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Flying Operations

FLIGHT TEST OPERATIONS PROCEDURES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFPD 11-2, *Aircraft Rules and Procedures*. It applies to all AFMC and AFMC gained units and personnel conducting flying operations. Attachments to this instruction prescribe Mission Design Series (MDS) specific operating procedures. Units will maintain all applicable attachments for assigned/possessed aircraft. Field units below major command (MAJCOM) level will forward copies of their proposed supplements to this publication to AFMC/DOV for review and approval. Keep supplements current by complying with AFI 33-360V1, *Publications Management Program*. See paragraph 1.2 of this instruction for guidance on submitting comments and suggesting improvements to this publication. Records Disposition. Maintain and dispose of all records as a result of processes and prescribed by this instruction in accordance with (IAW) AFMAN 37-139, *Records Disposition Schedule*. This instruction is affected by the Paperwork Reduction Act as amended in 1996.

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Chapter 1

GENERAL INFORMATION

1.1. Scope. This instruction, in conjunction with other governing directives, prescribes procedures for conducting the AFMC flight test mission under most circumstances, but is not to be used as a substitute for sound judgment or common sense. If procedures required to accomplish a specific mission (for example, special formations or employment tactics) are not covered in this volume, AFMC crewmembers will coordinate with HQ AFMC/DOV for approval. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

1.2. Recommended Changes. Send comments and suggested improvements to this volume on AF Form 847, **Recommendation for Change of Publication**, through channels to HQ AFMC/DOV, 508 W. Choctawhatchee Avenue, Suite 4, Eglin AFB FL 32542-5713. HQ USAF/XO will approve all interim changes to this instruction, except as specified herein, unless an aircraft emergency or operational necessity dictates exception.

1.3. Waivers. MAJCOM DO is waiver authority for this instruction. Forward all waiver requests to procedures established in this instruction to HQ AFMC/DOV for coordination. All participating crewmembers will be briefed on applicable waivers prior to flight.

1.4. Developmental Aircraft. Aircraft operations for developmental aircraft will be conducted IAW this basic instruction and approved test plans. New aircraft-specific supplements will be created when the aircraft reaches IOC.

1.4.1. Personnel will not operate new equipment or modified aircraft without properly validated and verified tech data in accordance with 00-5 series technical orders (T.O). If properly procured and verified tech data does not accompany new equipment or aircraft modifications delivered to the field, personnel will not accept these aircraft or modified equipment. Red line (Mark-up) copies are not acceptable. Exceptions to this policy are extremely limited and must be authorized by AFMC through DO and LG functional managers.

1.5. Interfly.

1.5.1. Interfly is the exchange and/or substitution of aircrew members and/or aircraft between commands. Interfly does not apply to routine exchanges of aircraft such as depot input or output. Normally, interfly should be limited to specific test programs or other special circumstances. Observe the following:

1.5.2. As a minimum, crews will be qualified in the aircraft design and series as well as systems or configurations required to fly the aircraft and/or mission.

1.5.3. Crew member(s) must thoroughly brief MAJCOM-Specific items.

1.5.4. Unit commanders may authorize interfly agreements by mutual agreement with the other participating unit. Formalize agreements through a memorandum of understanding between the participating units. Interfly involving the transfer of aircraft between MAJCOMs must be coordinated and approved through HQ AFMC/DOO.

1.6. Crew Requirements. Only mission qualified, mission essential aircrew and operational support personnel will fly on:

1.6.1. Functional check flights (FCF)(except flights using the O-8F mission symbol, "Equipment Check Flight not subject to FCF limitations"). (Note: Minimum number of maintenance technicians needed to perform airborne FCF duties that the aircrew cannot complete may be flown on FCFs as MESPs. Also, HQ AFMC/DOV personnel may administer checkrides during FCF missions. Flight surgeons may fly on initial FCF missions.)

1.6.2. The first flight of a new aircraft or the first flight after a major modification or programmed depot maintenance (PDM).

1.6.3. Aircraft carrying hazardous materials, AFJMAN 24-204, *Preparing Hazardous Materials for Military Air Shipments.*

1.6.4. Flights the director of flight operations (DFO) or other authority defines as hazardous.

1.6.5. Flights to identify the flight characteristics of aircraft altered by a configuration change.

1.6.6. Flights to test or check the structural integrity of airframes or engines.

1.6.7. Flights to discover or expand flight envelopes.

1.6.8. Record attempts.

NOTE:

Paragraphs 1.6.1. and 1.6.2. do not preclude required AFI 11-202 Vol 1 training for crewmembers undergoing FCF mission qualification training. See AFI 11-202, Vol 1_AFMCSUP 1 for FCF mission restrictions.

Chapter 2

MISSION PLANNING

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

2.2. Briefing/De-briefing. The aircraft commander will ensure the primary mission/alternate is thoroughly briefed/debriefed. The AC/FL/ML should ensure all members are briefed on current/forecast weather, NOTAMs and any mission changes prior to stepping to the aircraft when the flight briefing was conducted prior to the day of the flight. Include any appropriate restrictions levied by the Safety Review Board and/or test hazard minimizing procedures.

2.2.1. All aspects of test missions will be thoroughly briefed by the cognizant engineer or aircraft commander. Briefings will include actions to terminate the flight test profile if required.

2.2.1.1. Each flight will brief an alternate mission, if applicable. The alternate mission should be less complex than the primary.

2.2.1.2. Mission elements/events may be modified and briefed airborne as long as flight safety is not compromised. Unbriefed missions/events will not be flown. Flight leads will ensure changes are acknowledged by all flight members.

2.2.2. Flight Leader's Responsibility. Flight leaders are responsible for presenting a logical briefing that promotes safe, effective mission accomplishment. Use briefing guides to provide a reference list of items that may apply to particular missions. Items listed may be briefed in any sequence. Those items understood by all participants may be briefed as "standard." When flying with dissimilar aircraft in formation, brief proper position (to ensure adequate wingtip clearance) responsibilities, and aircraft-unique requirements for each phase of flight. If applicable, brief chase procedures to include taxi, takeoff, departure, formation rejoins, emergencies, no radio (NORDO) procedures, and weather contingencies.

2.2.3. Standards. Units may employ the use of squadron or unit "standards" as long as the standards are in a published document. However, during sorties where trainees or unassigned personnel are in the flight, all items will be briefed.

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

2.2.5. Either the pilot or flight test engineer will debrief all missions. As a minimum, the debriefing will include an evaluation of the mission objectives, test objectives, lessons learned, and execution errors.

2.3. Passenger Briefing Guides. On passenger carrying aircraft, passengers will be provided a pre-printed passenger briefing guide. Use lead MAJCOM briefing guides where appropriate. If none exists, use the general briefing guide in attachment 20.

2.4. Test Cards. Flight test cards will be constructed according to local procedures and have the appropriate level of authorization. Refer to AFI 99-XXX series instructions and AFMC supplements.

2.5. Low Altitude Charts. Low altitude charts are required for low-level operations. Charts will be updated from the chart update manual (CHUM)(N/A for charts produced by an approved mission planning system with a current DAFIF). Color reproduced charts are authorized provided it is a quality facsimile of the original raw chart containing essential terrain data and features. Note: Helicopter aircrews conducting controlled burn, firefighting, and search and rescue operations are exempted from this requirement. If practical, conduct an area survey for obstructions prior to commencing these operations.

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

2.5.1.1. Noise sensitive areas/no-fly areas.

2.5.1.2. Emergency airfields along the route of flight

2.5.1.3. Route abort altitude/emergency safe altitude (RAA/ESA). Compute the RAA for the entire route/area.

2.5.1.4. Minimum safe altitude (MSA) for each leg of the intended route of flight.

2.6. Local Area Maps. A local area map is not required if pilot aids include jettison areas, divert information, controlled bailout areas and provide sufficient detail of the local area to remain within assigned training areas.

2.6.1. Charts. Flight Information Publication (FLIP) en route charts may be used instead of maps on IFR navigational flights within areas adequately covered by these charts.

2.7. Mission Planning/TOLD Software. Mission planning may be accomplished with any certified mission planning software such as AFMSS. If AFMSS (MPS or PFPS/CFPS) is used to mission plan, any chart produced on either an MPS workstation or personal computer (PFPS/CFPS) will satisfy chart requirements set forth in this instruction. TOLD may be computed using any lead MAJCOM approved software for that MDS aircraft. The flight crew is responsible for the accuracy of input data.

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

2.9. Inflight Guides. Units may use locally developed inflight guides. The unit Stan/Eval function will approve inflight guides.

2.10. Ops Checks.

2.10.1. Accomplish sufficient ops checks to ensure safe mission accomplishment. Increase the frequency during tactical maneuvering at high power settings. Ops checks should include but aren't limited to fuel status, instruments, engines, and life support systems.

2.11. Minimum Runway Lengths. The following minimum runway lengths will be used for all planned operations. Unit commanders or DFOs may waive these requirements on a case-by-case basis.

Table 2.1. Runway Lengths.

AIRCRAFT	CABLE	NO CABLE
F-117	8,000 ft	12,000 ft
F-15	7,000 ft	8,000 ft
F-15E	8,000 ft	9,000 ft
F-16	7,000 ft	8,000 ft
F-4	8,000 ft	10,000 ft
T-38	N/A	8,000 ft
A-10	5,000 ft	5,000 ft
B-1	N/A	10,000 ft
B-2	N/A	10,000 ft
B-52	N/A	10,000 ft
B-707	N/A	7,000 ft
C-135	N/A	7,000 ft
C-130	N/A	See Attachment
C-5	N/A	6,000 ft
C-141	N/A	6,000 ft

2.11.1. For developmental aircraft, runway minimum length will be as described in the aircraft specific safety package.

2.11.2. Runway available (Fighter/Attack/Trainer). Do not take off if the computed ground roll exceeds 80% of the runway available, or if runway available is less than CFL plus 1000 feet, as appropriate.

Chapter 3

FORMATION PROCEDURES

3.1. General. These procedures apply to all fighter/attack and T-38 aircraft. Elements/ formations will be led by a flight lead designated on the flight authorization. For all other aircraft, refer to MDS specific attachments.

3.1.1. Formation flying demands all flight members know and adhere to specific roles. When one or more flight members fail to comply with these roles, dangerous situations can result. Emphasis should be placed on clearing, keeping sight or situational awareness of other flight members, and flight path deconfliction. If a flight member loses sight of his flight leader or other flight member at a time when he or she thinks they should be in sight, a "blind" call should be made. Losing sight during some types of tactical maneuvering is predictable, but reacquiring sight at the appropriate time is also predictable. Discipline among flight members is extremely important to safety and to mission accomplishment.

3.1.2. Do not perform rolling maneuvers during join-up/rejoins to non-tactical formation or below 5,000 feet AGL.

3.1.3. In IMC, maximum flight size in close formation is four aircraft except when flying in formation with a tanker.

3.2. Formation Definitions. These formations are authorized to be flown by AFMC aircrews:

3.2.1. Fingertip. Wingmen are positioned on both sides of flight lead. Refer to MDS specific attachment for parameters.

3.2.2. Echelon. A modified fingertip formation where all formation elements are positioned to the same side of flight lead. Formation references will be maintained for all turns into the echelon. The fuselages of all aircraft in the flight will maintain the same horizontal plane for turns away from the echelon.

3.2.3. Route. Route formation is a modified fingertip formation flown with an increased horizontal separation. Aircraft must not cross over each other during turns unless directed by the leader. Aircraft turning into the element will stack as necessary to keep the lead safely in sight. Wingmen will stay on the same horizontal plane as the lead for turns away from the element.

3.2.4. Close Trail. Fly close trail formations astern and below the jet wash of the preceding aircraft while keeping nose-to-tail clearance, but not more than two aircraft ship lengths aft.

3.2.5. Extended Trail. Fly extended trail formation with increased separation between aircraft.

3.2.6. Chase. Chase formation is used to give in-flight instruction, observe, photograph (document), assist, or evaluate. Specific positions will be briefed based on mission requirements.

3.2.7. Spread. Spread is a maneuverable formation used to give the wingman the opportunity to clear. It is normally flown 3,000’ line abreast.

3.3. Taxi.

3.3.1. Minimum taxi interval is 150 feet. Spacing may be reduced when holding short of or entering the runway.

3.3.2. Minimum taxi interval is 300 feet when operating on a Runway Conditions Reading (RCR) of less than 12.

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

3.3.4. When ice or snow is present, aircraft will not be taxied until all portions of the taxi route and runway have been checked for safe conditions. Units will specify minimum runway condition reading (RCR) for taxi operations.

3.4. Formation Takeoff. These procedures apply unless specifically addressed in the MDS specific attachment.

3.4.1. Flight lead will brief runway lineup and abort procedures.

3.4.2. Wingmen will normally be positioned on the upwind side of the runway with minimum wingtip clearance of 10 feet. Spacing between separated elements or flights on the runway must be at least 500 feet.

3.4.3. If the wingman overruns the leader, the leader will direct the wingman to assume the navigational lead, at which time the wingman will push up to MAX power, maintain his side of the runway, and make his own takeoff. The original leader will then be responsible for inflight separation and directing appropriate measures to regain flight integrity. The original wingman will fly the briefed departure until instructed otherwise by the flight leader.

3.4.4. Formation takeoff restrictions are as follows:

3.4.4.1. Formation takeoffs are restricted to elements of two like aircraft, such as two F-4s, two F-15s, etc.

3.4.4.2. Aircraft must be symmetrically configured and loaded such that a trim or control application to counter a heavy wing or yaw during takeoff is not required. An aircraft carrying a practice bomb dispenser (such as the SUU-20 bomb/rocket dispenser or ECM pylons/pods) may make formation takeoffs with like aircraft not similarly configured.

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

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

3.4.5. Formation takeoffs are prohibited if:

3.4.5.1. Slush, snow, ice, or standing water is on the runway.

3.4.5.2. Crosswind or crosswind gust component is more than 15 knots.

3.4.5.3. The computed takeoff roll exceeds 50% of the available runway.

3.4.5.4. The aircraft has live or full-scale ordnance. (Excluding A/A missiles, loaded SUU20s, or internal guns.)

3.5. En Route Procedures. Refer to AFI 11-205, Aircraft Cockpit and Formation Flight Signals, for airborne visual signal procedures. A radio call is mandatory when directing position changes at night or while in instrument flight conditions.

3.5.1. Tactical and special formations will be briefed. The briefing must include flight lead and wingman responsibilities during turns and position changes.

3.5.1.1. AFTTP 3-1, AFTTP 3-3 (Fighter Fundamentals), Weapon School Texts, and other MAJCOM directives provide excellent sources for specific procedures and techniques for tactical and special formations.

3.5.1.2. At night or in instrument meteorological conditions, in formations other than fingertip or route, formation position should be maintained with the primary reference to instruments and/or on board sensors (Radar, FLIR, TACAN, etc.). Use of visual references will be strictly secondary to aircraft instruments.

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

3.6. Joinups and Rejoins.

3.6.1. Weather criteria for join up underneath a ceiling is 1,000 feet and 3 miles visibility during daylight and 1,500 feet ceiling with 3 miles visibility at night.

3.6.2. Flight members will join in sequence. The number two aircraft will join on the left wing for a straight-ahead rejoin and the element will join on the right wing, unless otherwise briefed. The number two aircraft will join on the inside of the turn, and the element will join on the outside for turning rejoins. The flight leader will use radio transmissions to direct the desired formation positions if the mission or flight requires any deviation.

3.7. Flight Breakup. Flight breakup must be thoroughly briefed. Flight lead will maintain positive control and when necessary, issue instructions to ensure safe separation of participating aircraft. During formation breakups (visual or instruments), the flight lead will clear off aircraft/elements individually. Departing aircraft will initially turn away from the formation and, in VMC conditions, establish visual contact with previously departing aircraft/elements. Flight leaders will not break up formations until each pilot has a positive fix from which to navigate (visual, Air Traffic Control (ATC), INS, or TACAN).

3.8. Changing Leads.

3.8.1. The minimum altitude for changing leads within a formation/element in day VMC is 500 feet AGL over land or 1,000 feet AGL over water, except for emergencies.

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

3.8.3. Prior to initiating the lead change, the leader will ensure that the wingman assuming the lead is in a position to safely initiate the lead change and maintain visual contact.

3.9. Transitioning to IMC.

3.9.1. If loss of sight inadvertently occurs due to weather while in a VMC formation, immediately transition to instruments, recover to level or climbing flight, and execute the appropriate lost wingman procedures. The flight lead will ensure altitude separation between other aircraft in the flight until separate Instrument Flight Rules (IFR) clearances can be obtained.

3.10. Formation Penetration and Approaches.

3.10.1. Do not change lead or wing positions at night or in IMC when below 1,500 feet AGL or radar downwind altitude, whichever is lower.

3.10.2. Formation low approaches may be flown with dissimilar aircraft. Approach airspeed will be based on the higher approach speed of the two aircraft.

3.10.3. Formation penetrations are restricted to two aircraft when the weather at the base of intended landing is less than overhead traffic pattern minimums.

3.10.4. If flying a formation landing, the wingman should be positioned on the appropriate wing prior to weather penetration.

3.11. Formation Landings.

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

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

3.11.3. Formation landing restrictions are as follows:

3.11.3.1. Formation landings are restricted to elements of two like aircraft, such as two F-16s, two F-15s, etc.

3.11.3.2. Aircraft must be symmetrically configured and loaded such that a trim or control application to counter a heavy wing or yaw during landing is not required. An aircraft carrying a practice bomb dispenser (such as the SUU-20 bomb/rocket dispenser or ECM pylons/pods) may make formation landings with like aircraft not similarly configured.

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

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

3.11.4. Formation landings are prohibited if:

3.11.4.1. Effective crosswind component or crosswind gust exceeds 15 knots or flight manual limits.

3.11.4.2. The runway condition reading (RCR) is less than 18.

3.11.4.3. At night; while carrying hung or live ordnance; or with standing water, slush, or snow on the runway.

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

3.11.6. Pilots will maintain their respective landing side of the runway until both aircraft have decelerated to a safe speed. After ensuring adequate nose-tail separation, each aircraft will move to the cold (exit) side of the runway. The wingman will not increase braking to regain position after overrunning lead.

3.12. Approaches and Landings (Fighter/Attack/Trainer).

3.12.1. Normal Landing Pattern.

3.12.1.1. Individual aircraft will execute the break with a minimum interval of 5 seconds, unless mission involves chase procedures.

3.12.1.2. Aircraft must be wings level on final at approximately 300 feet AGL and 1 mile from the planned touchdown point.

3.12.1.3. Minimum pattern and touchdown spacing between landing aircraft is 3,000 feet for similar aircraft (e.g., F-15 A-E versus F-15 A-E), 6,000 feet for dissimilar aircraft (e.g., F-15 A-E versus F-16) or as directed by MAJCOM or the landing base, whichever is higher. Increase spacing whenever wake turbulence is anticipated.

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

3.12.2. Low approach minimum altitudes:

3.12.2.1. Normal single ship – Do not touchdown

3.12.2.2. IP/SEFEs flying chase position – 50 feet AGL

3.12.2.3. Formation low approach – Day: 100 feet AGL Night: 300 feet AGL.

3.12.2.4. Chase aircraft – 200 feet AGL unless safety or circumstances dictate otherwise.

3.13. Chase Formation. This section describes general procedures for planning, briefing, and flying chase formations.

3.13.1. Chase Requirements: The following missions require a safety chase aircraft:

3.13.1.1. Qualitative handling characteristics evaluation.

3.13.1.2. Structural integrity tests.

3.13.1.3. Dispensing, separation, and/or jettison tests of modified or new munitions and suspension equipment.

3.13.1.4. Category I ordnance delivery.

3.13.1.5. Missions requiring flight at or below 3,000 feet AGL, airspeed 600 knots or greater, and six or more "Gs".

3.13.2. Preflight. Chase aircrew will preflight the test aircraft and munitions to observe and become familiar with configurations, lanyards, airframe scratches, etc.

3.13.3. Takeoff.

3.13.3.1. Chase formation takeoff position will be thoroughly briefed. All formation takeoff restrictions apply except chased takeoffs may be accomplished if computed takeoff roll is in excess of 70 percent of available runway length and/or the crosswind or gust component exceeds 15 knots. Brief specific abort procedures.

3.13.3.2. When performing an airborne pickup, chase will fly no slower than "on-speed", no lower than 200 feet AGL, and be in the landing configuration. This procedure may be modified by specific test mission requirements.

3.13.4. Chase Position.

3.13.4.1. In addition to specific flight test requirements, the test aircraft is often concentrating on items not generally associated with normal formation operations. The chase aircrew must be aware of the test point requirements and assist the test pilot by continually monitoring his parameters and be responsible for aircraft separation. When moving into close formation from chase, the chase pilot will make a radio call indicating intentions. This call will be acknowledged. The chase pilot will also make a radio call indicating intentions to return to the chase position.

3.13.4.2. Safety Chase. Specific chase position will be briefed as required for specific test objectives. Avoid the 30-degree cone immediately behind and below lead's fight path in case of inadvertent stores release. When chasing live ordnance missions, the chase pilot is responsible for ensuring safe escape criteria is met.

3.13.4.3. Area Chase. The chase aircraft need only remain in the test area and maintain radio contact with the test aircraft.

3.13.4.4. Compatibility Chase. After completion of specified data point, the chase will move in at lead's request and inspect the stores and aircraft for abnormalities. During sustained high speed flight, the chase will assume a position to keep lead in sight while conserving fuel.

3.13.4.5. Photo Chase. Position is dictated by the photo requirements of the test and type lens used by the photographer. Chase aircraft will fly safety chase during times when photo chase is not required. Pilot and photographer will discuss disposition and stowage of photographic equipment during emergency egress/ejection. Pilot and photographer will discuss mission coordination terminology (i.e., "Camera Up, Camera Down, Move Up," etc.), and maneuvers to be performed.

3.13.5. Communications. Primary and chase aircraft will maintain radio contact during the mission. The chase pilot will issue immediate advisories to lead if lead deviates significantly from intended maneuvers or pre-briefed flight profile.

3.13.6. Landing.

3.13.6.1. Chase aircraft will be similar in maneuvering capability, configuration, and final approach speed to allow the chase pilot to achieve a position from which the landing can be safely observed and a go-around accomplished at minimum altitude.

3.13.6.2. When the lead aircraft is landing with an unexpended item, the primary function of the chase is to observe and report any items inadvertently released from the test aircraft. The chase will assume a maneuvering position in the pattern to accomplish this objective.

3.13.6.3. Minimum altitude is 200 feet AGL unless an emergency situation requires lower.

3.13.7. Training Sorties/Evaluations.

3.13.7.1. Chase pilots will fly outside the traffic pattern being flown by the lead aircraft.

3.13.7.2. Minimum altitude during training missions is 200 feet AGL, 50 feet AGL for instructors or flight examiners performing duties in these capacities.

3.13.8. A safety observer in a chase aircraft will maneuver as required to provide assistance and effective clearing.

3.14. Tactical Formations. This section describes general procedures for flying tactical formations.

3.14.1. Wingmen/elements go high and/or outside of the lead/lead element for deconfliction when required.

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

3.14.3. Loss of Visual. When any flight member/element calls "Blind," the other flight member/element will immediately respond with "Visual" and an altitude call/position report, or "Blind." When the other flight member/element is also "Blind", the flight leader will take action to ensure altitude separation between flight members/elements.

3.14.4. Deconfliction Responsibilities. The wingman is responsible for flight path deconfliction during tactical maneuvering unless he's "Padlocked", "Blind", or "Engaged."

3.14.5. Three/Four-Ship (or greater). When flights of more than two aircraft are in tactical formation:

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

3.14.5.2. Trailing aircraft/element(s) will maintain a sufficient distance back so that primary emphasis during formation maneuvering/turns is on low altitude awareness and deconfliction within elements, not on deconfliction between elements.

3.15. Severe Weather Penetration.

3.15.1. Do not attempt flight through severe weather. However, if unavoidable, obtain separate clearances prior to severe weather penetration. If not feasible, flights may assume an in-trail formation with a minimum of 1 NM separation between aircraft/elements. Obtain ATC clearance for a non-standard formation.

3.16. Night Formation Procedures.

3.16.1. Night Ground Operations. Taxi spacing will be a minimum of 300 feet and the aircraft will taxi on the taxiway centerline. Normally, use the taxi light during all night taxiing. (Exception: When the light might interfere with the vision of the pilot of an aircraft landing or taking off, the taxiing aircraft will come to a stop if the area cannot be visually cleared without the taxi light.) Flight lead will call brake release during night formation takeoffs.

3.16.2. Night Join-up. Weather criteria for night join-up underneath a ceiling is 1,500 feet and 3 miles. Accomplish join-up/rejoin at or above 1,000 feet AGL. During the rejoin, wingmen will cross check their altimeter to ensure they remain at least 1,000 feet AGL. After join up, the anti-collision strobes will be OFF and position lights will be BRIGHT (DIM if necessary) STEADY for all except the last aircraft. The last aircraft will keep the anti-collision strobe ON and position lights BRIGHT STEADY unless otherwise directed by the flight lead.

3.16.3. Night Formation Procedures.

3.16.3.1. Change of lead or wing positions must be accomplished at or above 1,500 feet AGL, unless established on radar downwind. Lead and position changes will be called over the radio and should be initiated from stabilized, wings-level attitude.

3.16.4. Night fingertip formation is flown in approximately the same position as during the day.

3.16.5. Night Breakup. Prior to a night formation breakup, the flight leader will confirm position and transmit altitude, airspeed, attitude, altimeter setting and heading. Wingmen will acknowledge, and confirm good navigational aids.

3.16.5.1. Only perform night formation landings when required to safely recover the aircraft.

3.17. Formation Instrument Flight Procedures.

3.17.1. The flight leader will notify the appropriate ATC agency when a VMC join-up will not be accomplished due to weather conditions or operational requirements, and coordinate for an appropriate altitude reservation. Formation in-trail departures will comply with instructions for a non-standard formation flight as defined in FLIP. Flight lead should request IFF squawks for wingmen in trail.

3.17.2. Do not sacrifice basic instrument flying when performing secondary trail tasks during trail departures in IMC. Strictly adhere to the briefed climb speeds, power settings, altitudes, headings, and turn points. If task saturation occurs, cease attempts to maintain trail, immediately concentrate on flying the instrument departure, and notify the flight lead

3.17.3. Takeoff. Each element or aircraft will climb to 1,000 feet AGL before making any turns unless departure instructions, or safety considerations require otherwise.

3.17.4. Instrument Trail Departures:

3.17.4.1. Maintain aircraft control by making a timely transition to instruments as outside visual cues deteriorate. Overriding priority must be given to flying the aircraft, not operating the radar.

3.17.5. Trail Departure Procedures:

3.17.5.1. Emphasis must be on specific ground track, airspeed, attitude and closure control. Takeoff spacing will be a minimum of 20 seconds.

3.17.5.2. Each aircraft/element will accelerate in MIL/AB power until reaching 350 KIAS or briefed climb speed and power setting. Climb speed will be maintained until reaching cruise mach/TAS, unless otherwise briefed.

3.17.5.3. Each aircraft/element will call "tied" when radar contact (or AAI return) is established with the preceding aircraft. No further radio calls are required once all aircraft are "tied" unless radar contact is lost. Refer to procedures under "No Radar/SKE Contact" if radar contact is lost or not received after takeoff.

3.17.5.4. Use all available means to ensure that trail is maintained on the preceding aircraft.

3.17.5.5. Each aircraft/element will maintain 20 seconds or the briefed trail spacing (2 NM minimum) using all available aircraft systems and navigational aids to monitor position.

3.17.5.6. Flight lead will make all heading changes with 30 degree bank turns.

3.17.5.7. For large aircraft, use the number of degrees to turn as the amount of bank angle, up to 30 degrees of heading change. For example, use 15 degrees of bank for a heading change of 15 degrees.

3.17.6. No Radar/SKE Contact:

3.17.6.1. Notify the flight leader if radar/SKE contact with the preceding aircraft/element cannot be gained or maintained. Each preceding aircraft will then call when initiating altitude changes or turns and when passing each 5,000-foot altitude increment.

3.17.6.2. Each aircraft/element will maintain at least 1,000 feet vertical separation from the preceding aircraft/element during the climb and after level off until visual contact is established. In the event a rejoin cannot be accomplished at level off, the flight leader will request 1,000 feet of altitude separation for each succeeding aircraft/element. If the MEA cannot be complied with, the 1,000-foot vertical separation may be reduced to 500 feet.

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

3.17.7.1. Two or Three Ship Flights:

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

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

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

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

NOTE:

If in 3-ship echelon, refer to 4-ship lost wingman procedures.

3.17.7.1.3. Precision and Nonprecision Final Approach. The wingman will momentarily turn away to ensure clearance and inform leader. Commence the published missed approach procedure and obtain a separate clearance from approach control.

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

3.17.8. 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:

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

3.17.8.2. Turns:

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

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

Chapter 4

AIR-TO-AIR TRAINING

4.1. General. Air-to-air training will be conducted according to AFI 11-214, Aircrew, Weapons Director, and Terminal Attack Controller Procedures for Air Operations and this instruction. AFTTP 3-1, AFTTP 3-3 (Fighter Fundamentals), and Weapons School Texts are primary references for air-to-air maneuvers and tactics. This section provides rules that apply to all categories of air-to-air training, which may include the following: ACBT, DACBT, BFM LOWAT, and air-to-air training.

4.2. Aircrew Qualification. Commanders must establish minimum aircrew qualifications for air combat and aerial attack training and will designate qualified aircrews.

4.3. Procedures. Follow these procedures when flying ACBT or intercept training missions.

4.3.1. Participating aircraft must be in an authorized configuration with no live munitions uploaded.

4.3.2. EXCEPTION: Live 20MM, 30 MM ammunition when gun is safed by all means available, including mechanical, hydraulic and electrical safeties. Refer to 11-2MDS volumes and Technical Orders (T.O.) for safing procedures.

4.3.3. Mission briefings must define ground control intercept (GCI) support requirements and cover all applicable training rules.

4.3.4. Briefings must also cover local area operating procedures, training areas, dissimilar formations and aircraft characteristics.

4.3.4.1. Aircrews must conduct an ops and fuel check prior to each engagement.

4.4. "G"Awareness. Perform a G awareness warmup whenever 6 Gs or greater is expected during the sortie. The G-awareness maneuver will consist of at least two 90 degree turns. (The second turn of the g-awareness exercise for air-to-air sorties will be a minimum of 180 degrees of turn.) The first turn will be a smooth onset rate to approximately 4 Gs. Pilots will use this turn to ensure proper g-suit operation and to practice their anti-g straining maneuver. Regain airspeed and perform another 90 degree turn at up to 6-7 Gs. If aircraft limits preclude either of the above, turns should be performed so as not to exceed aircraft limits.

4.5. ACBT (Aerial Combat Training) Briefing. Brief ACBT missions face-to-face before the flight. Geographically separated units must conduct a telephone briefing before conducting ACBT missions.

4.6. Training Rules. Training may be strengthened or expanded by supervisors and IPs based on the scenario and aircrew proficiency levels. Air-to-air training rules are specified in AFI 11-214.

Chapter 5

LOW LEVEL PROCEDURES

5.1. General. The low altitude environment defined by this instruction is at or below 2,000 feet AGL (300 feet for helicopters). Carry low level mission planning folders or charts on all low-level navigational flights. Minimum altitude will be IAW MDS specific attachments.

5.1.1. Minimum altitude for night or IMC low level operations is 1,000 feet (50 for helicopters) above the highest obstacle within 5nm of the planned course or IFR altitude/MSA whichever is more conservative. Aircrew qualified to fly terrain following radar (TFR) IAW AFI 11-2FT Volume 1 may operate at their minimum qualification altitude at night or in IMC.

5.2. Visual Procedures. Weather minimums for visual low level training will be 1,500 foot (1000 for helicopters) ceiling and 3 miles visibility for any route or area, or as specified in FLIP for Military Training Routes, unit regulations or national rules, whichever is higher.

5.2.1. Minimum altitude. Pilots will not fly lower than 500 feet (100 for helicopters) AGL unless they are certified or entered in a step-down training program.

5.2.1.1. A pilot's minimum altitude will be determined and certified by the unit commander. Pilots participating in approved step-down training programs will comply with the requirements and restrictions of that program. Document certification of the AF Form 1381, **USAF Certification of Aircrew Training**.

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

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

5.3. TF/TFR Flight. Flights will only be conducted on approved military training routes (MTRs), military operating areas and restricted areas. TFR operations are prohibited unless the crew is current in TFR operations as defined in AFI 11-2FT volume 1. TFR operations specified in an approved test plan will operate within the guidelines of the test plan and any restrictions imposed by the safety review board.

5.3.1. Commanders may authorize fighter/trainer aircraft to fly below 500 feet AGL provided the subject crews complete Low Altitude Step Down (LASTD) Training IAW AFI 11-2FT Volume 1. Aircrew trained in LASTD will maintain currency IAW AFI 11-2FT Volume 1.

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

5.4.1. If any of the following situations occur during Instrument Meteorological Conditions (IMC) or at night and the crew is unable to clear terrain visually, abort the route. NVGs may be used to clear terrain visually during night Visual Meteorological Conditions. TF/TFR equipped aircraft may con-

tinue to TF/TFR in an area of excessive negative altitude variation. However, in the event of a flyup, TF/TFR malfunction or any required climb to MSA, you must abort the route.

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

5.4.3. The aircraft radar altimeter indicates less than a 600 ft terrain crossing while at the MSA/IFR.

5.4.3.1. Flying and maintaining TA/TF/TFR clearance plane settings and the aircraft pressure altimeters indicate at or above the route IFR/MSA altitude.

5.4.3.2. Crews may enter the route in IMC conditions and fly MSA/IFR 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/TFR, in order to continue low level operations. Once the forecast/observed area(s) of excessive altitude variation is overflown, subsequent portions of the low level route may be flown.

5.5. Night Vision Goggles (NVG). NVGs will only be worn by current and qualified pilots or while completing an upgrade program in accordance with a command approved training program under the supervision of an NVG qualified IP. TPS students may wear NVGs while under the supervision of an NVG qualified IP. (Forward all unit developed NVG training programs to HQ AFMC/DOV for review.) NVGs will be used in VMC only. For multiplace aircraft, the IP must sit at a set of flight controls.

5.5.1. Illumination Levels.

5.5.1.1. High illumination is defined as a minimum of 2.2 millilux illumination derived from natural or artificial sources. This roughly equates to a 20% moon disk at an elevation of 30 degrees or higher. If weather or other conditions reduce actual inflight illumination below 2.2 millilux, low illumination procedures will be followed.

5.5.1.2. Low illumination is defined as less than 2.2 millilux.

5.5.1.3. Even when illumination levels are forecast, weather or other conditions may cause actual illumination levels to be higher or lower than expected. In flight, pilots must estimate whether actual inflight illumination levels are High or Low, and determine if the existing conditions provide sufficient NVG performance to accomplish the planned mission and/or events. Pilots will comply with High or Low illumination procedures/restrictions contained here and in AFI 11-214.

5.5.2. NVGs will be tested and adjusted for the individual pilot in a unit eyelane or NVG tester prior to use.

5.5.3. Fly with NVGs only in MAJCOM approved NVG compatible lighted cockpits. Permanently modified NVG compatible cockpits that have a degraded light source may be used for NVG missions. Specific missions with a degraded light source (Chem. Sticks) require a discernible horizon and will be at the discretion of the unit commander.

5.5.4. NVG sorties require an operational Ground Collision Avoidance System (GCAS) system, if the aircraft is so equipped.

5.5.5. While conducting formation procedures a “goggles on” or “goggles off” call will be made indicating which flight member is using goggles. Wingman will fly no closer than route position while wearing NVGs.

5.5.6. Use of NVGs during all takeoffs and landings are prohibited and the goggles will not be donned prior to 2,000 feet AGL. The NVGs will be removed a minimum of 5 minutes prior to landing. (N/A for helicopters)

5.5.7. Minimum altitude for NVG operations is:

5.5.7.1. Fixed Wing: TFR certified altitude or MSA.

5.5.7.2. Helicopter: 50 Feet above the highest obstacle.

5.5.8. The following restrictions apply:

5.5.8.1. The aircraft has an operable radar altimeter.

5.5.8.2. The cockpit has operable NVIS lighting.

5.5.8.3. Flight conditions are during times of high illumination (i.e. full moon, artificial ground illumination)

5.5.8.4. Inflight visibility of at least 5 NM (3 NM helicopter).

5.5.8.5. Operations are conducted within an approved MOA, Restricted area or MTR.

5.5.9. Tanker Rejoin. NVGs may be worn for night tanker rejoins, but will be raised to the up and stowed position or removed prior to the precontact position.

5.5.10. Close Formation. Wingmen wearing NVGs will fly no closer than route formation.

5.5.11. Weather Restriction. MAJCOM established night weather restrictions apply. Pilots must be ready to transition to instruments and execute appropriate lost wingman or route abort procedures in the event they inadvertently enter the weather. Under certain IMC or marginal VFR conditions, NVGs may allow pilots to maintain visual references with relation to the ground, the horizon, other aircraft, etc. However, while wearing NVGs pilots must still comply with published VFR cloud clearance and visibility minimums, have an IFR clearance prior to entering IMC, and follow all IFR procedures while in IMC.

