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SECRETARY OF THE AIR FORCE

AIR FORCE MANUAL 11-2FTV3

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Flying Operations

FLIGHT TEST OPERATIONS PROCEDURES

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This manual implements Department of the Air Force Policy Directive (DAFPD) 11-2, *Aircrew Operations;* and is consistent with DAFPD 11-4, *Aviation Service*, and Air Force Manual (AFMAN) 11-202V3, *Flight Operations*. It establishes the framework for conducting safe flight operations for all Air Force Materiel Command (AFMC) units, Defense Contract Management Agency (DCMA) units pursuant to Air Force Instruction (AFI) 10-220, *Contractor's Flight and Ground Operations*, Contractors conducting flight operations under United States Air Force service guidance, and Air Force Reserve units operating under AFMC flight operations authority. It applies to all civilian employees and uniformed members of the Regular Air Force and the Air Force Reserve supporting AFMC flight operations. It does not apply to the Air National Guard or the United States Space Force. This manual requires the collection and or maintenance of information protected by Department of Defense (DoD) Instruction 5400.11, DoD Privacy and Civil Liberties Programs. The applicable System of Records Notice (SORN) F011 AF XO A, Aviation Resource Management Systems (ARMS), is available at **http://dpclo.defense.gov/Privacy/SORNs.aspx**. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with AFI 33-322, *Records Management and Information Governance Program*, and disposed of in accordance with the Air Force Records Disposition Schedule located in the Air Force Records Information Management System. Refer recommended changes and questions about this publication to the office of primary responsibility (OPR) listed above using the Air Force Form 847, *Recommendation for Change of Publication.* Route AF Forms 847 from the field, through the appropriate major command (MAJCOM) operations staff, to Air Force Materiel Command Standardization and Evaluation Division (AFMC/A3V), **AFMC.A3V@us.af.mil**. Units may supplement this publication; coordinate supplements with AFMC/A3V prior to certification and approval. Keep

supplements current by complying with Department of the Air Force Instruction (DAFI) 33-360, *Publications and Forms Management*. The authorities to waive wing/unit level requirements in this publication are identified with a Tier ("T-0, T-1, T-2, T-3") number following the compliance statement. See DAFI 33-360 for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, as directed at **paragraph 1.2.3** of this publication for non-tiered compliance items. Compliance with the attachments in this publication is mandatory. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. New content includes roles and responsibilities, minimum equipment list procedures, and adopting lead MAJCOM procedures for aircraft normal, instrument, and restricted operations as documented in the attachments. Additionally, this publication now incorporates guidance previously published in AFMCI 11-201, *Supervision of Flight Operations*, as that AFMCI is scheduled to be rescinded.

Chapter 1

GENERAL INFORMATION

1.1. Roles and Responsibilities. When MAJCOMs, operations groups, squadrons or units are referenced in this AFMAN and users do not fall under this organizational structure then the equivalent agency or unit is substituted.

1.1.1. Lead Major Command (lead MAJCOM) provides Air Force aircraft operational guidance as specified in DAFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems*. This includes establishing aircraft operating standards and configuration control.

1.1.2. Air Force Materiel Command (AFMC) develops, delivers, supports and sustains Air Force weapon systems. AFMC is the lead agent for USAF contractor operations. This AFMAN is prescribed in AFI 10-220 as USAF service guidance.

1.1.3. AFMC/A3V is the focal point for formulating, and implementing, policy, procedures, and instructions, governing development, acceptance, depot, contractor, test support, and test aircraft flight operations. The division is responsible for the standardization and oversight of flight test and test support flying operations procedures for the USAF mission design series (MDS) aircraft flown in AFMC.

1.1.4. Flight Operations Authority (FOA). The FOA is responsible for oversight of day-to-day flight activities and compliance with USAF and AFMC flight operation policies. The FOA is typically the operations group commander (OG/CC). Reference AFI 11-401 AFMC_SUP, *Aviation Management*, **Attachment 9** for the AFMC FOA list. **Note:** See **Chapter 6**, *Supervision Of Flight Operations*, for additional responsibilities.

1.1.5. Pilot in Command (PIC). The PIC is the aircrew member designated by competent authority, regardless of rank, as being responsible for the safe operation of the aircraft. The PIC will ensure the aircraft is not operated in a careless, reckless, or irresponsible manner. **(T-1).**

1.2. Waivers. Accomplish all Tier 0 and Tier 1 waiver requests using the AF Form 679, *Air Force Publication Compliance Item Waiver Request/Approval*. Accomplish all Tier 2 and Tier 3 waiver requests on the AFMC Form 73, *AFMC Waiver and Approval Request*. Route Tier 0/1/2 waiver requests through appropriate operations channels to AFMC/A3V using the AFMC/A3V SharePoint™ (**https://usaf.dps.mil/teams/HQ-AFMC-STAN-EVAL/SitePages/Home.aspx**) for processing. Email approved T-3 waivers to AFMC/A3V workflow.

1.2.1. AFMC/CC delegates AFMC/A3 as the T-2 waiver authority for this manual.

1.2.2. AFMC/A3 is the USAF waiver authority for contractor operations.

1.2.3. AFMC/A3V is the T-3 waiver authority for units without flying wing commanders.

1.3. Aircraft Operations Policy.

1.3.1. AFMC is granted authority by AFI 11-200, *Aircrew Training, Standardization/Evaluation, And General Operations Structure*, to establish flight test publications that govern AFMC flight operations. This AFMAN establishes procedures

which are applicable to all AFMC units conducting flight operations. Guidance published in this AFMAN takes precedence over lead MAJCOM published guidance. When lead MAJCOM guidance is referenced but a variance in guidance between this AFMAN and lead MAJCOM exists, follow the guidance in this AFMAN.

1.3.2. AFMC adopts lead MAJCOM 11-2MDSV3 guidance for MDS-specific normal, instrument, and abnormal/restricted operating procedures unless that guidance is exempted in this AFMAN. **Note:** This AFMAN uses '11-2MDSV3' as an abbreviation for lead MAJCOM published AFI/AFMAN 11-2 series aircraft-specific volume three. **Note:** The expression "AFI/AFMAN" is used to denote a publication scheduled to transition from AF instruction to AF manual.

1.3.3. **Chapters 1** thru 6 of this AFMAN provide broad guidance for AFMC flight operations while the attachments offer MDS-specific guidance and exemptions from lead MAJCOM guidance. For those MDSs not covered by an attachment, aircrew will follow 11-2MDSV3 normal, instrument, and abnormal/restricted operating procedures as published by lead MAJCOM. **(T-2). Note:** Units may operate under AFMC/A3V approved interim MDS-specific procedures until such guidance can be integrated into this publication.

1.3.4. AFMC/A3V is the approval authority for operational guidance for newly possessed or developmental aircraft not already covered by the technical and safety review process or by an existing 11-2MDSV3. Units may forward draft guidance to AFMC/A3V workflow (**afmc.a3v@us.af.mil**) for review and approval.

1.3.5. AFMC possessed, unique, one-of-a-kind, or test bed aircraft lacking MAJCOM published operations guidance shall operate in accordance with approved test plans and applicable contractor flight operations procedures or AFMC/A3V approved procedures. **(T-2).**

1.3.6. Functional or acceptance check flights flown in aircraft not possessed by AFMC but under AFMC oversight should be operated in accordance with 11-2MDSV3 (e.g., C-20, C-21, C/RC-26, C-32 (B757); C-40 (B737), DHC-8, E-4, T-1, T-53; VC-25, and UV-18). **Note:** AFMC is the waiver authority for flights flown while under AFMC control.

1.3.7. Aircraft on loan to AFMC for short-term test shall be flown in accordance with 11-2MDSV3 guidance when AFMC MDS-specific guidance does not exist. **(T-3).**

1.3.8. The commandant of USAF Test Pilot School (TPS) is the approval authority for TPS curriculum missions and TPS flight operations conducted in non-USAF aircraft.

1.4. Recommended Changes. Post suggested improvements to this AFMAN on the AFMC/A3V SharePoint™ "EZ847" tab located at **https://usaf.dps.mil/teams/HQ-AFMC-STAN-EVAL/SitePages/Home.aspx**.

1.5. Inter-fly. Inter-fly is the exchange or substitution of aircrew members between AFMC operations groups, MAJCOMs, DoD services, or U.S. government organizations and agencies.

1.5.1. An inter-fly agreement is required when aircrew from one unit routinely support another unit and both units are not part of the same operations group (or equivalent). **Note:** For the purposes of this paragraph, "support" is defined as generic crewmembers (i.e., mission pilot, instructor pilot, evaluator pilot, loadmaster, boom operator, etc.) filling scheduling holes or providing critical manning to accomplish either unit's mission.

1.5.1.1. The FOA with aircraft oversight is the approval authority for authorizing inter-fly operations. The unit requesting to inter-fly is responsible for formalizing the agreement through a memorandum of understanding between participating organizations. **(T-2).**

1.5.1.2. Aircrew flying under an inter-fly agreement do not need additional approval for participating (i.e., administering or receiving) in cross-command evaluations or instruction.

1.5.1.3. All inter-fly crew members must be thoroughly briefed and understand which DoD service/MAJCOM/wing/group procedural guidance is applicable. **(T-2). Note:** The FOA with aircraft oversight determines the applicable guidance.

1.5.2. A formal inter-fly agreement is not required for aircrew that occasionally act as "guest help". The unit commander is the approval authority for authorizing guest help and is responsible for accepting guest help credentials. **Note:** Wing and MAJCOM staff flyers are typically considered "guest help".

1.5.3. Formally designated combined test force (CTF) organizations do not need inter-fly agreements for non-AFMC aircrews assigned to the CTF.

Chapter 2

MISSION PLANNING

2.1. General. The pilot in command (PIC) is responsible for ensuring all mission planning materials are current and command guidance is followed. **(T-2).** All crewmembers and formation members must be present for mission planning unless released by the PIC or flight lead. **(T-3).**

2.2. Mission Planning/Takeoff and Landing Data (TOLD) Software. Mission planning and TOLD computations may be accomplished using MDS specific lead MAJCOM approved software. If MAJCOM certified software does not exist or is unavailable, other mission planning programs (e.g., contractor-developed, or Jeppesen™) may be used. Aircrew using uncertified software shall verify data through manual calculations using aircraft technical order performance data. **(T-2).** AF or MAJCOM approved mission planning software (e.g., Joint Mission Planning System (JMPS) or Portable Flight Planning Software and Combat Flight Planning Software (PFPS/CFPS)) generated charts satisfies chart requirements set forth in this publication. The flight crew must ensure current data bases (i.e., Vector Vertical Obstruction Data, Digital Aeronautical Flight Information File) are loaded and that mission planning data is correctly entered. **(T-3).**

2.3. Low Altitude Charts. Aircrew must use low altitude charts for low-level operations. **(T-2).** When the aircraft has two pilot positions, only one pilot is required to have a low altitude chart. Required chart annotations are: (**Note:** Digital charts on portable electronic devices, electronic flight books, laptop, etc., meet the requirement of this paragraph.)

2.3.1. Location and dimensions of Class B/C/D airspace, civil/military airfields, and other potential high density traffic areas (e.g., parachute activity areas, ultralight/hang glider/glider sites, etc.) within 5 nautical miles (NM) of any planned visual flight route (VFR) or military training route (MTR) lateral boundary. **(T-2).**

2.3.2. Applicable airfield approach control frequencies in the vicinity of Class B, C, or D airspace. **(T-2).**

2.3.3. The intersection of visual military training route (VR) and instrument military training route (IR) or other possible areas of conflict. **(T-2).**

2.3.4. Noise sensitive areas and no-fly areas. **(T-2).**

2.3.5. Emergency airfields along the route of flight. **(T-2).**

2.3.6. Safe altitudes. **(T-2).**

2.3.7. Emergency safe altitude (ESA)for the route/area. **(T-1).**

2.3.8. Minimum safe altitude (MSA) for each leg. **(T-1).**

2.4. Local Area Maps and In-flight Guides. Pilots, navigators, and combat or weapons systems officers (CSO/WSO) 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. **(T-3).** The local area map is not required if the in-flight guide is current and includes required information. Additionally, en route charts may be used instead of maps on instrument

flight rules (IFR) navigation flights within areas adequately covered by these charts. **Note:** Digital charts on portable electronic devices meet the requirement of this paragraph.

2.5. Test Cards. Flight test cards are constructed and approved in accordance with local procedures. Test cards should be made available to the operations supervisor during mission execution when a control room is not active and when classification level allows.

2.6. Briefing/Debriefing Room Requirements. Briefing rooms should provide privacy and adequate size to seat required crewmembers and test team members. They may be multipurpose rooms, but privacy should be ensured during aircrew mission briefings. Briefing rooms must contain (hard copy or electronically):

2.6.1. Mission briefing guides and supplemental material as locally determined. **(T-3).**

2.6.2. A dry-erase board or suitable substitute. **(T-3).**

2.6.3. Visual aids (i.e., slide display boards, charts, briefing books, viewgraphs, computer display, etc.) to adequately present, as applicable, the following:

2.6.3.1. Airfield diagrams depicting runways, taxiways, parking areas, and other special use areas as appropriate (e.g., arm/de-arm areas, hot brake areas, hydrazine areas). **(T-3).**

2.6.3.2. Training rules (e.g., air-to-air, air-to-ground, chase, intercept, low-level), when appropriate. **(T-3).**

2.6.3.3. Visual aids for air refueling procedures, when applicable. **(T-3).**

2.6.3.4. Local area charts depicting the local flying area, VFR patterns including entry and departure procedures, special use airspace (SUA), 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 normally used supersonic areas/ranges. **(T-3).**

2.7. Briefing/De-briefing.

2.7.1. Flight lead (FL) or the PIC is responsible for presenting a logical briefing that promotes safe and effective mission accomplishment. Briefers must use a locally developed unit or aircraft standardized briefing guide. **(T-3).** Briefers must ensure the following is included in the briefing guide:

2.7.1.1. Airfield status and notices to airman (NOTAMs). **(T-3).**

2.7.1.2. Radar and visual search responsibilities. **(T-3).**

2.7.1.3. Mid-air collision avoidance. **(T-3).**

2.7.1.4. Interior/exterior aircraft lighting configuration for night vision goggle (NVG) operations (if applicable). **(T-3).**

2.7.1.5. Illumination conditions (e.g., moon illumination, depression angle, ending evening nautical twilight, cultural lighting) for NVG operations, when applicable. **(T-3).**

2.7.1.6. Chase procedures, when applicable. **(T-3).**

2.7.1.7. When aircraft are flown in formation, brief proper position to ensure adequate wingtip clearance, wingman responsibilities, and aircraft-unique requirements for each phase of flight. **(T-3).**

2.7.1.8. When briefing low-altitude missions, place emphasis on obstacle and 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. **(T-3).**

2.7.1.9. Alternate airfields. **(T-3).**

2.7.1.10. Test hazard minimizing procedures and test plan flight restrictions. **(T-3).**

2.7.1.11. Training rules. **(T-3).**

2.7.1.12. Specific mission procedures. **(T-3).**

2.7.2. Published procedures that are understood by all participants may be briefed as "standard." **Exception:** When unqualified trainees are in the flight, thoroughly brief all items.

2.7.3. All crewmembers and required test support personnel will attend the flight briefing unless previously briefed and excused by the PIC. **(T-3).**

2.7.4. Cognizant engineer or PIC will thoroughly brief all aspects of test mission. **(T-3).** Brief actions to terminate the flight test profile. Where critical flight parameters have been identified for elevated risk flight test, the PIC will establish appropriate termination criteria and assign a test team member to monitor those parameters in-flight. **(T-2).** Briefed mission elements or alternate mission events may be modified and briefed airborne as long as flight safety is not compromised. Missions or events not briefed prior to mission execution cannot be flown. Flight leads will ensure changes are acknowledged by all flight members. **(T-3).**

2.7.5. If the flight briefing was conducted prior to the day of the flight, the PIC 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. **(T-3).**

2.7.6. Aircrew will debrief all missions. **(T-3).** Include 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.

2.8. Passenger Briefing Guides. Passengers should have access to a pre-printed passenger briefing guide when flying on passenger carrying aircraft.

2.9. Normal/Minimum/Emergency Landing Fuel. Fuel requirements are in accordance with **Table 2.1**, *Command Minimums.* Plan to arrive at initial, downwind, or the final approach fix, as appropriate, with no less than normal fuel, and land with no less than minimum fuel. Declare "minimum fuel" to air traffic control (ATC) if it becomes apparent the aircraft will land with less than the required minimum fuel amount. Declare "emergency fuel" to ATC if it becomes apparent the aircraft will land below the required emergency fuel amount. (**T-3).**

2.10. Alternate Fuel Loads. Units may develop alternate fuel loads to support modified aircraft or special mission requirements. Document and approve these alternate fuel loads in a modification flight manual.

2.11. Runway Surface Conditions. For fixed wing aircraft, aircrew will only perform takeoff/landing operations on wet runway conditions or better. **(T-3).** The aircraft flight manual or aircraft attachment may prescribe further restrictions. FOA may authorize operations when

runway conditions are worse than wet provided minimum runway lengths can be complied with. Consider an alternate when the base of intended landing has worse than wet runway conditions and the runway condition reading (RCR) is not reported.

2.12. Runway Requirements. Reference **Table 2.1** for minimum runway length requirements. Aircraft gross weight, performance and weather conditions may drive longer runway requirements than those listed in **Table 2.1** For developmental aircraft, aircrew shall comply with the minimum runway length in the safety package. **(T-3).**

2.12.1. Intersection takeoffs are permitted for all aircraft if the runway remaining meets minimum length criteria as specified in the applicable **paragraph 2.12.2** or **2.12.3**, and **Table 2.1**

2.12.2. Use reported RCR when computing abort takeoff distance and landing ground roll.

2.12.3. Fighter/attack/trainer aircraft.

2.12.3.1. FOA is the approval authority for operating on runways without a compatible or operable departure end cable. **Note:** Approval authority may be delegated to the SOF.

2.12.3.2. Required take-off and landing data (TOLD) calculations for fighter/attack/trainer aircraft are, as 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; and single engine landing speed. **(T-3).**

2.12.3.3. FOA is the approval authority to takeoff or land when the computed required runway length exceeds 80 percent of the runway available.

2.12.4. All aircraft other than fighter/attack/trainer aircraft. **Exception:** Not applicable for helicopters or tilt-rotor when executing vertical landings.

2.12.4.1. Required TOLD calculations are in accordance with aircraft flight manual, **paragraph 2.2**, or MAJCOM approved tab data. **(T-2).**

2.12.4.2. FOA is the approval authority to takeoff or land when the computed required runway length plus an additional 1,000 feet safety buffer exceeds the runway available. **Exception:** FOA approval is not needed when designating an airfield as an alternate provided the alternate runway length exceeds computed landing distance corrected for forecast environmental conditions.

Table 2.1. Command Minimums.

AIRCRAFT	FUEL (Pounds)			MIN. RUNWAY LENGTH (Feet)		MIN. WIDTH (Feet)	
	NORM	MIN	EMER	WITH CABLE	NO CABLE	RWY	TAXI Way
A-10	1,500	1,200	800(1)	N/A	5,000	75	50

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
C-5	24,000	20,000	16,000	N/A	6,000 (3)	147	75
C-9B	5,250	4,250	3,250	N/A	6,000	100	75
C-12 C/D	500	400	300	N/A	4,000	60	30
C-12 F/J	800	600	400	N/A	5,000	60	30
C-12W	400	350	300	N/A	4,000	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
C-32	N/A	4,500	4,000	N/A	5,000	98	50
C-37	(2)	(2)	(2)	(2)	(2)	(2)	(2)
C-40	N/A	5,000	4,500	N/A	5,000	98	50
C-130	6,000	5,000	4,000	N/A	3,000	80 (2)	30
C-145	N/A	400	300	N/A	(4)	30	N/A
C-146	(2)	450	250	N/A	(2)	35 (2)	22 (2)
C-208	200	150	100	N/A	2,000	(2)	(2)
CV-22	1,500	1,500	1,200	N/A	N/A	30 (8)	20
DHC-8-Q200/Q300	600	400	300	N/A	3,000 (2)	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-15(A-D)	2,000	1,200	800	7,000	8,000	75	50
F-15E	2,500	1,900	800	7,000	8,000	75	50

F-16 (Blk 10-32)	1,000	800	600	(2)	(2)	75	50
F-16, (Blk 40+)	1,200	1,000	800	(2)	(2)	75	50
F-22	2,500	1,800	1,200	8,000	8,000	75	50
F-35	2,000	1,800	1,200	8,000	8,000	75	50
H-1	300	200	100	N/A	N/A	(2)	(2)
HH-60	600	500	400	N/A	N/A	(2)	(2)
KC-10	16,000	14,000	12,000	N/A	7,000	147	75 (5)
KC-46	(2)	(2)	(2)	(2)	(2)	(2)	(2)
KC-135	12,000	10,000	8,000	N/A	7,000	147	74
MQ-9	400	350	300	N/A	5,000	75	50
PC-12/U-28	300	200	150	N/A	2,500	50	25
RQ-4	1,200	1,000	800	N/A	8,000	148 (6)	75
RC-135	13,000	12,000	10,000	N/A	7,000	147	74
T-6	200	150	100	N/A	4,000	75	N/A
T-38	800	600	400	N/A	8,000	75	50
U-2	200 gal.	125 gal.	50 gal.	N/A	5,000	147	100

Notes (MD-specific attachments may have additional restrictions or guidance):

1. 800 pounds total or 400 pounds in either left/right main system, whichever occurs first.

2. See MD attachment or 11-2MDSV3, as applicable, for guidance.

3. The Giant Report may approve operations on specific taxiways less than 75 feet (23 meters) wide. If a 180 degree turn is required, then 150 feet (46 meters) width of stressed pavement (e.g., runway/taxiway intersection) is required for weights up to 732,500 pounds. Weights above 732,500 pounds require additional width.

4. Critical field length or acceleration-stop distance, as applicable.

5. Stressed width.

6. As listed or in accordance with approved safety plans.

7. 75 feet (23 meters) required to accomplish 180 degree turn.

8. 35 feet required to complete a 180 degree turn at 70 degree nacelle.

2.13. AFMC Close Watch or Waivered Flight Operations. All missions flown outside the continental United Sates (OCONUS) or missions that require an AFMC/A3 one-time flight approval waiver is deemed a close watch mission. Prior to mission execution, the pilot in command of the close watch mission will contact AFMC/A3F (**AFMC.A3F.Workflow@us.af.mil** or DSN 986-0073) for required flight following communication guidance. **(T-2). Note:** Reference **Attachment 29**, ***AFMC OCONUS and Unusual Mission Tracker***.

2.14. Minimum Equipment List (MEL). The MEL is an aircraft specific lead MAJCOM developed pre-launch document listing the minimum equipment/systems to operate the aircraft. Aircraft equipment may be divided into three broad categories: air worthiness/safety of flight; mission employment; and airspace compliance/certification. Aircrew will comply with lead MAJCOM's MDS-specific MEL for determining required equipment for flight. **(T-3).** When the MEL does not specifically categorize equipment, the PIC is the authority to determine which category equipment falls under. The waiver authority for each category is as follows: (**Exception:** A waiver is not required when intentionally degrading equipment in accordance with an approved test plan. This exception does not relieve the PIC of coordinating with airspace controlling agency when aircraft navigational performance is affected.)

2.14.1. Air worthiness/safety of flight equipment. The FOA is the waiver authority for equipment deemed required for safe flight or that affects airworthiness. Primary aircraft systems affecting airworthy status are engines, flight controls, landing gear, and instruments affecting IFR capability. FOA approval to operate with inoperative or degraded equipment shall be annotated in both the aircraft forms and aircrew post-mission forms. **(T-3). Note:** The waiver authority for operations not under FOA oversight is the first rated O-6 in the chain of command or AFMC/A3V when a rated O-6 is not in the chain of command.

2.14.2. Mission equipment. The PIC is the waiver authority for operating the aircraft with degraded or inoperative mission equipment. Annotate inoperative or degraded equipment in the aircraft forms.

2.14.3. Airspace compliance/certification. The PIC is the waiver authority for inoperative/degraded equipment affecting the aircraft's ability to comply with airspace navigational requirements. Notify the controlling agency when operating with degraded navigational equipment. The PIC shall not enter airspace requiring a specific navigational performance with degraded navigational equipment without controlling agency approval. **(T-2).** Annotate inoperative or degraded equipment in the aircraft forms.

2.15. Aerial Refueling Coordination. Prior to rendezvous, tanker and receiver crews shall ensure that in-flight refueling requirements and administration (i.e., altitude, altimeter, location, frequency, required offload, etc.) is complete and understood by all participants. **(T-3).**

2.16. 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 procedures as well as those outlined in AFI 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Techniques,* to minimize aircraft exposure to bird strikes. Additionally:

2.16.1. Aircrews operating within the continental U.S. must 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 above ground level (AGL). **(T-2).** Operations at bases with established BASH procedures do not require reference to AHAS during takeoff, landing, or instrument approaches. If AHAS information is not available for the operating location, attempt to use existing bird models to mitigate risk. When Next Generation Weather Radar (NEXRAD) is lower than the AHAS Risk, aircrew may use NEXRAD for a period of one hour from the NEXRAD report. If unable to obtain a NEXRAD update, transition to the procedures required by the AHAS Risk when the NEXRAD expires.

2.16.2. Flying operations are not restricted when AHAS Risk is LOW.

2.16.3. AHAS Risk 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. When AHAS Risk is MODERATE, limit low altitude, high-speed events (e.g., low-level navigation, air-to-surface weapons delivery, terrain following/terrain avoidance) below 3,000 feet to only those required for syllabus training, currency, approved flight test events, or required functional check flights. **(T-3).**

2.16.4. AHAS Risk 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 Risk is reported as SEVERE. **(T-3).** All test and test support mission events requiring flight below 3,000 feet AGL in areas where the AHAS Risk is SEVERE require FOA approval prior to execution.

Chapter 3

MISSION GUIDANCE

3.1. General. This chapter contains guidance that applies to all AFMC aircraft. Additional guidance may be contained in an MD-specific attachment.

3.1.1. The test and safety review process does not have authority to grant exception to this or any other directive publication, to aircraft flight manuals, or to preliminary TOs. **Exception:** For tests approved in accordance with AFTCI 91-202, *Air Force Test Center Test Safety Review Policy*, the AFTC test execution authority is delegated waiver approval authority for aircraft flight manuals and limitations. All proposed flight manual deviations must be coordinated with the aircraft program office engineer and approved deviations must be documented in the safety package. **(T-2).**

3.1.2. Test teams requiring waivers or exceptions must draft and submit them to the safety review board (SRB) for review. **(T-2).** Proposed waivers must be approved prior to executing the related test. **(T-2).** If the waiver authority approved but substantially altered the waiver request after the SRB process completed, the test team shall notify the SRB and the SRB must re-approve the safety package. **(T-2).** Subsequent references in this AFMAN to SRB or safety package approval assumes a waiver has been approved by the waiver authority, the SRB has assessed it, and the test execution authority has accepted it.

3.2. Common Mission Operations.

3.2.1. Instrument landing system (ILS) with precision runway monitoring. Aircrew shall not fly ILS approaches requiring precision runway monitoring unless there is a mission/test need and the pilot has accomplished the associated training. **(T-2).**

3.2.2. Touch-and-go landings are authorized. See **paragraph 5.24** and MD-specific attachments, if applicable, for additional guidance.

3.2.3. Flying unit commanders may approve touch-and-go operations with maintenance engineering support personnel (MESP) or mission essential personnel (MEP) onboard. Document pre-approval on the flight authorization.

3.3. Tactical and Systems Mission Operations.

3.3.1. Aircrew shall conduct air refueling operations in accordance with North Atlantic Treaty Organization Allied Tactical Publication guidance. **(T-0).**

3.3.2. Air-to-air refueling limitations.

3.3.2.1. Aircrew shall not conduct air refueling after known losses of tanker disconnect capability, including tanker manual operation without tanker disconnect capability, or manual boom latching, unless a fuel emergency exists. **(T-2).**

3.3.2.2. Reverse air refueling and manual boom latching procedures training must be under direct instructor supervision. **(T-2).** Brief procedures used for these events during mission planning. Both tanker and receiver air refueling systems must be fully operable. **(T-2).**

3.3.2.3. Aircrew shall 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. **(T-2).**

3.3.2.4. Coordination between the tanker pilot, boom operator, and the receiver pilot is mandatory for practice emergency separation training and must occur prior to the event. **(T-2).** The pilots and boom operator must ensure in-flight coordination includes when the maneuver will occur and who gives the command of execution. **(T-2).**

3.3.2.5. The receiver pilot and the boom operator must discuss boom envelope demonstrations prior to accomplishment. **(T-2).** 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. **(T-2).** Tanker disconnect capability must be verified by a boom operator initiated disconnect prior to receivers conducting limits demonstrations. **(T-2).**

3.3.2.6. NVGs may be worn for night tanker rejoins to include flying in the observation position. Aircrew must raise them to the up and stowed position or remove them prior to the pre-contact position. **(T-2). Exception:** Not applicable to helicopter or tilt-rotor.

3.3.3. Functional and acceptance check flight (FCF/ACF).

3.3.3.1. Units will perform FCFs and ACFs according to Technical Order (TO) 1-1-300, *Maintenance Operational Checks and Check Flights*, MDS-specific functional check flight manual, MDS-specific flight manual or partial/modification flight manual, and this publication. **(T-2).** FCFs following programmed depot maintenance (PDM) must also follow the current work specification. **(T-2).** In the absence of an applicable MDS-specific functional check flight manual, the program office will ensure the terms of the contract with the applicable original equipment manufacturer include development of FCF and maintenance action guidance for that aircraft. **(T-2).** FCFs for other reasons, such as major aircraft repair, modification, cyber-security testing, or extended aircraft downtime, can be tailored. The FCF aircrew, aircraft maintenance and sustaining engineering activity will determine the FCF procedures to accomplish. **(T-2).** An FCF or ACF using the O-8E mission symbol is intended to ensure the aircraft is airworthy in accordance with TO 1-1-300 and is subject to all applicable restrictions. In accordance with TO 1-1-300, primary aircraft systems affecting airworthy status are engines, flight controls, landing gear, and instruments affecting 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. In the absence of an applicable MDS-specific functional check flight manual, the program office will ensure the terms of the contract with the applicable original equipment manufacturer include development of FCF and maintenance action guidance for that aircraft. **(T-2).** The need for FCF after an aircraft modification is determined by the aircraft maintenance activity. These procedures augment those already defined in the MDS-specific functional check flight manual. Incorporate the first flight after a major modification requiring verification of system airworthiness into an approved test plan. The aircraft manufacturer or contractor defines FCF procedures for developmental aircraft.

3.3.3.3. The aircraft will not be flown during cyber testing. **(T-2).** Cyber test and evaluation is normally conducted in both cooperative and adversarial scenarios. The cooperative vulnerability testing identifies possible vulnerabilities in the aircraft or aircraft systems and may do so through the use of code inserted into the aircraft system software in cooperation with system operators to determine effects. Adversarial testing consists of actual attempts to infiltrate the sub-system and/or aircraft level systems without the cooperation of the system operators. Both phases of testing have the possibility of compromising software or components.

3.3.3.4. The system program office determines how the aircraft will be returned to airworthiness status following cyber testing.

3.3.3.5. Pilots flying tail hook equipped aircraft will conduct initial FCF flights from a runway with compatible approach and departure end cables or barriers. **(T-2).** Local guidance determines runway specific cable and barrier configurations. 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. Weather at the alternate airfield must meet FCF requirements. **(T-2). Exception:** 412th FOA may authorize green lakebeds as a replacement for approach/departure cables/barriers.

3.3.3.6. Unit developed check flight cards may be used in lieu of the MDS-specific functional check flight manual checklist provided they are derived from the applicable MDS-specific functional check flight manual checklist and are approved by the FOA.

3.3.3.7. Aircrew will comply with weather restrictions published in TO 1-1-300 and the weather minimums specified in **Table 3.1**, *ACF/FCF Take-off and Landing Minimums.* **(T-3).** Weather conditions are applicable for the expected duration of the flight profile. Aircrew must accomplish preflight inspections for ACF/FCF flights during daylight hours. **(T-3).** Additionally, aircrew will not conduct the initial preflight inspection during periods of precipitation to prevent the masking of fluid leaks. **(T-3).** Aircrew will terminate all daylight-required flight operations prior to official sunset. **(T-3).**

Table 3.1. ACF/FCF Take-off and Landing 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	1000/3	1000/3
Note: MD attachments may have alternative or additional guidance.		

3.3.3.8. Rated wing commanders (or equivalent) may authorize the combination of ACF/FCFs with other mission/training flights if the ACF/FCF is being conducted to evaluate auxiliary aircraft systems. For units without a rated wing commander, AFMC/A3V is the approval authority. The approval authority for combining an FCF and a ferry flight is AFMC/A3V.

3.3.3.9. 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.

