Maneuvers. The maneuvers listed in Table A11.3. are authorized for qualification and continuation training (or formal upgrade training where indicated). Certain maneuvers will only be performed during formal training under direct IP supervision. They are applicable to all C-130 aircraft. Aircraft commanders will ensure their crews are advised of the maneuvers being flown. The intent is to eliminate confusion or concern over unusual procedures that might not be anticipated. Good communication is a matter of policy and common sense.

Table A11.3. Operational Restrictions

Simulated Engine Failure	IP supervision. Retard one throttle to flight idle at not less than VMCA (one-engine inoperative, out of ground effect) nor less than 200 feet AGL. WX at or above circling minimums during daylight and the greater of 1000' and 2 miles visibility or circling minimums at night. Crosswind component corrected for RCR must be in the recommended zone. Use all 4 engines for touch-and-go or unplanned go-around.
Practice Engine Shutdowns	Day VMC. Direct IP supervision. Must remain above 2500' AGL.
No-Flap Landing	IP required. Max gross weight is 120,000 lbs. Max gross weight is 125,000 for AC-130H/U. Crosswind component corrected for RCR must be in the recommended zone. Authorized in day IMC if WX is at or above circling minimums, and at night with WX of 1,000 foot ceilings and 2 SM visibility or circling minimums, whichever is higher. Authorized in conjunction with simulated engine(s)-out landings. Consider the copilot's level of experience when conducting no-flap training.
Touch-and-Go Landings	Minimum runway length: flaps 50 percent, 5000 feet – for all other, 6000 feet. MP/FP/CPs must be touch and go certified IAW AFI 11-2FT Vol 1 Ground idle touch and go landings require direct supervision by an IP. No-flap ground idle touch and go landings not authorized. Crosswind component corrected for RCR must be in the recommended zone. WX: MP/FP/CPs minimum ceiling of 1000 ft and minimum visibility of 2 SM. IP in either seat 300 ft and 3/4 mile visibility. After touchdown, all engines will be set to 900° TIT minimum.
Stop-and-Go Landings	Authorized to be performed by any C-130 qualified pilot. Runway remaining for takeoff must be sufficient to allow takeoff and refusal speeds to be equal. Runway remaining for takeoff in the C-130J must be greater than the Refusal Distance in tab data for the existing conditions. Crosswind component corrected for RCR must be in the recommended zone. Ceiling and visibility must be at least 300 feet and 3/4 mile (RVR 40). Do not perform in conjunction with no flap landings.

Go-around, Missed Approaches	Initiated no lower than 200 feet AGL when practicing simulated emergencies. Practice instrument approaches - no lower than minimum altitude for the approach (Instructor not required). Initiate no lower than 500 AGL when aircraft, equipment, or personnel are on the runway. Initiate no lower than 100 AGL when practicing simulated emergencies other than simulated engine failures.
Simulated Engine-out Go-around; Missed Approach	Initiate simulated engine-out go around at no lower than 200 feet AGL or the minimum altitude for the approach.
Slow Flight Demonstration	At or above 5000 feet AGL. Fly at approach, threshold, and 1.2 times stall speed with gear down and flaps 0, 50, or 100 percent. Do not exceed 15 degrees of bank.
Approach to Stalls	Authorized during formal upgrade training or during FCF. Requires day VMC at a minimum of 5000 feet AGL or 5000 feet above cloud deck.
Instrument Steep Turns	Do not exceed 45 degrees of bank, except in day VMC. For bank angles in excess of 45 degrees, must be at or above 5000 feet AGL. Review stall speeds before performing turns.
Assault Takeoffs and Landings	Aircraft commanders must be assault trained and certified. Assaults must be performed from the left seat by aircraft commanders, or instructors in either seat.
Windmill Taxi Start (Not for C-130J Operations)	Authorized during daylight hours for training. Crosswinds must be in the recommended zone. Runway must be dry, hard-surfaced and 147 feet wide. T.O. –1 recommendations are mandatory.
Aborted Normal Takeoff	Authorized in daylight only. Crosswind must be in the recommended zone. Runway must be dry, hard-surfaced and long enough for refusal and takeoff speeds to be equal. Initiate the abort by stating 'REJECT" prior to refusal speed. Not authorized in conjunction with touch-and-go or stop-and-go landings. Pre-brief all actual engine shutdowns due to a simulated malfunction.
Simulated Engine-Out Takeoff	Authorized during day VMC conditions. Maximum gross weight is 120,000 lbs. Crosswind must be in the recommended zone. Runway must be dry, hard-surfaced and 147 wide x 7000 long. Not authorized in the AC-130H/U or EC-130H
Simulated 2-	Simulate failure of the second engine at not less than 1,000 feet AGL

Engine Out Landing	and not more than 120,000 lb. (125,000 for AC-130H/U) gross weight Authorized in day VMC conditions. Runway must be dry, hard-surfaced and 147 feet wide. Crosswind component must be in the recommended zone. Use all 4 engines for touch-and-go takeoff, go-around or missed approach.
Simulated 2-Engine Go-Around; Missed Approach	Authorized in day VMC conditions. Minimum altitude is 5,000 feet AGL. Do not initiate at less than 2-engine air minimum control speed.
Simulated Emergency Procedures Other Than Simulated Engine Out Operations	IP supervision. WX at or above circling minimums during daylight and the greater of 1000' and 2 miles visibility or circling minimums at night. No Passengers or MESP
Unusual Attitudes and Spatial Disorientation	Authorized no lower than 10,000 feet AGL. Day VMC conditions only. Do not exceed –1 limitations.

A11.5.17. Radar Altimeter.

A11.5.17.1. Any crewmember detecting the illumination of the radar altimeter Low Altitude warning light (C-130J, Special Alert) will notify the pilot flying the aircraft. Terrain clearance and aircraft position must be verified. Aircraft commander will brief radar altimeter advisory calls for low-level flights.

A11.5.17.2. The navigator and pilot will use the same radar altimeter setting unless briefed otherwise.

A11.5.17.3. -(C-130E/H) The radar altimeter will be set to the HAT/HAA during instrument approaches.

A11.5.17.4. -(C-130J) The RADALT reference will be set to HAT minus 50 feet for precision approaches

A11.5.17.5. Two radar altimeters are required for C-130J CAT II ILS.

A11.5.17.6. -(C-130J) Normally set the RADALT to 250 for non-precision approaches and 300 for circling approaches.

A11.5.18. Chaff and Flare Operations. Conduct the following procedures after the live firing of chaff and flares:

A11.5.18.1. After landing, taxi to the de-arm area or another suitable safe location to check for hung ordnance.

A11.5.18.2. The loadmaster or another qualified crewmember will deplane the aircraft and check all flare dispensers for hung ordnance. NOTE: The mid-fuselage dispensers can be visually checked by opening the paratroop doors. (Eye protection is required prior to opening the paratroop door.) The forward dispensers must be checked by deplaning a crewmember.

A11.5.18.2.1. ALE-40/47 or flare squibs that fail to fire are not considered hung ordnance.

A11.5.18.3. If hung ordnance is found, identified by a protruding or partially ejected flare cartridge, the aircraft will remain in a de-arm area until Explosive Ordnance Disposal (EOD) personnel meet the aircraft. The aircraft must remain in the designated safe area until EOD personnel can clear all hung ordnance.

A11.5.18.4. If hung ordnance is not found, the aircraft can proceed to the parking location.

A11.5.19. Descent. Prior to descent into unfamiliar areas, appropriate terrain charts (Operational Navigation Chart (ONC), Sectional Aeronautical Chart, Tactical Pilotage Chart (TPC), or Joint Operations Graphic (JOG)) should be reviewed to increase aircrew situational awareness of obstructions. The C-130J Global Digital Map with the appropriate charts loaded meets this requirement. Primary crewmembers will not be involved in duties other than aircraft operations, descent and approach monitoring, and required checklist items from the initial descent point to landing.

A11.5.20. Touch and Go Landings. Touch and go landings can only be performed by certified individuals. Refer to AFI 11-2FT Vol. 1, for specific certification requirements. Include type of touch and go as part of the briefing, (i.e., ground-idle or flight-idle). Use 900 TIT minimum during touch and go's. Any MP/FP/CP may complete flight idle touch and go landings. An IP is required to be in the seat for ground idle touch and go landings.

A11.5.21. Windmill Taxi Starts, Buddy Starts, and 3-Engine Takeoffs.

A11.5.21.1. Windmill taxi and buddy starts, dictated by operational requirements, may be authorized by the OG/CC or equivalent (System Program Director O-6 at units without an OG) to meet specific mission requirements. (N/A for C-130J).

A11.5.21.1.1. Windmill taxi starts, for training, may be accomplished during pilot proficiency training. Comply with all T.O. –1 restrictions and those contained in this instruction.

A11.5.21.2. Actual 3-Engine takeoffs require specific approval from HQ AFMC/A3.

A11.5.22. Ground Proximity Warning System (GPWS) / Ground Collision Avoidance System (GCAS)

A11.5.22.1. For operations in day VMC conditions, with terrain and obstacles clearly in sight, the PF will call runway and/or terrain in sight, state intentions and visually clear terrain.

A11.5.22.2. For operations at night or in IMC, if an aural warning is heard, immediately and simultaneously rotate the aircraft to establish a climb while rolling wings level, and add maximum power until the warning has ceased and adequate terrain clearance is verified. ***WARNING:*** Do not delay pull-up for diagnosis of the low altitude warning. Failure to roll wings level during the maneuver described above will decrease stall margin at heavy aircraft gross weights.

A11.5.22.3. Ensure the mode of the GPWS/GCAS is commensurate with the aircraft's phase of flight.

A11.5.23. Traffic Advisory and Collision Avoidance System (TCAS). Operate the TCAS with sensitivity set to Traffic Advisory/Resolution Advisory (TA/RA) to the maximum extent possible. ATC procedures and the "see and avoid concept" will continue to be the primary means of ensuring aircraft separation. Pilots shall not deviate from an assigned ATC clearance based solely on TA information. Attempt to attain visual contact and maintain safe separation. However, if visual separation with the intruding traffic cannot be assured, it is imperative to follow resolution advisories (RA) to obtain aircraft separation computed by TCAS. Failure to follow the computed RA may increase the probability of a midair collision. Do not exceed aircraft structural limits or safe flight speed in order to follow the RA. Always attempt to visually clear the airspace before maneuvering your airplane in response to a TCAS advisory. Advise ATC as soon as practical when a deviation becomes necessary due to a TCAS resolution advisory.

A11.5.24. Systems Operations Guidelines

A11.5.24.1. Objectives

A11.5.24.1.1. A fully mission capable aircraft is the ultimate objective of the logistics effort. The final responsibility regarding equipment required for a mission rests with the aircraft commander. If one aircraft commander accepts an aircraft to operate a mission or mission segment without an item or system, this acceptance does not commit that aircraft commander, or a different aircraft commander, to subsequent operations with the same item or system inoperative. When the aircraft commander considers an item essential, designate the component mission essential (ME) on the AFTO Form 781, and the item will be repaired or replaced prior to departure.

A11.5.24.1.2. Engine performance, aircraft attitude, vertical velocity indications, altitude, airspeed, and heading instruments should be operative in both pilot positions. For instruments with both analog and digital displays, as a minimum the analog portion must be operational. (Exception: the radar altimeter may have either analog or digital readouts operational.)

A11.5.24.2. Policy. Command operating guidelines list the equipment and systems normally considered essential for routine operations. This list is not inclusive of all equipment or systems essential to airworthiness. The aircraft commander is the approving authority for operations with degraded equipment and needs no further approval. This section provides guidance on how to operate with inoperative/degraded equipment. The Minimum Equipment List (MEL) shall not direct deviation from the aircraft flight manual limitations, emergency procedures or USAF/AFMC directives. The diversity of C-130 variants flown by this command complicates the task of balancing operational reliability with safe mission completion. C-130 Category specific guidance will be defined in the tables below. If there is no category listed, the restriction applies to all applicable versions. C-130J: Unless otherwise noted, when the item is duplicated on a soft panel (switch or indication), the number required may be satisfied by either location. For partial or complete hard panel failures, aircrews may revert to soft panel operations. Normally, if a soft panel is selected due to hard panel failure, it should be used for the remainder of the flight.

A11.5.24.2.1. If, after exploring all options, the aircraft commander determines that a safe flight is possible with an item listed below inoperative (beyond the scope listed here) a waiver shall be requested through channels to AFMC/A3V. Phone or e-mail methods are appropriate. Any inoperative item not covered in this publication shall be assessed by the aircraft commander and crew. If a safe flight can be accomplished, no further action is necessary. Exceptions for degraded operations is not intended for continued operations over an indefinite period with systems/subsystems inoperative.

A11.5.24.3. Navigation Systems.

A11.5.24.3.1. For flights in Minimum Navigation Performance Specifications (MNPS) airspace in the North Atlantic region or the Composite Hawaii/mainland US Route System, the following fully operable navigation systems are considered the minimum necessary to permit compliance.

A11.5.24.3.1.1. SCNS aircraft. Fully functional SCNS, to include the navigator's IDCU and either the pilot or copilot IDCU.

A11.5.24.3.1.2. Non-SCNS aircraft. Two independent sources of drift and ground speed, i.e. doppler/DVS and INS, doppler/DVS and GPS, INS and GPS, or dual INS.

A11.5.24.3.2. Sextant and sextant mount. (Not required on aircraft with integrated GPS or dual INS).

A11.5.24.3.3. Compass systems. When two systems are installed, both should be operational. If one system fails, refer to the flight manual to determine what other equipment is affected. One compass and one aligned inertial system is acceptable. The C-130 standby compass is not considered a separate source for the purposes of this paragraph.

A11.5.24.3.4. For flights on all other Category I routes, the aircraft commander determines the minimum navigational capability required to safely accomplish the mission.

A11.5.24.3.5. Equipment listed in FLIP AP/2 for permitting compliance with MNPS is mandatory. Loss of any component before track entry requires a return to station with maintenance capability or re-file via specified routes.

A11.5.24.3.6. Comply with all GATM requirements as directed. (i.e. ILS FM immunity).

Table A11.4. Engines/APU/GTC

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Engines	4	4	Do not depart unless all four engines will achieve predicted minimum takeoff power.
Torquemeter (C-130E/H)	4	4	AMP: indications are located on Primary Engine display. All 4 indications must be valid.
Horse Power (C-130J)	4	4	
Gas Generator Speed (NG) (C-130J)	4	4	
Measured Gas Temperature (C-130J)	4	4	
Tachometer	4	4	AMP: indications are located on Primary Engine display. All 4 indications must be valid.
TIT Indicators	4	4	AMP: indications are located on Primary Engine display. All 4 indications must be valid.
Fuel Flow Gages	4	4	AMP: indications are located on Primary Engine display. All 4 indications must be valid.
Oil Temperature Gages	4	4	AMP: indications are located on Primary Engine display. All 4 indications must be valid.
Oil Pressure Gages	4	4	Indicators for both the power section and the reduction gearbox section must be operational. AMP: indications are located on Primary Engine display. All 4 power section and gearbox indications must be valid.
Oil Quantity gages	4	3	One oil quantity gage may be inoperative provided the oil quantity is verified prior to flight and the Low Oil Quantity light is operational. AMP: indications incorporated into MFD. Low oil quantity indication is incorporated on the ICWA C-130J: Any number may be inoperative provided oil quantity is verified prior to flight and OIL QTY 1(2,3, or 4) LOI is operational
Low Oil Quantity Light	1	0	If inoperative, all four oil quantity gages must be operational. AMP: ICWA system must be operational
Oil Cooler Flap	4	0	Oil Cooler Flap may be inoperative if the flap can be manually positioned to open and fixed and oil temperature can be maintained within normal limits.
Oil Cooler Flap Position Indicator	4	0	AMP: Indicators removed and function incorporated into MFD
Automatic Thrust Control	1	1	

System (ATCS) C-130J			
FADEC Panel (C-130J)	1	1	
FADEC (C-130J)	8	7	One may be inoperative provided all dedicated sensor input and control logic is serviceable to/from the operative FADEC on the engine with redundancy lost. Use ATCS inoperative procedures. Note: All FADECS must be serviceable for auto shut-down. ATCS will be degraded.
Nacelle Interface Unit (NIU) (C-130J)	4	4	
APU	1	1	If the APU fails, flight in day VMC conditions is authorized provided no other electrical malfunction exists. Remain within 50 NM of a suitable airfield for landing.
GTC	1	0	

Table A11.5. Propellers.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Propeller	4	4	Propeller may be operated with a feather override failure where the override button fails to pop out at full feather (faulty pressure switch) provided maintenance instructions in the applicable fault isolation manual are followed and no other system is affected.
Synchrophaser	1	1	If the synchrophaser fails, the mission may continue to a repair facility provided no other portion of the propeller system is affected. The synchrophaser will be removed.

Table A11.6. Electrical System

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
AC Generators, Engine-Driven (Note 1)	4	4	
AC Generators, Engine-Driven (enroute) (Note 1)	4	3	If a generator fails at an enroute stop, flight to a destination with repair capability, including enroute stops, may be made. If the AC generator is not equipped with a disconnect, it will be removed and the generator mount padded before flight.
AC Generators, Engine-Driven (Local training) (Note 1)	4	3	Local training mission may continue after a generator is disconnected or removed and the mount padded, provided no other electrical malfunction exists.
Bus Switching System (BSS)	2	0	AMP: Both AMP specific BSS are required to be operational
Bus Switching Unit (BSU)	2	1	The #1 BSU must be operational. AMP: N/A
Transformer Rectifiers (TR)	4	4	5 TR's for the AC-130U. One essential TR may be inoperative for flight to a repair facility provided no other electrical malfunction exists. AMP: TRs replaced by AMP electrical system
Regulated Transformer Rectifier Unit (RTRU) (AMP)	6	4	Two RTRUs required on Essential DC and two RTRUs on Main DC are required.
ATM and ATM generator/APU generator	1	1	If the ATM, ATM generator/APU generator fails, flight in day VMC conditions is authorized provided no other electrical malfunction exists. Remain with 50 NM of a suitable landing airfield. The APU generator will be removed and padded before operation of the APU.
DC Volt Meter	1	1	
Electronic Circuit Breaker Unit	13	13	C-130J Only
C-130J Indications (Systems Status Display)	5	5	All displays for both Loadmeter and Voltmeter indications are required
Inverters	4	4	All versions of inverters are required.
Note: All associated equipment and indicators will be operational for each operative engine-driven AC generator. (i.e. generator control panel, GCU, voltage regulator, generator out/caution light AC loadmeter, etc.).			

Table A11.7. Fuel System

NOTE: The primary concern with inoperative fuel boost pumps or quantity indicators is fuel balance and wing loading. Degraded operation is permissible, however, flight crews must consider potentially trapped fuel and decreased range should further degradation occur.			
Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Main Tank Fuel Pumps	4	4	On aircraft equipped with dump mast shutoff valve switches, one main tank fuel boost pump may be inoperative for flight to a repair facility provided the respective fuel dump pump is operational.
Main Tank Dump Pumps	4	4	
Auxiliary Tank Fuel Pumps (per tank)	1	0	Auxiliary tank fuel pumps should be operational for any tank containing fuel
External Tank Fuel Pumps (per tank) (if tank contains fuel)	2	1	If one external tank boost pump is inoperative, fuel within that tank will be trapped should the second boost pump fail. Fuel balancing with the opposite tank will then be necessary resulting in a reduction of usable fuel.
Main Fuel Quantity Indicator (enroute) (see NOTES 1 and 2)	4	2	One main tank indicator may be inoperative provided: Both the tank with the inoperative indicator and its symmetrical tank quantity are verified by use of a fuel tank dipstick. The fuel tank did stick is calibrated for JP-4. Use with other fuels is inaccurate for reading pounds of fuel quantity. At enroute stops when engines are shut down, the tank with the inoperative indicator and the symmetrically opposite tank will be dip checked Crossfeed operations will begin when the symmetrically opposite quantity indicator has decreased to 1,500 lbs. (inboard) and 2,500 lbs. (outboard). For tanker aircraft (HC-130P/N and MC-130E/P) begin crossfeed when any main tank decreases to 2,000 lbs. Engine out training using the engine corresponding to the inoperative indicator or its symmetrical opposite will not be conducted during tank to engine operations. Flights consisting of multiple stops when the profile e does not allow dipping the tanks will terminate with a minimum of 8,000 lbs. calculated main tank fuel. Two main tank indicators may be inoperative provided they are not symmetrical tanks or on the same wing.

Main Fuel Quantity Indicators (local training)	4	2	Local training flights may be conducted with two inoperative main tank indicators provided: Inoperative indicators are asymmetrical. Main tank fuel quantity is visually verified using the fuel tank dip stick. The fuel tank dip stick is calibrated for JP-4. Use with other fuels is inaccurate for reading pounds of fuel quantity Engine out training is not performed unless all engines are on crossfeed from auxiliary or external tanks with operative indicators Symmetrical engine flow is maintained. Mission will terminate with a minimum of 8,000 lbs. calculated main tank fuel.
External Fuel Quantity Indicator (See NOTES 1and 2)	2	0	One external fuel tank indicator may be inoperative provided both external fuel tanks are checked full or empty. Both external fuel tank indicators may be inoperative provided both external tanks are verified empty. When an external tank indicator is inoperative and the tank cannot be visually checked empty due to foam modification, comply with the following prior to flight: Check pressure with each pump in the external tank. If no pressure is obtained, the tank is verified empty. If pressure is obtained, ground transfer the fuel from the external tank. Defuel the external tank if unable to ground transfer. When unable to verify an external tank is empty prior to engine start, the tank will be placed on crossfeed until no pressure is obtained. This will be completed prior to takeoff.
Auxiliary Tank Fuel Quantity Indicator	2	0	If the fuel quantity indicator is inoperative, fuel quantity will be verified with the magnetic sight gage.
Crossfeed Manifold Fuel Pressure Indication	1	1	
Cross ship/Crossfeed Separation Valve	1	0	May be inoperative provided the valve is electrically disconnected and secured OPEN
NOTES: 1. Both a main tank and external fuel tank indicator may be inoperative on the same wing provided the limitations listed for a single inoperative main fuel tank indicator and a single external fuel tank indicator are followed. 2. Fuel will not be transferred into or out of a main or external fuel tank with an inoperative indicator or its symmetrical tank during Inflight Refueling (IFR) or Helicopter Aerial Refueling (HAR)			

Table A11.8. Hydraulics

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Engine–driven Hydraulic Pumps	4	4	
Utility/booster System Engine Pump Warning Lights	4	4	
Utility System Hydraulic Pressure Indicator	1	1	AMP: Pressure indications incorporated into MFD display. System pressure must be indicated on Hydraulic System display and ICWA must be operational
Booster System Hydraulic Pressure Indicator	1	1	AMP: Pressure indications incorporated into MFD display. System pressure must be indicated on Hydraulic System display and ICWA must be operational
Hydraulic Suction Boost Pumps	2	2	
Auxiliary Hydraulic Pump	1	1	
Auxiliary Hydraulic Pressure Indicator	1	1	Direct reading gage in cargo compartment may be inoperative
Rudder Boost Pressure Indicators	2	1	AMP: Pressure indications incorporated into MFD display. System pressure must be indicated on Hydraulic System display and ICWA must be operational
Emergency System Hydraulic Pump	1	1	
Emergency System Pressure Indicator	1	1	AC-130H

Table A11.9. Anti-Ice/De-Ice System

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Ice Detection System	1	1	See Note 1.
Pitot Heat System	2	2	AMP: N/A
Smart Probe Pitot Heating (AMP)	4	2	Each Smart Probe includes integral pitot heating. Probes #2 and #3 supply air data information to the ISIS. Pitot heat must function on these probes must function for flights in IMC. Note: When only battery power is available, pitot will not function
TAS Probe Heat	1	1	When Installed.
Total Air Temperature Sensor Anti-Icing System (C-130J)	2	0	See Note 1.
Wing/Empennage Anti-Icing System	2	2	See Note 1.
Engine Inlet Air Duct Anti-Icing Systems	4	4	Valve(s) may be inoperative provide the valve has failed OPEN, otherwise see Note 1.
Leading Edge Temperature Indicators	6	6	
Wing Leading Edge And Wheel Well Over Temperature Warning Lights	7	7	AMP: Indications are duplicated in ICWA system
Propeller Anti-Icing Systems	4	0	Propeller Anti-Icing / De-Icing will be operational for flight into known or forecast icing conditions.
Propeller De-icing Timer Unit (C-130J)	1	0	See Note 1.
Windshield Anti-Icing Systems	2	2	See Note 1.
Radome Anti-Icing System (if installed)	1	1	May be inoperative for flights which do not require the use of the radar.
Angle of Attack Sensor Anti-Ice (C-130J)	2	1	If inoperative the associated AOA sensor is considered inoperative
NOTE 1: System may be inoperative provided the aircraft is not operated in known or forecast icing conditions.			

Table A11.10. Landing Gear/Brakes/Anti-Skid.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Wheel Brakes	4	4	
Anti-Skid	1	1	The anti-skid may be inoperative for flight to a destination with repair capability, including enroute stops. A local training flight may continue once airborne if the anti-skid fails provided the system is turned off. Limited to one full stop termination landing. Tactical/Assault landings with the anti-skid inoperative is not authorized.
Parking Brake	1	1	
Landing Gear Position Indicators	3	3	
Landing Gear Warning Light	3	0	May be inoperative provided GCAS is installed and fully functional

Table A11.11. Flight Recorder/Indicating/Locating Systems.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Flight Data Recorder	1	1	If CVR is operable, flight to repair facility is authorized AMP: N/A
Cockpit Voice Recorder	1	1	If FDR (DFDR) is operable, flight to repair facility is authorized AMP: N/A
ICVDR (AMP)	1	1	AMP incorporates the FDR and CVR into the ICVDR.
Emergency Locator Transmitter	1	1	
Underwater Acoustical Locator Beacon	1	1	
ACAWS or equivalent system	1	1	AMP: ICWA

Table A11.12. System Integration and Display (C-130J)

Avionics Management Unit (AMU)	2	1	All displays and data fields must be operative to consider the AMU operative
Bus Adapter Unit (BAU) Type I	6	4	BAU 3 (daytime only) and/or 6 will be used as replacements or can be failed. 1,2,4,&5 must be operational
Bus Adapter Unit (BAU) Type II	2	2	
Communication/Navigation/ Breaker Panel (CNBP)	1	1	All displays and data fields must be operative to consider the AMU operative
Communication/Navigation/ Identification Management Unit (CNI-MU)	3	2	Observer position may be inoperative. All components must be operative for the CNI-MU to be considered operative
Communication/Navigation/ Identification System Processor (CNI-SP)	2	1	One may be inoperative for one time flight to repair facility
Data Bus (1553B) Avionics	2	2	
Data Bus (1553B) Communication/Navigation Bus	2	2	
Data Bus (1553B) Display Bus	2	2	
Data Bus (1553B) Interprocessor Communication Bus	1	1	
Data Bus (1553B) Panel Bus	2	2	
Heads Down Display (HDD)	4	3	One may be inoperative provided HUD on that side is operational All displays and data fields must be operative to consider the AMU operative
Heads Up Display	2	0	May be inoperative provided both HDDs on that side are operational
Mission Computer	2	2	

Table A11.13. Fire Protection/Warning Systems

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Fire Extinguisher System	2	2	
Engine Fire and Turbine Overheat Warning Systems	4	4	AMP: ICWA Aural warnings may be inoperative as long as primary warning lights operate
Nacelle Overheat System	4	4	AMP: ICWA Aural warnings may be inoperative as long as primary warning lights operate
GTC/APU Fire Warning System	1	1	AMP: ICWA Aural warnings may be inoperative as long as primary warning lights operate
Smoke Detector (C-130J)	4	1	The under flight deck detector must be operational
Avionics Overheat Warning System (AMP)	1	1	

Table A11.14. Air Conditioning, Pressurization and Bleed Air Systems

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Flight Deck and Cargo Compartment Air Conditioning Units	2	2	Pressurization and both air conditioning systems are normally essential if passengers are carried. If a system fails, flight to a destination with repair capability (including enroute stops) may be accomplished. Passengers will be briefed on the possibility that discomfort may be encountered. C-130E/H: One air conditioning pack may be inoperative provided the cabin altitude can be maintained below 10,000 feet and a reasonable temperature can be maintained. Air conditioning and pressurization are not required for low-level missions if a reasonable temperature can be maintained. C-130J: One pack may be inoperative provided the Cross Flow Valve is operative and the associated Flow Control Valve is verified CLOSED C-130J: Both packs may be inoperative provided both Flow Control Valves are verified CLOSED and the Aux Vent Valves are operative for ventilation AMP: See Flight Manual for Avionics Cooling Requirements
Flight Deck Auxiliary Vent	1	1	
Cargo Compartment Auxiliary Vent	1	0	
Air Conditioning Control Panel: BA/ECS Channels C-130J Only	2	1	Loss of the 2nd Channel will result in loss of all pneumatic-powered components and systems (except engine anti-ice)
Cargo Compartment Recirculation Fan C-130J Only	1	0	See Flight Manual for cooling restrictions
Cross-Flow Valve C-130J Only	1	0	May be inoperative provided both A/C systems are operative or only one A/C is operative and the valve is manually positioned to Cargo Compartment 100% open
Flow Control and Shut Off Valve (Cargo comp) C-130J Only	1	0	May be inoperative provided the divider valve is operative, the right wing isolation valve is operative and ECS Cross-flow valve is operative
Flow Control and Shut Off	1	0	May be inoperative provided the divider valve

Valve (flight deck) C-130J Only			is operative, the left wing isolation valve is operative and ECS Cross-flow valve is operative
Temperature Control Valve C-130J Only	2	0	May be inoperative provided the valve is failed in the normal temp range, otherwise consider A/C inoperative
Duct Overheat Temp Sensor C-130J Only	2	0	May be inop provided associated A/C system is considered inop.
Flight Deck/Cargo Compartment Temperature Control System	2	2	Automatic or manual system may be inoperative provided the other control system is operable.
Avionics Cooling Fans C-130J and AMP	2	2	C-130J: One fan may be inoperative AMP: Both FAN1 and FAN 2 must operate
Cargo Comp Avionics Cooling Fans C-130J Only	2	1	
Overhead Console Cooling Fans C-130J Only	2	1	If both cooling fans fail in-flight, damage to HUDS may occur. Use PFDs as required. If HUDs are stowed, pull the associated ECBs to prevent damage from the heat
Under Floor Heat System	1	0	May be inoperative provided regulation of cargo compartment temperature is not a mission requirement.
Cabin Pressure Controller / Automatic Pressure Control System (C-130J)	1	1	Automatic controller may be inoperative for pressurized flight provided the manual controller is operative. May be inoperative for unpressurized flight.
Cabin Altimeter	1	1	May be inoperative for unpressurized flight.
Cabin Differential Pressure Indicator	1	1	May be inoperative for unpressurized flight.
Cabin Rate of Climb Indicator	1	1	May be inoperative for unpressurized flight.
Emergency De-Pressurization Switch	1	1	
Emergency Depressurization Handle	1	1	May be inoperative for unpressurized flight.
Outflow Valve	1	1	May be inoperative provided valve is manually positioned full open, pressurization mode select is NO PRESS, and aircraft is operated unpressurized
Safety Valve	1	1	May be inoperative provided outflow valve is manually positioned full open and aircraft is operated unpressurized.
Bleed Air Augmenter Valve (C-130J)	4	3	One may be inoperative provided valve is CLOSED and all Nacelle Shut Off valves are operative

Bleed Air Divider Valve	1	1	May be inoperative when Wing Isolations Valves are installed. Both must be operative
Bleed Air Pressure Indications	1	1	
Bleed Air Environmental Control System Electronic Controller (C-130J)	1	1	One Channel may be inoperative
Nacelle Shutoff Valves (C-130J)		4	4
Wing Isolation Valves	2	2	If Installed

Table A11.15. Landing Gear.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Landing Gear System	1	1	If a landing gear malfunction is encountered, make a full stop landing and troubleshoot the malfunction before continuing the mission. If repair capability does not exist and further flights can be made with the gear down and locked, the aircraft may be flown to a destination with repair capability (including enroute stops), provided the gear is not moved from the down and locked position. Flights (including enroute stops) with the landing gear doors removed may be accomplished to a destination with repair capability (Comply with –1 restrictions).
Landing Gear Position Indicators	3	3	
Ski Position Indicators	3	3	
Landing Gear Warning System	1	1	Light and Horn must be functional. AMP: ICWA "Landing Gear" aural warning may be inoperative provided landing gear control handle light and landing gear warning horn are functional

Table A11.16. Flight Instruments

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Airspeed Indicator	2	2	Information must be available to both pilot positions.
Vertical Velocity Indicator or Vertical Speed Indicator	2	2	Vertical Velocity indications may be inoperative on one indicator except for flights in RVSM airspace.
Flight Director Systems	2	2	
Attitude Director Indicator (ADI)	2	2	
Standby ADI (if installed)	1	1	AMP: Part of ISIS
Integrated Standby Instrument System (ISIS) (AMP)	1	1	ISIS provides attitude, heading, air data, and navigation. Air data must be operative for all flights. Navigation, attitude and heading must operate for all flights in night/IMC conditions
Standby Flight Instruments	1	1	
Horizontal Situation Indicators	2	2	
EFI Displays (if installed)	4	3	N/A: C-130J / AMP
Multi-Function Display (MFD) (AMP)	6	4	
BDHI	3	0	
Barometric Altimeters	3	2	Both pilots' altimeters must be operational.
CARA (Pilot's indicator)	1	0	Required to support GCAS/GPWS if carrying passengers.
HG 9050 (MC-130E)	2	1	Both required for radar OCF mission.
GPWS (if equipped)	1	0	Required if carrying passengers.
GCAS (if equipped)	1	0	Required if carrying passengers.
TAWS (if equipped)	1	0	Required if carrying passengers.
TCAS (if equipped)	1	0	Required if carrying passengers.
Digital / Central Air Data Computer (if installed)	1	1	AMP: N/A
Air data Computer System/ Smart Probes (AMP)	2/4	2/4	
Mission Processors (AMP)	2	2	

Table A11.17. Navigation Systems/Communications

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
ADC (C-130J)	2	1	Both must be operative for operations I RVSM airspace
Embedded Global Positioning / Inertial Navigation System (C-130J)	2	1	One may be inoperative provided no overwater flight, or BRNAV flight will be conducted
Total Air Temperature Sensor (C-130J)	2	2	
Standby magnetic Compass	1	1	
Heading Systems	2	1	
NAV Selector panel	2	2	AMP: Nav source selection included in MFS and must function in both pilot positions
Mission Control Display Unit (MCDU) (AMP)	2	1	Pilot MCDU must be operational
Communications Navigation Control Panel (CNCP) (AMP)	2	1	Pilot CNCP must be operational
VOR	2	1	
ILS	2	1	
ADF	2	0	Installed and functional if required for planned instrument approach)
TACAN	2	1	
Radar	1	0	Required if thunderstorms or hazardous conditions that can be detected by airborne radar are forecast or known along the route of flight Pilot's radar required for flight if known or forecast thunderstorms are expected along the route of flight or at night. (Aircraft equipped with two radar displays) if a navigator is not on board. A fully functional terrain following radar system is required for MC-130E/H TF operation at night or IMC.
IFF/SIF	1	1	As required for ATC and mission requirements (See Note 1).
#1 UHF Manual Control Head Radio	1	1	SCNS Equipped Aircraft or AC-130U/MC-130H. AMP: Com 1 radio is available with battery power and meets this requirment. Pilots CNCP and must be operational
#1 VHF Radio (Isol DC Bus power)	1	1	KC-130F/R/T

Get Home Radio Panel	1	0	One radion required. One time flight to repair facilioty is authorized
HF Radio	2	0	1 required for overwater flight
Control Wheel Hush Switch	2	1	C-130J Only
Control Wheel Mic Switch	2	1	
Flight Station Speaker	2	1	
NOTE 1: Perform a ground check of the IFF before takeoff, using either the self-test or a ground radar interrogation. If self-test is unacceptable and radar facilities do not permit a ground check, you may depart if the IFF was operational on the previous mission. Aircraft will not depart with an IFF known to be inoperative without ATC approval. Altitude reporting is required for RSVM			

Table A11.18. Flight Controls.