5.5.12. Weapons delivery.

5.5.12.1. Range weather restrictions and minimum altitudes during weapons delivery passes are IAW AFI 11-214. Minimum altitudes during night surface attack operations are IAW AFI 11-214 restrictions, the pilot’s NVG qualification minimum altitude, and the minimum altitude allowed by the actual illumination level, whichever is higher.

5.5.12.2. On Class A ranges, NVG qualified pilots, with the concurrence of the Range Control Officer (RCO), are allowed to choose external aircraft lighting settings that maximize training, minimize interference with NVGs, and still allow the RCO to safely monitor the aircraft. Depending on the lighting conditions and RCO equipment, this could involve normal, reduced, covert or blacked-out lighting IAW AFI 11-214.

5.5.12.3. During all range sorties for upgrading NVG pilots (basic NVG upgrade), covert or blacked-out lighting weapons deliveries may only be conducted dry.

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

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

Chapter 6

AIR TO SURFACE EMPLOYMENT

6.1. Air to Surface General Guidance. This chapter describes procedures for aircrew air-to-surface training and is applicable to all AFMC aircraft. Refer to appropriate AFTTP 3-1VXX, T.O. 1M-34, T.O. 1X-XX-34-X-1, T.O. 1X-XX-25-1, and T.O. 1X-XX-25-2 for weapons employment, planning and analysis. Developmental weapons employment will be conducted IAW approved test plans. AFI 11-214 contains air-to-surface procedures applicable to all aircraft. AFI 13-212V1, *Weapons Ranges*, and applicable range supplements as well as AFJI 11-204, *Operational Procedures for Aircraft Carrying Hazardous Materials*, and other MAJCOM instructions may also provide valuable information. This chapter does not apply to approved test missions.

6.2. Drop Procedures. Units conducting aerial delivery operations will develop specialized training programs and operational procedures. Units will employ AFMCI 11- 301, *Life Support Program*, AFJI 13-210, *Joint Airdrop Inspection Records, Malfunction Investigations, and Activity Reporting*, AFI 11- 402, *Aviation and Parachutist Service, Aeronautical Ratings and Badges*, FM 31- 19 (US Army), and applicable TOs for all operations. Refer to MDS specific attachment and or other MAJCOM instructions for guidance.

6.3. Responsibilities and Definitions:

6.3.1. Terms:

6.3.1.1. Attempted Release. The bombing system issues a release pulse in either automatic or manual mode with all switches correctly positioned.

6.3.1.2. Weapon. Any live, inert, or training munitions.

6.3.1.3. Hung Weapon. A hung weapon is defined as any weapon that doesn't separate from the aircraft after an attempted release. This may occur as a result of a release system or release unit malfunction resulting in a partially released bomb or a released bomb lying on closed bomb bay doors.

NOTE:

This includes weapons released and separation not confirmed or release status unknown.

6.3.1.4. Unexpended Weapon. Weapons on board the aircraft with no release attempt or after successfully releasing the intended number of weapons in a partial load. Weapons not released due to procedural errors are considered unexpended.

6.3.1.5. Range Control Officer (RCO). RCO or other range control personnel qualified to issue release clearance, confirm weapon release, or authorize use of jettison/salvo areas.

6.4. Planning Guidance:

6.4.1. Non-nuclear bombs, pods, Air to Ground Missiles (AGMs), or training weapons may be carried on flights provided that:

6.4.1.1. All range procedures and weapon employment rules are clearly delineated in range guides and/or test plans and thoroughly understood by all crewmembers or designated prior to any flight carrying weapons.

6.4.1.2. Aircraft follow a route to the release area that minimizes overflight of heavily populated and congested areas.

6.5. Release Procedures:

6.5.1. Minimum altitude for all range operations will be IAW applicable aircraft and weapon tech orders, range restrictions or flight test limits, whichever is higher.

6.5.2. Weapon Unlock/Release Enable/Master Arm will not be commanded unless there is intent to expend that ordnance IAW range procedures or actual test mission requirements.

6.5.3. Single-ship sorties may be flown and training ordnance expended if the event is prebriefed and the pilot is either mission qualified or an IP in the aircraft. Delivery events must be compatible when more than one type of aircraft is flown on the range at the same time.

6.5.4. Aircraft must fly the same delivery pattern (rectangular, pop-up, etc). Delivery modes may be mixed when the same target and delivery patterns are used.

6.5.5. Minimum Altitudes. Minimum release and recovery altitudes will be dictated by the fusing and fragment envelopes established in T.O. 1-1M-34, T.O. 1X-XXX-34-1-1, T.O. 1X-XXX-25-1 or other command directives, whichever is more restrictive.

6.5.5.1. Minimum recovery altitudes for fighter aircraft using training munitions are shown in Table 3.1

6.5.5.2. Fouls or Illegal Procedures. Fouls will be charged in accordance with AFI 11-214. DFOs may establish additional foul criteria. Any pilot who fouls twice, or whose procedures are considered dangerous, will be directed to leave the range. Pilots removed from the range for violations will not take part in any other weapons events on that sortie. They will either hold 1,000 feet above the highest pattern to be flown while waiting to rejoin the flight or will follow local directives.

6.5.6. Live Ordnance Deliveries. Compute minimum release altitudes to provide safe separation and safe escape from the frag envelope and ground clearance. Commanders define local procedures to be used for jettison and recovery of aircraft that have release malfunction/hung ordnance.

Table 6.1. Weapons Employment Minimum Altitudes.

Event	Dive Angle (Degrees)	Recovery Altitude (AGL)
Low Angle Bomb	< 15	200 ft
Low Angle Low Drag	< 30	1000 ft
Dive Bomb	>30	1500 ft
High Altitude Dive Bomb	> 30	4500 ft
Low Angle Strafe	5-15	75 ft
High Angle Strafe	> 15	1500 ft
Level or Pull up Deliveries	N/A	200 ft (run in and release)

6.6. In-flight Live Ordnance Procedures. Observe the following safety precautions for flight training activity with live weapons. Test missions will follow guidance in the approved test plan and safety package.

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

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

6.6.3. Weapon Unlock/Release Enable will not be completed until the aircraft is within the designated bombing range.

6.6.4. If release is verified by the Range Control Officer (RCO) and internal indications are consistent with RCO observations, aircrews may conduct additional training without restriction provided no weapons remain on the aircraft.

6.7. Hung Stores. Crews experiencing a hung store may contact the RCO for permission to release or jettison the hung weapon(s) in a suitable area. Follow RCO instructions and all warnings and cautions in the appropriate Dash-34 series tech order. If a hung weapon cannot be jettisoned/released, or if the crew elects not to jettison, the crew will accomplish the abort/post release checklist and return directly to home station or other suitable landing base, avoiding overflight of populated areas. Air refueling may be accomplished for safe recovery of the aircraft.

6.7.1. Refer to local guidance for recovery procedures with hung weapons. If the crew is required to land at an airfield other than the base of operations, with hung or unexpended weapons, advise the local authorities of the situation so that proper coordination can be accomplished with their safety office.

6.8. Off-Range Simulated Weapons Employment. Procedures in AFI 11-214 and the following apply:

6.8.1. Off-range simulated weapons employment will not be conducted with hung ordnance aboard the aircraft.

6.9. Weather Minimums.

6.9.1. Basic weather minimums established in AFI 11-214 apply. In no case will the ceiling be lower than 2,000 feet AGL for climbing or diving deliveries, or 1,500 feet AGL for level deliveries.

6.9.2. Level deliveries may be accomplished in IMC on approved ranges if the target is properly verified.

6.10. Target Identification. Pilots must positively identify the target prior to weapons release. Achieve positive identification by either visually acquiring the target or by confirming target location through valid on-board/off-board cues. These cues include radar, GPS, marking rounds, IR Maverick lock-on, IR pointers or NVG compatible marking devices. Pilots should exercise caution and possess a high level of target situational awareness when relying on a single target cue to confirm target location.

6.11. Compatibility Flight Profile & Chase Procedures.

6.11.1. General:

6.11.1.1. The first flight of a new weapon, or an existing weapon to be certified on a different aircraft, normally consists of a compatibility flight profile (CFP). The objectives are: (1) investigate

possible degradation of handling qualities and/or (2) demonstrate aircraft/munitions structural integrity.

6.11.1.2. A captive compatibility test normally consists of, but is not limited to, three sorties. The first sortie is a baseline flight. The second sortie is a handling qualities and structural integrity evaluation, and the third sortie is a vibration and endurance evaluation (speed soak). The second and third sortie may be combined into one sortie.

6.11.1.3. Pilots flying compatibility flight profiles must be graduates of established Test Pilot School courses.

6.11.1.4. If it is deemed by appropriate authorities that handling qualities are "not an issue", then a baseline is not required.

6.11.2. Planning:

6.11.2.1. Plan the handling qualities/structural integrity sortie(s) to fly the aircraft/munitions combination to the maximum symmetrical and unsymmetrical load factors at the maximum allowable speed. Employ a series of increasing values (build-up technique) to reach the maximum load factors and maximum airspeed specified in the flight clearance. In no case should the CFP maneuvers be planned that exceed flight manual listed aircraft munitions.

6.11.2.2. The carriage limits specified by the flight clearance and achieved during the CFP test are often used in subsequent release testing of the munitions. If a store is to be certified with identical carriage and release limits, it may be necessary during release testing to temporarily exceed the carriage limits (for example, high speed single deliveries that result in dry, hung, aborted, or partial store release passes). In such cases, a maximum allowable transient over-speed limit for captive carriage should be issued. This limit should allow test parameters followed by a nominal 5g-dive bomb recovery pull-up during the compatibility profile. Time at speeds above the normal carriage limit should be minimized.

6.11.2.3. Inert munitions with fuses, boosters, arming wires, or lanyards installed are required for CFP testing. The store to be certified will be flown in a jettisonable configuration. The review boards may approve non-jettisonable configurations and the use of live ordnance in certain cases. Request this approval early in the planning stages to facilitate Class II modification designs.

6.11.3. Procedures:

6.11.3.1. Overall procedures for conducting compatibility flight-testing are outlined in Military Standardization Handbook Guide to Aircraft/Stores Compatibility, paragraphs 6.2.1.7.1 through 6.2.1.7.9.

6.11.3.2. Still photographs will be taken of the test aircraft/store combination prior to each CFP sortie.

6.11.3.3. The baseline flight will be flown by the same pilot in the same configuration as the planned CFP, minus the test store(s). If possible, use the same tail number for the baseline and CFP. Fly the baseline to the same end points planned for the CFP using a build-up technique.

6.11.3.4. Specific flight test events for the handling qualities/structural integrity sortie(s) will be performed IAW MIL-HDBK-244, paragraph 6.2.1.7.6.2, with the following additional; restrictions:

6.11.3.4.1. Only Flight Test Techniques (FTTs) certified by the USAF Test Pilot School will be used to accomplish these data points.

6.11.3.4.2. The minimum altitude for all FTTs is 1000 feet AGL.

6.11.3.4.3. Start longitudinal short period and later-directional dynamic analysis with stability and control augmentation ON. If response is acceptable, and if necessary for analysis, perform the same event with augmentation OFF to determine response.

6.11.3.4.4. The symmetric pull-up FTT will be used, in lieu of maneuvering flight, when attempting to achieve load factors greater than 7.0 g's below 10,000 feet AGL. Unless Combat Edge is worn, total number of excursions above 7.0 g's below 10,000 feet AGL will be limited to 10 per sortie.

6.11.3.4.5. The bank-to-bank FTT (45 to 45 degree) will be used to achieve roll performance below 5000 feet AGL and in all power approach configurations.

6.11.3.4.6. Dive angles to achieve parameters will not exceed the planned data altitude (AGL) divided by 200. For example: 10 degrees maximum for 2000 feet. Minimum recovery altitudes for weapons release will still follow guidance in chapter 6 of this instruction.

6.11.4. Chase. Chase is not required for the baseline flight.

6.11.4.1. Post-Flight.

6.11.4.1.1. After each sortie, the aircrew will visually examine the aircraft/stores combination for damage, failure, cracks, looseness, popped rivets, etc. If significant discrepancies occur on the handling qualities/structural integrity sortie, the test should be discontinued. In addition to a visual inspection, the test item and suspension equipment may require non-destructive inspection (NDI).

6.11.4.1.1.1. Still photographs will be taken of the test store after each sortie during the compatibility test.

6.11.4.1.1.2. Test stores will not be down loaded between sorties, as this will invalidate the test.

Chapter 7

AIR REFUELING

7.1. General. AFMC aircrews will conduct air refueling IAW this regulation, MDS specific guidance provided in applicable attachments and applicable flight manuals and/or approved flight test plans.

7.2. Rendezvous.

7.2.1. Point Parallel Rendezvous. Receiver aircraft shall arrive at the Air Refueling Control Point (ARCP) no earlier than the scheduled Air Refueling Control Time (ARCT) minus 5 minutes and depart no later than ARCT plus 10 minutes. If unable to meet timing tolerance, attempt to contact a unit scheduler/duty officer for a new rendezvous time. If unable to schedule a new rendezvous time, air refueling is permitted provided ARTCC clearance is received.

7.2.2. Buddy, On-Course, and en route Rendezvous. Aircraft should arrive at the Rendezvous Point ± 5 minutes of the scheduled rendezvous time. If unable to meet timing tolerance, attempt to contact a unit scheduler/duty officer for a new rendezvous time. If unable to schedule a new rendezvous time, air refueling is permitted provided ARTCC clearance is received.

7.3. Air Refueling limitations.

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

7.3.2. Reverse air refueling and manual boom latching procedures training must be under instructor pilot supervision. Brief procedures used between receiver pilots and boom operators during mission planning. Inflight coordination between receiver pilot and boom operator must include briefing items as required by applicable air refueling technical orders. Both tanker and receiver air refueling system must be fully operable.

7.3.3. Do not accomplish breakaway training from the contact position or boom limit demonstration unless:

7.3.3.1. The receiver signal system is in normal.

7.3.3.2. The receiver and tanker have assured normal disconnect capability prior to initiating maneuver.

7.3.4. For breakaway training, the tanker pilot and boom operator and the receiver pilot will coordinate the maneuver prior to inflight accomplishment. Inflight coordination must include when the maneuver will occur and who will give the command of execution.

7.3.5. For boom envelope demonstrations, the receiver pilot and the boom operator will confirm normal disconnect capability and discuss the maneuver prior to accomplishment. Inflight coordination must include the receiver pilot informing the boom operator when commencing the demonstration, the limit to be demonstrated, and when terminating the demonstration.

7.3.6. Do not perform night contacts without sufficient slipway lighting unless necessary for the safe recovery of the aircraft.

Chapter 8

INSTRUMENT PROCEDURES

8.1. Approach Category. Refer to MDS specific attachments for aircraft approach categories.

8.2. Altitude Advisory Calls. The following procedures are applicable to multiplace aircraft that do not have guidance defined in Technical Orders.

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

8.2.2. Altitude Calls.

8.2.2.1. 1,000 feet above IAF (or holding) altitude.

8.2.2.2. Transition altitude/level.

8.2.2.3. 1,000 feet above or below assigned altitude.

8.2.2.4. 100 feet above/below assigned altitude to include MDA/DH

8.2.2.5. During instrument approaches call 100 feet above procedure turn, FAF, MDA or DH altitude.

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

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

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

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

8.3. Instrument Briefing. Aircrews in multiplace aircraft will brief their intentions prior to commencing the approach. Use the following as a guide:

8.3.1. Approach to be used.

8.3.2. Navigation and communication radios set.

8.3.2.1. TACAN/ VOR select switch.

8.3.2.2. Final approach course.

8.3.3. Altimeters

8.3.4. Sector altitude/ DH/ MDA/ field elevation.

8.3.5. Weather required for approach.

8.3.6. Missed approach point, climbout and intentions.

8.3.7. Review aerodrome sketch.

8.3.7.1. Terrain/ obstacle hazards.

8.3.7.2. Ceiling and visibility requirements/ RVR.

8.3.8. Crew duties and responsibilities.

8.3.9. Lost comm intentions.

8.3.10. Backup approach and frequency.

8.3.11. Heading and altitude systems.

Chapter 9

OPERATING LIMITS, EMERGENCY PROCEDURES AND RESTRICTIONS

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

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

9.3. FCF Guidelines. FCFs following PDM will be performed IAW T.O. 1X-XX-6CF-1 and the current work specification. FCFs for other reasons, such as major aircraft repair, modification, or extended aircraft downtime (as defined by T.O. 1X-XX -6CF-1) can be tailored. The FCF aircrew and aircraft maintenance/sustaining engineering activity will determine which FCF procedures will be accomplished.

9.3.1. FCF for Major Temporary 2 (T-2) Modified or Developmental Aircraft. When original equipment is modified or new equipment is added to the aircraft that is determined to be major by the aircraft Configuration Control Board (CCB) that is not covered by USAF technical orders, the contractor or responsible test organization will provide FCF/ACF or airworthiness procedures. The need for FCF after a T-2 modification will be determined by the aircraft maintenance activity. These procedures will augment those already defined in the -6. Conduct of the first flight after a major T-2 Mod requiring verification of system airworthiness will be part of an approved test plan. The aircraft manufacturer/contractor will define FCF procedures for developmental aircraft. See AFMCI 21-126, Temporary 2 (T-2) Modification of Aerospace Vehicles, for additional guidance.

NOTE:

T-2 modifications will normally be accomplished only on programs having approved program management directives (PMDs). No more than five systems may be modified on a temporary basis without SM approval. T-2 modifications will not be maintained on the system for longer than the approved test program requires. Systems will be returned to their original configuration upon completion of the test.

9.3.2. Use of Test Cards. Unit developed test cards may be used in lieu of the FCF cards. Completed cards will remain on file with the unit for a period of one year.

9.4. Fuel Dumping. Fuel dumping will be conducted only to reduce aircraft gross weight in an emergency or as required for flight test/FCF. When circumstances permit, dump over unpopulated areas at an altitude above 5,000 AGL, when feasible. Advise the appropriate air traffic control agency of intention, altitude, and location when fuel is dumped and when the operation has been completed.

9.5. Minimum Equipment Lists (MEL).

9.5.1. Lead MAJCOMs establish Minimum Essential Systems Lists (MESL) IAW AFPD 10-9 as a tool to determine aircraft mission capability. Many of these MESLs are written referencing the aircrafts' wartime and/or operational mission. The MESL therefore, may require equipment that for FCF, test, or aircraft ferry/delivery is not essential for flight.

9.5.2. Units may use MESLs to establish their own MELs for safety-of-flight or mission required systems.

9.6. Back Seat Landings. Instructor pilots may conduct back seat landings with any pilot occupying the front cockpit. Pilots noncurrent for back seat landings must fly with an IP in the front cockpit to regain back seat landing currency.

9.7. Weather Avoidance.

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

9.7.2. During flight, attempt to avoid thunderstorms by at least:

9.7.2.1. 20 NMs at or above flight level (FL) 230.

9.7.2.2. 10 NMs below FL 230.

9.7.2.3. 5 NMs for operations below 5000 feet AGL provided the outside air temperature is at or above 0 degree Celsius at flight altitude. Avoid gust fronts and winds preceding a rapidly moving thunderstorm.

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

9.8. Radio Failure. Pilots experiencing radio failure will comply with procedures outlined in FLIP, AFI 11-202 Vol 3 and local directives.

9.9. Search and Rescue (SARCAP) Procedures. In the event an aircraft is lost in flight, actions must begin to locate possible survivors and initiate rescue efforts. The following procedures are by no means complete and should be adjusted to meet each unique search and rescue situation.

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

9.9.2. Talk. Communicate the emergency situation and aircraft/flight intentions immediately to applicable control agencies. Use GUARD frequency if necessary.

9.9.3. Mark. Mark the last known position of survivor/crash site using any means available. TACAN/INS position, ATC/GCI positioning, or ground references should be used to identify the immediate area for subsequent rescue efforts.

9.9.4. Separate. Remain above the last observed parachute altitudes until position of all possible survivors is determined. Deconflict other aircraft assisting in the SARCAP by altitude to preclude midair collision. Establish high/low CAPs as necessary to facilitate communication with other agencies.

9.9.4.1. When establishing the high/low CAP, care should be taken to not endanger the aircraft searching for the survivor(s) by flying too low or slow in an attempt to visually acquire the survivor. Pilots should know their aircraft limits and not unnecessarily place the aircraft so close to air-

speed and power limits that an unexpected encounter with a bird or civilian traffic could cause another accident. Safety of the searching aircraft is paramount as channelized attention, target (wreckage) fixation, or marginal weather conditions may expose the searching aircraft to unacceptable risks.

9.9.5. Bingo. Revise BINGO fuels or recovery bases as required to maintain maximum SARCAP coverage over survivors/crash site. Do not overfly BINGO fuel. Relinquish SARCAP operation to designated rescue forces upon their arrival.

9.10. Emergency Limitations. Do not practice emergency procedures that degrade aircraft performance or flight control capabilities unless specifically authorized by an approved training syllabus or test plan. Further guidance is contained in the MDS attachments to this instruction.

9.10.1. Do not taxi aircraft with malfunctions that affect the nosewheel steering or brake systems.

9.10.2. Do not use a malfunctioning system unless it is required for safe recovery of the aircraft. Do not continue in flight trouble shooting of a malfunction after completing flight manual emergency procedures.

9.10.3. Flight examiners should suspend the evaluation during an actual emergency condition. Safe recovery of the aircrew and aircraft is the main priority. Evaluators will take an active role in ensuring the safe recovery of the aircrew and aircraft.

9.11. Unusual Attitudes. Practice unusual attitude recoveries are prohibited at night or in IMC and any time the safety observer is not qualified in the aircraft. Initiate practice unusual attitude recoveries at an altitude that will allow recovery no lower than 5,000 (500 for helicopters) feet AGL.

9.12. Takeoff Aborts.

9.12.1. Prior to flight, every member of the flight will review and understand takeoff data. Place particular emphasis on takeoff and abort factors during abnormal situations such as short/wet runway, heavy gross weights, and abort sequence in formation flights.

9.12.2. Anytime an aircraft experiences a high speed abort, hot brakes should be suspected. If confirmed, declare a ground emergency and taxi the aircraft to the designated hot brake area and perform hot brake procedures.

9.13. Air Aborts.

9.13.1. Abort the mission anytime aircraft damage or degraded aircraft control is known or suspected.

9.14. Pattern Restrictions. The training restrictions outlined in tables 9.1 and 9.2 apply to all AFMC flying units. AFMC units will comply with these restrictions for all flying activities.

Table 9.1. Training Restrictions -- Fighter and Trainer Jet.

	A	B	C
LINE	Event	IP or EP at a Set of Controls or in Chase Aircraft	No IP or EP
1	Simulated Emergeny Procedures	1. Day VFR (1500'/3 miles visibility) 2. All engines will be used for unplanned go-arounds 3. Gross weight must not exceed basic weight plus weight of full internal fuel or flight manual limits, whichever is less 4. No external ordnance (except training ordnance) 5. No passengers	1. Same 2. Same 3. Same 4. Same 5. Same
Simulated Single Engine – Lines 2, 3 ,4			
2	Climb Out	1. Not authorized	1. Same
3	Approach& Go-around	1. Ensure adequate obstacle clearance is maintained 2. Initiate engine out go-around above 200' AGL	1. Same 2. Same
4	Landing	1. Crosswind corrected for RCR must be in the recommended zone of the aircraft's landing crosswind chart	1. Same
5	*Simulated Flameout/ Flight Level (SFO/FL)	1. Ceiling is no lower than 500' above the highest portion of prescribed pattern 2. Low approach only (no lower than 50’ AGL) if flown from any cockpit to a dry lakebed. 3. Touch and go’s to hard runways only	1. Same 2. Same 3. Same
6	No Flap	1. Procedure must be IAW the flight manual 2. Full stop landing prohibited unless required in an approved training syllabus or considered a normal procedure	1. Same 2. Same
7	Touch & Go's	1. Weather must be at or above the minimums for the approach being flown, but no lower than 300' and 1 2. All engines will be set to military power or as specified in flight manual 3. No passengers 4. Wet runway or RCR 12 or greater 5. Crosswind corrected for RCR must be in the recommended zone of the aircraft's landing crosswind chart 6. No external ordnance other than training missiles and empty bomb dispensers	1. Weather must be at or above the minimums for the approach being flown, but no lower than 1000' and 3 2. Same 3. Same 4. Day -- Same Night -- Dry runway 5. Crosswind component 10 knots or less 6. Same 7. Designated airfields

Note: SFO patterns may be flown to touch & go or full stop landings under the following conditions.

1. As part of the USAF TPS curriculum (with IP).

2. Students may accomplish SFO/FL touch & go or full stop landings from the front/left seat in dual seat aircraft and single seat aircraft under the direct supervision of an IP.

3. For all SFO patterns, the aircraft must rollout wings level at a point no lower than 200 feet AGL on final, no slower than technical order minimum landing gear down airspeed on touch & go and full stop landings until the sink rate is under control and landing is assured. If these parameters are not met, a go-around will immediately be performed.

4. A qualified U-2 pilot according to the flight manual (with or without IP)

Table 9.2. Training Restrictions – Multiengine Jet, Recip, Turboprop.

	A	B	C
LINE	Event	IP or EP at a Set of Controls	No IP or EP
1	Simulated Emergency Procedures	1. Weather is at or above circling minimums during daylight and 1000' ceiling and 2 miles visibility or circling minimums (whichever is higher) at night 2. All engines will be used for unplanned go-arounds 3. No passengers	1. Day VFR (1500' & 3) 2. Same 3. Same 4. Initiated or terminated at or above 200' AGL
Simulated Engine Out- lines 2,3,4,5			
2	Takeoff	Prohibited	Prohibited
3	Climb Out	Simulate engine failure after a positive rate of climb is established	Simulate engine failure above 200' AGL
4	Approach & Go-around	Ensure adequate obstacle clearance is maintained	1. Same 2. Initiate no lower than 200' AGL
5	Landing	Crosswind corrected for RCR must be in the recommended zone of the aircraft's landing crosswind chart	Prohibited
6	Practice Engine Shutdown	1. VMC 2. Shutdown & restart must be accomplished above 5000' AGL	Prohibited

7	No Flap	IAW flight manual or AFI 11-2FT Volume 3 MDS Attachment	Prohibited
8	Touch & Go's	1. Weather is at or above the minimums for the approach being flown but no lower than 300' & 1 2. All engines will be set to military power or as specified in flight manual or MDS attachment. 3. No passengers 4. Wet runway / RCR 9 or greater 5. Crosswind corrected for RCR must be in the recommended zone of the aircraft's landing crosswind chart 6. B-52 may simulate single engine loss above 100 KIAS	1. Weather is at or above the minimums for the approach being flown, but no lower than 1000' & 3 2. Same 3. Same 4. Day – Same night -- Dry runway 5. Crosswind component 10 knots or less 6. Prohibited 7. DFO selected airfields

Note: T-39 pilots may perform SFOs using the same guidance as outlined table 9.1

9.15. Touch-and-Go Landings.

9.15.1. Will be flown as outlined in AFI 11-202V3 as supplemented by MAJCOM.

9.15.2. Will not be flown with live or hung ordnance or with fuel remaining in any external tank.

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

9.17. Armament System Malfunctions. Aircrew will not attempt to expend ordnance using a delivery system with a known weapons release malfunction.

9.18. Inadvertent Release.

9.18.1. Record switch positions at the time of inadvertent release and provide to armament and safety personnel. Record the impact point, if known.

9.18.2. Check armament switches safe and do not attempt further release in any mode. Treat remaining stores as hung ordnance and obtain a chase aircraft during RTB, if practical.

9.18.3. If remaining stores present a recovery hazard, jettison in a suitable area on a single pass, if practical.

9.18.4. Failure to Release/Hung Ordnance. Note switch positions. If ordnance (live or training) failed to release with switches properly set follow locally developed procedures for jettison and hung ordnance recoveries.

MARVIN R. ESMOND, Lt General, USAF
DCS, Air and Space Operations

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFPD 11-2, *Aircraft Rules and Procedures*

AFPD 11-4, *Aviation Service*

AFI 11-2FT-Volume 1, *Flight Test Aircrew Training*

AFI 11-2FT-Volume 2, *Flight Test Aircrew Evaluation Criteria*

AFI 11-202V1, *Aircrew Training*

AFI 11-202V3, *General Flight Rules*

AFI 11-2C-17 Volume 3, *C-17 Operations Procedures*

AFI 11-205, *Aircraft Cockpit and Formation Flight Signals*

AFI 11-214, *Aircrew, Weapons Director, and Terminal Attack Controller Procedures for Air Operations*

AFJMAN 11-226, *US Standard for Terminal Instrument Procedures (TERPS)*

AFJMAN 24-204, *Preparing Hazardous Materials For Military Air Shipments*

AFI 33-360V1, *Publications Management Program*

ACCI 11-456, *ACC Electronic Combat Training and EMCON Procedures*

CJCSM 3212.02, *Performing Electronic Attack in the United States and Canada*

FAAH 7610.4, *Federal Aviation Administration Handbook*

AFTTP 3-1V1, *Fighter Fundamentals*

AFTTP 3-1 V4, *Tactical Employment-- F-15*

AFTTP 3-1V5, *Tactical Employment--F-16*

AFTTP 3-1 V17, *Tactical Employment-- F-15E*

AFTTP 3-3V4, *Combat Aircraft Fundamentals-- F-15*

AFTTP 3-3V5, *Combat Aircraft Fundamentals--F-16*

AFTTP 3-3V17, *Combat Aircraft Fundamentals-- F-15E*

AFMCI 21-126, *Temporary 2 (T-2) Modification of Aerospace Vehicles*

T.O. 1-1-300, *Functional Check Flight Procedures*

T.O. 1-1C-1, *Basic Flight Crew Air Refueling Manual*

1-1C-1-34, *B-1B Flight Crew Air Refueling Procedures With KC-135 and KC-10*

AFTTP 3-3V20, *Combat Aircraft Fundamentals--B-1B*

T.O. 1A-10A-1, *Flight Manual*

T.O. 1A-10A-34-1-1, *Weapons Delivery Manual*

AFTTP 3-1, A-10, Vol 3 (AFTTP 3-1), *Tactical Employment*

MCH 11-A/OA10 Vol 5, *Combat Aircraft Fundamentals A-10*

AFTTP 3-1V23, *B-2 Tactical Employment*

T.O. 1B-2A-1, *Flight Manual*

T.O. 1B-2A-1-2, *Supplemental Flight Manual Systems Operations*

T.O. 1B-2A-1-3, *Supplemental Flight Manual*

T.O. 1B-2A-25-1, *Nuclear Bomb Basic Information*

T.O. 1B-2A-34-2-1, *Nonnuclear Weapons Delivery Manual*

T.O. 1-1C-1-37, B-2A Flight Crew Air Refueling Procedures

T.O. 1B-52H-1, *Pilots Flight Manual*

T.O. 1B-52H-1-12, *Navigator & Radar Navigators Flight Manual*

T.O. 1B-52H-1-13, *EWO Flight Manual*

T.O. 1B-52H-1-13-1, *EWO Flight Manual*

AFTTP 3-1V19, *B-52 Tactical Employment*

ACCM3-3V19 (AFTTP 3-3V19), *B-52 Fundamentals*

TO 1C-5A-1, *Flight Manual*

TO 1C-5A-1-1, *Performance Manual*

T.O. 1C-12C-1, *C-12C Flight Manual*

T.O. 1C-12J-1, *C-12J Flight Manual*

T.O.1C-17A-6CF-1, *C-17 Functional Check Flight Procedures*

T.O.1C-17A-1, *Flight Manual*

T.O.13C7-1-11/FM 10-501,

T.O.1F-15E-1, *Flight Manual*

T.O.1F-15E-1-1, *Performance Manual*

T.O.1F-15E-34-1-1, *Non-Nuclear Weapons Delivery Manual – F-15E*

T.O.1F-15A-1, *Flight Manual*

T.O.1F-15A-34-1-1, *Non-Nuclear Weapons Delivery Manual (Air-To-Air)*

T.O.1F-15A-34-1-2, *Non-Nuclear Weapons Delivery Manual (Air-To-Ground*)

T.O.1F-15C-34-1-1, *Non-Nuclear Weapons Delivery Manual – F-15C*

T.O.1F-15C-34-1-3, *Non-Nuclear Weapons Delivery Manual – F-15*

T.O.1F-16-1, *Flight Manual*

T.O.1F-16-1-1, *Performance Manual*

T.O.1F-16-1-2,

T.O.1-1C-1, *Basic Flight Crew Air Refueling Manual*

T.O.1-1C-1-30, *Air Refueling Procedures F-16*

T.O. 1T-39A-1, *Flight Manual*

Abbreviations and Acronyms

A/A—Air to Air

AAI—Air to Air Intercept

AB—Afterburner

AC—Aircraft Commander

ACF—Acceptance Check Flight

ACBT—Air Combat Training

ACC—Air Combat Command

ACCI—Air Combat Command Instruction

ACCMAN—Air Combat Command Manual

ACCR—Air Combat Command Regulation

ADI—Attitude Director Indicator

ADS—Aerial Delivery System

AFAC—Air Forward Air Controller

AFI—Air Force Instruction

AFJI—Air Force Joint Instruction

AFM—Air Force Manual

AFMC—Air Force Materiel Command

AFMCI—Air Force Materiel Command Instruction

AFMSS—Force Mission Support System

AFORMS—Air Force Operations Resource Management System

AFPAM—Air Force Pamphlet

AFR—Air Force Regulatiom

AFRC—Air Force Reserve Command

AFSATCOM—Air Force Satellite Communication

AFTO—Air Force Technical Order

AFTTP—Air Force Tactics, Techniques, and Procedures

AGL—Above Ground Level

AGM—Air to Ground Missile

AHC—Aircraft Handling Characteristics

AHRS—Attitude Heading Reference System

AIRMET—Airman's Meteorological Information

ALCM—Air Launched Cruise Missile

ALTRV—Altitude Reservation

AOA—Angle of Attack

APU—Auxiliary Power Unit

AR—Air Refueling

ARCP—Air Refueling Control Point

ARCT—Air Refueling Control Time

ARDA—Airborne Radar Directed Approach

ARIP—Air Refueling Initial Point

ARTCC—Air Route Traffic Control Center

ASL—Above Sea Level

ATC—Air Traffic Control

ATD—Aircrew Training Device

AVTR—Aircraft Video Tape Recorder

AWACS—Airborne Warning and Control System

BASH—Bird Aircraft Strike Hazard

BFM—Basic Fighter Maneuver

BIT—Built-in Test

BMC—Basic Mission Capable

BRA—Bomb Rack Assembly/Bearing-Range-Altitude

BRL—Bomb Release Line

BW—Bomb Wing

BQ—Basic Qualified

CATM—Captive Air Training Missile

CARA—Combined Altitude Radar Altimeter

CBI—Computer Based Instruction

CCB—Configuration Control Board

CDS—Container Delivery System

CC—Commander

CFIC—Central Flight Instructor Course

CFL—Critical Field Length

CFP—Compatability Flight Profile

CFPS—Combat Flight Planning System

CFT—Cockpit Familiarization Trainer

CFTR—Combined Force Training

CHUM—Chart Update Manual

COMSEC—Communications Security

CPT—Cockpit Procedures Trainer

CSS—Control Stick Steering

CT—Continuation Training

CTP—Companion Trainer Program

CW—Chemical Warfare

DACBT—Dissimilar Air Combat Training

DACT—Dissimilar Air Combat Tactics

DAFIF—Digital Aeronautical Flight Information File

DCPPI—Displaced Center Plan Position Indicator

DFO—Director of Flight Operations

DH—Decision Height

DMPI—Designated Mean Point of Impact

DNIF—Duties Not Including Flying

DO—Director of Operations

DOD—Department of Defense

DTC—Data Transfer Cartridge

DTUC—Data Transfer Unit Cartridge

DTU—Data Transfer Unit

DT&E—Developmental Test and Evaluation

EA—Electronic Attack

EC—Electronic Combat

ECM—Electronic Countermeasures

EEFI—Essential Elements of Friendly Information

EMCON—Emission Control

EMR—Electromagnetic Radiation

EOR—End of Runway

EP—Evaluator Pilot/Emergency Procedure

ERCC—Engine Running Crew Chang**e**

ESA—Emergency Safe Altitude

EVS—Electro-Optical Viewing System

EWO—Electronic Warfare Officer

FAA—Federal Aviation Administration

FAAH—Federal Aviation Administration Handbook

FAF—Final Approach Fix

FAR—Federal Aviation Regulation

FENCE—Fuel, Emissions, Navigation, Communications, Expendables

FCD—Flight Characteristic Demonstration

FCF—Functional Check Flight

FCIF—Flight Crew Information File

FCS—Flight Control System

FEB—Flight Evaluation Board

FIC—Flight Instructor Course

FIE—Fighter Inceptor Exercise

FL—Flight Level; Flight Lead

FLIP—Flight Information Publications

FLIR—Forward Looking Infrared

FM—Field Manual/Frequency Modulation

FQIS—Fuel Quantity Indicating System

FRL—Fuselage Reference Line

FSS—Flight Service Station

FTU—Formal Training Unit

FTT—Flight Test Technique

FVR—Flight Vector Reference

FWS—Fighter Weapons School

GCAS—Ground Collision Avoidance System

GCC—Graduated Combat Capability

GCI—Ground Control Intercept

GFAC—Ground Forward Air Controller

GPS—Global Positioning System

GSS—Gyro Stabilization System

GRM—Gate Release Mechanism

HA—Absolute Altitude

HAA—Height Above Aerodrome

HAT—Height Above Touchdown

HDBK—Handbook

HF—High Frequency

HQ—Headquarters

HHD—Higher Headquarters Directed

HHQ—Higher Headquarters

HUD—Heads-up Display

IAF—Initial Approach Fix

IAW—In Accordance With

ICAO—International Civil Aviation Organization

ID—Identification

IFF—Identification Friend or Foe

IFR—Instrument Flight Rules

ILS—Instrument Landing System

IMC—Instrument Meteorological Conditions

INS—Inertia Navigation System

IOS—Instructor Operator Station

IP—Instructor Pilot or Initial Point

IQC—Initial Qualification Course

IQT—Initial Qualification Training

IR—IFR Military Training Route

JDAM—Joint Direct Attack Munition

JOAP—Joint Oil Analysis Program

KCAS—Knots Calibrated Airspeed

KIAS—Knots Indicated Airspeed

KTAS—Knots True Airspeed

LAAF—LANTIRN Altitude Advisory Function

LANTIRN—Low Altitude Navigation and Targeting Infrared for Night

LAWS—Low Altitude Warning System

LOWAT—Low Altitude training

LASTD—Low Altitude Step Down

LASTE—Low Altitude Safety and Targeting Enhancement

LC—Lost Communications

LG—Logistics Group

LIS—Line in the Sky

MAC—Mean Aerodynamic Chord

MAJCOM—Major Command

MAP—Missed Approach Point

MARSA—Military Assumes Responsibility for Separation of Aircraft

MAU—Miscellaneous Armament Unit

MC—Mission Capable/Mission Commander

MCM—Multi-Command Manual

MCOPR—MAJCOM Office of Primary Responsibility

MCR—Multi-Command Regulation

MDS—Mission Design Series

MDA—Minimum Descent Altitude

MEA—Minimum En Route Altitude

MEL—Minimum Equipment List

MESP—Mission Essential Support Pesonnel

MFD—Multi-Functional Display

MIL—Military

MITO—Minimum Interval Takeoff

ML—Mission Lead

MOA—Military Operating Area

MQT—Mission Qualification Training

MRR—Minimum Runway Required

MS—Mission Support

MSA—Minimum Safe Altitude

MSL—Mean Sea Level

MT—Mission Trainer

MTR—Military Training Route

MP—Mission Pilot

MPS—Mission Planning Software/Mission Planning System

MVR—Maneuver

N/A—Not Applicable

NDI—Non-Destructive Inspection

NM—Nautical Miles

NMR—Non Mission Ready

NORDO—No Radio

NOTAM—Notice to Airmen

NSS—Navigation System

NVG—Night Vision Goggles

NVIS—Night Vision Imaging System

OAS—Offensive Avionics System

OG—Operations Group

OG/CC—Operations Group Commander

OMR—Optical Mark Reader

ONC—Operational Navigation Charts

OPR—Office of Primary Responsibility

OPSEC—Operations Security

OSS—Operations Support Squadron

OWS—Overload Warning System

OT&E—Operational Test and Evaluation

PAR—Precision Approach Radar

PDM—Programmed Depot Maintenance

PDS—Parachute Deployment System

PECP—Primary Entry Control Point

PF—Pilot Flying

PFPS—Portable Flight Planning Software

PIREP—Pilot Report (Weather)