3.3.4. Fighter/attack/trainer formation.

3.3.4.1. Fighter/attack/trainer formations and sub-elements will be led by a qualified flight lead. **(T-2).** The fight lead must brief formation positions for dissimilar aircraft/formations. **(T-3).** In all cases, wingmen are responsible for deconfliction unless otherwise briefed. The following procedures apply to all fighter, attack and trainer aircraft:

3.3.4.2. Taxi.

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

3.3.4.2.2. Night. Minimum taxi interval is 300 feet and the aircraft shall taxi on the taxiway centerline. **(T-3).**

3.3.4.2.3. Runway/taxiways with ice/snow/slush. Minimum taxi interval is 300 feet and the aircraft will taxi on the taxiway centerline. **(T-3). Note:** Requires FOA approval to operate on runway/taxiways with ice/snow/slush.

3.3.4.2.4. Pilots will not taxi in front of aircraft being armed/de-armed with forward firing ordnance. **(T-3).**

3.3.4.3. Takeoff.

3.3.4.3.1. Pilots must ensure takeoff interval between aircraft or elements is a minimum of ten seconds. **(T-2).** Fifteen seconds is the minimum separation when the previous aircraft uses afterburner. **Exception:** T-38 afterburner takeoff interval is a minimum of ten seconds. When executing a trail departure in anticipation of a rejoin above the weather, the minimum takeoff interval is 20 seconds. When the previous aircraft is carrying live or inert air-to-surface weapons, the minimum takeoff interval is 20 seconds.

3.3.4.3.2. Flight lead will brief runway lineup and abort procedures. **(T-3).**

3.3.4.3.3. Wingmen will be positioned on the upwind side of the runway when crosswinds are greater than five knots. **(T-3).** Minimum wingtip clearance is ten feet. Pilots must ensure spacing between separated elements or flights on the runway is at least 500 feet. **(T-3). Exception:** T-38 pilots may use lead MAJCOM guidance.

3.3.4.4. Trail departures.

3.3.4.4.1. Trail departures may 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 two to three nautical miles.

3.3.4.4.2. Takeoff spacing is 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. **(T-3).**

3.3.4.4.3. Each aircraft, or element, will maintain 20 seconds, or two to three nautical miles spacing using all applicable aircraft systems and navigational aids. **(T-3).** Make all heading changes in accordance with standard instrument procedures not to exceed 30 degree of bank.

3.3.4.4.4. 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 is 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.

3.3.4.4.5. On departure, each aircraft, or element, will follow no radar contact procedures until all aircraft/elements have called "tied." **(T-3).**

3.3.4.5. Rejoins.

3.3.4.5.1. Daytime. Weather minimums to rejoin underneath a ceiling are 1,000 foot ceiling and 3 miles visibility. **(T-3).**

3.3.4.5.2. Night. Weather minimums to rejoin underneath a ceiling are 3,000 foot ceiling and 3 miles visibility and wingmen must be above 1,000 feet AGL. **(T-3).** The last aircraft will keep anti-collision beacon/strobe and position lights on unless otherwise directed by the flight lead. **(T-3).**

3.3.4.5.3. Radar equipped aircraft, or elements, will call "tied" when radar contact is established with the preceding aircraft. **(T-3).** Alternatively, aircraft equipped with a data link system that displays the relative position of the preceding aircraft will call "tied" when airborne with a valid data link. **(T-3).** No further radio calls are needed once all aircraft are tied unless contact is lost.

3.3.4.5.4. 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. **(T-3).**

3.3.4.5.5. 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. provided all aircraft can comply with MSA restrictions. When any aircraft is below the MSA, vertical separation may be reduced

to 500 feet. The flight lead should request identification friend or foe (IFF) squawks for wingmen that must remain in trail. **(T-3).**

3.3.4.6. No radar contact procedures. When an aircrew loses situational awareness on the preceding aircraft/element, the following procedures apply:

3.3.4.6.1. 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." **(T-3).**

3.3.4.6.2. During climbs and descents, the aircraft, or 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." **(T-3).** In addition, the aircraft immediately preceding the aircraft that is not tied will call initiating any altitude or heading change. **(T-3).** Acknowledgments are not required.

3.3.4.7. En route procedures and working area operations.

3.3.4.7.1. Aircrew will not use exaggerated or rolling maneuvers to maintain or regain formation position below 5,000 feet. AGL or in airspace where aerobatics are prohibited. **(T-3).**

3.3.4.7.2. Maximum close formation flight size in instrument meteorological conditions (IMC) is four aircraft except when flying in formation with a tanker. **(T-3).**

3.3.4.7.3. For rejoins from tactical formations, the wingman will join to the side of the formation occupied at the time the rejoin is directed. **(T-3).** 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. **(T-3).**

3.3.4.7.4. If a flight member loses sight of his flight lead or other flight member at a time when he or she thinks they should be in sight, a "blind" call will be made. **(T-3).** Losing and regaining sight during certain types of tactical maneuvers is expected and does not drive making a "blind" call. When any flight member calls "blind," the other flight member will immediately respond with "visual" and a position report. **(T-3).** When the other flight member is also blind, the flight lead will take action to ensure altitude separation between flight members. **(T-3).**

3.3.4.7.5. When flights of more than two aircraft are in tactical formation:

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

3.3.4.7.5.2. During low altitude operations trailing aircraft/element will maintain a sufficient distance back so that primary emphasis during formation maneuvering is on low altitude awareness and deconfliction within elements, not on deconfliction between elements. **(T-3).**

3.3.4.7.5.3. 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. **(T-3).**

3.3.4.7.5.4. Increase the frequency of operational (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.

3.3.4.8. Position changes.

3.3.4.8.1. Day VMC. The minimum altitude for position changes within a formation is 500 feet AGL over land and 1,000 feet AGL over water, except for emergencies. **(T-3).**

3.3.4.8.2. Night or IMC. The minimum altitude for position changes within a formation is 1,500 feet AGL, unless established on radar downwind. Aircrew must make a radio call when directing position changes at night or in IMC. **(T-3).**

3.3.4.8.3. Pilots will not initiate lead changes with the wingman further aft of normal fingertip, route, or greater than 30 degrees back from line abreast. **(T-3).**

3.3.4.9. Formation breakup. Flight leads must thoroughly brief formation breakup. **(T-3).** Flight leads will maintain positive control and when necessary, issue instructions to ensure safe separation of participating aircraft. **(T-3).**

3.3.4.9.1. Flight leaders will not break up formations until each pilot has a positive fix from which to navigate. **(T-3).** Formation break-up should not be accomplished in IMC. If unavoidable, IMC break-up is 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. **(T-3).** Wingmen will acknowledge and confirm good navigational aids. **(T-3).** During formation breakups, under VMC or IMC, the flight lead will clear off aircraft and elements individually. **(T-3).** Departing aircraft will initially turn away from the formation and, in VMC conditions, establish visual contact with previously departing aircraft. **(T-3).**

3.3.4.9.2. VMC drags on final below the weather are authorized if coordinated with ATC and the weather is at least 1500 feet and three miles. Ensure trail formation is set and all aircraft are configured for landing prior to the final approach fix when flying an instrument approach, or three miles from the landing point when flying a visual approach. Minimum airspeed for any aircraft during the maneuver is final approach speed.

3.3.4.10. Overhead traffic patterns.

3.3.4.10.1. Overhead patterns can be made with unexpended practice ordnance (e.g., BDU-33s) and live forward firing ordnance. Overhead traffic patterns are prohibited with live, or inert, unexpended air-to-surface ordnance unless that ordnance is secure and within an internal weapons bay. **(T-3).** Normal spacing between overhead breaks is five seconds. Aircraft should be wings level on final at approximately 300 feet AGL and one mile from the planned touchdown point.

3.3.4.10.2. After landing, clear aircraft to the exit side (i.e., cold side) of the runway when speed and conditions permit. When landing staggered, the terminology "cleared cold" may be used to tell a preceding aircraft that closure and spacing of a following aircraft will safely allow both aircraft on the cold runway side.

3.3.4.11. Trail recovery.

3.3.4.11.1. ATC approval is mandatory to fly a trail recovery. **(T-0).** Flight leads must advise ATC of intentions to conduct non-standard formation. **(T-2).** Flight leads must ensure that ATC understands that instructions to the lead aircraft are for the entire flight, and ATC will provide radar flight following for the entire formation. **(T-2).**

3.3.4.11.2. Trail recoveries are limited to a maximum of four aircraft. **(T-2).** Prior to taking spacing the flight lead will ensure the requirements for formation breakup are accomplished. **(T-2).** Complete any formation changes to effect trail recovery positions prior to the final approach fix.

3.3.4.11.3. 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. **(T-3).** Flight members will maintain a minimum spacing of one mile between other flight members. **(T-3).**

3.3.4.11.4. The pilot will transmit a "lost contact" call if radar contact or data link situational awareness is lost with the preceding aircraft. **(T-3).** The preceding aircraft will respond with altitude, airspeed and heading. **(T-3).** Establish altitude deconfliction, 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. **(T-3).** If separation cannot be confirmed, execute missed approach or climb out as instructed by ATC.

3.3.4.11.5. Once established on a segment of a published approach, each aircraft must comply with all published altitudes and restrictions while maintaining in-trail separation. **(T-2).** All aircraft must report the final approach fix. **(T-2).**

3.3.4.11.6. Aircrews will not terminate trail recoveries in simultaneous precision approach radar (PAR) or airport surveillance radar (ASR) approaches. **(T-2).** Recoveries to separate PAR/ASRs are authorized. Flight leads will coordinate with ATC and split prior to PAR/ASR final. **(T-2).**

3.3.4.12. Formation approaches. Formation penetrations are restricted to two aircraft when the weather is less than overhead traffic pattern minimums. **(T-3).** Aircrew must ensure ceiling and visibility are at least 500 feet and 1 1/2 miles. **(T-3).** 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 is 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.

3.3.4.13. 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 lead, the wingman will simultaneously transition to instruments, execute the applicable lost wingman procedures, and inform flight lead. **(T-2).** The flight lead will acknowledge the lost wingman's radio call and transmit attitude, heading, altitude, airspeed, and other

parameters as appropriate **(T-2).** Permission to rejoin the flight must be obtained from the flight lead after lost wingman procedures have been executed. **(T-2).**

3.3.4.13.1. Two or three ship flights. Use the following procedures outlined below: **Note:** If in three ship echelon, use four ship lost wingman procedures.

3.3.4.13.1.1. Wings-level flight. Turn away using 15 degrees of bank for 15 seconds; then resume heading and obtain a separate clearance.

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

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

3.3.4.13.1.4. Precision and non-precision final approach. The wingman momentarily turns away to ensure separation and informs lead. Commence the published missed approach procedure and obtain a separate clearance from approach control.

3.3.4.13.1.5. Missed approach. The wingman momentarily turns away to ensure clearance and informs lead. Continue the published missed approach procedure and climb to 500 feet above missed approach altitude. Obtain a separate clearance from approach control.

3.3.4.13.2. 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:

3.3.4.13.2.1. Wings-level flight. Turn away using 30 degrees of bank for 30 seconds. Resume heading and obtain a separate clearance.

3.3.4.13.2.2. 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.

3.3.4.13.2.3. 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.

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

3.3.5. Night vision goggles (NVGs). **Exception:** This paragraph is not applicable to tilt-rotor.

3.3.5.1. Aircrew must test and focus their NVGs preflight using the Hoffman ANV-20/20™ tester or by a unit eye lane (or equivalent) tester prior to NVG operations. **(T-3).**

3.3.5.2. Use of NVGs during all takeoffs and landings are prohibited unless authorized in MD-specific attachments or required by an approved test plan.

3.3.5.3. NVGs will only be worn in-flight by NVG qualified aircrew or by upgrading aircrew under the supervision of a qualified NVG instructor. **(T-2).** Familiarization flights are authorized under the supervision of an NVG instructor pilot (IP) if appropriate ground training has been accomplished.

3.3.5.4. Aircrew will don NVGs above the MSA and in level to climbing flight when possible. **(T-3).** Remove NVGs a minimum of five 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. **(T-3).**

3.3.5.5. The flight lead will brief when each flight member dons/doffs their NVGs. **(T-3).** In single seat aircraft, only one flight member at a time will don NVGs. **(T-3).** In multi-seat aircraft, only one crew member at a time will don NVGs while another crew member monitors aircraft parameters. **(T-3).** A "goggles on" or "goggles off" call will be made indicating the status of the aircrew in each aircraft. **(T-3).** Wingman will fly no closer than route position while wearing NVGs. **(T-3).**

3.3.5.6. Aircrews will only use NVGs in VMC with a discernable horizon. **(T-2).** Flight leads or PICs must brief a non-NVG plan to execute if flight conditions degrade. **(T-3).**

3.3.5.7. 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, *Air Operations Rules and Procedures*. If another system such as terrain following/terrain avoidance (TF/TA) is used to clear terrain and obstacles, the minimum altitude is defined by that system's capability. **Note:** MD-specific attachments may prescribe different minima.

3.3.5.8. 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. **(T-3).** Aircrew must ensure that all control and performance instruments are sufficiently illuminated by an NVG compatible light source. **(T-3).** Aircrew must ensure aircraft lighting provides for immediate transition to instruments in the event of loss of visual references. **(T-2).**

3.3.5.9. Aircrews will suppress all NVG incompatible interior light sources that degrade the aircrew's ability to see outside of the cockpit with NVGs. **(T-3).** If an incompatible light source cannot be suppressed, pilots will terminate NVG operations. **(T-3).**

3.3.5.10. NVGs may be retained during in-flight emergencies unless they become a detriment to safely recovering the aircraft. In ejection seat equipped aircraft, aircrews will remove and stow NVGs as soon as an emergency begins to deteriorate into an ejection situation. **(T-2).**

3.4. Air-to-Air Operations. AFMC adopts AFI 11-214 for air-to-air training missions. Additional restrictions are detailed in this paragraph. Developmental air-to-air testing is conducted in accordance with test and safety review board guidance.

3.4.1. Air-to-air (A/A) maneuvering restrictions. Intercept qualified aircrew may conduct intercepts in accordance with limited maneuvering training rules. If both aircrews are intercept qualified, 1v1 intercepts to unlimited maneuvering are permissible. Unlimited maneuvering, on sorties greater than 1v1 (i.e., 2v1, 2v2), requires an air combat training (ACBT) qualification. Flights may consist of ACBT and intercept qualified crews; however,

intercept qualified crews will adhere to limited maneuvering restrictions in accordance with AFI 11-214. **(T-3).**

3.4.1.1. Maximum visual engagement size is four aircraft. Non-radar equipped aircraft are restricted to limited maneuvering in visual engagements larger than 2v1.

3.4.1.2. Aircrews will not conduct negative G gun jinks. **(T-2).**

3.4.2. Wingmen may complete their A/A system check during formation rejoins. Flight leads should strive to conduct A/A system checks within special use airspace, or above 10,000 feet MSL.

3.4.3. Separation of aircraft. In accordance with AFI 11-214.

3.4.4. Simulated gun employment. To prevent inadvertent firings when simulating gun employment, the pilot must ensure there is no ammunition loaded or safe the gun according to the dash 34 series TOs, and comply with Air Force tactics, techniques, and procedures (AFTTP) 3-1 MDS and AFTTP 3-3 MDS volumes and 11-2MDSV3 guidance (unless exempted in this AFMAN). **(T-2).** Perform a trigger check (i.e., trigger squeeze) before simulated gun employment.

3.4.5. Flight leads will direct a battle damage/bomb check prior to or during return to base (RTB) unless circumstances prevent such checks. **(T-3).** Formation spacing is 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. Hazards from air-to-air operations and battle damage check procedures should be identified and presented to the SRB for review and incorporation into the test plan.

3.5. Air-to-Surface Weapons Delivery.

3.5.1. Air-to-surface weapons delivery. This section describes procedures for aircrew air-to-surface operations. Weapons delivery operations are in accordance with AFMAN 13-212V1, *Range Planning and Operations*, TO 1-1M-34, *Aircraft Weapons Delivery Manual (Nonnuclear),* and aircraft specific dash 34 TOs. Aircraft weapons employment techniques and procedures are discussed in AFTTP 3-1 and 3-3 MDS volumes. AFMC follows AFI 11-214 rules for air-to-surface training missions with additional restrictions detailed in this chapter. Developmental air-to-surface testing is conducted in accordance with test and safety review board guidance. **Note:** Unless otherwise specified, all limits for tilt-rotor aircraft in airplane (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.

3.5.1.1. Aircrew must positively identify the target and ensure the visual identification correlates with the targeting system prior to weapons release. **(T-2).** When delivering weapons via an inertial navigation system (INS) or global positioning system (GPS) solution through an undercast, in IMC, beyond line of sight, or at night, target identification and correlation is defined as verifying the target coordinates and navigation solution validity.

3.5.1.2. Weather minimums are in accordance with the applicable range rules.

3.5.1.3. Single ship operations. Aircrew qualified in air-to-ground employment may fly single ship weapon employment missions. Aircrew qualified in an aircraft and certified

in weapons delivery events are considered basic mission qualified for AFI 11-214 single-ship restrictions.

3.5.1.4. AFI 11-214 details minimum release altitudes. Recovery altitudes and planned dive angles are specified in **Table 3.2**, *Weapons Employment Minimum Recovery Altitudes*, and AFI 11-214. Contact AFMC/A3V for guidance if a conflict in guidance exists.

Table 3.2. Weapons Employment Minimum Recovery Altitudes.

Event	Planned Dive Angle (Degrees)	Recovery Altitude (AGL)
Low Angle High Drag (Class A and T Ranges)	< 30	100 feet
Low Angle High Drag (Over-water Range, Class B and C Ranges)	< 30	300 feet
Low Angle Low Drag	< 30	1,000 feet
Dive Bomb	≥ 30	1,500 feet (1,000 feet for A-10)
High Altitude Dive Bomb	≥ 30	4,500 feet
Low Angle, Long Range, Two Target Strafe	≤ 15	75 feet fixed wing 50 feet helicopter (N/A for hover fire)
High Angle Strafe	>15	A-10 & F-16: 1,000 feet for planned dive angles > 15° and ≤ 30°. 1,500 feet for planned dive angles > 30° F-15E & F-35: 500 feet
Level or Pull up Deliveries	N/A	200 feet fixed wing 50 feet helicopters (N/A for hover fire)

Nuclear and Radar Events	Level ±2.5 degrees	200 feet
Targets Beyond Line of Sight	N/A	N/A

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. Aircrews will comply with the following live ordnance procedures:

3.5.1.6.1. Conduct a thorough and complete verification of all target data. **(T-2).**

3.5.1.6.2. No release system, indicator, or weapon bay door malfunction may exist. **(T-2).**

3.5.1.6.3. Do not weapon unlock/release enable/master arm to arm until the aircraft is within the designated bombing range. **(T-2).**

3.5.1.6.4. If all weapons are expended and release is verified visually by the pilot observing ground impact, or by the Range Control Officer (RCO), or by other flight members, and internal indications are consistent with outside observations, aircrews may conduct additional training without restriction. **(T-2).**

3.5.1.6.5. Do not make simulated weapon delivery passes on targets occupied by personnel. **(T-2).**

3.5.1.7. When ground controllers are operating on Class B or C ranges, aircrew will comply with the following procedures:

3.5.1.7.1. Pilots shall be familiar with applicable range weapons delivery procedures, appropriate targets and weapons footprints. **(T-2).**

3.5.1.7.2. Ground personnel locations shall be briefed and acknowledged by all pilots. **(T-2).**

3.5.1.7.3. Do not expend ordnance if any doubt exists as to the ground personnel or intended target locations. **(T-2).**

3.5.1.8. Flight leads will direct a battle damage/bomb check prior to or during recovery to base, unless circumstances prevent the check. **(T-3).** Battle damage checks for test missions will be determined by the SRB chair. **(T-3).** Formation spacing is 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.

3.5.1.9. Aircrew will not attempt to expend ordnance using a delivery system with a known weapons release malfunction unless following hung ordnance procedures. **(T-2).**

3.5.1.10. If an inadvertent release is encountered, record switch positions and impact point (if known) and provide details to armament and safety personnel. Aircrew will safe armament switches and not attempt further release in any mode. **(T-2).** Treat remaining stores as hung ordnance.

3.5.1.11. Crews experiencing a hung store should 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. **(T-2).** If practical, obtain a chase aircraft for a visual inspection. Refer to local guidance for recovery procedures with hung weapons. Air refueling may be accomplished if required for safe recovery of the aircraft. Land from a straight in approach. If the situation requires a landing 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 ground/safety crew**.**

3.5.1.12. Hang fire. A missile that fires but fails to depart the aircraft is a hang fire. Follow the hung ordnance recovery procedures in accordance with local guidance.

3.5.1.13. Misfire. 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.

3.5.2. On-range radio failure. Attempt contact with the RCO on the appropriate back-up frequency. If unable to establish contact, make a pass by the range control tower, or 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 lead will either rejoin the flight and RTB or direct another flight member to escort the aircraft with radio failure to a recovery base. **(T-3).** If radio failure occurs and circumstances preclude landing with unexpended ordnance, the pilot must accomplish a safe jettison of the ordnance prior to RTB. **(T-3).**

3.6. Air Drop. Units conducting aerial delivery operations will develop specialized training programs and publish local operational procedures. **(T-2).**

3.6.1. Units will conduct airdrops in VMC. **(T-2).** IMC airdrops are permitted if aircraft is equipped with approved software/hardware and aircrew properly trained in its operation. Comply with airspace and drop zone (DZ) restrictions for blind DZ operations.

3.6.2. Jumpmaster directed personnel airdrops require FOA approval except for helicopter, tilt-rotor, or C-12 airdrops. Document FOA approval with a memorandum for record.

3.6.3. Approved computer-aided computed air release point and high-altitude release point programs may be used. However, units must verify the following information: DZ impact coordinates; load information to include number and parachute type, load weights, sequence of extraction, and load position. **(T-2).**

3.6.4. Crews will not conduct airdrops using parachutes unless they are Service or MAJCOM approved. **(T-2).** This does not apply to approved test missions where the purpose of the test is to derive ballistic data for a specific load.

3.6.5. The primary aircrew will review the DZ survey during mission planning. **(T-3).**

3.6.6. Units must ensure DD Form 1748, *Joint Airdrop Inspection Report (Platforms)*, is accomplished prior to all equipment airdrops. **(T-2). Exception**: A-71 and A-21 containers rigged for door bundles.

3.6.7. Radio transmissions with the DZ should be limited to mission related items or those required for safety of flight (e.g., ATC directions, range clearance, unsafe surface conditions,

mission changes, impact scores, etc.). Aircrew will coordinate radio silence/no communications procedures prior to mission execution. **(T-3).**

3.6.8. Drop clearance is assumed 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 pre-briefed marking, jumbled block letter, the letter 'X', or red light/smoke/flare is considered a no-drop call.

3.6.9. No-drop decisions for automated airdrops.

3.6.9.1. Prior to the one or two minute warning, aircrew shall notify the PIC when any condition exists that could jeopardize a safe drop. **(T-2).**

3.6.9.2. After the one or two minute warning, any crewmember observing a condition that would jeopardize a safe drop will transmit "no drop" on the interphone. **(T-3).**

3.6.9.3. The PIC shall make a "no drop" call if required checklist items have not been completed prior to the ten/five second call. **(T-2).**

3.6.9.4. The non-flying pilot, the navigator/CSO (if applicable) and the loadmaster will acknowledge the "no drop" call. **(T-2).** Aircrew will immediately safe applicable automatic airdrop switches to prevent automatic release of the load. **(T-2).**

3.7. Low-level navigation operations. Aircrew shall comply with AFI 11-214 training rules for low altitude missions. **(T-2). Exception:** This paragraph is not applicable to tilt-rotor.

3.7.1. Low-level environment. Between sunrise and sunset, the low-level environment is defined as at or below 2000 feet AGL for fixed wing aircraft and at or below 300 feet AGL for helicopters. For IMC or night operations, the low-level environment is defined as below the MSA.

3.7.2. Aircrew must comply with the following minimum altitudes unless excepted in the MD-specific attachment:

3.7.2.1. Day VMC. Fixed wing pilots will not conduct low-level flight below 500 feet AGL unless current and qualified, or in training, in low altitude step down training (LASDT). **(T-2).** Helicopter pilots may conduct low-level flight down to 100 feet AGL, and with operations officer approval, minimum altitudes may be reduced to 50 feet above the highest obstacle (AHO) when training or testing dictate. Time should be limited below 100 feet AGL to the minimum required for mission objectives. These altitude restrictions do not apply to flight test techniques, such as tower flybys, performed in approved airspace, or FCF missions. MD attachments may provide additional guidance or MD-specific alternate minima.

3.7.2.2. Night and IMC. Aircraft will not fly lower than the MSA (or ESA when operating in SUA vice a MTR) unless using an approved terrain following/terrain avoidance (TF/TA) system. **(T-2).** The pilots must be qualified in the system used, and the system must be fully operative. **(T-2).**

3.7.2.3. Night VMC. Pilots using NVGs can fly lower than the MSA (or ESA when operating in a SUA vice a MTR) in VMC 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. **(T-2).** Aircraft must have an operable radar altimeter unless executing a test plan. **(T-2).** The pilot must set the altitude warning to the minimum altitude planned during the low-level route when conducting NVG low-level operations, **(T-3).**

3.7.2.4. Visual Procedures. Weather minimums for visual low-level operations are 1,500 foot ceiling for fixed wing and 1,000 foot ceiling for helicopters and tilt-rotor aircraft in CONV/VTOL mode and three miles visibility for all aircraft flying an MTR or any route or area as defined in local unit procedures.

3.7.3. When operating below 1,000 feet AGL, wingmen will stack at or above lead's altitude. **(T-2).**

3.7.4. When crossing ridges, high, or hilly terrain, maintain positive G on the aircraft and do not exceed TO or MD-specific attachment bank angle. If a bank angle is not specified, fighter/trainer aircraft are limited to 120 degrees while all others are limited to 60 degrees. **(T-2). Note:** Maneuvering at less than 1G is limited to upright (i.e., less than 90 degrees of bank) bunting maneuvers.

3.7.5. Flight leads will direct a climb to an altitude that ensures vertical separation of an obstacle no later than three NM prior for fixed wing and one NM prior for helicopters and tilt-rotor aircraft in CONV/VTOL when unable to ensure lateral separation of obstructions affecting the route of flight, **(T-2).**

3.7.6. MTR transition**.** Use radar services and on-board radar systems to the maximum extent practical to assist with visual look-out. Unless a faster minimum safe maneuvering speed is mandated by the aircraft TO, delay acceleration to airspeeds authorized in Flight Information Publication (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 following radar 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.

3.7.7. Low altitude step down training (LASDT) operations when not excepted in the MD-specific attachments applies to fixed wing operations below 500 feet AGL except for takeoff, landing, and weapons delivery minimum recovery altitudes. LASDT fixed wing aircrew will not fly lower than 200 feet AGL (**Exception**: 100 feet AGL is authorized for A-10) during training nor fly lower than 100 feet AGL during test unless approved by the safety and test review boards. **(T-2).** MD attachments may provide additional guidance or MD-specific alternate minima.

3.7.8. Terrain following/terrain avoidance. TF/TA operations are prohibited unless the crew is current and qualified, enrolled in an applicable training plan, or executing an approved test plan. **(T-2). Exception**: Aircrew may operate TF/TA in day VMC conditions if not current. Qualified FCF/ACF/operational check flight (OCF) aircrew may conduct day VMC TF/TA operations in accordance with functional check flight checklist procedures. Conduct TF operations specified in an approved test plan 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 is no lower than aircrew qualification for low-level navigation/LASDT or as approved in a safety/test plan.

3.7.9. Excessive negative altitude variations caused by temperature or pressure may affect safe terrain clearance at your MSA. Aircrew 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. **(T-2).** 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.

3.7.10. NVGs may be used to clear terrain visually during night VMC. TF equipped aircraft may continue to TF altitudes 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. **(T-3).**

3.7.11. Aircrew shall abort the route when the difference between aircraft system altitude and the MSL altitude as indicated with the most current altimeter setting exceeds minus 400 feet. **(T-3).** This can be measured directly with an altitude calibration check (e.g., a 2420 MSL pressure altimeter reading and a 2000 feet system (true) altitude would yield a minus 420 feet altitude variation).

3.7.12. Abort the route if the aircraft radar altimeter indicates less than a 600 feet terrain clearance while at the MSA. **(T-3).**

3.7.13. Abort the route when maintaining TF clearance plane settings and the aircraft pressure altimeters indicate at or above the route MSA. **(T-3).**

3.7.14. 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. **(T-2).** Once the forecast/observed area(s) of excessive altitude variation is over-flown, subsequent portions of the low-level route may be flown normally.

3.8. Flight Test Mission Operations.

3.8.1. Aircrew engaged in flight test or test support in single pilot aircraft will observe a maximum of 3.0 hours of test time (beginning at start of first test point and running continuously until 3.0 hours have expired) and maximum scheduled sortie duration of 4.5 hours including transit time. **(T-3).** The FOA (delegable to no lower than the unit commander) is the approval authority to extend allowable test time. **Note:** Unit commander may authorize pausing the 3.0 hour clock for significant breaks of 15 minutes or more for transit time or hot pit time. **Exception:** This paragraph does not apply to U-2 or remotely piloted aircraft (RPA) operations.

3.8.2. Target aircraft. Comply with test or safety review board restrictions. If not specified, comply with **paragraph 3.4**

3.8.3. Chase aircraft. Chase requirements are generated by the SRB or when the flight authority deems chase necessary for risk mitigation or training. **Note:** This guidance is not intended for test support aircraft being employed in a target role.

3.8.3.1. The chase aircrew must be aware of the test point requirements, monitor parameters, ensure safe separation and clear for the formation. **(T-3).** 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. **(T-3).** The flight lead will direct chase positions in flight as required by test objectives. **(T-3).**

3.8.3.2. Types of chase.

3.8.3.2.1. 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.

3.8.3.2.2. 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 situational 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 deconflict 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.

3.8.3.2.3. Photo chase. Position is dictated by the photo requirements of the test and photographic equipment. Flight planning and briefing includes formation positions during various phases of flight or test points as well as radio terminology. Pilot and photographer must discuss camera communications, maneuvers to be performed, disposition and stowage of photographic equipment in the event of emergency egress and ejection. **(T-3).** The primary responsibility of the chase pilot is to maintain the briefed minimum safe distance from the test aircraft or test items, and terrain.

3.8.3.2.4. Instructor pilot/standardization evaluation flight examiner (IP/SEFE) Chase. IP/SEFE chase is close formation to route formation so as to evaluate maneuvering parameters. Pilots will maintain in-flight nose-tail separation. **(T-3).**

3.8.3.3. Chase 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.

3.8.3.3.1. Briefings should be conducted between chase and test aircrew face-to-face. Verbal coordination by other means is required when a face-to-face briefing is impossible. Chase briefings must 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. **(T-3).**

3.8.3.3.2. 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.

3.8.3.3.3. Primary test and chase aircraft must maintain radio contact during the mission. **(T-3).** The chase aircraft should 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. **(T-2).** Chase will relay all "terminate," "abort," and "knock-it-off" calls. **(T-3).**

3.8.3.3.4. Fuel load should allow 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. **(T-3).**

3.8.3.3.5. Weather requirements for safety chase formation is a discernable horizon, three miles visibility, and clear of clouds. **(T-3).**

3.8.3.3.6. 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 feet AGL. The chase will not stack lower than lead when operating below 1,000 feet AGL. **(T-3).** Aircrew will not perform exaggerated rolling or vertical maneuvers below 5,000 feet AGL. **(T-3).**

3.8.3.3.6.1. 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. **(T-3). Exception**: Airborne pickup procedures may be modified by test and safety review boards.

3.8.3.3.6.2. In the traffic pattern, IP/SEFE chase fixed-wing aircraft may maneuver as necessary to observe test aircraft, but go no lower than 50 feet AGL. All other chase fixed-wing 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.**(T-2). Note:** 50 feet AGL is the minimum altitude the SRB can approve.

3.8.3.3.6.3. Planned recovery and abort altitudes and g-loadings following dives are based on available aircraft performance, and should account for the chase aircraft worst case 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.

3.8.3.3.6.4. 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. **(T-2).** 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.

3.8.3.4. Separation from test aircraft/air vehicles/munitions.

3.8.3.4.1. Manned aircraft. Fly no closer than route formation during test maneuvering unless performing briefed photo chase duties or battle-damage or clean and dry checks.