Trim Indicators	3	3	Flight to repair capability including enroute stops may be made. The trim tab position must be visually verified prior to flight.
Trim System	3	3	
Elevator Trim Tab Control Wheel Switch	4	4	Two switches for single switch installations (ie C-130E)
Elevator Trim Tab Power Selector Switch	1	1	
Emergency Elevator Trim Tab Switch	1	1	
Flap Position Indicator	1	1	C-130J: The Flap Position Indicator may be inoperative provided the AMU Indicator is operative
Stick Pusher (C-130J)	1	0	Flight to repair capability including enroute stops may be made provided the Stall Warning System is operational
Stall Warning System (C-130J)	1	1	All aural and visual warnings must be functional
Stall Warning Angle of Attack Sensors (C-130J)	2	1	

Table A11.19. Auto Flight (C-130J)

Go-Around (G/A) Switch	2	1	
Reference Mode Panel	2	1	Flight restricted to a repair facility including enroute stops as required
BARO SET Switch	2	1	Both are required for RSVM operations
Reference Select Switch	2	1	
Reference Set knob	2	1	
AFCS Annunciator Panel	2	0	May be inoperative provided annunciations(s) is operative in HUD or HDD PFD at affected location
Reference Set Panel Display	2	0	May be inoperative if individual annunciations markers are visible on HUD or HDD PFD –or- Consider that mode inoperative
Note: Unless listed above, components of the Auto Flight Panel may be inoperative. If switches/buttons are inoperative, consider that function of the autopilot inoperative			

Table A11.20. Aircraft Exterior/Interior Lighting.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Landing Lights	2	1	One may be inoperative provided the taxi light on the same side is operational.
Taxi Lights	2	1	One may be inoperative provided the landing light on the same side is operational.
Formation Lights	9	0	Not required for daylight operations. Two lights per wing are required for night formation flights.
Navigation Lights	6	3	For night operations, the left and right wingtip NAV lights must be operational in addition to one of the white lights on the tail cone.
Anti-Collision/Strobe Lights	2	2	Red or White is acceptable
Wing Leading Edge Lights	2	0	
Primary Instrument Cockpit Lighting	1	0	C-130E/H: All edge "peanut" lighting or backlit lighting (MD specific) will be operational for night operations for the following instruments: airspeed; altimeter; VVI/VSI; ADI; and HSI.
Flight Station Lighting (C-130J)	A/R	A/R	May be inoperative provided sufficient lighting is operative to make each instrument, control, and other device easily readable
Copilot Displays Light Circuit (C-30J)	1	1	
Lamp Test Circuit (C-130J)	1	1	

Table A11.21. Doors and Ramp System.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Ramp and Ramp Locking System	1	1	Warning light, latching mechanisms, and locking systems will be operative for pressurized flight. Aircraft will not be released for flight with a malfunctioning ramp lock system, with cargo on the ramp. Aircraft may continue to a destination if ramp locks malfunction In flight. Cargo ramp will not be operated in flight, with cargo on the ramp, with malfunctioning locks. Repair lock malfunction or remove cargo from the ramp prior to continuing flight operations. Do not pressurize the aircraft if the ramp locks fail to lock
Aft Cargo Door and Locking System	1	1	Pressurized flight may be performed with an aft cargo door lock malfunction when mission requirements dictate.
Crew Entrance Door and warning Light	1	1	Does not apply to AC-130H unless the crew entrance door is installed. C-130J: May be inoperative provided ACAWS DOOR OPEN messages are operative AMP: Warning Light removed. Incorporated into ICWA. Aural warning may be inoperative
Door Warning Lights	A/R	All	C-130J: May be inoperative provided applicable ACAWS DOOR OPEN messages are operative

A11.5.25. Supplemental Aircraft Equipment

A11.5.25.1. The following tables list supplemental equipment that is needed for routine operations in AFMC. These lists are not all inclusive of all items needed for safe and effective flight operations. Items listed in Table A11.19 are considered the minimum number required for flight. Guidance in this table does not override published directives on use of equipment nor provide relief when other directives require greater numbers. Items listed in Table A11.20 are highly desired for the missions indicated.

Table A11.22. Required Items

Escape Rope	3	Installed IAW Flight Manual
Crash Ax	2	Installed IAW Flight Manual
O2 Walk-Around Bottle	4	3 for C-130B installed/Charged IAW Flt Man
Emergency Exit Lights	All Exits	Located at each emergency exit and Installed IAW Flight Manual
Hand Operated Fire Extinguishers	4	Installed IAW Flight Manual
First Aid Kits	2	
Quick Don O2 Masks (w/goggles)	1 per crew member plus 2	Note 1
Fire Fighter Smoke Mask	2	Note 2.
ICS Communications Cords	A/R	As needed to support planned flight
Restraint Harness	1	Note 3
Restraint Harness Tie down Ring	1	Avail on Flight Deck
MLG Handcrank	2	Installed per Flight Manual
MLG Emergency Extension Wrench	1	Installed per Flight Manual
Tie Down Straps	2	
10K Tie-Down Devices	7	Note 4
10K Tie-Down Chains	14	Note 4
MLG Emergency Tie-Down Devices	2 sets	Required if chains/devices not avail
Hydraulic Fluid	2 cases	
Seats w/Cushions	A/R	As needed to support flight
Safety Belts	A/R	As needed to support planned flight
Troop Seat	1	2-man if scanner/LM on board
Parachutes	1 per crewmember	When required for specific mission
Core Bolts	26	34 for “stretch” variants. All critical positions installed and properly torque
Aircraft Markings	As Listed	Chopping, Leading Edge Ice, Escape Hatches and Doors, Tail Number
Water jug w/cups	1 gal	Required for crew comfort

Notes

1. A Quick don oxygen mask with attached goggles is the preferred smoke and fume protection for aircrew personnel. Quick don masks with attached goggles will be available for each primary crew member aboard plus two extra mask/goggle sets located at FS 245 and 617 for the purpose

of firefighting. Fire Fighter's Smoke masks may be used in lieu of Quick don masks/goggles at FS 245 and 617 if necessary. These requirements are in addition to the crew member's personal helmet and oxygen mask. Personal helmets/oxygen masks may be substituted for personal Quick don mask/goggles sets as mission directives require. Firefighting capability must be maintained through the use of Quick don mask/goggles and/or firefighters smoke masks. Total number of mask/goggle combinations must equal the primary crew positions for the mission to be planned/flown. Use and positioning of aircrew oxygen helmets/masks will be IAW published guidance. 2. Number may be reduced to zero if two quick don oxygen masks with attached goggles are used instead of smoke masks and positioned with walk around O2 bottles in the cargo compartment. IAW AFI 11-301 Vol 2 Table 4. Note 1, Smoke masks will not be placed on the flight deck. 3. One harness must be installed on the flight deck for the Flight Engineer. If parachutes are not used, a second restraint harness is required for FCF missions when doors are to be opened. A second harness may be desired for LM/Scanner use during door operations for Smoke/Fume Elimination. C-130J: One harness must be installed on the flight deck and a second harness will be prepositioned in the cargo compartment. Two harnesses will ensure that the Loadmaster will have a harness available for any door open warning. 4. Tie down devices and chains are not required when MLG Emergency Tie-Down Devices are carried aboard the aircraft. However, chains and devices provide an increased margin of safety in the event of device failure and these numbers are recommended.

Table A11.23. Desired Equipment.

Water Jug	5 gal	Needed for initial FCF flights for fluid spill
Chocks	1 Set	
Maintenance Ladder	1	
Tool Kit	1	Note 1
Accutach	1	Desired for initial FCF engine runs
Notes 1. Equip as needed for in-flight repair/emergencies. Units will publish a list of required items. Units will comply with all local requirements regarding FOD/Tool control.		

Attachment 12

C-135 OPERATING PROCEDURES

A12.1. General Information.

A12.1.1. Scope. This attachment, in conjunction with other governing directives, outlines procedures for operation of the C-135 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all C-135 series aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A12.2. Mission Planning.

A12.2.1. Aircrew Qualification. Primary crewmembers or those occupying a primary position during flight must be basic-qualified or in training for qualification for that crew position. If non-current, or in training for a particular event, the crewmember must be under the supervision of an instructor while accomplishing that event (direct supervision for critical phases of flight). Exceptions are IAW with AFI 11-401/AFMC S1.

A12.2.1.1. Pilots:

A12.2.1.1.1. Missions with passengers. Only a pilot that is qualified and current will occupy a pilot's seat with passengers onboard the aircraft. <u>One</u> of the following conditions must be met:

A12.2.1.1.1.1. Two qualified and current pilots must be at the controls. Or,

A12.2.1.1.1.2. A qualified pilot regaining currency, a basic-qualified receiving difference, conversion, or mission training; and an IP providing direct supervision must be at the controls.

A12.2.1.2. Other crewmembers: Non-current or unqualified navigators, flight engineers, communications systems operators, flight attendants, boom operators or avionics flight technicians may perform in their primary crew position on any mission when supervised by a qualified instructor of like specialty.

A12.2.2. Crew Complement. Minimum aircrew complement for basic and augmented FDP will be commensurate with the applicable T.O. 1C-135X(X)X-1 *Flight Manual*, applicable Partial/Modification Flight Manual and Table A12.1.

Table A12.1. Crew Complement

Position	Basic	Augmented	Notes
Pilot	1	2	
Copilot	1	1	
Nav	1	2	1, 2
FE	1	2	1, 2
BO	1	2	1, 3
CSO	1	2	1, 2
FA	1	2	1, 4
BO – Boom Operator (KC-135) CSO – Communications System Operator (Speckled Trout) FA – Flight Attendant (Speckled Trout) **Note 1:** When required by basic/partial/modification flight manual or as mandated by Unit CC for mission accomplishment. **Note 2:** One Navigator, flight engineer, and communications system operator satisfies augmented crew member requirements for Speckled Trout executive airlift missions. **Note 3:** One boom operator satisfies augmented crewmember requirements during non-tanker executive airlift missions. **Note 4:** Two FAs will be the basic crew complement for all Speckled Trout executive airlift missions. No FAs are required on local missions with 10 or fewer passengers, provided another crew member trained in passenger handling is aboard and designated as passenger monitor. FAs are not required in the absence of passengers.			

A12.2.2.1. The unit commander will designate additional crewmembers if the mission complexity or priority dictates, or to meet navigator or other crew position currency/training requirements.

A12.2.2.2. Augmented crews are required when a mission cannot be safely completed within a basic flight duty period. Augmentees must be basic-qualified in accordance with AFI 11-2FTV1, *Flight Test Aircrew Training*. In those situations requiring augmentation, the crew must be augmented from the start of the duty period. If augmentees are added to the crew, the crew's flight duty period will be computed based on the flight duty period of the most limited person.

A12.2.3. Runway, Taxiway, and Airfield Requirements. See Table 2.1. *In all cases ensure obstacle clearance requirements are met. Landing distance will not exceed runway available.* Crews will normally use 0.80 delayed braking factor (DBF) for computing landing distance. The pilot in command may direct using greater than 0.80 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 landing with greater than a 0.90 DBF. When using greater than 0.80 DBF crews will brief the planned braking speed.

A12.2.3.1. Runway Length for Takeoff and Intersection Takeoffs. Normally, takeoffs will be initiated from the beginning of the approved usable portion of the runway. Intersection takeoffs are authorized if the following conditions are met:

A12.2.3.1.1. 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.

A12.2.3.2. During operations on runways partially covered with snow or ice, takeoff computations will be based on the reported RSC or RCR for the cleared portion of the runway. A minimum of 50 feet either side of centerline should be cleared. If 50 feet either side of centerline is not cleared, then compute data based on the un-cleared portion up to 50 feet either side of centerline.

A12.2.4. Operations over Runway Cables (does not include recessed cables).

A12.2.4.1. Do not land on (touchdown on) approach end arresting cables (does not include recessed cables). If the aircraft lands before the cable, the crew should contact the tower to have the cable inspected.

A12.2.4.2. Do not takeoff or land over an approach end cable that has been reported as slack, loose, or improperly rigged by NOTAM, ATIS, or ATC.

A12.2.5. Minimum Runway Condition Report (RCR).

A12.2.5.1. For 412 FLTS operations, on an active DV Airlift mission, RCR limits are a minimum of 7 for taxi and 9 for take-off and landing.

A12.2.5.2. Operations from RAF Fairford and RAF Mildenhall. An RCR 15 may be used for computing takeoff performance for all operational and training missions when wet 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 will be made by the 100 OG/CC.

A12.2.6. Non-Standard Fuel Loads. For depot operations, after the initial PDM FCF landing fuel load may be left "as is" when fuel CG is in the range of 24-28%. This will result in a non-standard fuel load. Mission planning must take into account both the non-standard fuel load and FCF checks to be accomplished to ensure that the fuel is available and accessible in case of emergency and or divert.

A12.3. Common Mission Guidance.

A12.3.1. Engine Running Crew Change (ERCC). Use ERCC procedures when necessary to expedite aircraft movement or permit the exchange of crewmembers. Pilot in command must assess prevailing weather, lighting and parking location to ensure safe operations. Unless otherwise published, use the following procedures:

A12.3.1.1. Pilot in command will brief crewmembers on the intended ERCC operation to include their locations, duties, and responsibilities during the ERCC.

A12.3.1.2. Crewmembers should ensure that all loose items are secure prior to entering and exiting the aircraft.

A12.3.1.3. The parking brake will be set and at least one pilot in the seat will monitor brakes, interphone, and radio.

A12.3.1.4. Use terrain and taxi lights to enhance safety at night as the situation dictates.

A12.3.1.5. A crewmember should be positioned at the point of entry to act as a safety observer.

A12.3.1.6. No enplaning personnel should approach the airplane until the crewmember is in place.

A12.3.1.7. Crewmembers should approach and depart the aircraft from the nose. When departing crewmembers will proceed forward of the aircraft at least 50 feet before turning.

A12.3.1.8. Brief deplaning personnel to secure loose articles and remain forward of the interphone cord.

A12.3.1.9. Pilot in command will ensure that the aircraft is clear prior to taxi.

A12.3.2. Formation Flying. Formation is authorized IAW applicable technical order and AFI 11-2KC135Volume 3, *C/KC-135 Operating Procedures* or AFI 11-2RC-135Volume 3, *RC/OC/WC/TC-135 Operating Procedures*.

A12.3.3. Air Refueling Limitations.

A12.3.3.1. Do not accomplish AR operations when:

A12.3.3.1.1. Conditions result in marginal control of either aircraft or boom (in the opinion of either PIC or BO).

A12.3.3.1.2. Either the tanker or the receiver has less than the full number of engines operating (except B-52).

A12.3.3.1.3. The tanker aircraft is unable to retract the landing gear.

A12.3.3.1.4. Pod Control Panel malfunction exists that cannot be resolved.

A12.3.3.1.5. MPRS pod malfunction. NOTE: If Pod Control Panel is operational and only one pod is malfunctioning, AR is permissible with operational pod.

A12.3.3.2. Tanker Autopilot. 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. Verbal notification and acknowledgment will take place between the tanker and receiver prior to conducting autopilot-off training.

A12.3.3.3. A/R without Tanker Disconnect Capability. A/R without tanker disconnect capability means the boom operator cannot trigger an immediate disconnect. After a known loss of tanker disconnect capability with a particular receiver, no further contacts will be attempted with that receiver. The inability to get an immediate disconnect from one receiver by triggering a disconnect does not prohibit contact attempts with other receivers, if the tanker system (signal coil) checks good. However, if disconnects cannot be triggered on two successive receivers, no further contacts will be attempted.

A12.3.3.3.1. Exceptions to the restrictions are:

A12.3.3.3.1.1. During fuel emergency situations.

A12.3.3.3.1.2. When necessary to complete receiver over-water deployment or redeployment.

A12.3.3.3.1.3. Operational missions.

A12.3.3.4. Manual/Emergency Boom Latch Training. The following conditions must be met in order to complete training or an evaluation in manual /emergency boom latching:

A12.3.3.4.1. An AR IP must be at a set of controls during the receiver contacts.

A12.3.3.4.2. Contacts will be limited to the minimum required.

A12.3.3.4.3. The receiver aircraft AR system must be fully operable, and a disconnect capability with the receiver must have been previously determined by a boom operator initiated disconnect.

A12.3.3.5. Prohibited Refueling Maneuvers. When operating in manual/emergency boom latching or when the tanker does not have disconnect capability, limit contacts to the minimum number necessary to complete mission requirements. The following maneuvers are prohibited:

A12.3.3.5.1. Practice emergency separation while in contact.

A12.3.3.5.2. Demonstration of envelope limits.

A12.3.3.6. Practice Emergency Separations.

A12.3.3.6.1. Prior to the actual accomplishment of a practice emergency separation, coordination between the tanker pilot, boom operator, and receiver pilot is mandatory. Coordination must include when the separation will occur and who will give the command of execution. Tanker pilot coordination may be accomplished over interphone with the boom operator.

A12.3.3.6.2. If separation is initiated from the contact position, the receiver's A/R system must be in normal, and a boom operator disconnect capability with the receiver must exist.

A12.3.3.6.3. Practice emergency separations will not be accomplished with passengers on board unless passengers are seated with seat belts fastened.

A12.3.3.7. Limits Demonstration. Prior to a limits demonstration, a disconnect capability must have been previously determined by a boom operator initiated disconnect.

A12.3.3.8. Receiver AR Training. A qualified and current receiver IP will conduct training. The receiver pilot must inform and obtain acknowledgment from the tanker pilot and boom operator when an unqualified receiver pilot is receiving AR training. A boom operator qualified for the applicable category receiver must operate the boom controls, and if the tanker autopilot is off, the tanker must be flown by a pilot current and qualified in tanker AR.

A12.3.3.9. Altitude. A/R operations are normally conducted above 12,000 feet MSL, or 10,000 feet AGL, whichever is higher. A/R operations based at or above 12,000 feet MSL which momentarily fall below 10,000 feet AGL, but not lower than 5,000 feet AGL, due to overflight of mountain ridges, peaks, etc., are authorized. A/R operations in support of C-130 receivers at the receiver's optimum refueling altitude, but no lower than

5,000 feet AGL are authorized. A/R performed below those altitudes will only be on an approved test plan or for other operational considerations approved by the OG/CC. Except as noted above, A/R operations below 6,000 feet AGL is considered Low Altitude Air Refueling (LAAR) and must comply with the following:

A12.3.3.9.1. Consideration will be given to wearing helmets with visor down for protection against bird strikes. When available, a boom mike may be used to facilitate cross-cockpit communications.

A12.3.3.9.2. A knowledgeable safety observer will be used to the maximum extent possible.

A12.3.3.9.3. Maximum time per sortie for LAAR will be 1 hour.

A12.3.3.9.4. Perform during day, under VFR conditions.

A12.3.3.9.5. Minimum altitude is 3,000 feet above the highest obstacle or terrain within 4 NM of course centerline.

A12.3.3.9.6. Forecast, reported, or observed winds less than or equal to 27 knots.

A12.3.3.9.7. Less than forecast, reported or observed moderate turbulence.

A12.3.3.9.8. Over flat and rolling terrain or a minimum of 10 NM from land over contiguous water.

A12.3.3.9.9. The autopilot rudder axis or yaw damper will be used if functioning. Consideration will be given to not utilizing the other axes of the autopilot based upon maneuvering requirements.

A12.3.3.9.10. Flight manual restrictions for low altitude operations will be complied with.

A12.4. Instrument Procedures.

A12.4.1. Aircraft Category. The C-135 is approach category D.

A12.4.2. Traffic Advisory and Collision Avoidance System (TCAS). Operate the TCAS with sensitivity set to Traffic Advisory/Resolution Advisory (TA/RA) to the maximum extent possible. ATC procedures and the “see and avoid concept” will continue to be the primary means of ensuring aircraft separation. Pilots shall not deviate from an assigned ATC clearance based solely on TA information. Attempt to attain visual contact and maintain safe separation. However, if visual separation with the intruding traffic cannot be assured, it is imperative to follow resolution advisories (RA) to obtain aircraft separation computed by TCAS. Failure to follow the computed RA may increase the probability of a midair collision. Do not exceed aircraft structural limits or safe flight speed in order to follow the RA. Always attempt to visually clear the airspace before maneuvering your airplane in response to a TCAS advisory. Advise ATC as soon as practical when a deviation becomes necessary due to a TCAS resolution advisory.

A12.4.3. Enhanced Ground Proximity Warning System (E-GPWS) and/or Terrain Awareness and Warning System (TAWS). When operating in the low altitude structure, it is imperative to follow E-GPWS advisories. Advise ATC as soon as practical when deviation from an ATC clearance is directed by E-GPWS/TAWS.

A12.4.4. Aircraft Systems Operations and Navigation Procedures

A12.4.4.1. MFD. Pilot Flying (PF) must have a MFD with the full ADI for all takeoffs, final approaches and landings. Course guidance (other than stick map) appropriate for the current ATC clearance, will be displayed on a PF MFD. ***EXCEPTION***: When malfunctions limit the pilot to a single operable MFD.

A12.4.4.2. Weather Radar. Configure the weather radar based on mission requirements. For Pacer CRAG: The Predictive Wind Shear (PWS) function of the weather radar should normally be operating for all takeoffs, approaches, and landings.

A12.4.4.3. Flight Progress.

A12.4.4.3.1. Prior to flight, plot the oceanic portion of the flight on an appropriate chart. Annotate the chart with the mission number, AC's name, preparer’s name, and date. If practical, chart may be reused.

A12.4.4.3.2. The PIC will ensure the navigation waypoints loaded in the INS (FMS for Pacer CRAG) flight plan accurately reflect the intended/cleared route of flight. This can be done using one or more of the following methods:

A12.4.4.3.2.1. Latitude/longitude from current FLIP

A12.4.4.3.2.2. Bearing/distance from a flight plan after latitude/longitude are verified for each waypoint.

A12.4.4.3.2.3. Ground Based NAVAIDS.

A12.4.4.3.3. In-Flight, use all available NAVAIDS to monitor INS performance. Immediately report malfunctions or any loss of navigation capability, which degrades centerline accuracy to the controlling ARTCC. Use the following procedures for flight progress:

A12.4.4.3.4. Obtain a coast out fix prior to, or immediately on entering the Category I Route or over-water segment. Perform a gross error check using available NAVAIDs and annotate the position and time on the chart.

A12.4.4.3.5. When approaching each waypoint, recheck coordinates for the next waypoint.

A12.4.4.3.6. Approximately 10 minutes after passing each oceanic waypoint, record and plot the aircraft position and time on the chart, and ensure compliance with courses and ETA tolerances.

A12.4.4.3.7. If a revised clearance is received, record and plot the new route of flight on the chart.

A12.4.4.3.8. For Pacer CRAG, periodically check all solution position differentials on the INAV pages.

A12.4.4.3.9. Reduced Vertical Separation Minimum (RVSM) Airspace. Airspace where RVSM is applied is considered special qualification airspace. See FLIP GP for aircraft equipment requirements. Both the operator and the specific aircraft must be approved for operations in these areas. Always refer to the appropriate Area Planning (AP) publication for specific theater RVSM requirements.

A12.4.4.3.10. Required Navigation Performance (RNP) Airspace. Airspace where RNP is applied is considered special qualification airspace. Both the operator and the specific aircraft type must be approved for operations in these areas. The PIC is responsible for a thorough review of the aircraft forms and maintenance logs to ascertain the status of RNP equipment. Document (in the aircraft forms) malfunctions or failures of RNP required equipment, including the failure of this equipment to meet RNP tolerances.

A12.4.4.3.10.1. RNP-10. Compliance includes navigation accuracy within 10NM of actual position 95% of the time. Aircraft not possessing integrated GPS with receiver autonomous integrity monitoring (RAIM), or equivalent system, are limited in how long they may operate in RNP-10 airspace. See FLIP for RPN-10 long term requirements/aircraft capabilities. KC-135 aircraft with properly functioning steering solutions may operate in RNP-10 airspace without time limitations. If the capability to update the inertial navigation solution with the GPS is lost, or if the receiver autonomous integrity monitoring (RAIM) is lost, the aircraft is limited to 6.2 hours of operation in RNP-10 airspace after the GPS or RAIM is degraded.

A12.4.4.3.10.2. Enroute. At least two long-range navigation systems certified for RNP-10 must be operational at the oceanic entry point. Periodic crosschecks will be accomplished to identify navigation errors and prevent inadvertent deviation from ATC cleared routes. Advise ATC of the deterioration or failure of navigation equipment below navigation performance requirements and coordinate appropriate actions.

A12.4.4.3.11. Basic Area Navigation (BRNAV) Airspace. BRNAV is defined as RNAV with an accuracy that meets RNP-5 for operations under IFR in that European airspace designated for BRNAV/RNP-5 operations. When operating in BRNAV airspace, aircrews will immediately notify ATC if any of the required equipment fails, or is unable to meet BRNAV tolerances. Document in the aircraft forms malfunctions or failures of RNP required equipment including the failure of this equipment to meet BRNAV tolerances. The KC-135 is approved for BRNAV operations.

A12.4.4.3.12. MNPS Airspace Operations. Operations within the North Atlantic area's MNPS airspace, Canadian MNPS, or selected Pacific routes are designed for INS-auto-pilot coupled operation. (See FLIP AP/2, chapter 5 and AFI 11-202, Volume 3, *General Flight Rules*). When not engaged in AR operations, aircrews will adhere to these procedures. Comply with FLIP for operations in North Atlantic Minimum Navigation Performance Specification Airspace, and US West Coast to Hawaii Route System Procedures.

A12.4.4.3.12.1. Malfunctioning equipment that reduces the aircrew's capability to comply with MNPS, whether occurring prior to, or within MNPS airspace, will immediately be reported to the controlling agency and subsequent agencies throughout the route of flight. Prior to airspace entry, aircrews will return to the nearest maintenance repair facility unless the aircraft has a minimum of two operable and correctly functioning INUs, unless specifically cleared to proceed along original, or revised routing by the controlling agency. If subsequent failures occur, advise ARTCC, comply with track restrictions, and use all means available (HF DR, dead reckoning, etc) to ensure navigation accuracy.

A12.4.4.3.12.2. When flying in MNPS airspace, exercise special caution to ensure the coordinates of the assigned track and associated landfall and domestic routings are fully understood and correctly inserted into the automatic DR navigation system with appropriate cross-checks. If at any time the route (re-routing, if appropriate) is in doubt, check the details with ARTCC facility.

A12.4.4.3.12.3. When flying in MNPS airspace, crews will utilize Strategic Lateral Offset Procedures (SLOP) to the max extent possible. Refer to the MNPS Manual and AFI 11-217 for further information on SLOP.

A12.4.4.3.13. Inoperative Navigation Systems (Oceanic systems include: INU-1, INU-2, and GPS with RAIM).

A12.4.4.3.13.1. One unit inoperative: Advise ARTCC unless within range of normal radio aids. Plot position on navigation chart every 30 minutes. Check the accuracy of remaining nav systems, using all available NAVAIDs.

A12.4.4.3.13.2. Two units inoperative: Advise ARTCC. Cross-check compass system heading with mission plan at each waypoint or every 30 minutes. Verify last recorded position on chart. Use flight plan as guide. Use ADF, VOR/DME, weather radar ground mapping mode, to update estimated positions. If desired and other methods fail, try to obtain an HF DF fix. This service can be requested through the regular ARTCC frequencies.

A12.4.4.3.13.3. Differences Between Navigation Systems. When there is a difference between navigation systems, normally two of the three will be in close proximity, so that it will be simple to determine that the malfunctioning system is the one, which is most distant from the other two. When available, check position using available ground NAVAIDs. Comparing the doppler groundspeed with the groundspeed derived from each system may also provide a good indication of a malfunctioning system.

A12.4.5. RNAV Operations.

A12.4.5.1. KC-135R (BLK 40) (IAW FAA AC 90-100A and KC-135 (BLK 40) airworthiness certification) aircraft are approved for unrestricted RNAV/RNP 1, RNAV/P-RNAV/RNP 2, NAV/RNP 4, BRNAV, RNP operations and RNP 0.3, lateral navigation (LNAV) only procedures.

A12.4.5.1.1. All pilots/navigators (if applicable) must complete KC135 RNAV/GPS Operations Certification training before utilizing RNAV 1 (SIDs & STARs) and RNAV 2 ("Q" & "T" routes) airspace or RNP 0.3 RNAV (LNAV minima) approaches. Training requirements are located on the AFMC/A3V CoP. The AFMC training overview (word document) provides the appropriate training guidance.

A12.4.5.1.2. The KC-135 aircraft is not authorized to fly "overlay GPS approaches", due to concerns about the ability to accurately code the missed approach portion of these procedures. "Overlay GPS approaches" are characterized by "Or GPS" in the title (i.e. VOR or GPS RWY 15), these approaches are designed differently from

RNAV, RNAV (GPS) and GPS approaches, because overlays are designed around ground based NAVAIDs and interpreted for space based navigation. This does not preclude the use of "GPS in lieu of" to define individual points on a conventional approach, such as a final approach fix defined by an NDB for an aircraft that is not equipped with an NDB; crews can still use GPS to define these individual points IAW 11-217V1 paragraph 7.12.4.

A12.4.5.1.3. GPS overlays of conventional SIDs and STARs found in aircraft database are only authorized for situational awareness and require the pilots to use the ground based NAVAIDs as their primary navigational source, where RNAV SIDs and STARs do not require the use of ground based NAVAIDs.

A12.4.5.1.4. When flying RNAV SIDs KC-135 crews will accomplish a gyro takeoff and ensure pilot flying's primary course as a minimum is set to FMS. The crew will ensure the flight directors are set to NAV/LOC to provide flight director guidance prior to reaching 500 feet AGL, IAW FAA Advisory Circular 90-100A.

A12.4.5.1.5. Flight director lateral guidance must be available anytime the KC-135 is operating in RNP 0.3 airspace IAW KC-135 (BLK 40) performance assessment summary.

A12.4.5.1.6. HQ AFFSA/A30 has determined KC-135 (BLK 40) RNAV instrument approach procedures are in compliance with 11-217V1 paragraph 7.13.5.2, despite the current FMS software's inability to display leg length to a tenth of a mile in the flight plan pages prior to flight. To mitigate this software limitation, crews are required to evaluate distance-to-fly displayed as the FMS sequences to the next point against the chart value while flying the approach. If significant deviations from the expected values are witnessed the pilot should consider aborting the approach.

A12.5. Operational Procedures and Restrictions.

A12.5.1. Flight Duty Period. Observe AFI 11-202 Vol. 3 Chapter 9 restrictions, and the following:

A12.5.1.1. Basic Crew FDP.

A12.5.1.1.1. Maximum FDP for a basic crew is IAW AFI 11-202v3. Reduce this period to 12 hours without an operative autopilot altitude hold. If the autopilot fails after departure, continue to the next scheduled stop and then comply with this restriction.

A12.5.1.2. Augmented Crew FDP.

A12.5.1.2.1. Maximum FDP for an augmented crew (operational missions only) is IAW AFI 11-202v3. Reduce this period to 16 hours without an operative autopilot altitude hold. In this case, only the pilot portion of the crew need be augmented.

A12.5.1.2.2. Basic crews will not be augmented after FDP has started.

A12.5.1.2.3. Authorized only for a maximum of four intermediate stops/sorties. Sorties are defined as stops for the purpose of refueling or stops with significant ground time/delay. Waiver authority is the OG/CC.

A12.5.2. Duty Station. The pilot, copilot, flight engineer, navigator, and boom operator will be at their duty stations during all critical phases of flight. During other phases of flight, crewmembers may leave their duty station to meet physiological needs and to perform normal crew duties. During cruise flight, the flight engineer, navigator, or boom operator may leave his/her duty station for longer periods with pilot approval. Crewmembers will notify the pilot in command prior to departing assigned primary duty stations.

A12.5.3. Control Cabin Entry. Pilot in command may authorize passengers and observers access to the control cabin during all phases of flight. In all cases, sufficient oxygen sources must be available to meet the requirements of AFI 11-202, Volume 3. Passengers or observers will not be permitted access to the pilot or copilot position regardless of its availability. Exceptions are IAW AFI 11-401/AFMC Sup 1.

A12.5.4. Command Radios.

A12.5.4.1. The pilot not flying the aircraft normally makes all ATC radio calls.

A12.5.4.2. In terminal areas the pilot, copilot, navigator, flight engineer, and boom operator will monitor the primary command radio unless directed otherwise.

A12.5.4.3. The pilot operating the command radios will inform the crew when the primary radio is changed.

A12.5.4.4. One pilot should record and will acknowledge all ATC clearances. The navigator or boom operator will monitor the read-back and will ensure compliance with all clearances.

A12.5.4.5. Both pilots will monitor UHF guard (or VHF guard when appropriate) emergency frequency regardless of primary radio. ***EXCEPTION:*** Only one crewmember is required to monitor guard frequency during tanker or receiver rendezvous and A/R. During tanker A/R, the PNF normally monitors guard.

A12.5.5. Fuel Jettison Procedures. Use jettison altitudes above 20,000-feet AGL to the maximum extent possible. If jettison is accomplished, record all pertinent data to include flight conditions, altitude, airspeed, air temperature, wind direction and velocity, type and amount of fuel, aircraft type and position at time of jettison, time and duration of jettison activity, and reason jettison was accomplished. Retain this information for 6 months as documentation in the event of claim against the government resulting from the fuel jettison.

A12.5.6. Qualification Training. Initial qualification, re-qualification, or upgrade training for pilots will not be conducted on missions with passengers onboard. Mission qualification or mission instructor training may be conducted on missions with passengers onboard only if the individual in training is qualified (completed aircraft checkride with a valid AF Form 8).

A12.5.7. Three-Engine Ferry Operations. Consider three-engine ferry operations only after exhausting all other options to return an aircraft with an inoperative engine to full mission ready status. Each three-engine ferry sortie must be approved IAW AFI 11-202Vol 3 AFMC Sup 1. The owning MAJCOM will provide execution authority for these sorties. The following procedures apply:

A12.5.7.1. Plan ferry operations well ahead to allow sufficient time for completion of maintenance preparation actions.

A12.5.7.2. Plan the flight to the nearest destination possessing a usable maintenance support capability. Obtain clearances and alert all en route, alternate, and abort bases along the intended route of flight.

A12.5.7.3. Use the minimum crew necessary for the ferry operation. Do not carry passengers or other non-essential personnel. Observe aircraft flight manual limitations.

A12.5.7.4. All primary aircraft systems not associated with the failed engine must be fully operational.

A12.5.7.5. Performance data must satisfy takeoff field length requirements, gear down 3-engine climb performance, and final segment two-engine asymmetric go-around capability.

A12.5.7.6. Download cargo (including mission support kits) prior to ferry operations.

A12.5.8. Power Management Control (PMC) Operations. The pilot in command may (authorize) takeoff with one PMC inoperative. 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.

A12.5.9. Flight Maneuvers. The following maneuvers are authorized for qualification and continuation training. They are applicable to all mission and series C-135 aircraft, except when prohibited or restricted by the flight manual, partial/modification flight manual or other applicable directives. Direct instructor-pilot (IP) super-vision requires the IP to have immediate access to the controls. Comply with Training Restrictions in Table 9.2 of this instruction and the following:

A12.5.9.1. Simulated Engine Failure. Perform practice or simulated loss of engines IAW this instruction, the applicable flight manual.

A12.5.9.2. Approach and Landing, Simulated Engine-Out (direct IP supervision).

A12.5.9.3. Approach and Go-Around, Simulated Engine-Out (Power Rudder On). A planned three-engine go-around may be started at any time before the power is reduced in the flare. For an unplanned go-around use all four engines as soon as safe and practical.

A12.5.9.4. Approach and Go-Around, Simulated Engine-Out (Power Rudder Off) (direct IP supervision). This maneuver will not be accomplished unless an IP has briefed the maneuver prior to flight. The go-around will be started no lower than 200 AGL. For an unplanned go-around, use all four engines as soon as safe and practical.

A12.5.9.5. Simulated Engine Failure Takeoff Continued (direct IP supervision).

A12.5.9.6. Simulated 2-Engine Approach/Landing (direct IP supervision). May be practiced using two symmetric engines or three engines using two-engine procedures. Two-engine approaches and landings will not be practiced in an extensively modified aircraft. NOTE: During a go-around or missed approach, use the asymmetric engine as required to ensure at least a 3.3% climb gradient.

A12.5.9.7. Simulated Jammed Stabilizer Demonstration (spoiler use only) (direct IP supervision).

A12.5.9.8. Landing Attitude Demonstration (IP supervised).

A12.5.9.9. Spoiler/Lateral Control Demonstration (IP supervised).

A12.5.9.10. Trim Demonstration (IP supervised).

A12.5.10. Touch-and-Go Landing Limitations.

A12.5.10.1. Touch and Go landings may be performed under direct instructor pilot supervision or by a certified mission pilot IAW this instruction, AFI 11-2FTV1, and the applicable flight manual. Refer to AFI 11-2FT Vol. 1 as supplemented for specific touch and go training requirements, restrictions and approved airfields (without IP).

A12.5.10.2. Touch-and-go landings with passengers are prohibited. Civilian employees under direct contract to the DoD and MAJCOM approved maintenance personnel engaged in official direct mission support activities are considered mission essential and may be onboard when touch-and-go landings are performed under MEGP status.

A12.5.10.3. Brief touch-and-go landing considerations with the other appropriate aircrew members prior to final approach. On successive approaches, if the briefing remains the same and there are no questions, the briefing need not be repeated.