PMSV—Pilot to Metro Service

PNF—Pilot Not Flying

POC—Point of Contact

PPI—Plan Position Indicator

PTA—Planned Time of Arrival

PTAIP—Primary Terrain Avoidance Initiation Point

RAA—Route Abort Altitude

RAPCON—Radar Approach Control

RCO—Range Control Officer

RCR—Runway Conditions Reading

RCS—Radar Cross Section

RDT&E—Research Developmental Test and Evaluation

RLA—Rotary Launcher Assembly

ROE—Rules of Engagement

RPI—Rated Position Indentifier

RTB—Return to Base

RVR—Runway Visual Range

RQC—Requalification Course

RWR—Radar Warning Receiver

RZ—Rendezvous

SA—Situational Awareness or Surface Attack

SARCAP—Search and Rescue Combat Air Patrol

SAT—Surface Attack Tactics

SEFE—Stan/Eval Flight Examiner

SELO—Stan/Eval Liaison Officer

SFO—Simulated Flame Out

SIF—Selective Identification Feature

SIGMET—Significant Meteorological Information

SILS—Synthetic Instrument Landing System

SKE—Station Keeping Equipment

SMA—Start Maneuver Area

SOF—Supervisor of Flying

SPINS—Special Instructions

SPD—System Program Director

SPR—Single Point Refueling

SQ—Squadron

SRB—Safety Review Board

SSM—System Support Manager

STV—Steerable Television

SUU—Bomb Suspension and Release Unit

TA—Terrain Avoidance

TACAN—Tactical Air Navigation

TAL—Transfer Alignment

TAS—True Air Speed

TBD—To Be Determined/Developed

TDY—Temporary Duty

TDZ—Touch Down Zone

TERPS—Terminal Instrument Procedures

TF—Terrain Following

TFR—Terrain Following Radar

TOLD—Take Off Landing Data

TOT—Time Over Target

TPS—Test Pilot School

TR—Transit Route

TRB—Technical Review Board

TSO—Target Study Officer

TTR—Tactics and Training Range

UDLM—Unscheduled Depot Level Maintenance

UHF—Ultra High Frequency

UMD—Unit Manning Document

USAF—Unit States Air Force

VASI—Visual Approach Slope Indicator

VOR—VHF Omni Range

VFR—Visual Flight Rules

VHF—Very High Frequency

VLD—Visual Level Delivery

VMC—Visual Meteorological Conditions

VR—VFR Military Training Route

VRD—Vision Restricting Device

WSO—Weapons Systems Officer

VTR—Video Tape Recorder

WST—Weapons Systems Trainer

Terms

Additional Crew Member (ACM)—Mobility aircrew members and authorized flight examiners possessing valid aeronautical orders who are authorized to accompany the normal crew complement required for that mission according to chapter 3 of this AFI.

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

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

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

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

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

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

Block Time—Time determined by the scheduling agency responsible for mission accomplishment for the aircraft to arrive at (block in) or depart from (block out) the parking spot.

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

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

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

Combat Control Team (CCT)—A small task organized team of Air Force parachute and combat diver qualified personnel trained and equipped to rapidly establish and control drop, landing, and extraction

zone air traffic in austere or hostile conditions. They survey and establish terminal airheads as well as provide guidance to aircraft for airlift operation. They provide command and control, and conduct reconnaissance, surveillance, and survey assessments of potential objective airfields or assault zones. They also can perform limited weather observations and removal of obstacles or unexploded ordinance with demolitions. Also called CCT.

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

Critical Phase of Flight—Takeoff, low level (below MSA), airdrop, weapon delivery, air refueling, approach, and landing.

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

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

Direct Instructor Supervision—Supervision by an instructor of like specialty with immediate access to controls (for pilots, the instructor must occupy either the pilot or copilot seat).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 Mobility Air Forces (MAF) including crewmembers and/or aircraft from AETC, ACC, PACAF, USAFE, AMC, ANG and AFRC forces not gained by AFMC.

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

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

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

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

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

Local Training Mission—A mission scheduled to originate and terminate at home station (or an off-station training mission), generated for training or evaluation and executed at the local level.

Low Altitude Navigation Leg—The route segments of a bomber IR between the TA Initiation Point and TA Termination Point. For non-bomber IR, the low altitude navigation leg is that portion of the route designed primarily for low altitude flight; does not include segments intended for descent into and climb-out from the route.

Maintenance Status—

Code 1 - No maintenance required.

Code 2 (Plus Noun) --Minor maintenance required, but not serious enough to cause delay. Add nouns that identify the affected units or systems, i.e., hydraulic, ultrahigh frequency (UHF) radio, radar, engine, fuel control, generator, etc. Attempt to describe the nature of the system malfunction to the extent that appropriate maintenance personnel will be available to meet the aircraft. When possible, identify system as mission essential (ME) or mission contributing (MC).

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

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

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

Military Airspace Management System (MASMS)—The term MASMS in this instruction refers to Detachment 1, HQ ACC/DOR, the Military Airspace Management System Office at Offutt AFB, NE.

MASMS IR Route—A route scheduled through Det 1, HQ ACC/DOSR using the MASMS scheduling system.

Mission 1—1. The task, together with the purpose, that clearly indicates the action to be taken and the reason therefore. 2. In common usage, especially when applied to lower military units, a duty assigned to an individual or unit; a task. 3. The dispatching of one or more aircraft to accomplish one particular task.

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

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

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

Non-MASMS IR Route—A route in which scheduling activity in AP/1B is other than Det 1, HQ ACC/DOSR.

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

Operational Risk Management (ORM)—A logic-based common sense approach to making calculated decisions on human, material, and environmental factors before, during, and after Air Force operations. It enables commanders, functional managers and supervisors to maximize operational capabilities while minimizing risks by applying a simple systematic process appropriated for all personnel and Air Force functions.

Operational Site—An LZ that has (1) been surveyed by an instructor pilot (IP) experienced in remote operations to ensure no hazards exist, (2) a photograph available for aircrews to study the site prior to

landing and (3) approval from the DFO to be designated an operational site. Whenever practical, operational sites should have permanently installed and properly maintained wind indicators (wind sock, streamer, etc.).

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

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

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

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

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

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

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

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

Route Width (Route Perimeter)—The route boundary limits within which aircraft are

restricted to conduct operations.

Significant Meteorological Information (SIGMET)—Area weather advisory issued by an ICAO meteorological office relayed to and broadcast by the applicable ATC agency. SIGMET advisories are issued for tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, sever and extreme turbulence, severe icing, and widespread dust or sand storms. SIGMET frequently covers a large geographical area and vertical thickness. They are prepared for general aviation and may not consider aircraft type or capability.

Squadron Top 3—Squadron ADO, DO, CC.

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

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

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

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

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

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

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

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

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

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

Unilateral—Operations confined to a single service.

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

Zero Fuel Weight—Weight, expressed in pounds, of a loaded aircraft not including wing and body tank fuel. All weight in excess of the maximum zero fuel weight will consist of usable fuel.

Attachment 2

A-10 OPERATING PROCEDURES

Section A2A—General Information

A2.1. Scope. This attachment outlines those procedures applicable to the safe operation of the A-10 aircraft. With the complementary references cited, this regulation prescribes standard operational procedures for all AFMC A-10 pilots.

A2.2. References. This attachment, in conjunction with the documents listed in the subparagraphs below, are the primary references for A-10 operating procedures in AFMC.

A2.2.1. T.O. 1A-10A-1.

A2.2.2. T.O. 1A-10A-34-1-1.

A2.2.3. AFTTP 3-1, A-10, Vol 3 (MCM 3-1), *Tactical Employment*.

A2.2.4. MCH 11-A/OA10 Vol 5, *Combat Aircraft Fundamentals—A-10.*

A2.2.5. AFI 11-214, *Aircrew, Weapons Director, and Terminal Attack Controller Procedures for Air Operation.*

Section A2B—Starting Engines And Before Taxiing

A2.3. Pilots will be cleared by the crew chief prior to starting the Auxiliary Power Unit (APU), engines or actuating flight controls.

A2.4. All flights require the bleed air function of the APU.

A2.5. Aircraft stall warning devices will be fully operational for all flights.

A2.6. If a VFR takeoff is required for mission accomplishment, the aircraft must be capable of achieving a minimum single-engine climb rate of 150-feet/minute (gear up, failed engine wind-milling, and all jettisonable stores-jettisoned), unless a higher rate of climb is required for unique obstacle clearance requirements. IFR takeoffs will be conducted IAW AFI 11-202, Vol 3. Aircraft operating under IFR that are unable to comply with the required minimum climb gradients may be required to reduce fuel and ordnance loads, cart all stores (except electronic countermeasures pods), or wait for environmental conditions to change.

A2.7. Formation Takeoff Procedures. On the flight leader's signal, set the core RPM at 90 percent or as briefed by the flight leader and check the engine instruments.

A2.8. Join-up/Rejoin. Flight leaders will maintain 200 KIAS until join-up is accomplished unless briefed otherwise.

A2.9. Maneuvering Parameters.

A2.9.1. Minimum Altitudes.

A2.9.2. Confidence Maneuvers: Entry will be made at a minimum of 10,000 feet AGL.

A2.9.3. Do not perform aerobatics below 5,000 feet AGL.

A2.10. Approaches and Landings.

A2.10.1. Minimum pattern and touchdown spacing between similar landing aircraft are 3,000 feet (e.g., A-10 behind A-10), 6,000 feet for dissimilar aircraft (e.g., A-10 behind F-15) or as directed at the landing base, whichever is higher. Increase spacing whenever anticipating wake turbulence.

A2.10.2. The desired touchdown point for a VFR approach is 500 feet past the runway threshold, or the glidepath interception point for a precision approach. When local procedures or unique runway surface conditions require landing beyond a given point on the runway, adjust the desired touchdown point accordingly.

A2.10.3. Landing Restrictions.

A2.10.4. When the computed landing roll exceeds 80 percent of the available runway, land at an alternate if possible.

A2.10.5. Minimum landing RCR is 12. The DFO may waive the minimum RCR, for specified units operating in cold weather locations, but in no case will landing be attempted with an RCR below 8.

A2.10.6. Normally all aircraft will land in the center of the runway and clear to the turnoff side of the runway when speed/conditions permit, unless local conditions dictate otherwise.

A2.11. Closed Traffic Patterns. Initiate the pattern at the departure end of the runway unless directed/cleared otherwise by local procedures or the controlling agency. Minimum airspeed during a closed pattern, prior to configuring, is 150 KIAS. When in formation, a sequential closed may be flown with ATC concurrence, at an interval to ensure proper spacing.

A2.12. Formation Approaches and Landings. Do not perform practice formation approaches above 40,000 pounds gross weight.

Section A2C—Instrument Procedures

A2.13. Approach Category.

A2.13.1. The A-10 is Approach Category D. Accomplish missed approach in accordance with the flight manual procedures. Missed approach airspeed is 200 to 220 KIAS.

A2.13.2. Approach category C minima may be used to an emergency/divert airfield where no Category D minima is published, provided:

A2.13.3. A straight-in approach is flown.

A2.13.4. The aircraft is flown at a computed final approach speed of 140 KIAS or less.

A2.13.5. Missed approach airspeed is 200 to 220 KIAS.

A2.13.6. Missed approach airspeeds are based on 260 TAS or less for Category D approaches and 240 TAS or less for Category C approaches. At high pressure altitudes and temperatures, these true

airspeeds may not be compatible with published missed approach airspeeds and the approach should not be flown.

A2.13.7. A-10s are approved to use INS/GPS for en route Area Navigation (RNAV). En route INS navigation may be used for a period not to exceed 1 1/2 hours between INS updates. An update is defined as establishing a positive position using visual references or TACAN.

A2.13.8. Formation Instrument Trail Departure Procedures.

A2.13.8.1. Each aircraft/element will accelerate to 200 KIAS. Climb speed will be 200 KIAS and power setting will be 800 degrees ITT unless specifically briefed otherwise.

A2.13.8.2. Each aircraft/element will climb on takeoff heading to 1,000 feet AGL and accelerate to 200 KIAS before initiating any turns, except when departure instructions specifically preclude compliance.

A2.13.9. Use of the Heads-Up Display. The HUD may be used as an additional instrument reference in night/IMC conditions; however, do not use it as the sole instrument reference in these conditions. In addition, do not use the HUD to recover from an unusual attitude or when executing lost wingman procedures except when no other reference is available.

Section A2D—Air-To-Air Weapons Employment

A2.14. General. AFI 11-214 contains air-to-air procedures to include operations with live ordnance (air-to-air missiles) applicable to all aircraft. The procedures contained in this chapter specify additional procedures or restrictions that are applicable to A-10 operations.

A2.14.1. This chapter applies to all missions where the intent is to conduct maneuvers used to defeat aerial attacks or to employ ordnance against airborne fixed wing aircraft or helicopters. Fixed wing air-to-air training should emphasize visual acquisition of threats, maneuvering to negate any attack, mutual support, and forcing the attacker to disengage. Anti-helicopter air-to-air training should emphasize visual search techniques, maneuvers to negate helicopter attacks, aspect and range determination, and weapons selection and employment to kill the threat.

A2.14.2. Simulated Gun/AIM-9 Employment. Simulated Gun/AIM-9 employment is governed by the following:

A2.14.2.1. Simulated attacks using the gun trigger and AIM-9 pickle button are allowed if the following conditions are met:

A2.14.2.1.1. The gun is PINNED

A2.14.2.1.2. Rounds limit switch is in LIMIT.

A2.14.2.1.3. Rounds limit counter is ZERO.

A2.14.2.1.4. Gun rate switch is SAFE.

A2.14.2.1.5. Cold trigger check is accomplished and acknowledged throughout the flight.

A2.14.2.1.6. Master Arm switch is ARM, SAFE, or CAMERA. (If in SAFE or CAMERA, pickle button initiated AIM-9 employment is inoperative.)

NOTE:

If expendable practice ordnance is aboard the aircraft, check all release modes OFF, no weapons stations selected, fusing SAFE and acknowledged throughout the flight, prior to cold trigger check.

A2.14.2.2. Simulated Gun attacks are allowed when the gun is UNPINNED if the following conditions are met:

A2.14.2.2.1. Gun rate switch is SAFE.

A2.14.2.2.2. Master Arm switch is in SAFE or CAMERA. (Pickle button initiated AIM-9 employment is inoperative.)

A2.14.2.2.3. Cold trigger check is accomplished and acknowledged throughout the flight.

A2.14.2.2.4. Gun trigger is not depressed during attacks.

A2.14.2.3. Attacks using pickle button initiated AIM-9 employment are allowed when the gun is UNPINNED if the following conditions are met:

A2.14.2.3.1. Gun rate switch is SAFE.

A2.14.2.3.2. Master Arm switch is ARM.

A2.14.2.3.3. Cold trigger check is accomplished and acknowledged throughout the flight.

NOTE:

If expendable practice ordnance is aboard the aircraft, check all release modes OFF, no weapons stations selected, fusing SAFE and acknowledged throughout the flight, prior to cold trigger check.

A2.14.2.3.4. Simulated gun attacks are not permitted with Master Arm in the ARM position.

A2.14.3. Maneuvering Limits.

A2.14.3.1. Pilots will not maintain an angle of attack (AOA) that triggers the chopped stall warning tone.

A2.14.3.2. The minimum maneuvering airspeed during LOWAT is 240 KIAS.

A2.14.3.3. Negative G guns jink maneuvers are prohibited.

A2.14.3.4. Flaps will not be used as an aid to slow speed maneuvering.

Section A2E—Air-To-Surface Weapons Employment

A2.15. General. References: AFTTP 3-1 (MCM 3-1), MCH 11-A/OA10 Vol 5 , T.O. 1A-10-34-1-1, T.O. 1A-10-34-1-2, T.O. 1A-10-26 and Fighter Weapons School (FWS) Instructional Texts are primary references for fighter weapons employment theory, planning, techniques and analysis. AFI 11-214 contains operating and training procedures.

A2.16. Weather Minimums. Refer to AFI 11-214. Weather ceiling will be no lower than 1,500 ft AGL.

A2.17. Battle Damage/Bomb Checks. Unless circumstances prevent, flight leads will direct a battle damage/bomb check prior to or during RTB. This check is mandatory following the expenditure of live

ordnance (including all types of 30mm ammunition). Observe established deconfliction responsibilities and position change procedures. Formation spacing will be no closer than normal fingertip.

A2.18. Training Rules.

A2.18.1. Refer to AFI 11-214. If airspeed decreases below 210 KIAS in a pop-up attack, abort the maneuver. Base this airspeed on typical training weights and configurations. At heavy gross weight, adjust abort airspeed upward to provide sufficient G and turning room to recover from an adverse flight condition.

A2.18.2. Pilots must positively identify the target prior to weapons release. Achieve positive identification by either visually acquiring the target or by confirming target location through valid on-board/off-board cues. These cues include marking rounds, Pave Penny spot, IR Maverick lock-on, IR pointers or other NVG compatible marking devices. Pilots should exercise caution and possess a high level of target situational awareness when relying on a single target cue to confirm target location (e.g., employment at night with a Pave Penny spot alone, in the absence of no other confirming cues).

A2.18.3. Pave Penny Procedures. Pave Penny employment utilizes the concepts of a safety and optimum attack zones.

A2.18.3.1. The safety zone is a 20 degree fan whose apex is at the target and extends 10 degrees either side of the target-to-laser designator line.

A2.18.3.2. The optimal attack zone is a 120 degree fan whose apex is at the target and extends to 60 degrees either side of the target-to-laser designator line, excluding the safety zone.

A2.18.3.3. Pave Penny will not be used as a sole source for target identification. In some situations, laser spots shift from the designated target to the laser source while operating in the optimal attack zone - precluding total reliance on the laser spot.

A2.18.3.4. Attack heading should avoid the target-to-laser designator safety zone to preclude false target indications.

A2.18.4. Live Ordnance Procedures.

A2.18.4.1. Refer to AFI 11-214.

A2.18.4.2. Do not make simulated weapon delivery passes on targets occupied by personnel.

A2.18.4.3. When Ground Controllers are operating on Class B/C ranges the following procedures apply:

A2.18.4.3.1. All pilots will be familiar with applicable range weapons delivery procedures, appropriate targets and weapons footprints.

A2.18.4.3.2. Ground personnel locations will be briefed and acknowledged by all pilots.

A2.18.4.3.3. Pilots will not expend ordnance if any doubt exists as to the ground personnel or intended target locations.

Section A2F Abnormal Operating Procedures

A2.19. When a fuel imbalance is greater than T.O. 1A-10A-1 limits, terminate tactical maneuvering and investigate. If the fuel imbalance was caused by a slow feeding tank that can be corrected, vice a fuel system failure, the mission may continue IAW T.O. 1A-10A-1 guidance. Terminate the mission if fuel

imbalance cannot be corrected. Instruments, medium altitude navigation, deployment missions, and level weapons deliveries are authorized profiles to reduce gross weight.

A2.20. Armament System Malfunctions.

A2.20.1. Inadvertent Release.

A2.20.2. Record switch positions at the time of inadvertent release and provide to armament and safety personnel. Record the impact point, if known.

A2.20.3. Check armament switches safe and do not attempt further release in any mode. Treat remaining stores as hung ordnance and obtain a chase aircraft during RTB, if practical.

A2.20.4. If remaining stores present a recovery hazard, jettison in a suitable area on a single pass, if practical.

A2.20.5. Failure to Release/Hung Ordnance. If ordnance fails to release when all appropriate switches are set, proceed as follows:

A2.20.6. Live Ordnance. For hung live ordnance or an aircraft malfunction that precludes further live weapons delivery, refer to T.O. 1A-10A-34-1-1. The following procedures also apply:

A2.20.6.1. Note all release and fusing switches, then safe.

A2.20.6.2. Attempt to jettison store(s) using jettison or alternate delivery mode. Consider attempting to jettison the rack if ordnance is unsecure or unable to determine security.

A2.20.6.3. If ordnance remains on the aircraft, follow the hung ordnance recovery procedures.

A2.20.7. Practice/Inert Ordnance:

A2.20.7.1. Re-check switch positions and make an additional attempt to expend. If no release occurs, select another mode of delivery in an attempt to expend.

A2.20.7.2. If the secondary release mode fails, ordnance from other stations/dispensers may be released providing the aircraft will remain within symmetrical load limits.

A2.20.7.3. If remaining stores present a recovery hazard, jettison in a suitable area on a single pass, if practical.

A2.20.7.4. If ordnance remains on the aircraft, follow the hung ordnance recovery procedures.

A2.20.8. Hang Fire/Misfire - General.

A2.20.8.1. A missile that fires but fails to depart the aircraft is a hangfire. If this occurs, the chase pilot should closely observe and safety check the missile.

A2.20.8.2. A missile that fails to fire when all appropriate switches were selected is a misfire. If this occurs, safe the Master Arm switch and follow the hung ordnance recovery procedures.

A2.20.8.3. T.O. 1A-10A-34-1-1 contains hangfire/misfire procedures for specific ordnance types.

A2.20.8.4. Gun Unsafe. Refer to T.O. 1A-10A-34-1-1. The following procedures also apply:

A2.20.8.4.1. If the gun unsafe light is accompanied by any unusual noise/vibration, or any other indication of gun/aircraft damage, the pilot will declare an emergency.

A2.20.8.4.2. Accomplish gear lowering over an unpopulated area.

A2.20.8.5. Recovery with Weapons Malfunction/Hung Ordnance:

A2.20.8.5.1. If practical, visually inspect the aircraft for damage.

A2.20.8.5.2. Declare an emergency (not required for hung practice/inert ordnance or rockets).

A2.20.8.5.3. Obtain a chase aircraft, if available, and avoid populated areas and trail formations.

A2.20.8.5.4. Land from a straight-in approach, or IAW local hung ordnance procedures.

A2.20.8.6. Miscellaneous Procedures.

A2.20.8.6.1. Pilots will not attempt to expend ordnance using a delivery system with a known weapons release malfunction.

A2.20.8.6.2. When abnormal missile launch or erratic missile flight is noted after launch, another aircraft will visually inspect the launching aircraft (if possible) to determine if any damage has occurred.

A2.21. In-flight Practice of Emergency Procedures.

A2.21.1. Simulated Emergency Procedures - Definition. Any procedure that produces an effect that would closely parallel the actual emergency such as retarding the throttle to idle and disengaging the SAS to simulate a single engine situation.

A2.21.2. Emergency Practice.

A2.21.2.1. Accomplish all practice and/or training related to aborted takeoffs in the Cockpit Familiarization Trainer (CFT), or a static aircraft (if trainers unavailable).

A2.21.2.2. Practice in-flight engine shutdown is prohibited (except during FCF profiles).

A2.21.2.3. While inflight, simulated loss of both engines is prohibited.

A2.21.3. Simulated Single Engine (SSE) Approach/ Landing:

A2.21.3.1. Do not initiate simulated single engine failure below 1,000 feet AGL and terminate if the aircraft descends below 800 feet AGL prior to base leg or the airspeed drops below computed final approach speed for the aircraft configuration.

A2.21.3.2. Follow procedures in T.O. 1A-10A-1 for emergency landing patterns and actual single engine approaches as appropriate for the simulated engine failure situation. Pilots will engage anti-skid prior to landing.

A2.21.3.3. Pilots will plan approaches to avoid turns into the simulated dead engine when practical. If turns into the simulated dead engine are necessary, plan patterns to minimize bank angle.

A2.21.4. SSE approaches will be discontinued if the airspeed decreases below computed single engine final approach speed.

A2.21.5. Practice of emergency landing patterns at active airfields are authorized provided that:

A2.21.5.1. Adequate crash rescue and air traffic control facilities are available and in operation.

A2.21.5.2. Radio calls at pattern entry and as directed locally or by the controlling agency include the type emergency being simulated.

A2.22. Manual Reversion Approach and Landing. Factors to consider are pilot proficiency, instrument approach facilities, runway conditions, weather at the recovery field, and any accompanying aircraft malfunctions. Controlled bailout is recommended anytime existing conditions may preclude a safe recovery or during single engine operations.

A2.22.1. Flying in manual reversion is something that is done infrequently and must be treated accordingly. A thorough review of manual reversion procedures in the Dash-1 and/or Dash-6 will be accomplished before any flights where manual reversion is a mandatory part of the flight profile. Particular attention will be placed on actions to be taken when problems arise with manual reversion flight. The first action must be to revert to the normal flight control mode. If that action does not solve the problem and the aircraft is uncontrollable, then ejection is recommended.

A2.22.2. Pilots who fly in manual reversion must be completely aware of the characteristics of, problems associated with, and procedures to use with manual reversion.

A2.22.2.1. Other than actual emergencies requiring manual reversion, pilots will only go into manual reversion when on a dedicated FCF, FCF upgrade sortie or FTU upgrade sortie.

A2.22.2.2. If aircraft will not go into Manual Reversion or the pitch trim does not work, return Manual Reversion switch to NORM.

Attachment 3

B-1B OPERATING PROCEDURES

Section A3A—General Information

A3.1. Responsibilities. In conjunction with other governing directives, this attachment prescribes procedures for B-1B aircraft under most circumstances. It is not a substitute for sound judgment or common sense. Operations or procedures not specifically addressed may be accomplished if they enhance safe and/or effective mission accomplishment.

A3.2. References. The primary references for specific B-1B operations are located in technical orders, applicable volumes of ATTP 3-1, AFTTP 3-3 and this instruction. Training guidance is contained in AFI 11-2B-1V1, *B-1--Training*. Air refueling references are contained in T.O.s 1-1C-1, *Basic Flight Crew Air Refueling Manual*; 1-1C-1-34, *B-1B Flight Crew Air Refueling Procedures With KC-135 and KC-10*; and *Federal Aviation Administration Handbook (FAAH*) 7610.4. A reference for techniques is *Air Force Tactics and Training Pamphlet* (AFTTP) 3-3V20, *Combat Aircraft Fundamentals--B-1B.*

Section A3B—Mission Planning

A3.3. Local Aircrew Aids. Local aircrew aids should be developed locally to support the unit mission. The contents of these aids will be at the discretion of the unit.

A3.4. Chart/Map Preparation.

A3.4.1. 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. Annotate headings and maximum/minimum route structure altitudes. The chart will be of scale and quality that terrain features, hazards, noise sensitive areas, and chart annotations are of sufficient detail to allow navigation and safe mission accomplishment. Mark all noise sensitive areas, crossing IFR Military Training Routes (IR)/VFR Military Training Routes (VR), and airfields within route corridor along the route of flight. Review pilot's and OSO/DSO low altitude charts for compatibility and accuracy.

A3.4.2. Required Annotations. Low level charts will contain TF initiation points information blocks where appropriate.

Section A3C—Normal Operating Procedures

A3.5. Taxi Procedures. DFO approval is required for taxi operations when the RCR is below 9.

A3.6. Radar/Radio Altimeter Procedures. At least one radar altimeter channel must be operable before takeoff.

A3.7. 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 IAW AFI 11-2FT-B-1 Vol 1. A qualified DSO/WSO must be on board if ECM systems are to be tested during the FCF.

A3.8. Air Refueling Operating Guidelines. Tanker Visual Observation. Positions to the right and/or left and slightly behind the tanker where receivers fly while observing or awaiting air refueling. Approximately 150 to 300 feet separation on the 30-degree line aft of line abreast of the tanker is used.

A3.9. Formation & Chase Operations Guidelines. For additional guidance, refer to AFI 11-2B-1 V3 and ACCH 11-B1V5 (AFTTP3-3V20):

A3.10. Hazardous Conditions. Relay any safety hazard (e.g. icing, turbulence, thunderstorms, bird concentrations etc.), through a Pilot Weather Report (PIREP) to the controlling agency and any other aircraft operating in the area.

A3.11. Approach Category. The B-1 is normally approach category E. A lower category may be used if approach/missed approach airspeed meet FLIP guidance.

A3.12. Air Expendable Employment. Units must ensure that all personnel concerned are familiar with CJCSM 3212.02, Performing Electronic Attack in the United States and Canada AFI 11-214. In case of an inadvertent flare drop, contact the applicable airspace controller and advise them of the incident.

A3.13. Air to Surface Weapons Employment. Unit staff must ensure aircrews have current range information prior to flight. Aircrews will review all applicable rules, regulations, technical orders, and range/area procedures when carrying weapons.

Section A3D—Operational Limits And Restrictions

A3.14. General. This chapter 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 exist, deviations from the aircraft flight manual are prohibited.

A3.15. Runway Requirements. The minimum runway length for normal operations is 10,000 feet, stressed for aircraft configuration. Waivers for short runway takeoffs will be approved by the DFO on a case by case basis. When departing from a short runway, fuel load will be adjusted to keep the aircraft within safe takeoff tolerances (Cat I).

A3.16. Fuel Requirements. The usable fuel reserve requirements in AFI 11-202 Vol 3 MAJCOM supplements, General Flight Rules; apply except as listed below.

Table A3.1. Fuel Minimums.

12,000 lbs	Emergency Fuel
16,000 lbs	Min Fuel - Final Landing
20,000 lbs	Min Fuel over Destination or Alternate
40,000 lbs	Min Fuel over Remote or Island (No alternate required)
60,000 lbs	Min Fuel over Remote or Island (Alternate required)

A3.17. Flight Maneuvers.

A3.17.1. Recoveries. Do not intentionally place the aircraft in an unusual attitude for the purpose of practicing recoveries.

A3.17.2. Approach to Stall. Due to the increased stress placed on engines, approaches to stall will only be accomplished when required for FCF checks or accomplishment of a test point in a formal test program. The number of times the maneuver is repeated should be kept to an absolute minimum. Practice approaches to stall may be performed as part of an upgrade program, such as FCF pilot upgrade. However, training should be combined with actual test or FCF missions when possible. Terminate by 8,000 feet AGL to recover by 5,000 feet AGL..

A3.18. Traffic Pattern Limitations.

A3.18.1. See Table A3.4.2. for limitations and restrictions.

A3.18.2. Practice no-flap or slat full stop landings are prohibited.

A3.18.3. Practice pattern operations are prohibited under the following conditions:

A3.18.3.1. Any engine shut down.

A3.18.3.2. Unable to set military power on all four engines using normal throttle.

A3.18.3.3. Any flight control problem

A3.19. SCAS Failure. Do not perform touch and go landings with a PITCH/AUG 1 caution light illuminated. Normal touch-and-go landings or low approaches are permitted with ROLL AUG 1, YAW AUG 1, and/or SPOILER 1 caution light illuminated.

A3.20. Equipment Limitations. Do not initiate the penetration to low level or continue low level training if any of the following conditions exist:

A3.20.1. Any flight control system malfunction that denies the pilot a safe margin of control.

A3.20.2. Loss of Real Beam Ground Map (RBGM) or High Resolution Ground Map (HRGM), during night/IMC. RBGM or HRGM off/out operations are authorized during day VMC only.

A3.20.3. Loss of INS(s) during night/IMC. INS(s) off/out operations are authorized during day VMC.

A3.20.4. Loss of Avionics Control Unit Complex (ACUC) during night/IMC. ACUC off/out low level operations are authorized during day VMC while attempting to recycle the ACUC.

A3.20.5. At least one multi-function display (MFD) at the OSO position and the DSO MFD must be operable.

A3.20.6. Loss of all attitude reference systems (Gyro Stabilization System (GSS) and INS).

A3.20.7. Loss of all radar altimeter. Low level activity may be continued at MSA/RAA in VMC conditions. Loss of all radar altimeter does not prevent transition during day VMC.

A3.20.8. At least one aft station ADI.

A3.21. NVG Restrictions. Do not use NVGs at night during low altitude operations without the TF system engaged, unless operating at MSA/RAA.

A3.22. Navigation Equipment.

A3.22.1. An INS must be operational for takeoff on all missions except for flight in the local area during day VMC. Specific predesignated missions requiring INS in flight alignment may launch provided VMC can be maintained until INS is aligned.

A3.22.2. Do not takeoff with the GSS inoperative (steady illumination of the GSS caution light) unless day VMC can be maintained.

Table A3.2. Operating Limitations.

Event	Restriction
SCAS Off Landing	Prohibited (Sim only)
Simulated Engine Failure Touch & Go / Landing / Low Approach	Prohibited (Sim only)
25 Wing Approach	250,000 lbs. Maximum
Slat Only	230,000 lbs. Maximum
Partial Flap	250,000 lbs. Maximum
No-Flap Touch & Go	1. 250,000 lbs. Maximum 2. Full stops prohibited
Normal Touch & Go	1. Authorized to approach minimums 2. Min RCR = 9 3. Crosswind = tech order limits 4. 300,000 lbs. Maximum

Note: Simulated emergency procedures require:
1) Wx (1000-2) or circling minimums whichever is higher.
2) Dry runway.
3) 15 knot maximum crosswind component.

Attachment 4

B-2 OPERATING PROCEDURES

Section A4A—General Information

A4.1. Responsibilities. This attachment, in conjunction with other governing directives, outlines those procedures applicable to the operation of B-2 aircraft under most circumstances. It is not to be used as a substitute for sound judgment or common sense. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

A4.2. References. This volume, in conjunction with T.O. 1B-2A-1, *Flight Manual*; T.O. 1B-2A-1-2, *Supplemental Flight Manual Systems Operations*; T.O 1B-2A-1-3, *Supplemental Flight Manual*; T.O.1B-2A-25-1, *Nuclear Bomb Basic Information*; T.O. 1B-2A-25-2, *Nuclear Bomb Delivery Operating Procedures*; T.O. 1B-2A-34-2-1, *Nonnuclear Weapons Delivery Manual*; AFTTP 3-1V23, *B-2 Tactical Employment; Bombing/Navigation/AGM Training and Use of the ACC TTR System*; and AFI 11-214, *Aircrew, Weapons Director, and Terminal Attack Controller Procedures for Air Operations*; are the primary references for B-2A operating procedures.