3.8.3.4.2. RPA. Fly no closer than the test and safety board approved minimum distance.

3.8.3.4.3. 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. **(T-2).** 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 malfunction, as well as safe escape. **(T-2).**

3.8.3.5. Termination of a test event does not relieve the chase aircraft of the responsibility to deconflict 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. **(T-3).** Aircrew will terminate test and chase events for any of the following:

3.8.3.5.1. Exceeding limits. **(T-3).**

3.8.3.5.2. Loss of situational awareness. **(T-3).**

3.8.3.5.3. Other air vehicles becoming a safety risk to the flight. **(T-3).**

3.8.3.5.4. A dangerous situation is developing; radio failure is recognized. **(T-3).**

3.8.3.5.5. Airspace boundaries are violated. **(T-3).**

3.8.3.5.6. Visual contact with the test aircraft is lost (area chase excepted). **(T-3).**

3.8.3.6. Cargo and bomber aircraft chase restrictions.

3.8.3.6.1. Cargo and bomber aircraft may chase like aircraft (i.e., same MD) if the aircrew are visual formation trained. When this is this case, a chase qualification is not required. The chase aircraft will not come within 200 feet of the test aircraft at any time. **(T-3)**

3.8.3.6.2. Cargo and bomber aircraft may chase dissimilar aircraft (i.e., different MD) if the aircrew are chase qualified. The chase aircraft will not come within 200 feet of the test aircraft at any time. **(T-3). Exception**: Reference **Attachment 8** for authorized C-12 chase minimum spacing.

3.8.4. High angle-of-attack (high AoA). MD-specific attachments may provide high AoA guidance.

3.8.5. Fly compatibility flight profile training events to no greater than 90 percent of actual aircraft or store limits. **(T-2).**

3.8.6. Loads. Fly training loads profiles to no greater than 90 percent of actual aircraft or stores limits. **(T-2). Exception:** due to robust limiters, F-22 may fly loads to 100% of actual aircraft or stores limits.

3.8.7. Flutter. Fly training flutter profiles to no greater than 90 percent of actual aircraft or stores limits. **(T-2).**

3.8.8. Airstart for single-engine aircraft is in accordance with MD-specific attachments.

3.8.9. Aircraft qualitative evaluations.

3.8.9.1. Pilots (fixed wing/rotor/RPA). TPS pilots (students or graduates) performing qualitative flying evaluations in conjunction with a TPS syllabus, TPS curriculum development, curriculum exposure or short term qualitative evaluation may, under the direct supervision of a qualified instructor, operate the aircraft during critical phases of flight. Due to the inherent hazard of operations during critical phases of flight, risk mitigation measures must be implemented for qualitative evaluation pilot operations in these phases of flight. **(T-2). Note:** This paragraph also applies to TPS RPA pilots (students or graduates) operating a manned surrogate RPA from a ground control station.

3.8.9.2. Combat systems officer (CSO)/RPA pilot/flight test engineer/non-TPS graduate TPS staff instructors. TPS graduates or TPS students performing syllabus events (including qualitative evaluations) or non-TPS graduate TPS staff instructors performing curriculum mission familiarization or development flights may, under the direct supervision of a qualified instructor, operate the aircraft during all non-critical phases of flight during day VMC. They may also operate the aircraft from a non-mandatory pilot position for routine operational maneuvers in the following critical phases of flight: Low-level at or above 500 feet AGL in flat and rolling terrain, 1,000 feet in mountainous terrain (300 feet above highest obstacle for helicopters); simulated weapons delivery resulting in a time safety margin (TSM) of no less than eight seconds and remaining above 1,000 feet AGL; and simulated instrument or VFR approaches above 150 feet AGL (100 feet AGL if final approach airspeed is less than 130 KIAS) provided deviations will not jeopardize a normal transition to landing. Additionally, to transition below 500 feet AGL on a simulated instrument or VFR approach, meet stabilized approach criteria of minus five to plus ten knots from approach speed and a vertical velocity of less than 1,000 feet per minute. **Note:** Terrain is considered mountainous when elevation changes by more than 3,000 feet in ten nautical miles.

3.8.9.3. RPA pilots. TPS students and graduate TPS staff members may conduct syllabus required flight test techniques (FTT) during critical phases of flight provided they are under the direct supervision of a USAF TPS staff IP.

3.8.10. Dive planning and time safety margin (TSM).

3.8.10.1. For test points involving descents/dives that are not conducted in accordance with this AFMAN, AFTTP 3-series publications, or AFI 11-214, dive planning must be accomplished. **(T-2). Note:** An exception exists when determining if a maneuver is in accordance with the publications listed above. Some aircraft may not have a complete AFTTP series and lack maneuver parameters that a like aircraft contains in its publications. In this case, a test team may use the like aircraft publication and must provide justification to the safety board for why the test aircraft is able to execute in accordance with those parameters (e.g., similar P_s, G-available, turn performance, etc.). **(T-3).** An example of this is air-to-ground strafe: A test aircraft's publication may not describe strafe parameters, but a like aircraft's (AT-6 vs. A-29) publication does. The maneuver is also listed with a minimum altitude in AFI 11-214. In this case, a test team may use the like aircraft's guidance pending safety board and test execution authority approval.

3.8.10.2. When executing dive planning, test teams base recovery planning and risk management upon the calculated TSM. TSM is defined as the time in seconds to directly

travel from the worst case probable vector (i.e., worst case combination of parameters: e.g., dive angle, attitude, airspeed, roll rate, and available G that includes both planned and maximum allowed deviation/tolerance) to an unrecoverable condition. Use the following general planning factors and limits when calculating TSM:

3.8.10.2.1. The worst-case vector may occur at any point during the maneuver sequence. A maneuver sequence is broken up into four parts: entry, setup, maneuver FTT, and recovery. For instance, the worst-case vector may be during maneuver setup if a steep dive is used to gain airspeed for a FTT conducted in a shallow dive. The maneuver entry to achieve the required setup condition (i.e., attaining a certain dive angle) is typically operationally representative and not a limiting factor. It should be considered separate from the setup conditions when conducting dive planning.

3.8.10.2.1.1. Test teams may use multiple methods for dive planning and maneuver development, as long as the method is approved by the TRB, SRB, and the test execution authority.

3.8.10.2.1.2. An example alternate method is utilizing dive angle gates. For this example, a test team aborts the maneuver if the aircraft is steeper than 50 degrees at or below 10,000 feet, 20 degrees at or below 5,000 feet, or ten degrees at or below 2,500 feet AGL. These numbers are examples for one type of aircraft, and teams should use all available tools to validate dive planning and recovery assumptions. A test team may choose to use this approach for dive planning during the setup portion and apply TSM during the maneuver and recovery portion as an example of combined methods.

3.8.10.2.2. When the dive is becoming steeper at the dive recovery initiation point, the TSM is decreasing faster than one second for every second of delay. Test teams must account for this additional risk element and should highlight to aircrew any maneuvers with TSM values that are particularly sensitive to changes in abort parameters or recovery procedures. **(T-3).**

3.8.10.2.3. Calculate abort/recovery procedures using no more than 90% of available aircraft limits and performance characteristics (e.g., roll rate) at the flight conditions or 90% of the flight clearance authorized G loading, whichever is less. Additionally, minimize any combination of high-G, G dwell time, high-G onset, roll rate, and rapid transition from negative to positive G. Test teams should specify the recovery method used during dive planning calculations.

3.8.10.2.4. Normal-G onset rate is in accordance with aircraft capabilities at the test conditions.

3.8.10.2.5. Brief all normal G levels, roll rates and other assumptions used to calculate maneuver TSM to the technical and safety review boards.

3.8.10.2.6. Dive planning is used to identify how an aircraft can achieve a test point condition in a safe manner, and TSM is one tool used in that planning. SRBs and test teams should not rely solely on the TSM number, but understand what assumptions and planning went into generating the number. During the SRB, test cards and dive planning may not be complete, but it is incumbent on the test team to present to the

members of the SRB what dive planning efforts need to be accomplished to complete the test safely. These tools may include modeling, simulators with varying fidelity, or CTF dive planning programs.

3.8.10.2.7. When assessing overall risk, SRB members should understand the test team approach and weigh not only the TSM and dive planning, but also the type of maneuvers that are being executed. One example includes the risk of task saturation. An automatic ground collision avoidance system (AGCAS) test point where the pilot is solely focused on airspeed and altitude may have the same TSM as an aggressive negative P_s missile launch, but the risk for task saturation can be much different. Another important consideration is the time to correct the dive angle. A high speed low altitude shallow dive could share a similar TSM with a medium altitude steep dive wind-up-turn. The maneuver complexity and time to correct these dive angles are not the same and should be considered when assigning an overall risk level.

3.8.10.2.8. Some additional situations test teams must be alert for that may require additional risk mitigation include: high G, poor visibility, G-induced loss of consciousness, and system under test effects on engine and aerodynamic characteristics that may make it impossible to perform the planned recovery.

3.8.10.2.9. The procedures outlined in **Table 3.3**, *TSM Risk Assessment*, provide a starting point to minimize the risk of controlled flight into terrain.

Table 3.3. TSM Risk Assessment.

Risk Mitigation Standards	**Routine** (TSM ≥ 8 sec)	**Focused** (8 sec > TSM ≥ 4 sec)	**Aided** (4 sec > TSM ≥ 2.5 sec)	**Redundantly Aided** (2.5 sec > TSM ≥ 1.5 sec)	**Cued Anticipation**[1] (1.5 sec > TSM ≥ 0 sec)
Minimum Planning Fidelity[2]	in accordance with Normal Operations	M&S[2]	Best Available M&S[2]	Best Available M&S[2]	Best Available M&S[2]
Recovery Procedure[2,3]	Routine[4]	Defined & Documented[5]	Defined & Documented[5]	Defined & Documented[5]	Defined & Documented[5]
Minimum Training & Buildup[6]	Not Required	In-Flight Buildup[6]	Sim Rehearsal[8,9] & In-Flight Buildup[7]	Sim Rehearsal[8,9] & In-Flight Buildup[7]	Sim Rehearsal[8,9] & In-Flight Buildup[7]

Recovery Initiation Call	Pilot	Pilot	Backup for Pilot[10,11]	Two Backups for Pilot[10,11,12] & Anticipatory Cueing Desired[1,10,13]	Two Backups for Pilot [10,11,12] & Anticipatory Cueing Required[1,10,13]
Generic Risk Level *Assuming Mitigations Above Incorporated*	Low	Low	Low-Med	Med-High	High[14]

Notes:

1. Anticipatory cueing provides a timeline to recovery, e.g., automatic ground collision avoidance system heads-up display "chevron" symbology or altitude countdown.

2. Brief the SRB on all available modeling and simulation (M&S) tools and which was used for TSM planning. The SRB will validate both the dive planning M&S and the planned recovery procedure. **(T-3).**

3. Calculate abort/recovery procedures using no more than 90% of available aircraft limits and performance characteristics (i.e., roll rate) at the flight conditions or 90% of the flight clearance authorized G loading, whichever is less. Additionally, minimize any combination of high-G, G dwell time, high-G onset, roll rate, and rapid transition from negative to positive G.

4. Initiate recovery immediately after the test point is complete.

5. Document the planned and worst case allowable parameters, abort parameters and recovery procedure on flight test cards.

6. Test teams will brief the SRB on how dive planning factors/TSM contributed to the test point buildup plan. **(T-3).** Teams should consider the validity of their predictions and models when establishing test point flow.

7. Accomplish initial in-flight buildup maneuvers with a minimum TSM of eight seconds to validate predictions before proceeding to the test condition.

8. Simulator rehearsals will include practicing the complete recovery procedure. **(T-3).**

9. Establish crew and critical test team member maneuver currency as part of the test and safety review process.

10. All available onboard altitude awareness devices should be briefed and used. To eliminate confusion as to what constitutes an "available" device, the test and safety planning process will define the minimum required onboard devices. **(T-3).**

11. The recovery initiation back-up may be provided by an on-board safety crewmember, a chase aircrew, or control room personnel.

12. At least one of the two recovery initiation back-ups must be external to the test aircraft. Anticipatory cueing may be used as one of the two pilot backups in the Redundantly Aided column.

13. The recovery cueing system must be fully qualified prior to flight then checked immediately prior to the maneuver. Human intervention to back-up the cueing system may not be considered risk mitigation for less than 1.5 seconds of TSM. An automatic recovery system may be used, but anticipatory cueing should still be provided.

14. Without anticipatory cueing, controlled flight into terrain is probable.

Chapter 4

INSTRUMENT PROCEDURES

4.1. Weather Minimums. Current and qualified instrument-rated pilots may fly approaches to published minimums unless limited by the MD-specific attachment or by FOA local policy.

4.2. Approach Category Guidance.

4.2.1. Category D minimums may be used by approach category E aircraft when no category E minimums are published. When using category D minimums, comply with the following:

4.2.1.1. Fly a straight-in approach. **(T-3).**

4.2.1.2. Do not exceed a final approach airspeed of 165 KIAS. **(T-1).**

4.2.1.3. Maintain 255 knots true airspeed (KTAS) or less if required to fly the missed approach segment of the approach. **Note:** Maintaining 255 KTAS or less may not be possible under certain high pressure altitudes and temperatures conditions. Do not fly category D approaches under these conditions. **(T-1).**

4.2.2. Category C minimums may be used by approach category D aircraft when no category D minimums are published. When using category C minimums, aircrew will:

4.2.2.1. Fly a straight-in approach. **(T-3).**

4.2.2.2. Do not exceed a final approach airspeed of 140 KIAS. **(T-1).**

4.2.2.3. Maintain 240 KTAS or less if required to fly the missed approach segment of the approach. **Note:** Maintaining 240 KTAS or less may not be possible under certain high pressure altitudes and temperatures conditions. Do not fly category C approaches under these conditions. **(T-1).**

4.3. Weather Avoidance.

4.3.1. Plan and fly all missions to avoid areas of known or forecast severe weather including severe icing and severe turbulence. **(T-1).** These restrictions do not apply to planned severe weather penetration as part of an approved test plan.

4.3.2. Attempt to avoid thunderstorms by at least the following:

4.3.2.1. Twenty NMs laterally at or above FL 230.

4.3.2.2. Ten NMs laterally below FL 230.

4.3.2.3. Five NMs for operations below 5000 feet.

4.3.3. Avoid gust fronts preceding a rapidly moving thunderstorm. **(T-2).**

4.3.4. Avoid direct overflight of thunderstorms or cumulonimbus clouds by at least 2,000 feet. **(T-2).**

4.3.5. Avoid areas of high lightning potential (i.e., clouds within plus or minus 5,000 feet of the freezing level). **(T-2).**

4.4. Advisory Calls. The following procedures are applicable to multi-place aircraft that do not have procedures published in aircraft technical orders or 11-2MDSV3. **Exception:** Fighters and trainers are considered single-place aircraft and are exempt from these requirements. **Note:** MD-specific attachments may prescribe alternate procedures.

4.4.1. The pilot flying will periodically announce intentions during departures, arrivals, approaches, and when circumstances require deviating from normal procedures. **(T-3).** Mandatory advisory calls are provided in **paragraphs 4.4.2** through **4.4.3.2** The pilot not flying the aircraft will make these calls unless the aircraft flight manual designates a specific crewmember. **(T-3).**

4.4.2. If not voiced by an aircraft system, the pilot not flying will make the following altitude calls:

4.4.2.1. Call 1,000 feet above or below when descending or climbing to an initial approach fix (IAF) or holding altitude. **(T-3).**

4.4.2.2. Transition altitude/level. **(T-3).**

4.4.2.3. 1,000 feet above or below assigned altitude. **(T-3).**

4.4.2.4. When flying a precision approach, call 100 feet above: Procedure turn altitude; final approach fix altitude; minimum descent altitude (MDA); and decision height (DH) or decision altitude (DA). **(T-3).** At DH/DA the pilot flying will state intentions (i.e., "Continue", "Land" or "Go Around"). **(T-3).** The pilot flying may continue the approach below DH/DA 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 missed approach procedure or ATC issued climb out. **(T-2).**

4.4.2.5. When flying non-precision approaches, call "MDA" when reaching the MDA and "Runway in Sight" when the runway environment is in sight. **(T-3).** 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. **(T-3).** If the runway is not in sight, either pilot will state "Go Around" at the missed approach point (MAP) and the pilot flying will execute the appropriate missed approach procedure or ATC issued climb out instructions. **(T-2).**

4.4.3. Deviations.

4.4.3.1. The pilot not flying will announce 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. **(T-3).**

4.4.3.2. Any crewmember should announce a variation of 200 feet altitude, a deviation of plus or minus ten knots in airspeed, a potential terrain or obstruction issue, or a deviation from the approach procedure being flown.

4.5. Instrument Approach Briefings/Checklists. Aircrew of multi-place aircraft that do not have guidance defined in aircraft flight manuals must ensure the following items are set or

checked and briefed prior to the IAF: heading and attitude systems; navigation and communication radios; navigation source; final approach course; and altimeters. **(T-3).** In addition, review the approach and the aerodrome sketch and brief the following items: sector altitude; DH/DA/MDA; field elevation; weather required for approach; missed approach point; climb out intentions; terrain or obstacle hazards; crew duties and responsibilities; lost communication intentions; and a backup approach, when applicable. **(T-3).**

Chapter 5

OPERATING PROCEDURES AND RESTRICTIONS

5.1. General. This chapter does not supersede flight manual guidance. **Note:** MD-specific attachments may prescribe additional aircraft specific operational limits and restrictions.

5.2. Technical Orders (TOs). Aircrews will operate all aircraft in accordance with the applicable aircraft TOs, approved TO waivers, or, when applicable, technical and safety process approved procedures. **(T-2).** Do not operate aircraft/equipment without properly validated and verified tech data in accordance with 00-5 series TOs. **(T-2).** Aircraft and aircraft equipment/items may be operated using test cards derived from an approved test plan if other technical data does not yet exist. Modified aircraft are operated in accordance with the aircraft modification flight manual. See AFI 11-215, *Flight Manual Program*, for guidance on modification flight manuals.

5.3. Developmental Software. All software, including mission planning software, must be approved in accordance with the USAF airworthiness process prior to use outside of a test program. Flight outside of a test program with software that has not passed a safety of flight evaluation is prohibited. **(T-2).**

5.4. New/Modified Aircraft Equipment/Weapons. Aircrew members not qualified in the operation of new or modified aircraft equipment shall not operate that equipment unless under the supervision of a current and qualified instructor of like specialty qualified in that equipment. **(T-2). Exception:** This restriction does not apply to aircraft or systems under an approved test plan.

5.5. Environmental Restrictions for Ejection Seat Aircraft.

5.5.1. Winds. Normal flying operations will be terminated when surface winds along the intended route of flight exceed 35 knots steady state. **(T-3).**

5.5.2. Sea state. Do not conduct over-water flight operations when the sea state exceeds ten feet wave height. **(T-3).**

5.5.3. Anti-exposure suit wear. Comply with AFMAN 11-301V2, *Management and Configuration Requirements for Aircrew Flight Equipment (AFE)*, with the following exemptions:

5.5.3.1. Anti-exposure suit wear is not required for flights that require short duration transient overflight of water below 60°F to or from a working area provided the preponderance of the mission is conducted over water where the temperature is greater than 60°F.

5.5.3.2. When the mission area water temperatures are between 51°F and 60°F and the aircraft ramp temperature is observed or forecast to be 75°F or greater at step time, the FOA may waive anti-exposure suit wear for test or test support missions if the aircrew are equipped with the URT-44 (406 MHz beacon).

5.6. Aerial Demonstration/Show Formation. These flights require headquarters AF approval. Contact AFMC/A3F (**AFMC.A3F.Workflow@us.af.mil**) for assistance securing approval to participate in static displays and aerial events.

5.7. Aerial Photography and Equipment.

5.7.1. Only qualified aerial photographers with an Air Force Specialty Code 3N0XX and contractor aerial photographers are authorized to carry and operate photographic equipment in flight for mission related requirements. **(T-2).** Non-aerial photographer qualified personnel will not carry or use photographic equipment when flying in ejection seat aircraft or when occupying a crew station with a set of flight controls. **(T-3). Exception:** The FOA may approve aircrew or non-aircrew to carry camera equipment to support unique mission requirements.

5.7.2. Missions requiring more than two cameras aboard fighter or trainer aircraft require FOA approval. Equipment size must be small enough to ensure use of that equipment will not interfere with flight controls or throttle movement. Keep equipment stored until needed. Remove straps and lens caps before departing for the aircraft. Use coiled cords (i.e., not rigid). Inventory equipment before and after each mission. Avoid placing gear on aircraft consoles. Equipment must remain clear of aircraft controls, throttles, and cockpit systems that are critical to flight safety. For a controlled ejection, store equipment so that it does not affect seat operation.

5.8. Aircrew Anti-G Suit Requirements.

5.8.1. Aircrew flying G-suit capable aircraft must wear a G-suit. **(T-2).**

5.8.2. Full coverage anti-G suit (FCAGS) is required to be worn in aircraft where lead MAJCOM directs their operational use. Aircrew who completed F-15C or F-16 centrifuge training or the air-to-air portions of an F-15C or F-16 formal training course with the CSU-13B/P legacy G-suit may continue to use the legacy G-suit for sorties on which maximum load factor is planned to be 7G or less. Once issued, aircrew will wear the FCAGS when maximum load factor for the mission or alternate mission is planned to exceed 7Gs. **(T-2).** FOA may mandate additional risk mitigations.

5.9. Preflight/Ground Operations. A qualified person must monitor the aircraft gas turbine compressor or auxiliary power unit when used for pre-flight or other ground operations. **(T-2).**

5.10. Seat and Safety Belt Requirements.

5.10.1. Aircrew must wear seatbelts:

5.10.1.1. When an ejection seat is occupied. **(T-2).**

5.10.1.2. When occupying a primary crew seat unless crew duties dictate otherwise. **(T-3).**

5.10.1.3. As directed by the PIC. The PIC shall direct all occupants to fasten seatbelts securely when turbulence is encountered or expected. **(T-3).**

5.10.2. Crewmembers and test personnel conducting test points must wear a seat belt during taxi, takeoff, landing, and air refueling except when wearing the seat belt is impractical. **(T-3).**

5.10.3. Each passenger/occupant over two years old requires a seat equipped with a safety belt. **(T-2).**

5.10.4. Shoulder harness, when installed, must be worn with the seat belt during taxi, takeoff, landing and critical phases of flight. **(T-3).** Instructors and special mission aviators (SMA) need not wear the shoulder harness if it interferes with performing duties. The FOA may waive this requirement for specific crew positions when wear of the shoulder harness interferes with crew duties.

5.11. 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. Consider brake energy limits and cooling when planning high speed taxi checks. Accomplish high speed taxi checks, to include barrier certifications, 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 FOA and accomplished by a qualified IP or FCF pilot. **(T-3).** In multi-place aircraft, both pilots must be qualified in the aircraft. **(T-3).** Document high-speed taxi checks on the flight authorization form.

5.12. Aircraft Malfunctions/Damage. Do not taxi aircraft with malfunctions that affect the nosewheel steering or brake systems. **(T-2).** Only use a malfunctioning system when it is needed for safe recovery of the aircraft. Do not continue in-flight trouble shooting of a malfunction after completing flight manual emergency procedures. **(T-2).** Abort the mission and land as soon as practical when structural damage occurs, or is suspected, regardless of apparent damage. **(T-2).**

5.13. Duty Station (multi-place aircraft). A qualified pilot will be at a set of aircraft controls at all times during flight. **(T-2).** All primary aircrew members will be at their duty stations during critical phases of flight. **(T-2).** During other phases of flight, crewmembers may leave their duty station for brief periods to meet physiological needs or to perform normal crew duties. Only one pilot may be absent from their duty station at a time. Notify the PIC before departing assigned primary duty station. The PIC is the final authority for allowing personnel to move about the aircraft during flight.

5.14. 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. **(T-2).** The pilot flying will transfer control of aircraft by stating "Pilot [or Co-pilot] you have the aircraft [or controls]." **(T-3).** The pilot receiving control of the aircraft will acknowledge "Pilot [or Co-pilot] has the aircraft [or controls]." **(T-2).** For fighter or trainer aircraft, if the intercom fails, the pilot taking control of the aircraft will rock the wings and assume control of the aircraft, radios and navigational equipment unless pre-briefed otherwise. **(T-2).** In fighter or trainer aircraft, either pilot flying can pump the stick to pass control to the other pilot who should then rock the wings to acknowledge transfer of aircraft control (i.e., pump to pass/shake to take).

5.15. Takeoff Aborts. Place particular emphasis during pre-flight planning on takeoff and abort factors for abnormal situations (e.g., short/wet runway, heavy gross weight, and abort sequence in formation flights). Hot brakes should be suspected anytime an aircraft experiences a high speed abort. If confirmed, declare a ground emergency and taxi the aircraft to the designated hot brake area and perform hot brake procedures.

5.16. G-Awareness. Pilots must perform a G-awareness exercise whenever five G or greater are expected during the sortie. **(T-3).** If available, select pressure breathing for G on all sorties regardless of anticipated g-loading. Wearing the Combat Edge vest in the F-15 or 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 (UPG) vest on all sorties where flight will be conducted above 44,000 feet MSL. **(T-2).** If the UPG vest is not worn, ensure the CRU-122 vest port plug is installed. Pilots shall not exceed 6G if the plug is found missing during flight. **(T-3).**

5.16.1. Maintain a minimum of 6,000 feet spacing between aircraft during the g-awareness exercise. The g-awareness exercise consists of two turns with at least 90 degrees of heading change. The second turn of the g-awareness exercise for air-to-air sorties is a minimum of 180 degrees of turn. The first turn is a smooth onset rate to approximately four G. Use this turn to ensure proper G-suit operation and to practice anti-g straining maneuver. Accelerate and perform another 90 to 180 degree turn at up to seven G. **Note:** Do not exceed aircraft G limits performing g-awareness turns. **(T-2).**

5.16.2. Flight/element leads will ensure airspace intended for conducting the g-awareness exercise is free from potential traffic conflicts. **(T-3).** 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:

5.16.2.1. Special use airspace (i.e., restricted and warning areas, ATC-assigned airspace (ATCAA), military operating areas (MOA), and MAJCOM approved special mission areas).

5.16.2.2. Above 10,000 feet MSL outside of SUA.

5.16.2.3. Inside the confines of MTR.

5.16.2.4. Below 10,000 feet MSL outside of SUA.

5.17. Unusual Non-Aerobatic Attitude and Training Maneuvers. Do not perform unusual attitude recoveries in single seat aircraft, at night or in IMC, or anytime the safety observer is not qualified in the aircraft. **(T-2).** Abrupt training maneuvers (i.e., 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 or any time the safety observer is not qualified in the aircraft. **(T-2).** Initiate such maneuvers at an altitude that allows recovery no lower than 5,000 feet AGL for fixed wing and 500 feet AGL for helicopters. Perform these type of maneuvers in SUA, ATCAA, MTRs, or host nation approved airspace. For units without access to defined airspace, FOA will pre-coordinate and establish repeatable consistent routing and maneuver locations with ATC for unit mission accomplishment. **(T-2).** Aircraft deployed or based at overseas locations will operate in accordance with applicable host nation agreements or International Civil Aviation Organization standard and recommended practices. **(T-0).** If the aircraft operating requirements (i.e., altitude requirements, maximum airspeeds, dropping of objects, etc.) published in the host nation agreement are less restrictive than USAF/MAJCOM guidance, use the most restrictive guidance. **(T-2).**

5.18. Simulated Emergencies. Do not practice emergency procedures (EP) that degrade aircraft performance or flight control capabilities unless specifically authorized by an approved training syllabus, test plan, applicable 11-2MDSV3 publication, or MDS attachment. **(T-3).** Do not perform simulated emergency procedures with MESPs or MEPs onboard except when required in an approved test plan. **(T-3). Exception:** Waivers to this paragraph are not required when simulating emergencies directed by an approved test plan. In addition to the restrictions in AFMAN 11-202V3, the following restrictions apply when conducting simulated emergencies:

5.18.1. For fighter, attack, trainer, and U-2 aircraft.

5.18.1.1. During initial qualification or re-qualification sorties in single seat aircraft, the IP or EP will be in a chase aircraft and in a position to direct a go-around, if needed. **(T-3).**

5.18.1.2. Day VMC only.

5.18.1.3. Gross weight cannot exceed basic weight plus weight of full internal fuel or flight manual limits, whichever is less.

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

5.18.1.5. Simulated single engine (SSE). Use all engines for unplanned go-arounds. Initiate SSE go-around above 200 feet AGL (above 500 feet AGL for A-10). SSE climb out is not authorized. **(T-3).**

5.18.1.6. No flap full stop landings are prohibited unless required in an approved training syllabus or considered a normal procedure in the flight manual. **(T-3).**

5.18.1.7. Simulated flameout (SFO) patterns. Specific procedures for SFO training must be established in letters of agreement with appropriate agencies and published in appropriate local publications. The ceiling may be no lower than 500 feet above the highest portion of prescribed pattern. **(T-3).** The SFO pattern may be entered from any direction or altitude that ensures the aircraft is properly configured prior to base key and in a position to safely complete the approach. An SFO is not 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 needed, whether as a result of a traffic conflict or when making corrections. Once discontinued, initiate a go-around and do not attempt to re-enter or complete that pattern/approach. If flown to a dry lakebed, begin the go-around to descend no lower than 50 feet 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. Only qualified IPs or upgrading IPs may fly SFOs to touch down from the rear cockpit.

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

5.18.2. For bomber, cargo, tanker aircraft.

5.18.2.1. 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 prior to accomplishment of each simulated emergency condition or as the simulated condition is established. **(T-3).**

5.18.2.2. Refer to **Table 5.1**, *Simulated Emergency Restrictions for Bomber, Cargo, Tanker,* for additional restrictions. **Note:** MD-specific attachments may prescribe alternate restrictions.

Table 5.1. Simulated Emergency Restrictions for Bomber, Cargo, Tanker.

Event	IP or EP at a Set of Controls	No IP or EP at a Set of Controls
Simulated Emergency Procedures	1. Weather is at or above circling minimums during daylight and 1000 foot ceiling and two miles visibility or circling minimums (whichever is higher) at night. 2. No passengers.	1. Day VFR. 2. No passengers.
Simulated Engine Out Takeoff	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 feet 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 feet AGL.
Simulated Engine Out Landing	Crosswind corrected for RCR is in the recommended zone of the aircraft's landing crosswind chart.	Prohibited.
Practice Engine Shutdown	1. VMC with a discernable horizon. 2. Shutdown & restart is accomplished above 5,000 feet AGL (2,500 feet AGL for C-130).	Prohibited, except for FCF qualified pilots during FCF proficiency training under the following conditions: VMC with a discernable horizon; shutdown & restart is accomplished above 5,000 feet AGL (2,500 feet AGL for C-130).
No Flap	In accordance with flight manual or MD-specific attachment.	Prohibited for all aircraft except C-12.

5.19. Fuel Jettisoning/Dumping. Dump fuel only to reduce aircraft gross weight in an emergency or as required for flight test or FCF. **(T-2).** When circumstances permit, jettison fuel over unpopulated areas at an altitude above 5,000 feet AGL. Advise the appropriate air traffic

control agency of intention, altitude, and location. Units will establish jettison areas to minimize environmental impact. **(T-2).** Use designated jettison areas and local area procedures to the maximum extent possible except when safety of flight would be compromised.

5.20. Fuel Conservation. All aircrew will utilize fuel conservation techniques in the conduct of their missions. **(T-2).**

5.21. Dropped Objects. If an object inadvertently departs the aircraft, notify the controlling agency as soon as practical. In notification to agency, aircrew will include details of routing, altitude, and winds aloft. **(T-2).** After landing, notify maintenance and initiate appropriate safety processes.

5.22. Hazardous Conditions. Relay any safety hazard (e.g., icing, turbulence, thunderstorms, bird concentrations, etc.) through a pilot weather report to the controlling agency.

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

5.24. Fixed Wing Aircraft Touch-and-Go Landings.

5.24.1. Unit commander designated first pilots or mission pilots that are touch-and-go qualified may perform touch-and-go landings at FOA approved airfields. IPs and MP/FPs under IP supervision may perform touch-and-go landings at any airfield that meets aircraft landing requirements.

5.24.2. Do not accomplish touch-and-go landings with passengers onboard the aircraft. **(T-2).**

5.24.3. Fighter/attack aircraft. Do not perform touch-and-go landings when configured with air-to-air missiles, with live rocket motors, or with air-to-surface ordnance, live or inert, that is carted for release. **(T-2).** Touch-and-go landings may be performed with live gun ammunition on board provided the master arm switch is in safe.

5.24.4. Bomber/cargo/tanker aircraft. 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. **(T-2).**

5.24.5. Unimproved landing surfaces. Comply with aircraft flight manual and MD-specific attachment, if applicable, when landing on unimproved surfaces. **(T-2).** Unless authorized by local procedures, touch-and-go landings on lakebeds are prohibited.

5.25. Post Arresting Gear Engagement Procedures. Do not shut down the engine, unless fire or other conditions dictate, or raise the tail hook, or taxi, until directed to do so by the ground crew. **(T-3).**

5.26. Reduced Same Runway Separation. The FOA is authorized to implement reduced same runway separation. If implemented, local criteria and procedures should be published in the local flying directives. Questions regarding AFMC minimum runway separation standards may be directed to AFMC/A3O.