A12.5.11. Prohibited maneuvers. The following maneuvers, in addition to those already specified in applicable flight manuals, are prohibited unless part of an approved test plan, USAF TPS curriculum, FCF profile, or an actual emergency exists.

A12.5.11.1. Stalls.

A12.5.11.2. Initial Buffet.

A12.5.11.3. Dutch Roll.

A12.5.11.4. Emergency Descent.

A12.5.11.5. Simulated 3 engine, rudder power-off landings.

A12.5.11.6. Compound Emergencies (except simulated engine-out with rudder power or EFAS off).

A12.5.11.7. Takeoffs and landings with the EFAS off.

A12.5.11.8. Actual practice engine shutdown.

A12.5.12. Operating Limitations. Unless specifically authorized elsewhere in this section, do not practice emergency procedures that degrade aircraft performance or flight control capabilities (in-flight).

A12.5.12.1. In-flight, prior to simulating emergency procedures (EP), the pilot will notify all crewmembers.

A12.5.12.2. In the event of an actual emergency, all student training and simulated EPs will be terminated. Training will resume only when the pilot in command has determined that no hazard to safe aircraft operations exist.

A12.5.12.3. Rudder power will be on for all takeoffs and landings. The EFAS will be on for all C/KC-135R/T takeoffs and landings.

A12.5.12.4. Do not practice traffic pattern operations, instrument approaches, low approaches or go-around at gross weights that will not afford a minimum of 500 feet per minute rate of climb at approach speed, three engines, flaps-30, gear-up (gear-down for emergency procedures practice).

A12.5.13. Landing Limitations. The following landing limitations apply to both touch-and-go and full stop landings:

A12.5.13.1. Gross weight. Landing gross weights will be at a gross weight that will permit a safe, full stop landing in the runway available. At gross weights above 200,000 pounds pilot will brief and comply with flight manual sink rate limitations.

A12.5.13.2. Flap Setting. Do not practice landings with less than 30 degree flaps. Full stop landings should normally be made with 50 degree flap settings. Consideration should be given to runway length, landing distance (including flare and stopping distance), crosswinds, RCR, and other factors influencing the landing ground roll in deciding to land with less than 50 degrees of flaps.

A12.5.13.3. Multiple Full Stop Landings. Compute brake energy prior to each subsequent takeoff.

A12.5.13.4. Final Landing Fuel. Final landing fuel will not be less than **5,900** pounds. Engineering analysis has proven that engine fuel starvation is imminent past this point.

A12.5.14. Zero-Degree Flap Approach. Do not practice zero-degree flap approaches unless an instructor pilot has access to a set of flight controls and no emergencies (actual or simulated) exist. The approach will be terminated no lower than 200 feet AGL.

A12.5.15. Practice Emergency or Abnormal Gear and Flap Operation. Accomplish clear of clouds (not applicable when IP-supervised). May be accomplished day or night.

A12.5.16. Simulated Instrument Flight. Artificial vision restricting devices are not authorized for any phase of flight unless as part of an approved flight test plan. Simulated instrument flight may be flown and logged without the use of a vision-restricting device.

Attachment 13

F-35 OPERATING PROCEDURES

A13.1. General Information. The F-35 will be operated IAW this instruction, approved test plans and applicable Contractor Flight Operations Procedures.

Attachment 14

F-4 OPERATING PROCEDURES

A14.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the F-4 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all F-4 series aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A14.2. Mission Planning.

A14.2.1. TOLD will be calculated for every sortie using the current Flight Planning System. Off station crews may utilize the performance section of 1F-4(R)C-1CL or contact flight test operations to use specified software. There is no requirement to calculate or post a No-Chute Max Abort speed."

A14.3. Common Mission Guidance.

A14.3.1. Formation Procedures**.**

A14.3.1.1. Formation Takeoffs and Formation landings are prohibited.

A14.3.1.2. Close Formation. Wingmen must maintain wingtip clearance by flying a position that aligns the forward tips of the lead aircraft's stabilator and puts the aft join-up light in the star on the fuselage. Keep this position throughout all turns.

A14.4. Instrument Procedures.

A14.4.1. The F-4 is approach category E.

A14.5. Operating Procedures and Restrictions.

A14.5.1. Maneuvering Parameters**.** T.O. 1F-4C-1, TPS Guides and applicable phase manuals in addition to this instruction will be used to define and describe the performance of stalls, confidence maneuvers, aerobatics, or advanced handling maneuvers.

A14.5.2. Rig/Stab Aug checks are required prior to the performance of stalls, confidence maneuvers, or other maximum performance/high AOA maneuvering.

A14.5.2.1. Do not maneuver the aircraft at high AOA if an out-of-rig condition, malfunctioning Stab Aug, or asymmetrical load exists. Fly a straight-in approach for landing.

A14.5.2.2. The Roll channel of the Stab Aug will be disengaged for stalls, confidence maneuvers, and other maneuvers in which rudder rolls or reversals will be accomplished.

A14.5.3. Maneuvering Limitations. All flight maneuvering, except stall demonstrations and confidence maneuvers, is limited to a maximum of 19.2 units AOA, excessive wing rock, or 200 KIAS, whichever occurs first. A radio call to "Knock-It-Off" is normally required; however, at 200 KIAS primary attention will be devoted to regaining an adequate energy state. Stall demonstrations, confidence maneuvers, and indexer light orientations are limited to 120 KIAS.

A14.5.4. Approach to Stalls Restrictions:

A14.5.4.1. An IP is required in the aircraft for all stall demonstrations (except FCF missions).

A14.5.4.2. Initiate recovery at the first indication of nose rise, nose slice, 30 degree wing rock, or build-up of side forces (tendency to move pilot to the side of the cockpit), whichever occurs first. If no stall indications occur, initiate recovery not to exceed 25 units AOA; initiate landing configuration stall recoveries at 22.3 units AOA (pedal shaker).

A14.5.4.3. Stall recoveries will be IAW the flight manual.

A14.5.4.4. Minimum entry altitude is 15,000 feet AGL, maximum entry altitude is 25,000 feet MSL (20,000 feet MSL for accelerated & landing configuration stalls). Minimum altitude during recovery is 5,000 feet AGL.

A14.5.4.5. Approach to Accelerated Stalls. Discontinue the maneuver if the stall indications have not been observed before decelerating through 300 KIAS.

A14.5.5. Approach to Stall Demonstration Maneuvers.

A14.5.5.1. 1G stall approaches (clean/gear-flap configurations): Power is set at 80-85 percent.

A14.5.5.2. Accelerated Stall Approaches:

A14.5.5.2.1. Power is set at military

A14.5.5.2.2. Entry airspeed is 350-400 knots.

A14.5.6. Confidence Maneuvers.

A14.5.6.1. Minimum entry altitude is at or above 15,000 feet AGL to be recovered by 10,000 feet AGL. Entry airspeed is 300 knots for all maneuvers; ensure power is at MIL NLT 200 knots. Minimum airspeed is 120 knots.

A14.5.6.2. AOA Recovery. Set and maintain a 45-60 degree climb. At 200 knots, establish and maintain 3 to 8 units AOA. Recover at 250 knots.

A14.5.6.3. Low AOA Rolls. Set and maintain a 45-60 degree climb. At 200 knots, establish and maintain 3 to 8 units AOA and roll the aircraft 360 degrees with ailerons. Maintain 3 to 8 units AOA with wings level upright. Recover at 250 knots.

A14.5.6.4. High AOA Roll. Set and maintain a 30 degree climb At 200 knots (approx 10 to 15 units AOA), roll the aircraft 360 degrees with rudder; maintain 16 to 18 units AOA throughout rudder roll. Stop the roll with opposite rudder and reestablish/maintain 3 to 8 units AOA. Recover at 250 knots.

A14.5.6.5. Inverted Recovery. Set and maintain a 45-60 degree climb. At 200 knots, establish and maintain 3 to 8 units AOA and roll the aircraft 180 degrees with ailerons. Maintain 3 to 8 units AOA inverted until 200 knots **(*CAUTION:*** *Too much forward stick could cause a negative-G inverted stall*). At 200 knots, roll the aircraft upright and maintain 3 to 8 units AOA. Recover at 250 knots.

A14.5.6.6. For all recoveries expect degrees nose low while at 3 to 8 units AOA to equal degrees nose high from initial entry; i.e. expect to initiate recovery from 45-60 degrees nose low on all but the High AOA roll (30 degrees).

A14.5.7. Advanced Handling Maneuvers.

A14.5.7.1. Minimum altitude for advanced handling is 5,000 feet AGL (10,000 feet AGL over water); maximum AOA is 19.2 units and minimum airspeed is 200 knots. Use parameters IAW *F-4 Advanced Handling Maneuvers* in Table A14.1.

A14.5.8. Unusual Attitude Recoveries.

A14.5.8.1. An IP/SEFE is required for all Unusual Attitude Recoveries.

A14.5.8.2. Nose-Low Recovery. Confirm unusual attitude exists. Set power and roll to nearest horizon while pulling max available G until on-speed. If > 420 knots, set power at idle and extend speedbrakes; if <420 knots, select afterburners. Maintain on-speed until recovered. A14.5.8.3. Nose-High Recovery. Confirm unusual attitude exists. If >250 knots, execute *Inverted Recovery* (IAW para A14.6.6.5) in MIL/afterburner as required. If <250 knots, execute *AOA Recovery* (IAW para A14.5.6.2.) in afterburner. IMC/Simulated IMC recoveries will roll to a maximum of 90 degrees of bank.

A14.5.9. Aerobatic Maneuvers.

A14.5.9.1. Minimum altitude for aerobatics is 5,000 feet AGL; maximum AOA is 19.2 units and minimum airspeed is 200 knots. Use parameter IAW *F-4 Aerobatic Maneuvers* in Table A14.2.

Table A14.1. F-4 Advanced Handling Maneuvers.

ITEM	A MANEUVER	B ENTRY	C REMARKS
1	Nose-High Minimum-Time Turn	450 to 500 KIAS	4 to 5 Gs until reaching 19.2 units.
2	Nose-Low Minimum-Time Turn	350 to 400 KIAS	4 to 5 Gs until reaching 19.2 units.
3	Rudder Reversal	350 to 400 KIAS	, 250 knots min.
4	Rudder Roll	350 to 400 KIAS MIL Power	, 300 knots min.

Table A14.2. F-4 Aerobatic Maneuvers

ITEM	A MANEUVER	B ENTRY	C POWER SETTING	D REMARKS
1	Lazy 8	450 KIAS	90%	Approx 300 KIAS at 45°/45°/45° point. 200 to 230 KIAS/ 90° of bank at horizon
2	Chandelle	450 KIAS	90%	60° of bank at 45° of turn.
3	Aileron Roll or Barrel Roll	300 to 450 KIAS	92%-100%	
4	Split S	270 to 300 KIAS	As required	Entry altitude is at least 15,000 ft AGL.
5	Cloverleaf	450 KIAS	MIL	3G, 200 knots over the top.
6	Cuban 8, Loop, or Immelman	500 KIAS 450 KIAS	MIL AB	4.5 to 5Gs until on speed, 200 knots over the top.

Attachment 15

F-15 OPERATING PROCEDURES

A15.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the F-15 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all F-15 series aircraft. The notation, F-15, will be used to describe both the F-15A/B/C/D and F-15E. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A15.2. Mission Planning.

A15.2.1. Centrifuge. F-15E WSOs current and qualified with respect to centrifuge requirements (as defined by AFI 11-404) are not required to attend centrifuge training for the higher-g F-15B/D profile.

A15.2.2. Unit Developed Checklists. Unit developed checklists may be used in lieu of flight manual checklists (except -25 checklists) provided they contain, as a minimum, all items (verbatim and in order) listed in the applicable checklist~~.~~

A15.2.3. Low Altitude Map Preparation / Terrain Following (TF) Flight Map.

A15.2.3.1. On all low altitude flights, each aircraft in the flight will contain a minimum of one Chart Handbook Manual (CHUM) updated map of the low altitude route or training areas. The map will be of a scale and quality that terrain features, hazards, and chart annotations are of sufficient detail to allow navigation and safe mission accomplishment.

A15.2.3.2. Annotate all maps with a Route Abort Altitude (RAA). Compute the RAA for the entire route/area at a minimum of 1,000 feet (2000' in mountainous terrain) above the highest obstacle/terrain (rounded up to the next 100 feet) within the lateral limits of the route or training area, but in no case less than 5NM either side of planned route.

A15.2.3.3. For TF flight, annotate a Minimum Safe Altitude (MSA) for each leg of the intended route of flight. MSA is defined as an altitude that provides 1000 feet of clearance above the highest obstacle/terrain (rounded up to the next 100 feet) within 5NM of the planned course.

A15.2.3.4. Planned night turn point bank angles should reflect system limitations to ensure maps accurately display planned routes. Flight leads should select TF letdown points that avoid initial descents into rugged or mountainous terrain at night (defined by TO 1F-15E-1 as any vertical change that exceeds 900 ft/NM).

A15.2.4. Briefing/Debriefing.

A15.2.4.1. Emphasize low altitude flight maneuvering, obstacle and ground avoidance, Low Altitude Warning System (LAWS) features and limitations, low altitude comfort level, and complacency avoidance on all low-level mission briefings. For low altitude training over water and featureless terrain, include specific considerations with emphasis on minimum altitudes and spatial disorientation.

A15.2.4.2. Weapon Systems Officers (WSOs) should brief items applicable to rear cockpit duties during the mission.

A15.2.5. Stowing Equipment in Bay 5 (F-15A/C). Stow containers or baggage with hard sides inside a Bay 5 cargo container. Without a cargo container, stow only soft-sided personal equipment baggage, such as hang-up or A-3 bags, in Bay 5. Items stowed in Bay 5 will be positioned so as not to interfere with circuit breakers, test equipment, and ICS cables. Items should be secured with non-stretchable cord in such a manner to prevent movement in all three axes of motion. The pilot is responsible for ensuring items stowed in Bay 5 are loaded correctly and properly secured. The carriage restrictions for the Bay 5 cargo container are identical to the MXU-648/A cargo pod except for the airspeed restriction, which does not apply. Aircraft with items stowed in Bay 5 will not perform aerobatics but may execute tactical intercept missions restricted to LIMITED maneuvering. Do not execute zero or negative G maneuvers unless safety of flight dictates.

A15.3. Common Mission Guidance.

A15.3.1. Ground Visual Signals. When ground intercom is not used, use visual signals IAW AFI 11-218, *Aircraft Operations and Movements on the Ground* and this volume. The following signals augment AFI 11-218.

A15.3.1.1. Jet Fuel Starter (JFS) Start: With clenched fist, pilot makes a pulling motion.

A15.3.1.2. Flight Controls Check: Raise arm, clench fist, and make a stirring motion.

A15.3.1.3. Brake Check: Hold left or right arm horizontal, open hand and push forward, breaking at the wrist (as in applying rudder pedal pressure with feet).

A15.3.1.4. Digital Electronic Engine Control (DEEC), Improved Digital Electronic Engine Control (IDEEC)/Automatic Thrust Departure Prevention System (ATDPS) Check: With the fingers and thumb of each hand extended and joined at the tips, open and close the fingers and thumbs of both hands simultaneously, simulating nozzle opening and closing.

A15.3.1.5. Target Pod Clear: Extend arm and rotate a closed fist in a circular motion.

A15.3.2. Taxi / Takeoff. If the computed military power takeoff distance exceeds one-half of the available runway, takeoff using afterburner.

A15.3.3. Join-Up/Rejoin. Flight leaders will maintain 350 KCAS until join-up is accomplished unless mission requirements necessitate a different airspeed.

A15.3.4. Tactical Formation.

A15.3.4.1. Wingmen/trail elements will cross above the lead/lead element when deconfliction is required during tactical maneuvering.

A15.3.4.2. De-confliction Responsibilities. The wingman is responsible for flight path deconfliction during tactical maneuvering unless he calls “Padlocked", “Blind”, or “Engaged” and flight lead acknowledges.

A15.3.5. Minimum Altitudes.

A15.3.5.1. Nose high, low speed recoveries and Aircraft Handling Characteristics (AHC) vertical maneuvers: 10,000 feet AGL.

A15.3.5.2. Aerobatics: 5,000 feet AGL.

A15.3.6. Radio Procedures.

A15.3.6.1. Any flight member may make a "Knock-It-Off" or "Terminate" call IAW AFI 11-214. A KIO applies to any phase of flight and any type of mission.

A15.3.7. Air-to-Air Weapons Employment.

A15.3.7.1. Simulated Gun Employment. Missions may be flown with a loaded gun provided the gun is safe IAW TO 1F-15A/ E-34-1-1-CL-1 and a trigger check is performed prior to the first engagement. Never perform a trigger check with a hot gun, regardless of Master Arm switch position.

A15.3.7.2. Maneuvering Limitations. Minimum airspeed during low altitude offensive or defensive maneuvering (LOWAT) is 350 KCAS.

A15.3.8. Air-to-Surface Weapons Employment.

A15.3.8.1. Simulated Attacks against Off-Range or Manned Targets May be conducted, to include use of Master Arm and A/G Master Mode, when carrying practice ordnance under the following restrictions:

A15.3.8.1.1. No live or carted heavyweight inert A/G ordnance, or live A/A missiles are loaded.

A15.3.8.1.2. The A/G training mode is used on the Programmable Armament Control Set (PACS).

A15.3.8.1.3. Stations loaded with carted practice ordnance are not selected on the training PACS.

A15.3.8.1.4. The combat laser may be used only in approved areas.

A15.3.8.2. Loft Recovery Procedures in Night or IMC Conditions. Escape maneuvers following loft deliveries are instrument recoveries which exceed numerous TF limits. Use the following procedures to manually recover to within TF limits:

A15.3.8.2.1. Recovery Initiation Altitude (RIA) is the sum of the escape corridor MSA and altitude lost during the dive recovery. Compute RIA for the planned escape corridor. The escape corridor is defined as a 10NM wide corridor, starting at the planned roll out point and extending for 8NM along the egress heading. The MSA is 1,000 feet above the highest obstacle within the corridor, rounded up to the nearest 100 feet.

A15.3.8.2.2. Following release, roll to 120-135 degrees of bank and execute a 4-5G slicing turn. As the nose passes the horizon, decrease bank angle to 90 degrees and continue to decrease bank angle to keep the nose from dropping lower than 10 degrees nose low. Roll out on egress heading or upon reaching 10 degrees nose low and follow TF steering when it appears. If approaching RIA before rolling out, or before TF steering appears, pull to recover at or above MSA.

A15.3.8.2.3. An Electronic Attitude Director Indicator (EADI) will be displayed in both cockpits throughout the loft maneuver and recovery.

A15.3.8.2.4. If the TF system fails during recovery, maintain the appropriate minimum altitude (RAA/MSA) that provides terrain clearance.

A15.3.8.2.5. If at any time during a low altitude, nose-high LANTIRN weapons delivery (loft) or recovery, airspeed drops below 300 KCAS, abort the maneuver and recover. Direct primary emphasis towards aircraft attitude, altitude and regaining airspeed.

A15.3.8.3. Pop-Up Attacks**.** Abort pop-up attacks if airspeed decreases below 350 KCAS (300 KCAS above 10,000 feet AGL).

A15.3.9. Low Altitude Procedures.

A15.3.9.1. Fly low level formation positions/tactics using AFTTP 3-1vMDS, AFTTP 3-3vMDS as guides.

A15.3.9.1.1. Line abreast formation is authorized at or above 300 feet AGL. When flying below 300 feet AGL, direct the wingman to a wedge formation position.

A15.3.9.2. Obstacles:

A15.3.9.2.1. All obstacle avoidance planning will be based on Minimum Safe Altitude (MSA) and Route Abort Altitude (RAA).

A15.3.9.2.2. If unable to visually acquire or ensure lateral separation from known obstacles that could be a factor to the flight, flight leads will direct a climb not later than 3 NM prior to ensure sufficient vertical separation. Do not descend back into the low level environment until visual with the obstacle or positional awareness dictates it is safe to do so.

A15.3.9.2.3. Low Altitude Warning System (LAWS) equipped aircraft. During all low altitude operations the LAWS will be set at 90 percent of the briefed minimum altitude or 90 percent of the command-directed minimum altitude, whichever is higher.

A15.3.9.3. Minimum Airspeed. The minimum airspeed for low level (less than 1000'AGL) navigation is 300 KCAS.

A15.3.9.4. For night or IMC operation the minimum altitude is 1000 feet above the highest obstacle within 5 NM of course unless operating under the conditions of paragraph A15.3.10., General Terrain Following (TF) Operations.

A15.3.9.5. For Air to Surface range operations min altitudes will be determined by Range restrictions, AFI 11-214 restrictions, or aircrew minimums, whichever is greater.

A15.3.9.6. Visual Meteorological Conditions (VMC) Route/Area Abort Procedures. Comply with VFR altitude restrictions, maintain VMC and squawk applicable (IFF/SIF) modes and codes. Attempt contact with controlling agency, if required.

A15.3.9.7. IMC Route/Area Abort Procedures. Immediately climb to, or above, the briefed RAA and maintain preplanned ground track. Execute appropriate lost wingman procedures if necessary. If deviations from normal route/area procedures are required, or if the RAA/MSA is higher than the vertical limits of the route/area, squawk (IFF/SIF) emergency. Attempt contact with the appropriate ATC agency for an Instrument Flight

Rules (IFR) clearance. If required to fly in IMC without an IFR clearance, cruise at appropriate VFR altitudes until IFR clearance is received.

A15.3.10. General Terrain Following (TF) Operations**.**

A15.3.10.1. The minimum altitude for TF training will be the higher of MTR, MOA, or aircrew LASDT qualification, but not lower than 500' AGL at night or in IMC.

A15.3.10.2. An operational LANTIRN system is required to conduct night or day IMC low level operations below the MSA. If Low Altitude NVG qualified comply with restrictions in para 3.3.8.7. of the basic instruction.

A15.3.10.3. For training, unarmed TF operations are prohibited.

A15.3.10.4. Minimum equipment required for TF operations is TF radar, radar altimeter (RALT), and E-SCOPE. For IMC TF a functioning A/A and A/G radar is also required. For night operations, a usable Navigation/Forward Looking Infrared (NAV/FLIR) HUD image is required. NVGs may be used in place of the NAV/FLIR.

A15.3.10.5. Each crew will confirm by inter-cockpit communication that the TF and RALT are on and working properly before descending below the MSA.

A15.3.10.6. Any maneuvering that will put the aircraft outside of TF limits, negating fly-up protection, will be at or above the applicable MSA or RAA.

A15.3.10.7. Abnormal Operation during IMC TF. Aircrews who experience failure of any portion of the TF system or A/A / A/G radar while flying IMC TF will immediately climb to (or above) the MSA (or RAA if not within 5NM of course). If the failure(s) can be cleared and safe TF regained, TF operations may resume. Otherwise terminate the low level portion of the mission.

A15.3.11. Approaches and Landings.

A15.3.11.1. The desired touchdown point is 500-1000 feet past the runway threshold for a VFR pattern or 500-1000 feet past the Runway Point of Intercept (RPI) for a precision approach.

A15.3.11.2. Landing Restrictions:

A15.3.11.2.1. Do not land over any raised web barrier (e.g. MA-1A, 61QS11), or loose or slack cable (e.g. BAK-12/13/14).

A15.3.12. NVGs.

A15.3.12.1. Night BD checks are permitted only when wearing NVGs.

A15.3.12.2. Aircrew that are NVG Medium Altitude Qualified may fly below the MSA while wearing NVGs during low level navigation if using the TF system for terrain avoidance. With any failure of the TF system the aircrew will immediately climb to (or above) the MSA (or RAA if not within 5NM of course)

A15.4. Instrument Procedures.

A15.4.1. The F-15 is Approach Category E.

A15.4.2. Area Navigation. The F-15 INS and EGI are approved for Enroute Area Navigation (RNAV); however, RNAV and GPS approaches are not authorized.

A15.4.3. Trail Departures.

A15.4.3.1. Each aircraft/element will accelerate in MIL/AB power until reaching 350 KCAS. Climb at 350 KCAS until reaching cruise mach/TAS IAW Flight Manual, unless otherwise briefed.

A15.4.3.2. Upon reaching 350 KCAS, the flight leader will set 850 FTIT for PW-100/-220 and 900 FTIT for PW-229 unless otherwise briefed.

A15.4.4. Electronic Attitude Director Indicator (EADI) – F-15E. In IMC the EADI must be used as the primary attitude reference by the crewmember flying the aircraft. The F-15E HUD is not certified as a Primary Flight Reference (PFR) IAW AFI 11-217V1; therefore, it cannot be used as a sole attitude reference.

A15.4.4.1. The HUD is the primary reference for low level/TF operations. Do not use the HUD to recover from an unusual attitude or when executing lost wingman procedures except when no other reference is available.

A15.5. Operating Procedures and Restrictions.

A15.5.1. General. Follow the procedures in this chapter when other than normal circumstances occur. These procedures do not supersede flight manual guidance.

A15.5.2. Aircraft Over-G Procedures.

A15.5.2.1. Non-OWS equipped aircraft and OWS equipped aircraft whose OWS is not operational will terminate the mission and land as soon as practical from a straight-in approach.

A15.5.2.2. Aircraft equipped with an operable OWS system will immediately terminate maneuvering and call up the OWS matrix:

A15.5.2.3. If level "1" (one) is displayed in any column of the matrix except Mass Items (MIT), perform a battle damage check. If no abnormalities are noted, the flight lead may continue the briefed mission. If a subsequent level "1" or greater over-G occurs, terminate the mission, perform a battle damage check, RTB and fly a straight-in approach.

A15.5.2.4. If level "1" (one) or greater is displayed in the MIT column, or level "2" (two) or greater is displayed in any column of the matrix, terminate the mission, perform a battle damage check, RTB and fly a straight-in approach.

A15.5.2.5. Document over-Gs (level 1 or greater) in the AFTO Form 781.

A15.5.3. In-flight Practice of Emergency Procedures.

A15.5.3.1. A Simulated Emergency Procedure is defined as any procedure that produces an effect that closely parallels an actual emergency, such as retarding the throttle to simulate the drag equivalent to a flamed out engine.

A15.5.3.2. Practice aborted takeoffs only in the flight simulator, Cockpit Procedures Trainer (CPT), or a static aircraft.

A15.5.3.3. Simulated in-flight loss of both engines and practice in-flight engine shutdown is prohibited unless part of a syllabus for a formal training course such as TPS.

A15.5.3.4. Emergency Landing Patterns. Include the type of practice emergency pattern if appropriate in the gear down call.

Attachment 16

F-16 OPERATING PROCEDURES

A16.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the F-16 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of F-16 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A16.2. Mission Planning.

A16.2.1. Takeoff and Landing Data.

A16.2.1.1. Compute a 2,000 foot acceleration check speed anytime the computed takeoff roll exceeds 2,500 feet. When the computed takeoff roll is 2,500 feet or less, use the actual takeoff distance versus the computed takeoff distance to evaluate aircraft performance.

A16.3. Common Mission Guidance.

A16.3.1. General Requirements and Restrictions.

A16.3.1.1. **(B/D model aircraft)** When the rear cockpit is occupied by other than a fully qualified F-16 pilot, the stick control switch will be placed in the FWD position.

A16.3.1.2. Baggage or equipment will not be carried in the avionics bay behind the cockpit or in the aft canopy fixed transparency area.

A16.3.1.3. Baggage or equipment will not be carried in an unoccupied F-16B/D rear cockpit.

A16.3.1.4. Objects will not be placed in or on top of the engine intake.

A16.3.1.5. Publications, maps and personal items placed in the cockpit will be secured to avoid flight control and throttle interference.

A16.3.1.6. Pilots will ensure the ejection seat survival kit deployment switch is in the automatic position.

A16.3.1.7. The CAT III position of the Stores Configuration Switch will be selected when the aircraft is configured with a Category III loading in accordance with aircraft technical orders.

A16.3.1.8. Aircraft will not descend below 5,000 feet AGL during any portion of aerobatic maneuvering.

A16.3.1.9. Flight through wingtip vortices and jet wash should be avoided. If unavoidable, the aircraft should be unloaded immediately to approximately 1 G.

A16.3.1.10. Unless conducting authorized High AOA training, do not attempt to bypass flight control limiters to improve performance. Examples are: fuel transfer to alter center of gravity or use of the manual pitch override (MPO).

A16.3.1.11. Unless conducting authorized High AOA training, the minimum airspeed for all maneuvering is based upon activation of the low speed warning tone. When the low speed warning tone sounds, the pilot will take immediate action to correct the low speed condition.

A16.3.1.12. The minimum airspeed for low level navigation is 300 KCAS. If conditions allow, enough airspeed and altitude should be maintained to allow a zoom and JFS-assisted airstart attempt in the event of engine failure.

A16.3.1.13. Use of Altimeters.

A16.3.1.13.1. General. For those aircraft so equipped, the radar altimeter will be on for all flights. The MSL Floor altitude advisory will be used for those missions that are conducive to spatial disorientation (night/IMC), or where minimum altitudes must be observed (ACBT floors).

A16.3.1.13.2. Non-TFR Operations. Set the ALOW function of the radar altimeter no lower than the briefed minimum altitude.

A16.3.1.14. Afterburner Use. Do not use AB below 2,000 pounds total fuel or established bingo fuel, whichever is higher, unless required for safety of flight.

A16.3.2. Ground/Taxi Operations.

A16.3.2.1. Ice FOD Procedures. The following procedures apply when the conditions in the flight manual indicate engine damage due to icing is possible.

A16.3.2.1.1. The first aircraft will start 5 minutes early to check for inlet ice formation. The pilot will brief the crew chief to look for ice build up on the inlet lip and strut heater. Shutdown immediately if icing is visually detected, and notify the SOF and the squadron supervision.

A16.3.2.1.2. Position ANTI ICE switch to ON prior to engine start.

A16.3.2.1.3. An ice FOD monitor must be available to monitor the engine inlet for ice buildup whenever the aircraft is stopped for an extended period of time (i.e. ramp/shelter and EOR). While taxiing, avoid unnecessary stops en-route to EOR. If possible, remain at the ramp, or in the shelter until traffic delays are eliminated. Avoid standing water and snow or slush accumulations. When pulling into the arming area, attempt to stop the aircraft over an area clear of water, ice, or snow.

A16.3.2.1.4. Hold in the arming spot with an ice FOD monitor present until cleared for take-off.

A16.3.2.1.5. Shutdown immediately if icing is visually detected and notify the SOF and the squadron supervision. Make an appropriate entry in the aircraft forms. A qualified crew chief should accomplish an intake inspection prior to restarting the engine.

A16.3.2.2. Quick Check and Arming. Place hands in view of ground personnel while the quick check inspection, arming, or de-arming are in progress. If the intercom system is not used during EOR checks, the pilot will establish and maintain visual contact with the maintenance team chief or weapons load chief to facilitate the use of visual signals.

A16.3.2.3. EPU Check. When accomplishing EPU checks at EOR, pilots will ensure that maintenance technicians do not approach the aircraft until the EPU check is complete. Use a "thumbs up" signal or the intercom to indicate when it is safe.

A16.3.3. Takeoff.

A16.3.3.1. Make an afterburner takeoff anytime the computed MIL power takeoff roll exceeds 50 percent of the available runway.

A16.3.3.2. When centerline stores are carried, start the takeoff roll beyond a raised approach end cable, unless runway length, runway conditions (wet/icy), winds, gross weight or cable availability dictate otherwise. Aircraft configured with a centerline fuel tank may takeoff across approach end BAK-12 arrestment cables which are tied down with an 8-point system.

A16.3.3.3. For single ship takeoffs, aircraft will steer toward the center of the runway.

A16.3.3.4. To takeoff in formation, aircraft must be within 2,500 pounds gross weight of each other and have the same type engine (PW-220 vs. PW-220, etc.).

A16.3.4. Overhead Traffic Patterns.

A16.3.4.1. Tactical entry to the overhead traffic pattern is permitted if the following conditions are met:

A16.3.4.1.1. Published overhead pattern altitude and airspeed will be used.

A16.3.4.1.2. Specific procedures will be developed locally and coordinated with appropriate air traffic control agencies.

A16.3.4.1.3. Four aircraft are the maximum permitted. Aircraft (or elements) more than 6,000 feet in trail will be considered a separate flight.

A16.3.4.1.4. Regardless of the formation flown, no aircraft should be offset from the runway in the direction of the break. The intent is to avoid requiring a tighter than normal turn to arrive on normal downwind.

A16.3.4.1.5. Normal downwind, base turn positions, and spacing will be flown.

A16.3.5. Functional Check Flights (FCF). If an FCF is flown for engine-related causes, a maximum afterburner takeoff will be performed to maximize climb capability to obtain an immediate SFO high key position. A ceiling, if present, must be confirmed to be at least 500 feet above computed high key altitude. In all cases, departure-field weather must permit an immediate overhead SFO pattern where VMC can be maintained throughout the pattern. All engine-related FCF checks must be accomplished within gliding range of a suitable landing field and weather must permit a VMC descent to high key and VMC SFO at that airfield. Pilots flying engine-related FCFs will verify that these requirements can be met prior to takeoff.

A16.3.5.1. If the ceiling directly over the departure field is lower than 500 above the computed high key altitude, the following alternate procedures are authorized. A pre-planned and coordinated position and altitude (alternate high key) that will allow for an immediate VMC SFO will be determined prior to takeoff. The weather at the alternate high key must have a ceiling no lower than 500 feet above the computed altitude required, the field must be visible from this position, and the pilot must be able to maintain VMC throughout the SFO. These procedures must be coordinated and published locally, and pilots must be able to practice SFOs from the alternate high key position.

A16.3.6. Advanced Handling Characteristics. Minimum altitude for the Horn Awareness and Recovery Series (HARTS), Confidence Maneuvers, and Advanced Handling Maneuvers is 10,000 feet AGL. Reference the applicable exercises or maneuvers for minimum and recommended entry altitudes. Procedures for these maneuvers are found in AFTPP 3-3.F-16. HARTS maneuvers will be flown in CAT-1 configured aircraft only.

A16.3.7. NVG Lighting Restrictions. The use of the “WING/TAIL – OFF” simultaneously with “COVERT-FORM” or “COVERT-ALL” is a prohibited external lighting configuration for NVG operations.

A16.3.8. Air-to-Air Operations.

A16.3.8.1. Maneuvering Limitations.

A16.3.8.1.1. Minimum airspeed during offensive or defensive maneuvering below 5,000 ft AGL is 350 KCAS.

A16.3.8.1.2. All CAT I configurations are authorized for unlimited maneuvering, as defined by AFI 11-214. CAT III configured aircraft must maintain 200 KCAS minimum during maneuvering.

A16.3.8.2. Simulated Gun Employment. The gun is considered SAFE and simulated gun employment is authorized if the following conditions are met:

A16.3.8.2.1. Preflight. Accomplished IAW DASH-34 Cold Gun (SAFE) Procedures.

A16.3.8.2.2. In-Flight. A trigger check must be performed with the Master Arm switch in SIMULATE and the aircraft pointed away from other aircraft and inhabited areas. If HUD symbology reads "ARM" or SMS/MFD symbology reads "RDY," do not depress the trigger or continue with simulated weapons employment. Regardless of Master Arm switch position, do not perform a trigger check with a "hot" gun.

A16.3.9. Air-to-Surface.

A16.3.9.1. Off-Range Attacks**.** With expendable stores (bombs, external fuel tanks, TERs carted at the pylon, etc.) loaded on the aircraft, simulated weapons will be loaded (zero quantity) in the SMS/MFD only on empty or uncarted/unexpendable stations. EXCEPTION: When loaded, captive Maverick and HARM missiles may be selected. The Master Arm switch will be confirmed in OFF or SIMULATE prior to the first attack.

A16.3.9.2. Pop-Up Attacks. Abort pop-up attacks if airspeed decreases below 350 KCAS (300 KCAS above 10,000 feet AGL).

A16.3.9.3. Night Weapons Delivery/Range Operations.

A16.3.9.3.1. Compute a MSA for the entire bombing pattern.

A16.3.9.3.2. Do not exceed 135 degrees of bank when returning to the low altitude structure following practice or actual night weapons deliveries.

A16.3.9.4. LANTIRN Weapons Delivery/Range Operations.

A16.3.9.4.1. If CARA ALOW and/or MSL Floor altitude advisory warnings are used for altitude cues on medium altitude weapons deliveries, care must be taken to reset them as appropriate when descending into the low-level structure.

A16.3.9.4.2. The LANTIRN Attitude Advisory Function (LAAF) must be operational and set at the IP to TGT run-in MSA plus 5,000 feet for all night, self-designated laser-guided bomb (LGB) Loft deliveries.