Section A4B—Mission Planning

A4.3. Local Aircrew Aids.

A4.3.1. Aircrew aids should be tailored to aid the unit in performing its mission. The following areas are recommended for inclusion:

A4.3.2. Briefing guides.

A4.3.3. Local VHF/UHF/HF channelization.

A4.3.4. Takeoff and landing data.

A4.3.5. Weight and balance data.

A4.3.6. Recovery procedures with weapons onboard and jettison areas.

A4.3.7. Hot brake areas and procedures.

A4.3.8. Divert/alternate and emergency airfield

A4.3.9. Other information as deemed necessary (e.g., stereo flight plans, turnaround procedures, local training areas, instrument preflight, and maintenance brevity codes).

A4.4. Chart Preparation. Annotate low-level charts with TF Start/Termination areas.

Section A4C—Operating Procedures

A4.5. Preflight. For normal training missions, preflight should start one hour thirty minutes prior to scheduled takeoff. Test mission preflights will be performed as required. Ensure all FLIP and classified materials are present, current, and complete.

A4.6. Taxi. Minimum taxi interval is 500 feet in trail. Do not taxi the aircraft with a reported RCR of 6 or less anywhere on the taxi route.

A4.7. Takeoff/Departure.

A4.7.1. Unless a flight test requirement exists, do not takeoff under the following conditions:

A4.7.1.1. If the RCR is reported less than 9.

A4.7.1.2. Standing or pooled water on the runway.

A4.7.1.3. If the computed takeoff roll exceeds 80 percent of the available runway. (May be waived by unit commander.)

A4.7.1.4. Any attitude indicator, heading indicator, or pitot static instrument inoperative.

A4.7.1.5. One or more engines inoperative from start of takeoff roll.

NOTE:

During emergency evacuations, launch of aircraft with one or more engines inoperative may be accomplished at the discretion of the wing commander or when specifically directed by higher headquarters. At no time will launch be directed when computed takeoff distance exceeds 95 percent of runway available.

A4.7.2. Intersection takeoffs must provide at least 10,000 feet of usable runway.

A4.7.3. Instrument Approach Category. The B-2A is designated as an approach category "D" aircraft. If a case exists where airspeed for circling approaches exceeds 166 knots, use category "E" minima.

A4.7.4. Chase Procedures. A safety chase is not required for proficiency training flights. A safety/photo chase will be used as required on test flights per the approved safety package.

Section A4D—Operational Limitations And Restrictions

A4.8. Scope. This chapter adds B-2A aircraft limitations and restrictions to those already specified in flight manuals.

A4.9. General Limitations. The following limitations apply to training missions only. Test missions will follow guidance in an approved test plan and safety package.

A4.10. Performance Planning Criteria. A minimum of 1,000 feet overrun must be available in addition to the minimum runway required (MRR). When 1,000 feet of overrun are not available, reserve 1,000 feet of the runway to satisfy the minimum overrun requirements. Runway available for takeoff planning must be actual runway length minus any portion of the runway used to satisfy overrun requirements at the liftoff end of the runway.

A4.10.1. Stalls and Approach to Stalls. Practice stalls and approach to stalls are prohibited inflight.

A4.10.2. Unusual Attitudes. Practice unusual attitude recoveries are prohibited inflight.

A4.10.3. Flight Characteristics Demonstrations. Practice FCDs are prohibited in flight.

A4.11. Specific Limitations.

A4.11.1. Emergency Procedures.

A4.11.1.1. Weapons. Do not practice in-flight emergency procedures when weapons are loaded on the aircraft.

A4.11.2. Fuel Minimums:

A4.11.2.1. The fuel reserve requirements of AFI 11-202, Vol 3, General Flight Rules, apply except as outlined below:

A4.11.2.1.1. Plan missions to accomplish final landing with a minimum of 14,000 pounds indicated fuel. Test and training missions should arrive in the local area with a minimum of 30,000 pounds of fuel.

A4.11.2.2. The minimum fuel reserve for remote or island destination is 30,000 pounds useable fuel. The definition of a remote or island airfield is contained in AFI 11-202V3AFMCS1. If weather conditions are such that an alternate is required IAW AFI 11-202V3, then minimum fuel reserve is that required to delay for 2 hours.

A4.11.3. Air Refueling Limitations. Do not accomplish air refueling during training missions when any of the following conditions exist:

A4.11.3.1. When control stick steering (CSS) is engaged.

A4.11.3.2. Less than all four engines operating, except when necessary for safe recovery of the aircraft. (This includes retarding a throttle to idle, simulating the loss of an engine.)

A4.11.3.3. Night refueling with KC-135s when the tanker boom operator has not previously refueled the B-2 in the daylight. Exception to this restriction is if a night-qualified KC-135 instructor boom operator is on board.

A4.11.4. Low Level Limitations.

A4.11.4.1. B-2 training missions are restricted to no lower than 500 feet AGL and must be flown on a published low altitude route, in a MOA, or restricted area.

A4.11.4.2. If equipment problems impair the crew’s ability to clear terrain do not attempt low level flight.

A4.11.5. Weapons Limitations. While carrying weapons, do not conduct simulated bomb runs, touch and go's, unusual maneuvers, or other potentially hazardous activity. Carrying weapons does not preclude accomplishing fighter intercept activity or air refueling. Touch and go's may be accomplished with uncarted, inert weapons.

A4.11.6. Traffic Pattern Limitations:

A4.11.6.1. Touch-and-go landings are authorized only under the following conditions, unless flight test requirements dictate otherwise:

A4.11.6.1.1. Flight manual restrictions and procedures apply.

A4.11.6.1.2. RCR must be 9 or higher for touch-and-go landings.

A4.11.6.2. See Table A4.1 for in-flight and traffic pattern limitations.

A4.12. Aircrew and Aircraft Limitations:

A4.12.1. Brief all practice maneuvers or emergency procedures before the maneuver (either inflight or during mission planning).

A4.12.2. Do not practice compound simulated emergencies during critical phases of flight.

A4.12.3. Resume training only if the designated pilot in command determines no hazard to safe aircraft operations exists. In an actual emergency, terminate all training and emergency procedures practice.

Table A4.1. Traffic Pattern and Landing Limitations and Restrictions.

Approach Type	Gross Weight	Crosswind Component	Weather	IP Supervision	Night	RCR
Normal Low Approach	T.O.	N/A	Approach Minimums	No	Yes	N/A
Normal Touch and Go (Notes 1,2,3)	T.O.	10	300/1	Yes	Yes	9 or higher
Normal Touch and Go (Notes 1,2,3)	T.O.	30	1000/3	No	Yes	9 or higher
Sim Eng Out Low Appch (Note 5,6)	T.O.	N/A	Note 4	No	IP Supervision	N/A
Sim Eng Out Full Stop (Note 6)	T.O.	Note 7	Note 4	Yes	IP Supervision	Note 7
Sim Eng Out Touch and Go	T.O.	Note 7	Note 4	Yes	IP Supervision	Note 7

NOTES:

1. 10 knots max without IP or EP on board.

2. IP supervision is required if not touch and go qualified.

3. Go around if not in the designated touch down zone. Runway length and RCR consideration must permit an aborted takeoff using computed landing ground run distance.

4. Minimum weather required is circling minimal or 1,000 feet/2 miles visibility, whichever is higher. Crews without an IP of EP require 1500/3.

5. Ensure adequate obstacle clearance is maintained. Crews without an IP or EP on board will initiate go around no lower than 200 feet AGL.

6. Unplanned go-around/takeoff portion of maneuver requires the use of four engines.

7. Crosswind corrected for RCR must be in the recommended zone of the aircraft landing crosswind chart.

Attachment 5

B-52 OPERATING PROCEDURES

Section A5A—General Information

A5.1. References. The primary references for B-52 operations are T.O. 1B-52H-1, T.O. 1B-52H-1-12, T.O. 1B-52H-1-13, T.O. 1B-52H-1-13-1, and other applicable T.O.s, the *Electronic Combat (EC) Mission Guide,* ACCI 11-456, *ACC Electronic Combat Training and EMCON Procedures*, CJCSM 3212.02, *Performing Electronic Attack in the United States and Canada*, AFTTP 3-1V19, *B-52 Tactical Employment,* AFI 11-214, *Aircrew, Weapons Director, and Terminal Attack Controller Procedures for Air Operations*, and this instruction. A reference for techniques is ACCM3-3V19 (AFTTP 3-3V19), *B-52 Fundamentals.*

Section A5B—Mission Planning

A5.2. Low Altitude Charts. Each pilot team and each navigator team will carry a low altitude chart if the crew will conduct low altitude operations.

A5.3. Low Altitude Operations.

A5.3.1. Icing. Do not conduct low altitude flight in areas of forecast severe icing or in areas of reported moderate or severe icing conditions. If moderate or severe icing is encountered, abort the low altitude area.

A5.3.2. Turbulence. Do not fly low level in areas of forecast severe turbulence. Do not fly low level with forecast moderate turbulence associated with mountain wave effects, or with moderate or severe turbulence reported by military aircraft. If aircraft type (military or civilian) reporting turbulence is unknown, contact appropriate ARTCC for advisory. If moderate or severe turbulence is encountered, abort the low level area.

A5.3.3. Visibility/Cloud Clearance Requirements. Weather for TA operations on IR routes must be at or better than TA Visual Conditions (clear of clouds with 3 miles forward visibility). If TA Visual Conditions cannot be maintained, climb to MSA/IFR as soon as practical. Weather conditions for operations on VR routes must be 3000/5. If these weather conditions cannot be met, abort the route. For night operations, weather must meet the applicable day criteria. In addition, sufficient light and visibility must exist to recognize major changes in terrain elevations such as mountain peaks, ridgelines, valleys, and sloping terrain (NVGs may be used to satisfy visibility requirement).

A5.3.4. Equipment Restrictions:

A5.3.4.1. Mapping Radar Failure (Scope Blank or Inadequate for Navigation). Do not fly low level, during day IMC or night, with mapping radar failure. Aircraft without mapping radar may penetrate to low altitude during daylight hours provided TA Visual Conditions can be maintained. Abort the route if weather conditions fall below TA Visual Conditions at any time.

A5.3.4.2. OAS Processors. Do not fly low level with less than two OAS processors during night or in IMC. Crews may penetrate to low level and fly the route as long as day TA Visual Conditions can be maintained.

A5.3.4.3. Multi-Function Displays (MFD). Do not fly low level unless there is at least one operable MFD at the RN or Nav station..

A5.3.4.4. Attitude Heading Reference System (AHRS). Do not fly low level with a malfunctioning AHRS. Exception: The AHRS does not need to be fully operational if one Inertial Navigation System (INS) is providing accurate heading and there is accurate MD-1 gyro stabilization for the pilot's attitude director indicator (ADI) (this exception applies for day TA Visual Conditions only).

A5.3.4.5. Radar Altimeter. TA or EVS/visual contour flight without a properly operating radar altimeter is prohibited.

A5.3.4.6. Additional Night Equipment Restrictions. The following equipment must be fully operational for night TA operations, with or without NVGs:

A5.3.4.6.1. Mapping radar (for any night low level operation).

A5.3.4.6.2. Terrain avoidance system.

A5.3.4.6.3. Doppler/INS. either Doppler or INS ground speed and drift information may be used.

A5.3.4.6.4. EVS. Either Steerable TV (STV) or Forward Looking Infrared (FLIR) must be operational for night TA operations.

A5.3.4.6.5. Do not fly night TA if the aircraft performance is significantly degraded; for example, engine out or main gear extended.

A5.4. TA Procedures.

A5.4.1. Crewmembers must use all means available to clear terrain, including EVS equipment. Sound crew judgment must be used to determine whether current conditions warrant TA flight. If there is any doubt, the crew should climb to a safe altitude immediately.

A5.4.2. Descent from IFR altitude must be accomplished in TA Visual Conditions. The PTAIP, or Start TA Point, is not a mandatory start descent point. The OAS radar will be in full scan TA (Plan Position Indicator (PPI) display or Displaced Center Plan Position Indicator (DCPPI) display) for all descents to TA altitudes. Range marks will be displayed to the maximum extent possible (N/A day Visual Flight Rules (VFR)).

A5.4.3. TA flying under a cloud deck can be extremely hazardous, particularly under conditions of rising terrain or decreasing ceiling. In this case, climb immediately to MSA/IFR.

A5.4.4. Attempt to maintain route centerline when flying at IFR altitudes without visual terrain clearance. Crews are not authorized to deviate from published route corridor except when aborting the route.

NOTE:

conflict arises between the pilot's and navigator's information, climb to a safe altitude and resolve it; obtain further flight clearance if necessary. If differences are resolved resume scheduled training activity.

A5.4.5. If aircraft position is unknown, immediately climb to MSA/IFR altitude. If position cannot be determined after climbing to MSA/IFR altitude or any time route corridor has been exceeded, abort the route.

A5.4.6. Whenever bank angle exceeds 15 degrees the pilot flying the aircraft will make the turn visually or, if at night, initiate a climb to a safe altitude before executing the turn.

A5.4.7. Crews may omit the circled items of the Descent, After Descent, and TA Compensation checklist when weather conditions or time constraints prevent accomplishment of the comparison/FRL compensation. During night mountainous conditions, crews will accomplish the entire checklist unless the TA set has been previously compensated.

A5.4.8. Do not practice radar silent operations in IMC or at night.

A5.5. NVG Procedures.

A5.5.1. The pilot flying the aircraft will use TA procedures, radar altimeter, and visual inputs gained from the NVG to maintain the proper terrain clearance. NVGs will not be used for visual contour low level or visual formation.

A5.5.1.1. Cockpit Lighting. AFTTP 3-3V19 will be used as the baseline for proper NVG cockpit setup. Units may supplement this information. Approved lighting systems include the indigenous NVG cockpit lighting (C+ modification), cyalume light sticks, and an approved battery powered LED light bar. Always carry cyalume lights sticks as a backup as they remain the most reliable means of cockpit lighting. Unless on an approved test plan, do not use NVGs without one of the cockpit lighting systems mentioned above.

A5.6. Flare Drop Activity.

A5.6.1. Conduct live flare drop activity only in authorized special use airspace contained in current FLIP planning documents and overwater firing areas.

A5.6.2. Do not power the flare ejector system until within the approved flare drop area.

A5.6.3. Do not accomplish low approaches or touch-and-go landings after making or attempting a flare drop. Touch-and-gos are authorized after munitions specialists confirm all flares were dispensed (none remaining). Do not attempt a taxi-back sortie with confirmed hung, retained, or misfired flares.

A5.6.4. In case of an inadvertent flare drop, take the following actions:

A5.6.4.1. Immediately safe the flare ejector system.

A5.6.4.2. Record time and geographic coordinates of the inadvertent release.

A5.6.4.3. Contact the applicable airspace controller and advise them of the incident, approximate location and estimated damage.

A5.6.4.4. Units will develop local procedures to handle hung/hot flare situations if flares will be carried and/or expended in flight.

Section A5C—Air-to-Surface Employment

A5.7. The radar navigator/navigator is responsible for ensuring the proper ballistics are loaded for the target and the proper B-XX is input into Format 10 for the target destination.

A5.8. Do not open bomb bay doors during flight with internal weapons on board other than for intentional release or jettison or if directed in an approved test plan.

A5.9. While carrying internal weapons, do not simulate internal weapons release and while carrying external weapons, do not simulate external weapons release. Carrying weapons does not preclude accomplishing fighter intercept exercise, air refueling, transition excluding touch-and-go landings and simulated engine-loss, or AGM-142 training using a Captive Air Training Missile (CATM). Furthermore, it does not preclude accomplishing simulated external weapons or missile runs, with SMO simulations, while in "full sim" with actual weapons carried internally.

A5.10. If all weapons were loaded externally in positions visible to the aircrew, releases may be visually confirmed by the aircrew in lieu of confirmation by an RCO. Internal light indications must be consistent with visual observation. Do not rely on visual inspections by other aircraft or non-range personnel to clear the aircraft for subsequent training activity.

A5.11. If RCO confirmation of internal release is not possible, crews must perform a visual bomb bay check prior to conducting any additional training.

A5.12. Any crewmember entering the bomb bay must be qualified and must avoid inadvertent contact with the release mechanisms.

A5.13. Crewmembers will not enter the bomb bay to release bombs or to perform maintenance on release equipment.

A5.14. Observe the following safety precautions for continued activity with retained weapons:

A5.14.1. No weapons will be programmed against any target that is not within an approved training area.

A5.14.2. Accomplish post release/abort checklist before conducting any subsequent training activity.

A5.14.3. No release system, indicator, or weapon bay door malfunction may exist.

A5.15. If release is verified by the RCO and internal light indications are consistent with RCO observations, aircrews may conduct additional training without restriction provided no weapons remain on the aircraft. The RCO must positively confirm the exact number of weapons programmed for release.

A5.16. For internal weapons, aircrews will visually inspect the bomb bay if a hung weapon is suspected. If there are no weapons remaining on the aircraft, the aircrew may conduct additional training without restriction

Section A5D—Operational Limits And Restrictions

A5.17. Takeoff Planning Criteria. A minimum of 1,000 feet overrun must be available in addition to the minimum runway required (MRR). When 1,000 feet of overrun is not available, reserve a portion of the runway to satisfy the minimum overrun requirements. Runway available for takeoff planning must be actual runway length minus any portion of the runway used to satisfy overrun requirements at the liftoff end of the runway.

A5.18. Steep Turns. Except when otherwise required by an approved test plan, limit the maximum target bank angle to 45 degrees (not to exceed 60 degrees). The aircraft must remain clear of clouds throughout the maneuver. Do not perform steep turns during traffic pattern operations. For steep turns at or below 5,000 feet AGL/ASL, the following restrictions apply:

A5.18.1. Weather must be day VFR.

A5.18.2. Maneuver must be accomplished at or above 1,000 feet AGL/ASL with the flaps up. The aircrew will maintain at or above the minimum recommended airspeed or Mach for the planned bank angle throughout the maneuver.

A5.19. Unusual Attitudes and Stalls. Prohibited.

A5.20. Initial Buffet.

A5.20.1. Perform initial buffet practice as prescribed in the flight manual and under instructor pilot supervision.

A5.20.2. Pilots must review and discuss the correct recovery procedures and limitations for accomplishing initial buffet with the crew during mission planning.

A5.20.3. Practice recovery from initial buffet at a minimum altitude of 20,000 feet above the terrain. If clouds exist between the aircraft and the terrain, the aircraft must be at least 10,000 feet above the tops of the clouds. Do not practice recovery from initial buffet above FL 300 or at gross weights above 300,000 pounds.

A5.20.4. Perform the entire initial buffet maneuver with wings level.

A5.20.5. Do not practice initial buffet with weapons or missiles loaded.

A5.21. Chase Operations. Refer to AFI 11-2B-52V3 for chase procedures.

A5.22. Fuel Minimums.

A5.22.1. The fuel reserve requirements of AFI 11-202V3 apply except as outlined below:

A5.22.1.1. Plan missions to accomplish final landing with a minimum of 20,000 pounds.

A5.22.1.2. Plan the mission so the usable fuel over the alternate, if required, is a minimum of 24,000 pounds.

A5.22.2. The minimum fuel reserve for remote or island destination is 34,000 pounds. If weather conditions are such that an alternate airfield is required in accordance with AFI 11-202V3, then mini-

mum fuel reserve is 54,000 pounds. The definition of a remote or island airfield is contained in AFI 11-202V3_AFMCSUP1.

A5.23. Air Refueling Limitations and Restrictions. Do not accomplish air refueling during training missions when two or more engines are shut down or when any engine has been shut down due to fire or fire indication. Also do not accomplish air refueling when the aircraft gross weight is less than 230,000 pounds or more than the maximum limits specified in the appropriate flight manual.

A5.24. Low Altitude Limitations.

A5.24.1. Low altitude weight restriction is 230,000 to 420,000 pounds. These restrictions apply whenever the aircraft is operated at or below 5,000 feet above ground level or during ocean surveillance/reconnaissance operations at or below 5,000 feet MSL. The minimum low altitude weight restriction does not apply to en route, cruise or traffic pattern operations.

A5.24.2. Use of the autopilot nonsteering modes, other than second station, is not recommended for low altitude operations. Do not use nonsteering modes of the autopilot below 1,000 feet AGL except for the stab modes comparison check.

A5.24.3. Bank angles during low level or operations below 1,000 feet AGL/ASL are limited to 30 degrees maximum. Use steep turn guidance as applicable for higher altitudes.

A5.24.4. Normal minimum clearance plane settings: 300 feet day and 500 feet night. However, 200 feet clearance plane may be flown if necessary for the accomplishment of a test point or FCF. The time spent at this altitude will be kept to a minimum. The determining factor will be crew judgment, based on evaluations of aircraft equipment, weather conditions, aircrew capabilities, proficiency, and fatigue.

A5.24.5. Do not conduct TA or EVS/visual contour flight without a properly operating radar altimeter.

A5.25. Traffic Pattern Limitations.

A5.25.1. Touch-and-go landings are authorized only under the following conditions:

A5.25.1.1. Flight manual restrictions and procedures apply.

A5.25.1.2. Use a runway of sufficient width and length to permit a safe, normal full stop landing without the drag chute. Make the actual touchdown in the designated TDZ of the runway at a point and speed which would enable a safe full stop landing on the remaining runway. Initiate a go-around if this is not possible.

A5.25.1.3. The Runway Condition Reading (RCR) must be 9 or higher for touch-and-go landings.

A5.25.1.4. Non-IP aircraft commanders are limited to a maximum of 4 degrees crosswind crab.

A5.25.1.5. Non-IP aircraft commanders require a minimum 1,000 feet ceiling and 3 miles visibility.

A5.25.2. Instructor pilots or aircraft commanders will brief either in-flight or during mission planning, the individual being supervised on the following items prior to supervising touch-and-go landings.

A5.25.2.1. Flight manual procedures.

A5.25.2.2. The importance of smooth power application and stabilizing power before advancing throttles.

A5.25.2.3. Compressor stalls, including proper preventive action, recognition, and corrective action.

A5.25.2.4. Emergency jettison of drag chute.

A5.25.2.5. Proper use of airbrakes and stabilizer trim.

A5.25.2.6. Instructor Pilot (IP) or Aircraft Commander (AC) taking control of aircraft when necessary.

A5.25.2.7. Unplanned go-around using all throttles.

A5.25.3. Do not practice landings with less than 100 percent flaps, except where noted.

A5.25.4. Normally, deploy the drag chute on all full stop landings. Should operational requirements dictate a full stop landing be made without a drag chute, comply with flight manual taxi back limitations.

A5.25.5. Do not perform taxi back landings on wet runways.

A5.25.6. See Table A5.1. for inflight and traffic pattern limitations.

A5.26. Emergency Limitations.

A5.26.1. If it becomes necessary to shut down two or more engines or one engine for fire or fire indication, abort the mission.

A5.26.2. Refueling is not authorized with two or more engines inoperative or when any engine is shut down due to fire or fire indication, except when fuel is required to safely recover the aircraft.

A5.26.3. Compute performance with one or more engines inoperative assuming the loss of another engine.

A5.26.4. Aircraft with confirmed or suspected fuel leaks will abort the mission. Remain in the local area or proceed to the departure base or destination base by the most direct route. If circumstances permit, reduce to routine landing weight. Do not allow the center of gravity to exceed safe limitations or attempt any training activity, which would jeopardize safe recovery of the aircraft.

A5.27. Fuel Quantity Indication System Failure. Normally, each fuel quantity indicator for each fuel tank must be fully operational. If a fuel quantity indicating system failure is discovered prior to flight, the following exceptions apply:

A5.27.1. When a standard fuel load results in one or more empty tanks, the respective fuel quantity indicator for the empty tank need not be fully operational provided:

A5.27.1.1. The tank will remain empty throughout the flight, including inflight refueling.

A5.27.1.2. The fuel quantity gauge indicates zero.

A5.27.1.3. The circuit breaker for the respective indicator is pulled and a safety clip installed to prevent inadvertent resetting.

A5.27.2. Aircraft may be flown with either one external or one outboard, but not more than one, wing tank gauge inoperative or malfunctioning, provided the following procedures are adhered to:

A5.27.2.1. The aircraft is loaded with a standard fuel load.

A5.27.2.2. The circuit breaker for the inoperative or malfunctioning gauge is pulled and a safety clip installed to prevent inadvertent resetting. In this situation, the pilots must realize that regardless of the gauge indication, the total fuel quantity indicator will be receiving indications that the tank is empty. Therefore, there will be a discrepancy between the total fuel quantity indication and the actual amount of fuel on board.

A5.27.2.3. The fuel flow indicator for that tank is fully operational.

A5.27.2.4. Pilots must be particularly watchful when using fuel from a tank having an inoperative or malfunctioning fuel gauge since the only indication of fuel flow will be the fuel flow indicator light, lateral trim indications, and balance of fuel between main tanks one and four. The Fuel Quantity Indicating System (FQIS) sends a voltage to the total fuel quantity gauge rather than a restrictive value. When the circuit breaker is pulled, the indication to the total fuel quantity indicator from that gauge will be zero.

Table A5.1. Inflight and Landing Limitations.

Maneuver	Max Wt	Weather	IP Supervision	Additional Restrictions	Remarks
Simulated Engine Loss on Takeoff	290,000 lbs	NOTE 1	Required	**Note 4**	Limited to one engine simulated inoperative above S-1 speed or 100 KIAS, whichever is higher.
Simulated Six Engine Approach	290,000 lbs	NOTE 1	Required for other than day VFR		
Simulated Six Engine Landing	290,000 lbs	NOTE 1	Required	NOTE 3 &4	
Simulated Six Engine Approach and Go-Around	250,000 lbs	NOTE 1	Required for other Than day VFR	Symmetric	
Flaps Up Approach	290,000 lbs	NOTE 1	Required for other than day VFR	NOTE 5	
Flaps Up Touch-and-go Landings	250,000 3_approach; 270,000 2.5_approach	NOTE 1	Required	NOTE 4 & 5	
Low Approaches with One Engine Shut Down	290,000 lbs	NOTE 1	Required for other than day VFR	NOTE 2	Prohibited if engine(s) was shut down for fire, fire indication, or fuel leak.
Traffic Pattern Operations	325,000 lbs				
Landing Attitude Demonstration	290,000 lbs	Day/ Night	NOTE 6		Required Flaps down, touch-and-go limi-tations apply

Notes:

1. Day/Night. No lower than circling minimums or 1,000 feet ceiling and 3 miles visibility (2 miles if under radar contact), whichever is higher.

2. 200 feet Height Above Touchdown (HAT) or Decision Height (DH)/Minimum Descent Altitude (MDA) for the approach being flown, whichever is higher.

3. Comply with the following if a touch-and-go is to be accomplished: Touch-and-go limitations apply. No other simulated emergencies may be practiced during the maneuver. Rudder trim must be centered when decision is made to land Eight engine symmetrical thrust must be used for takeoff. If unplanned go-around is executed, symmetrical thrust will be established on all engines.

4. Dry runway crosswind component is 10 knots maximum. Touchdown must be made in the first third of the runway or go-around will be initiated.

5. 200 feet AGL to make decision to land or go-around.

6. Discernible horizon and the end of the runway visible.

Attachment 6

C-5 OPERATING PROCEDURES

Section A6A—Introduction

A6.1. Scope. This attachment provides guidelines for C-5 operations and applies to C-5 aircrews assigned to AFMC. The guidelines in this regulation shall be followed unless waived by AFMC/DOV or modified by an approved test plan.

A6.2. References. The primary references for specific C-5 operations are located in technical orders. Training guidance is contained in AFI 11-2FTV1, *Flight Test Aircrew Training*.

Section A6B—Mission Planning

A6.3. Obstacle Planning. The following guidance will be used to compute TOLD when obstacles and/or climb gradients are depicted.

A6.3.1. If there is a depicted obstacle and there is not a specified climb gradient:

A6.3.1.1. Obtain obstacle data from any available source. (height and distance)

A6.3.1.2. Compute data to ensure the aircraft can clear the known obstacle(s).

A6.3.1.3. Ensure you meet the 4-engine climb gradient (200 ft/nm).

A6.3.1.4. Ensure you meet the 3-engine climb gradient (152 ft/nm).

A6.3.2. If there is no obstacle depicted and there is not a specified climb gradient: The aircraft must be able to maintain 152 ft/nm climb gradient on three engines as a minimum.

A6.3.3. If an obstacle is not depicted and there is a specified climb gradient: The aircraft must maintain the specified climb gradient minus 48 ft/nm on three engines as a minimum.

A6.3.4. If there is a depicted obstacle and there is a specified climb gradient:

A6.3.4.1. Obtain obstacle data from any available source. (height and distance)

A6.3.4.2. Compute data to ensure the aircraft can clear the known obstacle(s).

A6.3.4.3. The aircraft must maintain the specified climb gradient minus 48 ft/nm on three engines as a minimum.

A6.3.5. In the event 3-engine climb criteria and/or obstacle clearance cannot be met, the crew may depart, at the aircraft commanders discretion if all of the following conditions are met:

A6.3.5.1. The aircraft is capable of achieving the minimum published/required climb

gradient (200 ft/nm if none published) with all engines operating.

A6.3.5.2. Day/VFR conditions exist on the entire departure and planned emergency return routing.

A6.3.5.3. The aircraft commander has determined through a review of all applicable maps and charts that, in the event of an engine failure, the planned departure and emergency return routing will allow for obstacle avoidance.

A6.3.5.4. TRT STANDING takeoff procedures are used.

Section A6C—Normal Operating Procedures

A6.4. Passenger Procedures. The aircraft commander has the discretion to release seats for passenger accommodations. Passengers can be carried on the flight station (jump seat or navigator's seat), in the relief crew area, or in the courier compartment. One additional current and qualified C-5 crewmember must be on board when carrying passengers other than on the flight station. This crewmember will perform only passenger-related duties. Passengers will not normally be carried in the troop compartment. If passengers are carried in the troop compartment, obtain qualified loadmasters and reference AMC guidance contained in AFI 11-2C-5 Vol 3 for any specific requirements.

A6.5. Observer. Use available crewmembers to assist in outside clearing during all taxi operations and any time the aircraft is below 10,000 feet MSL.

A6.6. Taxi Procedures.

Table A6.1. Minimum Taxi Clearance Criteria.

Lateral clearance of component	To an obstacle	Without Wing Walker	With Wing Walker
Main Gear Pod	Less than 3 feet high	25 feet	10 feet
Outboard Nacelle	3 feet high, but less than 6 feet high	25 feet	10 feet
Wing Tip	6 feet or higher	25 feet	10 feet

A6.7. Adverse Weather.

A6.7.1. Do not fly directly above thunderstorms and cumulonimbus (within 2,000 feet). Avoid them by using the above criteria. Avoid gust fronts and winds preceding a rapidly moving thunderstorm.

A6.7.2. In order to minimize exposure to thunderstorm hazards when approaching or departing an airport in an area where thunderstorms are occurring or are forecast:

A6.7.2.1. Try to maintain VMC.

A6.7.2.2. Maintain at least a 5-NM separation from heavy rain showers

A6.7.2.3. Avoid areas of high lightning potential; i.e. clouds within plus or minus 5000 feet of the freezing level.

NOTE:

Approaches or departures may be accomplished when thunderstorms are within 10 NMs. Thunderstorms must not be producing any hazardous condition at the airport or in the respective landing or takeoff corridor and must not be forecast or observed to be moving in that direction.

A6.7.3. C-5 aircraft will not be flown in areas of known or forecast severe turbulence.

A6.7.4. Do not fly into an area of known or forecast moderate or greater mountain wave turbulence. Crews should use good judgment when flying into any area conducive to mountain wave turbulence, and avoid these areas of potential turbulence when possible.

A6.8. Flight Engineer Procedures. All flight engineers assigned to AFMC will use the following guidance when operating C-5s, regardless of location. This guidance contains normal procedures for flight engineers (FE) not contained in the flight manual or applicable technical orders (T.O.).

A6.8.1. Authority to Clear Red X Symbols in the AFTO 781A, **Maintenance Discrepancy and Work Document**. A first engineer or above may clear red Xs for fan stops, pitot covers, gear pins, engine cowlings, exterior panels and single-point refueling (SPR) drains when qualified maintenance personnel are not available.

A6.8.2. Aircraft Servicing:

A6.8.2.1. Refueling and Defueling. Flight Engineers are authorized to refuel and defuel when maintenance personnel are not available. The applicable refueling and defueling checklist shall be used during all refueling and defueling operations. If ground support personnel are not available, the aircraft commander will designate other crewmembers to assist the FE. Aircrews will not refuel at bases with AMC support except in isolated cases when maintenance support is not readily available and the mission would be delayed.

A6.8.2.2. Refueling at Nonsupport Stations. When crewmembers are required to refuel due to lack of maintenance support, two refueling qualified personnel and an additional individual for scanner or safety duties are required. The additional individuals will be briefed on duties by the refueling team supervisor.

EXCEPTION**:** If left and right SPRs are used, two qualified personnel and two additional individuals are required.

A6.8.3. Weight and Balance. The flight engineer performing scanner duties is responsible for completing the DD Form 365-4, **Weight and Balance Clearance Form F**, when loadmasters are not on board and/or one has not been done through other means (i.e.- Canned DD Form 365-4, etc.).

A6.8.4. Aircraft Structural Integrity Program. The purpose of this program is to provide a reliable system for predicting potential or impending failures based on historical records of the aircraft's exposure to those actions contributing to fatigue failures.

A6.8.4.1. The program is monitored through the use of AF Form 4097, **C-5 Fatigue Tracking Worksheet**. Instructions for use of AF Form 4097 are in paragraph A6.5.

A6.8.4.2. Flight engineer will:

A6.8.4.2.1. Ensure all applicable sections of AF Form 4097 are completed according to procedures in Attachment 1.

A6.8.4.2.2. Ensure all AF Forms 4097 used accompany the aircraft back to home station with its records.

A6.8.5. Fault Code Reporting Procedures:

A6.8.5.1. The fault reporting method (FRM) is used to isolate system malfunctions with a minimum amount of troubleshooting and provide a description of the malfunction for maintenance.

A6.8.5.2. System malfunctions, whether monitored by MADAR (auto or manual) or observed by a crewmember, will be troubleshot using the fault reporting method (FRM) or fault isolation manual (FIM) procedures contained in MADAR to the maximum extent possible.

A6.8.5.3. The manual fault code (FC) from the troubleshooting routine and the auto fault code reported by MADAR will be recorded in AFTO Form 781A, maintenance discrepancy and work document, along with the description of the malfunction. Include any additional information required for clarification of the discrepancy.

A6.8.6. Monitoring Primary Radios. The FE will monitor the primary radio for flight clearances, altitudes, heading changes, and radio frequencies. The FE is not required to copy departure clearances.

A6.8.7. Scanner Duties. After takeoff, the scanner will normally make a walk-around when flaps are retracted, the after-takeoff climb checklist has been initiated, and the airplane is clear of turbulence. The walk-around should be completed by 10,000 feet.

EXCEPTION: When the scanner is sitting in the jump seat, he or she will remain there until 10,000 ft., unless coordinated with the pilot to clear off earlier for the after takeoff climb scan.

A6.8.8. Wheel and Brake Procedures. If dragging wheels or brakes are suspected during taxi, or upon completion of an Anti-Skid check, deplane the scanner and another crewmember, if available, and proceed as follows:

A6.8.8.1. Maintain interphone contact throughout the inspection.

A6.8.8.2. To inspect, approach directly from the front or rear of the tire, touch main landing gear tire and cautiously move the hand toward the wheel. Then place the hand near the brake to determine excessive heat without touching the brake surface. Repeat for each main landing gear (MLG) wheel and brake assembly.

A6.8.8.3. If any brake is significantly hotter than the majority, advise maintenance that corrective action is required. If an obviously dangerous overheated condition is observed, do not taxi the airplane.

A6.8.8.4. If no brake is found significantly hotter than the majority of brakes, the brake check is satisfactory.

Section A6D—Operational Limits And Restrictions

A6.9. General. This chapter adds aircraft limitations and restrictions to those already specified in the flight manual.

Table A6.2. Runway and Taxiway Requirements.

Runway Length	Runway Width	Taxiway Width
*6,000 feet/1,830 meters	**147 feet/ 45 meters	75 feet/23 meters

*HQ AFMC/DOV may approve operations down to 5,000 feet or 1,525 meters.

**If a 180-degree turn is required, then 150 feet or 46 meters is required.

A6.10. Runway, Taxiway, and Airfield Requirements. Figure A6.2 specifies the minimum runway length, width, and taxiway widths for normal operations. In all cases ensure obstacle clearance requirements are met. Landing distance will not exceed runway available.

A6.10.1. Runway Length for Takeoff/Intersection Takeoffs. Normally, takeoffs will be initiated from the beginning of the approved usable portion of the runway. Decision to make intersection takeoffs rests solely with the AC. Intersection takeoffs may be accomplished provided the operating environment (i.e. gross weight, obstructions, climb criteria, weather, etc.) will allow safe takeoff and departure. When less than the entire runway is used, takeoff and landing data (TOLD) card computations will be based on actual runway remaining from the point at which takeoff is initiated.