5.27. Search and Rescue Combat Air Patrol (SARCAP) Procedures. Units must take actions to locate possible survivors and initiate rescue efforts in the event an aircraft is lost in flight. **(T-2).** Care should be taken when establishing SARCAP to not endanger aircraft searching for the survivor(s). 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 recommendations to aid a search and rescue situation.

5.27.1. Mark. Mark the last known position of survivor or crash site using any means available.

5.27.2. Squawk. Immediately terminate maneuvering using appropriate knock-it-off procedures. Establish a SARCAP on-scene commander. IFF should be placed to EMER to alert controllers of the emergency situation.

5.27.3. Talk. Communicate the emergency situation, including crash site location and the downed aircraft's call sign and type, and intentions immediately to control agencies. Broadcast an emergency distress call on GUARD. Attempt communications with survivors using GUARD or UHF frequency 282.8. Pass on pertinent information (e.g., number and condition of survivors, ordnance at crash site, weather conditions, signaling devices, etc.) to rescue forces.

5.27.4. Separate. Remain above the last observed parachute altitude(s) until position of survivor(s) is determined. The on scene commander deconflicts other aircraft assisting in the SARCAP by altitude to preclude midair collision, directs non-essential aircraft to clear the area, and establishes high and low work areas as necessary to facilitate communication with other agencies.

5.27.5. Bingo. Establish BINGO fuels as required to maintain maximum SARCAP coverage over crash site. Do not over-fly BINGO fuel. **(T-2).** Hand off on scene commander duties if required. Relinquish SARCAP operation to designated rescue forces upon their arrival.

5.28. High-G Maneuvers. High-G maneuvers are defined as 7.0 Gs or greater. The term "sustained high-G" applies to a high-G loading duration longer than five seconds. The term "short duration high-G" applies to a high-G loading duration of five seconds or less.

5.28.1. Pilots must adhere to the following limits when performing multiple high G test points:

5.28.1.1. Sustained high-G test points. No more than eight sustained high-G test points per sortie. **(T-3).**

5.28.1.2. Short duration high-G test points. No more than 16 short duration high-G test points per sortie. **(T-3).**

5.28.2. When short duration and sustained test points are combined, the limits are 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). **(T-3).**

5.28.3. Pilots shall use the symmetric pull-up (lift vector above the horizon) FTT, in lieu of maneuvering flight, when attempting to achieve load factors greater than 7.0 Gs below 10,000 feet AGL. **(T-3).**

Chapter 6

FLIGHT OPERATIONS SUPERVISION

6.1. General Information. A chain of supervision is vital to the safe and efficient conduct of flight operations. This chain of supervision is structured around the following specific positions.

6.1.1. Flight operations authority (FOA). The FOA (generally the operations group commander) is responsible for overall supervision of the organization's flying operations, and directs necessary actions to ensure compliance with the provisions of this publication. **(T-2).**

6.1.2. Supervisor of flying (SOF). When on duty, the SOF is the direct representative of the FOA. In this capacity, the SOF provides real-time oversight of flying operations and is a primary source of assistance to aircrews. Decision authority is delegated to this position to accomplish the unit's mission.

6.1.3. Squadron flight operations supervisor. A unit commander designated representative responsible for oversight of unit flight schedule/operations.

6.2. Supervision Requirements. The following requirements are established for flying units.

6.2.1. SOF programs will be established for oversight of flight operations involving fighter, attack, and trainer aircraft or any other single-place aircraft (e.g., A-10, F-15, F-16, F-22, F-35, T-6, T-38, and T-X). **(T-2). Exception:** Detachment 2, WR-ALC, may follow flight safety supervisor procedures in accordance with AFMC/A3V approved local directives. **Note:** SOF programs are optional for units operating only multi-place aircraft.

6.2.2. Commanders of units not co-located with a parent wing or operations group may waive establishing the SOF position when authorized manning does not support filling this position. Commanders should consider integration with host base SOF programs when flying operations are compatible. Document integration with memorandum of agreement.

6.2.3. Units, particularly those without SOF programs, must maintain an appropriate level of supervisory oversight during flying operations. **(T-2).** This is necessary to ensure awareness of scheduled operations, adequate mission support, and the ability to respond to significant issues.

6.3. Responsibilities.

6.3.1. Flight operations authority establishes local policies and minimum supervision requirements (e.g., required personnel, authorized locations, duty periods, etc.) for operations supervision within the group and flying squadron(s). **(T-2).** The FOA must:

6.3.1.1. Implement a supervisor of flying (SOF) program. **(T-2).**

6.3.1.2. Designate a SOF who has the office primary responsibility (OPR). **(T-3).**

6.3.1.3. Provide necessary assets to accomplish SOF duties. **(T-3).**

6.3.1.4. Designate primary and alternate SOF duty locations. **(T-3).**

6.3.1.5. Approve new SOFs in writing following completion of training. **(T-3).**

6.3.2. The SOF OPR will develop and maintain the SOF training program. **(T-3).** The SOF OPR will:

6.3.2.1. The instructor must document when an individual has completed SOF training. **(T-3).**

6.3.2.2. Develop SOF checklists to cover the applicable items listed in **paragraph 6.8** **(T-3).**

6.3.2.3. Ensure SOF publications are current/updated as required. **(T-3).**

6.3.3. The person appointed as supervisor of flying must:

6.3.3.1. Be trained and FOA certified. **(T-3).**

6.3.3.2. Be on duty for local missions a minimum of 30 minutes prior to first scheduled takeoff and remain on duty until the last aircraft has landed. **(T-3).** **Note:** FOA determines requirements for SOF coverage for operations outside the local area such as cross-countries and delivery missions.

6.3.3.3. Be familiar with all scheduled missions during assigned duty periods. **(T-3).**

6.3.3.4. Provide advice, assistance, and recommendations to aircrews, supervisors, and support agencies regarding unsafe or deteriorating flying conditions. **(T-3).**

6.3.3.5. Provide aircrew assistance as necessary during in-flight emergencies or other abnormal situations. **(T-3).**

6.3.3.6. Monitor the status of primary and emergency airfields and inform flying units of changes that may affect flight operations. **(T-3).**

6.3.3.7. Determine the suitable weather alternates during periods of deteriorating weather conditions. **(T-3).**

6.3.4. Squadron supervisors provide technical assistance during in-flight emergencies when requested by the SOF or when the SOF is not qualified in the distressed aircraft as well as advise the SOF of any changes to the squadron's flying schedule. **Note:** SOF-qualified squadron supervisors may perform both supervisor and SOF duties simultaneously.

6.4. Inflight Emergencies (IFE). The primary objective during an abnormal/emergency situation is the safe recovery of the aircrew and aircraft.

6.4.1. Consider the following when establishing procedures for responding to IFE:

6.4.1.1. Securing a discrete frequency for recovering an emergency aircraft. ATC and the emergency aircrew should determine when to use a single frequency approach (SFA).

6.4.1.2. Maintain a contact list for notifying appropriate agencies and key personnel of an IFE.

6.4.1.3. Establish action priorities for responding to simultaneous emergencies/abnormal situations.

6.4.1.4. Understanding CONFERENCE HOTEL procedures for depot/contractor assistance. These procedures make aircraft specialists available by phone to the SOF and aircrew when in-flight situations pose systems-related questions that can't be answered at the local level. Most aircraft manufacturers and Air Logistics Centers (ALCs) provide 24-hour CONFERENCE HOTEL support. Consult the manufacturer and applicable logistics center for current telephone numbers and points of contact.

6.4.2. SOF response restrictions to an IFE.

6.4.2.1. The final decision during any IFE/abnormal situation rests with the pilot in command. However, SOFs may declare an in-flight emergency for any aircraft based on their knowledge of the aircraft and the flight and airfield environment. **Note:** Only the on-scene commander (normally the fire chief) can terminate an emergency.

6.4.2.2. Unless intervening to prevent injury or loss of life, SOFs will not use air traffic control frequencies including the SFA frequency without ATC approval. **(T-3).**

6.5. SOF Duty Restrictions.

6.5.1. The SOF will have a minimum of 12 hours crew rest prior to commencing crew duty day. **(T-3).**

6.5.2. Maximum duty day for SOF is 12 hours. **(T-2).** Duty beyond 12 hours up to16 hours is authorized only when the SOF had 12 hours crew rest and the FOA approves an extension to the duty day. The SOF duty day will not be extended beyond 16 hours. **(T-2).** FOA may delegate duty day waiver authority to the SOF's flying unit commander**.**

6.5.3. DNIF crew members may perform SOF duties with flight surgeon approval.

6.5.4. Crewmembers on extended DNIF may not perform SOF duties if qualification in their assigned aircraft has expired.

6.6. SOF Equipment. The FOA shall determine what equipment must be functional and immediately available to the SOF. **(T-3).** The following is recommended:

6.6.1. A dedicated radio (UHF, VHF, or HF, as appropriate) to contact airborne aircraft.

6.6.2. Telephone (land-line or cellular) or FM radio to contact the FOA, command post, weather facility, and ATC watch supervisors. Dedicated hot lines are preferred.

6.6.3. As a minimum, the alternate SOF location must be able to communicate with airborne aircraft and the command and control network.

6.6.4. The SOF must have access to an appropriate local weather dissemination system or the base weather shop.

6.6.5. A dedicated SOF vehicle, if used, must have a flightline clearance and be equipped with a radio capable of contacting unit aircraft and ATC.

6.6.6. Locally developed checklists may be used to detail normal and emergency procedures. Required SOF checklist items are listed in **paragraph 6.8**

6.6.7. FOAs will specify what publications are required to be maintained in the SOF library.

6.6.8. Binoculars must be immediately available to the SOF when in the control tower, RSU/ RMU or SOF vehicle.

6.7. SOF Training Program.

6.7.1. All SOFs will complete a formal training program. **(T-3). Exception:** the FOA may waive training requirements for individuals previously qualified as AFMC SOFs.

6.7.2. SOF's must possess a valid flightline driver's license when operating a vehicle on the flightline. **(T-3).**

6.7.3. Unit commanders determine who may be entered into SOF training. SOF candidates should be AFMC or DoD contractor pilots/navigators with proven maturity, judgment, and supervisory ability. They must be qualified in a unit aircraft. **(T-3).**

6.7.4. SOF training involves becoming familiar with airfield procedures, primary and alternate duty locations, equipment, and local support agencies. The training program should emphasize operating procedures and available resources, specifically capabilities and limitations. Include the following areas in the training program:

6.7.4.1. Weather (to include forecaster duties/priorities).

6.7.4.2. Approach control.

6.7.4.3. Tower.

6.7.4.4. Crash/Fire/Rescue.

6.7.4.5. Explosive Ordnance and Hazardous Materials.

6.7.4.6. Base Ops.

6.7.4.7. Command Post.

6.7.5. The SOF trainee will accomplish, as a minimum, one supervised tour (minimum of two hours) with a current and qualified SOF. **(T-3).** This tour should include the following:

6.7.5.1. Operation of all SOF equipment/radios.

6.7.5.2. Contact procedures for aircraft and support agencies.

6.7.5.3. A review of publications and checklists available to the SOF.

6.7.5.4. Operation of SOF vehicle (if applicable).

6.7.5.5. A familiarity tour of the airfield and discussion of frequently used travel routes.

6.7.5.6. When acting as primary SOF, the trainee should demonstrate successful handling of an IFE (actual or simulated).

6.7.6. When a SOF's training is complete the trainee must be interviewed and designated in writing for SOF duty by the FOA before that individual performs unsupervised tours.

6.8. SOF Procedural/Emergency Checklists. The SOF must have access to a procedural checklist, **(T-3).** The format of the checklist is at the discretion of the SOF OPR. The checklist should address the following items (as applicable to unit operations):

6.8.1. Opening, Changeover, and Closing.

6.8.2. FOA notification.

6.8.3. Aircraft emergency.

6.8.4. Barrier engagement.

6.8.5. Weather recall.

6.8.6. Emergency divert.

6.8.7. Change of runway.

6.8.8. Runway closure.

6.8.9. Anti-hijack.

6.8.10. Communications search/overdue aircraft.

6.8.11. Aircraft dispersal.

6.8.12. Controlled bailout/aircraft crash.

6.8.13. Hung ordnance.

6.8.14. Bird condition.

6.8.15. Controlled jettison.

6.8.16. Hydrazine spill/exposure.

6.8.17. Hot brakes.

6.8.18. CONFERENCE HOTEL (Contractor/depot emergency telephone numbers).

6.8.19. Phone List (e.g., telephone numbers for local flight service, terminal radar facility, etc.).

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

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AFMC Form 73, *AFMC Waiver and Approval Request*

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

DD Form 365-4, *Weight and Balance Clearance Form F*

DD Form 1748, Joint Airdrop Inspection Record (Platforms)

Abbreviations and Acronyms

A/A—Air-to-air

AC—Aircraft Commander

ACBT—Air Combat Training

ACF—Acceptance Check Flight

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFMC—Air Force Materiel Command

AFRC—Air Force Reserve Command

AFSOC—Air Force Special Ops Command

AFTO—Air Force Technical Order

AFTTP—Air Force Tactics, Techniques, and Procedures

AGL—Above Ground Level

AGCAS—Auto Ground Collision Avoidance System

AHM—Aircraft Handling Maneuvers

AoA—Angle of Attack

AOL—Aircraft Operating Limits

A/R—Air Refueling

ARMS—Automated Records Management System

ASR—Airport Surveillance Radar

ATC—Air Traffic Control

CC—Commander

CFL—Critical Field Length

CFPS—Combat Flight Planning System

CG—Center of Gravity

CONV/VTOL—Conventional airplane mode/Vertical Takeoff/Landing mode

CSO—Combat Systems Officer

CTF—Combined Test Force

DA—Decision Altitude

DAFIF—Digital Aeronautical Flight Information File

DCMA—Defense Contract Management Agency

DH—Decision Height

DoD—Department of Defense

DZ—Drop Zone

EOD—Explosive Ordinance Disposal

EP—Emergency Procedure

ERCC—Engine Running Crew Change

ESA—Emergency Safe Altitude

FCAGS—Full Coverage Anti-G Suit

FCF—Functional Check Flight

FCIF—Flight Crew Information File

FL—Flight Lead

FLIP—Flight Information Publications

FOA—Flight Operations Authority

FOD—Foreign Object Damage

FTT—Flight Test Technique

GPS—Global Positioning System

GW—Gross Weight

HAA—Height Above Aerodrome

HAT—Height Above Touchdown

HF—High Frequency

HUD—Heads-up Display

IAF—Initial Approach Fix

IFF—Identification Friend or Foe

IFR—Instrument Flight Rules

ILS—Instrument Landing System

IMC—Instrument Meteorological Conditions

INS—Inertial Navigation System

IR—Instrument Route

IP—Instructor Pilot

JMPS—Joint Mission Planning System

KIAS—Knots Indicated Airspeed

KTAS—Knots True Airspeed

LASDT—Low Altitude Step Down Training

M&S—Modeling and Simulation

MAJCOM—Major Command

MAP—Missed Approach Point

MC—Mission Commander

MD—Mission Design

MDA—Minimum Descent Altitude

MDS—Mission Design Series

MEL—Minimum Equipment List

MEP—Mission Essential Personnel

MESP—Maintenance Engineering Support Personnel

MFM—Modification Flight manual

MOA—Military Operating Area

MP—Mission Pilot

MSA—Minimum Safe Altitude

MSL—Mean Sea Level

MTR—Military Training Route

N/A—Not Applicable

NM—Nautical Miles

NOTAM—Notice to Airmen

NVG—Night Vision Goggles

OCF—Operational Check Flight

OG—Operations Group

OG/CC—Operations Group Commander

OSO—Offensive Systems Officer

OCONUS—Outside Contiguous United States

PAR—Precision Approach Radar

PF—Pilot Flying

PDM—Programmed Depot Maintenance

PFPS—Portable Flight Planning Software

PIC—Pilot in Command

PNF—Pilot Not Flying

RCO—Range Control Officer

RCR—Runway Conditions Reading

RNAV—En route Area Navigation

RPA—Remotely Piloted Aircraft

RTB—Return to Base

RVR—Runway Visual Range

SAR—Search and Rescue

SARCAP—Search and Rescue Combat Air Patrol

SEFE—Standardization Evaluation Flight Examiner

SFO—Simulated Flame Out

SID—Standard Instrument Departure

SMA—Special Mission Aviator

SOF—Supervisor of Flying

SRB—Safety Review Board

SSE—Simulated Single Engine

SUA—Special Use Airspace

TA—Terrain Avoidance

TAS—True Air Speed

TF—Terrain Following

TOLD—Takeoff Landing Data

TPS—Test Pilot School

TSM—Time Safety Margin

UHF—Ultra High Frequency

USAF—United States Air Force

VFR—Visual Flight Rules

VHF—Very High Frequency

VMC—Visual Meteorological Conditions

VR—VFR Military Training Route

WSO—Weapons Systems Officer

Terms

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.

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, actual weapons delivery, simulated weapon delivery (other than level), tactical/air combat operations, envelope expansion test points, and any aerial demonstration. NVG wear in and of itself does not constitute a critical phase of flight.

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.

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.

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.

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.

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 FOA.

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/terrain (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 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. 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.

OG/CC—The operations group Commander or equivalent authority having flight operations authority (FOA). See AFI 11-401 AFMC SUP.

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

Remotely Piloted Aircraft—Full scale (e.g., MQ-9, RQ-4, YQ-11) aircraft primarily controlled by a pilot outside of the 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.

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.

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.

Attachment 2

A-10 OPERATING PROCEDURES

A2.1. General Information. This attachment governs A-10 operations.

A2.2. Normal Operating Procedures. Aircraft normal operating procedures are in accordance with AFMAN 11-2A-10CV3 Chapter 3. **Exception:** FOA is the waiver authority for RCR below 12 operations.

A2.3. Instrument Procedures. Instrument procedures are in accordance with AFMAN 11-2A-10CV3 Chapter 4.

A2.4. Abnormal Operating Procedures. Abnormal procedures are in accordance with AFMAN 11-2A-10CV3 Chapter 7. **Exception:** Simulated single engine landings (full stop and touch-and-go) are prohibited. **(T-2).**

Attachment 3

B-1 OPERATING PROCEDURES

A3.1. General Information. This attachment governs B-1 operations.

A3.2. Normal Operating Procedures. Aircraft normal operating procedures are in accordance with AFI/AFMAN 11-2B-1V3 Chapter 3.

A3.2.1. 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.

A3.2.2. Publications. Aircrew will carry on board for each flight, at a minimum, one full copy of TO 1B-1B-4, *Flight Manual Supplement CITS Operator USAF Series B-1 Aircraft*, and Section III of TO 1B-1B-1, *Flight Manual USAF Series B-1 Aircraft.*

A3.3. Instrument Operating Procedures. Aircraft instrument procedures are in accordance with AFI/AFMAN 11-2B-1V3 Chapter 4.

A3.4. Aircrew and Aircraft Operational Limits and Restrictions. Aircraft operational limits and restrictions are in accordance with AFI/AFMAN 11-2B-1V3 Chapter 7.

A3.4.1. Low altitude. **Note:** Lead MAJCOM no longer trains or executes low altitude flight.

A3.4.1.1. AFMC is exempt from lead MAJCOM low altitude restrictions.

A3.4.1.2. Low Altitude Charts. On low altitude training flights, one member of the pilot team, the offensive systems officer (OSO) and defensive systems officer (DSO) will carry a chart. The chart will be of scale and quality that terrain features, hazards, noise sensitive areas, and chart annotations are of sufficient detail to allow individual navigation and safe mission accomplishment. Annotate charts with noise sensitive areas, location and dimensions of Class B/C/D airspace, civil/military airfields, and other potential high-density traffic areas (e.g., parachute activity areas and ultra-light/hang glider/glider sites, etc.) within 5 nautical miles of any planned VFR route or airspace boundary. Applicable airfield approach control frequencies in the vicinity of class B, C, and D airspace will be annotated and briefed on all such flights. In addition, annotate and brief the intersection of crossing instrument flight rules military training routes (IR) and visual flight rules military training routes (VR) as applicable and other possible areas of conflict. Review pilot's and weapon system officer's low altitude charts for compatibility and accuracy.

A3.4.1.3. IR training activity:

A3.4.1.3.1. Scheduling. Comply with the scheduling requirements of the route originating/scheduling activity. Confirm entry tolerances with the scheduling agency. If the originating/scheduling activity does not provide entry tolerances aircrew will enter only at scheduled time ±2½ minutes. If the aircrew cannot make the scheduled entry within ±2½ minutes, they may use subsequent primary or alternate entry points/times provided the airspace has been scheduled and briefed.

A3.4.1.3.2. Instrument routes are one-way. While flying IR do not turn more than 90 degrees off of route centerline.

A3.4.1.4. Minimum low altitudes. Visual contour flight is restricted to 300 feet AGL. Terrain following (TF) is restricted to 200 feet AGL. Minimum altitudes for military training routes in FLIP AP/1B, *Military Training Routes*, and those provided by the local airspace managers at the originating activity will take precedence if higher than the altitudes listed above.

A3.4.1.5. Minimum weather for visual contour (and TF when aircrew are not night/IMC TF certified) is limited to daytime only with minimum weather of 1,500 foot ceiling and 5 miles visibility (or higher as defined in FLIP AP/1B). TF operation above cloud decks in VMC conditions is not restricted.

A3.4.1.6. Do not use offensive radar set (ORS) quiet mode during night/IMC below 5,000 feet AGL.

A3.4.1.7. Do not initiate the penetration to low altitude or continue low altitude training if any of the following conditions exist:

A3.4.1.7.1. Any flight control system malfunction denies the pilot a safe margin of control.

A3.4.1.7.2. Loss of real beam ground map (RBGM) and high resolution ground map (HRGM), during IMC. Aircrew may perform RBGM and HRGM off/out operations during VMC only. During night VMC, climb to MSA until radar malfunction is corrected.

A3.4.1.7.3. Loss of INS(s) during night/IMC. Aircrew may operate INS(s) off/out during day VMC.

A3.4.1.7.4. Loss of avionics control unit complex (ACUC) during night/IMC. Aircrew may perform ACUC off/out low altitude operations during day VMC while attempting to recycle the ACUC.

A3.4.1.7.5. Either the OSO or DSO does not have a single, operable, multi-function display (MFD).

A3.4.1.7.6. Loss of all attitude reference systems (gyro stabilization system (GSS) and INS). Both aft station attitude indicators must be fully operational for low altitude operations during night/IMC.

A3.4.1.7.7. Loss of all radar altimeter channels. Aircrew may continue low altitude activity at MSA.

A3.4.2. Pilot in Command will brief the effects of heavy gross weight patterns/landings prior to every sortie. Aircrew will attempt to accomplish pattern and landings below 250K pounds. At gross weights greater than 250K pounds, limit transition work to that which is necessary for priority training/currency. **Exception:** AFMC is exempt from lead MAJCOM gross weight landing restrictions.

A3.4.3. Instructor pilots are qualified to fly all emergency patterns listed in 11-2B1-V3 **Table 6.2** to include those restricted to FTU IP and FIC IP supervision.

Attachment 4

B-2 OPERATING PROCEDURES

A4.1. General Information. This attachment governs B-2 operations.

A4.2. Mission Planning. If the interval from the initial briefing to takeoff exceeds 72 hours, a complete review and briefing must be re-accomplished.

A4.3. Normal Operating Procedures. Aircraft normal operating procedures are in accordance with AFI/AFMAN 11-2B-2V3 Chapter 3.

A4.3.1. Induction Icing Ground Operations. If the ice detection system indicates ice or ice is noticed on the inlet areas, shutdown the engines as soon as possible minimizing throttle movement. The risk of engine foreign object damage (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.

A4.3.2. Unless a flight test requirement exists, do not takeoff if any of the following conditions exist:

A4.3.2.1. Standing or pooled water on the runway. **(T-3).**

A4.3.2.2. The computed takeoff roll exceeds 80% of the available runway unless waived by FOA. **(T-3).**

A4.3.2.3. The tailwind exceeds ten knots unless waived by FOA.

A4.3.2.4. Any attitude indicator, heading indicator, or standby instrument is inoperative. **(T-3).**

A4.3.2.5. One or more engines are inoperative from the start of takeoff roll. **Exception:** Emergency evacuations with the approval of the wing commander or AFMC/A3. Under no circumstances should a crew takeoff with a computed takeoff distance that exceeds 95 percent of runway available. **(T-3).**

A4.3.2.6. Over any raised web barrier. **(T-3).**

A4.3.2.7. Do not start takeoff roll prior to approach end cables. **(T-3).** Takeoffs accomplished beyond approach-end cables are permitted provided at least the minimum runway length specified in **Chapter 2** is available beyond the cable.

A4.3.3. Takeoff rated thrust and FOA approval is required when critical field length is computed to be greater than 80% of the available runway. **(T-3).**

A4.3.4. Discontinue air refueling after loss of all tanker disconnect capability, except during the following conditions:

A4.3.4.1. Emergency fuel situation or emergency evacuation. Limit contact time to that required to obtain fuel. **(T-3).**

A4.3.4.2. Flight test mission warranting the increased risk as agreed upon by the test director and aircraft commander. It must be accomplished under IP supervision. **(T-3).** Limit contact time to that required to obtain fuel. **(T-3).**

A4.3.5. Visual observation position. Using quick-flow procedures from the ATP 3.3.4.2., the route/visual observation position may be used to expedite day, VMC A/R 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.

A4.3.6. Traffic pattern and landing maximum gross weight is 311,500 pounds. No FOA approval required for full stop landings at gross weights over 285,000 pounds.

A4.3.7. Chase formation and procedures. As required.

A4.4. Instrument Operating Procedures. Aircraft instrument procedures are in accordance with AFI/AFMAN 11-2B-2V3 Chapter 4.

A4.5. Aircrew and Aircraft Operational Limits and Restrictions. Reference AFI/AFMAN 11-2B-2V3 Chapter 5 for aircrew and aircraft operational limits and restrictions.

A4.5.1. Brake and nose wheel steering malfunctions. Do not taxi the aircraft with a brake system malfunction. **(T-3).** 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. **(T-3).** 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.

A4.5.2. Practice unusual attitude recoveries are prohibited in flight. **(T-3).**

A4.5.2.1. 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.

A4.5.2.2. 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.

A4.5.3. Do not accomplish breakaway training while in contact. **(T-3). Note:** See **paragraph 3.7.3** in 11-2B-2.

A4.5.4. Boom envelope demonstrations require IP supervision. **(T-3). Note:** See **paragraph 3.7.4** in 11-2B-2.

A4.6. Air-To-Surface Weapons Employment. Reference AFI/AFMAN 11-2B-2V3 Chapter 6.

A4.6.1. While carrying weapons, do not conduct simulated bomb runs, unusual maneuvers (unless necessary for flight test), or other potentially hazardous activity. **(T-3).** 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).

A4.6.2. 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). **(T-3).**

Attachment 5

B-52 OPERATING PROCEDURES

A5.1. General Information. This attachment governs B-52 operations. **Note:** Deviations from lead MAJCOM guidance are authorized when in accordance with an approved test and safety plan.

A5.2. Normal Operating Procedures. Aircraft normal operating procedures are in accordance with AFMAN 11-2B-52V3 Chapter 3 with the following additions.

A5.2.1. Low altitude operations will be no lower than 500 feet AGL/ASL. **(T-3).** Aircrew qualified in low altitude step-down training will fly no lower than 200 feet AGL/ASL.

A5.2.2. Aircrew may use the terrain avoidance system for situational awareness during day VMC conditions.

A5.2.3. When AHAS risk is moderate, limit low altitude, high-speed events (i.e., low-level navigation, air-to-surface weapons delivery, terrain following/terrain avoidance) below 3,000 feet to only those required for syllabus training, currency, approved flight test events, or accomplishment of FCFs.

A5.2.4. Fuel Minimums. In addition to the fuel requirements listed in **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, then minimum fuel reserve is 54,000 pounds.

A5.3. Instrument Operating Procedures. Aircraft instrument procedures are in accordance with AFMAN 11-2B-52V3 Chapter 4.

A5.4. Operational Limits and Restrictions. Aircraft operational limits and restrictions are in accordance with AFMAN 11-2B-52V3 Chapter 7, with the following additions.

A5.4.1. Initial buffet may be accomplished without IP supervision by FCF qualified aircraft commanders as part of an FCF profile provided all other restrictions are met.

A5.4.2. Simulated emergency and transition limitations.

A5.4.2.1. A simulated engine loss on takeoff may be conducted in conjunction with a simulated six engine landing, provided all other restrictions are met.

A5.4.2.2. Flaps up touch-and-go landings may be accomplished by qualified pilots at gross weights up to 270,000 pounds on a 2.5° approach or 250,000 pounds on a 3° approach.

A5.4.2.3. Initial buffet/approach to stall is permitted with internal and/or external stores when stores are pinned and uncarted in accordance with an approved test and safety plan.

A5.4.2.4. Bomb doors may be opened in flight concurrent with internal carriage for other than release when over a test range and on approved test and safety plan.

A5.4.2.5. Touch-and-goes with internal and external stores are approved when pinned and uncarted in accordance with an approved test and safety plan.

A5.4.2.6. High Altitude chart requirements as stated in the 11-2B-52V3 may be satisfied by carriage of a current EFB.

Attachment 6

C-5 OPERATING PROCEDURES

A6.1. General Information. This attachment governs C-5 operations.

A6.2. Mission Planning.

A6.2.1. An approved test plan directing specific fuel loads shall take precedence over standard fuel planning procedures. **(T-3).**

A6.2.2. The flight engineer performing scanner duties is responsible for completing the DD Form 365-4, *Weight and Balance Clearance Form F*, when a loadmaster is not on board or one has not been provided through other means (i.e., canned DD Form 365-4, etc.).

A6.3. Normal Operating Procedures. Aircraft normal operating procedures are in accordance with AFMAN 11-2C-5V3 Chapter 4 with the following exceptions:

A6.3.1. MA-1 Portable Oxygen Bottles. The flight engineer will ensure a minimum of two unmodified/modified bottles are installed on the aircraft. **(T-3).** During preflight, ensure at least one unmodified/modified bottle is placed on the flight deck, forward of the #1 escape hatch and one unmodified/modified bottle is placed in the center of the cargo compartment. In the event that the crew consists of loadmasters, the aircraft commander should ensure a minimum of four unmodified/modified bottles are installed on the aircraft.

A6.3.2. Passenger Procedures. When Loadmasters are not a part of the crew complement, 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 with a 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 to perform only passenger-related duties. **(T-3).**

A6.3.3. Passengers will not normally be carried in the troop compartment. If passengers are carried in the troop compartment, obtain qualified loadmasters and reference lead MAJCOM 11-2MDSV3 guidance for specific requirements.

A6.3.4. Cargo procedures. Cargo will not normally be carried. If cargo is carried, obtain qualified loadmasters and reference lead MAJCOM 11-2MDSV3 guidance for specific requirements. Parachute racks, survival equipment, a single B-1 stand, ballast for SCM-modified aircraft, and any small item(s) hand-carried by the crew are not considered cargo.

A6.3.5. Aircraft Recovery from Unprepared Surfaces. Aircrew will not attempt to recover an aircraft after inadvertent entry onto an unprepared surface not suitable for taxi unless directed to do so by the maintenance authority. **(T-3). Note:** Maintenance and ground crews will accomplish these types of aircraft recovery.

A6.4. Instrument Operating Procedures. Aircraft instrument procedures are in accordance with AFMAN 11-2C-5V3 Chapter 5.

A6.5. Operational Restrictions. Aircraft operational restrictions are in accordance with AFMAN 11-2C-5V3 with the following exceptions:

A6.5.1. Maneuvers typically performed for the flight test mission (i.e., 1-1-300, 1-C-5M-6CF, etc.), may be accomplished by FCF certified aircrews and non-FCF aircrew members under the direct supervision of an FCF instructor pilot or instructor flight engineer for training, proficiency, and FCF certification within an airworthy aircraft, approved flight simulator, or +OPS, O8F, O6, O3 coded AFMC C-5 missions.

A6.5.2. Do not practice training maneuvers when any actual emergency exists. **(T-3).**

A6.5.3. Approach to stall training. All practice approach to shaker onset/audible warning must be done in day VMC only conditions and at an altitude greater than 10,000 feet AGL with an instructor pilot in a pilot seat. **(T-3).**

A6.5.4. For practice approach to shaker onset, recover the airplane at shaker onset or the lowest acceptable computed shaker onset airspeed, whichever occurs first. **(T-3).**

A6.5.5. For practice approach to audible warning, recover the airplane at audible warning or the highest acceptable computed audible warning AoA, whichever occurs first. **(T-3).**

Attachment 7

C-9B OPERATING PROCEDURES

A7.1. General Information. The combination of this attachment, the Naval Air Training and Operating Procedures Standardization (NATOPS) flight manual, and the minimum equipment list, provides aircrew basic operating procedures for the C-9B aircraft. Test procedures not covered by the flight manual or this AFMAN shall be approved through the standard test-safety readiness review board or flight manual waiver processes.