A16.3.9.4.3. The pilot will perform no duties (i.e., adjusting designation cursor on targeting pod) other than maintaining aircraft control from the initial pull-up during the performance of a night weapons delivery. During safe escape maneuver or during a night climbing delivery which employs a descent back to low altitude, pilots will focus solely on aircraft control until the aircraft is recovered back within TFR limits and TFR indications are adequate to continue safe low altitude operations.

A16.3.9.5. Strafe Procedures**.** To prevent accidental gun firing, pilots will not select strafe mode until just prior to roll-in and will deselect strafe mode after establishing safe recovery parameters from each pass.

A16.3.10. LANTIRN Operations.

A16.3.10.1. Minimum Altitude. The minimum altitude for LANTIRN training will be the higher of VR/IR/MOA minimum altitude, or pilot minimum altitude as certified by the unit commander.

A16.3.10.2. Vision Restriction Device (VRD) Restrictions:

A16.3.10.2.1. VRDs will only be worn while conducting LANTIRN low-level training and LANTIRN weapon deliveries.

A16.3.10.2.2. When a VRD is in use, a safety observer must be present. A safety observer is defined as a crewmember qualified in that aircraft in the rear cockpit of a two-place aircraft or another aircraft flying in the chase position. The chase aircraft must maintain continuous visual contact and have two-way radio communication between aircraft.

A16.3.10.2.3. When a VRD is in use with the safety observer in the rear cockpit, pilots are restricted to the same altitude and procedures they are cleared to for night LANTIRN operations.

A16.3.10.3. Operational Procedures. All procedures in AFI 11-214 apply in addition to the following:

A16.3.10.3.1. Terrain following is prohibited after any alignment other than a full performance INS ground alignment, or extended interrupted alignment with a flashing RDY/ALIGN (status 10 or better) displayed.

A16.3.10.3.2. TFR/LANTIRN systems will be in-flight checked using flight manual procedures on every flight involving TFR/LANTIRN operations.

A16.3.10.3.3. Pilots must ensure all LANTIRN systems are functioning properly prior to sustained low-level operations. If any feature that is critical to overall system performance - Flight Control System (FLCS), INS, Combined Altitude Radar Altimeter (CARA) - is questionable or disabled, the checks and/or LANTIRN portion of the mission will be discontinued. When in formation, all pilots will confirm by radio call that the TFR and radar altimeter are on and working properly before descending below the MSA; "(Call Sign), RALT ON, TFR ON."

A16.3.10.3.4. For TFR/LANTIRN operations, the ALOW feature of the CARA will be on and set no lower than 90 percent of the set clearance plane (SCP). The CARA may be placed to standby or off only during air refueling operations. Pilots need to ensure the CARA is tracking properly when descending through 4,500 feet AGL.

A16.3.10.3.5. Minimum airspeed for TFR navigation is 400 KCAS.

A16.3.10.3.6. During descent, pilots will accomplish a 1,000 foot Set Clearance Plane (SCP) level off prior to selecting a lower SCP.

A16.3.10.3.7. Pilots will not conduct LANTIRN operations in IMC below the MSA, and must abide by FLIP weather minimums while on military training routes.

A16.3.10.4. Abnormal Operation:

A16.3.10.4.1. Pilots who experience failure of the terrain following system or failure of the LANTIRN HUD/FLIR imagery system while flying low-level missions will immediately climb to the MSA or above. The mission may be continued at the MSA within the low-level structure provided the aircraft position is known. If aircraft position cannot be positively determined, pilots will terminate that portion of the mission and execute route abort procedures.

A16.3.10.4.2. If the TFR/LANTIRN system fails prior to route entry, pilots may still enter the route and continue the mission at the MSA, provided the above provisions are met.

A16.3.10.4.3. Pilots will honor all system fly-ups and will not continue low-level operations below the MSA without TFR protection. The following procedures will be used at the first indication of a fly-up (pilots need only accomplish sufficient steps of the fly-up procedure to assure terrain clearance or until the fly-up terminates/clears):

A16.3.10.4.4. Allow the fly-up to develop. CAUTION: If an automatic fly-up is not initiated by the system and aural or visual pull-up warnings are present, pilots will manually initiate a fly-up and comply with these procedures.

A16.3.10.4.5. Throttle - As required. CAUTION: Military Power may be required to maintain a safe airspeed. Do not hesitate to use AB if required.

A16.3.10.4.6. When terrain clearance ensured, Paddle Switch - Depress and release. CAUTION: Holding the paddle switch depressed inhibits fly-up commands to the FLCS.

A16.3.10.5. If the system does not reset:

A16.3.10.5.1. Climb to MSA. CAUTION: Using climb angles greater than 20 degrees can result in rapid airspeed bleed off. The use of AB and/or steep climb angles can result in spatial disorientation.

A16.3.10.5.2. Level off at or above MSA and refer to checklist (if required).

A16.3.10.5.3. If the malfunction can be reset, pilots may continue TFR operations.

A16.3.11. High AoA. F-16 Flight Manual prohibited maneuvers of "intentional departures, not recovering at activation of low-speed horn, rudder-assisted rolls, and expanded g-limits" are allowed for test and safety review board approved flight tests and when used during approved High-AOA training programs. This flight manual deviation has been approved by HQ AFMC/A3 per AFMC waiver 09-166.

A16.4. Instrument Procedures.

A16.4.1. The F-16 is approach category E.

A16.4.2. The F-16 INS/GPS and EGI are approved for enroute Area Navigation (RNAV). Neither RNAV nor GPS approaches are authorized.

A16.4.3. Use of the Heads Up Display (HUD). Regardless of Block or OFP, do not use the HUD to recover from an unusual attitude or while executing lost wingman procedures except when no other reference is available. The HUD in F-16 Block 25/30/32 aircraft and Block 40/50 aircraft with Operational Flight Program (OFP) 40T5/50T4 (TV Code 117/115) and later OFPs may be used as a primary flight reference in night/IMC conditions. The HUD in all other F-16 Blocks and OFPs may be used as an additional instrument reference, but not the sole reference, in night/IMC conditions.

A16.5. Operating Procedures and Restrictions.

A16.5.1. Takeoff Aborts. If aborting above 120 KCAS, suspect hot brakes. Taxi the aircraft to the designated hot brake area and follow hot brake procedures. During any abort, the tailhook should be lowered if there is any doubt about the ability to stop on the remaining runway.

A16.5.2. In-flight Practice of Emergency Procedures.

A16.5.2.1. Aborted Takeoff Practice. All practice and/or training related to aborted takeoffs will be accomplished in the flight simulator, Cockpit Familiarization Trainer (CFT) or (if trainer unavailable) a static aircraft.

A16.5.2.2. Practice in-flight engine shutdown is prohibited unless conducting authorized airstart training.

A16.5.2.3. SFO's will not be performed to a touch and go or full stop landing if aircraft gross weight exceeds 23,000 lbs. (A/B model) or 25,000 lbs. (C/D model).

Attachment 17

NOT USED

A17.1. This attachment intentionally left blank as place holder for future use.

Attachment 18

T-38 OPERATING PROCEDURES

A18.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the T-38 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all T-38 series aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A18.2. Mission Planning.

A18.2.1. Takeoff Requirements.

A18.2.1.1. Compute takeoff and landing data for all flights. MAJCOM approved tab data may be used when available. Also, 558th ASCG T-38C (PMP) and T-38C (non-PMP) TOLD calculators may be used.

A18.2.1.2. Operations without a BAK-15. Use Refusal Speed (RS) - Both Engines Operating (RS-BEO) as Go/No-Go speed when Decision Speed (DS) is less than RS-BEO.

A18.2.1.2.1. When DS is greater than RS-BEO, the OG/CC (or designated representative) approval is required. Use Refusal Speed Engine Failure (RS-EF) as the Go/No-Go speed. (Note: Aborts for other than engine failure (e.g., generator lights, fire lights, etc.) initiated between RS-BEO and RS-EF may result in overrunning the runway surface.)

A18.2.1.2.2. When DS is greater than RS-EF takeoffs are not authorized.

A18.2.1.3. Operations with a BAK-15. Use Refusal Speed - Engine Failure (RS-EF) as Go/No-Go speed when DS is less than or equal to RS-EF. (Note: Aborts for other than engine failure (e.g., generator lights, fire lights, etc.) initiated between RS-BEO and RS-EF may result in barrier engagement.)

A18.2.1.3.1. When DS is greater than RS-EF and less than Takeoff Speed (TOS), takeoffs are allowed with OG/CC (or designated representative) approval. Use TOS as Go/No-Go speed with a remotely controlled BAK-15. With a non-remotely controlled BAK-15 in the raised position use Single Engine Takeoff Speed (SETOS) as Go/No-Go speed.

A18.2.1.3.2. When DS is greater than or equal to TOS, or DS & SETOS cannot be validated, takeoffs are not authorized unless specific procedures for operational requirements are developed and approved by the OG/CC. (Note: For some extreme combinations of temperature and pressure altitude, the performance charts will not yield a valid DS or SETOS. This occurs on the DS chart where the curves on the gross weight plot do not extend far enough upwards and on the SETOS chart where the gross weight plot is labeled "SINGLE ENGINE TAKEOFFS NOT POSSIBLE.")

A18.3. Common Mission Guidance.

A18.3.1. General Requirements and Restrictions.

A18.3.1.1. Pilots must take into consideration deviations from standard day temperatures at altitude when planning flights above FL300. The engine compressor stall/flameout susceptibility area chart will be consulted and flight will not be planned into the black striped area.

A18.3.2. Ground/Taxi Operations.

A18.3.2.1. Cold Weather Start.

A18.3.2.1.1. In the event of T-38C EED oil pressure indicator erroneously latching red immediately after a battery start in cold weather (oil pressure in excess of 55 psi), pilots are authorized to continue operating engines until oil pressure returns to within ops limits and then clear the latched oil pressure indication by, with both engines at IDLE, monitoring engine operation via the EED Repeater in the MFD while performing EED IBIT as detailed in the aircraft flight manual.

A18.3.3. Air-to-Air Operations.

A18.3.3.1. Maneuvering Limitations.

A18.3.3.1.1. Minimum airspeed during offensive or defensive air-to-air maneuvering below 5,000 ft AGL is 350 KIAS.

A18.3.3.1.2. Minimum maneuvering airspeed during ACBT is 150 KIAS.

A18.3.4. Air-to-Surface.

A18.3.4.1. Off-Range Attacks**.** With expendable ordnance loaded on the aircraft, simulated weapons employment off range is permitted. However, the master arm must remain safe, and the pickle button or trigger will not be used.

A18.3.4.2. Popup Attacks. Abort pop-up attacks if airspeed decreases below 300 KIAS.

A18.3.4.3. Night Weapons Delivery and Range Operations. Night weapons delivery and range operations are prohibited.

A18.3.5. Low Level

A18.3.5.1. The minimum airspeed on low-level navigation routes is 300 KIAS.

A18.3.5.2. Low-level missions will be flown no lower than 500 feet AGL unless specified in an approved test plan or approved by the OG/CC, and the aircrew is LASDT qualified and current.

A18.4. Instrument Procedures.

A18.4.1. The T/AT-38A/B/C is approach category E.

A18.5. Operating Procedures and Restrictions.

A18.5.1. Icing Restrictions. Do not cruise in forecast or reported icing conditions. Climbs or descents through forecast icing conditions more severe than light rime are prohibited.

A18.5.2. Maneuvering Parameters.

A18.5.2.1. On other than FCF missions, enter T-38 stalls and slow flight below 20,000 feet MSL and terminate above 8,000 feet AGL.

A18.5.2.2. Aerobatic Maneuvers.

A18.5.2.2.1. Aircraft will not descend below 5,000 feet AGL during any portion of aerobatic maneuvering. Aerobatic flight must be performed in special use airspace.

A18.5.2.2.2. Do not extend the flaps in an attempt to improve aircraft performance.

A18.5.2.2.3. Use T-38 aerobatic maneuver guidelines in Table A18.1.

Table A18.1. T-38 Aerobatic Maneuvers.

	A MANEUVER	B ENTRY	C POWER SETTING	D REMARKS
1	Lazy-8	300 to 400 KIAS	90% RPM minimum	
2	Chandelle	350 to 400 KIAS	90% RPM minimum	
3	Aileron Roll	150 KIAS minimum	As required	
4	Barrel Roll	300 to 500 KIAS	90% RPM minimum	
5	Split-S/Sliceback	200 to 300 KIAS	As required	Enter above 15,000 feet AGL
6	Cloverleaf	400 KIAS minimum	90% RPM minimum	
7	Cuban 8, Loop, or Immelmann	450 to 500 KIAS 350 KIAS	500°C EGT minimum AB	
8	Pitch Back	300 to 500 KIAS	500°C EGT minimum	

Attachment 19

KC10 OPERATING PROCEDURES

A19.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the KC-10 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all KC-10 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A19.2. Common Mission Guidance.

A19.2.1. Intersection Takeoffs. Intersection takeoffs are authorized if available runway length meets or exceeds the aircraft minimum runway length from table 2.1.

A19.2.2. Landing Guidance. The following landing limitations apply to both touch-and-go and full stop landings:

A19.2.2.1. All pilots will plan to land on centerline within the touchdown zone.

A19.2.2.2. All touchdowns will be at a gross weight and at a point and speed that will permit a safe, full stop landing in the remaining runway. If this is not possible, initiate a go-around.

A19.2.2.3. The maximum crosswind component for takeoff and full stop landings is 31 knots or flight manual limits, whichever is less.

A19.2.2.4. Transition, to include approaches and touch-and-go landings, can be conducted up to Flight Manual gross weight limits.

A19.2.2.5. Do not land on approach end arresting cables (does not include recessed cables). If the aircraft lands before the cable, the crew should contact the tower to have the cable inspected. Do not takeoff or land over an approach end cable that has been reported slack, loose, or improperly rigged by NOTAMs, ATIS, or ATC.

A19.2.2.6. Perform touch-and-go landings IAW this instruction and the applicable flight manual.

A19.2.2.7. Before final approach, the instructor pilot or qualified Mission Pilot (MP) will brief touch-and-go landing considerations with the other appropriate aircrew members. On successive approaches, if the briefing remains the same and there are no questions, the briefing need not be repeated and the pilot may simply state, "Briefing remains the same."

A19.2.2.8. Do not accomplish touch-and-go landings on slush-covered runways.

A19.2.2.9. The center gear will be extended for touch-and-go landings.

A19.2.2.10. A minimum of 9 wheel brakes must be operational. Antiskid on all operational wheel brakes must be functioning normally.

A19.3. Instrument Procedures. The KC-10 is approach category D, unless gross weight dictates category E.

A19.4. Operating Procedures and Restrictions.

A19.4.1. Prohibited Maneuvers. This section adds aircraft limitations and restrictions to those already specified in flight manuals and applies to all aircrew. Engine out training is covered by AFI 11-2FTV3, Table 5.1. The following maneuvers are prohibited unless on an approved test plan:

A19.4.1.1. Stalls.

A19.4.1.2. Dutch Roll.

A19.4.1.3. Emergency descents.

A19.4.1.4. Unusual attitudes.

A19.4.2. Air Refueling (AR) Limitations.

A19.4.2.1. Do not accomplish AR operations when:

A19.4.2.1.1. Conditions are encountered which, in the opinion of either aircraft commander or the boom operator, result in marginal control of either the aircraft or the boom.

A19.4.2.1.2. Either the tanker or the receiver has less than the full number of engines operating (except B-52).

A19.4.2.1.3. The tanker aircraft is unable to retract the landing gear.

A19.4.2.2. Tanker Autopilot. Aircrews will notify and receive acknowledgement from the receiver pilot any time any axis of the autopilot is not being used.

A19.4.2.3. AR without tanker disconnect capability. AR without tanker disconnect capability means the boom operator cannot trigger an immediate disconnect using either the normal disconnect system or the independent disconnect system (IDS). AR (tanker or receiver) will not be conducted after a known loss of tanker disconnect capability. Exceptions to the restrictions are:

A19.4.2.3.1. During emergency fuel situations.

A19.4.2.3.2. When necessary to complete receiver over-water deployment/redeployment.

A19.4.2.4. Manual boom latching (MBL), emergency boom latching (EBL) and override boom latching (OBL). The MBL, EBL and OBL with IDS system operative may be accomplished without restrictions. To complete training or evaluation in MBL, EBL and OBL procedures without IDS, the following conditions must be met.

A19.4.2.4.1. An AR instructor pilot must be at a set of controls during the receiver contacts (if other than fighter type).

A19.4.2.4.2. Contacts will be limited to the minimum required.

A19.4.2.4.3. The receiver aircraft AR system must be fully operable.

A19.4.2.4.4. Boom operator and receiver pilot must coordinate all actions as required by applicable directives and checklists when making contacts during the situations listed above.

A19.4.2.5. Practice Emergency Separations. Prior to the actual accomplishment of a practice emergency separation, coordination between the tanker pilot, boom operator and the receiver pilot is mandatory. Coordination must include when the separation will occur and who will give the command of execution. Tanker pilot coordination may be accomplished over interphone with the boom operator. Practice emergency separations may be accomplished with passengers onboard. Ensure all passengers are seated with seat belts fastened. Prior to a practice emergency separation from the contact position when conducting AR behind a KC135, a disconnect capability must have been previously determined by a boom operator initiated disconnect.

A19.4.2.6. Limits Demonstration. Prior to a limits demonstration, when conducting AR behind a KC135, a disconnect capability must have been previously determined by a boom operator initiated disconnect.

A19.4.2.7. Receiver AR Training. A qualified receiver IP will conduct training. The receiver pilot must inform and obtain acknowledgement from the tanker pilot and boom operator when an unqualified receiver pilot is receiving AR training. During this time, a boom operator qualified for the applicable category receiver must operate the boom controls, and if the tanker autopilot is off, the tanker must be flown by a pilot current and qualified in tanker AR.

A19.4.2.8. All personnel will be strapped in a crew position during either receiver or tanker AR operations unless a test plan requires personnel to be unrestrained.

A19.4.2.9. Altitude. A/R operations are normally conducted above 12,000 feet MSL, or 10,000 feet AGL, whichever is higher. A/R operations based at or above 12,000 feet MSL which momentarily fall below 10,000 feet AGL, but not lower than 5,000 feet AGL, due to overflight of mountain ridges, peaks, etc., are authorized. A/R operations in support of C-130 receivers at the C-130's optimum refueling altitude, but no lower than 5,000 feet AGL are authorized. A/R performed below those altitudes will only be on an approved test plan or for other operational considerations approved by the OG/CC. Except as noted above, A/R operations below 10,000 feet AGL is considered Low Altitude Air Refueling (LAAR) and must comply with the following:

A19.4.2.9.1. A knowledgeable safety observer will be used.

A19.4.2.9.2. Perform during day, under VFR conditions.

A19.4.2.9.3. Minimum altitude is 3,000 feet above the highest obstacle or terrain within 4 NM of course centerline.

A19.4.2.9.4. Forecast, reported, or observed winds less than or equal to 27 knots.

A19.4.2.9.5. Less than forecast, reported or observed moderate turbulence.

A19.4.2.9.6. Over flat and rolling terrain or a minimum of 10 NM from land over contiguous water.

A19.4.2.9.7. Flight manual restrictions for low altitude operations will be complied with.

A19.4.3. Cargo Loading Procedures. The KC10 cargo loading will only be performed by a KC10 boom operator that was previously fully cargo qualified in AMC and has operational cargo loading experience. This restriction does not apply to crew chiefs during aircraft reconfiguration.

Attachment 20

U-2 OPERATING PROCEDURES

A20.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the U-2 aircraft under most circumstances. It applies to both Air Force and Contractor aircrews and all management levels concerned with operation of all U-2 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A20.2. Mission Planning.

A20.2.1. Flight Logs.

A20.2.1.1. Flight logs generated using the approved mission planning software "Green Card" are authorized.

A20.2.2. Minimum Oxygen Requirements.

A20.2.2.1. T.O. U-2S-1 minimum oxygen requirements may be waived by the OG/CC for a short ferry flight or during mission unique situations. This waiver will be documented and attached to the flight mission paperwork.

A20.3. Common Mission Guidance.

A20.3.1. Specific Maneuvers.

A20.3.1.1. Approach and Landings. Conduct multiple patterns, touch and go landings, and simulated emergency patterns only when a qualified instructor pilot is in the aircraft or occupying the mobile vehicle. A qualified SOF/FSS must be in the mobile and in a position to monitor the pattern and landing. (Note: An ACC qualified mobile meets the requirements of this paragraph.)

A20.3.1.2. Do not intentionally perform touch and go landings or practice emergency patterns with Primary Mission Equipment (PME) on board.

A20.3.1.3. All AFMC and Contractor U-2 pilots are authorized to perform SFOs to a touch and go or full stop.

A20.3.1.4. All AFMC and Contractor U-2 pilots are authorized to perform touch and go landings at any military airfield in the local training area, to include Beale AFB, consistent with the above mobile requirement.

A20.3.2. Supervisory Requirements.

A20.3.2.1. A qualified SOF or Flight Safety Supervisor (FSS) will monitor all initial takeoffs and full stop landings. The control room will monitor every test sortie flown and a SOF or Flight Safety Supervisor (FSS) from the mobile vehicle will monitor every take-off, approach, and recovery. Additional information about the SOF and FSS program is contained in Det 2, WR-ALC sup to AFMCI 11-201.

A20.3.3. Personal GPS Units (PGUs).

A20.3.3.1. Aircrew members will not use PGUs for routine en-route navigation. Follow PGU policy in AFI 11-202, Volume 3. (Note: PGUs carried by U-2 pilots are used for emergency and situational awareness use only)

A20.4. Instrument Procedures.

A20.4.1. The U-2 is approach category B.

A20.4.2. Instrument evaluations will not routinely be conducted in the U-2.

A20.5. Operating Procedures and Restrictions.

A20.5.1. Weather Restrictions.

A20.5.1.1. Operations during high winds result in an increased risk, primarily caused by higher possibility of crosswind problems, windshear, and turbulence. The following wind limits will be used when determining go-no go weather.

A20.5.1.2. Maximum forecast wind, to include gust effects, for launch is 30 knots. Once airborne, a recall should be initiated if the forecast wind (gust) exceeds 35 knots. Maximum wind for actual landing is not specified, however, consideration should be given to the crosswind component (15 knots, maximum), gust factors, and the aircraft tow limit of 40 knots. Note: Sorties may launch if the landing is planned for one hour prior to the effective time of the out of limit wind forecast. Planned landings one hour after the effective time are not recommended. The OG/CC may waive these wind restrictions dependent on mission priorities.

A20.5.1.3. Takeoff. Maximum tail wind for initial takeoff is 10 knots.

A20.5.1.4. Touch and Go's. When flying touch and go's: the maximum crosswind component limit is 12 knots and a maximum tail wind component is 5 knots.

A20.5.2. Functional Check Flight (FCF).

A20.5.2.1. Initial FCF/ACF weather minimums are a 5000 foot ceiling, with 5 miles visibility. This limit may be waived, by the 412 OG/CC for USAF pilots and by AFMC/A3V for contractor pilots, to the minimums specified in chapter 3 of this instruction. Additionally, weather should allow continuous visual contact with the ground sufficient to allow a VMC recovery to either the primary airport or emergency alternates.

A20.5.2.2. Subsequent ACF and FCF minimums: 3000 foot ceiling and 3 miles visibility. This limit may be waived by the OG/CC to the minimums specified in chapter 3 of this instruction.

A20.5.3. Weather Minimums.

A20.5.3.1. Minimum weather required for engineering support flights, if not otherwise specified, is 1500 and 3 miles visibility or as outlined in the test plan, whichever is more restrictive. This minimum may be waived by the OG/CC but will not deviate from the specifics of the approved test plan and safety review board recommendations.

A20.5.3.2. Operational, Training and Delivery flights will follow command weather minimums.

A20.5.4. Crew Rest Requirements.

A20.5.4.1. Fatigue associated with flights in pressure suits and at high cabin altitudes is very insidious and accelerated by less than ideal crew rest prior to flight. The following restrictions apply to high altitude pressure suit flights:

A20.5.4.2. Pressure suit flying in excess of 6.5 hours, in a 24-hour period requires 18 hours recovery time between high flight landing and any subsequent takeoff.

A20.5.4.3. No more than two pressure suit flights allowed in a 12-hour period or three total sorties allowed in a 24-hour period. (A sortie includes an engine start, take off, and engine shutdown).

A20.5.4.4. No more than 13 flying hours in a 48 hour period.

A20.5.4.5. Maximum high altitude pressure suit sortie hours in any seven-day period is 25 hours.

A20.5.4.6. Crew duty day for pressure suit flying is 10 hours. The OG/CC, GFR, operations officer, or LMAC Chief Pilot may waive this to 12 hours, with the consent of the pilot flying. Waivers to 12 hours for any night flight will be approved by the 412 OG/CC for USAF pilots and by AFMC/A3V for contractor pilots, but only under extreme circumstances. For flights requiring duty periods greater than 12 hours, MAJCOM/DO approval is required. Document all waiver action in the remarks section of the flight authorization.

A20.5.5. Pressure Suit Requirements.

A20.5.5.1. A full pressure suit will be worn for all high flights (flights above FL 450) and crewmembers will pre-breath 100 percent oxygen for a minimum of one hour prior to takeoff.

Attachment 21

UH/TH-1 OPERATING PROCEDURES

A21.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the UH/TH-1 aircraft under most circumstances. It applies to both Air Force and Contractor AFMC aircrews and all management levels concerned with operation of all UH/TH-1 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A21.2. Mission Planning.

A21.2.1. Minimum Crew Requirements. Minimum crew requirements are established by T.O. 1H-1(U)N-1 and T.O. 1H-1(T)H-1. In addition to flight manual requirements, **Table A21.1** specifies minimum crew requirements for missions accomplished within AFMC. Flight engineers add significantly to the safety and efficiency of all helicopter missions and should be used to the maximum extent possible. On single pilot missions, additional aircrew or passengers may sit in the left front seat when not required in the cargo compartment.

Table A21.1. Minimum Aircrew Requirements.

Mission Profile	Minimum Required Crewmembers			
	Pilot	Co-Pilot	FE	Co-Pilot / FE
Basic Sortie	1			
EP Training [1, 3, 6]	1			1
Instruments (VMC)	1			1
Instruments (IMC)	1	1		
Flight with passengers (includes DV) [4]	1			
Remote Operations [2, 3]	1			1
Night Unaided [2, 3]	1			1
Night Vision Goggle (NVG)	1			1
SAR / MEDEVAC	1			1
Live Alternate Insertion and Extraction	1	1	1	
Training Alternate Insertion and Extraction	1		1	
Controlled Burn	1	1	1	
Cargo Sling / Water Bucket	1	1	1	
Functional Check Flight (FCF)	1			1
Shipboard Operations	1	1	1	
Paradrop Operations [5]	1			1

NOTES:
1. An instructor pilot must be designated on the flight orders and at a set of controls.
2. Single pilot landing at prepared sites and on ranges is permitted provided a minimum of 300 feet rotor disk clearance is provided. Landings may be made to areas that provide a minimum of 75 feet rotor disk clearance (from each blade tip) with a pilot and a co-pilot/FE. If landing to areas that do not meet these requirements, minimum crew is a pilot, co-pilot, and flight engineer.
3. Training flights accomplished as a part of an upgrade (to copilot, aircraft commander or

instructor) will have a flight engineer.
4. Mission profile and passenger personal requirements must be carefully considered prior to flying single pilot. Cabin doors will be closed when flying single pilot with passengers.
5. Operations permitted with Co-Pilot / FE if jump master is on intercom and is not jumping.
6. Passengers will not be on the aircraft when practice emergency procedures are flown.

A21.2.2. Weather Minimums.

A21.2.2.1. Ceiling and visibility requirements are in compliance with AFI 11-202v3 and applicable supplements except for VFR Training Missions which require 1000 feet / 3 miles visibility.

A21.2.2.2. Flight profiles consisting of only hover operations require a minimum of one mile visibility.

A21.2.2.3. Wind Limitations.

A21.2.2.3.1. Operational – IAW T.O. 1H-1(U)N-1 and T.O. 1H-1(T)H-1.

A21.2.2.3.2. Training – 40 knots peak wind or 20-knot gust spread.

A21.2.3. Weight and Balance.

A21.2.3.1. Weight and Balance will be computed IAW T.O. 1H-1(U)N-1, T.O. 1H-1(T)H-1, T.O. 1H-1(U)N-5, and T.O.1 -1B-50.

A21.2.3.2. Weight and Balance computations will be accomplished in handwritten form or by use of the current Automated Weight and Balance System (AWBS). When computing weight and balance, the "Transport" side of the form F will be used. Weight and Balance is normally computed by the flight engineer but can be computed by any qualified crewmember. The original form F will be signed by the crewmember that completed all computations and by the aircraft commander. The crewmember accomplishing the weight and balance form F will make a copy of the original to be carried on board the aircraft and the original form F will be filed with the operations desk or, when off station, the base operations section prior to crew step.

A21.2.4. Takeoff and Landing Data (TOLD)

A21.2.4.1. Whenever possible, TOLD should be completed prior to the aircrew briefing and re-computed in flight as applicable to mission profile. A standardized TOLD/Lineup card will be used, as determined by the AFMC UH-1 Command Chief Pilot and maintained in the applicable organization's in-flight guide.

A21.2.4.2. Power Requirements. The following criteria apply when flight planning and / or accomplishing test or training missions. Exception: due to the unique ability to instantaneously release the water or jettison the fire bucket, the following power requirements do not apply to fire bucket operations.

A21.2.4.2.1. Clear escape route: power for intended hover +5%.

A21.2.4.2.2. Restricted escape route: Out of Ground Effect (OGE) hover power +5%.

A21.2.5. Non-standard checklist exception.

A21.2.5.1. Copies of the Before Takeoff, Before Landing, Hoist Operator's Before Pickup, and Hoist Operator's After Pickup checklists may be posted in the cabin and used by the aircrew at the discretion of the flight commander. Accuracy of these extracts must be maintained and checked prior to each use.

A21.3. Common Mission Guidance.

A21.3.1. Night Vision Goggle (NVG) Operations. Use of NVGs during takeoffs, landings, and hover operations is authorized. The minimum enroute cruise altitude while flying with NVG's is 300 feet. Also see the requirements of paragraph A21.5.9.1.

A21.3.2. Unaided Night VMC. Minimum altitude while flying unaided during night VMC is 500 feet above the highest obstacle, within five nautical miles of course centerline.

A21.4. Instrument Procedures.

A21.4.1. UH/TH-1 aircraft are flown under Approach Category A. Prior to departing from an airfield with marginal weather conditions, or if IMC flight is expected, the aircraft commander will complete an instrument cockpit check and brief the appropriate instrument approach for emergency IFR return.

A21.4.2. Any crewmember seeing deviations greater than 10 degrees of heading, 10 knots of airspeed, or 100 feet of altitude will inform the pilot flying. Deviations from prescribed procedures for the approach being flown will also be announced.

A21.4.3. Mandatory altitude calls for the pilot not flying / flight engineer during non-precision approaches:

A21.4.3.1. "One hundred feet above minimum descent altitude" (MDA).

A21.4.3.2. "Minimums" at MDA.

A21.4.3.3. "Runway in sight." Call when the runway environment is in sight. Do not call too soon when obstructions to vision (such as fog, haze, low stratus clouds, etc.) are present.

A21.4.3.4. "Go-around." Call at missed approach point if the runway environment is not in sight.

A21.4.4. Mandatory altitude calls for the pilot not flying / flight engineer during precision approaches:

A21.4.4.1. "One hundred feet above decision height" (DH).

A21.4.4.2. "Land." Call at decision height if the runway environment is in sight and the aircraft is in a position for a normal landing.

A21.4.4.3. "Go-around." Call at decision height if the runway environment is not in sight or if the aircraft is not in a position for a normal landing.

A21.4.5. Mandatory calls for the pilot not flying / flight engineer during climb out/descent:

A21.4.5.1. "Five hundred feet below/above assigned altitude" and "one hundred feet below/ above assigned altitude."

A21.4.5.2. “Five hundred feet above/below initial approach fix altitude or holding altitude” and “one hundred feet above/below initial approach fix altitude or holding altitude.”

A21.5. Operating Procedures and Restrictions.

A21.5.1. Survival Equipment and restraint devices.

A21.5.1.1. Overwater flight. Life preserver and HEED (Helicopter Emergency Egress Device or equivalent device) will be worn by aircrew and a life raft will be on-board for over water flights when route of flight is beyond autorotational gliding distance of land. Ensure sufficient LPUs are available for all passengers. Life rafts are not required if a radio-equipped boat or a hoist-equipped helicopter provides mutual support coverage. Life rafts, life preservers, and HEEDs are not required when over water flight occurs only for short distances immediately after takeoff or before landing.

A21.5.1.2. Survival vests will be IAW AFI 11-301 and applicable supplements.

A21.5.1.3. Restraint Devices. Gunner’s belts are authorized for crew members when duties require them in lieu of a seat and lap belt. Only one gunner’s belt may be attached to a tie down ring at any one time. If seats are available, aircrew members will be seated in a seat with a lap belt. Passengers involved in AIE operations and / or paradrop operations may be restrained by alternate methods, provided multiple individuals are not secured to the same tie down ring.

A21.5.2. Preflight.

A21.5.2.1. Before applying power to the aircraft and / or operating aircraft systems, the AFTO 781 series forms will be reviewed by a qualified crewmember. The exceptional release (ER) must be signed prior to flight by an authorized maintenance representative or, in the absence of a maintenance representative, the aircraft commander.

A21.5.2.2. An operable white light (landing or searchlight) is required for all night flights.

A21.5.3. Aircraft Servicing and Ground Operations.

A21.5.3.1. Crewmembers may accomplish refueling duties when maintenance personnel are not available. Crewmembers will comply with T.O. 00-25-172. When not directly involved in the refueling operation, personnel will remain a minimum of 50 feet from the aircraft. Hot refueling (engines running) may be accomplished IAW T.O. 1H-1(U)N-1 and T.O. 1H-1(U)N-1CL-2

A21.5.3.2. Engine-running crew changes may be accomplished under the following provisions: one pilot will have seat belt and shoulder harness fastened during pilot change, the new aircraft commander will review aircraft weight and balance and configuration, and current takeoff and landing data must be computed.

A21.5.3.3. Fire Guard. A fire guard will be used for all engine starts. When maintenance personnel are not available, a crewmember may perform this duty. The primary duty is to assist the crew in evacuating the aircraft should a fire occur, not fight the fire at the engine compartment.

A21.5.4. En Route.

A21.5.4.1. Forced or Precautionary Landings. Aircraft commanders must consider a precautionary landing as an option when mechanical malfunctions or deteriorating weather interfere with mission accomplishment. The following procedures apply to all forced and precautionary landings:

A21.5.4.1.1. Make every effort to notify a controlling agency (i. e., declare an emergency if necessary IAW FLIP guidance) before making a forced or precautionary landing (time permitting).

A21.5.4.1.2. Every effort will be made to contact the SOF (ground- to- ground/ ground- to- air/ telephone) once the aircraft is safely on the ground.

A21.5.4.1.3. For precautionary landings due to deteriorating weather, the flight may be continued at the discretion of the aircraft commander.

A21.5.4.1.4. For actual, impending, or potential malfunctions, corrective action will be completed before continuing flight and OG/CC approval must be received prior to continuing flight. If contact cannot be established and if the aircraft commander determines it is potentially more hazardous to await maintenance assistance, he/ she may continue the flight to the nearest suitable area if the aircraft commander determines flight manual actions have corrected the malfunction.

A21.5.5. Transition Maneuvers/Emergency Procedure Training.

A21.5.5.1. Emergency procedures will be conducted at an approved landing area under radio communications with the appropriate controlling agency (for example, tower, runway supervisory unit, UNICOM, etc.). Aircraft rescue and fire-fighting equipment will be immediately available. All practice emergency procedures will be briefed during the flight briefing. Crews will complete the transition/emergency procedure briefing in the UH-1N In-Flight Guide.

A21.5.5.2. Slide Landing Training Areas. Slide landings will only be accomplished to runways or suitable taxiways, with ATC approval. Exercise extreme caution on barrier-equipped runways. Slide landings may also be accomplished to other approved surfaces meeting helicopter runway criteria specified in AFMAN 32-1123, *Airfield and Heliport Planning.* Minimum dimensions will be IAW UFC 3-260-01, *Airfield Facilities Design.* If wind information at the slide area cannot be obtained through tower or AWOS, a wind detection device must be present.

A21.5.5.2.1. The aircraft commander will accomplish the following:

A21.5.5.2.1.1. Brief the hazards of the slide landing area prior to commencing any maneuvers.

A21.5.5.2.1.2. Visually inspect the slide area for hazards and surface condition. If the visual inspection was inconclusive, test the surface prior to commencing emergency procedures by accomplishing a slide landing with both throttles full open.

A21.5.5.3. Simulated Emergency Procedures.

A21.5.5.3.1. Prohibited Training Maneuvers. The following maneuvers will not be intentionally accomplished in the aircraft:

A21.5.5.3.1.1. Actual engine shutdown.