A6.10.2. Minimum runway condition reading (RCR) for takeoff or landing is the lowest RCR depicted in the C-5 performance manual (never less than 3). Normally, RCR values are not reported for taxiways and ramps. During periods of reported low RCR, taxiways and ramps may have an even lower RCR than reported for the runway.

A6.11. Wind Restrictions. Airfields will be considered below minimums for takeoff and landing when winds (including gusts) are greater than:

A6.11.1. Maximum wind (any direction)—50 knots.

A6.11.2. Maximum tailwind component—10 knots.

A6.11.3. Maximum crosswind components, corrected for RCR, are as specified in TO 1C-5A-1-1.

A6.12. Prohibited Maneuvers. The following maneuvers are prohibited in the aircraft unless they are part of an approved test plan or aircraft recovery plan:

A6.12.1. Simulated/actual engine out takeoffs.

A6.12.2. Aborted takeoffs.

A6.12.3. Two engine out landings and missed approaches.

A6.12.4. Stop and go landings.

A6.12.5. No slat landings.

A6.12.6. Full stalls.

A6.12.7. Dutch rolls.

A6.12.8. Unusual attitudes / spatial disorientation training

A6.12.9. Simulated runaway pitch trim malfunctions

A6.13. Training and Equipment Restrictions.

A6.13.1. No Flap Landing. Perform no flap landings to a full stop only. Maximum crosswind component will not exceed 15 knots. Limit gross weight to 525,000 lbs or less.

A6.13.2. Stallimeter Training. All practice approach to shaker onset/audible warning must be done in day, VMC only conditions at an altitude greater than 10,000 ft AGL with an instructor pilot in the left or right seat.

A6.13.2.1. For practice approach to shaker onset, recover the airplane at shaker onset or the lowest acceptable computed shaker onset airspeed, whichever occurs first.

A6.13.2.2. For practice approach to audible warning, recover the airplane at audible warning or the highest acceptable computed audible warning AOA, whichever occurs first.

Table A6.3. Additional Training Restrictions.

MANEUVER	RESTRICTIONS	REMARKS
Simulated Engine Failures	Initiate above 300 ft AGL	Do not initiate at less than 2 engine Vmca. Do not practice when any actual emergency exists or during no flap landings. Simulate the use of MIN Q.
Go Around/Missed Approach (4 engine)	Initiate above 100 ft AGL	Use all engines for unplanned go arounds below 100 ft AGL
Go Around/Missed Approach (3 engine)	Initiate above 200 ft AGL	Use all engines for unplanned go arounds below 200 ft AGL
Touch and Go	7000 ft runway length	

A6.14. Equipment Limitations.

A6.14.1. Hydraulic Systems. The aircraft will not be flown with more than one hydraulic pump on two nonadjacent engines inoperative. If flown in this configuration, all PTUs shall be operative, and system filters shall be checked to ensure the system is not contaminated. All pumps shall be positive depress capability.

A6.14.2. Landing Gear. If a gear-down flight becomes necessary, make an AFTO Form 781 entry after the flight requiring inspection of the extended gear(s) prior to the next flight to include the associated gear-well areas, LN2 servicing panel and doors. Nose landing gear inspections include the kneeling door supporting actuators, brackets, and bulkhead assembly.

A6.14.3. Fuel System.

A6.14.3.1. If a main tank boost pump is inoperative, crossfeed and isolation valves shall be operational.

A6.14.3.2. Auxiliary tank boost pumps, one pump per tank may be inoperative. Both pumps may be inoperative in each tank if the tank is not serviced with fuel and/or the refuel valve is not leaking fuel back into the associated tank.

A6.14.3.3. Extended range tank boost pumps, one pump per tank may be inoperative. Both pumps may be inoperative in each tank if the tank is not serviced with fuel and/or the refuel valve is not leaking fuel back into the associated tank.

A6.14.3.4. The aircraft will not be flown with more than one inoperative fuel quantity indicator for each wing (symmetrically opposite indicator in the other wing shall be operative).

A6.14.4. Electrical System.

A6.14.4.1. One engine driven generator may be inoperative provided the bus tie system is operative.

A6.14.4.2. One Constant Speed Drive (CSD) may be inoperative and disconnected, provided the bus tie system is operative. The oil level of the disconnected CSD will be checked for proper oil quantity prior to flight and during all subsequent en route stops. Do not fly more than 50 hours with a disconnected CSD (nonwaiverable).

A6.14.5. Central Air Data Computer (CADC). CADC Replacement – These procedures apply when one CADC system has not been disturbed. If computer failure, as opposed to a pitot static system failure, is confirmed and a new CADC is installed, a leak check is not required. Crosscheck pilot and copilot airspeed indicators at 80 knots on takeoff roll. Abort the takeoff if airspeed differs by five knots or more.

A6.14.6. Inertial Navigation Systems (INS). One INS may be inoperative for navigation provided the attitude function is operative. The fully operational units should be installed in the number 1 and 3 positions.

A6.14.7. MADAR. One SAR/channel indicating fan (N1) or core (N2) vibration out of limits and one SAR/channel indicating normal vibration levels suggests an indicating system malfunction if they differ by more than .5 scope divisions. For this condition, the engine vibration will be considered within limits.

Section A6E—Instructions For Using AF Form 4097, C-5 Fatigue Tracking Worksheet

A6.15. The form will be closed out after each sortie, runway abort, or landing on a substandard runway. The criteria in AFI 11-401, Flight Management, and MAJCOM supplement, pertaining to sorties, landing, and flying time entries made in the AFTO Form 781 by the pilot in command apply, with the following exceptions:

A6.15.1. Do not start a new log for inflight mission symbol changes.

A6.15.2. Do not start a new log for practice full stop landings at a point other than the point of takeoff.

A6.15.3. Start a new log when the aircraft remains on the ground more than 20 minutes after touchdown, regardless of circumstances.

A6.16. Weights. Except for section VI, enter weights to the nearest thousand pounds. Always right-adjust the three columns. For example, enter a weight of 94,500 pounds as 095. For section VI, enter values in thousands and tenths of thousands, such as 94.5 for the above example.

A6.17. Altitudes. Enter altitude to the nearest thousands of feet in section III. Enter altitude as thousands and tenths of thousands of feet in section V. The decimal point is on the form. (EXAMPLE: Enter 24,600 feet as 24.6 in section V.)

A6.18. Instructions. Accuracy and neatness are essential. All numbers and letters must be legible. Do not use diagonal marks (/) on zeroes.

A6.18.1. Section I, Aircraft Identification. Complete a AF Form 4097 for each sortie or condition as defined in paragraph 1. Do not complete a log for any ground operation or sortie that does not involve an attempted takeoff. This includes ground aborts for maintenance, operations, weather, and onload or offload exercises. When a sortie is terminated prior to an attempted takeoff, transcribe the section I information contained on the log to a new AF Form 4097. Use the same log number.

A6.18.1.1. Effective Date**.** The Zulu date the form is started. (For each mission departure from home station, the AFTO Form 781J, **Aerospace Vehicle-Engine Flight Document**, will contain the correct information for the effective date and columns 1-20 in a special block. This information will be used for confirmation. (All discrepancies on the AF Form 4097 will be corrected to agree with the AFTO Form 781J.)

A6.18.1.2. Columns 1-3**.** Aircraft tail number: Enter the last 3 numbers of the aircraft's serial number.

A6.18.1.3. Columns 4-8**.** Log number: Only one log number will be used for each sortie flown. Place the year in columns 4-5. Right adjust the remaining three digits, ending in column 8. Unused columns should contain zeroes. No dashes are permitted. (EXAMPLE: The ninth log of the calendar year 1996 would be entered as 96009.)

A6.18.1.4. Column 9**.** Normally, the letter "A" will be entered in this column. (**EXCEPTION:** Enter C when ALDCS is off; enter D when air refueling with a KC-10 tanker and ALDCS is off; enter E when air refueling with KC-10 tanker and ALDCS is on.) In instances when additional AF Forms 4097 are needed (i.e. aborted takeoff, aircraft remaining on the ground more than 20 minutes after an intermediate landing, landings on substandard runways), add a suffix letter beginning with B through Z with the exception of C, D, and E explained above. (**EXAMPLE:** Initial log number 81011A, aircraft aborts takeoff for a door warning light on--initiate new log with number 81011B. Aircraft makes a full stop landing with taxi back for another takeoff, but is delayed on the ground over 20 minutes--initiate a new log with number 81011F. The mission is then completed after further flight. The aircraft has flown one sortie and has used one log number although three AF Forms 4097 are completed.)

NOTE:

When an AF Form 4097 is initiated for a flight that is aborted on the runway during an attempted takeoff resulting in mission termination, the form will be completed as much as possible. Include the reason for the abort in the remarks section.

A6.18.1.5. Columns 10-12**.** No entries will be made in these columns.

A6.18.1.6. Columns 13-17**.** Airframe hours: To nearest hour. Decimal and tenth of hour omitted.

A6.18.1.7. Columns 18-20. AGS: Aircraft Generation Squadron. (EXAMPLE: 60 AGS would be entered.)

A6.19. Section II, Initial Takeoff and Final Landing Data. Complete section II as follows: FE--enter rank, last name, and organization of FE at panel for takeoff.

A6.19.1. Initial Takeoff Data:

A6.19.1.1. Columns 21-24. Date: Enter the takeoff Zulu date as day and month.

A6.19.1.2. Columns 25-27. Gross weight: Aircraft gross weight at brake release. (Zero fuel weight plus columns 30-32, fuel weight at takeoff.) Entry will be to the nearest thousand pounds. (See paragraph 1.5.1.2.)

A6.19.1.3. Columns 28-29. CG: Takeoff center of gravity to the nearest whole percent.

A6.19.1.4. Columns 30-32. Fuel weight: Fuel weight at brake release to the nearest thousand pounds. (See paragraph 1.5.1.2.)

A6.19.1.5. Columns 33-36. Time Z: Sortie takeoff time to agree with the takeoff time as recorded on the AFTO Form 781 or 369. (See exceptions, paragraph 1.1.1.)

A6.19.1.6. Columns 37-40. Airfield ICAO code: ICAO designation (4 letters) for the airfield at which the takeoff occurred. If no ICAO code is listed for an airfield, leave blank and annotate the name of the airfield of takeoff in the remarks section.

A6.19.1.7. Column 41. Substandard runway: Enter an "X" if the runway is not asphalt or concrete.

A6.19.2. Final Landing Data:

A6.19.2.1. Columns 42-44. Fuel weight: Fuel weight at engine shutdown or 5 minutes after final touchdown, whichever comes first, to the nearest thousand pounds.

NOTE: This entry and the fuel entry (columns 30-32) are extremely important and must be accurate. The chronological event (cruise periods, touch and go (T&G), intermediate full stops and takeoffs) fuel weight is computed using the initial takeoff and final landing fuel weight.

A6.19.2.2. Columns 45-48. Time Z: Sortie landing time as recorded on the AFTO Forms 781. (See exceptions, paragraph 1.1.1.)

A6.19.2.3. Columns 49-52. Airfield ICAO code: ICAO designation (4 letters) for the airfield at which the final landing occurred. If no ICAO code is listed for an airfield, leave blank and annotate the name of the airfield of landing in the remarks section.

A6.19.2.4. Column 53. Substandard runway: Enter an "X" if the runway is not asphalt or concrete.

A6.19.2.5. Column 54. Fuel sequencing: Enter "S" for standard fuel sequence; enter "N" for nonstandard fuel sequence. When "N" is entered, make an entry in the remarks block to indicate fuel quantity in each tank containing fuel, and the total flight time spent in nonstandard configuration.

A6.20. Section III, Flight Profile Data:

A6.20.1. This section allows for four separate cruise periods. Do not enter temporary cruise periods of less than 15 minutes (due to clearance changes, weather, etc.). Entries are required for low-level clean configuration events where a cruise period time and altitude is held longer than 5 minutes at 6,000 feet mean sea level (MSL) or lower. Neither traffic nor the climb or descent portions of the sortie are to be entered. These entries are to be made left-to-right in chronological time sequence as they occur. The first cruise period start time should begin after the initial climb and cruise is stabilized. Cruise period stop times should be entered when one of the following events occur:

A6.20.1.1. Climb or descent in excess of 4,000 feet from recorded altitude is initiated.

A6.20.1.2. Altitude increases by more than 4,000 from the last recorded value. This may occur when multiple step-climbs (less than 4,000 feet each) are performed.

A6.20.1.3. Cruise Mach number is stabilized at 0.10 from the last recorded value.

NOTE:

Climb and descent criteria will normally govern when to close out a cruise period. The Mach number change criteria is possible during aerial refueling operations and turbulence encounters.

A6.20.2. Subsequent cruise periods should begin when Mach/altitude conditions are stabilized. The stop time for the last chronological cruise entry indicates scheduled cruise has ended and descent for landing follows.

NOTES: Cruise entries are not required if the entire flight remains in the initial takeoff airfield's traffic pattern. (See section II, columns 37-40.) However, a cruise entry will be required when:

1. The traffic pattern altitude (6,000 feet MSL) is exceeded, regardless of time duration.

2. Each time an aircraft departs from one base traffic pattern and flies to another base regardless of altitude or time duration.

A6.20.3. Section IV, Transition Training—Touch-and-Go Landings, Additional Full Stops, and Takeoffs.

A6.20.3.1. Columns 10-11**.** Sequence number: Keypunch instructions, no entry required.

A6.20.3.2. Columns 12-55**.** T&G: There is space to record 22 touch-and-go landings. Enter additional T&Gs in remarks column, if required. Enter the Zulu time at touchdown for each T&G. Enter T&Gs left to right on the first line as they occur. After the 11th T&G entry, begin second line and enter 12th and subsequent T&Gs left to right as they occur. Leave unused portion blank. Do not skip any entries. Time entries should always be ascending in chronological order (allowance is made for passing through 2400Z).

A6.20.3.3. Columns 56-59**.** Full stop: There is space to record two practice full stop landings. Enter additional full stop landings in the remarks section. Enter the Zulu time at touchdown for the first practice full stop on the first line. Leave unused portion of section IV blank.

NOTE:

Do not enter practice landings on substandard runways. A new log must be accomplished for each substandard runway practice landing.

A6.20.3.4. Columns 60-63. Takeoff: There is space to record two additional takeoffs. Enter additional takeoffs in remarks section. Enter the Zulu time at takeoff for the additional takeoffs as they occur. Leave unused portion blank.

A6.21. Section V, Inflight Operations.

A6.21.1. Columns 10-11. Sequence numbers: Keypunch instructions, no entry required.

A6.21.2. Columns 12-17. Event: Place an "X" in the appropriate column.

A6.21.3. Column 12. Terrain Following (TF)**.

A6.21.4. Column 13. Low Level (LL)**.

A6.21.5. Column 14. Aerial Refueling (R)*.

A6.21.6. Column 15. Airdrop (A)*.

A6.21.7. Column 16. Cargo Jettison (CJ)*.

A6.21.8. Column 17. Fuel Jettison (FJ).

*Simulated events will be recorded.

**Usually applies during special operations low level (SOLL) II and tactical VFR training (TVT) sorties. Use LL when flying a clean configuration event at or below 2,000 feet AGL for longer than 5 minutes.

A6.21.9. Columns 18-21. Event start time (Zulu time): For airdrop or cargo jettison, the start time is when the aerial delivery system (ADS) doors start to open. For AR, start time is when the aircraft enters tanker wake turbulence or the aircraft is within approximately 500 feet of the tanker.

A6.21.10. Columns 22-25. Event stop time (Zulu time): For airdrop or cargo jettison, stop time is when the ADS doors are closed. For AR, time ends when the aircraft leaves the tanker wake turbulence or the aircraft is approximately 500 feet from the tanker.

A6.21.11. Columns 26-28. Incremental weight: Enter the weight onloaded or offloaded for the event "X-ed" in columns 12-16. Enter "000" for simulated events.

A6.21.12. Columns 29-32. Altitude or clearance plane setting: Enter the altitude in thousands and tenths of thousands of feet. A decimal point has been provided on the form. For terrain following and low-level, enter the altitude in feet AGL.

A6.21.13. Columns 33-40. Terrain following and low-level: If an "X" was placed in column 12 or 13, make the following entries:

A6.21.14. Columns 33-34. Route code: Enter the code number of low-level route flown.

A6.21.15. Columns 35-36. Mode: Place an "X" in the appropriate column, "A" for automatic, "M" for manual.

A6.21.16. Column 37. Ride setting: Enter a "0."

A6.21.17. Columns 38-40. Mach: Enter the 3-digit Mach number being flown for terrain following. (Decimal is assumed.)

NOTE:

An altitude entry is required for all events. Columns 18-32 must be completed for each event. Columns 33-40 must be completed for terrain following and low level only. Do not place decimal points in any columns. All allowed decimal points are preprinted on the form.

A6.22. Section VI, Sortie Time and Takeoff Weight Computation.

A6.22.1. Flight Duration:

A6.22.1.1. Landing Time: Enter the ending Zulu landing time.

A6.22.1.2. Takeoff Time: Enter the initial Zulu takeoff time.

A6.22.1.3. Total Time: Enter the total flight time in hours and minutes.

A6.22.1.4. Total Time: Enter the total flight time in hours and tenths.

NOTE:

The takeoff and landing time entries in sections II and VI should be identical and should be the same as recorded in the AFTO Form 781 for the sortie being reported. (See paragraph 1.1.1 for exceptions.)

A6.22.2. Takeoff Weight Computation. Complete the takeoff weight computation portion when computing takeoff requirements. The operating weight and cargo, passenger, and miscellaneous weight entries should not change. The fuel weight at brake release is subject to change due to unforeseen delays. The FE need not readjust section VI entries in case of delays. The FE should always enter the corrected fuel weight and gross weight at takeoff in section II.

NOTE:

LN2 weight will be included in the aircraft operating weight.

A6.22.3. Remarks. Enter any appropriate comments that could influence aircraft fatigue factors. Examples are: severe turbulence encountered, hard landing, nonstandard fuel sequence, high load maneuvers, unpressurized flight, and inflight thrust reverser operation. If active list distribution control system (ALDCS) is off or inoperative in flight, record the conditions and flight duration. Record the appropriate sequence number from section V, Inflight Operations Data, of any AR event occurring behind the KC-10.

EXAMPLE: "KC-10 AR, seq XX" where "XX" is the sequence number. Other required remarks are mentioned in the various section instructions.

NOTE:

If all blocks for a specific maneuver are completed and additional blocks are needed, use another AF Form 4097 for continuation. Use same log number and annotate in the remarks section of the continuation form, "Continuation of log number XXXXX."

Attachment 7

C-12 OPERATING PROCEDURES

Section A7A—General Information

A7.1. Responsibilities. This attachment, in conjunction with other governing directives, prescribes C-12 procedures under most circumstances, but is not to be used as a substitute for sound judgment or common sense. The pilot in command (PIC) is ultimately responsible for the safe and effective operation of the aircraft.

A7.2. References. The primary reference for C-12 operations are Technical Order (T.O.) 1C-12C-1, *USAF Series C-12C Flight Manua*l or T.O. 1C-12J-1, *USAF Series C-12J Flight Manual* and this instruction.

Section A7B—Mission Planning

A7.3. Local Aircrew Aids. Aircrew aids should be developed locally to support the unit mission. The contents of these aids will be at the discretion of the unit.

A7.4. Briefing/Debriefing.

A7.4.1. C-12 Paradrop mission briefings will be conducted with a qualified jumpmaster and will begin NLT 1 hour prior to scheduled takeoff. C-12J will not conduct actual paradrop missions.

A7.4.2. C-12 Photo/Safety Chase mission briefings will be conducted at the discretion of the aircraft commander. Following the chase briefing, the C-12 aircrew will conduct their own crew briefing. Chase mission debriefings will also be at the discretion of the aircraft commander of the lead aircraft.

A7.4.3. The aircraft commander will indicate on the mission card all activities planned for the flight. Leave one copy at squadron operations.

A7.4.4. Weight and Balance. For AFFTC based C-12s, the accuracy of each aircraft's Chart A and C will be maintained and periodically verified by a NASA-Dryden engineer. For the 46TG based C-12, the accuracy of Chart A and C will be maintained and periodically verified by a 46TG engineer. Both the NASA engineer and the 46TG engineer will provide the DD Form 365-4 (Weight and Balance Clearance Form) for their respective aircraft. For AFFTC based C-12s, the original Form Fs will be filed and maintained in the 418 FLTS and USAF Test Pilot School operations desks. For the 46TG based C-12, the original Form F will be filed and maintained in the 586 FLTS. Duplicate copies will be filed in the aircraft weight and balance manual. Flight plans will include the date on Form F. After completion of any modification or demodification, a new Form F and/or Chart C will be furnished by the responsible weight and balance authority to the respective operating unit(s). Aircrew members will not make Chart C entries. Form Fs for are valid for 180 days and must be revalidated at that time by the responsible weight and balance authority. New Form Fs should be submitted to the respective operating unit(s) with the new date. Aircraft commanders must ensure that the Form F reflects the actual loading of the aircraft. Configuration or loading differences from the filed Form Fs will require that the Form F be reaccomplished for the specific mission to ensure the weight and balance limits for all phases of flight will not be exceeded.

Section A7C—Operating Procedures

A7.5. For planning purposes when taxiing, the C-12 has a wing span of 56 feet.

A7.6. Reverse Taxi.

A7.6.1. The pilot will coordinate reverse taxi directions and signals with the crew chief or scanner.

A7.6.2. The crew chief or scanner will be outside the aircraft and positioned to effectively direct the reverse taxi.

A7.7. Takeoff Requirements:

A7.7.1. Compute takeoff and landing data for all flights. MAJCOM approved tab data may be used when available.

A7.7.2. Minimum runway length for takeoffs and full stop landings in the C-12C is 4000 feet and the C-12J is 5000 feet. In no case will a takeoff be performed if the runway available is less than either ACCL/STOP distances. Minimum runway for touch and goes is 5000 ft for the C-12C and 6000 feet for the C-12J.

A7.8. Chase Operations. Chase operations are defined as flights involving similar or dissimilar aircraft performing maneuvers with a “non-cooperative” lead aircraft (i.e., moderate banked turns, shallow climbs, and descents) from a route or trail position.

A7.8.1. Chase Restrictions.

A7.8.1.1. Day VMC only.

A7.8.1.2. No wing takeoff or landings.

A7.8.1.3. Minimum ATC wake turbulence criteria applies when chasing larger aircraft.

A7.8.1.4. Minimum lateral spacing is one-half the wingspan of the largest participating aircraft.

A7.8.1.5. Minimum chase altitude is 200 feet AGL.

A7.8.1.6. Minimum altitude for airborne pickup is 200 feet AGL.

A7.8.1.7. Minimum aispeed for airborne pickup is final turn/final approach airspeed for the established configuration.

A7.8.2. Airdrop Procedures. The C-12J is prohibited from airdrop operations. The C-12C is authorized to airdrop personnel out of the rear main cabin entry door. The following guidelines apply:

A7.8.2.1. Maximum airspeed is 205 knots with the airstair door removed.

A7.8.2.2. Airdrop configuration is 40 percent flaps and gear as necessary.

A7.8.2.3. Minimum airspeed is 100 knots.

A7.8.2.4. A loadmaster is not required to be on board the aircraft when the jumpmaster is from the AFFTC test parachute program.

A7.8.2.5. The minimum exit altitude for free fall is 2500 feet AGL.

A7.8.2.6. The minimum emergency exit altitude is 1000 eeft AGL.

A7.8.2.7. Below 1000 feet AGL all airdrop personnel will have lapbelts securely fastened.

Section A7D—Instrument Procedures

A7.9. Approach Category.

A7.9.1. The C-12 is approach category C. A missed approach will be accomplished in accordance with flight manual procedures.

Section A7E—Operational Limits And Restrictions

A7.10. Maneuvering Parameters.

A7.10.1. Unusual Attitudes. Perform unusual attitudes above 8,000 feet AGL and avoid exceeding bank angles of 60 degress and pitch attitudes of + 25 degrees.

A7.10.2. Stall Characteristics. Recover the aircraft at the first indication of stall warning or actual stall during stall demonstrations. During stall training under an approved syllabus, instructor pilots may allow the trainee to recover the aircraft at the first indication of aerodynamic stall. Perform all practice stalls and stall recoveries above 5,000 feet AGL.

A7.10.3. Practice Engine Shutdown/Restarts. Actual engine shutdowns and restarts for practice will only be accomplished during training under an approved training syllabus. Minimum altitude for practice engine shutdowns and restarts is 5,000 feet AGL. 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.

A7.10.4. Engine Failure Immediately After Takeoff. Simulated engine failures immediately after takeoff may only be performed after a positive rate of climb is attained, the aircraft is above the safe single engine airspeed defined in the appropriate flight manual, and the aircraft is capable of at least a 3 percent single engine climb gradient. In addition, a C-12 instructor pilot will be have direct access to a set of flight controls.

A7.10.5. No Flap Landings/Touch and Goes. C-12s have no restrictions on No Flap landings or touch and goes. This is a normal flap setting and may be accomplished without an IP or EP.

A7.10.6. Touch-and-Goes. Without a C-12 qualified IP or EP onboard, both MPs must be MP Touch and Go certified in order to perform actual touch and goes in the aircraft

A7.10.6.1. Edwards AFB Lakebed Landings. Crosswind limits for lakebed landings are limited to ¾ flight manual limits. Touch and go landings are prohibited.

A7.11. Transfer of Aircraft Control. Both pilots of the C-12 must know at all times who has control of the aircraft. Transfer of aircraft control will be made with the statement “You have the aircraft.” The pilot receiving control of the aircraft will acknowledge “I have the aircraft.” Once assuming control of the aircraft, maintain control until relinquishing it as stated above.

A7.12. Minimum and Emergency Fuel. When it becomes apparent an aircraft will enter initial or start an instrument final approach at the base of intended landing or alternate (if required), declare the following (as applicable):

A7.12.1. Normal fuel –500 (800C12J) pounds.

A7.12.2. Minimum fuel – 400 (600C12J) pounds or less.

A7.12.3. Emergency fuel – 300 (400 C12J) pounds or less.

Attachment 8

C-17 OPERATING PROCEDURES

Section A8A— Mission Planning

A8.1. Scope. This attachment, in conjunction with other governing directives, prescribes procedures for conducting C-17 operations in AFMC. It is not to be used as a substitute for sound judgement or common sense. For operating procedures not covered in this attachment refer to AFI 11-2C-17 Vol 3, *C-17 Operating Procedures*, for guidance. Deviations to this attachment are allowed only if procedures are part of an approved test plan that has been through a safety review.

A8.2. Flight Data Calculations. Flight crews may manually compute flight plans or use mainframe based or contracted Computer Flight Plans. The flight crew has final responsibility for accuracy of the flight plan used.

A8.3. Fuel Planning. On flights where a test plan does not dictate required fuel load, fuel planning is the responsibility of the aircraft commander. The C-17 mission computer can be used for fuel planning. It plans a complete climb, cruise, descent and approach and landing based on the pilot inserted ROUTE DATA and PRFM factors. This fuel is "En Route" fuel. The "Alternate" fuel is a LRC profile climbing from the destination to the highest possible cruise altitude (5 minute cruise), descent and landing at the alternate. "Missed approach" fuel is already included in the alternate fuel. The mission computer calculates actual fuel burn to landing at both the destination and alternate. "Holding" is based on endurance holding at 10,000, 250 KCAS, +10 temp dev, for 45 minutes or 1+15.

A8.4. Low Level Navigation. Low level minimum altitude is 500 AGL.

Section A8B—Normal Operating Procedures

A8.5. Aircrew Uniform. All primary crew members will have Nomex gloves in their possession. It is recommended that primary crew members wear Nomex gloves during engine start, taxi, takeoff and landing. Crew members will remove rings and scarves before performing aircrew duties.

A8.6. Takeoff and Landing Policy. After thoroughly evaluating all conditions, the aircraft commander will determine who accomplishes the takeoff and landing and occupy either the left or the right seat during all takeoffs and landings. The aircraft commander can allow a qualified co-pilot to takeoff from either seat.

A8.7. Outside Observer. When available, use a crew member to assist in outside clearing during all taxi operations and any time the aircraft is below 10,000 feet MSL.

A8.8. Duty Station. A qualified pilot will be in control of the aircraft at all times during flight. (EXCEPTION: Unqualified pilots undergoing qualification training under the direct supervision of an instructor pilot) The aircraft commander, copilot, and loadmaster will be at their duty stations during critical phases of flight. During other phases of flight, crew members may leave their duty station for brief periods to meet physiological needs and to perform normal crew duties. Only one pilot may be absent from their

duty station at a time. Notify the aircraft commander before departing assigned primary duty station. The aircraft commander is the final authority for allowing personnel to move about the aircraft during flight.

A8.9. Seat Belts. All occupants will have a designated seat with a seat belt. Use of seat belts will be as directed by the aircraft commander and the flight manual. Crew members occupying the pilot, co-pilot, or loadmaster positions will have seat belts fastened at all times in-flight unless crew duties dictate otherwise. All crew members will be seated with seat belts and shoulder harnesses fastened during taxi, takeoff, receiver AR, and landing, unless crew duties dictate otherwise. Additionally, anytime the seat belt advisory sign is illuminated (inoperative on aircraft T-1), crew members will be seated with seat belt fastened, unless crew duties dictate otherwise. For AR, all aircrew members and passengers will be seated with seat belts fastened (unless authorized by the AC to observe tanker AR or crew duties dictate otherwise), and all equipment will be properly secured. Crew members performing instructor or flight examiner duties are exempt from seat belt requirements; however, a seat with an operable seat belt will be assigned.

EXCEPTION: Crew members may taxi without the shoulder harness fastened for positioning and de-positioning the aircraft.

A8.10. Runway, Taxiway, and Airfield Requirements.

A8.10.1. Minimum runway/taxiway widths for C-17 operations.

A8.10.2. Minimum runway/taxiway widths for C-17 operations.

A8.10.2.1. Runway width: 90 feet (28 meters).

A8.10.2.2. Taxiway width: 50 feet (16 meters).

A8.10.2.3. Minimum width for 180° turn: 90 feet (28 meters) with star turn.

A8.10.3. Takeoff and Landing.

A8.10.3.1. Minimum runway length for takeoff is critical field length (CFL) unless a minimum altitude is required at the departure end of runway.

A8.10.3.2. Minimum runway length for Ê flap landing is computed landing distance, with idle reverse.

A8.10.4. Minimum runway length for FULL flap landing is computed ground roll, with max reverse, plus 500 feet. Touchdown must be within the first 500 feet of the runway and full flaps will be used. Weather minimums must be circling minimums, no lower than 600/2. Prior to landing at a short field, the aircraft commander must verify takeoff performance to ensure he/she can take off after the planned offload/onload.

NOTE: Runways less than 3,500 feet require MAJCOM/DO waiver.

A8.10.5. Intersection takeoffs are authorized if CFL is less than the remaining runway length, and the mission type allows the procedure. The decision to make intersection takeoffs rests solely with the aircraft commander.

A8.11. Reverse Taxi.

A8.11.1. The pilot will coordinate reverse taxi directions and signals to be used with the loadmaster and marshaller (when available).

A8.11.2. Unless briefed otherwise, the following standard terms will be used by the loadmaster when conducting reverse taxi operations:

A8.11.2.1. The #1 and #4 engines will be used as turn references, i.e., "More turn towards #1," "Less turn towards #4."

A8.11.2.2. When the aircraft nears the desired reverse taxi stopping point, the loadmaster will give the following commands: "Prepare to stop, five, four, three, two, one, stop."

A8.11.2.3. CAUTION. During the entire reverse taxi operation, if the loadmaster states the word "Stop," the pilot will immediately stop the aircraft. Failure to comply may result in damage to aircraft or injury to personnel.

A8.11.3. Ensure all passengers are seated and cargo is secure.

A8.11.4. Open aft cargo door and lower the ramp to coplaner position. Paratroop door(s) may be opened in addition to the cargo door and ramp if required. If ramp cargo prohibits easy movement for the loadmaster or the ramp cannot be lowered due to cargo tiedowns, the loadmaster will stand in either troop door to clear the area behind the aircraft.

A8.11.5. The loadmaster must have enough maneuverability to observe and direct reverse taxi, and report any hazards. The loadmaster will provide the pilot with continuous interphone instructions on conditions in the maneuvering area. This includes turns, distance remaining (for wingtips, empennage, and main gear), and stopping point. During aircraft backing, if the pilot and loadmaster lose interphone contact the pilot will stop the aircraft.

A8.11.6. If deemed necessary by the aircraft commander, the loadmaster will deplane and direct reverse taxi operations from a safe distance behind the aircraft.

A8.11.7. When reverse taxiing at night, the pilots and loadmaster will ensure the taxi area is sufficiently lighted. Use the staging lights, retracted landing lights, or any other source that provides adequate lighting of the taxi area.

A8.11.8. During reverse taxi operations, stop no less than 25 feet from an obstruction with or without a marshaller/wing walker.

A8.11.9. The aircraft tail cannot be seen by the loadmaster from inside the aircraft and could possibly strike an obstruction well before the main gear tires are near the ramp edge. If any doubt exists as to sufficient clearance, stop the aircraft..

A8.12. Communications.

A8.12.1. Sterile Cockpit. Limit conversation to that essential for crew coordination and mission accomplishment during taxi, takeoff, air refueling, approach, landing, and any flight below 10,000 feet MSL (except cruise).

A8.12.2. Aircraft Interphone. Primary crew members will monitor interphone/hot mike (as applicable). Crew members will advise the aircraft commander before checking off headset.

A8.12.3. Command Radios:

A8.12.3.1. The pilot not flying the aircraft normally makes all ARTCC radio calls.

A8.12.3.2. In terminal areas the pilot, copilot, and loadmaster will monitor the primary command radio unless directed otherwise. The loadmaster or designated crew member should monitor C2 frequencies (if applicable) on the inbound and outbound leg, unless otherwise directed.

A8.12.3.3. The pilot operating the command radios will inform the crew when the primary radio is changed.

A8.12.3.4. One pilot should record and will acknowledge all ATC clearances.

A8.12.3.5. Both pilots will monitor UHF guard (or VHF guard when appropriate) emergency frequency regardless of primary radio.

A8.12.3.6. Loadmasters will coordinate with pilots before going ISOL on interphone.

EXCEPTION: Only one pilot crew member (normally the PNF) is required to monitor guard frequencies during rendezvous and AR.

A8.13. Functional/Acceptance Check Flights. FCFs and ACFs will be performed according to T.O. 1-1-300 and applicable MAJCOM instructions (i.e., 21-XXX series). Additional guidance can be found in T.O.s 1C-17A-6CF-1 and 1C-17A-1.

A8.14. Aircraft Servicing and Ground Operations.

A8.14.1. Aircraft Refueling. Crew members qualified in ground refueling may perform refueling duties. Aircrews will only refuel in cases when maintenance support is not readily available and the mission would be delayed. Crew members may augment maintenance refueling teams at en route stops.

A8.14.2. Concurrent Ground Operations. Concurrent ground operations (simultaneous refueling or de-fueling while cargo or maintenance operations are being performed) are authorized in accordance with T.O. 00-25-172. Aircrews performing dash-1 preflight inspections or cargo loading concurrent with servicing must have cooperation and close coordination with the chief servicing supervisor (CSS). The CSS will remain in continuous intercom contact with fuel servicing team members during the entire servicing operation.

A8.14.3. Movement into or within the safe area must be under control of the CSS. Individuals must properly ground themselves before boarding the aircraft or handling fuel servicing equipment. Concurrent servicing, loading, and maintenance must be conducted according to T.O. 00-25-172 and current checklists, which will be reviewed before concurrent operations. Current checklist procedures take precedence over T.O. 00-25-172 procedures.

A8.14.4. Simultaneous fuel and oxygen servicing is not authorized.

A8.15. Cargo Handling. All cargo and passenger handling will be in accordance with AFI 11-2C-17 Vol 3 to the maximum extent possible.

A8.16. Formation Procedures. Visual formation, to include chase and target support, is authorized with similar and dissimilar aircraft. SKE formation will be flown in accordance with AFI 11-2C-17 Vol 3 to the maximum extent possible.

A8.17. Engine Running Onload and Offload (ERO) Procedures. Use ERO procedures when necessary to expedite aircraft or cargo movement. The aircraft commander is also responsible for coordination with the onload/offload base to ensure the ERO is conducted in a safe manner. These ERO procedures may be used for any mix of personnel or cargo. Material handling equipment should be used if palletized cargo is to be onloaded or offloaded. Aircraft commanders must assess prevailing weather, lighting and parking location to ensure safe operations. General procedures follow.

A8.17.1. T.O. 1C-17A-1 operational stop checklist will be accomplished when performing ERO procedures.

A8.17.2. Unless threat conditions dictate otherwise, use wing leading edge, taxi, and staging lights to enhance safety at night.

A8.17.3. The aircraft commander will brief the crew on all aspects of intended ERO operation, emphasizing specific crewmember duties.

A8.17.4. Do not onload or offload through the crew entrance door and cargo ramp and door at the same time. Paratroop doors will not be used.