A7.2. Mission Planning.

A7.2.1. The minimum crew for the C-9B is a pilot and copilot. **(T-2).** Either pilot may accomplish pilot flying (PF) or pilot not flying (PNF)/pilot monitoring (PM) duties. The PIC will ensure all NATOPS loadmaster-specified duties, including door arming and disarming, are completed. **(T-3).**

A7.2.2. A test conductor (TC) or test director (TD) will be included in the crew composition as required for test operations and test card execution. **(T-3).**

A7.3. Mission Guidance.

A7.3.1. Aircraft systems operations. Reference aircraft MEL when assessing inoperative equipment. **Note:** See **paragraph 2.14** for MEL waiver authority.

A7.3.2. Landing Gear and Flap Operations. The PF will command gear and flap operations and the PM will activate the systems. **(T-3).** The PNF will acknowledge the command prior to system activation. **(T-3).**

A7.4. Instrument Procedures. The C-9B is approach category C and is cleared to CAT I minimums not lower than 300 feet and one mile.

A7.5. Operating Procedures and Restrictions.

A7.5.1. Briefs. The PF will give a departure, takeoff, and approach briefing. **(T-3).** Reference **paragraph 4.5** for briefing items.

A7.5.2. Advisory Calls. The PF will announce changes to the level of automation as well as flight director and autopilot mode selections. The PM will make all updates to the FMS, altitude alerter, and other such items when the autopilot is not engaged. PF must affirm all changes made by the PM for correctness. **(T-3).**

A7.5.3. Standard takeoff procedures.

A7.5.3.1. Speed setup: V1 (white), VR (no bug), V2 (salmon bug), min slat retract (white), clean maneuver (white).

A7.5.3.2. When clear for takeoff: Nosewheel light on; complete 4’s check- EPR 1.4, N1 less than 74, EGT less than 400, FF less than 4000, N2 less than 84.

A7.5.3.3. At 60 KIAS, PM calls “power set N1 crosschecked”.

A7.5.3.4. At 80 KIAS, PM calls “thrust normal”.

A7.5.3.5. At decision speed, PM calls “V1”.

A7.5.3.6. At rotation speed, PM calls “rotate”.

A7.5.3.7. Once airborne, PF calls “positive rate” and “gear up”.

A7.5.3.8. Upon passing takeoff safety speed, PM calls “V2”.

A7.5.3.9. When safely airborne and climbing through 1,000 feet AGL, PF initiates AFE flap retraction and calls for the “after takeoff/climb checklist”.

A7.5.4. Abort procedures. If a takeoff abort is initiated, the PF shall perform the abort procedure. **(T-2).** Aircraft speed below 80 KIAS is considered a low speed abort and aircrew can abort for any reason. Aircraft speed from 80 KIAS to V1 is considered a high-speed abort and aircrew should review hot brake procedures once stopped/clear of the runway.

A7.5.5. Initiate after takeoff checklists at or above 1,000 feet AGL. **(T-3).**Wing lights should remain on until passing 10,000 feet MSL.

A7.5.6. Climb procedures. If aircraft takeoff weight is greater than 100,000 pounds, use the 320 knot/.74M climb schedule when below 10,000 feet MSL. If aircraft weight is less than 100,000 pounds, use the 290/.72M climb schedule. Both the PF and PM shall verbally acknowledge 1,000 feet and 500 feet above or below assigned altitude (e.g., “1000 to go”). **(T-3).** The PM should set all altitude setting, navigation aid, and frequency changes. The PF may assist the PM, as long as the autopilot is engaged and coupled. Regardless of who sets the altitude setting, both pilots will verbally confirm the new altitude.

A7.5.7. En route. If a pilot leaves the cockpit, the remaining pilot will update the returning pilot on any changes upon return to the cockpit. **(T-3).**

A7.5.8. Descent. Descent checklists should normally be initiated when passing through FL 180 or assigned cruise altitude, whichever is lower. When turning the engine and ALT/AUX hydraulic pumps on during the descent checklist, turn the ALT/AUX pumps on first to ensure these pumps are providing proper pressure. **(T-3).**

A7.5.9. Approach, and landing. Normally initiate the approach checklist at or prior to descending through 10,000 feet MSL. **Note:** The approach checklist should not be executed above 14,500 feet MSL due to the air-conditioning auto shutoff feature.

A7.5.9.1. Speed setup. Set the salmon bug to Vref and the white bug to Vref CONFIG.

A7.5.9.2. Callouts. The PM will make the following calls during the approach phase:

A7.5.9.2.1. “Five-hundred feet above minimums”. **(T-3).**

A7.5.9.2.2. “Approaching minimums”. **(T-3).**

A7.5.9.2.3. “Field in sight” when at or above MDA/DH and the field is in sight. **(T-3).**

A7.5.9.2.4. “Go around” when at MAP/DH and the field is not in sight. **(T-3).**

A7.5.9.3. The PM will monitor airspeed after the PF has visually acquired the runway and make applicable airspeed calls (e.g., “bug plus five”). **(T-3).**

A7.5.10. During right seat full stop landings, control of the aircraft shall be positively passed to the pilot in the left seat when the aircraft is at 60 knots or below and the thrust reversers are stowed. **(T-2).**

A7.5.11. On landing the PM shall call "Spoilers Deployed" or "No Spoilers" as appropriate. **(T-3).** If the spoilers do not deploy the PF should immediately deploy the spoilers manually. After the spoilers call, the PM should then make thrust reverser calls such as "two amber" and "two blue" and then call out the EPR readings. The PM should call out "100", "80", and "60" KIAS deceleration airspeeds.

A7.5.12. Communications. Limit conversation to that essential for crew coordination and mission accomplishment during taxi, takeoff, approach, landing, flight below 10,000 feet. **(T-2).**

A7.5.13. Touch-and-go-landings may be performed by pilots qualified in the basic aircraft from either seat. **Note:** The minimum runway length required for touch-and-go landings is 8,000 feet for full flap or 10,000 feet for partial flap configurations. **(T-3).**

A7.5.14. Training maneuver restrictions. **Table A7.1**, *Training Maneuver Restrictions*, lists the training maneuver restrictions and associated minimum altitudes. These restrictions apply unless deviations are approved in a test plan. **(T-3).**

Table A7.1. Training Maneuver Restrictions.

Simulated emergency on takeoff or on approach.	Initiate above 500 feet AGL.	For simulated engine failure on takeoff, pilot monitoring must guard the appropriate rudder.
Approach to stalls.	Above 10,000 feet AGL.	Limited to day VMC conditions. Do not accomplish unless required for FCF training, certification, or check flight accomplishment. **(T-3).**
Planned VFR go-arounds with simulated emergencies other than engine out.	Initiate above 100 feet AGL.	None.
Simulated landing.	Initiate above 50 feet AGL.	Limited to weather required for circling minimums.

A7.6. Prohibited In-Flight Maneuvers. Pilots shall comply with NATOPS guidance. **(T-2).**

Attachment 8

C-12 OPERATING PROCEDURES

A8.1. General Information. This attachment governs C-12 operations.

A8.2. Mission Planning.

A8.2.1. Conduct C-12 Paradrop mission briefings with a qualified jumpmaster.

A8.2.2. Instructor pilots may run engines and taxi the aircraft as a single pilot. FOA may approve individual basic aircraft qualified pilots for single-pilot ground operations. Document via MFR in training folder or on the letter of X.

A8.2.3. FOA approved tab data may be used when available.

A8.2.4. C-12 C/D/J runway available for takeoff must exceed accelerate-stop distance plus 500 feet, computed without reverse and corrected for RCR. On runways with a screen height requirement, runway available must also exceed accelerate-go[J]/accelerate after lift-off[C/D] computed to the specified screen height. **Note:** These minimums replace the command minimums established in **paragraph 2.12**

A8.2.5. Runway available for landing must exceed landing distance plus 500 feet, computed without reverse from a 50-foot obstacle and corrected for RCR. **Note:** These minimums replace the command minimums established in **paragraph 2.12**

A8.2.6. Minimum runway for a touch-and-go is 5,000 feet for the C-12C/D and 6,000 feet for the C-12J.

A8.3. Normal Operating Procedures. Aircraft normal operating procedures are in accordance with AFMAN 11-2C-12 Chapter 11.

A8.4. Chase Operations. Chase operations are defined as flights involving similar or dissimilar aircraft performing maneuvers from a route or trail position.

A8.4.1. Chase Restrictions.

A8.4.1.1. Day VMC only.

A8.4.1.2. No wing takeoff or landings.

A8.4.1.3. Minimum ATC wake turbulence criteria applies when chasing larger aircraft.

A8.4.1.4. Minimum lateral spacing is one-half the wingspan of the largest participating aircraft.

A8.4.2. Airdrop Procedures. The C-12C is authorized to airdrop personnel out of the rear main cabin entry provided the door is removed from the aircraft. The C-12J is prohibited from airdrop operations. **(T-3).**

A8.4.2.1. Maximum airspeed is 205 knots with the entry door removed. **(T-3).**

A8.4.2.2. Normal airdrop configuration is 40% flaps or 100% flaps and gear as necessary. Zero flaps may be used for dummy drops where faster airspeed is desired.

A8.4.2.3. Minimum airspeed is 100 knots with flaps 40% and 90 knots with flaps 100%. **(T-3).**

A8.4.2.4. A jumpmaster is required to be on board the aircraft. **(T-3). Note:** The jumpmaster may also be a jumper if part of the test parachute program.

A8.4.2.5. The minimum exit altitude for free fall is 2,500 feet AGL. **(T-3).**

A8.4.2.6. The minimum emergency exit altitude is 1,000 feet AGL. **(T-3).**

A8.4.2.7. Below 1,000 feet AGL all airdrop personnel will have lap belts securely fastened. **(T-3).**

A8.5. Operational Restrictions. Aircraft operational restrictions are in accordance with AFMAN 11-2C-12 Chapter 10.

A8.5.1. Unusual Attitudes. Perform unusual attitudes at an altitude that allows recovery not lower than 5,000 AGL and avoid exceeding bank angles of 60 degrees and pitch attitudes of + 25 degrees. **(T-3).**

A8.5.2. Approach to stall training. 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 feet AGL.

A8.5.3. Practice engine shutdown/restarts. Actual engine shutdowns and restarts for practice shall only be accomplished during training under an approved training syllabus or during FCF proficiency training. **(T-3).**

A8.5.4. Simulated engine failures immediately after takeoff shall only be initiated when the aircraft is above 200 feet AGL, above the safe single engine airspeed, and capable of meeting 200 feet/NM (or the published climb gradient if higher). **(T-3). Exception:** Initiating this event below 500 feet AGL is allowed when required by an approved test or a training plan event provided the aircraft has a positive rate of climb prior to initiating the simulated engine failure.

A8.5.5. Both MPs must be touch-and-go certified in order to perform actual touch-and-go events in the aircraft when a C-12 qualified IP or EP is not onboard. **(T-3)**

A8.6. USAF TPS Single Pilot Operations.

A8.6.1. USAF TPS Student and Staff CSOs and RPA pilots may occupy a pilot seat during critical phases of flight for curriculum, curriculum development and curriculum exposure flights. A second pilot is not required on these flights. A curriculum exposure flight is defined as a flight in which a staff aircrew member flies a sortie developed for TPS students.

A8.6.2. Restrictions.

A8.6.2.1. No passengers. **(T-2).**

A8.6.2.2. The single pilot must be a qualified instructor pilot (IP) flying from either the right or left pilot seat. **(T-2).**

A8.6.2.3. The rated CSO or rated RPA pilot must occupy the pilot seat not occupied by the IP during all critical phases of flight. **(T-2).**

A8.6.2.4. Flight must be conducted in day VMC. **(T-2).**

A8.6.2.5. No intentional touch-and-go or stop-and-go will be performed. **(T-2).**

A8.6.2.6. During critical phases of flight, the CSO or RPA pilot shall only control the aircraft within the constraints allowed for non-mandatory pilot positions in **paragraph 3.6** **(T-2).**

A8.7. Instrument Procedures. Aircraft instrument procedures are in accordance with AFMAN 11-2C-12 Chapter 12.

Attachment 9

C-17 OPERATING PROCEDURES

A9.1. General Information. This attachment governs C-17 operations.

A9.1.1. AFMC crews will carry publications in accordance with AFMAN 11-2C-17V3 section 5.2. **(T-3). Note:** When used, a minimum of two EFBs are required for flight. **(T-3).**

A9.1.2. When directed by lead MAJCOM guidance to consult C2 channels, AFMC crews will consult the FOA. **Note:** FOA may approve unit-specific C2 procedures.

A9.2. Operating Procedures. Unless listed below, aircraft operating procedures are in accordance with AFMAN 11-2C-17V3 Chapter 4.

A9.2.1. Buddy starts must be approved by the owning unit commander. **(T-3).**

A9.2.2. Lakebed runways operated by Edwards AFB are considered to be hard-surface runways and taxiways.

A9.2.3. Aircrew will adhere to the stabilized approach criteria and procedures referenced in AFMAN 11-2C-17V3 Chapter 4. **(T-3). Exception:** Aircrew are not required to make the mandatory callouts above 300 feet AGL on visual/tactical approaches. If the aircraft is not stable on a visual/tactical approach at 300 feet AGL, the PF will execute a go-around. **(T-3).**

A9.2.4. Chase, target support, and other visual formation operations are authorized with similar and dissimilar aircraft.

A9.2.5. Night vision device/night vision goggle (NVD/NVG) use.

A9.2.5.1. NVD/NVG use is permitted for takeoffs, landings, touch-and-goes, and airdrop if the crew is current and has completed the appropriate NVG training plan. **Exception:** Loadmasters will not use NVGs while conducting personnel airdrops. **(T-3).**

A9.2.5.2. NVD/NVGs may be used for night tanker rejoins up to the pre-contact position. NVGs will not be used inside the pre-contact position. **(T-3).**

A9.2.5.3. NVD/NVG approaches and landings to unlit runways are authorized.

A9.2.5.4. Maximum crosswind component for NVG touch-and-go landings is 25 knots.

A9.2.6. Airdrop.

A9.2.6.1. Airdrops to unmarked or unlit drop zones are authorized provided the following are met:

A9.2.6.1.1. Positive communication is established with the Drop Zone Controller or Drop Zone Safety Officer and drop clearance has been received. **(T-3).**

A9.2.6.1.2. A “no drop” signal is established and coordinated with the ground party in the event of lost communications. **(T-3).**

A9.2.6.2. Pilot-directed airdrops (PDA) are authorized provided the drop zone is visually acquired and both pilots determine that the load will land within the confines of the drop zone.

A9.2.6.3. Airdrops without automated (computer) logic are authorized provided the loadmasters and jumpers were thoroughly briefed on execution procedures before the flight.

A9.2.6.4. Consult AFI 11-409, *High Altitude Airdrop Mission Support Program*, for high altitude airdrop oxygen requirements (i.e., pre-breathe times, exposure limits, physiological technician (PT) requirements, and restrictions).

A9.3. Instrument Operating Procedures. Aircraft instrument operating procedures are in accordance with AFMAN 11-202V3 and AFMAN 11-2C-17V3 Section 5F–Arrival.

A9.3.1. Artificial vision restricting devices are not authorized for any phase of flight. **(T-3).**

A9.3.2. Simulated instrument flight may be flown and logged without the use of a vision-restricting device.

A9.4. Operating Restrictions and Training Limitations. Unless listed below, operating restrictions are in accordance with AFMAN 11-2C-17V3 Chapter 3 and training limitations are in accordance with AFMAN 11-2C-17V3 Chapter 7.

A9.4.1. C-17 Minimum Equipment List (MEL). See **paragraph 2.14** for guidance on applying the MEL published in AFMAN 11-2C-17V3, Chapter 3.

A9.4.2. AFMC is exempt from lead MAJCOM restrictions regarding passengers on training missions.

A9.4.3. AFMC is exempt from lead MAJCOM restrictions requiring an IP to directly supervise touch-and-go landings. Qualified mission pilots (MPs) may conduct touch-and-go landings, but will not instruct pilots of lower qualification on such maneuvers.

A9.4.4. Unscheduled air refueling is authorized at any time with the consent of both the tanker and receiver PIC.

A9.4.5. Aircrew is exempt from lead MAJCOM guidance prohibiting flight pilots (FPs) from practicing AAR with passengers on board. Flight pilots who have accomplished or are enrolled in the AAR training plan may accomplish AAR under the direct supervision of an IP at any time.

A9.4.6. Aircrew may fly lead MAJCOM prohibited flight maneuvers only when supporting an approved test plan, train-up for a test plan, or when required as part of an AFMC/A3V approved training plan. **Note:** FOA is the approval authority for authorizing lead MAJCOM prohibited maneuvers.

A9.4.7. Qualitative Evaluation Flights.

A9.4.7.1. Use the guidelines in the qualitative evaluation (qual-eval) review board (QRB) to conduct qual-eval flights. **(T-3).** Normal mission elements may be conducted under the supervision of a current and qualified IP. All other mission elements and FTTs must be conducted under the supervision of an IP who is a TPS graduate. **(T-3).**

A9.4.7.2. Landing gear and flap/slat operating policy. During qualitative evaluation flights with an unqualified pilot occupying one of the primary pilot positions, an IP may command and actuate all aircraft configuration changes.

Attachment 10

C-130 OPERATING PROCEDURES

A10.1. General Information. This attachment, in conjunction with other governing directives, outlines procedures for operation of the C-130 aircraft under most circumstances. AFMC aircrews and all management levels concerned with operation of all C-130 aircraft must comply with the outlined requirements and consult AFMC/A3V for waivers to this attachment.

A10.1.1. Crew Complement and Management.

A10.1.1.1. 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 (e.g., 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).

A10.1.1.2. Crew Complement. Crew complement for the C-130 is in accordance with **Table A10.1**

A10.1.1.2.1. The minimum crew in AFMC is:

A10.1.1.2.1.1. C-130H and derivative aircraft: pilot; copilot; and flight engineer, or as directed in the applicable aircraft T.O.

A10.1.1.2.1.2. C-130J and derivative aircraft: pilot, copilot, and loadmaster.

Table A10.1. Crew Complement.

	Basic		**Mission**		**FCF**	
C-130H and Variants	# Req'd	Note(s)	# Req'd	Notes(s)	#Req'd	Note(s)
Aircraft Commander	1		1		1	
Copilot						
Navigator/CSO	A/R	1	A/R	1	A/R	1
Flight Engineer	1		1		1	
Scanner/Loadmaster	A/R	2,3	1/2	4	1	2
Other Aircrew	A/R		A/R		A/R	
AC-130U (H plus)						
Gunner	1	5	5		1	5

FCO			1			
EWO						
TV						
IR						
AC-130W (H plus)						
CSO			1			
Gunner	1	5	2	6	1	5
EC-130H (H plus)						
AMT			1		1	5
EWO						
C-130J and Variants						
Aircraft Commander	1		1	4	1	7
Copilot						
Loadmaster						
MC or HC -130J (J plus)						
CSO			1		A/R	
AC-130J (J plus)						
CSO	A/R	1	A/R	1	A/R	1
WSO			1	8		
SO						
Gunner	1	5	3	5, 9	1	5

Notes:

1. When required for mission accomplishment. Required for low-level navigation unless waived by FOA. For over-water missions, see FLIP area planning.

2. An additional qualified aircrew member may perform scanner duties as authorized and required by the mission. FCF scanners must complete specific FCF scanner training.

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. **(T-3).** 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.

b) High altitude (up to 13,000 MSL) non-static line personnel are dropped from the ramp and door, or only one paratroop door is opened.

c) Dropping a single bundle using manual gate cut procedures.

d) Dropping training loads using Emergency Parachute Jettison System (EPJS) (C-130J Only).

e) Dropping only simulated airdrop training bundles (SATB).

f) A no-drop (dry pass only) is planned.

g) Conducting single hose refueling.

h) At Sq/CC discretion, an instructor loadmaster and student fulfills the two loadmaster requirement to drop unilateral training heavy equipment loads without the EPJS (C-130J and C-130J variants only). This note is not applicable to SMA's whose primary aircraft does not perform an airdrop mission.

5. An appropriately trained Loadmaster or Scanner may be substituted.

6. Comply with the following requirements during mission sorties:

a) Only one gunner is required during mission training sorties that will not conduct Common Launch Tube (CLT) installation/removal procedures or live fire any Gun Weapon Systems (GWS). **(T-3).** One gunner is authorized to configure GWS for motion, but will not place rounds in the GWS. **(T-3).**

b) Two gunners are required to conduct CLT installation/removal procedures or to

perform live fire operations when only one GWS will be utilized. **(T-3).**

c) Three gunners are required to perform live fire operations when utilizing multiple GWS. **(T-3).**

7. An additional aircrew member may be added to facilitate the FCF mission and document check results.

8. Either two WSOs or two sensor operators (SO) can be used. For dry fire tests, only one WSO or one SO is required.

9. For dry fire tests, only two gunners are required.

A10.1.2. Pilot Phase II training may be conducted on missions with passengers onboard only if the individual in training is basic aircraft qualified for the seat position occupied.

A10.1.3. Maintenance personnel 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.

A10.2. Mission Planning.

A10.2.1. Minimum Altitudes. See **paragraph A10.3.6** for guidance to compute all low-level related altitudes.

A10.2.2. Departure Planning. Use AFMAN 11-202V3 and this manual when planning an IFR departure.

A10.2.2.1. IFR Departures.

A10.2.2.1.1. AFMC/A3 authorizes reduced obstacle climb gradient takeoffs up to a gross weight (GW) which would, in the event of an engine failure, not lower the rate of climb to less than a 2.5 percent climb gradient (152 feet per NM).

A10.2.2.1.2. Critical Field Length (CFL). Takeoff GW must never exceed that which would require CFL in excess of the runway available for a normal takeoff. **Note:** N/A for Maximum Effort operations. Comply with MFLMETO guidance in the applicable T.O.

A10.2.2.1.3. If the requirements of AFMAN 11-202V3 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 feet/NM with all engines operating and 152 feet/NM (per **paragraph A10.2.2.1.1**) 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 AFMC/A3 authorizes use of the required climb gradient minus 48 feet/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 minimums only) then an IFR departure using those procedures is not authorized.

A10.2.2.1.4. 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 an IFR clearance can be obtained (i.e., ATC vectors).

A10.2.2.2. VFR Departures. VFR Departures shall not be flown in lieu of proper obstacle clearance planning. **(T-2).**

A10.2.2.2.1. VFR departures require detailed planning to ensure obstacles and high terrain is avoided. Conduct VFR operations only when required for mission accomplishment.

A10.2.2.2.2. Ensure the minimum climb gradient on four engines provides obstacles clearance along the planned departure route. **Note:** Use the climb out flight path -4 engines charts for this calculation.

A10.2.2.2.3. Engine-out climb gradient capability ensures that in the event of an engine failure, the planned departure or emergency return route provides obstacle avoidance. VFR departures must ensure they can vertically clear published IFR departure procedure restrictions along the planned departure route with one engine inoperative. **(T-3).** When departing VFR and unable to vertically clear published IFR departure procedure restrictions along the planned departure route with one engine inoperative, AFMC/A3 (as delegated) authorizes operations at or below an aircraft gross weight that enables a climb rate of at least 300 feet per minute on three engines at obstacle clearance speed. Use the takeoff gross weight limited by 3 engine climb performance charts for this calculation. **(T-3).** The pilot shall ensure pre-departure planning includes emergency return routing (if applicable) and a gross weight reduction plan (fuel dumping or cargo jettison) if applicable. **(T-3).**

A10.2.3. Flight Data Calculations.

A10.2.3.1. Computer Flight Plans. The authorized flight planning software for most C-130 variants is PFPS/CFPS/JMPS. If your aircraft is not supported by PFPS/CFPS, use a contractor-developed equivalent or compute the flight plan manually. **(T-3).**

A10.2.3.2. Refer to applicable 11-2MDS volumes for guidance for fuel planning when required for the mission.

A10.2.3.3. A C-130H (and variants) pilot or additional flight engineer must crosscheck the TOLD Card for accuracy by using the performance manual or approved tab data. **(T-3).** As a minimum, the person checking the data will:

A10.2.3.3.1. Verify gross weight independently from the TOLD Card. **(T-3).**

A10.2.3.3.2. Review and compare the computed distances or ground roll with the actual conditions, runway available, and departure procedures. **(T-3).**

A10.2.3.3.3. Crosscheck minimum control, takeoff, and landing speeds. **(T-3).**

A10.2.3.4. [C-130J and variants] Pilots will crosscheck the CNI-MU TOLD information for accuracy. **(T-3).**

A10.2.3.4.1. Verify gross weight independently from the entered value. **(T-3).**

A10.2.3.4.2. Verify the entered parameters and configurations. **(T-3).**

A10.2.3.4.3. Verify the correct speeds have been entered into the V SPEEDS page. **(T-3).**

A10.2.3.4.4. Review and compare the computed distances or ground roll with the actual conditions and runway available. **(T-3).**

A10.2.4. Runway and Taxiway Minimums. Minimum dimensions for aircraft operations are shown in **Table A10.2**

Table A10.2. Minimum Dimensions.

Parameter:	**Minimum Requirement:**
Taxiway width	30 ft.
Runway width	80 ft. for non-assault qualified crews 60 ft. for assault qualified crews **Note:** Both pilots must be assault qualified, or a non-qualified pilot must be under the direct supervision of an assault qualified IP.
Runway length (Normal T/O)	Critical Field Length (Balanced or Unbalanced for C-130H), or in accordance with **Table 2.1**, whichever is longer.

Runway length (Normal ldg)	Landing distance from 50 ft. over the threshold, plus 500 ft.* *For RVR(Vis) less than 4000m (3/4 mile): Add 1,000 ft. to landing distance
Runway length (Assault ldg)	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
Runway length (Assault T/O)	Charted Minimum Field Length for Maximum Effort Takeoff (MFL-METO) (corrected for one-engine minimum controllable airspeed (Vmca) if applicable), but not less than 3,000 ft. Takeoff at Vmca in ground effect or Vmeto, whichever is greater, unless actual obstacles are a factor. Vmca corrections may be disregarded while conducting approved test plan operations or while conducting approved assault takeoff/landing upgrade training
NVG Takeoff	Same as Normal or Assault T/O
NVG Landing (Normal)	Same as Normal Landing
NVG Landing (Assault)	Ground Roll plus 500 feet for marked touchdown (500 ft.) zones. Use Ground Roll plus 1,000 feet for unmarked zones or 1,000 ft. marked zones.

A10.2.5. Operations Over Runway Cables.

A10.2.5.1. Do not land on (touchdown on) approach end arresting cables (does not include recessed cables). **(T-3).** If the aircraft lands before the cable, contact the tower to have the cable inspected. **(T-3).**

A10.2.5.2. 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.

A10.2.5.3. Operations are authorized on runways where BAK-12 systems are installed, with a minimum of an eight-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 eight point tie-downs, aircrews should recognize the increased risk of damage to the aircraft.

A10.2.6. The LZ markings must be firmly established during mission planning and included in the aircrew briefing.

A10.2.7. Minimum Runway Condition Report (RCR). When no RCR is available, refer to the aircraft flight manual for standard conversions based on general runway condition.

A10.2.8. Reduced Power Operations for C-130H and variants are intended to prolong engine service life.

A10.2.8.1. During proficiency flights, TIT may not be less than 900 degrees C for takeoff, not to exceed 19,600 in-lbs. of torque. **(T-3). Note:** N/A for Series 3.5 engines.

A10.2.8.2. 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 briefed by the formation commander. **Note:** N/A for Series 3.5 engines.

A10.2.8.3. Set 970 degrees C TIT for -15 engines for climb power to cruise altitude unless mission requirements dictate otherwise, not to exceed 19,600 in-lbs. of torque.

A10.2.8.4. Use maximum power for max effort takeoffs (actual or simulated), not to exceed 19,600 in-lbs. of torque.

A10.2.9. The C-130 is a category III aircraft for turbulence. Additionally, AFMC applies the following guidance/restrictions:

A10.2.9.1. For Low Level Operations utilize turbulence category II criteria.

A10.2.9.2. Do not use the AFH 11-203V2, *Aircraft Turbulence Intensity Conversion Chart*, to downgrade severe turbulence for any flight regime.

A10.2.9.3. AF produced turbulence products are based upon category II aircraft. If referencing other products or reports, crews should confirm the type of aircraft the forecast turbulence applies to, or what type of aircraft reported the encounter, to gain a more accurate picture for their route of flight.

A10.3. Common Mission Guidance. Aircrew attached to AFSOC or AFSOC gained flying organizations will comply with AFSOC published guidance when flying sorties on an AFSOC Flight Authorization. **(T-2).**

A10.3.1. 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 of 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.

A10.3.2. Formation. Use 11-2MDS-specific guidance for tactical and special formation procedures. The most probable formation flown in AFMC is visual fluid trail. Maintain spacing as briefed or required to assure nose, tail and wing tip separation.

A10.3.3. NVG Operations. NVGs are approved for use during takeoffs and landings for properly qualified aircrew. 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 feet. contours for level/rolling terrain and in mountainous terrain.

A10.3.4. Airdrop Procedures. Use 11-2MDS-specific guidance for C-130 airdrop operations.

A10.3.4.1. Operate specialized airdrop equipment (test articles, etc.) in accordance with test plans and or locally approved procedures.

A10.3.5. Low-level Navigation. C-130 low-level operations are not held to LASDT constraints. Instead, if the crew member has received a 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.

A10.3.6. Minimum Altitudes.

A10.3.6.1. Day VMC en route. Plan a minimum of 300 feet AGL 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.

A10.3.6.2. Night VMC en route. (Non-NVG) Plan en route legs at an indicated altitude of 500 feet above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation), or 400 feet plus one chart contour interval above the highest depicted terrain contour, whichever is highest, within 3 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, complete the climb 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 en route altitudes. If the route has been planned on a JOG and night altitudes are verified, the route may be flown with the lower altitudes when flying with reference to a tactical pilotage chart (TPC).

A10.3.6.3. Night VMC (NVG). Plan a minimum of 300 feet AGL modified contour altitude above the terrain using visual references and radar altimeter. Minimum visibility is 3 NM.

A10.3.6.4. TF Operations. TF operations may be flown at any set clearance. Day/IMC and night VMC TF operations requires additional training. See AFMAN 11-2FT Vol 1, C-130 Attachment.

A10.3.6.5. 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. Climb to the 500 set clearance plane if a pilot must leave the seat during TF operations. Compute the MSA for each leg, route segment, or entire low-level route. Compute MSA the same as night (non-NVG) altitudes above.

A10.3.6.6. Minimum IMC En route Altitude. Compute minimum IMC en route 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.

A10.3.6.6.1. Use minimum altitudes for IFR operations within published Military Training Routes (MTRs) in US sovereign airspace as the computed leg MSAs unless a higher altitude is required by FLIP AP/1B.

A10.3.6.7. 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 10 NMs either side of the planned route centerline.

A10.3.6.7.1. Climbing to the ESA may put the aircraft in a controlled (i.e., IFR) altitude structure requiring coordination with air traffic control agencies.

A10.3.6.8. Pressure altimeters are calibrated to indicate true altitudes under international standard atmospheric (ISA) conditions. Any deviation from these standard conditions may 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.

A10.3.7. Chase Operations. C-130 aircrew are not normally required to maintain chase qualification.

A10.3.7.1. If the C-130 is required to fly as a test mission chase, the following restrictions apply:

A10.3.7.1.1. The C-130 acts as chase for another C-130.

A10.3.7.1.1.1. The aircrew shall be C-130 visual formation qualified. **(T-2).**

A10.3.7.1.1.2. Formation procedures are in accordance with this publication. Formation spacing will be no closer than 200ft. **(T-2).**

A10.3.7.1.2. If the C-130 aircrew is required to chase any other aircraft, complete chase qualification training in accordance with AFMAN 11-2FTV1 and comply with **Chapter 3** of this publication.

A10.3.7.1.2.1. Chase spacing will be no closer than 200ft. **(T-2).**

A10.3.7.2. If a specific test mission requires an aircraft to chase the C-130, the following restrictions apply:

A10.3.7.2.1. Prior to each chase sortie, supervisory personnel shall ensure the C-130 PIC and chase pilots are briefed on the mission content, restrictions, and responsibilities. **(T-3).**

A10.3.7.2.2. The C-130 and chase aircraft must maintain radio contact throughout the chase operation. **(T-3).**

A10.3.7.2.3. 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 should be defined in the test plan but may not be closer than 200ft. **(T-2).**

A10.3.7.2.4. Test plan execution dictates chase position.

A10.3.7.2.5. 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.). **(T-3).**

A10.3.8. Test Pilot School (TPS) Curriculum. Any curriculum profile must be flown in accordance with the procedures and limitations of the applicable C-130 and in accordance with all guidance in this manual. **(T-2).** An IP must be in the seat for all TPS curriculum events. **(T-2).**

A10.3.9. Use of Automation (C-130J). When automation is used (AFCS/FD and auto-throttles) the pilot flying normally initiates all AFCS/FD/auto-throttle inputs into the system. When hand flying the aircraft, the non-flying pilot normally makes the inputs.