A21.5.5.3.1.2. Blade stall and power settling.

A21.5.5.3.1.3. Dual fuel control failures.

A21.5.5.3.1.4. Dual hydraulic system failures.

A21.5.5.3.1.5. Hovering autorotation.

A21.5.5.3.2. Training Restrictions. Unusual attitude training and emergency procedures involving engines (to include simulated autorotations), engine fuel systems, flight controls, or hydraulic systems will be accomplished only:

A21.5.5.3.2.1. During visual meteorological conditions.

A21.5.5.3.2.2. After official sunrise/prior to official sunset (extended daylight hours may be authorized by MAJCOM).

A21.5.5.3.2.3. When passengers are not on board.

A21.5.5.3.2.4. With an instructor pilot designated on the flight authorization.

A21.5.5.3.3. Single Engine Emergencies. Simulated single engine failure will be entered no lower than 150 feet AGL and 55 KIAS while in-flight. Single engine emergencies may be initiated from the ground or in a hover if single engine hover power is available. Single engine approaches may be initiated below 150 feet AGL as long as simulated torque available is limited with both throttles full open. If a throttle is reduced to flight idle, ensure that combined torque is below single engine computed to prevent over torque of the remaining engine. Single engine approaches and landings must be practiced to a slide or hard surface landing area.

A21.5.5.3.4. Boost Off. Minimum entry altitude and airspeed is 500 feet AGL 70 KIAS during straight and level flight, or on the ground.

A21.5.5.3.5. Manual Fuel. Minimum entry altitude and airspeed is 500 feet AGL and 70 KIAS, in a hover if single engine hover capability is available, or on the ground. Before entering into manual fuel, ensure that the collective setting is below single engine computed torque available. After entering into manual fuel, maintain torque on the manually governed engine approximately five to ten percent below the governed engine. During high density altitude conditions, it may be required to maintain torque on the ungoverned engine less than five percent to preclude over temp, over speed, and/or over torque of the governed engine.

A21.5.5.3.6. Practice Autorotations. Due to the risk associated with this maneuver, carefully consider wind, density altitude, aircraft gross weight, and individual pilot proficiency prior to performing autorotations. The IP will terminate the maneuver and initiate a power recovery at the first indication of abnormally high or low rotor RPM, excessive sink rate, low airspeed, ineffective flare or at anytime an inadvertent touchdown may occur.

A21.5.5.3.6.1. The initial autorotation will be a straight-ahead autorotation accomplished by the instructor to evaluate aircraft performance. On evaluation flights, the instructor receiving the evaluation may accomplish this requirement.

A21.5.5.3.6.2. Practice autorotation will be accomplished to an area clear of obstructions that permits a safe go-around.

A21.5.5.3.6.3. Practice autorotations require the aircraft landing direction to be aligned within 45 degrees of the wind direction when wind is 15 knots or greater. With winds less than 15 knots, aircraft landing direction must be within 90 degrees of wind direction.

A21.5.5.3.6.4. Minimum entry altitude is 800 feet above ground level (AGL) for 180 degree turning autorotations; 500 feet AGL for all others. Practice autorotations in excess of 180 degrees must terminate with a power recovery at or above 500 feet AGL unless aligned on final for an approved training area within normal autorotation parameters.

A21.5.5.3.6.5. Simulated instrument autorotation must be terminated with full power recovery no lower than 500 feet AGL unless conducted to an area meeting the requirements above.

A21.5.6. Medical Evacuation / Search and Rescue (SAR).

A21.5.6.1. Aeromedical Evacuation Missions. Aircraft will not be used for routine patient transfer. Medical evacuation flights may be operated to transport seriously ill or injured persons and/or to transport medical personnel, equipment, or supplies under emergency conditions when other means are not suitable or readily available.

A21.5.6.2. Search and Rescue (SAR). SAR missions involving life threatening injuries/illnesses will not launch until authorized and thorough mission planning is complete. Crews will attempt to coordinate medical support if time and circumstances permit.

A21.5.6.2.1. Altitude Restrictions:

A21.5.6.2.1.1. Operational Searches. Altitudes are determined by the aircraft commander and are dependent on terrain, aircraft limitations, crew limitations, weather, etc.

A21.5.6.2.1.2. Training Searches. Any search training below 300’ must be in a surveyed low level area. Day search training can be accomplished down to a minimum altitude of 100’ AHO. NVG search training can be accomplished to a minimum altitude of 300’ AGL / AWL. Night unaided search training can be accomplished to a minimum altitude of 500’ AGL/AWL.

A21.5.7. Operational / Unprepared Landing Site Procedures. This section provides guidance for the successful accomplishment of operational and unprepared landing site operations. The aircraft commander must consider crew qualification, aircraft power and capability, weather (including winds), terrain, environmental factors, illumination and mission requirements before performing any approach to an unprepared landing area. The final decision to accomplish the approach or landing rests with the aircraft commander.

A21.5.7.1. Power Available Check. Perform a power available check prior to remote, AIE, search, cargo sling, fire bucket, controlled burn missions, or anytime time use of maximum or near-maximum power is anticipated.

A21.5.7.2. Landing Area Evaluations.

A21.5.7.2.1. Operational Sites. Operational sites are areas specifically prepared and maintained for helicopter operations (not including airports or helipads listed in FLIP documents). Units will designate permanent operational sites and develop site diagrams. These sites may be used for routine landings and do not require a full remote site evaluation.

A21.5.7.2.2. Site Diagrams. Refer to AFI 13-217.

A21.5.7.2.3. Operational Site Evaluation (OSE). The pilot will review the site diagram prior to accomplishing an Operational Site Evaluation (OSE) for all operational site landings. This review will highlight hazards and will assist the crew in determining the best approach/departure route. The pilot will review the site diagram prior to all landings and takeoffs at the site. Evaluate and confirm elevation, power requirements, obstructions, wind, and approach and departure routes before initiating final approach. A power available check is not required unless the aircraft commander believes a critical requirement exists. The purpose of the site evaluation is to alert the pilot to unforeseen, dangerous situations prior to being committed for final landing. If a site diagram is unavailable or non-current, complete a remote site evaluation.

A21.5.7.2.4. Remote Landing Sites. Areas not defined as operational sites are considered unprepared or unfamiliar landing areas. Operating into these areas require a remote site evaluation which consists of a high and low reconnaissance. The full site evaluation does not need to be re-accomplished during successive approaches to the same area where conditions are equal to or less restrictive than previous approaches.

A21.5.7.2.5. High Reconnaissance. The high reconnaissance is flown at a minimum of 300 feet above the site and a minimum airspeed of 50 KIAS. During this reconnaissance, in addition to T.O. 1H-1(U)N-1 or T.O. 1H-1(T)H-1 requirements, the crew will evaluate:

A21.5.7.2.5.1. Winds – direction, turbulence, and null areas.

A21.5.7.2.5.2. Elevation, pressure altitude.

A21.5.7.2.5.3. Temperature.

A21.5.7.2.5.4. Power available, power required, power margin.

A21.5.7.2.5.5. Approach and departure route.

A21.5.7.2.5.6. Size, slope, surface suitability.

A21.5.7.2.5.7. Touchdown point.

A21.5.7.2.5.8. Escape route (brown out / white out heading, abort Go/No-Go).

A21.5.7.2.6. Low Reconnaissance. The low reconnaissance confirms items noted in the high reconnaissance. Pilots may descend to a minimum of 50 feet above the highest obstacle along the flight path and at a minimum of 50 knots to reconfirm items noted on the high reconnaissance. The pilot should fly the low reconnaissance on the same approach angle and approach route as discussed during the high reconnaissance. If the selected approach route is not satisfactory, select another route and execute another low reconnaissance. The low reconnaissance may be accomplished on final approach if OGE hover power is available.

A21.5.7.3. Communication. On final approach, the pilot not flying / flight engineer will make advisory calls in 100 foot increments when above 300 feet AGL and 50 feet increments when below 300 feet AGL. The advisory will include altitude and airspeed and, at the pilot's discretion, descent rate and power applied (i.e.,"250 feet, 40 knots, sink 500 [fpm], torque 50"). After each advisory call, the FE/scanner(s) will provide terrain/hazard clearance inputs. Advisory calls should be clear and concise with commentary on the progress of the approach and hover operation.

A21.5.7.4. Landing. When landing in an unfamiliar LZ, plan the approach to a hover to avoid landing on hidden obstacles. After landing, slowly reduce power until surface stability is verified. This procedure will facilitate an immediate departure as well as prevent possible tipping and/or aircraft damage due to unstable surface. When landing to dry grassy areas, landing/searchlights should be turned off to prevent inadvertent ground fires.

A21.5.7.4.1. Obstacle Clearance. Whenever rotor clearance is 25 feet or less, the scanner will inform the pilot of the clock position relative to the nose of the aircraft and estimated distance to the obstacle.

A21.5.8. Night Operations.

A21.5.8.1. Night Approaches to Remote and Operational Sites. Do not leave flight altitude until the location of the landing area has been identified. Brief and conduct a remote site evaluation prior to the approach, provided adequate lighting is available.

A21.5.8.2. During night VFR descents, the pilot not flying / flight engineer will call 1,000 feet above intended altitude, 500 feet above intended altitude, 100 feet above intended altitude, and intended altitude. On final approach, the pilot not flying / FE will call rates of descent greater than 500 fpm.

A21.5.9. NVG Operations.

A21.5.9.1. The searchlight must be operable and equipped with an IR filter for flights conducted below 20 percent EMI (Equivalent Moon Illumination). When EMI is below 20 percent, minimum enroute altitude is 300 feet AHO with an operable radar altimeter. If both radar altimeters are inoperative, minimum enroute altitude is 500 feet AHO.

A21.5.9.2. Comply with the NVG preflight procedures in applicable NVG T.O. (e.g., T.O. 12S10-2AVS9-2). Do not fly with NVGs that fail to meet the visual acuity requirements.

A21.5.9.3. Training will not be conducted with less than 5% EMI. Adequacy of lighting on moonless nights will be evaluated by crew, taking into consideration cultural lighting and cloud cover.

A21.5.10. Unaided Night Operations.

A21.5.10.1. Minimum en-route altitude is 500 feet AHO within 5 miles of the flight path on either side of course center.

A21.5.10.2. Site Selection for Training. In addition to AFI 13-217 *Drop Zone and Landing Zone Procedures,* the following apply. Sites will be selected where the vertical development of the surrounding terrain does not restrict the pilot's option to execute a go-around, with minimum maneuvering, at any point during the approach.

A21.5.10.3. The obstacles/terrain within three NM of the site will not exceed 200 feet above the site elevation. Restricting the approach and departure route to directions that will avoid terrain or obstacles exceeding the above criteria satisfies this requirement.

A21.5.10.4. Illumination Requirements for Helicopter Landing Areas. Helicopters on operational support missions may operate into and from unlighted areas provided all available illumination is used. On all other missions, operations into remote or operational sites between official sunset and official sunrise will be made only if one of the following conditions can be met:

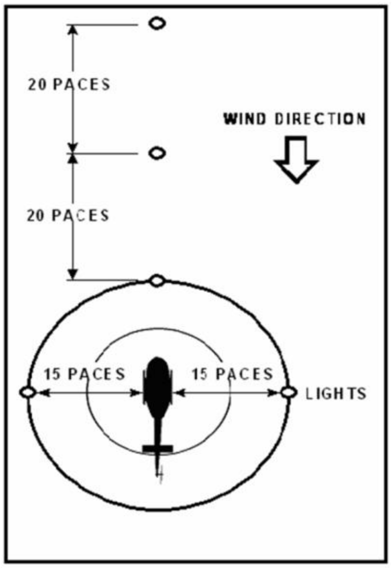
A21.5.10.4.1. The area is outlined by discernible lights.

A21.5.10.4.2. The pilot can clearly see the approach path and landing surface (as would be possible immediately after official sunset or before sunrise).

A21.5.10.4.3. For sites without permanent lighting, prior to full darkness (may be within 30 minutes after official sunset or 30 minutes before official sunrise), make a visual survey of the site and position lights to outline the landing area. Check for obstacles, general site condition, and wind. This survey may be accomplished by other crews flying during the day or by ground party.

A21.5.10.5. Landing Zone Lighting Patterns. Since a variety of landing zone lighting patterns are in use, the pilot should anticipate diversity in lighting patterns when participating in joint and/or combined operations. The inverted Y light system, see Figure A21.1, is an excellent way to identify landing zones. The two lights at the base of the inverted Y should normally be spaced 15 paces to the sides of the helicopter**.** The lights for the stem of the inverted Y should set into the wind, 20 paces apart. When set up in this fashion, the inverted Y provides visual cues to determine the correctness of the glide angle by observing the apparent distance between the lights in the stem of the Y. If the lights in the stem appear merged into a single light, a shallow glide angle is indicated. If the lights in the stem appear to increase in distance apart, the approach is becoming steeper. Approach path lineup corrections can also be made using the stem of the Y. For example, if the stem points to the left, the helicopter is left of course and should correct to the right. The direction of the approach is into the open end of the Y. The touchdown area is outlined by the triangle formed by the three lights marking the open end of the Y. When set up properly, wind direction will be along the stem of the Y.

Figure A21.1. Inverted Y Landing Zone Lighting.



A21.5.11. Ship Board Operations

A21.5.11.1. General. Aircrews will abide by the versions, to include marshaling procedures outlined in the following: Joint Publication 3-04.1 *Joint Tactics, Techniques, and Procedures for Shipboard Helicopter Operations (Electronically or updated CD version)* and AFI 11-218, *Aircraft Operations and Movement on the Ground.* Aircrew will conduct shipboard operations training IAW Navy/Army/Air Force Memorandum of Understanding. Refer to AFI 11-2FT Volume 1 for all training requirements.

A21.5.11.2. Mission Commanders will ensure that all personnel receive a pre-deployment briefing consisting of the following:

A21.5.11.2.1. Launch Procedures and light/hand signals.

A21.5.11.2.2. Landing Procedures and light/hand signals.

A21.5.11.2.3. Aircraft control doctrine and procedures.

A21.5.11.2.4. Emergency procedures peculiar to shipboard operations

A21.5.11.2.5. Special procedures for night and IFR.

A21.5.11.2.6. Communication.

A21.5.11.2.7. Ship Resume.

A21.5.12. Aerial Delivery Operations.

A21.5.12.1. Aerial delivery operations refer to air movement of personnel, supplies, or equipment in which unloading is accomplished from the aircraft while in flight.

A21.5.12.2. Drop Procedures. Refer to AFI 11-301V1, Aircrew *Flight Equipment (AFE) Program*, AFJI 13-210, *Joint Airdrop Inspection Records, Malfunction Investigations, and Activity Reporting*, 11-402, *Aviation and Parachutist Service, Aeronautical Rating and Badges* , FM 31- 19 (US Army), and applicable T.Os for all operations.

A21.5.13. External Load Operations.

A21.5.13.1. External load operations refers to equipment transport via cargo hook. This includes cargo sling and fire bucket operations. Refer to the UH-1N In-Flight Guide for preflight criteria.

A21.5.13.2. Crews will complete the applicable briefings outlined in the UH-1N In-Flight Guide prior to accomplishing the mission.

A21.5.13.3. Refer to T.O. 1H-1(U)N-1, T.O. 1H-1(T)H-1, AFJAM 11-223 Volumes 1-3, AFOSHSTD 91-46 for the cargo sling.

A21.5.14. Fire Bucket Operations.

A21.5.14.1. General. Firefighting is one of the most hazardous missions performed by the UH-1N. During actual fires, the entire crew must exercise extreme caution due to the rapidly changing conditions and multiple aircraft operating in and around the fire area. If at any time the safety of the crew is in question, aircraft commanders will cease operations and clear the area. Avoid over-flight of ground personnel, structures, vehicles, etc. to the maximum extent possible.

A21.5.14.2. Mission Preparation.

A21.5.14.2.1. Conduct a fire bucket briefing prior to all fire bucket operations. The ingress checklist will be accomplished per the guidance in the UH-1N In-Flight Guide. Complete the egress checklist upon leaving the fire area.

A21.5.14.2.2. Fire Bucket Terminology. The fire bucket itself is referred to as the “bucket,” and the water source is referred to as “water.” If at any time the presence of the bucket constitutes a hazard, any crewmember may call “Pickle, Pickle, Pickle.” If this call is made, the pilot will release the load immediately, without discussion.

A21.5.14.3. Drop Control.

A21.5.14.3.1. Airspeed and Direction. Drops made into the wind or at slower airspeed increase the concentration of the drop by shortening the swath. Drops made downwind or at higher airspeeds will reduce concentration and increase swath length.

A21.5.14.3.2. Altitude. Altitude affects concentration in swath width; the lower the drop, the narrower the swath and the heavier the concentration. Conversely, the higher the drop, the more time the water mass has to break up into droplets and be dispersed by wind drift, therefore, the wider the swath and the lighter the concentration. The standard drop is from 50-foot AHO bucket height and 50 knots indicated airspeed.

A21.5.14.3.2.1. Set the radar altimeters for the length of the load plus 10 feet. When calling altitudes, flight engineers will relay bucket height above the ground and /or obstacles.

A21.5.14.4. Drop Techniques. Drops on structures, equipment or personnel should be avoided unless specifically requested or there is an obvious threat to someone’s life.

A21.5.14.4.1. Hover / Spot Drops. Except on isolated snags or trees, hover drops are not recommended on active ground fire, unless well inside a burned area, since the rotor downwash will intensify and spread far more fire than the drop will extinguish. If attempting to concentrate the bulk of a drop on a single target a low airspeed, high altitude drop will be just as effective while avoiding adverse consequences of the rotor downwash.

A21.5.14.4.2. Cross-slope drops. Cross-slope drop, whether above or below the fire, usually present no special problems; however, watch the main rotor clearance on the uphill side in steep terrain.

A21.5.14.4.3. Down slope drops. Down slope drops low on the slope may be approached cross-slope at a reduced airspeed with a 90-degree descending turn to the target. This allows the pilot flying to see the target if turning in the direction of the side they are sitting on. Another less recommended method is to come directly over the ridge for the drop. This type of drop requires careful planning, especially in steep terrain. The pilot must pick out objects on top of the ridge above the fire and in the background beyond the fire to line up on, as the down slope drop presents a blind run. This means that the pilot cannot see the target until crossing the ridge above the fire and only if not obscured by smoke. If the slope is very steep it may be advisable to approach the ridge top at a reduced airspeed, using caution not to get too slow if downwind or too low when on the leeward side. Slowing prior to the "dive" reduces the chance of excessive airspeed. The pullout must be planned to provide adequate terrain clearance in the event the drop is aborted for any reason. Down slope drops may be made at a slower airspeed and are more effective if made into the wind.

A21.5.15. Alternate Insertion/Extraction Operations.

A21.5.15.1. Alternate insertion/extraction (AIE) is the insertion or extraction of any personnel by means other than landing the aircraft. The following procedures apply to day and night operations.

A21.5.15.2. Equipment.

A21.5.15.2.1. The flight engineer will accomplish preflight and post-flight inspections of all AIE equipment used in flight. Preflight/post-flight will be accomplished IAW T.O. 1H-1(U)N-1, T.O. 1H-1(T)H-1, and the UH-1N In-Flight Guide. The flight engineer will also accomplish all required cleaning of AIE equipment which is outlined in the cleaning criteria checklist located with the AIE equipment.

A21.5.15.2.2. During all live AIE training, personnel being inserted / extracted will wear eye protection, any uniform that completely covers the arms and legs, a helmet, and either leather or flight gloves.

A21.5.15.2.3. All hoist-equipped aircraft will have precision wire rope cutters readily available in the event the electrical cable cut guillotine fails. Affix cable cutters to the aircraft or hoist for quick access.

A21.5.15.3. Aircrew Procedures:

A21.5.15.3.1. Water AIE.

A21.5.15.3.1.1. Conduct all water AIE training a minimum of 50 yards offshore in approved water training areas.

A21.5.15.3.1.2. Both radar altimeters must be operable for all water operations.

A21.5.15.3.1.3. Observation pass. If an observation pass is required, after the initial sighting of the survivor, maneuver to a position approximately 100 feet downwind of the survivor from which an observation pass can be accomplished. Pattern direction (either left or right patterns) is at the discretion of the pilot. If swimmer deployment is anticipated, the observation pass will be made at a maximum of ten-feet AWL and ten knots with a heading from zero to 90 degrees off the wind line to allow for swimmer deployment. If swimmer deployment is not required, make the observation pass above ETL at a minimum of 25 feet AWL. After the observation pass, initiate a climbing turn at 50 feet AWL to a 100 feet AWL minimum downwind altitude. If OGE hover power is not available, a minimum of 50 KIAS and 50 feet AWL is required prior to initiating the climbing turn to downwind. If OGE hover power is available, start the turn at a minimum of translation lift airspeed and 50 feet AWL.

A21.5.15.3.1.4. Do not descend below 50 feet AWL until established on final. If the survivor is not ready for immediate pickup, situation permitting, establish a holding hover approximately 75 feet downwind of the survivor.

A21.5.16. Hoist Operations.

A21.5.16.1. Limitations. Restrict live hoist training to the minimum necessary to accomplish initial qualification, re-qualification and support training. The unit CC/DO will determine eligibility of personnel to ride the hoist during training.

A21.5.16.2. Land Hoist. Recommended "live" hoist altitude is 10 feet, but will be no greater than 25 feet for training.

A21.5.16.3. Water Hoist. Recommended hoist altitude over water or vessels is the minimum altitude necessary to avoid salt spray and/or shipboard obstacles. Do not conduct live hoist training over water or ships if required hover altitude exceeds 50 feet.

A21.5.16.4. Water Hoist Recoveries. Install the flotation collar prior to lowering the forest penetrator. It is recommended to place at least one seat paddle in the down position and remove one safety strap from the stowed position. Do not unhook the safety strap fastener from the penetrator.

A21.5.16.5. Grounding. Ground the hoist hook to discharge static electricity to prevent personnel on the ground or water from sustaining a shock. To preclude ignition of fuel, do not ground the hoist near damaged aircraft or vehicles.

A21.5.16.6. Hoist Rescue Devices. Approved rescue devices include the forest penetrator, rescue basket, stokes litter, rope ladder, hook and survivor's sling. A survivor unfamiliar with the rescue device will be assisted by a crewmember to ensure proper entry and security for a safe pickup. The aircrew determines which device is most appropriate for each scenario.

A21.5.16.6.1. Survivor's Sling (Horse Collar). The survivor's sling (NSN 1680-00-5A21.43-2712) is a buoyant device consisting of a fiber filling encased in a brightly colored waterproof cover to facilitate high visibility during rescue operations. Webbing, woven through the cover with both ends terminating in two v-rings, is used to attach the sling to the hoist hook. Two retainer straps, one long with a quick ejector snap and one short with a v-ring, are provided for personnel security. Additional information on the survivor’s sling is found in NAVAIR 13-1-1-6.5. Personnel performing rescue operations when it is impossible for the helicopter to land use the survivor’s sling. The sling can be used to lower a rescuer, as well as raise a survivor over land or water. Use the same procedures as for the forest penetrator.

Attachment 22

F-22 OPERATING PROCEDURES

A22.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the F-22 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all F-22 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A22.2. Mission Planning. None additional

A22.3. Common Mission Guidance.

A22.3.1. General Requirements.

A22.3.1.1. Wear of the upper pressure garment is required when flying above 44,000 feet MSL or at greater than 6g.

A22.3.1.2. Publications, maps and personal items placed in the cockpit will be secured to avoid flight control or throttle interference.

A22.3.2. Ground/Taxi Operations.

A22.3.2.1. Keep hands in view of ground personnel during quick check, arming or dearming operations. If the intercom system is not used during EOR checks, the pilot will establish and maintain visual contact with the ground personnel to allow the use of visual signals.

A22.3.2.2. When ground intercom is not used, use visual signals IAW AFI 11-218, *Aircraft Operations and Movement on the Ground*, and this instruction. All signals pertaining to operation of aircraft systems will originate with the pilot. The crew chief will repeat the given signals when it is safe to operate the system. The pilot should not activate any system that could pose danger to the ground crew prior to receiving proper acknowledgment from ground personnel. The following signals augment AFI 11-218:

A22.3.2.2.1. APU Start. With clenched fist, make a pulling motion.

A22.3.2.2.2. Engine Start. Hold up number of fingers corresponding to which engine is being started, and make circling motion.

A22.3.2.2.3. Flight Control Check. Raise right arm, clench fist, and make a stirring motion.

A22.3.2.2.4. Refueling Receptacle Open or Close. Display hand flat on top of helmet with fingers extended. To open, raise fingers to the vertical position and heel of hand remaining stationary. To close, reverse signal.

A22.3.2.2.5. Weapons Bay Open or Close. Display hands with fingers extended, palms up and edges of hands touching. Move hands apart several times.

A22.3.3. Takeoff.

A22.3.3.1. Make an afterburner takeoff when configured with two external wing tanks or anytime the computed MIL power takeoff roll exceeds 50 percent of the available runway.

A22.3.3.2. Aircraft will steer toward the center of the runway at the start of the takeoff roll.

A22.3.3.3. Do not takeoff with an SES LOW ICAW.

A22.3.3.4. Formation takeoffs with inert internal munitions are permitted.

A22.3.4. Maneuvering Parameters. For aerobatics, remain above 5,000 feet AGL. During nose high/low speed and Advanced Handling Characteristics vertical maneuvering, ensure maneuvers are terminated to allow recovery above 5,000 feet AGL.

A22.3.5. Ops Checks.

A22.3.5.1. Accomplish sufficient ops checks to ensure safe mission accomplishment. Ops checks are required during climb or at level off after takeoff, prior to each engagement, and following air refueling.

A22.3.5.2. Minimum items to check are ICAWS, total fuel, G-suit connection, oxygen system, cabin altitude, and HUD maximum G indicator.

A22.3.5.3. The query and response for ops checks will include total fuel amount as read on the Standby Flight Group. If wingmen are within 500 lbs of the flight lead, a “same” call may be used.

A22.3.5.4. When external tanks are feeding, add a “tanks feeding” call to the normal ops check reply. Make a “tanks dry” call once the external tanks are confirmed dry. Once the “tanks dry” call has been made, no further reference to tanks needs to be made on subsequent ops checks.

A22.3.6. Fuel Requirements. Do not use AB below established bingo fuel, unless required for safety of flight.

A22.3.7. Battle Damage Checks. When circumstances permit, flight leads will direct a battle damage check after each mission prior to or during RTB. Brief deconfliction responsibilities and position change procedures.

A22.3.8. Overhead Traffic Patterns. Overhead patterns can be made with unexpended live/inert ordnance.

A22.3.9. Approaches and Landings.

A22.3.9.1. Formation landings with inert internal munitions are permitted.

A22.3.10. Night Procedures.

A22.3.10.1. Night Lighting.

A22.3.10.1.1. When ground personnel are working under the aircraft, the POSN/ANTI-COLL switch will be placed in BRT (position lights 100 percent, steady, anti-collision light off).

A22.3.10.1.2. The landing light and a position light on each wingtip must be operational for flight. If only two position lights are operating, one must be on top of the wing and one on the bottom.

A22.3.10.1.3. For taxi and takeoff, the POSN/ANTI-COLL switch should be set to FLASH. In jets modified with reduced-intensity anti-collision lights, the ANTI-COLL/BRT setting may be used.

A22.3.10.1.4. After join-up, the last aircraft in the flight should remain in the takeoff setting. Flight lead will set position setting 2 and adjust as needed. Other flight members set BRT unless otherwise directed.

A22.3.10.2. Night Vision Goggles (NVGs).

A22.3.10.2.1. NVGs may be worn for night tanker rejoins, but will be raised to the up/stowed position or removed no later than the pre-contact position.

A22.3.10.2.2. Unless required for battle damage checks or aircraft assistance, wingmen wearing NVGs will fly no closer than route formation.

A22.3.11. Air-to-Air Weapons Employment

A22.3.11.1. Simulated Gun Employment. A loaded gun is considered safe and simulated gun employment is authorized if the following conditions are met:

A22.3.11.1.1. Preflight. Accomplished IAW 1F-22A-34-1-1CL-1 Cold Gun Procedures.

A22.3.11.1.2. In-Flight. A trigger check must be performed with the Master Arm switch in ARM with Embedded Training deselected. Point the aircraft away from other aircraft and inhabited areas. Do not perform a trigger check with a hot gun.

A22.3.11.2. Maneuvering Limitations.

A22.3.11.2.1. Minimum airspeed during low altitude offensive or defensive maneuvering (LOWAT) is 350 KCAS.

A22.3.11.3. Air-to-Air Training. With expendable stores (bombs and external fuel tanks) loaded on the aircraft, simulated air-to-air missiles will only be loaded on empty or uncarted/unexpendable stations. Simulated missile shots will only be performed from the Embedded Training mode.

A22.3.12. Air-to-Surface Weapons Employment

A22.3.12.1. Off-Range Attacks. With expendable stores (bombs and external fuel tanks) loaded on the aircraft, simulated bombs will only be loaded on empty or uncarted/unexpendable stations. Simulated bomb releases will only be performed from the Embedded Training mode.

A22.3.13. Low Altitude Procedures. The minimum airspeed for low-level navigation is 300 KCAS.

A22.4. Instrument Procedures.

A22.4.1. Instrument Approach.

A22.4.1.1. The F-22 is approach category E. Missed approach airspeed is 250 KCAS.

A22.4.1.2. The F-22 GINS is approved for enroute Area Navigation (RNAV). RNAV approaches are prohibited.

A22.4.2. Use of Heads Up Display (HUD). The HUD is the primary instrument reference.

A22.4.3. Trail Procedures.

A22.4.3.1. If IFDL is working properly, a "tied" call is not required.

A22.4.3.2. Trail Departures.

A22.4.3.2.1. Each aircraft/element will accelerate in MIL/AB power until reaching 350 KCAS. Climb at 350 KCAS until reaching 0.88 Mach, unless otherwise briefed.

A22.4.3.2.2. Upon reaching 350 KCAS, the flight leader will set and maintain 90% ETR, unless otherwise briefed.

A22.4.3.3. Trail Recoveries.

A22.4.3.3.1. Minimum spacing between flight members is 9,000 feet.

A22.4.3.3.2. Flight leads will direct airspeed/configuration changes. Trailing aircraft must simultaneously comply with the directed change.

A22.5. Operating Procedures and Restrictions.

A22.5.1. Takeoff Aborts. If aborting above 110 KCAS, suspect hot brakes. Taxi the aircraft to the designated hot brake area and follow hot brake procedures. During any abort, the tailhook should be lowered if there is any doubt about the ability to stop on the remaining runway.

A22.5.2. In-flight Practice of Emergency Procedures.

A22.5.2.1. Practice aborted takeoffs only in the flight simulator.

A22.5.2.2. Practice in-flight engine shutdown is prohibited unless conducting authorized training.

A22.5.2.3. HUD-off and Standby Flight Group approaches will only be practiced in the flight simulator.

A22.5.2.4. Simulated single-engine approaches. Simulated single-engine approaches will be flown in day VMC only from a straight-in approach and will not use the Flight Test Display control law option unless under control room monitoring.

A22.5.2.5. Practice Safe Return-to-Base (SRB) recoveries in day VMC only.

Attachment 23

RQ-4 OPERATING PROCEDURES

A23.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the RQ-4 aircraft under most circumstances. It applies to both Air Force and Contractor AFMC aircrews and all management levels concerned with operation of all RQ-4 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A23.1.1. Phase Manuals. Phase manuals are "how to" documents that expand on basic procedures in flight manuals and applicable USAF instructions. Training units may develop these manuals from procedures contained in relevant documents to enhance volume and provide student crewmembers with explanatory study material. Phase manuals will not be less restrictive than flight manuals and applicable USAF instructions. Operational units may use phase manuals to augment mission qualification and continuation training.

A23.1.2. Crew. The crew is defined as personnel responsible for safe operation of the RQ-4 aircraft. For the RQ-4, the term pilot refers to a pilot in the LRE or MCE or to the Mission Commander (MC).

A23.1.2.1. Minimum Crew: Common Ground Station (CGS): Pilot (MCE/LRE/MC)

A23.1.2.2. The MC is responsible for the smooth conduct of the mission including air vehicle routing, collection objectives, and crew duties. Though not always directly controlling the aircraft, the MC is the Pilot In Command (PIC) with the authority and responsibilities outlined in AFI 11-202V3. The MC is the final authority on mission and flight issues. The MC should maximize the mission objectives while maintaining safety of flight.

A23.1.2.2.1. For all ground and flight operations, at least one pilot will occupy the controlling shelter at all times. Normally, two pilots will be scheduled for each shift of a long mission allowing each to take breaks.

A23.1.2.3. The SO is responsible for mission collection planning and management. The SO is responsible for monitoring image quality, controlling the automatic or manual imagery dissemination, and assisting the pilot as required with checklists and available crew aids.

A23.1.2.4. The Hawkeye is responsible for executing the pilot’s aircraft exterior inspection; verifying the aircraft is properly configured for each phase of ground movement, takeoff, and landing; visually clearing appropriate taxiways and runway areas prior to and during taxi, takeoff, and landing operations; alerting the PIC of any required corrective action; and maintaining constant communications with the PIC in order to maintain safe ground operations prior to launch and after landing until engine shut down and ground safety pin insertion.

A23.2. Mission Planning.

A23.2.1. Responsibilities.

A23.2.1.1. Mission Commanders (MC). The MC is responsible for mission planning and briefing. Mission planning and mission briefing are two separate activities. The MCs and mission planners will jointly review mission plans to ensure mission effectiveness and safety if a mission planner is available. (mission planner may not be on-site at FOLs).

A23.2.1.2. Commanders will ensure currency of all mission planning materials and compliance with command guidance. Squadron and Forward Operating Location operations officers will schedule adequate mission planning time prior to flight.

A23.2.1.3. Crewmembers other than the crew flying the mission may accomplish mission planning. If operationally necessary, mission elements and events may be modified the day of the flight or while the RQ-4 is airborne as long as changes do not compromise flight safety. The MC will ensure all crewmembers acknowledge any changes.

A23.2.1.4. Complete sufficient mission planning to ensure safe mission accomplishment. Areas covered will include, at a minimum, fuel requirements, takeoff and landing data (when applicable), mission objectives, threat study (when applicable), departure/arrival procedures including thorough contingency route planning, communication plan, and collection plan. The use of RQ-4 certified departures and arrivals ensure safe margins for varying conditions including winds, wet runway, aircraft weight, Differential Global Positioning System (DGPS) tolerances, etc. This does not relieve the MC of ensuring a safe mission plan for current conditions. Any additional risks must be briefed and elevated to the appropriate authority for approval if required.

A23.2.2. Mission Materials.

A23.2.2.1. AFMSS Mission Plan. The mission plan is created entirely in AFMSS consisting of Navigation route, collection plan, communications plan, and other required files. The Mission Generation Process of creating these files is complicated and has the potentiality for human errors.

A23.2.2.2. Mission Materials. AFMSS produces products to aid the crew in mission monitoring. Products include: flight plan, sensor plan, action points, screen capture charts showing the route in various scales, etc. Units will standardize the mission materials package to allow for maximum situational awareness and flexibility to the pilot and cover all possible contingencies (emergency routes). A copy of the Flight Operators Manual and associated directives will be available in each ground shelter.

A23.2.3. Briefing/Debriefing.

A23.2.3.1. Briefing Guides. Briefing guides provide the briefer with a reference list of items that may apply to particular missions. The briefer should cover only mission essential information. Those items understood by all participants may be briefed as "standard." Reference 452 FLTS OI 11-1RQ for squadron specific briefing guides.

A23.2.3.2. Mission Brief (or T-1 Brief). The MC will brief all crew members to ensure safe and effective mission accomplishment. Use the following procedures for all mission briefings:

A23.2.3.2.1. All crewmembers scheduled to support the mission will attend the briefing. Students in combined Initial Qualification Training (IQT)/Mission Qualification Training (MQT) and crewmembers who are logging individual events for currency do not need to attend the mission briefing provided they are under the supervision of an instructor who attended the briefing; however, they must receive a changeover brief in their respective crew position before participating in the flight. Other crewmembers who did not attend a mission briefing must obtain Squadron Operations Officer (SQ/DO) approval prior to participating in a flight. The pilot in command or MC will ensure crewmembers participating in a flight under SQ/DO approval are adequately briefed prior to assuming crew duties.

A23.2.3.2.2. Brief any manual pilot interventions in the case of contingencies not autonomously handled by the AV (if applicable).

A23.2.3.2.3. Mission elements and events may be modified and briefed while the RQ-4 is airborne as long as changes do not compromise flight safety. Do not fly unbriefed missions and/or events. The pilot or MC will ensure all crewmembers acknowledge all changes.

A23.2.3.2.4. Changeover Briefs. Individual crewmembers will complete a changeover brief for each crew position changeover.