A8.17.5. Prior to the loadmaster directing onload/offload operations, aircraft parking brake will be set and at least one pilot will monitor brakes, engines, interphone, and radios.

A8.17.6. The loadmaster will direct all onload/offload operations. Prior to onload/offload operations, personnel in the cargo compartment will be briefed regarding their location, duties, and responsibilities during the ERO. No doors will be opened without coordinating with the loadmaster. As per load configuration, the briefing will include:

A8.17.7. Exact offload procedures and applicable signals for vehicle drivers.

A8.17.8. Drivers will be told to assume their positions during taxi-in. They will actuate brake pedals sufficiently to ensure vehicle brakes are operational, and they will not start engines until directed by the loadmaster. The loadmaster will not direct engine starts until the aircraft comes to a complete stop, and the door and ramp are open and positioned for offload.

A8.17.9. If a combat offload is to be accomplished before offloading vehicles do not remove restraint until after the combat offload is completed.

A8.17.10. Vehicle parking brakes will not be released until all restraint is removed and cleared by the loadmaster.

A8.17.11. Personnel to be offloaded will be briefed to secure baggage aboard vehicles (if applicable).

A8.17.12. Vehicles and all personnel exiting via the ramp will proceed directly aft of the aircraft at least 25 feet before turning and at least 200 feet before stopping.

A8.17.13. After the aircraft is slowed to taxi speed, the loadmaster may remove all tiedowns except one forward and one aft. After ensuring the ramp toes are in the appropriate position, open the cargo door, and lower the ramp to an approximate horizontal position.

A8.17.14. Ensure the crew rest window to the cargo compartment is clear of obstructions for cargo door and ramp ERO operations.

A8.17.15. After clearance from the pilot to start off/onloading operations, the loadmaster positions the ramp for off/onloading, extends the stabilizer struts (if required) and directs the off/onload.

A8.17.16. When EROs are accomplished through the cargo ramp and door, engines will be placed in reverse idle prior to the pilot giving clearance for off/onload operations. If a thrust reverser will not extend, consideration should be given to shutting down the affected engine.

A8.17.17. The loadmaster will direct all onload and offload operations using briefed signals. Other qualified loadmasters may perform these duties; however, the crew loadmaster retains overall responsibility for the operation. Passengers will be escorted by a crewmember when enplaning or deplaning. Deplane passengers before removing cargo and enplane after loading cargo unless cargo size and location dictates otherwise.

A8.17.18. Load Data. If cargo/passenger onload information can be obtained prior to landing/onload, complete the DD Form 365-4 for the subsequent sortie. The loadmaster may use the load plan total weight and load center of balance (CB) for entry on the DD Form 365-4.

A8.17.18.1. The load must be placed on the aircraft exactly to load plan.

A8.17.18.2. Prior to flight, if there is any doubt as to the accuracy of the load plan weight or CB, the loadmaster must accomplish the DD Form 365-4 by station loading each individual item.

A8.17.19. After off/onloading is completed, resume taxi after coordination with the loadmaster.

CAUTION. The stabilizer struts will be stowed and the ramp raised to at least the horizontal position prior to taxi.

NOTE: The copilot will ensure that the TOLD has been updated (to include operating weight and CG). The copilot is also responsible for updating ATC clearances (as required).

A8.17.20. Crew Entrance Door ERO Procedures. The aircraft commander may approve the offload or onload of personnel and small cargo through the crew entrance door. In this instance, the throttles may be positioned to idle or reverse idle, open only the crew entrance door, and deplane the loadmaster to assure safety of deplaning/enplaning of personnel.

CAUTION. Ensure personnel use hearing protection and all loose articles are secured.

A8.17.21. Crew changes during local training missions are authorized provided the enplaning crew does not approach the aircraft until a deplaning crewmember is positioned on headset outside the aircraft.

A8.17.22. After the off/onloading operation, ensure the crew entrance door is closed and the cargo compartment is secured prior to resuming taxi.

A8.18. Combat Offload Procedures.

A8.18.1. Combat offload procedures are used to rapidly offload CDS containers, airdrop platforms, or single, multiple, or married pallets when material handling equipment (MHE) is not available or the situation dictates. This can involve either of the cargo rail systems (logistic or Aerial Delivery System (ADS).

CAUTION. Excessively rough, sharply undulating surfaces may cause damage to the aircraft ramp during combat offload operations. Reducing forward taxi speed on these surfaces will reduce aircraft oscillation. The aircraft commander must ensure the offload area will permit the offload operation to be conducted without damage to the aircraft.

A8.18.1.1. Prior to commencing combat offload operations, the aircraft commander will brief each crewmember on the procedures to be used. If possible these procedures should be briefed during mission planning since some checklist items may be accomplished prior to arrival at the offload location. Ensure the offload area will not block other aircraft.

A8.18.1.2. All crewmembers participating in the combat offload will refer to the Combat Offload checklist. Report any problem to the aircraft commander immediately.

A8.18.1.3. Ensure other individuals assisting the crew receive a thorough safety and procedures briefing for the entire offload sequence.

A8.18.1.4. If space is limited and the offload environment permits, normal aircraft backing procedures may be used to provide maximum offload space.

CAUTION. To combat offload, a surface of at least 1,000 feet is required; however, 1,500 feet is desired to provide a margin of safety.

A8.18.2. All obstructions to the pilot's cargo compartment viewing window will be removed.

A8.18.3. The loadmaster will be on interphone with hot mike selected and maintain constant contact with both pilots during combat offload operations.

A8.18.4. Set interior lighting to the minimum required to perform the mission.

A8.18.5. When performing a combat offload, the loadmaster will open the cargo door, and lower the ramp to 3.8 degrees below horizontal when combat offloading single 463L pallets or CDS containers. Install short ADS links to position the ramp to horizontal when combat offloading married 463L pallets or airdrop platforms. If ground personnel are present, the loadmaster will make contact with the individuals to ensure no one disrupts the operation. After the area is clear and secure, the loadmaster positions for the offload.

A8.18.5.1. All combat offloads will be accomplished from the forward loadmaster station.

A8.18.6. The copilot will update the mission computer (as necessary) to ensure the next flight plan leg is available and TOLD has been updated (to include new operating weight and CG). The copilot is also responsible for updating ATC clearances (as required).

Section A8C—Airdrop Procedures

A8.19. Airdrop.

A8.19.1. All airdrops will normally be conducted in VMC with the drop zone clearly visible. The procedures that follow are for VMC airdrops only. For airdrop operations in IMC comply with AFI 11-2C-17 Vol 3 to the maximum extent possible.

A8.20. Airdrop Kits.

A8.20.1. The loadmaster will ensure enough equipment is included to satisfy load or mission require ments. Minimum contents of the airdrop kit will include cloth-backed pressure sensitive tape, 1/2-inch tubular nylon cord, 550 cord, 5 cord, and 80 pound cotton webbing.

A8.21. Joint Airdrop Inspection.

A8.21.1. The loadmaster will complete the Joint Airdrop Inspection Records (applicable DD Form 1748) before takeoff and verify the accuracy. Reject loads with inaccurate or unavailable weights, or loads hazardous to flight. If inflight rigging required, the loadmaster will use the applicable DD Form 1748 as a checklist to ensure all items are completed.

A8.22. Verification of Load Information.

A8.22.1. The pilot and loadmaster will review the applicable DD Form 1748 prior to station time. The pilot and loadmaster verify actual number/type of parachutes, load weight, sequence of extraction, lowest L/R lock number engaged in platform for heavy equipment, and position of loads in the aircraft agree with the CARP data entered into the mission computer. If an individual load has a different type or number of parachutes from other loads, compute a CARP for each load to ensure all loads will land on the DZ. Base drop altitude on the item requiring the highest drop altitude.

A8.23. Safety Equipment.

A8.23.1. Protective Headgear. Personnel performing duties required to be mobile in the cargo compartment during airdrop, low level operations, or threat environments must wear protective headgear (except personnel performing water jumps). All other personnel in the cargo compartment will be seated with seat belts fastened. Check the serviceability of protective headgear prior to flight. During paratroop missions, loadmasters will lower their helmet visor before opening the troop doors and keep them lowered until the troop doors are closed.

A8.23.2. Parachutes/Restraint Harnesses Requirements. All occupants of the cargo compartment will either wear a parachute or an attached restraint harness, or be seated with a seat belt fastened before a troop door and/or the cargo door and ramp is opened.

EXCEPTION: Loadmasters not required to perform duties aft of FS 1027 are exempt from wearing parachutes/restraint harnesses/seat belts. For static line jumps, static lines are attached to anchor cables before troop door(s) are opened. **EXCEPTION:** Jumpers exiting on subsequent passes may stand and hook up with door(s) opened if they are forward of FS 1027.

A8.23.2.1. During the aircrew briefing, the aircraft commander will brief the loadmaster(s) when the mission profile requires flight below 800 feet AGL with the door(s) open.

A8.23.2.2. Except for an actual contingency, towed trooper, or emergency that threatens the survivability of the aircraft and crew, the restraint harness will not be disconnected or lengthened to a point that would allow the loadmaster to fall outside the aircraft.

A8.23.2.3. If a troop door and/or the door/ramp is open and the aircraft is below 800 feet AGL or above 14,000 feet MSL, loadmaster(s) must wear a restraint harness when performing airdrop duties.

A8.23.3. Restraint Harness Operation. The restraint harness will be fitted and adjusted prior to flight. The lifeline will be 18 feet 6 inches long. After the lifeline has been adjusted, disconnect the hook, roll and secure the lifeline, and stow on the restraint harness.

A8.23.4. Restraint Harness Procedures. Prior to opening troop door(s) and/or the ramp/door in-flight (or for airdrops that require the loadmaster to be positioned at the aft loadmaster station), attach the restraint harness at FS 1188 and adjust the life line as follows:

A8.23.4.1. Troop door airdrop operation: Adjust to allow mobility only to the troop door(s) and air deflector controls.

A8.23.4.2. Ramp bundle/CDS airdrop operation: Adjust to allow mobility to FS 1403.

A8.23.4.3. Troop door and ramp bundle airdrop operations: Adjust to allow mobility only to the troop door(s) and air deflector controls.

A8.24. Airdrop Checklists. Unless used in conjunction with drop execution, avoid use of the word GREEN from initiation of the Pre-Slowdown Checklist until completion of the post drop checklist. "GREEN LIGHT" must be seen or heard by the loadmaster for all drops.

A8.24.1. If a racetrack/re-attack is flown, re-accomplish all checklists beginning with the Completion of the Post Drop Checklist followed by the Pre-Slowdown Checklist. The aircraft commander must ensure the loadmaster has adequate time (normally 10 minutes) to complete all items before the drop is initiated. The one minute advisory is always given on time.

A8.24.2. The loadmaster will advise the pilots when an emergency condition exists in the cargo compartment, complete the required emergency checklist, and report status. The PF will attempt to fly a smooth, stable platform until the loadmaster has completed the emergency actions.

A8.24.3. Loadmasters will make a visual inspection of the cargo compartment prior to the initiation of the Pre-Slowdown Checklist to ensure that nothing has fallen between or aft of the airdrop load(s) as a result of takeoff or evasive maneuvering. A visual inspection of each extraction system, to include the security of recovery parachutes, will also be accomplished.

A8.25. En Route.

A8.25.1. For equipment or CDS AUTO drops, the aircraft will be at drop altitude and drop airspeed by ten seconds (five seconds for MANUAL drops) prior to the computed air release point. During personnel drops (SKE and visual), the aircraft should be at or above drop altitude and stable not later than one minute out (2 minutes for jumpmaster–directed drops) to allow the jumpmaster(s) access to the paratroop doors. The pilot should attempt to minimize excessive pitch or bank changes when paratroopers are standing in the cargo compartment.

A8.26. Drop Zone Communication.

A8.26.1. Limit radio transmissions with the DZ to those required for safety of flight and essential for airdrop operations. The Drop Zone Control Officer (DZCO) will broadcast wind and weather information, and will issue the final clearance to drop.

A8.27. Navigating To The Release Point.

A8.27.1. Accurately positioning the aircraft to the release point is the most critical phase of the airdrop mission.

A8.27.1.1. The mission computer determines the release point based on desired point of impact, desired airspeed/altitude, payload and parachute information, and atmospheric data entered for the airdrop. The computed location is then provided to the flight plan. For active flight plan airdrops, warning cues are normally controlled according to the Time To Go (TTG) indicated on the Airdrop Progress Page. Inside of one minute, the warning cues are controlled according to the TTG indicated by the selected airdrop timer. The PF is responsible for ensuring the aircraft is positioned at the release point at green light and for maintaining drift-corrected track through red light. The PNF is responsible for ensuring a count down to green light, the green light call and the red light call are given.

A8.27.1.2. Crew coordination is of the utmost importance to ensure all advisories and checklists are completed, proper DZ line-up is maintained, the point-of-impact (PI) is identified (if VMC), and time over target (TOT) is within established tolerances. The loadmaster will advise the crew when the load is clear, or any delay or malfunction occurs.

A8.28. No Drop Decisions.

A8.28.1. Prior to the one minute advisory, any crewmember observing a condition that would jeopardize a safe drop will identify the condition to the aircraft commander. After the one-minute advisory, any crew member observing a condition that would jeopardize a safe drop will state "NO-DROP" on interphone. The PNF and loadmaster will immediately acknowledge the "NO-DROP" call and confirm illumination of the red light. The pilot will de-arm Auto Drop (if used). The crew will accomplish the appropriate procedure for the type airdrop being made IAW amplified checklist. No airdrop will be accomplished on that pass. The crew will then accomplish the Post Drop Checklist.

A8.28.2. During Heavy Equipment and CDS airdrop missions, the loadmaster will not attempt to re-arm the PDM, TRM, or CDS airdrop system after initiation of the Release Point Checklist. This situation constitutes a “NO-DROP”. Further attempts to airdrop the equipment may be accomplished IAW Heavy Equipment and CDS emergency procedures.

NOTE: Checklists may still be in progress after the one minute advisory. A no-drop will be called if checklist items are not complete prior to the Release Point Checklist (prior to activating Ready/Drogue Switchlight).

A8.28.3. On personnel airdrops where surface winds are unknown, e.g., blind drops to unmanned DZs, the jumpmaster and/or Army airborne mission commander (if designated) will be advised when drop altitude winds exceed 30 knots. In this instance, the decision to drop will be at user's discretion.

A8.28.4. The drop zone safety officer (DZSO) will determine when surface conditions on the DZ are hazardous for personnel drops. The DZSO will make the decision to suspend or cancel personnel drops, and inform the DZSO no later than one minute prior to the drop. In the event conditions are unsafe for drop operations, the DZSO ensures cancelled drop information is radioed to aircraft concerned as soon as possible.

A8.29. Drop Zone Escape Procedures.

A8.29.1. The escape maneuver should not begin until the loadmaster calls "LOAD CLEAR". Turn to escape heading, set flaps as required, increase airspeed to no more than 250 KCAS (until doors are closed) and climb or descend as appropriate. Retrieve static lines, close all doors, retract flaps and slats, and accelerate as soon as conditions permit.

A8.30. Pilot-Directed Airdrops (PDA).

A8.30.1. In VMC, a pilot-directed drop may be accomplished in MANUAL ADS mode if dictated by the mission. As soon as the DZ is visible and identified by both pilots, they jointly confirm the release point location. The pilot flying controls the offset distance and assumes responsibility for maintaining the required track across the DZ. The PNF backs up the PF on the proper offset/track, identifies the release point, and normally controls the time of green light and red light.

A8.30.1.1. During the final seconds of the approach to the release point, the pilot not flying the aircraft places a hand near the ADS jump/release button. Five seconds prior to release, the pilot not flying will give a preparatory call "FIVE SECONDS" and initiate a countdown sequence. At this call, if either pilot feels the aircraft location is not within their precoordinated parameters of the CARP box, a "NO DROP" condition will be announced.

A8.30.1.2. At the release point the pilot not flying will simultaneously state "GREEN LIGHT" and depress the ADS jump/release button.

A8.30.1.3. Both pilots will monitor the time to red light, and the PNF will announce "RED LIGHT" and depress the ADS red light button at the appropriate time.

A8.30.1.4. The loadmaster will advise the pilot when the load is clear (or of any delay or malfunction).

A8.31. Jumpmaster Directed Airdrops (JDA).

A8.31.1. Jumpmaster directed airdrops may be conducted by qualified jumpmasters (or trainees under supervision of qualified personnel). The following procedures will be used to direct the aircraft to a release point and determine the exit point for the parachutists:

A8.31.1.1. Personnel will not exit the aircraft unless the green light is illuminated.

A8.31.1.2. Pilots ensure a CARP/HARP is calculated by the mission computer for each drop.

A8.31.1.3. Inflight visual signals, verbal signals, and interphone procedures between the jumpmaster, loadmaster, and pilots are coordinated prior to the drop.

A8.31.1.4. After the slowdown check is completed, the loadmaster permits the jumpmaster to begin spotting procedures. The jumpmaster visually relays steering signals to the loadmaster, who verbally relays them to the pilot. The jumpmaster may spot from the aircraft ramp or a paratroop door; however, the aircraft ramp and paratroop doors are not to be open simultaneously for spotting. At the one minute warning on the PFD, the pilot not flying turns on the green light to indicate clearance for the jumpmaster to determine the exact exit point. When further exit of jumpers becomes unsafe (aircraft emergency or similar circumstances), turn on the red light.

A8.31.1.5. The jumpmaster's parent service accepts responsibility for the parachutists' impact point.

NOTE: When using the paratroop doors, jumpmasters may find that spotting procedures are made more difficult due to the size and shape of the gear pods and air deflectors.

A8.32. Zone Marker (ZM) Airdrops.

A8.32.1. SKE ZM airdrops may be accomplished provided the ZM is physically located at the DZ. The ZM must be placed within 1500 yards of the PI, but as close as possible for maximum accuracy.

A8.33. High Altitude Airdrop Procedures.

A8.33.1. Airdrops conducted above 3,000 feet AGL are considered high altitude drops. All airdrop conducted above 10,000' MSL will be in accordance with procedures (oxygen and pr-breathing requirements, maximum duration at altitude, physiological technician requirements, etc.) outlined in AFI 11-409 Chapters 1 and 2. Maintain cabin pressure at or below 10,000vfeet MSL until the Pre-Slowdown Checklist (time for checklist may have to be adjusted) and prebreathing are complete. De-pressurization will not exceed 3,000 feet per minute. Slower rates are recommended if time allows. Aircrew will execute the cabin altitude checklist Ensure zero pressure differential before clearing doors to be opened. Parachutists transfer from the aircraft oxygen system to personal oxygen system at approximately one minute to green light.

A8.33.2. There are no altitude wind restrictions for personnel HALO/HAHO operations. Surface wind restrictions are contained in AFI 13-217.

A8.33.3. The following configurations are required:

A8.33.3.1. Drop Airspeed: 138 - 145 KIAS (with aircraft in airdrop sub-mode).

A8.33.3.2. Deck Angle: less than 5 degrees.

A8.33.3.3. Flaps as required.

A8.33.3.4. Air deflector in full open position with paratroop door open.

A8.33.3.5. Cargo ramp and door or paratroop door(s) open.

A8.33.4. Complete the slowdown and configure not later than three minutes prior to scheduled drop time. Use computed flap setting.

A8.33.5. Troop Door Exit. Air deflectors must be operational if paratroop doors are used. If an air deflector does not extend, do not open the affected troop door.

A8.33.6. Ramp Exit. Cargo door open, ramp in coplanar position.

A8.33.7. Airdrop Procedures. Drops may be performed as either HARP or jumpmaster directed. Direct communications will be available between the jumpmaster and the pilot during jumpmaster directed drops.

A8.33.8. At the thirty-minute advisories the pilot not flying the aircraft should provide updated winds and weather conditions to the jumpmaster. Notify the jumpmaster of any deviations from the plan such as altitude, run-in track or release point. Depressurize the cabin to 10,000 feet so that parachutists can arm parachutes. Repressurization after the drop will be consistent with mission requirements. Normally the cabin altitude should return below 10,000 feet as soon as practical.

A8.33.8.1. Ensure any paratroopers remaining on board de-arm their chutes before cabin altitude descends below 10,000 feet.

A8.33.9. As a backup, the loadmaster will coordinate and use the following hand signals:

A8.33.9.1. Time warnings may be given to the jumpers by the loadmaster pointing at his watch and indicating the correct warning/advisory with his fingers.

A8.33.9.2. Wind velocity on the DZ will be indicated by cupping one hand in front of oxygen mask/mouth, then indicating with upturned fingers the speed of the wind.

A8.33.9.3. Indicate a no-drop by passing the forefinger across the throat.

A8.33.10. Carry pencil and paper to write out messages that cannot be understood with hand signals. Write out messages from the jumpmaster for the loadmaster to relay to the pilot.

A8.33.11. For jumpmaster directed HALO drops the green light may be turned on one minute prior to the planned release point. The MC will provide a standard "GREEN LIGHT" call at the jointly agreed upon release point.

NOTE: User accepts responsibility for accuracy of team employment once a release point has been jointly agreed upon.

A8.33.12. When the departure base is located near the drop zone, the pilot should average climb winds to update the release point. Ascertain wind data in 1,000-foot increments from surface to 10,000 feet and in 2,000-feet increments from 10,000 feet to drop altitude. If climb to drop altitude in the objective area is not possible, the release will have to be based on preflight or best known winds.

A8.34. High Altitude Container Delivery System.

A8.34.1. High altitude CDS drops are conducted when it is operationally or tactically more advantageous than low altitude operations. High altitude CDS containers are rigged with special parachutes and other equipment to reduce drift effect and total time of fall. Parachutes on the container(s) are rigged to be airdropped from a High Altitude with a High Opening (HAHO) or High Altitude with a Low Opening (HALO). The different types of delivery used for high altitude CDS airdrops are:

A8.34.1.1. High Velocity. CDS loads are rigged with a ring slot parachute and descend at approximately 65-100 feet per second. Loads normally consist of non-destructible type supplies which can withstand the high velocity impact. Individual bundle weights should be within ten percent of other bundle weights dropped on the same pass.

A8.34.1.2. Low Velocity:

A8.34.1.2.1. Staged Delivery. This system consists of a standard A-22 container rigged with a 15-foot ring slot parachute (reefed with a 148-inch reefing line) which stabilizes the container as it descends at approximately 200 feet per second. At a predetermined height above the ground, an altitude sensing device actuates a pyrotechnic cutter. The cutter releases the 15-foot stabilizing chute from the load and, in turn, deploys the second stage G-12D cargo parachute. This allows the container to impact at the standard rate of descent.

A8.34.1.2.2. Confined Ballistic System (CBS). This system consists of a standard A-22 container rigged with a 22 or 28 foot ring slot parachute or a G-12D cargo parachute. The parachute is reefed down to a specific diameter and equipped with one or two CBS de-reefing devices which activate and cut the reefing line after the predetermined burn time. This allows the load to descend in the reefed condition at approximately 130 feet per second. Upon activation of the CBS cutter and full chute deployment, the descent rate slows to 70 feet per second

for 22 and 28 foot chutes and 26 feet per second for G-12 cargo parachute. The drop altitude for CBS is determined by the specific burn time of the de-reefing device. Prior to takeoff, the aircraft commander will determine the total number of CBS de-reefing devices installed on the loads. During the Pre-Slowdown Checklist the loadmaster will arm the CBS devices by removing the safety pins.

A8.35. Personnel Airdrops.

A8.35.1. Personnel airdrops are accomplished by the use of static lines or by using free fall procedures. Static line drops are normally performed at low altitudes (typically 800 feet AGL), through the paratroop doors. Aircraft used for personnel airdrop will have all associated equipment required by T.O. 1C-17A-9 installed and operational.

NOTE: When using the paratroop door for airdrops, ensure all required sidewall seats are operational to the stowed up position.

A8.35.2. Pilots, loadmaster, and jumpmaster(s) will accomplish associated briefings prior to the takeoff.

A8.35.3. The following configurations are required to support static line personnel airdrop form the paratroop door:

A8.35.3.1. 20-foot static lines are the only authorized static lines for use on the C-17. 15-foot static lines are prohibited.

A8.35.3.2. Total aircraft gross weight will not exceed 385,000 pounds at green light.

A8.35.3.3. Airspeed will be 130 +/-3 KCAS and aircraft deck angle will be between 6 and 7 degrees.

A8.35.3.4. Maximum number of jumpers, or combination of jumpers and door bundles, is limited to 51 per door for a single pass.

A8.35.3.5. All door bundles must be equipped with a 20-foot static line.

A8.35.3.6. Canadian Retrieval System must be installed

NOTE: In certain cases the mission computer may not compute the proper flap index for the desired deck angle. If this happens, adjust the flap index to achieve the desired deck angle. This should be accomplished when at the established drop airspeed and configuration and may require 3 to 5 NM to reach the desired deck angle.

A8.35.4. Jumpmaster-Loadmaster Paratroop Door Procedures. After accomplishing the slowdown check, the loadmaster will allow the jumpmaster access to the paratroop doors not later than 1 minute. If a troop door or air deflector malfunctions after takeoff, the door on the affected side will not be opened. Troops may be safely dropped from the operational side of the aircraft only with the concurrence of the primary jumpmaster. If repairs can not be accomplished, subsequent drop sorties will be at the discretion of primary jumpmaster. The loadmaster will take a position so as to provide maximum maneuverability for jumpmaster(s) and safety personnel to perform their duties. Upon seeing the red jump lights illuminate, the loadmaster will notify the jumpmaster(s) or safety personnel of the red light condition. The loadmaster will take no further action to stop any of the remaining parachutists. The loadmaster will count (if possible) all parachutists that exit the aircraft while the red light is illuminated.

A8.35.4.1. Do not attempt to physically stop or hinder jumpers from exiting the aircraft if jumpers continue to exit after “Red Light.”

A8.35.4.2. Access to the paratroop door will revert back to the loadmaster after all parachutists have either exited or have been stopped by the jumpmaster(s)/safety personnel and cleared from the paratroop door area. For racetracks, the loadmaster will not allow access to the doors until completion of the next slowdown check.

A8.35.5. Mass Paratroop Airdrop Procedures. Coordinate all in-flight procedures between the loadmaster and jumpmaster during the pilot/jumpmaster/loadmaster briefing. Cover items such as approximate number of paratroopers jumping per pass, how and when sidewall seats are raised.

A8.35.6. Static Line Retrieval. Do not increase airspeed above 250 KCAS until all static lines are retrieved, air deflectors are stowed, and troop doors are closed. Retrieve static lines as soon as possible after personnel and/or door bundles are dropped. The paratroop retrieval system is only used for retrieval of a fouled paratrooper. If only D-bags are being retrieved, the standard aircraft retriever cable rigging should be used. Manual static-line retrieval may be used to retrieve no more than ten static lines per door, per pass with one loadmaster, or 20 static lines per door, per pass with two people (combination of loadmasters, jumpmasters or safety personnel). Use the cargo winch only as an emergency backup and do not preposition the cable. During training, if static lines cannot be retrieved, cut them over government property. During contingency operations, immediately cut them free if they can't be retrieved.

A8.35.7. Free Fall Airdrops. These may be conducted from the paratroop doors or from over the ramp. Anchor cable installation is not required for free fall operations.

A8.35.7.1. Static line personnel airdrop over the ramp is prohibited.

A8.36. Door Bundle Airdrops.

A8.36.1. A-7A or A-21 containers weighing up to 500 pounds (excluding the weight of the parachute) are referred to as door bundles and may be dropped from the aircraft through the paratroop door using the personnel airdrop checklist. Door bundles may be dropped independently or in conjunction with personnel. When airdropping multiple bundles from the same exit, bundles will be dropped one at a time. When dropped with personnel, the bundle(s) will be the first object(s) to exit the aircraft. A maximum number of 102 paratroopers may be airdropped preceded by one A-7A or A-21 bundle per door utilizing 20’ static lines. All paratroop personnel will follow applicable service procedures. Remove restraint and position the bundle(s) in the paratroop door prior to completion of the slowdown checklist. If jumpers are to follow the door bundle(s), the user will be responsible for ejecting the bundle(s) out of the troop door(s). Ensure door bundles are not rigged with breakaway static lines. The dimension including the parachute, must not exceed 48 inches by 30 inches by 66 inches (unless authorized in a specific rigging T.O.). When the container is placed in the door for airdrop, the largest dimension will be placed in the vertical/upright position.

NOTE: The mission computer can be used to determine a CARP for door bundles (the same as for CDS) by using the door exit option on the AD COMBO page.

A8.36.2. When door bundles are dropped with personnel, compute the CARP for first paratrooper exiting after the bundle and an additional CARP for the door bundle to ensure that it will impact within DZ boundaries. Release the bundle at the personnel CARP, followed by the parachutists when

the door is clear. When a door bundle is the only object being dropped, base the release on the CARP for the bundle.

A8.36.3. No door bundle will exit an aircraft after a paratrooper has jumped.

A8.37. Heavy Equipment Airdrops.

A8.37.1. The aerial delivery unit supporting the load movement will ensure current publications are available for loadmaster reference during joint inspections.

A8.37.2. Use the following configurations for heavy equipment airdrops:

A8.37.2.1. Airspeed: 145(+/-5) KCAS.

A8.37.2.2. Deck Angle: 3.5 to 5 degrees.

A8.37.2.3. Flaps: As required.

A8.38. Container Delivery System (CDS) Airdrops.

A8.38.1. CDS is designed to airdrop single or double A-22 type containers. Single A-22 type containers may be rigged for low velocity, high velocity, or high altitude low opening (HALO) airdrops. Double A-22 type containers are normally rigged for low velocity airdrops only. The system can be rigged for individual or multiple container airdrops. The weight of each container will be IAW T.O. 13C7-1-11/FM 10-501.

NOTE: When A-7A or A-21 containers are rigged in place of A-22 containers they must be rigged on skid boards that are 48 inches wide.

A8.38.2. The aircraft rail system allows drops of up to 40 containers on 48 by 48-inch skid boards, 20 from each side of the ADS rails with the enhanced center vertical restraint (ECVR) system installed or 30 without. Containers may be rigged and airdropped singularly or in any combinations of up to 20 from either side or in even number combination up to 40 from both sides on a single pass or multiple airdrops.

NOTE: Double A-22 containers, each mounted on 48 inch wide by 96 inch long skid boards, may be dropped from each side of the ADS rails in single or double stick configuration.

A8.38.3. Forward Restraint. If the combined weight of the containers (per side) is 9,400 lbs or less, the CDS forward buffer stop assembly (BSA) is not required. The ramp forward restraint gate(s) may be used instead of the BSA.

A8.38.4. Vertical/Lateral Restraint. The ADS rails used in conjunction with the inboard logistic rails provide all necessary vertical and lateral restraint provided the container is secured to the skid board for 2 g's. Vertical restraint must be applied to containers resting on cargo ramp and the last 60" of the cargo floor.

A8.38.5. Final aft restraint is provided by the Gate Release Mechanism(s) GRM(s) and Type XXVI release gate(s). The number of release gate(s) is based on the combined rigged weight of the containers to be dropped on a single pass.

A8.38.6. Use the following configurations for CDS airdrops:

A8.38.6.1. Max of 30 bundles (40 bundles ECVR) from rails with vertical restraint (forward of F.S. 1100).

A8.38.6.2. Airspeed: 145 (+/-5) KCAS.

A8.38.6.3. Deck Angle: 6-9 degrees.

A8.38.6.4. Flaps: As required.

A8.38.6.5. At the green light, the mission computer (in AUTO) or the pilot not flying the aircraft (in MANUAL mode) releases the GRM(s).

A8.38.6.5.1. During load exit, aircraft turns will not be initiated. Failure to maintain wings level may cause improper exit of bundles.

A8.38.6.6. Loadmasters are authorized to conduct CDS airdrop operations from the Aft Loadmaster Control Panel. When this procedure is used, the loadmaster will preflight the aft station and the pilot will ensure the ADS arm light is illuminated.

A8.38.6.7. Manual retrieval of up to 10 static lines is authorized for single stick airdrops only. This does not eliminate the need to rig the retrieval system.

A8.39. Free Fall Airdrops.

A8.39.1. The delivery of certain type supplies, containers, or weapons can be accomplished without the use of parachutes. Free fall airdrops are used when the drop zone size, load composition, or the tactical situation renders other methods of delivery impractical. The pallet, skid boards, or containers used will depend on the load composition. Normally skid boards are rigged for standard CDS delivery with the exception that parachutes are not used. Loads that do not exceed door bundle dimensions may be dropped from the troop doors. The terrain, wind, load being dropped, and tactical situation will determine the drop altitude. Use normal CDS airdrop checklists and emergency procedures for ramp and door airdrops, and personnel airdrop checklist for door bundles.

A8.40. Emergency Procedures.

A8.40.1. All crew members should review the applicable emergency procedures for the airdrop to be performed before takeoff. If a malfunction occurs during an airdrop, the loadmaster immediately notifies the pilot by stating "MALFUNCTION." The pilot not flying the aircraft will immediately turn on the red light and state "RED LIGHT ON." The pilot flying will immediately de-arm the autodrop mode (if engaged) and maintain drop altitude and airspeed. After the loadmaster has competed the appropriate Malfunction Checklist, the Post Drop Checklist will be initiated.

A8.40.2. Emergency Parachutist Bailout Procedures. Under satisfactory conditions (static line exit) the minimum acceptable bailout altitude is 400 feet above the terrain. When an aircraft emergency occurs during static line airdrops, the pilot maintains an acceptable attitude for the parachutists to evacuate the aircraft. If the jump must be made at an airspeed in excess of 150 KCAS, advise the parachutists of the airspeed and altitude. Order evacuation by turning on the green light and giving the briefed alarm bell signals.

A8.40.2.1. If conditions are unsuitable for aircraft evacuation, turn the red light on until exit doors are closed. The aircraft commander advises the jumpmaster through the loadmaster to have the parachutists unhook, take their seats, and fasten seat belts.

A8.40.3. Towed Parachutist. When notified of a malfunction during a personnel airdrop, the pilot flying the aircraft will maintain drop airspeed, at least the minimum drop AGL altitude (if possible)

for the type parachute being used, and avoid flying over or up wind of water or built-up areas. Avoid turning the aircraft in the direction of the towed parachutist as this often starts him/her swinging violently and increases the possibility of injury. All turns should be shallow and coordinated to reduce the severity of parachutist's oscillation.

A8.40.3.1. The aircraft commander will make the final decision whether or not to cut the parachutist free. The first priority is to retrieve the parachutist whether he/she is conscious or unconscious. However, if the parachutist cannot be retrieved and indicates consciousness, cut the parachutist free. Towed parachutists indicate consciousness and that reserve parachute is ready by maintaining a tight body position with both hands on reserve parachute. This indicates the jumper is prepared to be cut away. If parachutists does not signal, cannot be observed, or if a condition exists that prevents cutting the static line, the parachutist will be retrieved.

A8.40.3.2. If the decision is to cut the parachutist free, the loadmaster will cut the static line on the aircraft commander's command.

NOTE:

The jumpmaster/safety observer is responsible for identifying how the parachutist is entangled. If being towed by anything other than the static line, the jumpmaster/safety will attempt to free the parachutist. If being towed by the static line, the jumpmaster/safety will make a recommendation to the aircraft commander, through the loadmaster, whether to retrieve the parachutist or cut him/her free. If all parachutists have exited and there are no safety personnel onboard, this responsibility rests with the loadmaster.

A8.40.3.3. If a parachutist becomes entangled and is being towed after exiting the aircraft, the loadmaster will state "MALFUNCTION" and complete the Personnel Airdrop Malfunction Checklist.

A8.40.3.4. Parachutist Retrieval. The loadmaster will take the following action:

A8.40.3.4.1. Install the retrieval system.

A8.40.3.4.2. Initiate retrieval using the static line retriever winch. Use the opposite retriever winch if first retriever winch fails. Use the cargo winch as an emergency backup only after both retriever winches have failed. Do not preposition the cable.

A8.40.3.4.3. When the parachutist is adjacent to the open doorway, pull the paratrooper into the aircraft and secure the paratrooper forward of the paratroop door.

A8.40.3.4.4. The loadmaster, safety observer(s), and jumpmaster(s) should remain clear of the line of travel of the static line retriever cable until the parachutist has been retrieved to the door area. During retrieval attempts, take all possible action to ensure the parachutist does not slip back at any time. Once the Personnel Airdrop Malfunction Checklist has been completed by the loadmaster, the Post Drop Check will be initiated.

A8.40.3.4.5. Manual retrieval of a towed parachutist is the last resort.

A8.40.4. Heavy Equipment Emergency Procedures. When notified of a malfunction, the pilot flying the aircraft will maintain drop airspeed, maintain safe altitude, avoid yawing the aircraft, avoid flying over populated areas, and ensure the cargo ramp and door remain in the airdrop position until the malfunction is corrected. The aircrew will complete the following procedures as required.

A8.40.4.1. Loose Platform. A loose platform occurs when the ADS locks release the platform prior to green light or after a malfunction has occurred. If this condition exists, state "MALFUNCTION" and complete the Heavy Equipment Malfunction Checklist. No further attempt will be made to airdrop the platform(s).