A10.3.9.1. The flying pilot should exchange aircraft control for any duty that requires the flying pilot to be heads down for more than two CNI inputs.

A10.4. Instrument Procedures.

A10.4.1. Instrument Approach Procedures.

A10.4.1.1. The C-130 is normally a category C aircraft. If approach speeds exceed 140 knots, the minimums for category D are used.

A10.4.1.2. Circling Approach. If the circling minimums are not published by category, ensure the HAA and visibility are not less than the following:

A10.4.1.2.1. Category C - 500 feet – 1 ½ statute miles.

A10.4.1.2.2. Category D - 600 feet - 2 statute miles.

A10.4.1.3. 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.

A10.4.1.4. For precision radar approaches, minimum visibility is no lower than RVR 24 or ½ mile if RVR is not available. DH is based on an HAT of no less than 200 feet.

A10.4.1.5. Fly a precision approach, if available, at night and during marginal weather. If PAR, MLS, ILS, or LPV 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.

A10.4.1.6. C-130J aircrew are considered Special Authorization (SA) CAT I ILS qualified with a decision height (DH) as low as 150 feet and a visibility as low as RVR of 1,400 feet if qualified for Cat II ILS. The HUD requirements for SA C Cat I operations will be the same as CAT II operations. Use of the HUD is mandatory. **(T-2).** If the crew receives a CAT II unsafe annunciation above 300 feet AGL, they may elect to continue to the normal CAT I minimums to the same runway (no lower than 200 feet DH). If a CAT II unsafe annunciation is received below 300 feet AGL, the crew will immediately commence a go-around unless visual cues are sufficient to complete the approach to landing. SA CAT II ILS approaches are not authorized.

A10.4.2. Advisory Calls. C-130 crews will use the guidance below instead of the guidance provided in **Chapter 4**. The pilot flying should periodically announce intentions during departure, arrivals, approaches, and when circumstances require deviating from normal procedures. Mandatory advisory calls are: (**Note:** The pilot not flying the aircraft should make these calls except those designated for other crewmember.)

A10.4.2.1. 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” may state “REJECT” with a brief description of the malfunction.

A10.4.2.2. Takeoff aborts and landings. The Flight Engineer (non-flying pilot for C-130J) should state which power levers may be brought into reverse: “All 4”, “Inboards”, or “Outboards” as appropriate.

A10.4.2.3. Altitude calls:

A10.4.2.3.1. 1000 feet above initial approach fix (IAF) (or holding) altitude.

A10.4.2.3.2. Transition altitude/level.

A10.4.2.3.3. 1000 feet above/below assigned altitude.

A10.4.2.4. Approaches:

A10.4.2.4.1. Call 100 feet above procedure turn, final approach fix, MDA, or DH altitude.

A10.4.2.4.2. Non-precision approaches.

A10.4.2.4.2.1. “Minimums” when reaching MDA.

A10.4.2.4.2.2. “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.

A10.4.2.4.2.3. “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.

A10.4.2.4.3. Precision approaches.

A10.4.2.4.3.1. "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.

A10.4.2.4.3.2. "Land." Call at DH if runway environment is in sight and the aircraft is in a position for a normal landing.

A10.4.2.4.3.3. "Go-around." Call at DH if the runway environment is not in sight or anytime 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, a go-around must be initiated by 100 feet if a determination to land cannot be made.

A10.4.2.5. Deviations.

A10.4.2.5.1. The pilot not flying the aircraft should 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.

A10.4.2.5.2. Any crewmember seeing a variation of 200 feet altitude, a deviation of ±10 knots or a potential terrain obstruction problem should immediately notify the pilot. Deviations from prescribed procedures for the approach being flown should also be announced.

A10.5. Operating Procedures and Restrictions.

A10.5.1. Flight Duty Period (FDP). 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. Short duration engine shutdowns to facilitate test configurations (reposition ballast for CG requirements) are not limited in the three-sortie maximum. The maximum FDP for a basic aircrew (not augmented) is 16 hours. **(T-3).** All tactical (mission) events, FCF, proficiency training, or test events must be completed within the first 12 hours of the FDP. **(T-2).**

A10.5.2. 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.

A10.5.3. Aircraft commanders may authorize passengers access to the flight station during any phase of flight. Passengers are not be permitted access to any pilot position. **(T-2).**

A10.5.4. Personal Equipment Requirements.

A10.5.4.1. Parachutes and Survival Kits. AFMC aircraft are 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. The LPP or conventional BA-22 parachute may be worn when at or above 1000 feet AGL in lieu of a restraint harness when near an open exit and a harness is not available.

A10.5.4.2. Helmets and Oxygen Masks. Carry a personal helmet and oxygen mask anytime parachutes are required aboard the aircraft (to avoid head injuries during bailout).

A10.5.5. Cockpit Congestion and Loose Objects.

A10.5.5.1. During the flight, the number of persons on the flight deck shall be the minimum commensurate with mission requirements. **(T-2).**

A10.5.5.2. Ensure helmet bags and other personal gear is properly stowed to prevent obstruction of egress routes during emergencies.

A10.5.6. 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.

A10.5.7. Aircraft Lighting.

A10.5.7.1. Unless otherwise directed, the aircraft strobe lights are operated as follows:

A10.5.7.1.1. "Before Starting Engines" Checklist, "red" position.

A10.5.7.1.2. "Lineup" Checklist, "white" for day, night single-ship, and day formation. "Red" for night formation.

A10.5.7.1.3. "After Landing" Checklist, "red" position.

A10.5.8. Aircraft Servicing and Ground Operations.

A10.5.8.1. Aircraft Refueling. Non-essential crewmembers and passengers are not allowed on board.

A10.5.8.1.1. Simultaneous fuel and oxygen servicing is not authorized. Simultaneous fuel and cargo loading and maintenance actions are permitted in accordance with local procedures.

A10.5.8.1.2. For aeromedical evacuation, refer to 11-2MDS-specific guidance.

A10.5.8.1.3. Concurrent qualified ground crews may perform simultaneous refueling and cargo loading.

A10.5.8.1.4. 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.

A10.5.8.1.5. Use primary fuel management in accordance with the aircraft flight manual whenever practical.

A10.5.8.2. Fire Protection.

A10.5.8.2.1. The aircraft engine fire extinguisher system fulfills the minimum requirements for fire protection during engine start.

A10.5.8.2.2. A fire guard is required for all engine starts. In the absence of additional ground personnel, the ground controller or an additional crewmember may act as the fire guard.

A10.5.9. Life Support/Aircrew Flight Equipment Requirements.

A10.5.9.1. 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).

A10.5.9.1.1. 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 FL 250.

A10.5.9.1.2. 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. **(T-2).**

A10.5.9.1.3. Follow the guidance in AFI 11-409 for un-pressurized flights.

A10.5.9.1.4. 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. **(T-2).** Crewmembers will fit and adjust LPUs for over-water flights and will wear them on over-water missions below 2,000 ft AGL. **(T-2).** LPUs need not be worn for takeoffs, landings, or approaches.

A10.5.10. Communications.

A10.5.10.1. 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).

A10.5.10.2. Aircraft Interphone. Primary crewmembers shall monitor interphone during critical phases of flight. **(T-3).** All C-130J crewmembers should monitor VOX in addition to interphone/primary net during critical phases of flight. Crewmembers should advise the aircraft commander prior to checking off interphone.

A10.5.10.3. Command Radios:

A10.5.10.3.1. The pilot not flying the aircraft normally makes all air traffic control (ATC) radio calls.

A10.5.10.3.2. The pilot operating the radios will announce which radio is primary, and advise the crew when the primary radio changes. **(T-3).**

A10.5.10.3.3. One pilot records and acknowledge all ATC clearances. Another crewmember should monitor the read back and ensure compliance.

A10.5.10.3.4. Both pilots should monitor UHF guard (or VHF guard when appropriate) regardless of primary radio.

A10.5.11. Reverse Taxi.

A10.5.11.1. The pilot will coordinate reverse taxi directions and signals to be used with the scanner or loadmaster. **(T-3).**

A10.5.11.2. Secure all cargo and ensure all passengers are seated.

A10.5.11.3. Open the aft cargo door and lower the ramp to approximately 12 inches above horizontal.

A10.5.11.4. 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. **(T-3).**

A10.5.12. Engine Running On-load and Offload (ERO). Comply with published ERO checklists (when available in applicable Dash-1 operations) and the general guidance listed below. 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 are not normally 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.

A10.5.12.1. General Procedures.

A10.5.12.1.1. Aircraft commanders will brief crewmembers on the intended ERO operation. **(T-3).**

A10.5.12.1.2. The parking brake will be set and at least one pilot in the seat will monitor brakes, interphone, and radio. **(T-3).**

A10.5.12.1.3. The pilot will ensure the aircraft is depressurized and comply with guidance for emitters (STBY or OFF for items such as radar). **(T-3).**

A10.5.12.1.4. Use wing leading edge and taxi lights to enhance safety at night as the situation dictates.

A10.5.12.1.5. Station another crewmember on interphone or public address (PA) in the cargo compartment as safety observer. Safety observers will remain forward of all cargo. **(T-3).**

A10.5.12.1.6. 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.

A10.5.12.1.7. Do not move the aircraft until a “Clear to Taxi” call is received from the Loadmaster or other appropriate crewmember.

A10.5.12.2. Offload Preparation/Procedures. Connect aerial delivery support (ADS) arms in flight. Prior to landing, the loadmaster will brief all personnel in the cargo compartment regarding their locations, duties, and responsibilities during the ERO. **(T-3).**

A10.5.12.2.1. One tie-down device forward and aft will remain connected to vehicles until the aircraft is parked. **(T-3).**

A10.5.12.2.2. The crew will instruct vehicle operators and passengers to proceed directly aft of the aircraft at least 50 feet before turning and/or 300 feet before stopping. **(T-3).**

A10.5.12.3. Personnel on/offload through the aft cargo door and ramp.

A10.5.12.3.1. A crewmember must escort passengers when enplaning or deplaning through the aft door or ramp. **(T-3).**

A10.5.12.3.2. Auxiliary ground loading ramps should be used.

A10.5.12.3.3. Unless cargo size and location dictate otherwise, deplane passengers before cargo, and enplane after cargo.

A10.5.12.4. Personnel on-load and offload through the crew entrance door:

A10.5.12.4.1. Station a crewmember on interphone with cord held taut at approximately 20 feet at an angle of 45 degrees from the aircraft axis. **(T-3).**

A10.5.12.4.2. Brief deplaning personnel to secure loose articles and remain forward of the interphone cord.

A10.5.12.4.3. No enplaning personnel should approach the airplane until the crewmember is in place.

A10.5.13. Takeoff and Landing Guidance. An aircraft commander or higher (IP/EP) will occupy either the left or right seat during all takeoffs, landings, and critical phases of flight. **(T-2).** 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 will only takeoff or land from the right seat unless in upgrade status to MP/FP and under the direct supervision of an IP. **(T-3).**

A10.5.13.1. An instructor qualified pilot or aircraft commander will make all takeoffs and landings during:

A10.5.13.1.1. Aircraft emergencies. **(T-3).**

A10.5.13.1.2. Assault or substandard airfield operations. **(T-3). Exception:** Instructors providing upgrade training, receiving an evaluation, gaining currency, or proficiency.

A10.5.13.1.3. Situations when in the opinion of the aircraft commander, marginal conditions exist.

A10.5.14. Simulated Emergency Procedures.

A10.5.14.1. Perform 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.

A10.5.14.2. When conducting simulated engine(s) out training, the flight engineer will post actual charted minimum control speed on the TOLD card. **(T-3).** During simulated 3-engine takeoff operations, adjust takeoff speed for minimum control speed. The instructor pilot should strive to maintain zero to positive torque on the simulated shutdown engine(s). For the C-130J, reference the minimum control speeds through Tab data or the CNI. Minimize turns into the simulated inoperative engine(s) when possible.

A10.5.15. Prohibited In-flight Maneuvers. The following maneuvers will not be practiced or demonstrated in-flight:

A10.5.15.1. Rudder force reversals (fin stalls). **(T-2).**

A10.5.15.2. Spins. **(T-2).**

A10.5.15.3. Simulated runaway trim malfunctions. **(T-2).**

A10.5.15.4. Simulated hydraulic system loss by turning engine driven hydraulic pumps off (for simulated flight control malfunctions/degraded operations). **(T-2).**

A10.5.16. Flight Maneuvers. The maneuvers listed in **Table A10.3** are authorized for qualification and continuation training (or formal upgrade training where indicated). Certain maneuvers are only performed during formal training under direct IP supervision. They are applicable to all C-130 aircraft. Aircraft commanders should 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 discipline and common sense. Operational restrictions that require instructor supervision may be satisfied with the instructor observing the event over the shoulder. The instructor will be in the seat for all events that require direct instructor supervision. **(T-3).**

Table A10.3. Operational Restrictions.

Simulated Engine Failure	Direct IP supervision. Retard one throttle to flight idle at not less than VMCA (one-engine inoperative, out of ground effect) nor less than 300 feet AGL. WX at or above circling minimums during daylight and the greater of 1000‘ and 2 statute 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 or non-EP Engine Shutdowns	Direct IP supervision (Ground or In-Flight). In-Flight: Day VMC. Must remain above 2500 feet AGL. **Exception**: Complete actual engine shutdowns conducted under an approved test plan above 1000 feet AGL. Once the engine has been shut down, altitudes will be per

	the test plan.
No-Flap Landing	IP supervision. Max gross weight is 120,000 lbs. Max gross weight is 125,000 for AC-130U/W/J. 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. (Direct IP supervision).
Touch-and-Go Landings	Minimum runway length: flaps 50 percent / Flight Idle: 5000 feet – for all other: 6000 feet. Any MP/FP/CPs may conduct Flight Idle touch-and-go landings. 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, set all engines to 900 degTIT minimum (C-130H and variants).

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 engine failures emergencies. (Direct IP supervision) 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. (IP supervision)
Simulated Engine-out Go-around; Missed Approach	Direct IP supervision. Initiate simulated engine-out go around at no lower than 200 feet AGL or the minimum altitude for the approach.
Slow Flight Demonstration	Direct IP Supervision 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 (Training)	Direct IP Supervision. Authorized during formal upgrade training. Requires day VMC at a minimum of 5000 feet AGL or 5000 feet above cloud deck.

Stalls	The aircraft may be flown to aerodynamic stall (C-130H: G-break; intolerable buffet, roll off) or stick pusher activation (C-130J) for FCF, approved test plans, approved training plans, or FCF/FQHQ continuation training. Requires day VMC at a minimum of 5000 feet AGL or 5000 feet above a cloud deck. Continuation training stall entries are restricted to the following: 1)Flight idle with 0 degrees of bank and up to 3 KIAS/second deceleration rate; 2) Flight idle with up to 30 degrees of bank and 1 KIAS/second deceleration rate; or 3) Up to 1000 HP (C-130J) / 4000 inch-pounds torque (C-130H) with 0 degrees of bank and 1 KIAS/ second deceleration rate. Training events will not exceed 25 degrees nose high or less than 60 KIAS. **Note:** Direct IP supervision is required for power–on or turning stalls.
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 mission pilots , or instructors in either seat.
Windmill Taxi Start (Not for C-130J Operations)	Direct IP Supervision. 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	Direct IP Supervision. 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	Direct IP Supervision. 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-130U/W/J or EC-130H.
Simulated 2-Engine Out Landing	Direct IP Supervision. Simulate failure of the second engine at not less than 1,000 feet AGL and not more than 120,000 lbs (125,000 for AC-130 variants) 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	Direct IP Supervision. Authorized in day VMC conditions. Minimum altitude is 5,000 feet AGL. Do not initiate at less than 2-engine air minimum control speed. (C-130H).
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.
Unusual Attitudes and Spatial Disorientation	IP Supervision. Authorized no lower than 10,000 feet AGL. Day VMC conditions only. Do not exceed aircraft flight manual limitations.

A10.5.17. Radar Altimeter.

A10.5.17.1. Any crewmember detecting the illumination of the radar altimeter Low Altitude warning light (C-130J, Special Alert) will notify the pilot flying the aircraft. **(T-**

3). Terrain clearance and aircraft position must be verified. Aircraft commander will brief radar altimeter advisory calls for low-level flights. **(T-3).** Set no lower than 20% below en route altitude.

A10.5.17.2. The navigator/CSO and pilot must use the same radar altimeter setting unless briefed otherwise.

A10.5.17.3. [C-130H] Set the radar altimeter to the HAT/HAA during instrument approaches.

A10.5.17.4. [C-130J] Set the RADALT reference to HAT minus 50 feet for precision approaches.

A10.5.17.5. Two radar altimeters are required for C-130J CAT II ILS.

A10.5.17.6. [C-130J] Normally set the RADALT to 250 for non-precision approaches and 300 for circling approaches.

A10.5.17.7. The radar altimeter may be set at the pilot's discretion for VFR patterns.

A10.5.18. Chaff and Flare Operations. Conduct the following procedures after the live firing of chaff and flares:

A10.5.18.1. After landing, taxi to the de-arm area or another suitable safe location to check for hung ordnance.

A10.5.18.2. Any qualified crewmember must deplane and check all flare dispensers for hung ordnance. **(T-3). 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.

A10.5.18.2.1. ALE-40/47 or flare squibs that fail to fire are not considered hung ordnance.

A10.5.18.3. 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. **(T-3).** The aircraft must remain in the designated safe area until EOD personnel can clear all hung ordnance. **(T-3).**

A10.5.18.4. If hung ordnance is not found, the aircraft can proceed to the parking location.

A10.5.19. 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. **(T-3).**

A10.5.20. Touch-and-go Landings. Touch-and-go landings can only be performed by certified individuals. Refer to AFMAN 11-2FTV1 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 (C-130H and variants).

A10.5.21. Windmill Taxi Starts, Buddy Starts, and 3-Engine Takeoffs.

A10.5.21.1. Actual Windmill taxi and buddy starts, dictated by operational requirements, may be authorized by the OG/CC to meet specific mission requirements (N/A for C-130J).

A10.5.21.1.1. Windmill taxi starts, for training, may be accomplished during pilot proficiency training without further approval. Comply with all T.O. restrictions and those contained in this manual.

A10.5.21.2. Actual 3-Engine takeoffs require specific approval from AFMC/A3.

A10.5.22. Ground Proximity Warning System (GPWS)/Ground Collision Avoidance System (GCAS).

A10.5.22.1. For operations in day VMC conditions, with terrain and obstacles clearly in sight, the PF should call runway and/or terrain in sight, state intentions and visually clear terrain.

A10.5.22.2. 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. **(T-2). Warning:** failure to roll wings level during the maneuver described above decreases stall margin at heavy aircraft gross weights.

A10.5.22.3. Ensure the mode of the GPWS/GCAS is commensurate with the aircraft‘s phase of flight.

A10.5.23. 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 are the primary means of ensuring aircraft separation. Pilots shall not deviate from an assigned ATC clearance based solely on TA information. **(T-1).** 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 the airplane in response to a TCAS advisory. Advise ATC as soon as practical when a deviation becomes necessary due to a TCAS resolution advisory.

A10.5.24. Systems Operations Guidelines.

A10.5.24.1. Objectives.

A10.5.24.1.1. 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. ME designated items must be repaired or replaced prior to departure. **(T-3).**

A10.5.24.1.2. 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.

A10.5.24.2. Minimum Equipment List Guidance. **Table A10.4** through **Table A10.20** list the command operating 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 is 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.

A10.5.24.2.1. 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.

A10.5.24.3. Navigation Systems.

A10.5.24.3.1. 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.

A10.5.24.3.1.1. SCNS aircraft. Fully functional SCNS, to include the navigator/CSO IDCU and either the pilot or copilot IDCU.

A10.5.24.3.1.2. 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.

A10.5.24.3.2. 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.

A10.5.24.3.3. For flights on all other Category I routes, the aircraft commander determines the minimum navigational capability required to safely accomplish the mission.

A10.5.24.3.4. 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.

A10.5.24.3.5. Comply with all GATM requirements as directed (i.e., ILS FM immunity).

Table A10.4. Engines/APU/GTC.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Engines	4	4	Do not depart unless all four engines can achieve predicted minimum takeoff power.
Torquemeter (C-130H)	4	4	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	All 4 indications must be valid.
TIT Indicators	4	4	All 4 indications must be valid.
Fuel Flow Gages	4	4	All 4 indications must be valid.
Oil Temperature Gages	4	4	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. 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. 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.
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	
EIDS (Engine Instrument Display) (EC-130H AVP)	2	1	Flight may be continued to next repair facility as long as operable EIDS is in the Top Position (Isol DC).
Automatic Thrust Control System (ATCS) C-130J	1	1	
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 is 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. If the APU generator is inop, remove the generator prior to operation of the APU.
GTC	1	0	

Table A10.5. 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 (C-130H)	1	1	If the synchrophaser fails, the mission may continue to a repair facility provided no other portion of the propeller system is affected. Remove the synchrophaser.
Synchrophaser (C-130J)	1	0	
EPCS	4	4	

Table A10.6. Electrical System.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
AC Generators, Engine-Driven (**Note**)	4	4	
AC Generators, Engine-Driven (en route) (**Note**)	4	3	If a generator fails at an en route stop, flight to a destination with repair capability, including en route stops, may be made. If the AC generator is not equipped with a disconnect, remove it and pad the generator mount before flight.

AC Generators, Engine-Driven (Local training) (**Note**)	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 Unit (BSU)	2	1	The #1 BSU must be operational.
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.
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. Remove and pad the APU generator before operation of the APU.
DC Volt Meter	1	1	
RTRU (EC-130H AVP)	4	3	
Electronic Circuit Breaker Unit	13	13	C-130J Only. 16/16 required for Block 7.0/8.1
C-130J Indications (Systems Status Display)	5	5	All displays for both Loadmeter and Voltmeter indications are required.
Inverters (C-130J)	4	4	All versions of inverters are required.
Note: All associated equipment and indicators must be operational for each operative engine-driven AC generator. (i.e., generator control panel, GCU, voltage regulator, generator out/caution light, AC loadmeter, etc.). **(T-2).**			

Table A10.7. 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 is trapped if the second boost pump fails. Usable fuel will be reduced due to required fuel balancing with the opposite tank.
Main Fuel Quantity Indicator (en route) (**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. At en route stops when engines are shut down, dip check the tank with the inoperative indicator and the symmetrically opposite tank. Begin crossfeed operations when the symmetrically opposite quantity indicator has decreased to 1,500 lbs. (inboard) and 2,500 lbs. (outboard). For tanker aircraft (HC-130P/N) 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 shall not be conducted during tank to engine operations. **(T-2).** Flights consisting of multiple stops when the profile does not allow dipping the tanks will terminate with a minimum of 8,000 lbs. calculated main tank fuel. **(T-3).**

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. 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. Terminate the mission 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, place the tank on crossfeed until no pressure is obtained. Complete this prior to takeoff.

Auxiliary Tank Fuel Quantity Indicator	2	0	If the fuel quantity indicator is inoperative, verify fuel quantity using 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. Do not transfer fuel 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 A10.8. 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	
Booster System Hydraulic Pressure Indicator	1	1	
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	2	

Table A10.9. Anti-Ice/De-Ice System.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Ice Detection System	1	1	**Note:** 1.

Pitot Heat System	2	1(J) 2(H)	The associated pitot system is considered inop. Both pilots select the pitot static source with the operative pitot heat. Do not fly the aircraft in known or forecast icing conditions. **(T-2).** The aircraft is not allowed to be flown in reduced vertical separation airspace (RVSM) airspace if using a single pitot static system.
TAS Probe Heat	1	1	When Installed.
Total Air Temperature Sensor Anti-Icing System (C-130J)	2	0	**Note:** 1.
Wing/Empennage Anti- Icing System	2	2	**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	
Propeller Anti-Icing Systems	4	0	Propeller Anti-Icing/De-Icing must be operational for flight into known or forecast icing conditions. **(T-2).**
Propeller De-icing Timer Unit (C-130J)	1	0	**Note:** 1.
Windshield Anti-Icing Systems	2	2	**Note:** 1.
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 A10.10. Landing Gear/Brakes/Anti-Skid.

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 en route stops), provided the gear is not moved from the down and locked position. Flights (including en route stops) with the landing gear doors removed may be accomplished to a destination with repair capability (comply with flight manual restrictions).
Wheel Brakes	4	4	
Anti-Skid	1	1	The anti-skid may be inoperative for flight to a destination with repair capability, including en route 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. Assault landings with the anti-skid inoperative is not authorized.
Parking Brake	1	1	
Landing Gear Position Indicators	3	3	Soft panel may be used. Limited to one full stop landing (C-130J).
Landing Gear Warning Light (C-130J)	3	0	May be inoperative provided GCAS is installed and fully functional.
Landing Gear Warning System (C-130H)	1	1	Light and Horn must be functional.

Table A10.11. 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.

Cockpit Voice Recorder	1	1	If FDR (DFDR) is operable, flight to repair facility is authorized.
Emergency Locator Transmitter	1	1	
Underwater Acoustical Locator Beacon	1	1	
ACAWS or equivalent system	1	1	

Table A10.12. System Integration and Display (C-130J).

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
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 may be used as replacements or can be failed. 1, 2, 4, & 5 must be operational.
Bus Adapter Unit (BAU) Type II	4	4	
Bus Interface Unit (BIU)	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 A10.13. 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	
Nacelle Overheat System	4	4	
GTC/APU Fire Warning System	1	1	
Smoke Detector (C-130J)	4	1	The under flight deck detector must be operational.

Table A10.14. Air Conditioning, Pressurization and Bleed Air Systems.

Item/System	Installed	Operation	Remarks/Limitations/Exceptions

light 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 en route stops) may be accomplished. Brief passengers on the possibility that discomfort may be encountered. C-130H: 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.
Flight Deck Auxiliary Vent	1	1	
Cargo Compartment Auxiliary Vent	1	0	
Air Conditioning Temp Control Panel: C-130J Only	2	1	Loss of the 2nd Channel results in loss of all pneumatic-powered components and systems (except engine anti-ice).
Cargo Compartment Recirculation Fan	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 Valve (flight deck) C-130J Only	1	0	May be inoperative provided the divider valve 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	2	2	C-130J: One fan may be inoperative.
Cargo Comp Avionics Cooling Fans	2	1	
Overhead Console Cooling Fans C-130J Only	2	1	If both cooling fans fail in-flight, damage to HUDS may occur. Use flight displays as required. If HUDs are stowed, pull the associated circuit breaker 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	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 A10.15. 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	Turn needle may be inop provided no other malfunctions exist on either ADI.
Standby ADI (if installed)	1	1	
Standby Flight Instruments	1	1	Day VMC if inop.
Horizontal Situation Indicators	2	2	
EFI Displays (if installed)	4	3	The inop EFI must be in the copilot HIS position N/A: C-130J.
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.
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	

Table A10.16. Navigation Systems/Communications.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
ADC (C-130J)	2	1	Both must be operative for operations RVSM airspace.
Embedded Global Positioning/Inertial Navigation System (C-130J)	2	1	One may be inoperative provided no overwater flight, or BRNAV flight is conducted.
Total Air Temperature Sensor (C-130J)	2	2	
Standby magnetic Compass	1	1	
Heading Systems	2	1	

NAV Selector panel	2	2	
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 or CSO is not on board. A fully functional terrain following radar system is required for MC-130H TF operation at night or IMC.
IFF/SIF	1	1	As required for ATC and mission requirements (**Note 1**).
#1 UHF Manual Control Head Radio	1	1	SCNS Equipped Aircraft or AC-130U/MC-130H.
#1 VHF Radio (Isol DC Bus power)	1	1	KC-130F/R/T.
Get Home Radio Panel	1	0	One radio required. One time flight to repair facility 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	
MFD (EC-130H AVP)	5	2	One must be operative at the pilot position & the co-pilot position. Co-pilot position must be in the outboard position (ISOL DC).
CDU (EC-130H AVP)	4	2	Both must be operative at the pilot / co-pilot position.
ADC (EC-130H AVP)	2	1	
INS/AHRS (EC-130H AVP)	4	2	Either On-side INS or AHRS must be operative at each pilot position.
DCP (EC-130H AVP)	3	2	Both pilot potions must be operative.
IHC (EC-130H AVP)	3	0	

Radar Control Panel (EC-130H AVP)	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. Do not depart with an IFF known to be inoperative without ATC approval. Altitude reporting is required for RSVM airspace.			

Table A10.17. Flight Controls.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Trim Indicators	3	3	Flight to repair capability including en route 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 en route 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 A10.18. Auto Flight (C-130J).

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Go-Around (G/A) Switch	2	1	
Reference Mode Panel	2	1	Flight restricted to a repair facility including en route 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 A10.19. 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-130H: All edge and peanut lighting or backlit lighting (MD-specific) must be operational for night operations for the following instruments: airspeed; altimeter; vertical velocity indicator; attitude indicator; and horizontal situation indicator. **(T-3).**

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 A10.20. 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 must be operative for pressurized flight. **(T-2).** Aircraft will not be released for flight with a malfunctioning ramp lock system with cargo on the ramp. **(T-2).** Aircraft may continue to a destination if ramp locks malfunction in flight. Do not operate ramp 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	C-130J: May be inoperative provided automated warning system DOOR OPEN messages are operative.
Door Warning Lights	A/R	All	C-130J: May be inoperative provided applicable ACAWS DOOR OPEN messages are operative.

A10.5.25. Supplemental Aircraft Equipment

A10.5.25.1. 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 A10.21** 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 A10.22** are highly desired for the missions indicated.

Table A10.21. Required Items.

Item/System	Operational	Remarks/Limitations/Exceptions
Escape Rope	3	Installed in accordance with flight manual.
Crash Ax	2	Installed in accordance with flight manual.
O2 Walk-Around Bottle	4	Installed/Charged in accordance with Flt Man (with straps).
O2 Regulators	4	Four but not less than one per crewmember.
Emergency Exit Lights	All Exits	Located at each emergency exit and Installed in accordance with Flight manual.
Hand Operated Fire Extinguishers	4	Installed in accordance with flight manual.
First Aid Kits	2	
Quick Don O2 Masks (w/goggles)	1 per crew	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.
Life Raft(s)	A/R	Required for overwater operations (beyond power off gliding distance from land). Capacity must exceed the total number of personnel on board the aircraft. **(T-2).** Floor loaded rafts may be used to fulfill this requirement.

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. **(T-2).** 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.

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. Smoke masks are not 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. **(T-3).**

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. Use of 25K chains and devices is an acceptable alternative.

Table A10.22. Desired Equipment.

Item/System	Operational	Remarks/Limitations/Exceptions
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.

Note:

1. Equip as needed for in-flight repair/emergencies. Units must publish a list of required items. **(T-2).** Comply with all local requirements regarding FOD/Tool control.

Attachment 11

C-146 OPERATING PROCEDURES

A11.1. General Information. This attachment governs C-146A and NC-146A (Do-328 Test Bed) operations. **Note:** The NC-146A Test Bed aircraft follows the same guidance as the C-146A in this attachment unless otherwise stated.

A11.1.1. 645th Aeronautical Systems Group (AESG) maintains current memorandums of agreement between AFMC, AFSOC, and Air Force Reserve Command (AFRC).

A11.1.2. Operate under AFMC flight orders when executing test or test support missions.

A11.1.3. Follow operational procedures of the MAJCOM that is approving the Flight Authorization.

A11.2. Aircraft Operating Restrictions. Aircraft operating restrictions are in accordance with AFMAN 11-2C-146AV3 Chapter 4.

A11.3. Operational Procedures. Aircraft operational procedures are in accordance with AFMAN 11-2C-146AV3 Chapters 5 and 6.

A11.3.1. The minimum crew complement for flight operations is two pilots.

A11.3.2. Personnel not authorized to be placed on the Aeronautical orders but supporting unit missions can be flown in MESP, MEP, or passenger status. The PIC or designated representative will brief all MEPs on emergency procedures, egress, and appropriate FCIF items. **(T-3).**

A11.4. Training and Limitations. Training and limitations are in accordance with AFMAN 11-2C-146AV3 Chapter 9.

Attachment 12

E-3 OPERATING PROCEDURES

A12.1. General Information. This attachment governs E-3 operations.

A12.2. Aircraft Operating Restrictions. Aircraft operating restrictions are in accordance with AFMAN 11-2E-3V3 Chapters 3 and 4.

A12.2.1. Crew Complement. Minimum aircrew complement will be commensurate with Flight Manual and mission specific requirements.

A12.2.2. Maneuver restrictions.

A12.2.2.1. The pilot will notify all crewmembers prior to simulating emergency procedures (EP). **(T-3).**

A12.2.2.2. Terminate all student training and simulated EPs in the event of an actual emergency. **(T-2).** Training may resume if the PIC has determined that no hazard to safe aircraft operations exist.