A23.2.3.2.5. Mission Debrief. After changeover or landing, debrief all missions as a crew.

A23.3. Common Mission Guidance.

A23.3.1. Common Ground Station (CGS).

A23.3.1.1. The MC is the approval authority for visitor seating in the CGS. Only qualified pilots or students in a formal course of training and under instructor supervision may fly the RQ-4.

A23.3.1.2. Ensure the RQ-4 is not in a critical phase of flight before entering the CGS. While the RQ-4 is airborne, all personnel will limit extraneous conversations.

A23.3.1.3. Place no items (checklists, charts, etc.) on the keyboards or on the mouse at any time during ground or flight operations.

A23.3.1.4. The MC will ensure the CGS is clean and orderly after a mission. All crewmembers are responsible for personal and professional items prior to departing the CGS.

A23.3.1.5. The MC will ensure removal of all classified material from the CGS upon mission completion.

A23.3.1.6. Smoking is prohibited in or within 50 feet of the CGS.

A23.3.1.7. Crewmembers will take appropriate unclassified logs to mission debrief.

A23.3.1.8. Crewmembers will operate in the CGS only those electronic items necessary for flight and/or mission operations.

A23.3.2. Communications. Crewmembers will use the following crew positions for intercom identification and call up: “MC,” “pilot,” “CX,” and “QC” for the shelter. Call sign for the Vehicle Test Controller (VTC) is "VTC." Do not discuss classified information when making radio transmissions.

A23.3.2.1. Ground Communications.

A23.3.2.1.1. The pilot and ground crew will maintain good communication during all ground checks and anytime the aircraft's engine is operating on the ground.

A23.3.2.1.2. VTC operator will maintain communication with the pilot as per checklist procedures

A23.3.2.2. In-flight Communications.

A23.3.2.2.1. Limit intercom communications to flight critical information from start of "Before Starting Engine" checklist until completion of "After Takeoff and Climb" checklist and from initiation of "Descent and Landing" checklist until completion of "Shutdown" checklist. During critical phases of flight, keep a sterile environment consistent with good CRM procedures. Critical phases of flight are taxi, takeoff and departure up to safe altitude, arrival and landing, taxi back, shutdown, and any other time determined by the pilot in command.

A23.3.2.2.2. Limit telephone calls to the CGS to time-critical flight related items.

A23.3.2.2.3. Pilots flying the aircraft should not use the telephone during a critical phase of flight unless absolutely necessary for safe operations.

A23.3.2.2.4. All crewmembers will monitor the intercom to the maximum extent possible and advise the pilot prior to going off intercom and will announce when back on intercom.

A23.3.3. Checklists. Each pilot will have and refer to appropriate checklists during flight operations to ensure accomplishing required actions. The PIC will ensure accomplishment of all checklist items and when completed state applicable "Checklist Complete."

A23.3.4. Engine Start/Taxi.

A23.3.4.1. All engine starts require a fireguard.

A23.3.4.2. VTC operator starts the engine on pilot's command and announces each state of the start process (engine parameters, BIT checks, etc.). Ground Chase ("Hawkeye") will monitor engine start and maintain area control for the pilot.

A23.3.4.3. The pilot taxiing the aircraft should designate only one 'in-control' link. For local operations, two 'in-control' links may be utilized to ensure C2 coverage and mitigate undesired taxi interruptions provided it is briefed and the pilot not in control also executes Stop Taxi commands as required.

A23.3.4.4. Hawkeye will maintain position to accurately assess the position of the aircraft while taxi operations are performed. He will inform the pilot of any deviations in crosstrack, heading, and speed. The pilot will inform Hawkeye of impending turns, speed changes, stops, etc., as required.

A23.3.5. Takeoff.

A23.3.5.1. Do not taxi and/or takeoff over a raised cable or into a raised webbing-type barrier. Pilots may takeoff beyond or between raised cables provided there is 8000 ft of runway beyond or between barriers.

A23.3.5.2. During departure/arrival pilots will monitor the aircraft performance and advise Air Traffic Control of any deviations from planned route or Air Traffic Control clearance.

A23.3.5.3. Any crewmember or ground crew member noting a safety-of-flight malfunction will alert the pilot and give a brief description of the problem. The pilot will make the decision to continue or abort.

A23.3.6. Approach/Landing.

A23.3.6.1. The pilot or MC will pre-coordinate the handoff to the LRE in the mission briefing. Any change to handoff procedures will be briefed during the mission in a non-critical phase of flight. Positive exchange of aircraft control is mandatory.

A23.3.6.2. All pilots will monitor the approach and landing and backup the PIC as necessary. All available links should be maintained to limit loss of communications (Contingency 1). Good CRM procedures are essential.

A23.4. Instrument Procedures.

A23.4.1. Approach Category. The RQ-4 is an approach category C aircraft.

A23.4.2. Weather Minimums.

A23.4.2.1. The weather (TEMPO or prevailing) for RQ-4 operations at any airfield must be at or above a ceiling and visibility of 1000 feet and 2 miles. The weather for RQ-4 operations must be at or above these minimums at the time of takeoff and be forecast for the ETA +/- 2 hours. If the arrival window forecast weather degrades below 1000 feet and 2 miles during the mission, RQ-4 pilots will return aircraft to their operating base with sufficient fuel to hold for a minimum of 2 hours (if required) then penetrate and land with normal recovery fuel.

A23.4.2.2. The Global Hawk aircraft autonomously executes the planned approach and landing without any requirement for visual reference with the runway. For Global Hawk approaches, visibility minimums are observed to allow Hawkeye (SOF), or the pilot using the aircraft's nose camera, to visually verify that the aircraft is on runway centerline during the final stages of the approach.

A23.4.3. Self Contained Approach Planning. All Global Hawk approaches are self contained. Approaches are the product of the GH Mission Planning System, and are built using predetermined slopes appropriate for either normal or engine out (emergency) operations. All approaches are constructed in compliance with local ATC restrictions and host nation agreements. SCA operations are routine to every flight, and as such, no requests are submitted through HQ or other agencies for approval.

A23.4.4. Minimum Descent Altitude (MDA). Approaches planned on the mission planning system emulate precision approaches, and as such do not include MDAs.

A23.4.5. SCA Construction. Use current DAFIF sources for all topographical, point obstruction, and airfield information (DAFIF and Chart Updates provided each 28 days by NGIA). NAVAIDs are not used in constructing the approach.

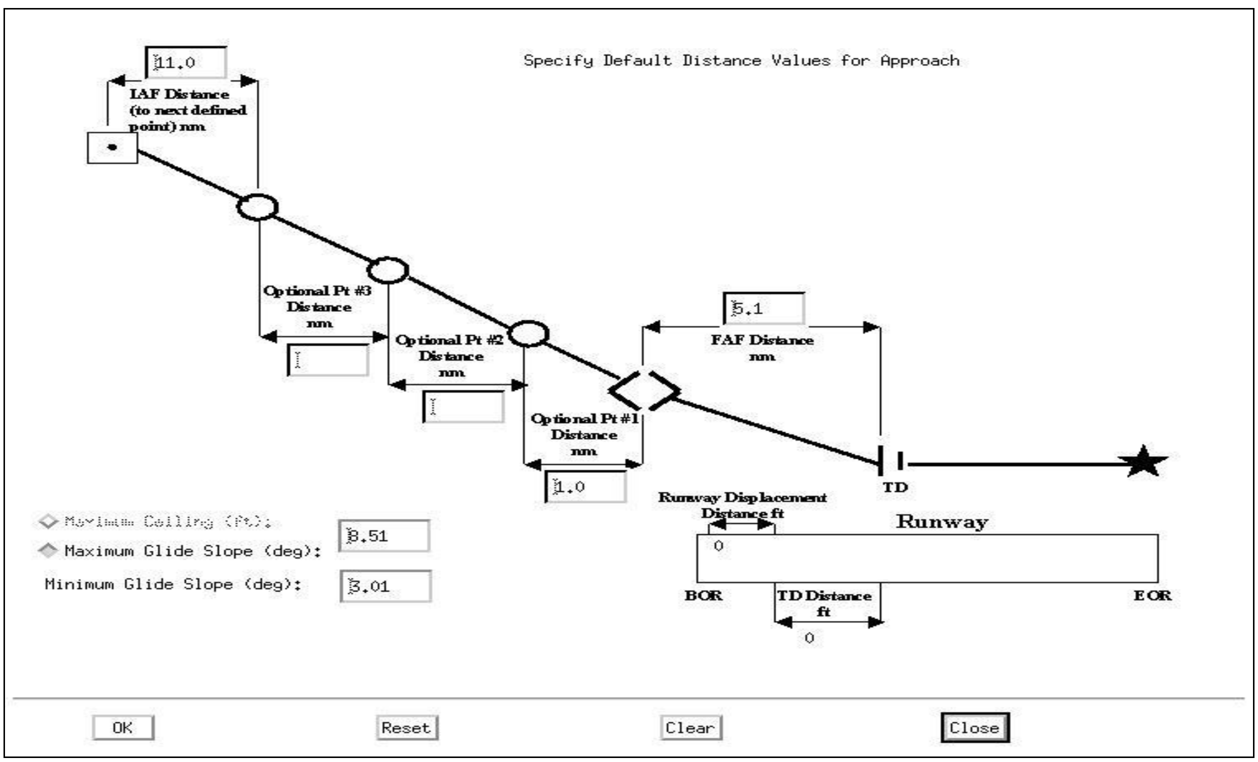
A23.4.6. Enroute Altitudes. Descent to the first point on a Global Hawk approach is generally from a cruising altitude in excess of FL 600, though lower enroute descents may be appropriate in some instances. The last enroute point is assigned an attribute which associates it with the IAF for the desired approach. Descents are normally spirals performed at the IAF from the operating altitude.

A23.4.7. Obstacle Clearance: Use the published FLIP minimum and emergency safe altitudes for the Inner Terrain Clearance Elevation (ITCE) and Outer Terrain Clearance Elevation (OTCE) respectively. ITCEs and OTCEs interact with the navigation software to ensure that the aircraft remains above those altitudes out to the appropriate distances (25 and 100 NM).

A23.4.8. Global Hawk approaches fall into three categories, Standard, Missed, and Minimal, and are constructed as described in the next three paragraphs. An approach to any given runway contains at least two of these three approaches.

A23.4.8.1. Standard Approaches are constructed as depicted in Figure A23.1. Standard approach glide slope is determined by the planning system based on aircraft performance factors at the estimated gross weight, winds, aircraft configuration and airspeed.

Figure A23.1. RQ-4 Standard Instrument Approach Construction Procedure (typical).



A23.4.8.2. Minimal Approaches are straight-in approaches which begin ten miles from the end of the runway. They are provided with the planning system as a means of quickly building an approach to a runway or ditch point. Glideslope values are the same as in a standard approach.

A23.4.8.3. Missed approaches are intended to bring the aircraft around to a point at which the approach may be re-attempted. The last point of the missed approach is associated with the first point of the next approach, which may be the same as the original standard approach, or a shorter, modified standard approach. Values for distances between optional waypoints may be selected and filled in by the planner, or not used. Altitudes are set into the system by the planner.

A23.4.9. Glideslope Planning.

A23.4.9.1. Global Hawk software plans approaches within a window of 3.5 to 8.5 degrees. Approaches are typically built using 4.5 degrees, and 5.25 for emergency/engine-out operations. Terrain clearance is included in the AFMSS function with the appropriate Digitized Terrain Elevation Data (DTED) loaded.

A23.4.9.2. Mission planners will use 6-DOF simulation to select touchdown point to maximize runway available.

A23.5. Operating Procedures and Restrictions.

A23.5.1. Minimum Equipment. Two communication links, at least one being a line-of-sight (LOS) link between the air vehicle and the CGS, are required to be up and operational prior to takeoff. Furthermore, RQ-4 will not exit restricted airspace without two good command and control links

Attachment 24

HH-60G OPERATING PROCEDURES

A24.1. General Information. The HH-60G will be operated IAW AFI 11-2HH-60G Volume 3, *HH-60 Operations Procedures* and lead MAJCOM directions.

Attachment 25

CSAR-X OPERATING PROCEDURES

A25.1. General Information. The CSAR-X will be operated IAW this instruction and approved test plans.

Attachment 26

CV-22 OPERATING PROCEDURES

A26.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the CV-22 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all CV-22 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A26.1.1. Unless otherwise stated in this instruction, the CV-22 is considered a helicopter for the purpose of terminal area operations (takeoff, approach, and landing) or when configured ≥ 60 degrees nacelle. The CV-22 will be considered a fixed wing for other operations.

A26.1.2. Except where otherwise noted, for purposes of any FAA guidance or Air Force Instruction, when in airplane mode follow the fixed wing rules. When flying in conversion mode (≥ 60 degrees nacelle) follow helicopter rules.

A26.2. Mission Planning.

A26.2.1. Flight Planning Systems. The primary flight/mission planning system is the Special Operations Forces Planning and Rehearsal System (SOFPARS). SOFPARS is a subset of the Air Force Mission Support System (AFMSS) that includes the Portable Flight Planning Software (PFPS) and the Joint Mission Planning System (JMPS). The core mission planning software (PFPS or JMPS) in conjunction with V-22-specific modules and hardware interfaces is known as the V-22 Mission Planning System (VMPS).

A26.2.2. Fuel Planning. For flight planning purposes, fuel requirements for descent, approach, and missed approach will be 1,500 pounds.

A26.2.3. Weight and Balance. If the basic weight/moment of the aircraft is changed, a new DD Form 365-4, *Weight and Balance Clearance Form F-Transport*, will be computed. A new or corrected DD Form 365-4 need not be recomputed provided the initial takeoff gross weight (item 16) is not changed by more than 500 lbs. If the change is more than 500 lbs, the crew will modify the weight and balance using the cockpit management system (CMS). The crew will ensure CG and weight limits are not exceeded. These computations will be briefed during the crew, mission brief, or during flight, as required.

A26.2.4. Weather Planning.

A26.2.4.1. OG/CCs or equivalent may establish minimum weather criteria (ceiling or visibility) less than day minimums for flights during which only hovering maneuvers will be performed (i.e. hover checks, OCF, FCF).

A26.2.4.2. Training Weather Minimums:

A26.2.4.2.1. VFR Training Minimums. Comply with AFI 11-202V3, helicopter weather minimums unless local weather minimums are more restrictive. In the absence of more restrictive criteria, the following minimum weather criteria (ceiling/visibility) apply during all VFR training operations:

A26.2.4.2.1.1. In CONV/VTOL mode (≥ 60 nacelle). Under day time operations: Day: 500/2 SM or 700/1 Statute Mile (SM). Under night time operations: Night: Unaided: 1000/2 SM, Aided (NVG): 500/2 SM.

A26.2.4.2.1.2. In APLN mode (< 60 nacelle). Day/Night/NVG: 1500/3 SM.

A26.2.4.2.2. IFR Training Minimums. Comply with AFI 11-202V3 MAJCOM Sup, helicopter weather minimums unless local weather minimums are more restrictive. Instrument meteorological conditions (IMC) TF flight may be accomplished on published IFR Military Training Routes or other approved, surveyed training routes.

A26.2.4.2.3. Wind Limits. Do not accomplish hovering operations during training when the surface wind gust spread exceeds 20 knots without an instructor pilot at a set of flight controls.

A26.2.4.3. Illumination and NVG Requirements.

A26.2.4.3.1. Any training or test missions planned when the effective illumination (regardless of methodology or measurement) is forecast to be less than 10 percent, or .8 millilux, during the mission will require an additional level of Operational Risk Management (ORM).

A26.2.4.3.2. The Squadron CC/DO will be made aware of the ORM assessment and risk mitigation conducted for missions planned to be flown in low illumination conditions.

A26.2.5. En Route Planning. Crews should fly test missions at the highest altitude commensurate with test requirements.

A26.2.6. Low Level Planning. Maps with a scale of 1:500,000 or greater detail are required for low level operations. Maps with a scale of 1:250,000 or greater are highly desired.

A26.2.6.1. Emergency Safe Altitude (ESA). ESA is an altitude that will provide positive terrain clearance in IMC during situations that require the exiting of the low-level environment. To compute ESA, add 1,000 feet (2,000 feet in mountainous terrain) to the highest obstacle or terrain feature within 10 NM of route centerline or intended flight path, rounded to the next 100- foot increment. Use of area ESAs is recommended whenever possible, however, a single ESA is sufficient when there are no significant changes in topography.

A26.2.6.1.1. Failure to maintain an accurate altimeter setting during flight may cause lower than planned terrain clearances or impact with terrain when using the computed emergency safe altitude ESA/MSA.

A26.2.6.2. Minimum Safe Altitude (MSA). MSA provides terrain clearance during situations that require the interruption of low-level operations. To compute MSA for each leg or leg segment, add 500 feet (or the planned set clearance for TF operations) to the elevation of the highest terrain or obstacle within 3 NM of route centerline or the planned flight path, and round up to the next 100-foot increment.

A26.2.6.2.1. Failure to maintain an accurate altimeter setting during flight may cause lower than planned terrain clearances or impact with terrain when using the computed emergency safe altitude ESA/MSA.

A26.2.6.3. Aeronautical Chart Preparation. Pilots will carry a chart on all flights and ensure all charts used for flight have the most current hazards posted. Aircrew will also ensure appropriate civil airspace is annotated along their route of flight.

A26.2.6.4. Route Surveys. Prior to any low level operations in non-surveyed areas, accomplish a survey of the route or area as follows:

A26.2.6.4.1. Conduct an extensive map study of the selected routes and areas. Annotate all manmade obstacles over 50 feet AGL (or the lowest altitude to be flown), except when below the tree line. Additionally, annotate any published low-level routes, avoid areas or other hazards within the boundaries. Use the Chart Updating Manual (CHUM) to ensure current obstacles are depicted on maps.

A26.2.6.4.2. Fly the survey during the day. Conduct a visual search of the proposed route or area at the lowest applicable altitude down to a minimum altitude of 50 feet AGL in CONV mode or 100 feet AGL in APLN mode. Check the obstacle location against map location and any additional obstacles charted.

A26.2.6.4.3. If a route or area has been inactive or flight operations have not been conducted at survey minimums for 12 months, re-accomplish the survey or restrict operations to or above the lowest level flown during the 12-month period.

A26.2.7. Crew Complement. The crew complement for operations is specified in the flight manual and Table A26.1.

Table A26.1. Crew Complement.

Mission	Pilot	Copilot	Flight Engineer
Engine Ground Run[1]	**1**		**1**
Ferry/FCF/Prof[3]	**1**	**1**	**1**
Day[4]/Night Tactical[4]/LVAs	**1**	**1**	**2**
Air Refueling	**1**	**1**	**1**
Hot Refueling[2]	**1**	**1**	**2**

Notes:
1. Minimum crew is either 1 Pilot and 1 Flight Engineer or 2 Pilots.
2. Only one FE is required while operating at a location with sufficient ground crew to perform hot refueling duties.
3. This mission category includes all basic non-tactical operations to and from improved/approved areas (airfields, helipads, etc.) day and night. Qualified crews may use night vision goggles (NVGs) as appropriate to improve general flight safety.
4. At the discretion of the squadron (SQ/CC), crew complement may be 2 pilots and 1 Flight Engineer (FE). Crew complement will not be reduced if Low Visibility Approaches (LVAs) are anticipated.

A26.2.8. Security. CV-22 aircraft are priority C resources when they are not configured for special missions that require higher security priority. This security priority designation applies to operational aircraft worldwide. Some aircraft contain equipment and documents which require protection per DOD 5200.1, DOD Information Security Program/AFI 31-401, Information Security Program Management. Requirements for protection of the aircraft in a transient status at US and foreign bases are found in DOD 5200.1 and AFI 31-401.

A26.2.9. Arming of Crewmembers. Unit commanders may direct arming of crewmembers as deemed necessary by mission threat analysis. During operations where weapons are on board, it may be necessary to arm a weapon qualified aircrew member. Protect these weapons and others installed IAW AFI 31-207, *Arming and Use of Force by Air Force Personnel* and AFMAN 31-229, *USAF Weapons Handling Manual*.

A26.3. Mission Guidance.

A26.3.1. Landing Zones.

A26.3.1.1. A thorough review of the landing zone survey and accompanying photographs or imagery will be accomplished by all crewmembers during the aircrew brief. The PIC is responsible for ensuring that any crewmember unable to attend the brief either reviews the landing zone survey or is briefed on the hazards associated with the LZ.

A26.3.1.2. CV-22 aircrew will follow procedures for Helicopter Landing Zones in AFI 13-217.

A26.3.2. Altitude Restrictions. Except for navigation profiles flown as part of approved test plans or in conjunction with FCF profiles, do not operate the aircraft lower than the altitudes shown below.

A26.3.2.1. Conduct all APLN mode operations at or above 300 feet AGL and CONV/VTOL mode operations above 100 feet AGL, except when lower altitudes are required for takeoff, landing, test missions, training flights in approved surveyed areas or routes, or while conducting a route survey under day VMC.

A26.3.2.2. Conduct low-level sorties in mountainous terrain no lower than 300 ft modified contour or 200 ft set clearance plane (SCP) in airplane mode, 100 ft in CONV mode. In non-mountainous terrain or over water where there is a valid mission requirement, crews may descend to no lower than 100 feet AGL in APLN and 50 ft CONV. Limit the time at minimum altitudes to the duration required for mission accomplishment. Without an operational FLIR, lowest altitude permitted is 500 ft modified contour.

A26.3.2.3. Unaided (no NVG and no TF system). Minimum en-route altitude for night navigation, for testing and training, is 500 feet above the highest obstacle within 3 NM (MSA).

A26.3.2.4. Aided. NVGs or TF systems are the only approved methods for conducting night operations below 500 feet AGL. Time spent at the minimum altitude should be the minimum required to complete the test or complete mission proficiency training and night water operations.

A26.3.3. Low Level Operations. The low level environment is defined as operations below 500’ AGL in APLN mode and 300’ AGL in CONV/VTOL mode during the day. The night NVG low level environment is defined as operations below 1000’ AGL in APLN mode and 500’ AGL in CONV/VTOL mode.

A26.3.4. IMC Terrain Following/Terrain Avoidance (TA) Training.

A26.3.4.1. AFFSA AFSOC Waiver Vol 3/2000-1 allows IMC TF/TA operations below published enroute IFR minimum altitudes. Conditions and requirements of AFSOC 2000-1 are listed in AFI 11-202V3 MAJCOM Sup.

A26.3.4.2. Prior to entering IMC conditions the aircrew must ensure the TF/TA radar and navigation systems are functioning properly.

A26.3.4.3. Altitude Restrictions. For IMC TF/TA en-route training, the minimum altitude is 200 feet SCP.

A26.3.4.4. IMC TF and flight director (FD) approach (APPR) approaches will be conducted to surveyed/approved landing zones along specified routes. Visual contact with the ground allowing confirmation of aircraft position and drift state (by someone on the crew) will be established prior to decelerating below 30 KGS.

A26.3.4.5. Degraded systems training will not be conducted during IMC TF/TA operations.

A26.4. Instrument Procedures.

A26.4.1. Approach Category. The CV-22 is approach category A and will adhere to Helicopter IFR procedures laid out in AFI 11-202V3 and AFMC Supplement.

A26.4.2. Ceiling Below Minimums. If the reported ceiling is below minimums for the approach, but the visibility value is at or above the authorized minimums before initiating an en-route descent or published approach, ensure fuel remaining is sufficient to accomplish the en-route descent, approach, missed approach, and flight to alternate with appropriate reserves.

A26.5. Operating Procedures and Restrictions.

A26.5.1. Aircraft Equipment

A26.5.1.1. General. A fully mission capable aircraft is the ultimate objective of the logistics effort. The final responsibility regarding equipment required for a mission rests with the aircraft commander. If one aircraft commander accepts an aircraft to operate a mission or mission segment without an item or system, this acceptance does not commit that aircraft commander, or a different aircraft commander, to subsequent operations with the same item or system inoperative. When the aircraft commander considers an item essential, designate the component mission essential (ME) on the AFTO Form 781, and the item will be repaired or replaced prior to departure. This section provides guidance on how to operate with degraded equipment.

A26.5.1.1.1. Radar Altimeter. The radar altimeter will be operational for night, low-level tactical events as well as all low-level operations over open water.

A26.5.1.1.2. Avionics Cooling. Avionics cooling will be operational prior to departure. Should avionics cooling malfunction after departure, flight may be continued as long as airspeed is at or above 200 KCAS. Flight below 200 KCAS should be minimized to the maximum extent possible.

A26.5.1.1.3. Environmental Control System (ECS). If environmental conditions permit, the aircraft may be flown without ECS. Crew comfort, type of mission, and length of mission should be considered when deciding whether or not to proceed.

A26.5.1.1.4. Electrical Systems. If a variable frequency generator (VFG) fails at an en route stop, the mission may continue. Loss of a single VFG and/or converter with no other system failures will not adversely impact the electrical system and flight may be continued at the discretion of the PIC. Comply with all flight manual guidance. Continued operations with 1 VFG inoperative are authorized for a period not to exceed 35 flight hours.

A26.5.1.1.5. Fuel Systems. Degraded operation is permissible, however, flight crews must consider potentially trapped fuel (center of gravity (CG) limits) and decreased range should further degradation occur.

A26.5.1.1.5.1. Fuel Pumps. All suction lift pumps should be operational prior to departure. All boost pumps will be operational prior to departure.

A26.5.1.1.5.2. Operations will not be conducted with any malfunction in the fuel system that affects the fuel quantity warning system.

A26.5.1.1.6. Landing Gear. If a landing gear malfunction is encountered, only a full stop landing will be made. The discrepancy will be corrected prior to the next flight. **Exception:** If repair capability does not exist and a positive determination is made that further flight can be accomplished with the gear down and locked, the aircraft may be flown to a destination where repair capability exists provided the gear is not moved from the down and locked position. Required en-route stops are authorized. Takeoffs and landings should be minimized and made from a hover.

A26.5.1.1.7. Navigation Systems. The aircraft will not be flown with more than one inertial navigation system (INS) failure as this would remove any redundancy in the aircraft attitude indicating system and flight control system.

A26.5.1.1.8. Cockpit Displays. If the standby altitude indicator (AI) is inoperative, the aircraft may only be flown in day visual meteorological conditions (VMC) conditions. Flight in night VMC conditions permitted if night vision goggles (NVGs) are used. If any of the standby pitot-static instruments are inoperative, the aircraft will not be flown. Should there be degraded performance or damage to pitot-static probes 1, 2, or 4, standby instrumentation will be affected and the aircraft will not be flown. As a minimum, one operating multi-function display (MFD) is required at the pilot and the copilot position and one operable display electronics unit (DEU) is required.

A26.5.2. Aircrew Flight Equipment Requirements**.** Upon reporting to the aircraft, the PIC or designated representative will ensure sufficient quantities of appropriate serviceable aircre flight equipment, survival equipment, and protective clothing are aboard the aircraft. Aircrew flight equipment and medical kits below 200 lbs may be secured with seat belts.

A26.5.2.1. Aircrew members will wear life preservers and underwater breathing devices on overwater flights when route of flight is beyond gliding distance of the shore. Passengers will have life preservers available and will be worn at the discretion of the Pilot in Command. Life rafts will be available to cover all personnel on board. Life rafts, life preservers, and helicopter emergency egress device (HEED)/Helicopter Aircrew Breathing Device (HABD) are not required when over-water flight occurs only for short distances, takeoff, approach, and before landing.

A26.5.2.2. Survival vests will be onboard the aircraft and available to the crew for all flights and may be worn at the discretion of the PIC.

A26.5.2.3. Crewmembers occupying a primary crew position should accomplish a communications and operations check of their oxygen masks prior to flight. This oxygen mask will remain connected and readily available for cockpit crewmembers and available for cabin crewmembers for use before engine start until after engine shutdown.

A26.5.2.4. CV-22 crews will use rotary wing requirements for over water flight. See AFI 11-301, MAJCOM Sup 1, for further guidance.

A26.5.3. Flying Clothing/Safety Equipment.

A26.5.3.1. Eye Protection.

A26.5.3.1.1. Use protective goggles, plastic/shatter resistant lens, glasses/sunglasses, or the helmet visor for eye protection if duties require personnel to be in close proximity of the aircraft when the proprotors are turning. Wear goggles whenever dust, sand, dirt, etc., constitute a hazard.

A26.5.3.1.2. During all live firing of weapons from the aircraft, ensure that all personnel involved in the firing of weapons wear eye protection to include one of the following: helmet visors, shatter resistant glasses/eye protection, safety goggles, or aircrew gas mask. Glass lens eyeglasses alone do not satisfy the requirement.

A26.5.4. Maximum Flight Duty Period (FDP).

A26.5.4.1. FCF/ACF, proficiency training, test sorties, test support sorties and tactical events must be completed during the first 12 hours of the FDP and are limited to a maximum of three sorties per day.

A26.5.4.2. The basic FDP is 16 hours provided no tactical events, test sorties, test support sorties, proficiency training, Functional Check Flights (FCF) (including maintenance ground runs) are accomplished after 12 hours and no Aerial Refueling (AR) is accomplished after 14 hours. If the autopilot (coupled modes) is not fully operational for the required mission profile, or its use is denied for more than 4 hours, the FDP will be 12 hours. A fully operational autopilot is defined as a system which is capable of coupling course (ENAV or INAV), speed, and altitude. For the purposes of this paragraph, NVG terminal operations to a prepared surface are not considered tactical events and use of NVGs is authorized throughout the flight duty period.

A26.5.4.3. The OG/CC or equivalent may extend FDP up to 2 hours IAW AFI11-202V3 and AFMC Supplement.

A26.5.5. Checklist. Accomplish all checklists with strict discipline using the challenge and response method as required.

A26.5.6. Aircraft Forms/Fuel Card. Review the aircraft forms before applying power to the aircraft or operating aircraft systems. Ensure that the USAF fuel card and/or other authorized method of payment are aboard the aircraft.

A26.5.7. Control. A qualified pilot will be at a set of flight controls at all times when proprotors are turning.

A26.5.8. Crew Duties and Responsibilities.

A26.5.8.1. Change of Aircraft Control. The change of flight controls will be accomplished using a positive change of controls. Use a statement which includes the crew position such as, "Pilot/Copilot has controls" to transfer control. The other aircrew member will acknowledge using the crew position also such as, "Pilot/Copilot has controls."

A26.5.8.2. Boldface. The aircraft commander normally calls for boldface procedure execution. The pilot not flying should be the primary crewmember responsible for executing BOLDFACE and other emergency checklist procedures that involve cockpit switches while the pilot flying maintains aircraft control and reacts appropriately. The flight engineer, if in the cockpit, will confirm any switches prior to being actuated and will reference the checklist for guidance during the emergency. Additional crewmembers, if on board, should review the flight manual and assist as needed/requested.

A26.5.9. Communications Policy**.**

A26.5.9.1. Interphone Communications.

A26.5.9.1.1. Limit intercommunication system (ICS) transmissions to those essential for crew coordination.

A26.5.9.1.2. Clearance is required from the PIC prior to going off ICS.

A26.5.9.2. The pilot operating radios will brief the crew on which radio is primary. All crewmembers will monitor the primary radio unless specifically directed to do otherwise by the PIC.

A26.5.9.2.1. Regardless of the primary radio, monitor ultra high frequency (UHF) GUARD (243.0).

A26.5.10. Aircraft Lighting. Operate aircraft lighting IAW AFI 11-202V3, MAJCOM supplements. Additionally, All anticollision lights will be operational for day or night operations. When flying in formation, only the trail aircraft is required to have a visible anticollision light on. In the event of failure of any light or all lights of the anticollision light system after takeoff, flight may be continued.

A26.5.11. Arresting Cables. Avoid rolling over arresting cables at high speed to preclude damage to the bottom of the aircraft.

A26.5.12. Proprotor Turning Offload and Onload Procedures. Employ the following procedures when engines are running:

A26.5.12.1. Do not approach the aircraft until cleared by the crew.

A26.5.12.2. Place one engine condition lever (ECL) in START (or reduce both ECLs), when practical, to reduce the proprotor downwash whenever personnel are present near the aircraft.

A26.5.12.3. Personnel and equipment should approach and depart between the 4 and 8 o'clock position during engine running ground operations. When using the crew door, approach and depart from the nose of the aircraft as much as possible to stay in the pilot's field of view until clear of the aircraft. Avoid the regions directly outboard of the nacelles (3 and 9 o'clock) due to engine exhaust deflected by the coanda system.

A26.5.13. Oxygen Requirements. Comply with AFI 11-202V3, for unpressurized aircraft.

A26.5.14. Aircraft Servicing and Ground Operations.

A26.5.14.1. Conduct hot refueling IAW AFI 11-235, *Forward Area Refueling Point (FARP) Operations*, TO 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*, and appropriate flight manuals. The guidance in this section supplements the procedures outlined in TO 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*, appropriate flight manuals, and checklist.

A26.5.14.2. Transmissions on other than line of sight (LOS) radios are prohibited.

A26.5.14.3. Aircrew will not wear Gortex garments within 50 feet of the aircraft when refueling with JP-4 or Jet B.

A26.5.14.4. Personnel not directly involved in refueling operations will remain clear by a minimum of 50 feet.

A26.5.14.5. In the absence of qualified maintenance personnel, aircrew may service aircraft hydraulic and oil systems IAW the flight manual.

A26.5.15. Forced or Precautionary Landings. If the crew becomes doubtful of the aircraft's airworthiness or encounters hazardous weather conditions preventing further flight, they should execute a precautionary landing, provided the landing conditions are not more hazardous than the in-flight problem. Report all precautionary landings through the appropriate chain of command as soon as communications are established.

A26.5.16. Radar Altimeter Procedures.

A26.5.16.1. During low-level operations, the recommended low altitude warning setting is 80 percent of intended cruise altitude.

A26.5.16.2. For instrument approaches, set the radar altimeter low altitude warning to the appropriate height above touchdown (HAT) or height above aerodrome (HAA) prior to the final approach fix (FAF).

A26.5.17. Radar Advisories. Participate to the maximum extent possible while operating in VFR or simulated IFR conditions.

A26.5.18. Power Checks.

A26.5.18.1. Aircrew will reconfirm power requirements using either the cockpit management system (CMS) or performance charts when power required is within ten (10) percent of power available.

A26.5.18.2. Takeoff and landing will be executed utilizing interim power at the pilot's discretion. For tactical approaches to and from LZs, interim power will be used.

A26.5.19. Personnel Restraints.

A26.5.19.1. Aircrew. At least one pilot will have seat belt and shoulder harness fastened when engines are running. Crewmembers may perform duties that require them to be unrestrained for short periods of time, provided they are not in close proximity to an open door.

A26.5.19.2. Except for primary and additional aircrew all cabin occupants must be seated with seat belts fastened during taxi, initial takeoff, and initial approach and landing.

A26.5.20. Power Required for Tactical Terminal Operations Training.

A26.5.20.1. Clear escape route – out of ground effect (OGE) hover power.

A26.5.20.2. Restricted escape route – OGE hover power plus 10 percent.

A26.5.21. Obstacle Clearance for Tactical Terminal Operations Training. Horizontal obstacle clearance will be no less than 25 feet from the proprotor tip path plane. Shipboard operations to marked spot cleared for V-22 may be conducted with less clearance.

A26.5.22. Flare and Chaff Policy. Dispense flares IAW controlling agency procedures and restrictions. When over water, dispense flares at least 3 NM from any surface vessel, platform, or landmass. Upon next landing, deplane a crewmember to visually inspect dispensers to ensure that there are no hung flares. If a hung flare is detected, follow appropriate procedures.

A26.5.23. Simulated Instrument Flight. The use of a hood or other artificial vision-restricting device is not authorized for any phase of flight unless IAW approved test plan.

A26.5.24. Emergency Procedures. Emergency procedures are normally practiced in the aircrew training device (ATD). Do not retard ECL's or fail any aircraft systems, except as required during FCF's.

A26.5.25. Mission Employment. Refer to CV-22 CONOPS Annex C as appropriate.

A26.5.26. Direct Support Operator Procedures. Refer to CV-22 CONOPS Annex C as appropriate.

A26.5.27. Flight Engineer Procedures. Refer to CV-22 CONOPS Annex C as appropriate.

Attachment 27

MQ-1/9 OPERATING PROCEDURES

A27.1. General Information.

A27.1.1. Scope. This attachment, in conjunction with other governing directives, outlines procedures for the operation of the MQ-1/MQ-9 Remotely Piloted Aircraft (RPA) under most circumstances. It applies to all aircrew operating AFMC MQ-1/MQ-9 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A27.2. Mission Planning.

A27.2.1. Mission Planning Requirements. The PIC is responsible for mission planning and briefing. Mission planning and briefing are two separate activities. The PIC and mission planners (if available) will jointly review mission plans to ensure safety and mission effectiveness. Crewmembers other than the crew flying the mission may accomplish mission planning. Commanders will ensure currency of all mission planning materials and compliance with command guidance. Squadron and Forward Operating Location operations officers will schedule adequate mission planning time prior to flight.