A8.40.4.2. Parachute Deployment Mechanism (PDM) Malfunction. If the drogue chute does not deploy automatically or with the manual backup switch, the loadmaster will state "MALFUNCTION" and complete the Heavy Equipment Malfunction Checklist. The airdrop may be made using the opposite PDM only if it had been checked during preflight and the ADS GANG LOCK BACKUP switch(s) were not actuated.

A8.40.4.3. Drogue Jettison/Malfunction. If the drogue chute has deployed but not inflated the loadmaster will state "MALFUNCTION" and activate the DROGUE JETTISON switch. (If the drogue chute fails to jettison the loadmaster will activate the EMERG DROGUE (Jettison) switch.) Loadmaster states, "DROGUE JETTISONED" and complete the Heavy Equipment Malfunction Checklist. The airdrop may be made using another drogue parachute only if the EMERG DROGUE (Jettison) or ADS GANG LOCK BACKUP switch(s) were not actuated.

A8.40.4.4. Tow Release Mechanism (TRM) Malfunction. If the extraction link fails to release from the Tow Release Mechanism automatically or with the manual backup switch, the loadmaster will state "MALFUNCTION" and activate the DROGUE JETTISON switch. (If the drogue chute fails to jettison the loadmaster will activate the EMERG DROGUE (Jettison) switch.) Loadmaster states, "DROGUE JETTISONED" and complete the Heavy Equipment Malfunction Checklist. No further attempt will be made to airdrop the platform.

A8.40.4.5. Load Extraction Malfunction. If the extraction parachutes have exited the aircraft and the platform fails to move, activate the R LOCKS GANG RELEASE switch. If the platform still fails to exit state “MALFUNCTION” and complete the Heavy Equipment Malfunction procedures. No further attempt will be made to airdrop the platform.

NOTE: The platform will move slowly if there is no extraction force due to malfunctioning extraction chutes. Do not attempt to restrain the platform once the right locks have been released.

A8.40.5. CDS Emergency Procedures. When notified of a CDS malfunction, the pilot flying the aircraft will maintain drop airspeed and AGL altitude (if possible) and avoid flying over populated areas. Also, the pilot will avoid yawing the aircraft until the malfunction is corrected. The PF should not change deck angle unless requested by the loadmaster. The loadmaster will complete the following procedure as required.

A8.40.5.1. GRM Fails to Release/Load Fails to Move. If the GRM(s) fail to release or load stops moving aft, ensure that all containers that are moving have exited, then state "MALFUNCTION" and complete the CDS Malfunction Checklist. No further attempt will be made to airdrop the container(s).

A8.40.5.2. A flap index change and/or nose down trim may be required to ensure the load remains in the aircraft.

A8.40.6. High Altitude Emergency Procedures. If a physiological incident occurs, the aircraft commander will:

A8.40.6.1. Abort the mission/drop.

A8.40.6.2. Begin a descent (pressurization and descent will be determined by the type and degree of sickness or pain).

A8.40.6.3. Ensure the affected person remains on 100 percent oxygen until a medical doctor determines the type of treatment required.

A8.40.6.4. Proceed to the nearest base at which qualified medical assistance is available. Advise the control tower of the emergency and request an ambulance and doctor meet the aircraft.

A8.40.6.5. Advise attending physician to call Brooks AFB Hyperbaric medicine (DSN: 240-3278; Commercial: 512-536-3278).

Section A8D—Operational Limits And Restrictions

A8.41. Aircrew Qualification.

A8.41.1. Primary crew members or those occupying a primary position during flight must be qualified or in training for qualification for that crew position. If non-current, or in training for a particular event, the crew member must be under the supervision of an instructor while accomplishing that event (direct supervision during critical phases of flight).

A8.41.1.1. Unqualified test pilots may perform qualitative evaluation duties in either pilot seat, with an instructor in the other seat. Passengers are not allowed on the aircraft.

A8.41.2. Loadmasters. Non-current or unqualified loadmasters may perform in their primary crew position on any mission when supervised by a qualified instructor.

A8.41.3. Touch and go landings with passengers require OG/CC approval.

A8.42. Crew Complement.

A8.42.1. The minimum complement for a basic crew is a pilot, co-pilot and loadmaster. Two or more loadmasters are required for Dual Row, Type I LVAD, Tow Test, Dummy Drop, and Dummy Retrieval sorties. Due to the unique demands and requirements of the test mission, the aircraft commander will determine the minimum essential crew members required for each particular mission. If an augmented aircrew is required, or if more than 40 passengers are carried on board, comply with requirements in AFI 11-2C-17 Vol 3 Table 3.1.

A8.43. Minimum Equipment List.

A8.43.1. Due to the unique requirements of the test mission, the aircraft commander, in concert with inputs from maintenance, engineering, instrumentation, etc., will be the final authority on mission status.

A8.44. Aircrew Publication Requirements In Flight. In accordance with Table A8.1.

Table A8.1. Aircrew Publications Requirements In Flight.

PUBLICATION	PILOT	LM	AIRCRAFT PUBS KIT
TO 1C-17A-1			X
TO 1C-17A-1-1			X
TO 1C-17A-1-35			X
TO 1C-17A-1-2			X
Abbreviated Checklist	X	X	X
TO 1C-17A-9			X
TO 1C-17A-1(-9,-5-1,-5-2) Modification Flight Manual			X (T-1 only)

A8.45. Oxygen Requirements. The minimum quantity of oxygen aboard the aircraft before takeoff must be sufficient to accomplish the planned flight to a suitable recovery base, should oxygen be required. Crew members occupying a crew station will have an oxygen mask connected and readily available for use from engine start until engine shutdown.

A8.46. Approaches. Crews are cleared at any time to fly approaches to published minimums using raw data, flight director, or autopilot/autothrottles. Mission Computer (MC) approaches are cleared for day/night VMC. For MC approaches in IMC refer to AFI 11-2C-17 Vol 3 for guidance.

A8.47. Fuel Requirements. The normal landing fuel for the C-17 is 20,000 pounds usable fuel. Minimum fuel is 16,000 pounds usable fuel, and emergency fuel is 12,000 pounds usable fuel.

A8.48. Aircraft T-1 (Tail # 870025) Restrictions.

A8.48.1. Icing. T-1 is restricted from cruising in areas of known or forecast icing conditions due to inoperative wing anti-ice systems. Intermediate climbs and descents through light icing are approved.

A8.48.2. Electromagentic Radiation (EMR) Restrictions. For T-1 EMR considerations, all flights in Southern California outside R-2508 (from approximately Beale AFB to the ADIZ) must be conducted no lower than 5,000 feet AGL. For flights outside this area, operate no lower than FL200 unless specifically EMR cleared. A chart depicting EMR hazards in the CONUS is kept at the 418 FLTS/DOV.

A8.48.3. Steep Approach/Austere Airfield Operations. For T-1, limit gross weight to 428,000 pounds when crosswinds are greater than 20 knots due to 80 percent loads restriction.

A8.49. Training Restrictions.

A8.49.1. Qualification Training. Initial qualification, requalification, or upgrade training for pilots will not be conducted on missions with passengers onboard.

A8.49.2. Touch and Go Landing Limitations.

A8.49.3. Touch and go landings will only be accomplished under the direct supervision of an IP or certified MP. When qualified MPs perform a touch and go for proficiency, one of the pilots must have at least 50 hours in the C-17.

A8.49.4. Minimum runway length is 7000’.

A8.49.5. Simulated engine out approaches may be flown with an instructor pilot or flight examiner in one of the pilot seats, except for IP candidates under the supervision of a flight examiner during initial or requalification upgrade evaluation to IP. One throttle may be retarded to idle under the following conditions: airspeed not less than VMCA; positive rate of climb established during takeoff and climb out; and no lower than 500 ft AGL on approach to land. Three engine go-arounds with autopilot engaged are not recommended unless on a specific test card. Rudder pedals are not active with the autopilot engaged.

A8.49.6. Abnormal flap/slat configuration approaches will not be flown in the aircraft for training.

A8.49.7. Approach to stall training will be performed no slower than stick shaker onset speed and with an instructor pilot in one of the seats.

Attachment 9

C-130 OPERATING PROCEDURES

Section A9A—General Information

A9.1. General.

A9.1.1. This attachment applies to AFMC aircrews and all management levels concerned with operation of the C-130 aircraft. For operating procedures not specifically addressed in this attachment, users will refer to AFI 11-2C130 Vol 3, *C-130 Operations Procedure*s. Where this lead-MAJCOM guidance is incompatible with unit operations, contact AFMC/DOV.

Section A9B—Crew Complement/Management

A9.2. Noncurrency and Qualification Training. Noncurrent 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.

A9.3. Crew Complement. Minimum crew complement for the C-130 is IAW Table A9.1.

A9.3.1. For C-130J, minimum crew is pilot, copilot, and loadmaster.

Table A9.1. Crew Complement.

Crew Position	Basic	Airdrop	FCF
Aircraft Commander	1	1	1
Copilot	1	1	1
Navigator	A/R (1)	A/R (1)	A/R (1)
Flight Engineer	1	1	1
Scanner/Loadmaster	1 (2)(3)	1/2 (4)	1

NOTES:

1. When required for mission accomplishment (for overwater missions, see FLIP AP).

2. An additional qualified aircrew member may perform scanner duties as authorized.

3. Two loadmasters or one loadmaster and another qualified crewmember are required if more than 40 passengers are scheduled to be carried. Both crewmembers must remain in the cargo compartment, one forward and one aft for takeoffs and landings. Qualified crewmembers may perform these duties on missions where 15 passengers or less are carried, and 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 feet MSL) non-static line personnel are dropped from the ramp and door or, only one paratroop door is opened.

c. Dropping only simulated airdrop training bundles (SATBs).

d. A no-drop (dry pass) is planned and ground time is sufficient to permit onload or offload by one loadmaster.

A9.4. Crew Duty Day. Crew duty day begins when reporting for duty. Observe AFI 11-202 Vol 3 Chap 9 restrictions, and the following:

A9.4.1. FCF/ACF, proficiency training, test and evaluation, and tactical events must be completed during the first 12 hours of the crew duty day.

A9.4.2. Limit crew day to 12 hours with an inoperative autopilot.

A9.4.3. The maximum number of sorties per day is three. Waiver authority is the unit commander/DFO.

Section A9C—Basic Operating Restrictions

A9.5. Fuel Minimums.

A9.5.1. Minimum fuel on arrival at the destination or alternate is 7,000 pounds

A9.5.2. Minimum fuel for final landing is 6,000 pounds

A9.6. Runway and Taxiway Minimums. Minimum dimensions for aircraft operations are shown in Table A9.3.1.

Table A9.2. Minimum Dimensions.

Parameter:	Requirement:
Minimum Taxiway width:	30 ft
Minimum Runway width:	80 ft for normal ops. 60 ft for assaults
Minimum runway length for Normal takeoff:	Critical field length
Minimum runway length for Normal landing:	Landing distance from 50 ft over the threshold, plus 500 ft* *For RVR(Vis) less than 40 (3/4): Add 1000 ft to ldg distance
Minimum runway length for Assault Landing:	Ground roll plus 500 ft, but not less than 3000 ft Compute landing performance with two engines in reverse, two engines in ground idle, and full brakes
Minimum runway length for Assault Takeoff:	Charted MFLMETO (corrected for one-engine Vcma, if applicable), but not less than 3000 ft. Takeoff at Vmca in ground effect or Vmeto, whichever is greater, unless actual obstacles are a factor

Section A9D—Normal Procedures

A9.7. Aircrew Uniform.

A9.7.1. Crewmembers will remove rings and scarves prior to performing aircrew duties.

A9.7.2. All crewmembers will have Nomex gloves and will wear them for takeoffs and landings.

A9.8. Personal Equipment Requirements.

A9.8.1. Helmets and Oxygen Masks. Carry a personal helmet and oxygen mask anytime parachutes are required aboard the aircraft (to avoid head injuries during bailout)

A9.9. Cockpit Congestion and Loose Objects.

A9.9.1. The maximum number of persons on the flight deck during takeoff and landing will not exceed the number of seat belts available on the flight deck. During the flight, the number of persons on the flight deck will be the minimum commensurate with mission requirements.

A9.9.2. Ensure helmet bags and other personal gear are properly stowed to prevent obstruction of egress routes during emergencies.

A9.10. Checklists. A checklist is not complete until all items have been accomplished. Notes amplifying checklist procedures or limitations may be added to the checklists (in pencil).

A9.10.1. Checklist items that do not apply to the unit's aircraft or mission may be lined out. Do not challenge these items during checklist accomplishment.

A9.11. Duty Station. Only one pilot, or the flight engineer, may be absent from their duty station at a time. Notify the aircraft commander prior to departing assigned duty station.

A9.12. Flight Deck Access. Aircraft commanders may authorize passengers access to the flight station during any phase of flight. Passengers will not be permitted access to any pilot of the positions.

A9.13. Takeoff and Landing Policy. The pilot in command will occupy either the left or right seat during all takeoffs and landings. Instructor pilots may takeoff or land from either seat.

A9.13.1. An instructor pilot or aircraft commander will make all takeoffs and landings during:

A9.13.2. Aircraft emergencies.

A9.13.3. Assault or substandard airfield operations. **EXCEPTION:** Instructors providing upgrade training, receiving an evaluation, gaining currency, or proficiency.

A9.13.4. Situations when in the opinion of the aircraft commander, marginal conditions exist.

A9.14. Outside Observer. When available, use a crew member to assist in outside clearing any time the aircraft is below 10,000 feet MSL and during all taxi operations.

A9.15. Seat Belts.

A9.15.1. Seat belts and shoulder harnesses will be fastened during taxi, takeoff, and landing, unless crew duties dictate otherwise.

A9.15.1.1. The flight engineer is exempt from wearing the shoulder harness for ground operations.

A9.15.1.2. Crewmembers performing instructor or flight examiner duties may stand and observe, provided a seat with an operable belt is available.

A9.16. Aircraft Lighting.

A9.16.1. Unless otherwise directed the aircraft strobe lights will be operated as follows:

A9.16.1.1. "Before Starting Engines" Checklist, "red" position.

A9.16.1.2. "Lineup" Checklist, "white" for day, night single-ship, and day formation. "red" for night formation.

A9.16.1.3. "After Landing" Checklist, "red" position.

A9.17. Advisory Calls. Follow guidance in 11-2FT Vol 3, and the following:

A9.17.1. Takeoff. State "GO" at refusal speed or takeoff speed, whichever is lower.

A9.18. Communications Policy.

A9.18.1. 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).

A9.18.2. Aircraft Interphone. Primary crewmembers will monitor interphone during critical phases of flight. Crewmembers will advise the aircraft commander prior to checking off interphone.

A9.18.3. Command Radios:

A9.18.3.1. The pilot not flying the aircraft normally makes all air traffic control (ATC) radio calls.

A9.18.3.2. The pilot operating the radios will announce which radio is primary, and advise the crew when the primary radio changes.

A9.18.3.3. One pilot will record and acknowledge all ATC clearances. Another crewmember should monitor the read back and ensure compliance.

A9.18.3.4. Both pilots will monitor UHF guard (or VHF guard when appropriate) regardless of primary radio.

A9.19. Reverse Taxi.

A9.19.1. The pilot will coordinate reverse taxi directions and signals to be used with the scanner or loadmaster.

A9.19.2. Secure all cargo and ensure all passengers are seated.

A9.19.3. Open the aft cargo door and lower the ramp to approximately 12 inches above horizontal.

A9.19.4. 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.

A9.20. Radar Altimeter.

A9.20.1. Any crewmember detecting the illumination of the radar altimeter Low Altitude warning light will notify the pilot flying the aircraft. Terrain clearance and aircraft position must be verified. Aircraft commander will brief radar altimeter advisory calls for low level flights.

A9.20.2. The navigator and pilot will use the same radar altimeter setting unless briefed otherwise.

A9.20.3. The radar altimeter will be set to the HAT/HAA during instrument approaches.

A9.21. Functional Check Flights (FCFs) and Acceptance Check Flights (ACF). FCFs and ACFs will be performed according to T.O. 1-1-300, TO 1C-130(E)H-6CF-1, and training attachments in AFI 11-2FT Volume 1.

A9.22. Reduced Power Operations. Takeoffs may be made using reduced power. Values listed below are the minimum required. Other power settings may be used as mission requirements dictate or permit.

A9.22.1. Reduced power operations for normal takeoffs will use a predicted torque corresponding to 900 degrees TIT (970 for Dash 15) not to exceed 19,600 inch-pounds of torque. Power settings up to maximum power may be used during stop-and-go takeoffs to comply with training restrictions listed in this chapter. Maximum continuous power should be used to takeoff and climb to cruise altitudes.

A9.22.2. Takeoffs from touch-and-go landings will use a minimum of 900 degrees TIT

A9.22.3. Reduce power for formation takeoffs to a torque corresponding to maximum continuous power. Formation leaders will brief takeoff torque when different series C-130 aircraft are in the same formation.

A9.22.4. Reduced power is not authorized for assault takeoffs.

A9.23. Flight Data Calculations.

A9.23.1. Computer Flight Plans. The authorized flight planning software for most C-130 variants is PFPS. If your aircraft is not supported by PFPS, use a contractor-developed equivalent or compute the flight plan manually.

A9.23.2. Navigators will refer to Chapter 11 guidance in 11-2C130V3 for fuel planning.

A9.23.3. A pilot crewmember, or additional flight engineer, will cross-check the AF Form 4063, **Mini C-130 TOLD Car**d, for accuracy by using the performance manual or approved tab data. As a minimum, the person checking the data will:

A9.23.3.1. Verify gross weight independently from the AF Form 4063.

A9.23.3.2. Review and compare the computed distances or ground roll with the actual conditions and runway available.

A9.24. Aircraft Servicing and Ground Operations.

A9.24.1. Aircraft Refueling. Nonessential crewmembers and passengers are not allowed on board.

A9.24.1.1. Simultaneous fuel and oxygen servicing is not authorized.

A9.24.1.2. For aeromedical evacuation, refer to AFI 11-2C130 Vol 3.

A9.24.1.3. Concurrent qualified ground crews may perform simultaneous refueling and cargo loading.

A9.24.1.4. SCNS/INS may be on and may have data inserted during refuel. Do not turn on or off during refuel operations.

A9.24.2. Fire Protection.

A9.24.2.1. The aircraft engine fire extinguisher system fulfills the minimum requirements for fire protection during engine start.

A9.25. Engine Running Onload and Offload (ERO). Use ERO procedures when necessary to expedite aircraft movement or permit the exchange of crewmembers. ERO procedures may be used for any mix of personnel or cargo. Material handling equipment should be used if palletized cargo is to be onloaded or offloaded. Aircraft commanders must assess prevailing weather, lighting and parking location to ensure safe operations.

WARNING: Do not onload or offload through the crew entrance door and cargo ramp and door at the same time. Paratroop doors will not normally be used.

NOTE: At their discretion, aircraft commanders may ERO any category of passenger. The number of passengers and amount of baggage to be onloaded or offloaded should be taken into consideration.

A9.25.1. General Procedures.

A9.25.1.1. Aircraft commanders will brief crewmembers on the intended ERO operation.

A9.25.1.2. The parking brake will be set and at least one pilot in the seat will monitor brakes, interphone, and radio.

A9.25.1.3. Use wing leading edge and taxi lights to enhance safety at night as the situation dictates.

A9.25.1.4. Station another crew member on interphone or public address (PA) in the cargo compartment as safety observer. Safety observers will remain forward of all cargo.

A9.25.2. Offload Preparation/Procedures. Aerial delivery support (ADS) arms will remain connected in flight. Prior to landing, the loadmaster will brief all personnel in the cargo compartment regarding their locations, duties, and responsibilities during the ERO.

A9.25.2.1. One tiedown device forward and aft will remain connected to vehicles until the aircraft is parked.

A9.25.2.2. Vehicles and passengers will proceed directly aft of the aircraft at least 50 feet before turning and/or 300 feet before stopping.

A9.25.3. Personnel on/offload through the aft cargo door and ramp.

A9.25.3.1. Passengers will be escorted by a crewmember when enplaning or deplaning through the aft door and ramp.

A9.25.3.2. Auxiliary ground loading ramps should be used.

A9.25.3.3. Unless cargo size and location dictate otherwise, deplane passengers before cargo, and enplane after cargo.

A9.25.4. Personnel onload and offload through the crew entrance door:

A9.25.4.1. Station a crewmember on interphone with cord held taut at approximately 20 feet at an angle of 45 degrees from the aircraft axis.

A9.25.4.2. Brief deplaning personnel to secure loose articles and remain forward of the interphone cord.

A9.25.4.3. No enplaning personnel should approach the airplane until the crewmember is in place.

A9.26. Life Support Requirements.

A9.26.1. 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).

A9.26.1.1. On missions carrying passengers, distribute supplemental oxygen to each passenger regardless of planned flight altitude. If POKs are used, the kits need only be positioned on the aircraft and distributed to each passenger for scheduled flights above FL 250

A9.26.1.2. 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.

A9.26.1.3. Aircrews required to fly unpressurized missions from 18,000 feet to FL 249 will prebreathe the 100 percent oxygen for thirty minutes. For any flight above FL 249, refer to lead MAJCOM guidance.

A9.26.1.4. Life preserver units (LPU). The loadmaster/scanner will place an LPU within easy reach of each seated passenger and aircrew member for overwater flights. Crewmembers will fit and adjust LPUs for overwater flights and will wear them on overwater missions below 2000 feet. LPUs need not be worn for takeoffs, landings, or approaches).

A9.27. Descent. Prior to descent into unfamiliar areas, appropriate terrain charts (Operational Navigation Chart (ONC), Sectional Aeronautical Chart, Tactical Pilotage Chart (TPC), or Joint Operations Graphic (JOG)) should be reviewed to increase aircrew situational awareness of obstructions. Primary crewmembers will not be involved in duties other than aircraft operations, descent and approach monitoring, and required checklist items from the initial descent point to landing.

A9.28. Instrument Approach Procedures.

A9.28.1. The C-130 is a category "C" aircraft. If approach speed exceeds 140 knots, the minimums for category "D" will be used.

A9.28.2. Circling Approach. If the circling minimums are not published by category, ensure the HAA and visibility are not less than the following:

A9.28.2.1. Category C - 500 feet – 1 ¾ miles.

A9.28.2.2. Category D - 600 feet - 2 miles.

A9.29. Dropped Objects. If an object inadvertantly departs the aircraft, the flight crew will notify the controlling agency as soon as practical; include details of routing, altitude, winds aloft, etc. After landing, notify maintenance.

A9.30. Chaff and Flare Operations. Conduct the following procedures after the live firing of chaff and flares:

A9.30.1. After landing, taxi to the de-arm area or another suitable safe location to check for hung ordnance.

A9.30.2. The loadmaster or another qualified crewmember will deplane the aircraft and check all flare dispensers for hung ordnance.

NOTE:

The mid-fuselage dispensers can be visually checked by opening the paratroop doors. (Eye protection is required prior to opening the paratroop door.) The forward dispensers must be checked by deplaning a crew member. ALE-40/47 or flare squibs that fail to fire are not considered hung ordnance.

A9.30.3. If hung ordnance is found, identified by a protruding or partially ejected flare cartridge, the aircraft will remain in a de-arm area until Explosive Ordnance Disposal (EOD) personnel meet the aircraft. The aircraft must remain in the designated safe area until EOD personnel can clear all hung ordnance.

A9.30.4. If hung ordnance is not found, the aircraft can proceed to the parking location.

A9.31. Windmill Taxi Starts, Buddy Starts, and 3-Engine Takeoffs.

A9.31.1. Windmill taxi and buddy starts may be authorized by the OG/CC or equivalent to meet specific mission requirements.

A9.31.2. 3-Engine takeoffs require specific approval from HQ AFMC/DO.

Section A9E—Low Level Navigation, Formation, and Airdrop

A9.32. Low Level Navigation. Except for navigation profiles flown as part of approved test plans, do not operate the aircraft lower than the altitudes shown below.

A9.32.1. Day VMC En Route. Plan a minimum of 500 feet AGL (300 AGL on approved routes) modified contour altitude above the terrain using visual references and radar altimeter. Aircrews may fly lower to perform system checks (OCF/FCF/Test etc.). However limit time below 300 feet to the minimum required for system checks.

A9.32.2. Night VMC En Route. Plan en route legs at an indicated altitude of 500 feet above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation), or 400 feet plus one chart contour interval above the highest depicted terrain contour, whichever is highest, within 5 NMs of route centerline to include the aircraft turn radius over each turnpoint. If the altitude for the next leg is higher than the current leg altitude, climb will be completed prior to the turnpoint. If the altitude for the next leg is lower than the current leg, do not initiate descent until over the turnpoint. 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).

A9.32.2.1. Minimum Safe Altitude (MSA). MSA is an initial VFR altitude that provides additional terrain clearance while the aircrew analyzes situations that require interruption of low-level operations (route disorientation and equipment malfunctions or when either pilot must leave the seat during low-level operations, etc.). An MSA will be computed for each leg, route segment, or entire low-level route. Compute MSA the same as night altitudes above.

A9.32.2.2. Minimum IFR En Route Altitude. Compute minimum IFR en route altitude by adding 1,000 feet (2,000 feet in mountainous terrain) above the highest obstruction to flight (manmade obstruction, terrain feature, or spot elevation) within 5 NMs of route centerline. Round this altitude to the next 100-foot increment.

A9.32.2.2.1. Minimum altitudes for IFR operations within published Military Training Routes (MTR) in US sovereign airspace will be the computed leg MSAs unless a higher altitude is required by FLIP AP/1B.

A9.32.2.3. Emergency Safe Altitude (ESA). ESA is designed to provide positive IMC terrain clearance during emergency situations that require leaving the low-level structure. Several ESAs may be computed for route segments transiting significant terrain differentials, or a single ESA

may be computed for the entire low-level route. To compute ESA, add 1,000 feet (2,000 feet in mountainous terrain) to the elevation of the highest obstruction to flight within 22 NMs either side of the planned route centerline.

NOTE:

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

A9.32.2.4. Pressure altimeters are calibrated to indicate true altitudes under international standard atmospheric (ISA) conditions. Any deviation from these standard conditions will result in erroneous readings on the altimeter. This error becomes important when considering obstacle clearances in temperatures lower than standard since the aircraft's altitude is below the figure indicated by the altimeter. Refer to the flight information handbook to determine correction.

A9.33. Airdrop.

A9.33.1. For airdrop missions refer to AFI 11-2C130 Vol 3.

A9.33.2. Specialized airdrop equipment (test articles, etc) will be operated in accordance with test plans and/or locally approved procedures.

A9.34. Formation. All tactical and special formation procedures will be flown in accordance with AFI 11-2C130 Vol 3.

Section A9F—Operating Restrictions

A9.35. Pilot Qualification Training. Pilot mission qualification training may be conducted on missions with passengers onboard only if the individual in training is qualified (completed aircraft checkride with a valid AF Form 8) for the seat position occupied.

A9.35.1. Maintenance and civilian employees under direct contract to the DoD, engaged in official direct mission support activities, are considered mission essential and may be onboard when touch-and-go or stop-and-go landings are performed.

A9.36. Flight Maneuvers. The maneuvers listed in Table A9.6.1. are authorized for qualification and continuation training (or formal upgrade training where indicated). Certain maneuvers will only be performed during formal training under direct IP supervision. They are applicable to all C-130 aircraft.

A9.36.1. Aircraft commanders will ensure their crews are advised of the maneuvers being flown. The intent is to eliminate confusion or concern over unusual procedures that might not be anticipated. Good communication is a matter of policy and common sense.

A9.37. Touch and Go Landings. Touch and go landings can only be performed by certified individuals. Refer to AFI 11-202 Vol 1, as supplemented, for specific certification requirements.

A9.37.1. Include type of touch and go as part of the briefing, (i.e., ground-idle or flight-idle).

A9.38. Simulated Emergency Procedures. Do not conduct aircraft systems emergency procedures training during any tactical (formation and low level navigation) missions.

Table A9.3. Operational Restrictions.

Simulated Engine Failure	IP supervision. Prohibited during tactical operations. Retard one throttle to flight idle at not less than VMCA (one-engine inoperative, out of ground effect) nor less than 200 feet AGL. WX at or above circling minimums during daylight and the greater of 1000 feet and 2 miles visibility or circling minimums at night. Crosswind component corrected for RCR must be in the recommended zone. Engine out circling approaches will not be compounded with any other simulated malfunctions.
Practice Engine Shutdowns	Day VMC Direct IP supervision Must remain above 5000 feet AGL.
No-Flap Landing	IP required No-flap circling approaches will not be combined with any other simulated emergencies. Max gross weight is 120,000 pounds. 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.
Touch-and-Go Landings	Minimum runway length: flaps 50 percent, 5000 feet - for all other, 6000 feet. MPs must be touch and go certified IAW AFI 11-202V1__AFMCSUP 1, chap 4. 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: MPs minimum ceiling of 1000 feet and minimum visibility of 2 SM IP in either seat 300 feet and 1 mile visibility.
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. Crosswind component corrected for RCR must be in the recommended zone. Ceiling and visibility must be at least 300 feet and 3/4 mile (RVR 40). Do not perform in conjunction with no flap landings.
Go-around, Missed Approaches	Initiated no lower than 200 feet AGL when practicing simulated emergencies. Practice instrument approaches - no lower than minimum altitude for the approach.
Slow Flight Demonstration	At or above 5000 feet AGL. Fly at approach, threshold, and 1.2 times stall speed with gear down and flaps 0, 50, or 100 percent. Do not exceed 15 degrees of bank.
Approach to Stalls	Authorized during formal upgrade training or during FCF. Requires day VMC at a minimum of 5000 feet AGL or above cloud deck.
Instrument Steep Turns	Do not exceed 45 degrees of bank, except in day VMC. For bank angles in excess of 45 degrees, must be at or above 5000 feet AGL. Review stall speeds before performing turns.
Assault Takeoffs and Landings	Aircraft commanders must be assault trained and certified Assaults must be performed from the left seat by aircraft commanders, or instructors in either seat.

Attachment 10

B707/C135 OPERATING PROCEDURES

Section A10A—General Information

A10.1. Responsibilities. In conjunction with other governing directives, this attachment prescribes procedures for C-135, C-18, E-3, E-8 and B707 derivative aircraft under most circumstances. Operations or procedures not specifically addressed may be accomplished if they enhance safe and/or effective mission accomplishment

A10.2. References. . The primary references for specific B707/C135 operations are located in technical orders and applicable Air Force Instruction.

Section A10B—Normal Operating Procedures

A10.3. Crew Complement. Minimum aircrew complement will be commensurate with Flight Manual and /or mission specific requirements.

A10.4. Intersection Takeoffs. Intersection takeoffs are authorized if aircraft minimum runway length is met from the point of the intersection.

A10.5. Engine Running Crew Changes. Unless otherwise published, use the following procedures:

A10.5.1. A crewmember should be positioned at the point of entry to act as a safety observer. Crewmembers should approach and depart the aircraft from the nose. Crewmembers should ensure that all loose items are secure prior to entering and exiting the aircraft. Pilot in Command (PIC) will ensure that the aircraft is clear prior to taxi.

A10.6. FCF Operating Guidelines. FCFs will be performed IAW T.O. XX-XX-6CF appropriate guidance.

Section A10C—Operational Limits And Restrictions

A10.7. Prohibited Maneuvers. This section adds aircraft limitations and restrictions to those already specified in flight manuals and applies to all aircrew. Unless on an approved test plan or an actual emergency exists, deviations from the aircraft flight manual are prohibited. The following maneuvers are prohibited:

A10.7.1. Stalls.

A10.7.2. Zero Flap Landings.

A10.7.3. Dutch Roll (unless in approved lesson plan).

A10.7.4. Emergency Descent.

A10.7.5. Simulated 3 engine, rudder power-off landings are prohibited.

A10.7.6. Compound Emergencies. (Except simulated 3 engine, rudder power-off or simulated 3 engine EFAS-off.).

A10.7.7. KC-135R takeoffs and landings with the EFAS off.

A10.7.8. Actual practice engine shutdown (unless in approved lesson plan).

A10.7.9. In-flight, prior to simulating emergency procedures (EP), the pilot will notify all crewmembers.

A10.7.10. In the event of an actual emergency, all student training and simulated EPs will be terminated. Training will resume only when the pilot in command (PIC) has determined that no hazard to safe aircraft operations exist.

A10.7.11. In the event of an actual emergency, all student training and simulated EPs will be terminated. Training will resume only when the pilot in command (PIC) has determined that no hazard to safe aircraft operations exist.

A10.8. Landing Limitations.

A10.8.1. The following landing limitations apply to both touch-and-go and full stop landings:

A10.8.2. All pilots will plan to land on centerline within the touchdown zone.

A10.8.3. All touchdowns will be at a gross weight and at a point and speed that will permit a safe, full stop landing in the remaining runway. If this is not possible, initiate a go-around.

A10.9. Zero-Degree Flap Approach. Do not practice zero-degree flap approaches unless an instructor pilot has access to a set of flight controls and no emergencies (actual or simulated) exist. The approach will be terminated no lower than 200 feet AGL.

A10.10. Touch-and-go Landings.

A10.10.1. Perform touch-and-go landings IAW this instruction, AFI 11-2FTV1, and the applicable flight manual.

A10.10.2. Before final approach, the instructor pilot or qualified Mission Pilot (MP) will brief touch-and-go landing considerations with the other appropriate aircrew members. On successive approaches, if the briefing remains the same and there are no questions, the briefing need not be repeated.

A10.11. Simulated Loss of Engines.

A10.11.1. Perform practice or simulated loss of engines IAW this instruction, the applicable flight manual, and the following:

A10.11.2. Simulated engine-out approaches may end in a missed approach, a full-stop landing, or a touch-and-go landing using all engines during the takeoff phase. A planned three-engine go-around may be started at any time before the power is reduced in the flare. If no IP or EP is onboard, the go-around will be initiated no lower than 200 feet AGL. If it becomes necessary to go-around, use all four engines as soon as safe and practical.

A10.11.3. Simulated two-engine approaches and landings will be practiced under IP supervision only. Simulated two -engine approaches can be practiced using two symmetric engines or three engines using two-engine procedures. Two-engine approaches and landings will not be practiced in an extensively modified aircraft. (E-3 Simulator only.)

A10.11.4. Simulated engine-out, rudder-power-off approach and go-around will not be accomplished unless an IP has briefed the maneuver prior to flight and an IP has access to a set of flight controls. The go-around will be started no lower than 200 AGL. For an unplanned go-around, use all four engines as soon as safe and practical. (E-3 Simulator only.)

A10.11.5. (C-135 only) Do not practice traffic pattern operations, instrument approaches, low approaches or go-around at gross weights that will not afford a minimum of 500 feet per minute rate of climb at approach speed, three engines, flaps-30, gear-up (gear-down for emergency procedures practice). For the KC-135R, a minimum of a 2.8 climb gradient at touchdown speed, three engines, planned flap setting, gear-down.

A10.12. Practice Emergency Gear and Flap Operation.

A10.12.1. May be accomplished day or night, but must always be practiced clear of clouds.

A10.13. Formation Flying.

A10.13.1. Formation is authorized IAW applicable technical order.

A10.14. Air Refueling Limitations.

A10.14.1. Do not accomplish AR operations when:

A10.14.1.1. Conditions are encountered which, in the opinion of either aircraft commander or the boom operator result in marginal control of either aircraft.

A10.14.1.2. Either the tanker or the receiver has less than the full number of engines operating. (except B-52).

A10.14.1.3. The tanker aircraft is unable to retract the landing gear.

A10.14.2. Tanker Autopilot. Conduct AR using all axis of the tanker autopilot except when either the tanker or receiver requires training with the tanker autopilot off or when the tanker autopilot is inoperative. Tanker pilots must notify the receiver pilot when any axis of the autopilot is not being used.

A10.14.3. AR without Tanker Disconnect Capability. AR without tanker disconnect capability means the boom operator is unable to get an immediate disconnect by triggering the disconnect switch. After a known loss of tanker disconnect capability with a particular receiver, no further contacts will be attempted with that receiver. The inability to get an immediate disconnect from one receiver by triggering a disconnect does not prohibit contact attempts with other receivers, if the tanker system (signal coil) checks good. However, if disconnects cannot be triggered on two successive receivers, no further contacts will be attempted. Exceptions to the restrictions are:

A10.14.3.1. During fuel emergency situations.

A10.14.3.2. When necessary to complete receiver over-water deployment/redeployment.

A10.14.3.3. Operational missions.

A10.14.4. Manual/Emergency Boom Latch Training. The following conditions must be met in order to complete training or an evaluation in manual/emergency boom latching:

A10.14.4.1. An AR IP must be at a set of controls during the receiver contacts.

A10.14.4.2. Contacts will be limited to the minimum required.

A10.14.4.3. The receiver aircraft AR system must be fully operable, and a disconnect capability with the receiver must have been previously determined by a boom operator initiated disconnect.