A12.2.3. Prohibited Maneuvers.

A12.2.3.1. 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. **(T-3).** The following maneuvers are prohibited:

A12.2.3.1.1. Stalls. **(T-3).**

A12.2.3.1.2. Zero flap landings. **(T-3).**

A12.2.3.1.3. Dutch roll (unless in approved lesson plan). **(T-3).**

A12.2.3.1.4. Simulated emergency descent. **(T-3).**

A12.2.3.1.5. Simulated 3 engine, rudder power-off landings are prohibited. **(T-3).**

A12.2.3.1.6. Simulated compound emergencies excluding three engine, 25 degree flaps landing. **(T-3).**

A12.2.3.1.7. Actual practice engine shutdown (unless in approved lesson plan). **(T-3).**

A12.3. Operational Procedures. Aircraft operational procedures are in accordance with AFMAN 11-2E-3V3 Chapter 4.

A12.4. Training and Operating Limitations. Limitations are in accordance with AFMAN 11-2E-3V3 Chapter 4.

A12.4.1. Simulated loss of engines. Perform practice or simulated loss of engines in accordance with this AFMAN, the applicable flight manual, and the following:

A12.4.1.1. 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.

A12.4.1.2. Simulated two-engine approaches and landings will be practiced under IP supervision only. **(T-3).** 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. **(T-3).**

A12.4.1.3. 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. **(T-3).** The go-around will be started no lower than 200 AGL. **(T-3).** For an unplanned go-around, use all four engines as soon as safe and practical. **(T-3).**

A12.4.2. Practice emergency gear and flap operation. Accomplish day or night, clear of clouds.

A12.4.3. 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. **(T-3).** Terminate the approach no lower than 200 feet AGL.

A12.5. Instrument Procedures. Instrument procedures are in accordance with AFMAN 11-2E-3V3 Chapter 4. **Note:** The E3 is an instrument category D aircraft.

Attachment 13

E-8 OPERATING PROCEDURES

A13.1. General Information. This attachment governs E-8 operations.

A13.2. Aircraft Operating Restrictions. Aircraft operating restrictions are in accordance with AFMAN 11-2E-8V3 Chapter 4, *Flight Crew Operating Procedures*.

A13.3. Operational Procedures. Aircraft operational procedures are in accordance with AFMAN 11-2E-8V3 Chapter 4, *Flight Crew Operating Procedures*.

A13.4. Training and Operating Limitations. Limitations are in accordance with AFMAN 11-2E-8V3 Chapter 4, *Flight Crew Operating Procedures*.

A13.5. Instrument Procedures. Instrument procedures are in accordance with AFMAN 11-2E-8V3 Chapter 4, *Flight Crew Operating Procedures*.

Attachment 14

F-15 OPERATING PROCEDURES

A14.1. General Information. This attachment governs F-15 operations. In the context of this AFMAN, F-15 denotes the F-15A/B/C/D, F-15E, F-15SA, F-15QA, and F-15EX. Advanced/Omni-Generational F-15 denotes any F-15 with digital flight controls, such as F-15SA, F-15QA and F-15EX. **Note**: F-15 supplemental guidance not provided elsewhere in this publication will be in accordance with approved test plans or AFMC/A3V approved guidance, both of which take precedence over AFI/AFMAN 11-2F-15/F-15EV3.

A14.2. Normal Procedures. Normal procedures are in accordance with AFI/AFMAN 11-2F-15 V3 **Chapter 3** for the F-15A/B/C/D and AFI/AFMAN 11-2F-15E V3 **Chapter 3** for the F-15E.

A14.2.1. Unit Developed Checklists. Unit developed checklists may be used in lieu of flight manual checklists provided they contain, as a minimum, all items (verbatim and in order) listed in the applicable checklist.

A14.2.2. Stowing Equipment in Bay 5 (F-15A/C). Stow containers or baggage with hard sides inside a Bay 5 cargo container. **(T-3).** 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 avionics. **(T-3).** 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. **(T-3).** 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. **(T-3).** Do not execute zero or negative G maneuvers unless safety of flight dictates. **(T-3).**

A14.2.3. A 90-180 G warm-up/G awareness exercise suffices for all F-15s, including F-15A-D.

A14.3. Instrument Procedures. Instrument procedures are in accordance with AFI/AFMAN 11-2F-15 V3 **Chapter 4** for the F-15A/B/C/D and AFI/AFMAN 11-2F-15E V3 **Chapter 4** for the F-15E and Advanced F-15.

A14.3.1. The F-15 is Approach Category E.

A14.3.2. Trail Departures (Advanced F-15).

A14.3.2.1. Each aircraft/element accelerates in MIL/AB power until reaching 350 KIAS. Climb at 350 KIAS until reaching cruise mach/TAS in accordance with flight manual, unless otherwise briefed.

A14.3.2.2. Upon reaching 350 KIAS, the flight leader sets 10 degrees nose high (7 degrees with -220 F-15Es in the formation) and power as required to hold airspeed unless otherwise briefed.

A14.4. Operational Restrictions. Operational restrictions are in accordance with AFI/AFMAN 11-2F-15 V3 **Chapter 7** for the F-15A/B/C/D and AFI/AFMAN 11-2F-15E V3 **Chapter 7** for the F-15E, with the following additions:

A14.4.1. Simulated in-flight loss of both engines and practice in-flight engine shutdown is prohibited. **Exceptions**: Upgrading in FCF or aircraft handling maneuvers (AHM), or part of a syllabus for a formal training course such as TPS.

A14.4.2. AHM guidance does not apply to Advanced F-15.

A14.4.3. Any OWS-reported over-G will be handled in accordance with AFI/AFMAN 11-2F-15/F-15E V3, Flight Manual, or approved test plan.

Attachment 15

F-16 OPERATING PROCEDURES

A15.1. General Information. This attachment governs F-16 operations.

A15.2. Normal Operating Procedures. Aircraft normal operating procedures are in accordance with AFMAN11-2F-16V3 **Chapter 3**, with the following additions:

A15.2.1. Minimum airspeed above 5,000 feet AGL is the low speed warning horn for CAT I aircraft and 200 KIAS for CAT III aircraft for non-qualified pilots (USAF TPS crew-solo) or pilots with less than 500 hours in the F-16.

A15.2.2. Do not conduct F-16 HARTS maneuvers 3 through 5 with aircraft carrying ballast. This restriction does not apply to F-16s capable of, but not carrying ballast.

A15.2.3. Practice in-flight engine shutdown is prohibited unless conducting authorized airstart training.

A15.2.4. SFO's will not be performed to a touch-and-go or full stop landing if aircraft gross weight exceeds 23,000 pounds for A/B models or 25,000 pounds for C/D models.

A15.2.5. F-16s equipped with an operational AGCAS will set AGCAS mode (NORM/MIN/SHOW/OFF) per mission/test requirements and confirm it is mode selected.

A15.2.6. High AoA Test/Training. F-16 Flight Manual prohibited maneuvers of "intentional departures, not recovering at activation of low-speed horn, rudder-assisted rolls, and expanded g-limits" and bypass of flight control limiters to improve performance (e.g., use of manual pitch override or fuel transfer to alter center of gravity) are authorized in accordance with the approved High AoA Safety Package or Test Plan.

A15.2.7. 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. **(T-3).** 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. **(T-3).** 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. **(T-3).** Pilots flying engine-related FCFs will verify that these requirements can be met prior to takeoff. **(T-3).**

A15.2.8. If the ceiling directly over the departure field is lower than 500 feet 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. **(T-3).** These procedures must be coordinated and published locally, and pilots must be able to practice SFOs from the alternate high key position. **(T-3).**

A15.2.9. Aircrew will have their Anti-G Straining Maneuver (AGSM) reviewed by an instructor via tape review during applicable training and as required to meet the AGSM Refresher currency in accordance with AFMAN 11-2FTV1 and AFMAN 11-404. **(T-3).**

A15.2.10. Pilots may extend the trailing edge flaps as needed for mission requirements.

A15.3. Instrument Procedures. Aircraft instrument procedures are in accordance with AFMAN11-2F-16V3 **Chapter 4**.

Attachment 16

F-22 OPERATING PROCEDURES

A16.1. General Information. This attachment governs F-22 operations.

A16.2. Normal Procedures. Normal procedures are in accordance with AFI/AFMAN 11-2F-22AV3 Chapter 3.

A16.3. Instrument Procedures. Instrument procedures are in accordance with AFI/AFMAN 11-2F-22AV3 Chapter 4.

A16.4. Operational Restrictions. Operational restrictions are in accordance with AFI/AFMAN 11-2F-22AV3 Chapter 7, with the following additions.

A16.4.1. Practice aborted takeoffs only in the flight simulator.

A16.4.2. Practice in-flight engine shutdown is prohibited unless conducting authorized training.

A16.4.3. HUD-off and standby flight group approaches will only be practiced in the flight simulator.

A16.4.4. 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.

A16.4.5. Practice Safe Return-to-Base (SRB) recoveries in day VMC only.

Attachment 17

F-35 OPERATING PROCEDURES

A17.1. General Information. This attachment governs F-35 operations.

A17.1.1. The notation 'F-35' is used to describe all F-35 variants (F-35A/B/C) unless specified.

A17.1.2. Aircraft Operating Limits (AOL). Nothing in this AFI overrides any existing AOL that may be in effect and more restrictive. AOLs, flight clearances, and Flight Series Data (FSD) restrictions supersede any item outlined in this attachment. Due to concurrent flight testing, it is imperative that operators know all applicable limits prior to flight and comply accordingly.

A17.2. Mission Planning. Maximum asymmetry. Various emergency procedures reference aircraft lateral asymmetric values despite having no real-time computation displayed in the cockpit. During mission planning, pilots will identify those conditions where lateral asymmetry could exceed 15,000 and 30,000 foot-pounds in the event those emergency procedures are required. **(T-3).**

A17.3. Aircraft Procedures.

A17.3.1. Comply with 11-2MDSV3 normal procedures, instrument procedures, and operational restrictions unless this publication provides specific exceptions or differing guidance.

A17.3.2. Visual Signals.

A17.3.2.1. REFUELING PROBE OPEN or CLOSED (F-35B/C). Display right arm with a clenched fist. To open, rotate the arm outward away from the chest to mimic the probe extending. To close, move the arm from the extended position back toward the chest.

A17.3.2.2. TAIL HOOK DOWN or UP (F-35C). Display right fist with thumb extended downward. Move thumb downward suddenly to meet horizontal palm of left hand. To open, reverse the motion (thumb upward suddenly to meet the horizontal palm of left hand).

A17.3.2.3. LAUNCH BAR RAISE or LOWER (F-35C). Rest the right elbow in left palm with right forearm horizontal. To raise, bring right hand up to shoulder level. To lower, bring right hand down to horizontal.

A17.3.2.4. WING FOLD or SPREAD (F-35C). To fold, display arms straight out at sides, then swept forward and hugged around shoulders. To spread, display arms hugged around shoulders, then swept straight out to the sides.

Attachment 18

H-1 OPERATING PROCEDURES

A18.1. General Information. Reference AFMAN 11-2UH-1NV3 Chapter 1 through 3 or AFMAN 11-2TH-1HV3 **Chapter 1**, as applicable, for general information. This attachment governs UH-1 & TH-1 operations. Operational limits and restrictions are found throughout this attachment and MDS specific volume three guidance.

A18.1.1. Use the O4 mission symbol for direct test missions.

A18.1.2. Use the O5 mission symbol for test support missions.

A18.1.3. Use the O6 mission symbol for helicopter crew continuation or upgrade training.

A18.1.4. Use the O7 mission symbol for operational missions (e.g., supporting test wing customers paying for support such as paradrop or helocast, conducting distinguished visitor support, natural disaster response, search and rescue operations, firefighting, etc.).

A18.1.5. Briefing guides/checklists. Aircrew may use either lead MAJCOM developed crew briefing guides and checklists or locally developed guides and checklists that are published in the unit's in-flight guide.

A18.1.6. Training may be conducted on any operational mission in AFMC. The unit DO and aircraft commander will use sound operational risk management to determine whether the type of training and aircrew complement are compatible with the operational mission to be flown.

A18.1.7. Minimum crew requirements. **Table A18.1**, *Minimum Aircrew Requirements,* specifies minimum crew requirements for missions accomplished within AFMC. Special missions aviators 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 A18.1. Minimum Aircrew Requirements.

Mission Profile	Minimum Required Crewmembers			
	Pilot	Co-Pilot	SMA	Co-Pilot / SMA
Basic Sortie	1			
EP Training [1, 2, 3]	1			1
Instruments (VMC)	1			1
Instruments (IMC)	1	1		
Flight with passengers (includes DV) [4]	1			
Remote Operations (day or NVG) [5]	1			1
Day Water Operations (non-Live)	1			1
Night Unaided to prepared landing areas (airfields)	1			1
SAR / MEDEVAC	1	1	1	

Live Alternate Insertion and Extraction (AIE)	1	1	1	
Training AIE (actual device use, hoist/rope ladder)	1	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	1	1	1	
Chase[6, 7]	1	1		

Notes:

1. An instructor pilot must be designated on the flight orders and at a set of controls.

2. Training flights accomplished as a part of an upgrade (to copilot, PIC or instructor) will have a special missions aviator. **(T-3).**

3. Passengers will not be on the aircraft when practice emergency procedures are flown. **(T-2).**

4. Mission profile and passenger personal requirements must be carefully considered prior to flying single-pilot.

5. Single-pilot landings at prepared sites and/or within a range complex are 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/SMA. If landing to areas that do not meet these requirements, minimum crew is a pilot, co-pilot, and special missions aviator.

6. If the chase formation includes aircraft with a crew complement less than a pilot, copilot, and SMA, the minimum aircraft separation is 3 rotor diameters, based on the aircraft with the largest rotor diameter.

7. Minimum separation will be no less than one rotor diameter, based on the aircraft with the largest diameter. **(T-2).**

A18.2. Mission Planning. Reference AFMAN 11-2UH-1NV3 Chapter 4 or AFMAN 11-2TH-1HV3 Chapter Two, as applicable, for mission planning.

A18.2.1. Day and night VFR training missions require 1000 feet ceiling and 3 miles visibility.

A18.2.2. Flight profiles consisting of only hover operations require a minimum of one mile visibility for both operational and training missions.

A18.2.3. Passengers may be flown on H-1 aircraft during contingency operations (e.g., hurricane relief or rescue operations). **Note:** Military personnel not on aeronautical orders nor approved in another capacity such as MEP/MESP may still fly aboard the H-1 when supporting activities such as special forces team insertions/extractions, SERE instruction, and training for recovering [simulated] survivors.

A18.3. Normal Operating Procedures. Reference AFMAN 11-2UH-1NV3 Chapter 5 and 6 or AFMAN 11-2TH-1HV3 **Chapters 3** and **4**, as applicable, for normal operating procedures.

A18.3.1. NVG operations. Use of NVGs during takeoffs, landings, and hover operations is authorized. The minimum en route cruise altitude while flying with NVG's is 300 feet. **(T-3).**

A18.3.2. Unaided Night VMC (cruise flight). Minimum altitude while flying unaided during night VMC is 500 feet above the highest obstacle, within five nautical miles of course centerline. **(T-3).**

A18.3.3. H-1 navigation and cruise flight below 2,000 feet AGL is considered normal operations and no low altitude step down training (LASDT) program is required nor desired for operations between 300 and 2,000 feet AGL.

A18.4. Instrument Procedures. Reference AFMAN 11-2UH-1NV3 Chapter 7 or AFMAN 11-2TH-1HV3 **Chapter 5**, as applicable, for instrument procedures.

A18.5. Mission Events. Reference AFMAN 11-2UH-1NV3 Chapter 8 or AFMAN 11-2TH-1HV3 **Chapter 6** through **11**, as applicable, for mission event guidance.

A18.5.1. Flight Test Procedures.

A18.5.1.1. The test planning and approval process shall establish the procedures and limits for a particular test effort. **(T-2).**

A18.5.1.2. Flight Test Techniques (FTT). When conducting helicopter performance and handling quality testing, comply with U.S. Navy Test Pilot School guidance. TPS graduates (or TPS students with an IP) may practice flight test techniques at a set of flight controls on training flights. Low airspeed control response, tethered hover, pace vehicle, and H-V diagram FTT practice shall only be accomplished as spin-up for an approved test program. Pace vehicle operations may be unit developed but approved by the FOA during the test and safety review process. **(T-3).**

A18.5.1.3. TPS graduate and student pilots and flight test engineers may participate in the qualitative evaluation program. The PIC must be an IP. The IP may demonstrate practice autorotations to a power recovery if a UH-1 pilot/SMA is in the cabin to assist in monitoring aircraft performance. Unqualified members are prohibited from flying autorotations. **(T-2).** No other emergency procedures are to be demonstrated. **(T-3).**

A18.5.2. Shipboard operations will be accomplished in accordance with, to include marshaling procedures, Joint Publication 3-04, *Joint Shipboard Helicopter and Tiltrotor Aircraft Operations* and AFMAN 11-218, *Aircraft Operations and Movement on the Ground*. **(T-3).** Aircrew will conduct shipboard operations training in accordance with Navy/Army/Air Force memorandum of understanding. **(T-3).**

A18.5.2.1. Refer to AFMAN 11-2FTV1 for shipboard operations training requirements.

A18.5.2.2. Mission Commanders will ensure that all personnel receive a pre- deployment briefing consisting of the following: **(T-3).**

A18.5.2.2.1. Launch Procedures and light/hand signals.

A18.5.2.2.2. Landing procedures and light/hand signals.

A18.5.2.2.3. Aircraft control doctrine and procedures.

A18.5.2.2.4. Emergency procedures peculiar to shipboard operations.

A18.5.2.2.5. Special procedures for night and IFR.

A18.5.2.2.6. Communication.

A18.5.2.2.7. Ship Resume.

A18.5.3. Helicopter landing zones (HLZ) and operational site diagrams. HLZ surveys are required for all dedicated training missions and recommended as part of the normal mission planning for supporting customers like Special Forces who may use an HLZ repeatedly.**(T-3). Exception:** HLZ surveys are not required if another survey is available (e.g., Fixed-wing DZ/LZ survey). Approved operational sites are not considered HLZs. For operational missions, HLZ surveys are not required.

A18.5.3.1. HLZ review process. The following paragraphs outline the HLZ review process from performing the initial groundwork to the final coordination. Forward completed surveys to the OG/OGV office for coordination. Surveys must be reaccomplished when the user or provider determine changes in the ground or air aspects of the HLZ data require a new survey. **(T-3).**

A18.5.3.2. The HLZ surveys will be conducted during daylight by a qualified combat controller or any qualified helicopter aircrew member (i.e., pilot or SMA). The surveyor (AF Form 4303, item 4A) performs the actual ground portion of the HLZ survey (i.e., measurements, coordinates, calculating size, obtaining maps and creating diagrams) and annotates results on the AF Form 4303. The surveyor may be a member of the unit that intends to use the HLZ, or a member of another unit may perform the ground portion of a survey if requested and time permits. To facilitate future use of surveyed HLZs, initial surveys should encompass the largest area available and not be limited by specific mission requirements. The surveyor will forward the completed survey to the SQ/DO office for review. **(T-3).** Include recommended use, any deviations from HLZ standards contained in service or MAJCOM directives, and other pertinent remarks.

A18.5.3.2.1. The AF Form 4303 reviewer is the SQ/DO. The reviewer (AF Form 4303, item 4B) ensures the HLZ can be safely used from a flight perspective. Throughout the review process, HLZ survey packages will include all applicable maps, photos, charts and diagrams necessary to determine the safety and utility of the HLZ.

A18.5.3.2.2. Approval authority (AF Form 4303, item 4C). Prior to use, surveys will be approved for air operations by the FOA. **(T-3).** This approval assures the review has been accomplished and the HLZ is considered safe for air operations.

A18.5.3.2.3. The survey is ready for use once item 4C of AF Form 4303 is completed. The SQ/DO determines where HLZ surveys are maintained. Surveys will be accessible to aircrews for use in pre-mission planning. **(T-3).**

A18.5.3.3. HLZ surveys document the conditions that existed at the time the survey was accomplished and may not account for changes to seasonal topography. Recommended uses may be based on minimum requirements and should not be misconstrued to be all-inclusive (i.e., a HLZ recommended for two UH-1s may not be suitable for a HH-60). It

is the responsibility of the flying and ground units involved to ensure that any HLZ being considered for use meets the requirements for their specific operation.

A18.5.3.4. Helicopter landing zone survey updates. HLZ surveys will be updated every six months. **(T-3).** HLZs that are not updated in the six-month time period are considered closed for use until resurveyed using the above criteria. A resurvey does not require a new AF Form 4303. The absolute minimum to update a HLZ survey requires a qualified combat controller or qualified helicopter aircrew member to resurvey the HLZ during daylight. This member must evaluate items six through ten of AF Form 4303. **(T-3).** Annotate date of update and surveyor's initials in remarks section. A HLZ survey that has not been updated for 12 months is considered expired and a new AF Form 4303 will be accomplished and rerouted for approval. **(T-3).**

A18.5.3.5. Expedited HLZ surveys. The expedited HLZ survey process may be used to meet specific commander's objectives when time constraints exist that could preclude completion of the full HLZ survey process in time to meet mission training requirements. The expedited HLZ survey process may also be used when the unit has no intention of establishing and maintaining the HLZ as a frequently used HLZ with an approved IMT 4303 and subsequent periodic reviews.

A18.5.3.5.1. The use of an AF Form 4303 is desired, but not required, for an expedited HLZ survey. Expedited survey requests should include, at a minimum, an HLZ name, the date surveyed, name and unit of surveying personnel, the HLZ controlling agency and phone/e-mail contact information, long axis headings of HLZ, GPS coordinates, length/width, slope, elevation, and remarks regarding obstacles, hazards and surface conditions.

A18.5.3.5.2. Forward requests for expedited HLZ surveys to the FOA for final review and approval.

A18.5.3.5.3. The FOA is the approval authority for landing anywhere within a defined geographic boundary (e.g., test or training range complex). FOA approvals may be limited by a specific time period or by a specific 'named' training exercise window.

A18.5.3.5.4. Prior to conducting operations in the designated area, the approved expedited survey will be made available to the aircrew for mission planning. **(T-3).** If there are multiple locations for HLZs, include each location in the expedited HLZ survey request. Use of HLZs that are approved by the applicable range group are highly encouraged.

A18.5.3.5.5. Aircrew will adhere to the following methods (in order of precedence) to assess an expedited HLZ surveyed site: Overflight of the HLZ prior to the mission; use of aerial photography; ground site survey/photography; use of satellite imagery; other methods like a PFPS map study.

Attachment 19

H-60 OPERATING PROCEDURES

A19.1. General Information.

A19.1.1. Use the O4 mission symbol for direct test missions.

A19.1.2. Use the O5 mission symbol for test support missions.

A19.1.3. Use the O6 mission symbol for helicopter crew continuation or upgrade training.

A19.1.4. Use the O7 mission symbol for operational missions (e.g., supporting test wing customers paying for support such as paradrop or helocast, conducting distinguished visitor support, natural disaster response, search and rescue operations, firefighting, etc.).

A19.2. Mission Planning.

A19.2.1. VFR training missions require 1000 feet ceiling and 3 miles visibility.

A19.2.2. Flight profiles consisting of only hover operations require a minimum of one mile visibility for both operational and training missions. **Exception:** Functional check flights (see **Table 3.1**).

A19.2.3. Wind limitations for training is 40 knots peak wind or 20-knot gust spread.

A19.2.4. For developmental aircraft, weight and balance/performance data/TOLD may be provided by the contractor generating the aircraft for flight test.

A19.2.5. Passengers may be flown on H-60 aircraft during contingency operations (e.g., hurricane relief or rescue operations). **Note:** Military personnel not on aeronautical orders nor approved in another capacity such as MEP/MESP may still fly aboard the H-60 when supporting activities such as special forces team insertions/extractions, SERE instruction, and training for recovering [simulated] survivors.

A19.2.6. H-60 navigation and cruise flight below 2,000 feet AGL are considered normal operations. LASDT qualification is not required.

A19.2.7. Conduct all operations at or above 300 feet AGL except when lower altitudes are required for takeoff, departure, arrival, landing, operational missions, training flights in approved surveyed areas, approved test missions, or when directed lower by a helicopter route chart. **(T-2).**

A19.2.8. Do not conduct cruise flight below 300 feet AGL unless supporting an approved test plan, required for training, required for search and rescue operations, or directed by ATC. **(T-3).**

A19.2.9. Minimum crew requirements for missions are listed in **Table A19.1**, *Minimum Aircrew Requirements*,. **Table A19.1** assumes that the crewmembers are qualified or certified for the mission events, are upgrading under the supervision of an instructor, or are conducting operations in accordance with an approved test build-up or test plan. When conducting approved flight tests where attaining specific mission qualifications/certifications or instructor supervision is not practical or applicable, build-up and other risk mitigations shall be planned and briefed as a part of the test safety planning and approval process.

Special missions aviators (SMA) add significantly to the safety and efficiency of all helicopter missions and should be used to the maximum extent possible.

Table A19.1. Minimum Aircrew Requirements.

Mission Profile	Minimum Required Crewmembers		
	PIC	Copilot	SMA
Basic Sortie, Instruments (VMC & IMC), Functional Check Flight (FCF)/Acceptance Check Flights (ACF), Night Unaided or NVG Operations to Prepared Landing Areas (airfields/helipads)	1	1	1[1]
EP Training[2, 3]	1	1	1[1,4]
Remote Operations (Day and NVG)	1	1	1[5]
Flight with Passengers, Day Water Operations, Live Hoist/Alternate Insertion and Extractions (AIE) or Simulated Hoist/AIE using actual device deployment, Aerial Gunnery, Sling Load, Water Bucket, Paradrop Operations, Search and Rescue (SAR), and MEDEVAC	1	1	1
Low-Level or NVG Low Altitude (cruise flight < 300' AGL), Day or NVG Formation, Shipboard Operations, NVG Water Operations, actual Limited Visibility Approaches (LVA)	1	1	2
Chase	1	1	1[6,7]
Helicopter Air-to-Air Refuel (HAAR)	1	1	2[8]
Ground Runs with Rotors Turning (FCF ground runs, ground tests, maintenance ground runs)[9,10]	1	1[11]	

Notes:

1. Not required if flight manual states minimum aircrew is two pilots. A SMA may not be required, but should be used when practical to reduce risk.

2. An instructor pilot must be designated on the flight orders and be positioned at a set of flight controls. **(T-3).**

3. See A19.6.3 for additional restrictions and guidance.

4. Training flights accomplished as a part of an upgrade to copilot, aircraft commander or instructor pilot will have a SMA. **(T-3).**

5. Landings may be made to areas that provide a minimum of 75 feet rotor disk clearance (from each blade tip) with minimum crew of 2 pilots. If landing to areas that do not meet this requirements, minimum crew will include a SMA.

6. Minimum separation will be no less than one rotor diameter, based on the aircraft with the largest diameter rotor. Performing chase duties without a SMA is authorized (if flight manual minimum crew is two pilots) but the minimum aircraft separation in this case is 3 rotor diameters, based on the aircraft with the largest rotor diameter. **(T-3).**

7. An H-60 being chased will follow minimum crew requirements for its designated mission. An H-60 performing chase duties will follow minimum crew requirements for the planned mission if that profile requires more crew members.

8. Only one SMA is required for non-simultaneous HAAR.

9. Aircraft taxi or flight is not permitted. A qualified aircrew member must review the aircraft forms and accomplish a preflight. The pilot crew position may be filled by any qualified aircraft commander. A Copilot/SMA will occupy the other cockpit seat. **(T-3).**

10. For FCF ground runs, an FCF-certified aircraft commander is required (the Copilot/SMA need not be FCF certified). **(T-3).**

11. Copilot or SMA.

A19.3. Normal Operating Procedures. Reference AFMAN 11-2HH-60V3 Chapter 4 for normal operating procedures.

A19.3.1. Prohibited training maneuvers may be performed if in accordance with an approved test plan.

A19.3.2. NVG operations. Use of NVGs during takeoffs, landings, and hover operations is authorized. The minimum en route cruise altitude while flying with NVG's is 300 feet. **(T-3).**

A19.3.3. Unaided Night VMC (cruise flight). Minimum altitude while flying unaided during night VMC is 500 feet above the highest obstacle, within five nautical miles of course centerline. **(T-3).**

A19.3.4. Overwater flight. Life preserver and helicopter emergency egress device or equivalent device) will be worn by all aircrew for overwater flights when route of flight is beyond auto-rotational gliding distance from land. Ensure sufficient life preserver units are available for all passengers. When the flight crew includes a cabin crew member a life raft will be on-board for over water flights when route of flight is beyond auto-rotational gliding distance of land. **Exception:** A life raft is not required if a radio-equipped boat or a hoist-equipped helicopter provides mutual support coverage. For missions that dictate the flight crew be limited to a minimum crew of two pilots and raft deployment is not possible, mission planers will attempt to coordinate a radio-equipped boat or a hoist-equipped helicopter to provide mutual support coverage. **(T-3).** If boat or helicopter coverage is not available, pilot only overwater flight beyond auto-rotational gliding distance from land should be minimized to only what is needed to accomplish the mission and requires approval from the unit commander (may be delegated to the DO). Additionally, each pilot will check with AFE to ensure their flight vest includes any personal survival equipment normally packed in a raft. Life rafts, life preservers, and helicopter emergency egress device are not required when over water flight occurs only for short distances immediately after takeoff or before landing. Check local requirements for wear of anti-exposure suits when water temperatures are below 60°F. **Note**: Aircraft equipped with advanced helicopter emergency egress lighting system (or equivalent) do not require exits to be marked with chemlights.

A19.3.5. Do not accomplish air refueling operations below 1,000 feet AGL. **(T-3).**

A19.3.6. Reference AFMAN 11-2HH-60V3 Chapter 6 for formation, water, AIE, and parachute delivery operations.

A19.3.7. Reference AFTTP 3-3.HH-60 for sling load, Bambi bucket, and shipboard operations.

A19.3.8. Weapons Employment. Units with a weapons and tactics department and training program (e.g., DT/OT CTF's) will ensure that weapons systems employment procedures and training standards are included in the training program. **(T-3).** Otherwise, units will follow local installation procedures and unit operating instructions. For tactical training and currency, weapons employment should be conducted in accordance with approved training plans, the AFMAN 11-2FTV1, and AFTTP 3-3.HH-60. For the purpose of developmental testing of weapons systems, employment currency or certification is not required when employment is conducted in accordance with an approved test plan build-up/test plan.

A19.4. Instrument Procedures. Reference AFMAN 11-2HH-60V3 Chapter 5 for instrument procedures.

A19.5. Aircraft Operational Limits and Restrictions. Reference AFMAN 11-2HH-60V3 Chapter 4 for aircraft prohibited maneuvers and emergency procedures training. Emergency procedures training shall be conducted at an approved landing area under radio communications with the appropriate controlling agency (i.e., tower, runway supervisory unit, etc.). **(T-3).** Aircraft rescue and fire-fighting equipment must be immediately available. **(T-3).** Brief all practice emergency procedures during the flight briefing.

A19.6. Flight Test Procedures.

A19.6.1. The primary task for H-60 aircraft in AFMC is to conduct developmental and sustainment flight tests and test support missions. The test planning and approval process establishes the procedures and limits for a particular test effort.

A19.6.2. Flight Test Techniques. When conducting helicopter performance and handling quality testing, comply with U.S. Naval Test Pilot School Flight Test Manuals (FTM) 106 and 107. TPS graduates (TPS students or non-TPS qualified flight test pilots assigned to the unit with an IP) may practice FTM 106 and FTM 107 flight test techniques at a set of flight controls on training flights. If practicing control response, tethered hover, or pace vehicle testing, the aircrew shall have test cards approved at the appropriate risk level and the practice flights should be part of spin-up for an approved test program. **(T-3).** Pace vehicle operations may be unit developed but approved by the FOA during the test and safety review process.

A19.6.3. Qualitative Evaluations. Qualitative evaluations are intended to allow TPS graduates and TPS students to experience flying a completely different aircraft and be exposed to the unique handling qualities, flight control mechanical characteristics, and performance capabilities of rotary-wing aircraft. TPS graduate and student pilots and flight test engineers may participate in the qualitative evaluation program. The PIC must be an IP. The IP may demonstrate practice autorotations to a power recovery when an H-60 pilot/SMA is in the cabin to assist in monitoring aircraft performance. Do not allow unqualified members to conduct autorotations. **(T-3).** Manual stabilator, degraded AFCS (Boost/SAS/FPS – Off), and roll-on landings may be flown or demonstrated at IP discretion.

A19.7. Functional Check Flights and Acceptance Check Flights. FCF and ACF shall be performed by a certified H-60 FCF pilot with an H-60 qualified pilot occupying the other pilot's seat. **(T-2).** SMA are desired, but not required for FCF/ACF flights. Additional crewmembers may be added with unit commander approval.