A27.2.2. Inflight Publications. FLIP terminal instrument procedure books are not required in the GCS except when operating from an airfield with a published MQ-1/MQ-9 compatible approach. If the MQ-1/MQ-9 compatible approaches are separately published plates, then only those plates are required in the GCS. If units annotate the ground track from compatible MQ-1/MQ-9 approach plates on the PSO Tracker display chart, it will be to scale and reflect current FLIP products. When operating away from El Mirage or Gray Butte Airfields a taxi diagram will be loaded in both PSO racks or in the GCS for the aircrew to reference.

A27.2.3. Local Area Maps And Inflight Guides. A local area map of sufficient detail to remain within assigned operational or training areas will be available to crewmembers and displayed in the GCS. Units will ensure that, as a minimum, the PSO racks contain charts that are accurate enough to ensure the safe operation of the aircraft. Maps, charts, and FLIP required for navigation for both the planned IFR and VFR phases of flight shall be available to the aircrew at all times.

A27.2.4. Briefing/De-briefing

A27.2.4.1. The PIC is responsible for presenting a logical briefing to all crewmembers that promotes safe, effective mission accomplishment. A structured, logical debrief of the flight shall be conducted at the completion of each mission.

A27.2.4.2. Briefing Attendees. Crewmembers who are logging individual events for currency do not need to attend the mission briefing iaw Chapter 2, however, they must receive a changeover brief in their respective crew position before participating in the flight. Other crewmembers who did not attend a mission briefing must obtain Squadron Operations Officer (SQ/DO) approval prior to participating in a flight. The pilot in command or MC will ensure crewmembers participating in a flight under SQ/DO approval are adequately briefed prior to assuming crew duties.

A27.2.4.3. Brief Content. A Go/No-Go and Operational Risk Management (ORM) checklist will be completed by the PIC with all crewmembers available. The extent and depth of the briefings will depend on the type of flight, complexity of the tests and equipment, previous mission and flight crew experience. Those items published in unit standards and understood by all participants may be briefed as “standard.” Mission briefings will be accomplished IAW Mission Briefing Guides contained within the unit In-Flight Guides.

A27.2.4.3.1. In-flight Changes. Do not fly unbriefed missions and/or events. If operationally necessary, mission elements and events may be modified while the MQ-1/MQ-9 is airborne as long as changes do not compromise flight safety. The PIC will ensure all crewmembers understand any changes.

A27.2.4.4. Crew Change/Handover Brief. When conducting handover operations the LRE and MCE pilots should carefully plan and coordinate handover locations, times, and other mission pertinent information. Emphasis should be placed on notifying the other element of current mission status, mission accomplishment, items not accomplished, and any deviations from previously coordinated operations.

A27.2.5. Crew. The crew is defined as the personnel responsible for safe operation of the MQ-1/MQ-9 aircraft. For the MQ-1/MQ-9, the term pilot refers to a pilot in the LRE or MCE or to the Mission Commander (MCC).

A27.2.5.1. Pilot-in-command (PIC). The PIC will be designated in the flight authorization IAW AFI 11-401. For multiple crews, the PIC will be designated for each crew.

A27.2.5.2. Pilot/Sensor Operator (PSO) racks. For normal ground and flight operations, the pilot in control of the aircraft will occupy the left seat unless equipment malfunctions dictate use of an alternate control rack. In addition, during critical phases of flight, a pilot or sensor operator must be in the right seat. The crewmember in the right seat will act as a safety monitor while operating the Multi-Spectral Targeting System (MTS) to ensure the safety of the aircraft and ground personnel.

A27.2.6. Flight Plan. When required by the FAA CoA, the PIC or delegated shall file a flight plan prior to flight. A flight plan may not be required due to the unique nature of RPA operations. The PIC’s initials on the Flight Authorization (AF IMT 4327a) cover the requirements stipulated in AFI 11-202V3.

A27.3. Common Mission Guidance.

A27.3.1. Ground Control Station (GCS).

A27.3.1.1. Entry Procedures. The GCS will be considered the flight deck of the aircraft under operation with no exceptions.

A27.3.1.2. At the beginning of every flight, the PIC will display the appropriate access signs on the GCS entry points.

A27.3.1.3. For GCS entry procedures, critical phases of flight will be defined as: takeoff to initial climb configuration; final approach to touchdown (or low approach); LRE to MCE (and vice versa) handover operations; medium or high risk test point execution, and terminal attack sequences (maneuver-to-attack to weapons impact).

A27.3.1.4. During critical phases of flight and any other time determined by the pilot in command keep a sterile environment consistent with good CRM procedures. The technician will post an access sign instructing personnel to call for entry. During an emergency situation, requested personnel can enter the rear door without calling. Exit from the GCS through the rear door. If no rear exit is available, coordinate with the PIC prior to exiting. Talking should be minimized and only if necessary for the execution of the mission in the GCS, especially when the aircraft is below 2000' AGL.

A27.3.1.5. During all phases of flight there will be no entry or exit through the forward door, unless the GCS does not have an aft door. Aircrew will not answer pages in the GCS and the PA system should be turned down in volume. The PA can be used to declare an IFE or call a Code Red or Yellow. If crewmembers are unable to answer the phone, a technician may answer and ask the crew if they are able to take the call. The PIC has final authority on number of personnel in the GCS. The PIC can designate the technician to limit the nonessential personnel within the GCS.

A27.3.1.6. Limitations/Restrictions. While in the GCS, crewmembers will operate only those electronic items necessary for flight and/or mission operations.

A27.3.1.7. Telephone usage is authorized in the GCS while the RPA is in flight.

A27.3.1.8. Smoking is prohibited in or within 50 feet of the GCS.

A27.3.2. Required Equipment.

A27.3.2.1. Video Sources. Two separate video sources are required for flight operations. At least one nose camera, either EO or IR, must be available.

A27.3.2.2. Navigation Equipment. The inertial navigation system (INS) and global positioning systems (GPS) are required for flight operations.

A27.3.2.3. Transponder. The aircraft shall have an operable transponder with altitude encoding for all flights, unless the PIC has contacted the controlling facility and been given permission to fly without it. The PIC should get the name and phone number of the individual at the controlling facility granting permission to fly the mission.

A27.3.2.4. Sensor Equipment at Night. A minimum of one IR sensor must be operational for any mission with planned operations between the hours of official sunset and official sunrise.

A27.3.2.5. Data Recording. New recording media (VCR tape, RDVD, etc.) shall be installed prior to each ground run or flight operation.

A27.3.2.6. Ground Crew Communication. Two way communications are required between the pilot and ground crew during all ground operations and airborne operations that require ground crew participation.

A27.3.3. Engine Starts. The engine will only be started on the command of the pilot.

A27.3.4. Taxi Operations.

A27.3.4.1. Maintain safe taxi speeds at all times. Maximum taxi speed is 20 knots ground speed on taxiways and runways. Maximum taxi speed is 5 knots ground speed in turns. Crews are allowed to perform high speed brake checks up to 35 knots ground speed or airspeed as the test mission dictates.

A27.3.4.2. Do not taxi over arresting gear (i.e. BAK 9/12 or BAK-14).

A27.3.4.3. Prior to arm/de-arm, pilots will notify the ground crew that hands are clear of all aircraft controls.

A27.3.5. Takeoff/Departure.

A27.3.5.1. Do not takeoff, land or accomplish touch-and-go landings over raised webbing-type barriers (e.g., MA-1A, 61QSII). Pilots may takeoff, land or accomplish touch-and-go landings before, beyond or between raised cables or barriers provided the available distance meets minimum runway length requirements.

A27.3.5.2. Command the MTS to position mode whenever below 500' AGL. Above 500' AGL and with pilot concurrence, the sensor operator may use the MTS at their discretion.

A27.3.5.3. Maintain an engine-out glideback capability to the maximum extent possible.

A27.3.5.4. For initial takeoffs on test sorties, with safety and test review board approval, the available runway for landing must exceed total planned landing distance by at least 500 feet. This is meant to apply to emergency heavy weight landings that occur immediately after takeoff. Attempt to dump fuel or jettison ordnance to reduce gross weight and landing distance. In all other cases, landings will be planned so that the available runway exceeds landing distance by at least 1000 feet.

A27.3.6. Ops Checks.

A27.3.6.1. Accomplish sufficient ops checks to ensure safe mission execution. Time between ops checks will not exceed one hour.

A27.3.6.2. Minimum items to check are: communication links, engine instruments, total fuel quantity and distribution, current feeding fuel tank, and aircraft weight.

A27.3.7. Enroute. PICs shall maintain normal VFR/IFR separation utilizing chase aircraft and two way radio communications with a controlling agency. If flying within the National Airspace System (NAS), the PIC will request flight following from ATC as much as possible.

A27.3.8. Recovery. The normal procedure is to bring the RPA into visual range of the ground crew. Once the ground crew can maintain visual on the RPA and it is within the CoA limits for distance away from the observer, the aircrew may clear the chase aircraft off by stating "CLEARED OFF". Once cleared off, chase will either leave the area of operations or orbit south of the field and land after the runway is clear.

A27.3.9. Approach and Landing.

A27.3.9.1. Stabilized Approach. Stabilized approach is defined as payload in position mode, configured for landing, normal glidepath, and on target airspeed (minus 5 KIAS and plus 15 KIAS). Aircraft must be stabilized by 200 feet AGL. If the aircraft becomes un-stabilized below 200 feet AGL, or if the following sink rate limits are exceeded, a go around is mandatory. Sink rate limits: 1200 feet per minute (FPM) descent rate below

200 feet AGL and 600 FPM below 50 feet AGL. Momentary deviations do not require a go around as long as immediate corrective actions are taken.

A27.3.9.2. The desired touchdown zone for a visual approach is 500 to 1500 feet from the threshold, or the glide path interception point for a precision approach. When local procedures or unique runway surface conditions require landing beyond a given point on the runway, adjust the desired touchdown zone accordingly and brief applicable crewmembers.

A27.3.9.3. During a go-around or low approach, do not fly directly over aircraft on the runway at low altitude.

A27.3.9.4. Comply with the wake turbulence avoidance criteria for a small aircraft (category 1).

A27.3.9.5. Pilots will not practice EO nose-camera landings at night.

A27.3.9.6. The crewmember in the right seat will announce altitude deviations (plus or minus) exceeding 100 feet at the initial approach fix and the final approach fix. The crewmember in the right seat will announce "DECISION HEIGHT" or "MDA" (Minimum Descent Altitude) when reaching these altitudes for precision and non-precision approaches.

A27.3.9.7. For MQ-9 landings using beta range (full reverse), the pilot will call "Full Reverse" after he pulls the power lever into reverse. The right seat crew member will call "Full Reverse" after he confirms the pilot's action. The right seat crew member will call ground speeds as the aircraft decelerates in 10 knot increments (60 kts, 50 kts, 40 kts, 30 kts) then call out the directive: "Ground Idle". The pilot will call "Ground Idle" after moving the power lever to ground Idle. The right seat crew member will again verify the pilot's action.

A27.3.10. Simulated Flame Out (SFO) procedures. Minimum airspeed during an SFO traffic pattern is Max Endurance airspeed. Landings (touch-and-go or full-stop) may be accomplished out of an SFO, provided an IP is present, the approach is stabilized and the aircraft will land in the recommended touchdown zone. Terminate the SFO maneuver if airspeed decreases below the minimum stated or at 100 feet AGL if the aircraft will land short of the runway threshold.

A27.3.11. Air-to-Surface Weapons Delivery

A27.3.11.1. Battle Damage/Weapons Checks. Crews will perform battle damage and weapons checks prior to or during RTB. This check is mandatory following expenditure of live ordnance. If unable to complete the check using organic sensors, request support from the chase aircraft or a ground observer before landing.

A27.3.11.2. Captive-carry Ordnance Procedures. If carrying training ordnance, aircrew can arm the master arm switch and actuate all appropriate buttons. Pinned up live or inert weapons are not considered training ordnance.

A27.3.12. Chase Operations.

A27.3.12.1. Chase Crew Requirements. Two pilots are required for night chase operations. The safety pilot (pilot not flying) is responsible for clearing for traffic while the pilot flying is responsible for maintaining aircraft control and visual separation with the RPA. Two pilots are also required when oxygen is required by FAA regulations. A single pilot may be used in day chase missions.

A27.3.12.2. It is the chase aircraft's responsibility to advise the RPA aircrew if the flight path indicates a possible conflict with other aircraft or weather. Two-way radio communication will be maintained between the chase aircraft and the RPA. If there has been no communication between the chase aircraft and the RPA in the last 15 minutes, a radio check between the two aircraft will be accomplished.

A27.3.12.3. Weather Minimums. Chase operations will be conducted in VMC. For rejoins underneath a ceiling, minimum ceiling/visibility criteria are 1000 feet/3 NM for day, 3000 feet/3 NM for night.

A27.3.12.4. Altitude Minimums. Chase aircraft will not go below 500 feet AGL during chase procedures in day/VMC conditions. Chase aircraft will not go below minimum safe altitude (MSA) during chase procedures at night. MSA is defined as 1000 feet above the highest obstacle in the defined testing/training area and will be briefed on every mission. (Recommend the MSA be based on a 5 NM radius from the RPA.)

A27.3.12.5. Distance Minimums. Chase aircraft will maintain 300 feet to 1500 feet of separation from the RPA. Chase aircraft should maintain a slight stack and 2 to 5 aspect on the RPA.

A27.3.12.6. Equipment Procedures. The chase aircraft and the RPA will have their beacons and strobe lights on during daylight operations to increase visibility for other aircraft.

A27.3.12.7. The RPA will squawk the transponder code for the formation. The chase aircraft will squawk standby and be ready to squawk for the formation in the event the RPA's transponder fails.

A27.3.12.8. The chase crew will call "READY FOR REJOIN" when in position and visual the RPA. Additionally, the chase crew will report all gear up and gear down positions.

A27.3.12.9. The RPA will call all turns at night or in close formation, as well as all altitude and airspeed changes.

A27.3.13. Lost Communication.

A27.3.13.1. RPA Lost Communication. If the chase aircraft detects the RPA is lost comm, the chase crew will contact the RPA ops desk and direct the RPA to recover to the local area. If the RPA does not recover, chase crew will provide ATC with the actual position and probable destination of the RPA. If the chase aircraft cannot safely continue to execute chase responsibilities (maintain VMC, chase low on fuel, a potential threat of a collision exists, etc.), the chase aircraft will proceed to and loiter, well clear of the landing runway. If radio communications are regained, chase aircraft will request to rejoin. Otherwise, the chase aircraft will return to base (RTB).

A27.3.13.2. Chase Aircraft Lost Communication. If the RPA crew detects a communication failure with the chase aircraft, the RPA crew will RTB.

A27.3.14. Loss of Visual Contact. If the chase aircraft loses visual contact with the RPA, immediate separation is essential. Upon losing sight of the RPA, the chase aircraft will call "BLIND" with altitude over the radio. The RPA will acknowledge the blind call and immediately transmit heading, altitude, and airspeed. The RPA will remain predictable and continue its current flight path unless directed otherwise. The sensor operator will utilize the MTS (if available) in an attempt to clear the RPA flight path and avoid a collision. The chase aircraft will obtain a minimum of 500 feet altitude separation until visual contact is regained. If visual contact is lost for more than 30 seconds, chase aircraft will request assistance from ATC to reacquire the visual. While the chase aircraft is visually searching, the RPA will make position reports and call turns.

A27.3.15. Encountering IMC. The chase aircraft should be directive to avoid IMC penetration; however, if an inadvertent IMC penetration occurs resulting in loss of visual, immediate separation from the RPA is essential. Smooth application of control inputs is imperative to minimize the effects of spatial disorientation. The chase aircraft will simultaneously transition to instruments, maneuver away from the last known RPA position, and call "BLIND, POPEYE" over the radio. The RPA aircrew will acknowledge the blind call and immediately transmit heading, altitude, and airspeed. The RPA will remain predictable and maintain its current flight path unless directed otherwise. The sensor operator will utilize the MTS (if available) to clear the RPA's flight path. The chase aircraft will obtain a minimum of 500 feet altitude separation until visual contact is regained. If visual contact is lost for more than 30 seconds, chase aircraft will request assistance from ATC to reacquire the visual. While the chase aircraft is visually searching, the RPA aircrew will make position reports and call turns. The chase aircraft and the RPA will coordinate separate ATC clearances to ensure separation with each other as well as other aircraft (IFR clearance, squawk, etc). Once clear of IMC and visual the chase aircraft will request rejoin with the RPA.

A27.3.16. Chase Rejoins.

A27.3.16.1. Takeoff. This is the preferred method of rejoin. Chase aircraft will normally takeoff prior to the RPA, loiter south of the field and call "READY FOR REJOIN" on the Common Traffic Advisory Frequency (CTAF) or other pre-briefed frequency. The RPA aircrew will announce takeoff on the CTAF. Chase aircraft will keep the RPA in sight, climb with it, and plan to rejoin by 2000 feet AGL. Chase aircraft will not go below final approach speed during rejoin.

A27.3.16.2. In-flight. If the RPA is airborne prior to the chase aircraft's arrival, the chase aircraft will remain south of the runway environment until visual. The RPA will assist the rejoin by stating the RPA's location, heading, airspeed and altitude. Once visual, the chase aircraft will request to rejoin.

A27.4. Instrument Procedures.

A27.4.1. The MQ-1 is an approach category A aircraft. The MQ-9 is an approach category B aircraft.

A27.4.2. Weather Minimums, Restrictions, and Planning Factors. The MQ-1/MQ-9 are weather category 1 aircraft.

A27.4.2.1. All flights at El Mirage and Gray Butte Airfields shall be conducted under VFR conditions throughout the planned route of flight (1500 feet ceiling, 3 SM visibility, +/- 1 hr ETA). Pilots will maneuver the aircraft so as to maintain appropriate VFR cloud clearances during departure, en-route, and recovery IAW AFI 11-202V3. The following sources shall be utilized in determining weather conditions: airport control tower, regular and special weather reports obtained through DUATS (if available), Flight Service Station, Military Weather Services, commercial pilot reports and GCS installed weather systems.

A27.4.2.2. Operating the MQ-1/MQ-9 with ceiling and/or visibility below VFR minimums requires a published airport surveillance radar or precision approach radar terminal approach procedure at the operating airfield. The MQ-1/MQ-9 INS/GPS is not certified for flying GPS instrument approaches.

A27.4.2.3. Normally, declaring an alternate airfield is not an available option for the MQ-1/MQ-9 unless the airfield has a pre-positioned GCS (or LRGCS). If a pre-positioned GCS is available, use published alternate weather requirements IAW AFI 11-202V3. Holding (instead of an alternate airport) is authorized for RPA operations. While airborne, if the actual weather deteriorates below 1500 feet ceiling or the visibility is below 3 SM, MQ-1/MQ-9 crewmembers will increase recovery fuel to allow the aircraft to hold for at least one hour, in addition to, normal recovery fuel.

A27.5. Operating Procedures and Restrictions.

A27.5.1. Wind. Actual winds must be within flight manual limits at takeoff and landing. If forecast winds exceed flight manual limits at ETA, the RPA must return to the local area one hour prior to the forecasted winds exceeding limits. If unable to land prior to the increased winds, terminate the mission in time to return to the airfield with sufficient fuel for at least two hours of low approaches in addition to normal recovery fuel. For cross-country sorties, winds must be forecast within limits for +/- 1 hour of ETA.

A27.5.2. Thunderstorms and Lightning. Lightning strikes and electrostatic discharges can occur in what may look like benign conditions. All flight and ground operations are prohibited when lightning is reported within five (5) nautical miles of the airfield. All ground operations are prohibited if thunderstorms are producing hazardous conditions such as hail, strong winds above 30 knots, heavy rain or lightning.

A27.5.3. Cold-Weather Operating Procedures. Do not takeoff with frost, ice or snow accumulation on the wings. Whenever the outside air temperature is less than 40 degrees Fahrenheit or the pilot is concerned about frost, ice or snow, apply an ice retardant to the wings or inspect the aircraft for frost immediately prior to takeoff. Pilots should avoid penetration of visible moisture or precipitation to the maximum extent possible, particularly above the freezing level. If precipitation cannot be avoided, pilots should maximize climb or descent rate to exit potential or actual icing conditions.

A27.5.3.1. Icing Procedures. Do not conduct flight into forecast icing greater than light. Do not conduct flight into known icing conditions. If encountering icing in flight, take action to exit icing conditions immediately.

A27.5.4. Runway/Taxiway Conditions. When no RCR is available, refer to International Civil Aviation Organization conversions in the Flight Information Handbook. Handling characteristics of the MQ-1/MQ-9 on ice or snow are not optimum. Minimize power settings to limit taxi speed to no more than 5 KGS. If required to stop, try to stop over clear portions of the taxiway. The pilot will remain focused on the outside video display at all times.

A27.5.5. Emergency Mission Planning. Maintain awareness of current and forecast weather along the planned and emergency mission routes of flight, and at the intended landing field. Update the emergency mission route for weather hazards (e.g., cloud layers, icing, turbulence, etc.) throughout the flight. Alter the route, if necessary, and use care to select appropriate aircraft parameters to avoid hazardous weather conditions.

Attachment 28

AL-1 OPERATING PROCEDURES

A28.1. General Information. The AL-1 will be operated IAW this instruction and approved test plans.

ATTACHMENT 29

DHC-8-Q200/Q300 OPERATING PROCEDURES

A29.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the DHC-8 (Dash 8) Series 200 and 300 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of DHC-8 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A29.2. Mission Planning.

A29.2.1. Aircrew.

A29.2.1.1. Minimum Crew for Flight. The minimum crew for the DHC-8 is a pilot (aircraft commander) and copilot for high-speed taxi and flight operations.

A29.2.1.2. Supplemental Crew. Additional crew may include sensor operators and/or observers.

A29.3. Common Mission Guidance.

A29.3.1. Minimum Air Work Altitude. Unusual attitudes, stalls, steep turns, and flight at minimum control airspeed will be accomplished clear of clouds and at or above 5,000 feet AGL.

A29.3.2. Single Engine Simulation. To simulate an engine out situation, retard the appropriate power lever to 20 percent torque (at not less than VMCA nor less than 200 feet AGL).

A29.4. Instrument Procedures.

A29.4.1. The DHC-8 is approach category B.

A29.4.2. CNS/ATM Limitations. Navigation capability limitations are as stated in the Pilot's Operating Handbook and any Supplements for the aircraft flown.

A29.5. Operating Procedures and Restrictions.

A29.5.1. Reverse Taxi. The reverse taxi capability of the DASH 8 will not be utilized, except in an emergency, or as part of a test plan. If the aircraft must be reversed, follow procedures in the Flight Manual and use a safety observer outside the aircraft, in full view of the pilots. Hand signals will be pre-briefed.

A29.5.2. Runway and Taxiway Minimums.

A29.5.2.1. The aircraft commander will determine that all airfield facilities are of suitable construction, and weight bearing capacity.

A29.5.2.2. Minimum Runway Length for Takeoff. For takeoff, runway available must exceed computed takeoff field length corrected for Runway Condition Reading (RCR) or 3,000 feet whichever is greater. The decision to make intersection takeoffs rests solely with the PIC.

A29.5.2.3. Minimum Runway Length for Landing. For landing, runway available must exceed computed landing distance without reverse over a 50 foot obstacle corrected for RCR or 3,000 feet whichever is greater.

A29.5.2.4. Minimum Runway Length for Touch and Goes. Touch-and-go landings are authorized on runways of 6,000 ft or more. If the planned landing runway has arresting gear, there must be at least 6,000 ft between cables.

A29.5.3. Arresting Gear. Taxiing or landing over arresting gear or cables is not authorized due to restricted clearance of the radar dome and EO/IR pod. Plan to touch down beyond and takeoff prior to arresting gear.

Attachment 30

PC-12/U-28 (AND VARIANTS) OPERATING PROCEDURES

A30.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the U-28/PC-12 aircraft and U-28/PC-12 modified aircraft. . It applies to AFMC aircrews and all management levels concerned with operation of U-28/PC-12 aircraft. Operations not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A30.2. Mission Planning.

A30.2.1. Fuel Requirements. Plan an additional 15 minutes of fuel per hour at Maximum Cruise Power fuel consumption rates for that portion of the flight where structural icing or thunderstorms requiring off-course maneuvering are forecast or reported.

A30.2.2. Flight Logs.

A30.2.2.1. Prepare a flight log for each off-station mission and include the following as a minimum: turn points, headings, distances, Estimated Time Enroute (ETE), Minimum Safe Altitude (MSA) (for low-level operations), and fuel computations. A flight log is not required if the above information is included on a flight map

A30.2.2.2. A flight log is not required for flights within 2.5 hours of home station. It is the responsibility of the aircraft commander to brief fuel requirements and meet the minimum fuel requirements of Table 2.1.

A30.2.3. Departure Planning. Use AFI 11-202V3, AFMAN 11-217 and this instruction when planning an IFR departure.

A30.2.3.1. IFR Departures.

A30.2.3.1.1. Takeoff gross weight (GW) must not exceed that which would lower the rate of climb to less than a 3.3 percent climb gradient (200ft/NM).

A30.2.3.1.2. If no minimum climb gradient is published, use 200 ft/NM. Review AFMAN 11-217 for further guidance.

A30.2.3.2. VFR Departures will not be flown in lieu of proper obstacle clearance planning. VFR departures require detailed planning to ensure obstacles and high terrain are avoided.

A30.3. Common Mission Guidance.

A30.3.1. Crew Complement. Minimum crew for the U-28/PC-12 is one U-28/PC-12 qualified pilot. In addition to the qualified pilot, a second qualified pilot or instrument rated safety pilot is required if other crewmembers are on board. Crew complement for the U-28/PC-12 is IAW Table A30.1.

Table A30.1. Crew Complement

Crew Position	Basic
Aircraft Commander	1
Safety Pilot	1 (A/R)
Observer	3 (A/R)

A30.3.1.1. Non-current or unqualified crewmembers may perform in their primary crew position when supervised by an instructor of like specialty. For pilots, the instructor must occupy the other pilot seat.

A30.3.2. Safety Belts, Shoulder Harnesses.

A30.3.2.1. The aircraft commander will ensure crewmembers and passengers have safety belts securely fastened during takeoffs, approaches, landings, simulated emergencies, and when turbulence is encountered or anticipated.

A30.3.2.2. When occupying their crew position, the pilot and copilot will have safety belts fastened at all times, and safety belts with shoulder harnesses fastened for taxi, takeoff, approach and landing.

A30.3.3. Runway and Taxiway Minimums.

A30.3.3.1. The aircraft commander will determine that all airfield facilities are of suitable construction, and weight bearing capacity.

A30.3.3.2. Minimum Takeoff Runway. The Accelerate-Stop Distance must be less than 80% of usable runway available.

A30.3.3.3. Minimum Landing Runway. The computed Landing Distance must be less than 80% of useable runway (without propeller reverse).

A30.3.3.4. Operations from other than hard surfaced runways are not authorized.

A30.3.4. Take-off/Landing Procedures.

A30.3.4.1. Only qualified U-28/PC-12 pilots will conduct the takeoff and landing unless the other pilot is a U-28/PC-12 instructor. Either pilot can taxi the airplane onto the runway for take-off.

A30.3.4.2. Crosswind for Takeoff and Landings. Table A30.2 will be used to determine the recommended maximum crosswind component for takeoffs or landings. The pilot's operating handbook does not introduce RCR into performance factors for takeoff or landing.

Table A30.2. Maximum Crosswind Component

Flap Setting	**Maximum Crosswind Component (KNOTS)**
0	**30**
15	**25**
30	**20**
40 (Landing only)	**15**

A30.3.5. Touch-and-Go/Stop-and-go Landings.

A30.3.5.1. Conduct touch and go operations IAW the PC-12/U-28 Checklists. Touch-and-Go operations require two qualified pilots or an IP if the other pilot is unqualified or non-current.

A30.3.5.2. The Touch-and-Go Checklists may be used when performing multiple instrument approaches or VFR pattern practice at the same airport or transitioning to another airport within 25 NM. Pilots will complete the Climb, Cruise, Descent, and Before Landing Checklists after the initial takeoff or if transiting to another airfield greater than 25 NM from the airport where instrument-approach or VFR-pattern practice was accomplished.

A30.3.5.3. When the runway surface is reported as wet and crosswinds exceed 75% of the maximum demonstrated crosswinds listed in the Pilot Operating Handbook (POH), Stop-and-Go or Touch-and-Go operations are prohibited.

A30.3.5.4. Stop-and-Go or Touch-and-Go operations are prohibited on icy or snow-polluted runways.

A30.3.6. Minimum runway length for touch and go operations is 5,000 feet for full and partial flap landings and 6,000 feet for no-flap landings.

A30.3.7. Stop and go landings are authorized if the Accelerate-Stop Distance is less than 80% of usable runway available. Stop-and-go landings will not be accomplished unless a minimum of 2400 RVR, or ½ SM mile (if RVR is unavailable) and useable runway length is not less than 80% of Accelerate-Stop distance.

A30.3.8. Touch-and-Go Landings are authorized when ceiling and visibility range are better than 300 and ¾.

A30.3.9. Aircraft Loading/Cargo Handling. Ensure a weight and balance computation is accomplished prior to each flight. Use of spreadsheet products is acceptable, provided all weights and moments are properly accounted for by flight station.

A30.3.10. Taxi. All aircraft doors will be closed during taxi operations.

A30.3.11. Flap Setting. Takeoff flap setting will be 15 degrees. Takeoff flap setting of 30 degrees is permissible, provided the procedure is briefed by the pilot.

A30.3.12. Oxygen Requirements. Oxygen will be used as prescribed in AFI 11-202V3/AFMC Sup 1 or the flight manual, whichever is more restrictive.

A30.3.13. Communications Policy.

A30.3.13.1. Sterile Cockpit. Limit conversation to that essential for crew coordination and mission accomplishment during taxi, takeoff, approach, landing, and any flight below 10,000 feet MSL (except cruise).

A30.3.13.2. Aircraft Interphone. Primary crewmembers will monitor interphone during critical phases of flight. Crewmembers will advise the aircraft commander prior to checking off interphone.

A30.3.13.3. Command Radios.

A30.3.13.3.1. The pilot not flying the aircraft normally makes all air traffic control (ATC) radio calls. During periods of high tasking it is acceptable for the pilot flying the aircraft to assume ATC radio duties.

A30.3.13.3.2. The pilot operating the radios will announce which radio is primary, and will inform the crew when the primary radio changes.

A30.3.13.3.3. One pilot will record and acknowledge all ATC clearances. Another crewmember should monitor the read back and ensure compliance.

A30.3.13.3.4. Both pilots will monitor UHF guard (or VHF guard when appropriate) regardless of primary radio.

A30.3.14. Functional Check Flights. For initial takeoff weather minimums during FCF/ACF operations, PC-12 aircrews will use the fighter, attack, trainer, and U-2 guidance regarding weather found in table 3.1.

A30.4. Instrument Procedures.

A30.4.1. The U-28/PC-12 is approach category B. The pilot may fly circling approaches at higher speeds raising the circling minimums to the category for the speed to be flown. The PF is responsible for briefing speeds and flying the approach according to the correct minimums.

A30.4.2. During night or marginal weather, fly a precision approach, if available. If a PAR or ILS is not available, fly any available approved instrument approach. On training and evaluation flights, or flights at familiar airfields, pilots may fly non-precision approaches or VFR patterns to accomplish required training or evaluation requirements.

A30.5. Operating Procedures and Restrictions.

A30.5.1. Maximum Gross Weights. Operating weights will be in accordance with the flight manual (and supplements) weight, altitude, and temperature limits.

A30.5.2. Flight Duty Period**.** Observe restrictions and guidance of AFI 11-202 Vol 3, Chapter 9 and AFMC Sup 1 for transport type aircraft. In addition to the restrictions for FDP in AFI 11-202 Vol. 3, limit crew duty day to 12 hours with an inoperative autopilot even if a second qualified U-28/PC-12 pilot is available. If the autopilot fails after departure, continue to the next scheduled stop and then comply with the 12-hour duty day limitation.

A30.5.3. Survival/Aircrew Flight Equipment Requirements.

A30.5.3.1. On missions carrying passengers, ensure oxygen masks are available for all occupants regardless of planned flight altitude.

A30.5.3.2. A minimum One first aid kit should be onboard the aircraft at all times.

A30.5.4. Air Work

A30.5.4.1. Descent. Prior to descent into unfamiliar areas, appropriate terrain charts (Operational Navigation Chart (ONC), Sectional Aeronautical Chart, Tactical Pilotage Chart (TPC), or Joint Operations Graphic (JOG)) should be reviewed to increase aircrew situational awareness of obstructions. Primary crewmembers will not be involved in duties other than aircraft operations, descent and approach monitoring, and required checklist items from the initial descent point to landing.

A30.5.4.2. Unusual attitudes, stalls, steep turns, and flight at minimum control airspeed will be accomplished clear of clouds and at or above 5,000 feet AGL.

A30.5.4.3. Steep turns will be limited to 60 degrees of bank during level flight in day, VMC; otherwise, bank is limited to 45 degrees. Review stall speeds before accomplishing.

A30.5.4.4. Traffic Pattern Stall Series requires day VMC at a minimum of 5000 feet AGL or 5000 feet above cloud deck.

A30.5.5. Practice/Simulated Emergencies.

A30.5.5.1. Practice/simulated emergencies will not be accomplished with passengers onboard. Emergency procedures, which require placing switches in other than their normal positions or placing the aircraft in an abnormal configuration, may only be accomplished during training, evaluation, or currency flights when an instructor or flight examiner is in one of the pilot seats. Instructor pilot candidates who occupy a pilot seat and are under the supervision of a flight examiner pilot (not in a pilot seat) may practice simulated emergency procedures during initial or re-qualification upgrade evaluations. Preface all simulated emergencies with the word “simulated” and terminate simulated emergencies when an actual emergency arises.

A30.5.5.2. Simulated engine-out. Simulated engine-out maneuvers will only be accomplished near a suitable landing area.

A30.5.5.3. Simulated Forced Landings. Simulated forced landings outside the airfield environment due to simulated engine malfunction/failure and other emergencies will only be accomplished in VMC under VFR. The IP will initiate the simulated emergency to practice a forced landing only in an area previously studied by the IP for hazards and obstacles. The IP will terminate the simulated forced landing and direct a go-around no lower than 100 feet AGL.

A30.5.5.4. Practice engine shut-downs will not be accomplished.

A30.5.6. Aircraft Equipment

A30.5.6.1. A fully mission capable aircraft is the ultimate objective of the maintenance effort. The final responsibility regarding equipment required for a mission rests with the aircraft commander. If one aircraft commander accepts an aircraft to operate a mission or mission segment without an item or system, this acceptance does not commit that aircraft commander, or a different aircraft commander, to subsequent operations with the same item or system inoperative. When the aircraft commander considers an item essential, designate the component mission essential (ME) on the AFTO Form 781 (or user equivalent), and the item will be repaired or replaced prior to departure.

A30.5.6.2. Engine performance, aircraft attitude, vertical velocity indications, altitude, airspeed, and heading instruments should be operative in both pilot positions. For instruments with both analog and digital displays, as a minimum the analog portion must be operational.

Attachment 31

C-20 GULFSTREAM OPERATING PROCEDURES

A31.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the C-20 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of C-20 aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A31.2. Mission Planning.

Table A31.1. Minimum Crew Complement

Crew Position	Training Mission	Operational Mission
Aircraft Commander	1	1
First Pilot	1	1

A31.3. Common Mission Guidance.

A31.3.1. The aircraft commander will determine that all airfield facilities are of suitable construction, and weight bearing capacity. If takeoff/departure end overruns are available, (stressed or authorized for normal operations), they may be used to increase the runway available for takeoff/landing if needed.

A31.3.1.1. Taxi restrictions: If in doubt, the AC should consider deplaning a crewmember to safely marshal the aircraft.

A31.3.1.2. For 90 degree turns to/from a surface less than 35 feet, but no less than 25 feet, the other surface will be a minimum width of 45 feet. Offset to the larger surface to keep on the pavement.

A31.3.1.3. Minimum taxiway width for 90 degree turns (with fillets) is from a 35 foot to 35 foot taxiway. Aircraft Commander will make the final "on scene" decision to use approved taxiways.

A31.3.2. Barriers. Do not takeoff, land or accomplish touch and goes over raised webbing-type barriers (e.g., MA-1A, 61QSII). Pilots may takeoff, land or accomplish touch and go landings beyond or between raised cables or barriers provided the available distance meets minimum runway length requirements.

A31.3.3. Wind Restrictions. Airfields will be considered below minimums for takeoff and landing when winds (including gusts) are greater than: Maximum wind (any direction) - 50 knots; Maximum tailwind component - 10 knots; Maximum crosswind components, corrected for RCR, as specified in TO 1C-20B-1-1. The maximum crosswind component during manual (autopilot off) CAT II ILS approaches is 10 knots. The maximum crosswind component for practice CAT II ILS approaches is 15 knots.

A31.3.4. Training Restrictions.

A31.3.4.1. Unless specifically authorized elsewhere in this section or in an approved test plan, do not practice emergency procedures that degrade aircraft performance or flight control capabilities (in-flight).

A31.3.4.1.1. In-flight, prior to simulating emergency procedures (EP), the pilot will notify all crewmembers. In the event of an actual emergency, all student training and simulated EPs will be terminated. Training will resume only when the pilot in command has determined that no hazard to safe aircraft operations exist.

A31.3.4.2. Touch-and-Go Landing Limitations.

A31.3.4.2.1. Touch and Go landings may be performed under direct instructor pilot supervision or by a certified mission pilot IAW this instruction, AFI 11-2FTV1, and the applicable flight manual. Refer to AFI 11-2FT Vol 1 as supplemented for specific touch and go training requirements, restrictions and approved airfields (without IP).

A31.3.4.2.2. Touch-and-go landings require at least 8000' of runway, ensure aircraft performance assures full stop capability per aircraft performance manual.

A31.3.4.2.3. Do not accomplish touch-and-go landings on slush covered runways.

A31.3.4.2.4. Brief touch-and-go landing considerations with the other appropriate aircrew members prior to final approach. On successive approaches, if the briefing remains the same and there are no questions, the briefing need not be repeated.

A31.3.5. Flight Maneuvers. The following maneuvers are authorized for qualification and continuation training, except when prohibited or restricted by the flight manual, partial/modification flight manual or other applicable directives. Direct instructor pilot (IP) super-vision requires the IP to have immediate access to the controls. Comply with Training Restrictions of this instruction and the following:

A31.3.5.1. Simulated Engine Failure. Perform practice or simulated loss of engines IAW this instruction and the applicable flight manual.

A31.3.5.1.1. Approach and Landing, Simulated Engine-Out (direct IP supervision).

A31.3.5.1.2. Approach and Go-Around, Simulated Engine-Out (direct IP supervision). A planned single-engine go-around may be started at any time before 200 AGL. For an unplanned go-around, use both engines as soon as safe and practical.

A31.3.5.1.3. Simulated Engine Failure Takeoff Continued (Simulated Engine Out Climb Out) (direct IP supervision). Minimum altitude to initiate a simulated engine failure on takeoff is 200 feet AGL.

A31.3.5.2. Landing Attitude Demonstration (direct IP supervision).

A31.3.6. Prohibited maneuvers. The following maneuvers, in addition to those already specified in applicable flight manuals, are prohibited unless part of an approved test plan, USAF TPS curriculum, ACF/FCF profile, or an actual emergency exists.

A31.3.6.1. Simulated emergency descents

A31.3.6.2. Split flap landings

A31.3.6.3. Tactics maneuvers (except MAJCOM approved tactics maneuvers)

A31.3.6.4. Aborted takeoffs

A31.3.6.5. Full stalls

A31.3.7. Special flight planning considerations:

A31.3.7.1. Departure Planning:

A31.3.7.1.1. Refer to AFMAN 11-217 V1 Chapter 9 and AFI 11-202 Vol 3 AFMC Sup 1, paragraph 8.7 for authorized departure procedures. VFR departures and Jeppesen Special Departure Procedures (SDP's) require OG approval. In no case will the aircrew perform a VFR departure in lieu of OEI obstacle clearance planning or an IFR departure procedure. Use of SDP's as alternate departure routing (no emergency) is not authorized. Refer to AFMAN 11-217 V1 for description of SDP's.

A31.3.7.1.2. Climb Gradient: IAW AFMAN 11-217 V1 paragraph 9.3, AFMC authorizes the use of zero feet obstacle clearance to compute engine-out performance data. Refer to AFMAN 11-217 V1. However, if the airport has a Special Departure Procedure (SDP) for your type aircraft, you are required to use the SDP for engine-out performance planning.

A31.3.8. Takeoff Minimums and Departure Alternates.

Table A31.2. Takeoff Weather Minimums.

Mission	Visibility	Remarks
Operational Missions	RVR 1000 (300 meters)	When less than RVR 1600, but equal to or greater than RVR 1000, the crew may take off, provided the runway has a minimum of 2 functioning RVR readouts (minimum RVR 1000 on all functioning readouts) and runway centerline lighting is operational.
All Others	RVR 1600 (490 meters)	For runways with more than one operating RVR readout, RVR must read 1600 minimum on all.

A31.3.9. Takeoff minimums. IAW AFI 11-202 V3, Table A31.2 describes MAJCOM authorized weather minimums for the C-20.

A31.3.10. Destination Filing Requirements. The forecast destination weather will be according to AFI 11-202, Volume 3 and the following:

A31.3.11. Dual Alternates. IAW AFI 11-202 V3, file two alternates when the forecasted weather at the intended destination is below minimums for the lowest suitable approach or the forecast surface winds (intermittent or prevailing) exceed limits corrected for RCR.

A31.3.12. OCONUS. File an alternate, regardless of forecast weather, when the destination aerodrome is outside the 48 conterminous states.

A31.3.13. Remote or Island Destination. When filing to a remote or island destination, aircrews will use 1+15 holding fuel (in lieu of an alternate and 45 minutes holding fuel). A remote or island destination is defined as any aerodrome which, due to its unique geographic location, offers no suitable alternate (civil or military) within 2 hours flying time. The forecast weather at the remote or island destination must meet the following criteria:

A31.3.13.1. The prevailing surface winds, corrected for RCR, must be within limits at ETA and forecast to remain so for 2 hours thereafter, and

A31.3.13.2. The prevailing ceiling and visibility must be equal to or greater than published minimums for an available non-precision approach (excluding ASR), for ETA plus 2 hours. NOTE: If a precision approach is available, the ceiling or visibility may be temporarily (TEMPO) below non-precision approach minimums (excluding ASR), but not below precision approach minimums (for ETA plus 2 hours).

A31.3.13.3. When filing to a destination where the alternate is located in Alaska or at latitudes greater than 59 degrees, aircrews will use 1+15 holding fuel in lieu of 45 minutes holding fuel. This extra holding fuel is not a substitute for normal alternate fuel planning, but rather an additional safety margin.

A31.3.13.4. Compute holding fuel using planned destination or alternate gross weight as applicable to destination filing requirements.

A31.3.14. Adverse Weather**.**

A31.3.14.1. Icing. The Air Force Weather Agency Technical Note (AFWA/TN 98/002) Meteorological Techniques, states that freezing drizzle is equivalent to moderate icing and freezing rain is equivalent to severe icing. Flight into areas of forecast or reported severe icing (freezing rain) is prohibited.

A31.3.14.1.1. Prior to using anti-icing fluids, ensure wings and flight control surfaces are clear of frost, ice and snow (de-iced via hot air or heated type I fluids IAW operations manuals). As a guide, ACs may use published anti-icing holdover times IAW AF T.O. 42C-1-2 Aircraft Anti-icing Procedures, and AFFSA holdover tables located at the FAA website: **http://www.faa.gov/avr/afs/fsat/fsat0301.doc**. The holdover time begins when anti-icing fluid is first applied and the AC shall use time, temperature, and dilution of mixture to determine when times are exceeded and re-apply fluid, if required. **NOTE:** In all cases, ACs shall ensure visual inspection within 5 minutes of takeoff.

A31.3.14.1.2. SAE Type I/II anti-icing fluids are suitable for use on C-20 aircraft. Air Force Military Specification Type 1 and Type 2 anti-icing fluid is similar to SAE Type I/II fluid, but has different properties. Typical use of Mil Spec Type 1 fluids is to heat the fluid and de-ice the aircraft, as the concentration of glycol/water is inconsistent. NOTE: With any Mil Spec Type 1/2 fluid, there is no guarantee to prevent re-freezing. As a result, there is no holdover time associated with this fluid.

A31.3.14.1.3. SAE Type II/IV anti-icing fluid differs from SAE Type I fluid in that it has a higher viscosity and adheres longer to aircraft surfaces. SAE Type II/IV fluid, when applied, has a molasses-like appearance, and is subsequently blown off aircraft surfaces during takeoff acceleration, (approximately 80 knots).

A31.3.14.1.4. Based on actual testing and review of the runoff characteristics in the undiluted (neat) form, Gulfstream has determined that Type IV de-icing fluid is aerodynamically acceptable for the wing. Listed Type IV de-icing fluids that are approved for use on the Gulfstream aircraft may be used in all dilution mixtures.

Approved Type IV	Unapproved Fluids
Union Carbide Ultra +	Arktica
Clariant Safewing MP IV	
Octagon Max Flight	
Kilfrost ABC-S	

A31.3.15. Turbulence. Flights into areas of forecast or reported severe turbulence are prohibited. Knowledge of the tropopause flight level will help in altitude planning to avoid turbulent flight areas. Ask the weather briefer for the tropopause flight level whenever possible. Turbulence can be expected +4000 feet of this altitude. Do not fly into an area of known or forecast moderate or greater mountain wave turbulence

A31.3.16. Fuel Limitations. C-20 aircraft are not allowed to operate on JP-8+100 except in emergency conditions. If inadvertent refueling with JP-8+100 occurs, the aircraft will be immediately de-fueled prior to flight. All JP-8+100 locations are required to maintain a clean JP-8 capability to support transient aircraft. Every effort must be made not to allow aircraft flight while serviced with JP-8+100. If emergency refueling occurs utilizing JP-8+100, flight crews will make an AFTO 781 entry stating, “CAUTION: Aircraft refueled using JP-8+100, preventive measures must be taken when de-fueling. Close coordination with maintenance and POL fuels personnel must be accomplished.”

A31.3.17. Local TOLD Card. The aircraft commander will complete the entire TOLD card, including the landing portion, prior to departure. Pilot not flying (PNF) will confirm accuracy of FMS computed performance data and complete manual TOLD card when directed by the aircraft commander.

A31.3.18. Multiple Full-Stop Landings. For all practice, full-stop landings, the PNF will complete a new TOLD card using actual GW, field, and weather conditions. PNF will confirm accuracy of FMS computed performance data and complete manual TOLD card when directed by the aircraft commander.

A31.4. Instrument Procedures.

A31.4.1. The C-20 is primarily approach category C.

A31.4.2. RNAV, GPS and RNAV(GPS) Instrument Departures, Arrival and Approaches. All C-20 aircrews are authorized to fly pure GPS, RNAV, and RNAV(GPS) instrument departures, arrivals, day or night, IMC or VMC. Comply with procedures IAW AFI 11-202V3 and temperature corrections procedures IAW AFI 11-202V3 and FIH. Aircraft must have required navigation performance (RNP) set IAW MD procedures as published on the IAP. PNF shall monitor lateral cross track, vertical velocity trends, IAW operations manual guidance and report alerts (RNP, RAIM or loss of GPS signal) to the Pilot Flying (PF). PF shall execute missed approach if excessive deviations occur.

A31.4.2.1. Equipment. Aircraft must have operable RNAV (INS/IRS) and/or GPS-updated FMC equipment to ensure sufficient RAIM, or appropriate level of ANP is available IAW operations manual procedures prior to initiating the approach. IAP notes such as “DME/DME RNP 0.3 N/A” or “GPS Required” state that GPS signal and aircraft equipment must be operational to start the approach. If the required approach RAIM/ANP is not available, the approach shall not be flown.

A31.4.2.2. RNAV Instrument Approaches. Properly trained C-20 aircrews and certified aircraft are approved to perform LNAV approaches IAW AFI 11-202V3 and operations manual guidance applies.

A31.4.2.3. LNAV approaches. LNAV approaches are non-precision approaches and may be flown IMC to a barometric LNAV MDA(H). They may be also be flown using VNAV procedures to a derived decision altitude (DDA) = LNAV MDA(H) +50ft. PNF shall monitor lateral track error IAW operations manual guidance and provide trends to the PF.

A31.4.2.4. Flying Conventional Approaches Without GPS in the Title. Approaches in the FMS database without “GPS” or “or GPS” in the title may only be used to enhance position orientation. When flying a conventional approach, pilots may use RNAV equipment for situational awareness, but may not use RNAV as the sole means of course guidance inside the FAF. The NAVAID(s) in the approach title is(are) the primary NAVAID(s) and must be serviceable, tuned, identified, monitored and displayed to the pilot throughout the approach.

A31.4.2.5. Minimum descent altitudes. For all overlay approaches, FMC/FMS procedures are approved no lower than the published MDA and WX minima as prescribed on the underlying approach. Barometric LNAV procedures IAW operations manual guidance are authorized no lower than computed derived decision altitude (DDA). Overlay DDA is defined as MDA plus 50 feet. This enables aircraft tail clearance over required obstacle clearance at MDA.

A31.4.2.6. Crew actions: Prior to initiating the overlay approach, crews shall determine WGS-84 status, applicable GPS inhibit procedures, and MEL restrictions that would affect equipment and approach capability. This includes NAVAIDs which must be monitored (if applicable) and actions to be taken if FMS reliability exceeds tolerances. If the underlying NAVAID exceed tolerances, or ANP exceeds RNP (RAIM/RNP alerts), the crew will disregard FMS guidance and transition to the underlying approach (if applicable) or take over visually.

A31.4.2.6.1. WGS-84 Status:

A31.4.2.6.1.1. If WGS-84 compliance is in question, contact AFMC/TERPS or AMC Suitability, DSN 779-3112 for confirmation.

A31.4.2.6.1.2. WGS-84 compliance. Individual country compliance with the

World Geodesic System (1984) means that the country's NAVAID and obstacle database conforms to the same US grid standard that today's updated avionics use to determine position. US NAS/Canadian domestic airspace can be assumed to be WGS-84 compliant. WGS-84 standard is used to determine accredited countries to authorize RNAV(GPS) and overlay terminal procedures. ACs shall contact MAJCOM TERPS to determine country status if in doubt as to a country's WGS-84 status. RNAV/GPS and Overlay approaches may not be flown in non-compliant or undetermined WGS-84 countries unless:

A31.4.2.6.1.3. WGS-84 Non-compliant. GPS must not be used as part of the FMC/FMS navigation solution for any portion of the IAP. Additionally, the GPS signal shall be inhibited IAW operations manual procedures and the aircraft must be able to maintain required RNP for operations without GPS. The operations flight manual shall provide specific procedures for flying IAPs in non-compliant WGS-84 countries.

A31.4.2.6.1.4. WGS-84 Undetermined. The underlying NAVAID must be tuned, identified, monitored and displayed in the cockpit. LNAV and/or VNAV operations manual procedures may be used to MDA or DDA only. The approach briefing shall include PF and PM duties to monitor ground based NAVAID IAW operations manual procedures, as this it the primary navigation.

A31.5. Operating Procedures and Restrictions.

A31.5.1. Maintenance specialists and civil contractors, flying for the purpose of conducting in-flight maintenance inspections are considered MESPs. These specialists should be deplaned after completion of the in-flight inspection. Authorize MESPs and MEGPs via DCMA form 644 or equivalent .

Attachment 32

C/RC-26 OPERATING PROCEDURES

A32.1. General Information. This guidance is provided by the lead command and unit supplements.

Attachment 33

FALCON 20 OPERATING PROCEDURES

A33.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the Falcon 20 aircraft under most circumstances. It applies to AFMC aircrews and all management levels concerned with operation of all Falcon 20 series aircraft. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A33.2. Mission Planning. A flight shall not be commenced until all pertinent flight data has been compiled, including the pilot's flight log as specified in chapter 12 and an ATC flight plan or Flight Itinerary has been filed. Likewise the PIC shall not commence a flight unless it has been ascertained that the facilities available and directly required for such flight and for the safe operation of the aircraft are adequate, including communication facilities and navigation aids. For transoceanic flights, the aircrew will retain the trip documentation (flight log, plotting chart, weather, etc.) and give to the chief pilot upon completion of the trip. The chief pilot will retain the documents for six months.

A33.2.1. Weather Considerations. The following Weather considerations will be reviewed as part of the flight planning process.

A33.2.1.1. SEVERE WEATHER. No aircraft will be dispatched into an area of known thunderstorms unless the aircraft is equipped with operating weather radar. Flights shall not proceed through areas in which turbulence of more than moderate intensity exists unless the flight crew cannot avoid those areas by weather radar references. Passengers will be advised to fasten seat belts prior to anticipated severe weather and seat belt signs illuminated.

A33.2.1.2. WIND SHEAR. Wind shear may create a severe hazard for aircraft below 1,000 ft AGL in the vicinity of a "micro burst", particularly during the approach to landing and in the take-off phases. Because of the hazards associated with flying through and in the vicinity of these intense downdrafts, which on reaching the surface spread outward from the down flow centre in all directions, the best defense is to avoid it altogether as it could be beyond you or your aircraft's capability. Pilots are to heed wind shear PIREPs as a previous pilot's encounter may be the only warning you will receive. On receiving such notice, alternate action such as delaying a departure or an arrival until the phenomena has passed is recommended. If wind shear is encountered, prompt action is required. In all aircraft, the recovery could require full power and pitch attitude consistent with the maximum angle of attack for the aircraft. In addition, warn others as soon as possible by sending a PIREP to the closest air traffic services facility.

A33.2.1.3. ICING. The flight crew shall give careful consideration to all factors involved when operating into areas of known or anticipated areas of icing and assure that the aircraft anti-icing and de-icing systems are functioning properly. The only time a structurally or externally modified XYZ CONTRACTORFF aircraft will be flown in icing is for transitional purposes. Continued flight into areas of icing greater than light rime shall be avoided. For the phase of flight during a XYZ CONTRACTORFF Flight Test operating into conditions of known or predicted icing is prohibited. If icing conditions are encountered which have not been reported or forecast, it should be reported to the nearest Flight Service Station or Air Traffic Control unit.

A33.2.2. Flight Plans. Flight test and demonstration flights will be flown under IFR to the maximum extent consistent with mission accomplishment. When IFR is not practical, a VFR flight plan will be filed or equivalent data will be left with a responsible agency or individual. On flights conducted under VFR, radar traffic advisories and TCAS will be utilized to the maximum extent possible. Appropriate and current VFR charts must be available and used prior to commencing VFR operations.

A33.2.3. Aircraft Weight and Balance. The pilot-in-command is responsible for the proper loading, including load security, weight and weight distribution. All loadings (including fuel) shall be distributed using the current weight and balance report. The load shall be distributed to ensure that the center of gravity will remain within the prescribed limits throughout the entire flight.

A33.2.3.1. Aircraft take-off and landing weights shall not exceed that which would preclude the aircraft meeting performance requirements for take-off, en-route and landing at any aerodrome used.

A33.2.3.2. The weight & balance calculation may take two forms: one that is pre-computed for different fuel and passenger loads, and the other that is individually prepared for a specific flight reflecting non-standard loading. If the specific flight has non-standard loading, the UltraNav program should be utilized to compute the weight & balance calculation.

A33.2.3.3. The pilot-in-command will ensure that all items carried that are not included in the equipment list that forms part of the weight and balance report have been included in the weight calculations.

A33.2.3.4. Each aircraft shall have a current weight and balance report with an up-to-date equipment list. Using this information, the center of gravity location and operational empty weight (OEW) shall be calculated.

A33.2.4. Aircraft with a MEL. Flight crews shall comply with MEL procedures approved for the specific aircraft. MEL deferral procedures are specified in each MEL approved for the aircraft. Flight crews shall ensure that all “Operations” and “Maintenance” procedures are followed.

A33.2.5. Turbulence. Flights shall not be planned or flown through area of moderate turbulence. When approaching areas of anticipated turbulence, NCM should be verbally advised and if possible, the FASTEN SEAT BELT sign illuminated.

A33.3. Common Mission Guidance.

A33.3.1. Crew Complement. Minimum crew for the FA 20 MODEL C is 2 pilots. Crew complement for the FA 20 MODEL G, see Table A33.1.

Table A33.1. Crew Complement

Crew Position	Basic
Aircraft PIC	1
Copilot	1
Sensor Operator	3(A/R)

A33.3.2. Oxygen Requirement. Except for maintenance test flights, ferry flights and flight test programs, Flight Facility aircraft will not be flown unpressurized above 10,000 feet MSL. Flight test aircraft will adhere to the requirements set forth in service guidance regarding the use of oxygen.

A33.3.3. Passenger Briefing. The PIC will ensure that prior to flying in the aircraft; every passenger will have received a briefing with the following information: the fastening, unfastening, tightening and general use of safety belts or safety harnesses; the use and location of the passenger oxygen system including the location and use of oxygen masks; the location and use of the portable oxygen bottle; the location of emergency exits and for NCM seated next to an exit, how that exit operates; the location, purpose of, and advisability of reading the passenger safety briefing card; the location of any emergency equipment the passenger may have a need for in an emergency situation such as the ELT, fire extinguisher, survival equipment (including the means to access if in a locked compartment), first aid kit, life preserver or flotation device and life raft; flight Facility procedures regarding the use of portable electronic devices, and any other considerations based on the configuration of the aircraft cabin and equipment; the advisability of using safety belts or safety harnesses during flight; the safest direction and most hazard-free route for passenger movement away from the airplane following deplaning and any dangers associated with the airplane type such as pitot tube locations, propellers, or engine intakes; location and operation of engineering power kill switch.

A33.3.3.1. The pilot-in-command shall ensure that NCM are given a safety briefing as appropriate to the passenger's needs; and covers at least the items specified in this section. The standard safety briefing may be shortened for regular/recurring NCM who are familiar with the aircraft, route and have repeated exposure to that type of flight.

A33.3.3.2. Smoking is not permitted on any Flight Facility-operated aircraft by NCM or crewmembers. NCM will be advised of this policy

A33.3.4. Flight Data Recorder. Where installed, the FDR shall be operated continuously from the time the electrical power is first applied to the time that the aircraft is shut down and the electrical power is removed.

A33.3.5. TCAS. Where installed, TCAS will be checked in accordance with the manufacturer's instructions before the first flight of the day.

A33.3.6. Fueling. Pilots or Crew Chiefs will supervise the fuelling of their aircraft to ensure that it is properly bonded and the aircraft is fueled as desired.

A33.3.7. Cargo. Cargo may not be carried outside a cargo compartment unless: it is carried in an approved cargo rack, bin, or compartment installed in the airplane, or it is properly secured by a safety belt or other tie down having enough strength to eliminate the possibility of shifting under all normally anticipated flight and ground conditions, or it is packaged or covered to avoid possible injury to passengers, or it is not located in a position that restricts the access to or use of any required emergency or regular exit or the use of the aisle between the crew and the passenger compartment.

A33.3.7.1. When cargo is carried in cargo compartments accessible in-flight, the cargo must be loaded so as to allow a crew member to effectively reach all parts of the compartment with the contents of a hand fire extinguisher.

A33.3.7.2. At the discretion of any pilot or maintenance technician, any piece of cargo may be opened for inspection prior to being accepted for flight aboard any Flight Facility aircraft.

A33.3.8. Runway Surface Condition. Use only hard-surfaced runways for takeoff or landing. The runway condition will be such that structural damage or undue concern of crew or passengers will not occur

A33.3.9. Takeoff Restrictions. No takeoff shall be initiated when the following conditions exist: Freezing rain, hail, or severe icing conditions; heavy wet falling snow or ice adhering to any part of the aircraft; thunderstorms at, or adjacent to, the airport; inoperative radar or other approved thunderstorm detection equipment when thunderstorms or other potentially hazardous weather conditions are present or forecast anywhere along the intended route; hazardous weather or conditions at the destination or alternate(s) which will prevent a safe landing; braking actions reported nil; dry snow greater than four inches (4") in depth covering an appreciable part of the runway. (Aircraft Flight Manual will be adhered to if it is more restrictive); standing water of greater than three-quarters of an inch (¾") in depth covering an appreciable part of the runway. (Aircraft Flight Manual will be adhered to if it is more restrictive.)

A33.3.9.1. If a takeoff must be made with standing water, slush or snow covering the runway, takeoff performance shall be based the published contaminated runway take-off distance.

A33.3.10. Deicing. Prior to flight, the aircraft shall be deiced by appropriate procedures and no takeoff shall be attempted with frost, snow, or ice accumulations on wing and tail surfaces, windshield, pitot static, or angle of attack system. Flight /Maintenance Manual Supplements contain detailed procedures for ground deicing of their respective aircraft. When practical, the aircraft should be placed in a hangar during periods of inclement weather.

A33.3.10.1. Avoid spraying wheel and brake assemblies with de-icing fluid. Ice and moisture buildup in the brake stack may cause the brakes to freeze and lock after departure or following taxi and shutdown. When moisture and freezing weather conditions exist, using firm brake pressure during taxi can minimize problems. This will permit the brake stack to reach a warm condition, minimizing any moisture buildup within the stack. Snow/slush may also be removed by cycling the landing gear after takeoff. Firm touchdowns should be made when landing with suspected frozen brakes. The parking brake should be released as soon as possible following shutdown in conditions conducive to freezing.

A33.3.11. Sterile Cockpit. When operating within 10 nm of the airport of intended departure or landing (jet aircraft, 5 nm for propeller aircraft) and with the intent of takeoff or landing, Flight Crew Members will not engage in non-pertinent conversation between themselves or with NCM.

A33.3.12. Descent. Once cleared below FL180 domestically or at appropriate transition level internationally, the current barometric setting as received from the controlling authority will be repeated aloud as a means of acknowledgment in the cockpit. Altimeters will then be set and cross-checked.

A33.3.12.1. The PF will make the following altitude callouts during the descent phase of every flight: "Flight Level 180/transition level, altimeters set and cross-checked".

A33.3.12.2. Both pilots will monitor the altimeters during descent to negate the possibility of one pilot reading the instruments incorrectly.

A33.3.12.3. If turbulence is anticipated at a lower level, airspeed will be reduced to appropriate turbulence penetration speed.

A33.3.12.4. The approach briefing will be conducted during the final enroute descent and will be completed well before reaching the Final Approach Fix (FAF). The briefing will cover all pertinent details relating to the instrument approach, runway exit, missed approach, terrain awareness and crew coordination.

A33.3.12.5. The altitude preselect (when available) will be set as follows:

A33.3.12.5.1. Precision Approach: Missed Approach Altitude

A33.3.12.5.2. Non Precision Approach (using MDA): Minimum Descent Altitude (MDA)

A33.3.12.5.3. Non Precision Approach (VGP/LPV) : Missed Approach Altitude

A33.3.12.5.4. Visual Approach: 500' AGL or pilot's discretion

A33.3.13. Touch-and-Go Landing Limitations.

A33.3.13.1. Touch and Go landings may be performed under direct instructor pilot supervision or by a certified mission pilot IAW this instruction, AFI 11-2FTV1, and the applicable flight manual. Refer to AFI 11-2FT Vol 1 as supplemented for specific touch and go training requirements, restrictions and approved airfields (without IP).

A33.3.13.2. Touch-and-go landings require at least 8000' of runway, ensure aircraft performance assures full stop capability per aircraft performance manual.

A33.3.13.3. Do not accomplish touch-and-go landings on slush covered runways.

A33.3.13.4. Brief touch-and-go landing considerations with the other appropriate aircrew members prior to final approach. On successive approaches, if the briefing remains the same and there are no questions, the briefing need not be repeated.

A33.4. Instrument Procedures.

A33.4.1. The Falcon 20 is approach category C.

A33.4.2. On non-precision approaches, all NAVAIDs available should be utilized to back up the approach. This includes the FMS lateral and vertical navigation features as necessary.

The PNF will call out movement of the lateral/vertical steering guidance from the fully deflected position on the HSI (i.e., VOR radial or Localizer), "Localizer or Course Alive" and "Glide Slope Alive" if appropriate. When the Flight Director captures the lateral/vertical steering, both pilots will acknowledge "Localizer or Course Capture and Glide Slope Capture".

A33.4.3. Final Approach. To the maximum extent possible, all actual IMC approaches will be executed coupled to the autopilot, in particular, when conducting approaches to near minimum weather conditions. In addition, the aircraft will depart the final approach fix in a stabilized condition, i.e. on altitude, on speed, and in the appropriate approach configuration.

A33.4.4. Inter-cockpit calls. The PF will call for landing gear down and the Before Landing Checklist at or prior to the FAF. The landing shall not be made until the checklist is complete. If the situation permits, an abnormality encountered during the landing phase will be cause for rejecting the landing, followed by a climb to a safe altitude and an investigation of the problem in an organized manner.

A33.4.4.1. After passing the FAF on all approaches, the PNF shall monitor the instruments and will call out any warning indications or significant deviations from the planned flight path, descent rate, or airspeed.

A33.4.4.2. The PNF will also make the following calls:

A33.4.4.2.1. “Airspeed”, when airspeed is below Vref or in excess of Vapp + 10

A33.4.4.2.2. “Sink Rate”, when sink rate exceeds 1000 ft/min.

A33.4.4.2.3. “Localizer” or “Glideslope” if one dot deviation is exceeded.

A33.4.4.2.4. “Bank”, when bank angle is greater than 30 degrees.

A33.4.4.2.5. At “1000 ft. above minimums”

A33.4.4.2.6. At “500 ft. above minimums”

A33.4.4.2.7. At “100 ft. above minimums”

A33.4.4.3. The PF will acknowledge deviation call outs. (i.e. “correcting”)

A33.4.4.4. The following are mandatory calls:

A33.4.4.4.1. “Minimums, Runway/Lights at (clock position)” when the runway threshold is completely in view and the aircraft positioned suitable for the pilot to take over and continue the approach visually.

A33.4.4.4.2. PF will acknowledge with “Contact” if the runway threshold is in view and sufficient to continue the landing.

A33.4.4.4.3. “Minimums, Go Around” if no approved visual references are available or the aircraft is not in position to continue a normal approach. Concurrence and acknowledgement by the PF is required.

A33.4.4.4.4. “Go Around,” at anytime during the approach until before touchdown if the PNF feels safety is in question. The PF will acknowledge the call and initiate an immediate, unquestioned missed approach and the issue will be resolved when the aircraft is safely established on the missed approach.

A33.4.4.5. As the minimum altitude or forecast ceiling is approached, the PNF will periodically direct his/her attention outside the airplane to establish visual contact with the approach lights or runway. The PNF must <u>ensure</u> that the PF has the runway or approach lights in sight.

A33.4.5. Visual Approaches. The PF should attain a "stabilized approach", i.e. on altitude, on airspeed, and in the appropriate landing configuration prior to passing 500' AGL on a visual approach. Available lateral and vertical guidance (e.g. ILS) will be utilized as required to assist in runway alignment.

A33.4.6. Circling Approaches. The visual portion of the approach should be planned so as not to exceed 30 degrees angle of bank. The approach must be stabilized (on speed, wings level, on a normal glide path) by 300' AGL.

A33.4.7. FMS/GPS Approach Operations. Crews should use all available radio NAVAIDs, but also should endeavor to navigate using identical navigation displays. FMS programming for the IAP and the approach briefing should be completed prior to arrival into the terminal area, preferably prior to descent. The CDU should be examined to confirm that all waypoints and course/distances contained in the database procedure, including the missed approach, conform to the printed chart. The approach chart is the final authority. Proper setting of the Altitude Pre-selector (ASEL) is critical to VNAV approach operations. Incorrect settings of the ASEL may result in unintentional level off or descents when VNAV is engaged. Both pilots will confirm all settings verbally.

A33.4.7.1. Display and Monitoring Requirements. Approved GPS Overlay and all GPS/FMS Stand alone Procedures: Both pilots display FMS on EFIS/HSI.

A33.4.7.2. GPS approaches will not be conducted at non-WGS-84 compliant airports.

A33.5. Operating Procedures and Restrictions.

A33.5.1. Aircraft Parking and Securing. The Pilot-In-Command is responsible for the security and safe disposition of the aircraft and its contents (including secure data) during all layovers. Parking the aircraft in a secure, well-lighted area, away from boundary fences and within direct observation of security personnel shall always be considered.

A33.5.2. When strong winds or storms are expected, the aircraft should be parked as nearly headed into the anticipated wind as possible. Under these circumstances, brakes should be reset after the heat generated during the landing and taxiing has dissipated.

A33.5.3. During overnights or extended layovers (especially in winter weather, or when thunderstorms with possible hail are anticipated), the Pilot-In-Command will arrange for hangar accommodations where available. Whenever possible, these arrangements should be made well in advance of the scheduled arrival.

A33.5.4. Where hangar facilities are not available, the Pilot-In-Command must ensure that adequate facilities are available to de-ice the aircraft during cold weather operations. In addition, water should be drained from the aircraft system and other items that could freeze and break should be removed.

A33.5.5. Post flight inspection similar to the preflight walk-around inspection should be accomplished.

A33.5.6. If maintenance is required, the Pilot-In-Command will discuss such arrangements with the crew chief or his/her designee. If the possibility of a delay exists, alternate arrangements should be discussed with all affected persons (non-flying crewmembers, engineering team members, crew chief, etc.).

A33.5.7. The FBO should be given a contact number where crewmembers can be reached in the event of an emergency

A33.5.8. As soon as possible, the Pilot-In-Command will brief maintenance on all discrepancies that exist. Aircraft discrepancy sheets will be filled out for any discrepancies that need attention.

A33.5.9. Recording of Aircraft Defects. An aircraft maintenance log will be carried on each flight and discrepancies encountered during the flight clearly and concisely entered in the log to assist Maintenance in rectifying the problem. Maintenance personnel will briefly note the remedial action opposite the particular discrepancy in the log. Previous write-ups that remain open will be entered in the "Deferred" section of the Maintenance Log.

A33.5.9.1. Pilots with significant discrepancies on their aircraft, or ones requiring parts to be ordered, should call ahead to give maintenance personnel as much notice as possible.

A33.5.9.2. Pilots required by Airworthiness Directive (AD) to perform a ground or flight check of an aircraft component or system will review the inspection and signoff requirements with maintenance personnel to insure compliance with FAR Part 43 record keeping requirements.

A33.5.10. Emergency Procedures.

A33.5.10.1. The PIC shall ensure that, in the event of an emergency and where time and circumstances permit, all NCM are given an emergency briefing covering the following items: safety belts or safety harnesses; seat backs and rack tables; carry-on baggage; location of emergency exits.

A33.5.11. Protective Breathing Equipment. In aircraft where protective breathing equipment is installed, it shall be donned at the first sign of smoke in the aircraft, before any other action is taken to identify or isolate the source of the smoke.

Attachment 34

NON-USAF AIRCRAFT TRAINING GUIDELINES

A34.1. General Information. AFI 11-401/AFMC Sup 1 paragraph 1.11.1.2 designates the Commandant of the USAF Test Pilot School (TPS) as the approval authority for TPS curriculum missions conducted in non-USAF aircraft. TPS uses leased sailplanes (gliders) to support the Soaring Program.

A34.1.1. Soaring**.** TPS operates contractor-owned glider aircraft in support of the TPS curriculum. Glider aircrew consist of assigned or attached military, civil service, and contractor pilots who are trained and qualified under Title 14 of the Code of Federal Regulations (14 CFR 61), *Certification: Pilots, Flight Instructors, and Ground Instructors*. Operation of the gliders is governed by 14 CFR 91, *General Operating and Flight Rules*. TPS Operating Instruction 11-4, *Soaring* contains specific guidance for administration of the glider program. Guidance is provided for aircrew selection, training, mission qualification and operating procedures.

A34.1.2. The USAF TPS is authorized to use the National 490 parachute when conducting training in civilian gliders per AFMC waiver 08-23.

Attachment 35

OTHER AIRCRAFT

A35.1. General Information. There are numerous aircraft in the USAF inventory that are fielded and fully operational. These aircraft occasionally enter AFMC status, primarily while undergoing heavy maintenance (PDM) or extensive modifications. AFMC does not maintain a standing crew force to operate these aircraft. Instead, they are flown during post maintenance/modification check flights by owning unit aircrew on a TDY basis to the maintenance facility. While the aircraft is flown for check flight purposes and while under AFMC control (does not include delivery flight), the following aircraft may be operated IAW published AFI 11-2MDS guidance without the need for further coordination or approval from AFMC/A3V. AFMC retains all waiver authority for any required item or issue involved in the check flight.

A35.1.1. Aircraft governed by this attachment:

A35.1.1.1. C-21

A35.1.1.2. C-22 (B727)

A35.1.1.3. C-32 (B757)

A35.1.1.4. C-37 (Gulfstream V)

A35.1.1.5. C-38 (Gulfstream G100)

A35.1.1.6. C-40 (B737)

A35.1.1.7. E-4

A35.1.1.8. T-1 Jayhawk

A35.1.1.9. T-6 Texan

A35.1.1.10. T-41

A35.1.1.11. T-43

A35.1.1.12. VC-25

A35.1.1.13. UV-18