A19.7.1. The FCF/ACF pilot should guard both the collective and throttles/power control levers any time the throttles/power control levers must be manipulated. The FCF pilot should occupy the left seat unless a qualified FCF instructor pilot is conducting training.

A19.7.2. FCF/ACFs should be flown in designated FCF areas.

A19.7.3. For the purposes of a FCF/ACF, terminate autorotation RPM checks no lower than 500 feet AGL.

A19.7.4. Retarding both throttles/power control levers to idle is allowable during autorotations conducted during FCFs as part of main rotor track and balance or as part of an approved test plan

A19.8. Interfly. Interfly approval is not required for the following cases:

A19.8.1. Qualified aircrew assigned or attached to ACC, AETC, AFRC, NGB or DCMA units for the purpose of test aircrew training, test buildup, or executing test events.

A19.8.2. Higher headquarters unit visits by qualified aircrew or to include aircrew proficiency evaluations (APE).

A19.8.3. Senior supervisory and staff aircrew members approved in accordance with AFI 11-401.

Attachment 20

KC-10 OPERATING PROCEDURES

A20.1. General Information. This attachment governs KC-10 operations.

A20.2. Aircraft Operating Restrictions. Aircraft operating restrictions are in accordance with AFMAN 11-2KC-10V3 Chapters 4 and 9.

A20.2.1. The following items are not considered cargo: static display box; tow bar; tie-down equipment box; engine covers; palletized flight test equipment; crew baggage; and empty pallet sub-flooring.

A20.2.2. Do not exceed 30 degrees of bank angle except for practice single-ship retrograde maneuvers, steep turn demonstration performed according to applicable training plan, or as needed to maintain required VFR pattern ground track. **(T-3).** Minimum altitude for bank angles greater than 30 degrees is 10,000 feet AGL or traffic pattern altitude if used to maintain required VFR pattern ground track. **(T-3).**

A20.3. Operational Procedures. Aircraft operational procedures are in accordance with AFMAN 11-2KC-10V3 Chapter 5.

A20.4. Instrument Procedures. Instrument procedures are in accordance with AFMAN 11-2KC-10V3 Chapter 6.

Attachment 21

KC-135 OPERATING PROCEDURES

A21.1. General Information. This attachment governs KC-135 operations.

A21.1.1. Primary crewmembers, or those occupying a primary position during flight, must be basic-qualified, in training for qualification, or flying under a qualitative evaluation status. If non-current, in training for a particular event, or performing a qualitative evaluation, the crewmember must be under the supervision of an instructor while accomplishing that event with direct supervision for critical phases of flight. **(T-2). Note:** Aircrew are exempt from any references in Lead MAJCOM guidance that references 11-2MDSV1 or mission qualifications and will instead comply with 11-2FTV1guidance.

A21.1.2. Augmented crews. Augmentees must be basic aircraft qualified. In those missions requiring augmentation, the crew must be augmented from the start of the duty period. If augmentees are added to the crew after crew show time, the crew's flight duty period will be adjusted based on the flight duty period of the most limited person. **(T-3).**

A21.1.3. Test Pilot School graduates or TPS students may occupy a primary position if under the supervision of a qualified instructor. Senior officer course and FTL-E qualified members may conduct tanker or receiver AAR with passengers if supervised by a qualified instructor.

A21.1.4. Aircrew are exempt from lead MAJCOM published fuel loads and sequences. 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.

A21.1.5. Aircrew are exempt from 11-2KC-135V3 addenda restrictions.

A21.1.6. Unit commander shall determine what flight manuals are required to be carried in flight. **(T-2). Note:** Digital publications are authorized.

A21.1.7. For missions with passengers, follow lead MAJCOM guidance. **Exception:** Touch-and go-is authorized with passengers aboard.

A21.1.8. Minimum aircrew complement for basic and augmented flight duty period is in accordance the applicable flight manual or applicable partial/modification flight manual.

A21.1.9. Squadron Operations Supervisors will be the approval authority for landings requiring greater than 0.90 DBF or greater than 50% of the steady-state headwind component.

A21.2. Instrument Procedures.

A21.2.1. Pilots and navigators must complete KC-135 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. **(T-3).**

A21.2.2. Overlay GPS approaches are not authorized. Overlay GPS approaches are characterized by "Or GPS" in the approach title (e.g., VOR or GPS RWY 15). GPS substitution is authorized to define named points on a conventional approach. **(T-2).**

A21.2.3. GPS overlay of a conventional SID or STAR shall only be used for situational awareness. **(T-2).** Pilots must use the ground based NAVAIDs depicted in the SID/STAR as the primary navigational source.

A21.3. Aircrew and Aircraft Operational Limits and Restrictions.

A21.3.1. Aircrew are exempt from lead MAJCOM takeoff/landing/touch-and-go weight and wind restriction limits. At gross weights above 200,000 pounds pilot will brief and comply with flight manual sink rate limitations. **(T-3).**

A21.3.2. Aircrew are exempt from lead MAJCOM mandatory approach advisory calls and responses.

A21.3.3. Avoid landing on (i.e., 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. 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.

A21.3.4. Air refueling limitations.

A21.3.4.1. Aircrew are exempt from air refueling altitude restrictions in lead MAJCOM guidance.

A21.3.4.2. Normal air refueling (A/R) operations are conducted at or above 12,000 feet MSL or 10,000 feet AGL, whichever is higher. Overflight of terrain (i.e., mountain ridges, peaks, etc.) is permissible provided the aircraft remains at or above 5,000 feet AGL. **Exception:** A/R operations in support of C-130/C-17/A-10 receivers conducted at the receiver's optimum refueling altitude, but no lower than 5,000 feet AGL, are authorized and considered normal operations. **Note:** A/R performed below these altitudes will only be on an approved test plan or for other operational considerations approved by the FOA.

A21.3.4.3. 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:

A21.3.4.3.1. A safety observer should be used to the maximum extent possible.

A21.3.4.3.2. Maximum time per sortie for LAAR will be 1 hour. **(T-3).**

A21.3.4.3.3. Perform during day, under VFR conditions. **(T-3).**

A21.3.4.3.4. Minimum altitude is 3,000 feet above the highest obstacle or terrain within 4 NM of course centerline. **(T-3).**

A21.3.4.3.5. Less than forecast, reported or observed moderate turbulence. **(T-3).**

A21.3.4.3.6. Over flat and rolling terrain or a minimum of 10 NM from land over contiguous water. **(T-3).**

A21.3.4.3.7. The autopilot rudder axis or yaw damper will be used if functioning. **(T-3). Note:** Consideration should be given to not use the other axes of the autopilot based upon maneuvering requirements.

A21.3.4.3.8. Flight manual restrictions for low altitude operations must be complied with. **(T-2).**

A21.3.5. Crewmembers performing instructor or flight examiner duties are exempt from seat belt requirements if not occupying a primary crew position; however, they will have a seat available with an operable seat belt.

A21.3.6. 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. Comply with training restrictions in **Table 5.1** and the following: **Note**: Direct IP supervision means the IP is in a pilot seat with direct access to aircraft controls while IP supervision means the IP is observing from the flight deck.

A21.3.6.1. Simulated jammed stabilizer demonstration, spoiler use only. Requires direct IP supervision. **(T-3).**

A21.3.6.2. Landing attitude demonstration. Requires IP supervision. **(T-3).**

A21.3.6.3. Spoiler/lateral control demonstration. Requires IP supervision. **(T-3).**

A21.3.6.4. Trim demonstration. Requires IP supervision. **(T-3).**

A21.3.6.5. Practice emergency or abnormal gear and flap operation. Accomplish clear of clouds unless IP-supervised. May be accomplished day or night.

A21.3.6.6. Simulated engine failure. Perform practice or simulated loss of engines in accordance with this AFMAN and the applicable flight manual (i.e., do not use lead MAJCOM simulated engine failure procedures).

A21.3.6.7. Approach and landing, simulated engine-out. Requires direct IP supervision. **(T-3).**

A21.3.6.8. Approach and go-around, simulated engine-out with 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.

A21.3.6.9. Approach and go-around, simulated engine-out with power rudder off. Requires direct IP supervision. **(T-3).** Brief this 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.

A21.3.6.10. Simulated engine failure takeoff continued. Requires direct IP supervision. **(T-3).**

A21.3.6.11. Simulated two engine approach and landing. Requires direct IP supervision. **(T-3).** 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.

A21.3.7. Aircrew are exempt from lead MAJCOM simulated engine-out training syllabus.

A21.3.8. Aircrew are exempt from lead MAJCOM touch-and-go landing restrictions. Brief touch-and-go landing considerations with 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. **Note:** Touch-and-go landings may be

performed under direct instructor pilot supervision or by a qualified pilot in accordance with this manual, AFMAN 11-2FTV1, and the applicable flight manual.

A21.3.9. Fuel Planning and Considerations. Aircrew are exempt from lead MAJCOM fuel planning and conservation restrictions. Comply with this AFMAN's normal, minimum, and emergency fuel guidance. **Warning:** Final landing fuel must not be less than 5,900 pounds. **(T-2).** Engineering analysis has proven that engine fuel starvation is imminent below 5,900 pounds.

Attachment 22

MC-12 OPERATING PROCEDURES

A22.1. General Information. This attachment governs MC-12 operations.

A22.2. Normal Operating Procedures. Aircraft normal operating procedures are in accordance with AFMAN 11-2MC-12V3 Chapter 3.

A22.2.1. Publications. Aircrew will carry on board for each flight, at a minimum, one full copy of the Pilot Operating Handbook, approved supplements, and one crew station checklist per occupied crew position. Fanfold checklists are approved for use.

A22.2.2. The following maneuvers may be performed:

A22.2.2.1. 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. **(T-3).**

A22.2.2.2. Approach to stall/stall training. Recover the aircraft at the first indication of stall warning or actual stall during stall demonstrations. **(T-2).** 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.

A22.2.2.3. Practice engine shutdown and restarts. Planned engine shutdowns and restarts will only be accomplished during training under an approved training syllabus or during FCF proficiency training. **(T-3).** 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.

A22.2.3. At least one crew member should monitor guard frequency to the maximum extent possible.

A22.2.4. Engine running on/offloads are authorized.

A22.2.5. Recommend aircrew carry either identification tags or US government identification cards on all sorties.

A22.3. Instrument Operating Procedures. Aircraft instrument operating procedures are in accordance with AFMAN 11-2MC-12V3 Chapter 7.

A22.4. Aircrew and Aircraft Operational Limits and Restrictions. Reference AFMAN 11-2MC-12V3 Chapters Two and 3 for aircrew and aircraft operational limits and restrictions.

A22.4.1. FCFs or ACFs will be conducted as required by T.O. 1-1-300 or AFI 21-101.

A22.4.2. Aircrew are not required to carry an operational flashlight on each flight unless scheduled to takeoff or land during civil nautical twilight. Flashlights installed in the aircraft are sufficient low-light aiding devices.

A22.4.3. Do not accomplish no flap landings or touch-and-goes except in an actual emergency due to possible L-3 faring damage. **(T-3).**

Attachment 23

PC-12/U-28 OPERATING PROCEDURES

A23.1. General Information. This attachment governs U-28/PC-12 aircraft and U-28/PC-12 variants/modified aircraft.

A23.2. Aircraft Operating Restrictions. Aircraft operating restrictions are in accordance with AFMAN 11-2U-28V3 Chapter 5.

A23.2.1. Aircraft maximum weight operations up to 10,979 pounds are at the discretion of the PIC. Aircraft operations with weights above 10,979 pounds must be approved by the FOA, or be conducted under an approved test plan. **(T-3).**

A23.2.2. Minimum crew for the U-28/PC-12 is one U-28/PC-12 qualified pilot. **(T-3).** In addition to the qualified pilot, a second qualified pilot or instrument rated safety pilot is required if other crewmembers are on board. Flight Test Engineers, test conductors, and test directors may occupy the right seat during non-critical phases of flight provided this is accomplished IN ACCORDANCE WITH AFMAN 11-2U-28V3 **Chapter 5**.3. A safety pilot may occupy either seat if the other pilot is a current and qualified Instructor Pilot, otherwise they should occupy the right seat.

A23.2.3. Crew complement for the U-28/PC-12 is in accordance with **Table A23.1**, *Crew Complement*.

Table A23.1. Crew Complement.

Crew Position	Basic
PIC	1
Safety Pilot	1 (when required)
Observer	3 (when required)

A23.2.4. Operations from other than hard surfaced runway are not authorized. **(T-3).**

A23.2.5. Touch-and-Go operations require two qualified pilots or an IP if the other pilot is unqualified or non-current. **(T-3).**

A23.2.6. Passengers. Mission Essential Personnel (MEP) and Mission Essential Support Personnel (MESP) will be documented IN ACCORDANCE WITH AFI 11-401 and applicable supplements. Approval authority is the SQ/CC. Required crew compliment is in accordance with **paragraph A25.1.2** of this AFMAN. Simulated emergency procedures are prohibited unless specified in an approved test plan. The PIC will ensure supported forces are briefed on the mission profile and events before flight. **(T-3).**

A23.3. Operational Procedures. Aircraft operational procedures are in accordance with AFMAN 11-2U-28V3 Chapter 6.

A23.3.1. Overwater Flights. Aircrew will coordinate with the 645th AESG for appropriate support and approval for overwater/trans-oceanic flights. **(T-3).** Aircrew are exempt from the approval and reporting instructions published in AFMAN 11-2U-28V3 Chapter 6.

A23.3.2. Required Publications. Hard copy FLIP, publications, and checklists are not required if the aircrew use electronic flight bags. Aircrew are not required to carry AFSOC specific publications or AFSOC mission kits.

A23.4. Instrument Procedures. Instrument procedures are in accordance with AFMAN 11-2U-28V3 Chapter 6. **Exception:** Aircrew are not approved to conduct self-contained approaches.

Attachment 24

RC-135 OPERATING PROCEDURES

A24.1. General Information. This attachment governs RC/NC/WC/TC-135 operations.

A24.2. Mission Guidance.

A24.2.1. Missions with passengers. Only a pilot that is qualified and current will occupy a pilot's seat with passengers onboard the aircraft. One of the following conditions must be met: **(T-2).**

A24.2.1.1. Two qualified and current pilots must be at the controls.

A24.2.1.2. An IP in one seat providing direct supervision of the other pilot regaining currency or receiving differences, conversion, or mission training.

A24.2.2. Non-current or unqualified navigators/CSOs, flight engineers, systems operators, or avionics flight technicians may perform in their primary crew position on any mission when supervised by a qualified instructor of like specialty.

A24.2.3. Augmented crew. An augmented crew is required when a mission cannot be completed within the prescribed flight duty period. **(T-2).** An augmented crew consists of two qualified mission pilots, two navigators, and one flight pilot/copilot. If augmentees are added to the crew after the flight duty period begins, the crew's flight duty period will be computed based on the flight duty period of the most limited person.

A24.3. Normal Operating Procedures. Reference AFMAN 11-2RC-135V3 Chapter 5 for aircrew and aircraft normal operating procedures.

A24.3.1. Runway, Taxiway, and Airfield Requirements.

A24.3.1.1. The PIC may, as an exception, direct using greater than 80 percent delayed braking factor but must be cognizant of the resultant increase in brake wear. **Note:** Unit commander is the approval authority to use a delayed braking factor greater than ninety percent. When using greater than 80 percent breaking factor, the PIC shall brief the planned braking speed. **(T-3).** It is permissible to use 95 percent braking factor when calculating 30 flap total landing distance on a planned touch-and-go.

A24.3.1.2. Calculated landing distance must not exceed runway available. **(T-2).**

A24.3.2. Intersection takeoffs are authorized provided the operating environment (i.e., gross weight, obstructions, climb criteria, weather, etc.) allows a safe takeoff and departure. Calculate takeoff performance base on the runway remaining from the point at which the takeoff is initiated. In no case will a takeoff be made from a position where less than 7000 feet of runway remains. **(T-3).**

A24.3.3. 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. **(T-3).** Unless otherwise published, use the following procedures:

A24.3.3.1. Pilot in command will brief crewmembers on the intended ERCC operation to include their locations, duties, and responsibilities during the ERCC. **(T-3).**

A24.3.3.2. The parking brake will be set and at least one pilot in the seat will monitor brakes, interphone, and radio.

A24.3.3.3. Use terrain and taxi lights to enhance safety at night as the situation dictates.

A24.3.3.4. A crew member should be positioned at the point of entry to act as a safety observer. No enplaning personnel should approach the airplane until the crewmember is in place.

A24.3.3.5. 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.

A24.3.3.6. PIC will ensure that aircraft is clear prior to taxi and brief deplaning personnel to secure loose articles and remain forward of the interphone cord.

A24.3.4. Formation Flying. Formation is authorized IN ACCORDANCE WITH applicable technical order and AFMAN 11-2RC-135Volume 3, *RC/OC/WC/TC-135 Operating Procedures*.

A24.3.5. Air Refueling Limitations. Air Refueling is authorized IN ACCORDANCE WITH applicable technical order and AFMAN 11-2RC-135V3, *RC/OC/WC/TC-135 Operating Procedures.*

A24.4. Aircrew and Aircraft Operational Limits and Restrictions. Reference AFMAN 11-2RC-135V3 Chapter 4 for aircrew and aircraft operational limits and restrictions.

A24.4.1. The following maneuvers are authorized for qualification and continuation training. Direct IP supervision is required. **(T-2).** Follow training restrictions in **Table 5.1** of this publication and the following:

A24.4.1.1. Simulated engine-out approach and landing.

A24.4.1.2. Simulated engine-out with rudder power on approach and go-around. 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.

A24.4.1.3. Simulated engine-out with rudder power off approach and go-around. This maneuver will not be accomplished unless an IP has briefed the maneuver prior to flight. Begin the go-around no lower than 200 AGL. For an unplanned go-around, use all four engines as soon as safe and practical.

A24.4.1.4. Simulated engine failure takeoff continued.

A24.4.1.5. Simulated two engine approach and landing may be practiced using two symmetric engines or three engines using two-engine procedures. Two-engine approach and landing will not be practiced in an extensively modified aircraft.

A24.4.1.6. Simulated jammed stabilizer demonstration (spoiler use only).

A24.4.1.7. Landing attitude demonstration.

A24.4.1.8. Spoiler/lateral control demonstration.

A24.4.1.9. Trim demonstration.

A24.4.2. Touch-and-go landings may be performed under direct instructor pilot supervision or by a certified mission pilot in accordance with this publication, AFMAN 11-2FTV1, and the applicable flight manual.

A24.4.3. The following maneuvers are prohibited and are in addition to the lead MAJCOM published prohibited maneuvers: **Exception:** Normally prohibited maneuvers may be flown when required as part of an approved test plan, when required by USAF TPS curriculum, or when part of an FCF profile.

A24.4.3.1. Simulated three engine, rudder power-off landings. **(T-2).**

A24.4.3.2. Actual practice engine shutdown. **(T-2).**

A24.4.4. Simulated Emergencies. Unless specifically authorized elsewhere in this attachment, do not practice in-flight emergency procedures that degrade aircraft performance or flight control authority. **(T-2).** In the event of an actual emergency, all student training and simulated EPs will be terminated. **(T-2).** Training may resume if the PIC determines there are no hazards to safe aircraft operations.

A24.4.5. Rudder power, SYD and EFAS will be on for all landings, unless specifically directed by an applicable technical order procedure.

A24.4.6. Do not practice traffic patterns, instrument approaches, low/missed approaches, or go-arounds at gross weights that will not allow AFMAN 11-202V3 climb gradient. **(T-2). Note:** Use three engine, flaps-30, gear-up (gear-down for emergency procedures practice) configuration for climb calculation.

A24.4.7. For multiple full stop landings, compute brake energy prior to each subsequent takeoff. **(T-3).**

A24.4.8. 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. **(T-3).** Terminate the approach no lower than 200 feet AGL.

A24.4.9. Artificial vision restricting devices are not authorized for any phase of flight unless as part of an approved flight test plan. **(T-3).** Simulated instrument flight may be flown and logged without the use of a vision-restricting device.

A24.4.10. Aircrew may substitute AFMC LASDT guidance for lead MAJCOM low altitude operations guidance (see **paragraph 3.5.4**).

A24.4.11. Aircrew are exempt from lead MAJCOM touch-and-go landing restrictions. Brief touch-and-go landing considerations with 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.

Attachment 25

RQ-4 OPERATING PROCEDURES

A25.1. General Information. This attachment governs RQ-4 operations.

A25.2. Aircraft Operating Restrictions. Aircraft operating restrictions are in accordance with AFMAN 11-2ERQ-4V3 Chapters 2 and 3. Additional operational guidance and procedures will be adhered to from the 452 FLTS Standards of Operations, CTF Directives and CTF Charters.

A25.2.1. Authorized Airfields. Airfield selection and approval process are in accordance with AFMAN 11-202V3, paragraph 4.8, *UAS Airfields and Operations*. The following primary airfields are approved for use by Global Vigilance (GV) Combined Test Force (CTF) UAS: Edwards AFB, CA; Palmdale USAF Plant 42, CA; Beale AFB, CA; Grand Forks AFB, ND, and Patuxent River NAS, MD. Airfields approved for use by lead MAJCOM may also be used by GV CTF.

A25.2.2. Termination Points and Ditch Points. GV CTF mission planners shall designate termination and ditch points, as required, for specific mission plans when landing at a suitable airfield cannot be made without undue risk to personnel and property on the ground. **(T-3).** Unit commander, or delegated representative, may approve termination and ditch points. The points will be reviewed and updated by GV CTF mission planners, as required, for mission plan changes and re-approved if new points are added. **(T-3).** Termination and ditch points approved for use by lead MAJCOM may also be used by GV CTF.

A25.2.3. Mission Planning Requirements. Dedicated day prior mission planning by the entire crew should be the norm for all mission crew element sorties, but not required.

A25.2.3.1. All crewmembers scheduled to support the mission will plan or assist in the mission planning as directed by the Mission Commander (MC), as well as attend the briefings. Initial Qualification Training (IQT) or Mission Qualification Training (MQT) students and crewmembers who are logging individual events for currency do not need to attend the mission briefings provided they are under the supervision of an instructor who attended the briefings. Unit operations officer, or delegated representative, may excuse other crewmembers from mission briefings provided the crewmembers are adequately briefed by the MC prior to assuming crew duties.

A25.2.3.2. Briefing/Debriefing. The MC will brief all crewmembers to ensure safe and effective mission accomplishment during the T-1 Brief. All crewmembers will use approved briefing guides from the 452 FLTS Standards of Operations.

A25.2.4. Maintenance Personnel. One qualified vehicle test controller (VTC) operator is required for ground operations.

A25.3. Operational Procedures. Aircraft operational procedures are in accordance with AFMAN 11-2ERQ-4V3 Chapter 3.

A25.3.1. Aircrew Responsibility. Mission commander shall perform the duties of Pilot-in-Command as defined in AFMAN 11-ERQ-4V3.

A25.3.2. Flight Manuals and Checklists. Crewmembers are responsible for ensuring a current copy of the Electronic Flight Manual (EFM) or contractor furnished technical data, Developmental Program Manual (DPM) for DT&E, are available in the cockpit.

A25.3.3. Taxi and Takeoff. The pilot should normally designate only one “in-control” data link. For local operations at the UAS primary airfields, two “in-control” data links may be utilized to ensure C2 coverage and mitigate undesired taxi and takeoff interruptions.

A25.4. Instrument Procedures. Instrument procedures are in accordance with AFMAN 11-2ERQ-4V3 Chapter 4.

Attachment 26

T-6 OPERATING PROCEDURES

A26.1. General Information. This attachment governs T-6 operations.

A26.2. Normal Operating Procedures. Aircraft normal operating procedures are in accordance with AFI/AFMAN 11-2T-6V3 with the following exceptions.

A26.2.1. Weather Requirements. In addition to the weather requirements listed in **Table 3.1**, during all engine-related and propeller-related check flight sorties, the minimum weather shall allow a line of sight to a suitable airfield within engine-out glide range.

A26.2.2. Out-of-Control Flight (OCF) Recoveries:

A26.2.2.1. When conducting OCF recoveries over clouds, plan to complete all OCF recoveries, to include dive recoveries, at least 3,000 feet above the clouds.

A26.2.2.2. To avoid entering IMC during a check flight sortie where OCF or spin recoveries are required, a minimum of 10,000 feet of airspace clear of clouds should exist below OCF or spin entry altitude.

A26.2.3. Formation.

A26.2.3.1. Initiate planned formation low approaches at no lower than 200 feet AGL.

A26.2.4. Emergency Landing Patterns (ELP).

A26.2.4.1. Maintain VFR cloud clearances when flying practice ELP. **(T-3).**

A26.2.4.2. ELPs flown in a tower-controlled pattern require 500 feet below clouds and 3 miles visibility. **(T-1).**

A26.2.4.3. When conducted in controlled airspace, ELPs must be coordinated with the ATC agencies responsible for the airspace the ELP will transit. **(T-2).**

A26.2.5. Angle of attack (AoA) patterns. When flying AoA patterns, the following restrictions apply:

A26.2.5.1. AoA patterns will not be flown to AoA landings. Aircrews will fly AoA patterns to a normal round out and flared touchdown. **(T-2).**

A26.2.5.2. AoA patterns will not be flown when the tower is reporting wind gusts. **(T-3).**

A26.2.5.3. AoA patterns may be flown with all flap settings.

A26.3. Instrument Operating Procedures. Aircraft instrument operating procedures are in accordance with AFI/AFMAN 11-2T-6V3.

A26.4. Operational Restrictions. Aircraft operational restrictions are in accordance with AFI/AFMAN 11-2T-6V3.

Attachment 27

T-38 OPERATING PROCEDURES

A27.1. General Information. This attachment governs T-38 operations.

A27.2. Mission Planning.

A27.2.1. Takeoff Requirements.

A27.2.1.1. Compute takeoff and landing data for all flights. **(T-3).** MAJCOM or lead MAJCOM approved tab data, TOLD calculators, or EFB applications, may be used when available.

A27.2.1.2. Operations with a remotely Controlled BAK-15:

A27.2.1.2.1. When decision speed (DS) is less than or equal to refusal speed with engine failure (RS-EF), use RS-EF as go/no-go speed. Aborts for other than engine failure (e.g., generator warning lights, fire indications, etc.) initiated between refusal speed with both engines operating (RS-BEO) and RS-EF may result in overrunning the runway surface or barrier engagement.

A27.2.1.2.2. If DS is greater than RS-EF, but less than or equal to takeoff speed (TOS), takeoffs require FOA approval and valid DS and single engine TOS (SETOS). Use TOS as the go/no-go speed.

A27.2.1.2.3. If DS is greater than TOS, or when DS or SETOS cannot be validated, takeoffs are not authorized unless specific procedures for operational requirements are developed and approved by the FOA. **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."

A27.2.1.3. Operations without a BAK-15, including when the remote control equipment is not operating and the BAK-15 is lowered, and operations with an MA-1A:

A27.2.1.3.1. When DS is less than or equal to RS-BEO, use RS-BEO as go/no-go speed. Aborts for other than engine failure initiated above RS-BEO may result in departing the prepared surface.

A27.2.1.3.2. When DS is greater than RS-BEO and less than or equal to RS-EF, FOA approval is required. Use RS-EF as the go/no-go speed. Aborts for other than engine failure may result in overrunning the runway surface if initiated above RS-BEO.

A27.2.1.3.3. When DS is greater than RS-EF, takeoffs are not authorized. **(T-3).**

A27.2.1.4. Operations with a raised, non-remotely controlled BAK-15:

A27.2.1.4.1. When DS is less than or equal to RS-EF, use RS-EF as go/no-go speed.

A27.2.1.4.2. When DS is greater than RS-EF and less than TOS, takeoffs are allowed with FOA approval as long as the performance data results in a valid DS and SETOS. Use SETOS as the go/no-go speed. Delay rotation until 155 knots indicated airspeed

(KIAS) and ensure the nosewheel tire is off the runway no later than 174 knots ground speed.

A27.2.1.4.3. When DS is greater than or equal to TOS, takeoffs are not authorized. **(T-3).**

A27.2.2. Obstacle Climb Gradient. If the gear down single engine climb gradient is lower than the minimum required, operations supervisors are permitted to authorize the use of gear up single engine climb gradients to meet required minimum performance if the mission is deemed operationally necessary and if unable to practically increase gear down climb performance by other means. However, operations supervisors should also consider that there may be conditions where the aircraft may not be able to reach SETOS plus 10 KIAS by the end of the runway and detailed planning should be accomplished to ensure safe operations during takeoff emergencies. Units will annotate via established risk management procedures anytime the gear down single engine climb gradient is less than the minimums specified in AFMAN 11-202 Vol 3 and supplements.

A27.2.3. Consult the engine compressor stall/flameout susceptibility area chart when planning flights above FL300. Avoid mission profiles that place the aircraft into the black striped area. **(T-3).**

A27.3. Normal Operating Procedures. Reference AFMAN 11-2T-38V3, Chapter 3.

A27.3.1. In the event T-38C EED oil pressure indicator erroneously latches red immediately after a battery start in cold weather (i.e., oil pressure in excess of 55 psi), pilots are authorized to continue operating the engines until oil pressure returns to within normal range and then clear the latched oil pressure indication.

A27.3.2. Minimum maneuvering airspeed during offensive or defensive air-to-air maneuvering below 5,000 feet AGL is 350 KIAS. **(T-3).**

A27.3.3. Minimum maneuvering airspeed during ACBT is 150 KIAS. **(T-3).**

A27.3.4. Air-to-surface.

A27.3.4.1. 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. **(T-2).**

A27.3.4.2. Popup attacks. abort pop-up attacks if airspeed decreases below 300 KIAS. **(T-3).**

A27.3.4.3. Night weapons delivery and range operations. Night weapons delivery and range operations are prohibited. **(T-3).**

A27.3.5. Low-level.

A27.3.5.1. The minimum airspeed on low-level navigation routes is 300 KIAS. **(T-3).**

A27.3.5.2. Low-level missions will be flown no lower than 500 feet AGL unless specified in an approved test plan, or approved by the FOA, and the aircrew is LASDT qualified and current. **(T-3).**

A27.4. Operating Procedures and Restrictions. Reference AFMAN 11-2T-38V3, Chapter 6.

A27.4.1. On other than FCF missions, enter stalls and slow flight below 20,000 feet MSL and terminate above 8,000 feet AGL.

A27.4.2. Do not extend the flaps in an attempt to improve aircraft performance when conducting air-to-air, air-to-surface, or aerobatic maneuvers. **(T-3).**

A27.4.3. Aircraft will not descend below 5,000 feet AGL during any portion of aerobatic maneuvering. **(T-3). Note:** Aerobatic flight must be performed in special use airspace. **(T-3).**

Attachment 28

U-2 OPERATING PROCEDURES

A28.1. General Information. This attachment governs U2 operations.

A28.2. Aircraft Operating Restrictions. Aircraft operating restrictions are in accordance with AFMAN 11-2U2V3 Chapter 4 and 5.

A28.3. Operational Procedures. Aircraft operational procedures are in accordance with AFMAN 11-2U2V3 Chapter 3 and 6.

A28.3.1. Flight manual minimum oxygen requirements may be waived by the FOA for a short ferry flight or during mission unique situations. This waiver must be documented and attached to the flight mission paperwork.

A28.3.2. SFOs are authorized to a touch-and-go or full stop landing.

A28.3.3. Touch-and-go landings are authorized at any military airfield in the local training area, to include Beale AFB.

A28.3.4. A qualified SOF or Flight Safety Supervisor (FSS) will monitor all initial takeoffs and full stop landings. **(T-3).** The control room must monitor every test sortie flown and a SOF or Flight Safety Supervisor from the mobile vehicle must monitor every take-off, approach, and recovery. **(T-3).**

A28.3.5. *Do not conduct more than two pressure suit sorties in a 12-hour period or three sorties in a 24-hour period. (T-3). Note: A sortie includes an engine start, takeoff, and engine shutdown.*

Attachment 29

AFMC OCONUS AND UNUSUAL MISSION TRACKER

Table A29.1. AFMC OCONUS and Unusual Mission Tracker.

AFMC OCONUS/Unusual Mission Tracker				
Unit	Mission Type: OCONUS, One-Time Flight, Delivery, Test			
Big Safari				
412 TW				
96 TW				
413 FTG				
GDSS Mission Number (If Applicable)				
Call Sign(s)				
MDS/Tail Numbers				
A/C Commander/Flight Lead				
Mission Commander (if applicable)				
Unit POC (Name, Rank, Phone)				
After Duty Hours DSN/Commercial				
Unit Command Post DSN/Comm				
Leg	Status	ETD/ETA (Z)	Location	Notes: (Landing Code, ETIC, etc.)
1	Depart			
	Arrive			
2	Depart			
	Arrive			
3	Depart			

	Arrive			
4	Depart			
	Arrive			
5	Depart			
	Arrive			
6	Depart			
	Arrive			
	Arrive			