A10.14.5. Practice Breakaway. Prior to the actual accomplishment of a practice breakaway, coordination between the tanker pilot, boom operator, and the receiver pilot is mandatory. Coordination must include when the maneuver will occur and who will give the command of execution. Tanker pilot coordination may be accomplished over interphone with the boom operator. Also, all crewmembers on both aircraft will be briefed on interphone prior to the practice breakaway. If the maneuver is initiated from the contact position, the receiver's AR system must be in normal, and a disconnect capability with the receiver must have been previously determined by a boom operator initiated disconnect. The following limitation applies:

A10.14.5.1. Practice breakaways while in the contact position and demonstration of boom envelope limits are prohibited when the tanker has loss disconnect capability or during manual/emergency boom latching.

A10.14.6. Limits Demonstration. Prior to a limits demonstration, a disconnect capability must have been previously determined by a boom operator initiated disconnect.

A10.14.7. Receiver AR Training. A qualified receiver IP will conduct training. The receiver pilot must inform and obtain acknowledgment from the tanker pilot and boom operator when an unqualified receiver pilot is receiving AR training. During this time, a boom operator qualified for the applicable category receiver must operate the boom controls, and if the tanker autopilot is off, the tanker must be flown by a pilot current and qualified in tanker AR.

Attachment 11

C-141 OPERATING PROCEDURES

Section A11A—Guidance

A11.1. Scope. This attachment provides guidelines for C-141 operations and applies to C-141 aircrews assigned to HQ AFMC. The guidelines in this regulation shall be followed unless waived by AFMC/DOV or modified by an approved test plan.

A11.2. References. The primary references for specific C-141 operations are located in technical orders. Training guidance is contained in AFI 11-2C141V1, *C-141 Aircrew Training*.

Section A11B—Normal Operating Procedures

A11.3. Passenger Procedures. The aircraft commander has the discretion to release seats for passenger accommodations. Passengers can be carried on the flight station (jump seat or navigator's seat), or in the cargo compartment. One additional current and qualified C-141 crewmember must be on board when carrying passengers other than on the flight station. This crewmember will perform only passenger-related duties. Passengers will not normally be carried in the cargo compartment and an attempt to obtain qualified loadmasters should be made. When passengers are carried oxygen masks (EEBD, EPOS, POK, Quick-don, or passenger masks) are required.

A11.4. Flight Gloves. All aircrew members will have Nomex gloves in their possession for each flight. Gloves will be worn when situations dictate or as directed by the aircraft commander.

A11.5. Outside Observer. Use available crewmembers to assist in outside clearing during all taxi operations and any time the aircraft is below 10,000 feet MSL.

A11.6. Adverse Weather.

A11.6.1. C-141 aircraft will not be flown in areas of known or forecast severe turbulence or icing.

A11.6.2. Do not fly into an area of known or forecast moderate or greater mountain wave turbulence. Crews should use good judgment when flying into any area conducive to mountain wave turbulence, and avoid these areas of potential turbulence when possible.

Section A11C—Operational Limits And Restrictions

A11.7. General. This chapter adds aircraft limitations and restrictions to those already specified in the flight manual.

A11.7.1. Approach Category. The C-141 is a category D aircraft.

Table A11.1. Runway and Taxiway Requirements.

Runway Length	Runway Width	Taxiway Width
*6,000 feet/1,830 meters	**98 feet/30 meters	***50 feet/15 meters

*HQ AFMC/DOV may approve operations on runways as short as 5,000 feet or 1,525 meters.

**If a 180-degree turn is required, then 138 feet or 41 meters is required.

***Turning from a 50-foot wide taxiway to another 50 foot wide taxiway without fillets is not recommended.

A11.8. Runway, Taxiway, and Airfield Requirements. Figure 1 specifies the minimum runway length, width, and taxiway widths for normal operations. In all cases ensure obstacle clearance requirements are met. Landing distance will not exceed runway available.takeoff

A11.8.1. Runway Length for takeoff / Intersection takeoffs. Normally, takeoffs are initiated from the beginning of the approved usable portion of the runway. Aircraft commanders may make intersection takeoffs provided the operating environment (for example, gross weight, obstructions, climb criteria, weather, etc.) would allow a safe takeoff and departure. When less than the entire runway is used, compute the Performance Data Worksheet and obstacle data based on the actual runway remaining from the point at which the takeoff is initiated.

A11.8.2. RCR Limitations. The minimum RCR for takeoff or landing is the lowest RCR depicted in the C-141 performance manual. Normally, RCR values are not reported for taxiways and ramps. During periods of reported low RCR, the taxiways and ramps may have an even lower RCR than reported for the runway.

A11.9. Wind Restrictions. An airfield will be considered out of limits for takeoff and landing on takeoffa dry runway when winds (including gusts) are greater than:

A11.9.1. Maximum wind (any direction)—50 knots.

A11.9.2. Maximum tailwind component—10 knots.

A11.9.3. Maximum crosswind component—25 knots.

A11.9.4. Rudder Pedal Steering or Spoilers inoperative-20 knots.

A11.10. Prohibited Maneuvers. The following maneuvers are prohibited in the aircraft unless they are required due to an actual emergency, part of an approved test plan, or approved by AFMC/DOV.

A11.10.1. Simulated/actual engine out takeoffs.

A11.10.2. Aborted takeoffs.

A11.10.3. Simulated runaway pitch trim maneuvers.

A11.10.4. Jammed stabilizer.

A11.10.5. Landing with an inoperative hydraulic system.

A11.10.6. No flap takeoffs or touch and go landings.

A11.10.7. Aileron tab operation.

A11.11. Training Restrictions.

Table A11.2. Training Restrictions.

TRAINING EVENT	RESTRICTIONS
Practice No Flap Landings	(1) An instructor pilot must occupy a pilot position. (2) Weather at or above circling minimums during daylight and 1,000 foot ceiling and 2 miles visibility or circling minimums (whichever is higher) at night. (3) Maximum crosswind for no flap landings during training is 15 knots. (4) Full stop only.
Touch and Go Landings	(1) Minimum runway length 7000'.
Simulated Engine Out	(2) Do not initiate engine-out condition below three-engine approach speed or three-engine VMCA; do not slow below three-engine VMCA until landing is assured. (3) Do not initiate engine-out condition below 500 feet AGL on climbout or 200' on approach . (4) Use all four engines for go-arounds initiated below 200 feet.
Approach to Shaker Onset	(1) An instructor pilot must occupy a pilot position. (2) Day, VMC only. (3) Initiate above 10,000 feet AGL and complete no lower than 5,000 feet AGL. (4) Recover at shaker onset or computed shaker onset speed, whichever occurs first.

Section A11D—Aircraft Operating Guidelines

A11.12. General. This general reference is intended to be an aid to an aircraft commander, the final flight authority, to determine whether safe ACF/FCF flight can be accomplished. The aircraft commander will base the decision to fly on unique mission requirements and degraded systems effects.

A11.13. ACF/FCF Discrepancy Identifiers. The aircraft commander determines an aircraft's overall status. Use the following discrepancy identifiers to effectively communicate an aircraft's status with WR-ALC maintenance personnel only. The Mission Contributing (MC) and Mission Essential (ME) terms should be used after all aircraft flights. The term Mission Essential After Flight (MEAF) will be used for ACF/FCF missions at AFMC and contractor facilities only.

A11.13.1. MC - Mission Contributing. These items are identified as contributing to the aircraft's overall condition and do not, at the present time, prevent the aircraft from operating safely. Circumstances (i.e., weather, passenger or cargo requirements) or other aircraft systems malfunctions/failures may result in MC write-ups being redesignated as ME.

A11.13.2. ME - Mission Essential. These items are identified as essential for flight. Whether for safety of flight or because the system(s) must be operational to certify that modification or repairs to the aircraft were completed correctly.

A11.13.3. MEAF - Mission Essential After Flight. The term MEAF is for use as a mission-advancing tool. These are maintenance discrepancies discovered before, during, or after an ACF/FCF flight and must be repaired before the aircraft will be released to its home unit. The repair may be accomplished before any re-fly of the aircraft, but must be repaired before the ACF/FCF sign-off in the aircraft AFTO Form 781 will occur.

A11.14. Sign off of the ACF/FCF with ME discrepancies. The ACF/FCF should not be signed off in the AFTO Form 781A with any open ME or MEAF flight discrepancies in the forms. After all ME and MEAF discrepancies are cleared, a pilot may sign off the ACF/FCF requirement statement in the AFTO Form 781A.

A11.15. Aircraft Systems/Component Malfunctions:

A11.15.1. Air Conditioning - both packs operational to fly an FCF. Left pack must be operable throughout flight for emergencies. The right pack may fail in-flight but will require a reflight to confirm new components are capable of maintaining aircraft pressurization on one A/C pack.

A11.15.2. Antiskid and Brakes – All brakes should be operative.

A11.15.3. APU - not required.

A11.15.4. Bleed Air. The following components are required for FCF engine operations and before FCF flight:

A11.15.4.1. Bleed Air Valves.

A11.15.4.2. Bleed Duct Overheat System.

A11.15.4.3. Floor Heat Shutoff Valve.

A11.15.4.4. Wing Isolation Valve.

A11.15.5. Communications & Interphone:

A11.15.5.1. Interphone - communication capability with all primary crewmembers, the crew entrance door, and the left or right troop door is required.

A11.15.5.2. Radios: Communication capability is required from both the pilot's and copilot's positions. UHF-1 or VHF 1 must operate to maintain radio communications ability under emergency generator operation. Additionally, either UHF-2 or VHF-2 should be operative.

A11.15.6. Doors:

A11.15.6.1. Cargo Doors - not required.

A11.15.6.2. Crew Entrance - must be operative.

A11.15.6.3. Troop Doors - one may be inoperative.

A11.15.7. Electrical System/Components:

A11.15.7.1. Bus ties - must be operational.

A11.15.7.2. Emergency Generator - must be operative.

A11.15.7.3. Disconnected Generator/CSD - One may be disconnected. If a wing(s) was (were) removed during PDM/UDLM, all generators should be operational to confirm generator wiring continuity.

A11.15.7.4. Load monitor relays - No.2 may not work when placed in the override position, but must open under single generator operation. However, all generators must be operative. No. 3 load monitor relay must be operative.

A11.15.7.5. Transformer/Rectifiers - both should be operative.

A11.15.8. Engine:

A11.15.8.1. Continuous Ignition - one may be inoperative on each wing and flight continued.

A11.15.8.2. Fuel Enrichment - should be operational.

A11.15.8.3. Fuel Heaters & Indicators - should be operational.

A11.15.9. Engine Instruments:

A11.15.9.1. CSD Oil Temperature - should operate or CSD disconnected.

A11.15.9.2. EGT - one indicator may be inoperative. However, use $510^{O}C$ as maximum allowable EGT.

A11.15.9.3. EPR - may be inoperative provided N1 RPM is operative.

A11.15.9.4. EVI - may be inoperative.

A11.15.9.5. Low Oil Pressure light - must be operative.

A11.15.9.6. Low Oil Quantity light - may be inoperative provided associated oil tank quantity is checked and engine oil fully serviced after engine runs. Closely monitor oil pressure and temperature throughout flight.

A11.15.9.7. N1 RPM - may be inoperative provided EPR is operative.

A11.15.9.8. Oil Pressure Indicator - must be operative.

A11.15.9.9. Oil Temperature - must be operative.

A11.15.9.10. VSEI - one per engine may be inoperative:

A11.15.10. Fire Detection & Protection Systems:

A11.15.10.1. APU Fire Detection – must be operative.

A11.15.10.2. APU Fire Extinguisher - must be operative provided the APU is operated.

A11.15.10.3. Engine & Pylon Fire/Overheat Detection & Extinguishers - all must be operational.

A11.15.10.4. Engine Fire Agent Discharge Disk - may be missing provided agent pressure is good.

A11.15.11. Flight Controls:

A11.15.11.1. Overhead insulation - not allowed to interfere with or touch control cables.

A11.15.11.2. Power Control Assemblies - must be able to shut off and re-power.

A11.15.12. Flight Recorders - Digital and Voice should be operational.

A11.15.13. Floor Heat - needed to conduct pressurization checks.

A11.15.14. Floor Overheat System - must be operational for all engine operations and flight.

A11.15.15. Fuel System:

A11.15.15.1. Boost pumps - all should be operative before flight.

A11.15.15.2. Crossfeed Valves - no leakage (internal pressure bleed off/increase), must be operable.

A11.15.15.3. Extended Range Tank Ejectors - must be operative for FCF.

A11.15.15.4. Indicators - In flight, only one inoperative indicator per wing (symmetrically opposite indicator in the opposite wing should be operative.)

A11.15.15.5. Separation Valves - all must be operable, minor leakage (internal pressure bleed off/increase) is allowed with the left and right separation valves. Center separation valve is allowed no leakage.

A11.15.16. Fuel leaks - the origin of the fuel leak must be positively identified, once identified:

A11.15.16.1. Gorilla fitting and E-point repair areas - will be permanently fixed before flight.

A11.15.16.2. Temporary/permanent fix - only permanent repairs will be made with putty. MEAF is not authorized; any fuel leak requiring a permanent fix will be fixed before flight.

A11.15.16.3. Jettison/drain masts - must be repaired before flight if any in-tank maintenance was performed on the aircraft.

A11.15.17. Landing Gear - Dash 1 guidelines apply.

A11.15.18. Hydraulics - all pumps and valves should operate on the ground.

A11.15.19. Navigation & Flight Instrumentation:

A11.15.19.1. AHRS/INS1/INS2- at least two should be operative prior to flight.

A11.15.19.2. CADC/SCADCs - must be operative.

A11.15.19.3. Multi-Function Standby Instrument (MFSI) - must be operative on C-141C aircraft prior to flight.

A11.15.19.4. Standby Attitude Indicator - C-141B model aircraft not required.

A11.15.20. Pressurization:

A11.15.20.1. Emergency Depressurization switches - both operative on the ground, one may be inoperative in flight.

A11.15.20.2. Emergency Pressurization switches - both should be operative on the ground.

A11.15.20.2.1. Left side should be operative in-flight. (emergency checklist item)

A11.15.20.2.2. Right side may fail in-flight.

A11.15.20.3. Cabin Limit Override - may fail in-flight; must be repaired prior to delivery.

A11.15.20.4. Cabin Limiter - may fail in-flight. Requires re-fly if aircraft received major structural repairs (i.e., large sections of fuselage skin replaced, 998, 1058 frame replacement).

A11.15.21. Takeoff Light - should determine reason why it will not work before flight. Do not fly if touchdown relay malfunction is suspected.

A11.15.22. Thrust Reversers:

A11.15.22.1. Thrust Reverser(s) fails to open - If there are any touchdown relay/wiring problems, the aircraft will not be flown even with the reversers pinned. For other malfunctions, the thrust reversers will be pinned if any malfunction is not repaired before the aircraft is flown.

A11.15.22.2. Indication Problems - must trouble shoot to confirm there are no malfunctions with the touch-down relays, wiring, etc. Thrust reversers will be pinned if any malfunction is not repaired before flight.

Section A11E—Flight Engineer & Scanner Duties

A11.16. Flight Engineer Procedures. All flight engineers assigned to AFMC will use the following guidance when operating C-141s, regardless of location. This guidance contains normal procedures for flight engineers (FE) not contained in the flight manual or applicable technical orders.

A11.17. Scanner Duties. After takeoff, the scanner will normally make a walk-around when flaps are retracted, the after takeoff climb checklist has been initiated and the airplane is clear of turbulence. The walk-around should be completed by 10,000 feet when flight station duties permit.

EXCEPTION: When occupying the jump seat, the scanner will normally remain there until 10,000 ft., unless coordinated with the pilot to cleared off earlier for the after takeoff climb scan. On FCF/ACF mission profiles, the scanner will complete the walk-around as soon as flight station duties permit.

A11.18. Aircraft Servicing.

A11.18.1. Refueling and Defueling. Flight Engineers are authorized to refuel and defuel when maintenance personnel are not available. The applicable refueling and defueling checklist shall be used during all refueling and defueling operations. If ground support personnel are not available, the aircraft commander will designate another crewmember to assist in the servicing operation. Aircrews will not refuel at bases with AMC support except in isolated cases when maintenance support is not readily available.

A11.18.2. Refueling at Nonsupport Stations. When crewmembers are required to refuel due to lack of maintenance support, two refueling qualified personnel and an additional individual for Single Point Receptacle (SPR) duties is required. The additional individual will be briefed on duties by the servicing supervisor.

A11.19. Aircraft Structural Integrity Program. The completion of the AFTO Form 451 is not required during FCF/ACF mission profiles or during pickup, delivery, and training missions.

A11.20. Authority to Clear Red X Symbols in the AFTO Form 781A. A first engineer or above may clear red Xs for engine and pitot covers, engine cowlings, and exterior panels when qualified maintenance personnel are not available. To clear other Red X symbols, the flight engineer will contact WR-ALC Maintenance Control or the aircraft's home station Job Control to obtain permission.

A11.21. Engine Operating Policy. Crew rest is required for all crewmembers prior to conducting engine operations.

A11.21.1. Flight Engineers. Flight engineers are authorized to start, operate, warm up, and conduct operational checks of aircraft engines IAW AFI 11-218, paragraphs 1.4. & 1.4.1. Flight engineers are not aircraft taxi qualified. If an engine run is required in a designated run-up area, the aircraft will be towed or pilots will be added to the crew to perform taxi operations.

A11.22. Fault Code Reporting Procedures. The fault reporting code will be used to provide a description of the malfunction when requested by maintenance.

A11.23. Monitoring Primary Radios. The flight engineer and scanner will monitor the primary radio for flight clearances, altitudes, heading changes, and radio frequencies. The FE is not required to copy departure clearances. The scanner will aid in radio transmissions as directed by the aircraft commander.

A11.24. Weight and Balance. The flight engineer performing scanner duties is responsible for completing the DD Form 365-4 when loadmasters are not on board and/or one has not been done through other means (i.e.,- Canned DD Form 365-4, etc.).

Section A11F—Formation Procedures

A11.25. Formation Procedures. Formation procedures will be IAW AFI 11-2C-141 Vol 3.

Attachment 12

F-4 OPERATING PROCEDURES

Section A12A—General Information

A12.1. Formation Procedures and Techniques:

A12.1.1. Formation Takeoff Restrictions. Formation takeoffs are prohibited:

A12.1.1.1. Between nonleading edge slat and leading edge slat (LES) aircraft (i.e., different wing configurations).

A12.1.1.2. When the gross weight between the aircraft differ by more than 3,000 pounds.

A12.1.1.3. When the gross weight is more than 55,500 pounds.

A12.1.1.4. Takeoff roll is more than 70 percent of the usable runway.

A12.1.2. Formation Takeoff Procedures:

A12.1.2.1. On the flight leader's signal, stabilize RPM at 85 percent.

A12.1.2.2. After a head nod from the wingman, the leader will give a head nod/radio call as the signal to start takeoff roll.

A12.1.2.3. The throttles will be advanced smoothly to maximum power then retarded as necessary (not below 1/2 AB range) to allow the wingman adequate power control.

A12.1.2.4. Maintain at least 10 feet wingtip clearance throughout the takeoff roll.

A12.1.2.5. The leader will direct the wingman to assume the lead if the wingman overruns the leader. The wingman will select full AB, maintain his side of the runway, and make his own takeoff. The original leader will be responsible for in-flight separation and directing appropriate measures to regain flight integrity or initiate lost wingman procedures. The original wingman will fly the briefed departure until instructed otherwise by the flight leader.

A12.1.2.6. Gear will be retracted after the flight leader observes the wingman is safely airborne. A head nod or radio call is the signal for gear retraction. Flaps will be raised 3 seconds after initiation of gear retraction.

A12.1.2.7. The leader will retard the throttles out of afterburner at 300 knots, at prebriefed airspeed, a radio call, or on a visual signal. No preparatory signal is required.

A12.1.3. Close Formation. Wingmen must maintain wingtip clearance by flying a position that aligns the forward tips of the lead aircraft's stabilator and puts the aft joinup light in the star on the fuselage. Keep this position throughout all turns.

Section A12B—Normal Operating Procedures

A12.2. Maneuvering Parameters. T.O. 1F-4(X)-1, TPS Guides and applicable phase manuals in addition to this instruction will be used to define and describe the performance of stalls, confidence maneuvers, aerobatics, ACBT, or advanced handling maneuvers.

A12.2.1. A rig check will be accomplished after the tanks indicate empty to ensure that the tanks are empty if external wing tanks are carried. A straight-in approach and landing will be accomplished if the aircraft fails the rig check.

A12.2.2. Stab aug checks are required prior to the performance of stalls, confidence maneuvers, ACBT, or other maximum performance/high AOA maneuvering.

A12.2.3. Do not maneuver the aircraft at high AOA if an out-of-rig condition, malfunctioning stab aug, or asymmetrical load exists. Fly a straight-in approach for landing.

A12.2.4. The roll channel of the stab aug will be disengaged for ACBT, stalls, confidence maneuvers, and other maneuvers in which rudder rolls or reversals will be accomplished.

A12.2.5. External wing tanks and the Royal jet centerline tank will be empty prior to performing stalls, confidence maneuvers, aerobatics (except Lazy Eight and Chandelles), ACBT, or advanced handling maneuvers. This restriction does not apply to the High Performance Centerline tank which can be flown within Dash-1 limits.

A12.2.6. All flight maneuvering, except stall demonstrations and confidence maneuvers, is limited to a maximum of 19.2 units AOA (25 unit AOA for LES aircraft), excessive wing rock, or 200 KIAS, whichever occurs first. A radio call to "Knock-It-Off" is normally required; however, at 200 KIAS primary attention will be devoted to regaining an adequate energy state. Stall demonstrations, confidence maneuvers, and indexer light orientation are limited to 120 KIAS.

A12.2.7. Low-angle (5-20 degrees) weapons deliveries will not be performed below 5,000 feet AGL with fuel remaining in the external wing tanks.

Section A12C—Operating Restrictions

A12.3. Approach to Stalls Restrictions.

A12.3.1. An IP is required in the aircraft for all stall demonstrations (except FCF missions).

A12.3.2. Initiate recovery at the first indication of nose rise, nose slice, 30 degrees wing or build-up of side forces (tendency to move pilot to the side of the cockpit), whichever occurs first. If no stall indications occur, initiate recovery not to exceed 25 units AOA (29 units AOA with LES). Initiate landing configuration stall recoveries at 22.3 unit AOA (pedal shaker).

A12.3.3. Stall recoveries will be IAW the flight manual.

A12.3.4. Minimum entry altitude is 15,000 feet AGL. Minimum altitude during recovery is 5,000 feet AGL.

A12.3.5. Landing Configuration Approach to Stall. Maximum entry altitude (non LES) is 20,000 MSL.

A12.3.6. Approach to Accelerated Stalls. Discontinue the maneuver if the stall indications have not been observed before decelerating through 300 KIAS.

A12.3.7. Check the aircraft rig and stability augmentation system and turn off the roll aug prior to approach to stalls.

A12.4. Approach to Stall Demonstration Maneuvers.

A12.4.1. 1G stall approaches (clean/gear flap configurations): Power is set at 80-85 percent.

A12.4.2. Accelerated Stall Approaches:

A12.4.2.1. Power is set at military

A12.4.2.2. Entry airspeed is 350-400 knots.

A12.5. Confidence Maneuvers.

A12.5.1. Check the rig, stab augs, and turn off the roll aug before confidence maneuvers. Do not perform these maneuvers with an asymmetrically loaded aircraft. Enter each maneuver at or above 15,000 feet AGL.

A12.5.2. AOA Recovery. Set and maintain a 45- to 60-degree climb at a minimum of 300 knots. Adjust the throttles to ensure MIL power is reached prior to 200 knots. When the airspeed reaches 200 knots, establish and maintain a 3 to 8 unit AOA. Recover to level flight when you regain sufficient airspeed (about 250 knots).

A12.5.3. Low AOA Rolls. Set and maintain a 45- to 60-degree climb at a minimum of 300 knots. Adjust the throttles to ensure MIL power is reached prior to 200 knots. When the airspeed reaches 200 knots, establish and keep a 3 to 8 unit AOA and roll the aircraft 360 degrees with aileron. Keep 3 to 8 units AOA with wings level upright until sufficient airspeed is regained (about 250 knots). Recover to level flight.

A12.5.4. High AOA Roll (Except LES F-4E). Set and maintain a 30-degree climb at a minimum of 300 knots. Adjust the throttles to ensure MIL power is set prior to 200 knots. The AOA will be about 10 to 15 units when the airspeed reaches 200 knots. Roll the aircraft 360 degrees with the rudder when airspeed is 200 knots. Keep 16 to 18 units AOA once the roll starts. After finishing the rudder roll, establish 3 to 8 units AOA until you regain enough speed (about 250 knots). Recover to level flight.

A12.5.5. High AOA Roll (LES F-4E). Set and maintain a 30-degree climb at a minimum of 300 knots. Adjust the throttles to ensure MIL power is set prior to 200 knots. Push the aileron and rudder in the direction of the roll and set and keep a 23 to 25 unit AOA when you reach 200 knots. Use the rudder and aileron to stop the roll, set a 3 to 8 unit AOA until you regain enough flying speed (about 250 knots), and recover to level flight.

A12.5.6. Inverted Recovery. At no less than 300 knots, set and keep a 45- to 60-degree climb while adjusting the throttles to make sure MIL power is reached prior to 200 knots. When the airspeed reaches 200 knots, set and keep a 3 to 8 unit AOA and roll the aircraft 180 degrees with the aileron.

Note: When inverted, keep a 3 to 8 unit AOA

CAUTION: Pushing the stick forward too much could cause a negative-G inverted stall. When the nose of the aircraft falls through the horizon, roll the aircraft 180 degrees until it is upright and keep a 3 to 8 unit AOA. When you have enough flying airspeed (about 250 knots), recover to level flight.

A12.6. Advanced Handling Maneuvers.

A12.6.1. The minimum altitude for advanced handling is 5,000 feet AGL or 10,000 feet over water. The maximum AOA is 19.2 units (25 units for LES F-4E). Check the rig and stab augs and turn off the

roll aug before doing these maneuvers. Use F-4 advanced handling maneuvers from the guidelines in Table A12.1.

A12.7. Aerobatic Maneuvers.

A12.7.1. Ensure the external fuel tanks are empty when performing aerobatic maneuvers (except Lazy 8s or Chandelles). Use F-4 aerobatic maneuver guidelines in Table A12.2.

Table A12.1. F-4 Advanced Handling Maneuvers.

ITEM	A MANEUVER	B ENTRY	C REMARKS
1	Nose-High Minimum-Time Turn	450 to 500 KIAS	4 to 5 Gs until reaching 19.2 units (25 units for LES F-4E)
2	Nose-Low Minimum-Time Turn	350 to 400 KIAS	4 to 5 Gs until reaching 19.2 units (25 units for LES F-4E)
3	Rudder Reversal	350 to 400 KIAS	19.2 units (25 units for LES F-4E) at least 250 KIAS
4	Rudder Roll	350 to 400 KIAS MIL Power	19.2 units (25 units for LES F-4E) at least 300 KIAS over the top

Table A12.2. F-4 Aerobatic Maneuvers.

ITEM	A MANEUVER	B ENTRY	C POWER SETTING	D REMARKS
1	Lazy 8 or Chandelle	450 KIAS	92% with tanks 90% clean	200 to 230 KIAS at horizon. 90_ point
2	Aileron Roll or Barrel Roll	300 to 450 KIAS	90-100%	
3	Split S	270 to 300 KIAS	As required	Entry altitude is at least 15,000 ft AGL
4	Cloverleaf	450 KIAS	MIL	200 KIAS over the top
5	Cuban 8, Loop, or Immelman	500 KIAS 450 KIAS	MIL AB	

Attachment 13

F-15 OPERATING PROCEDURES

Section A13A—Introduction

A13.1. Scope. This attachment and the complementary references, prescribes standard operational procedures for all AFMC and AFMC gained F-15 aircrew. The notation, F-15, will be used to describe both the F-15A/B/C/D and F-15E.

A13.2. References. The primary references for F-15 operations are T.O. 1F-15E-1, T.O. 1F-15E-1-1, T.O. 1F-15E-34-1-1, T.O. 1F-15A-1, T.O. 1F-15A-34-1-1, T.O. 1F-15A-34-1-2, T.O. 1F-15C-34-1-1, T.O. 1F-15C-34-1-3, AFTTP 3-1V1/V4/V17, AFTTP 3-3V4/V17, AFI 11-202V3; AFI 11-214, and this volume. Units may use phase manuals developed by replacement training units as long as that guidance is not less restrictive.

Section A13B—Mission Planning

A13.3. Terrain Following (TF) Flight Map Preparation. Planned night turn point bank angles should reflect system limitations to ensure maps accurately display planned routes. Flight leads should select TF letdown points that avoid initial descents into rugged or mountainous terrain at night.

A13.4. Briefing/Debriefing.

A13.4.1. Takeoff and Landing Data (TOLD) will be computed and briefed on every mission. Emphasize takeoff and abort factors during abnormal situations such as short/wet runway, heavy gross weights, non-standard cable configurations, and high density altitude.

A13.4.2. Emphasize low altitude flight maneuvering, obstacle avoidance, Low Altitude Warning System (LAWS) features, and low altitude comfort level on all low-level mission briefings.

A13.4.3. Weapon Systems Officers (WSO) should brief items applicable to rear cockpit duties during the mission.

A13.5. Unit Developed Checklists/Local Aircrew Aids.

A13.5.1. Unit developed checklists may be used in lieu of flight manual checklists (except -25 checklists) provided they contain, as a minimum, all items (verbatim and in order) listed in the applicable checklist.

A13.5.2. Units will produce an aircrew aid that includes briefing guides, radio channelization, airfield diagrams, impoundment procedures, emergency action checklists, NORDO/divert information, bailout and jettison areas, cross-country procedures, and other information deemed necessary by the unit.

A13.6. Combat Edge Use. Once equipped and qualified, COMBAT EDGE will be worn on all sorties when aircrews plan or are likely to maneuver at or above 6-Gs during the mission.

A13.7. Stowing Equipment in Bay 5 (F-15A/C). Stow containers or baggage with hard sides inside a Bay 5 cargo container. Without a cargo container, stow only soft-sided personal equipment baggage,

such as hang-up or A-3 bags, in Bay 5. Items stowed in Bay 5 will be positioned so as not to interfere with circuit breakers, test equipment, and ICS cables. Items should be secured with non-stretchable cord in such a manner to prevent movement in all three axes of motion. The pilot is responsible for ensuring items stowed in Bay 5 are loaded correctly and properly secured. The carriage restrictions for the Bay 5 cargo container are identical to the MXU-648/A cargo pod except for the airspeed restriction, which does not apply. Aircraft with items stowed in Bay 5 will not perform aerobatics but may execute tactical intercept missions restricted to LIMITED maneuvering. Do not execute zero or negative G maneuvers unless safety of flight dictates.

Section A13C—Normal Operating & Formation Procedures

A13.8. Ground Visual Signals. Refer to AFI 11-218 and appropriate phase manuals for ground visual signals.

A13.8.1. Target POD Clear. Extend arm and rotate a closed fist in a circular motion.

A13.9. Takeoff.

A13.9.1. Do not takeoff if the RCR is less than 12.

A13.9.2. If the computed military power takeoff distance exceeds one-half of the available runway, takeoff using afterburner.

A13.10. Join-Up/Rejoin.

A13.10.1. Flight leaders will maintain 350 KCAS until join-up is accomplished unless mission requirements necessitate a different airspeed.

A13.10.2. Flight leads will normally direct a battle damage/bomb check after each mission prior to Return to Base (RTB). Brief deconfliction responsibilities and position change procedures.

A13.11. Tactical Formation.

A13.11.1. Wingmen/trail elements will cross above the lead/lead element when deconfliction is required during tactical maneuvering.

A13.11.2. Deconfliction Responsibilities. The wingman is responsible for flight path deconfliction during tactical maneuvering unless he calls “Padlocked," “Blind,” or “Engaged” and flight lead acknowledges.

A13.12. Show Formation. Refer to AFI 11-209, *Air Force Participation in Aerial Event*s, and applicable MAJCOM directives for specific rules and appropriate approval levels to participate in static displays and aerial events.

A13.13. Maneuvering Parameters.

A13.13.1. Minimum altitude for nose high/low speed recoveries and Aircraft handling Characteristics (AHC) vertical maneuvers is 10,000 feet AGL.

A13.13.2. Remain above 5,000 feet AGL during all aerobatics maneuvering.

A13.14. G-Awareness Exercises. Reference AFI 11-214 and AFTTP 3-3, Chap 9. G-awareness exercise will be accomplished prior to all tactical maneuvering exceeding 6 g's.

A13.15. Radio Procedures. Use brevity code and other terminology IAW AFI 11-214, AFTTP 3-1V1, and local standards.

A13.16. Low Altitude Procedures.

A13.16.1. Fly low level formation positions/tactics using AFTTP 3-1V4, AFTTP 3-1V17, AFTTP 3-3V4, and AFTTP 3-3V17, as guides.

A13.16.1.1. Line abreast formation is authorized at or above 300 feet AGL. When flying below 300 feet AGL, direct the wingman to a wedge formation position.

A13.16.2. Obstacles:

A13.16.2.1. All obstacle avoidance planning will be based on Minimum Safe Altitude (MSA) and Route Abort Altitude (RAA).

A13.16.2.2. Flight leads will direct a climb not later than (NLT) 3 NM prior to an obstacle if unable to visually acquire or ensure lateral separation from that obstruction.

A13.16.3. Minimum Airspeed. The minimum airspeed for low level navigation is 300 KCAS.

A13.16.4. For night or IMC operation the minimum altitude is 1000 feet above the highest obstacle within 5 NM of course unless operating under the conditions of paragraph 3.19, LANTIRN Operations.

A13.16.5. For over water operation the minimum altitude is 1000 feet above the surface unless in sight of land or using TF flyup protection. If in sight of land or using TF flyup protection the minimum altitude may be lowered to 500 feet above the surface.

A13.16.6. For Air to Surface range operations min altitudes will be determined by Range restrictions, AFI 11-214 restrictions, or aircrew minimums, whichever is greater.

A13.16.7. Visual Meteorological Conditions (VMC) Route/Area Abort Procedures. Comply with VFR altitude restrictions, maintain VMC and squawk applicable (IFF/SIF) modes and codes. Attempt contact with controlling agency, if required.

A13.16.8. IMC Route/Area Abort Procedures. Immediately climb to, or above, the briefed RAA and maintain preplanned ground track. Execute appropriate lost wingman procedures if necessary. If deviations from normal route/area procedures are required, or if the RAA/MSA is higher than the vertical limits of the route/area, squawk (IFF/SIF) emergency. Attempt contact with the appropriate ATC agency for an Instrument Flight Rules (IFR) clearance. If required to fly in IMC without an IFR clearance, cruise at appropriate VFR altitudes until IFR clearance is received.

A13.17. LANTIRN Operations.

A13.17.1. An operational LANTIRN system is required to conduct night or day IMC low level operations below MSA.

A13.17.2. Unarmed TF operations in IMC are prohibited.

A13.17.3. Each crew will confirm by inter-cockpit communication that the TFR and radar altimeter are on and working properly before descending below the MSA.

A13.17.4. Any maneuvering that will put the aircraft outside of TFR limits, negating fly-up protection, will be at or above the applicable MSA or RAA.

A13.17.5. Abnormal Operation. If NAV FLIR visibility is insufficient for use as an aid for terrain avoidance (N/A for IMC TF qualified crews using IMC procedures on an IFR Route (IR) route) climb to MSA/RAA.

A13.18. Night Vision Goggles (NVG) Procedures. USAF/MAJCOM guidance (including AFI 11-202V3, AFI 11-214, and AFI 48-123, *Medical Examination and Standards*) outline NVG procedures. AFTTP 3-1V4/V17 and AFTTP 3-3V4/V17 will incorporate expanded tactical guidance.

A13.19. Fuel Requirements.

A13.19.1. Normal Recovery Fuel. The fuel on initial or at the Final Approach Fix (FAF) at the base of intended landing or alternate, if required. Fuel quantity will be as established locally or 2,300/2,000 pounds (F-15E/F-15A-D), whichever is higher.

A13.19.2. Minimum/Emergency Fuel. Declare the following when it becomes apparent that an aircraft may land at the intended destination or alternate, if required, with:

A13.19.2.1. Minimum Fuel. 1,800/1,500 pounds (F-15E/F-15A-D) or less.

A13.19.2.2. Emergency Fuel. 1,200 pounds or less.

A13.20. Approaches and Landings.

A13.20.1. The desired touchdown point for a VFR approach is 500 feet from the threshold or the glide path interception point for a precision approach.

A13.20.2. Landing Restrictions:

A13.20.2.1. When the computed landing roll exceeds 80 percent of the available runway, land at an alternate if possible.

A13.20.2.2. Do not land over any raised web barrier (e.g., MA-1A, 61QS11).

A13.20.2.3. When the RCR at the base of intended landing is less than 12, land at an alternate if possible. If an alternate is not available, an approach end or mid-field arrestment is recommended.

A13.21. Overhead Traffic Patterns. Overhead patterns can be made with unexpended practice ordnance and unexpended live air-to-air ordnance.

A13.22. Touch-and-Go Landings.

A13.22.1. Fly touch-and-go landings IAW AFI 11-202V1 and AFI 11-202V3, as supplemented by MAJCOM.

A13.22.2. Do not fly touch-and-go landings with ordnance (except a safed 20mm gun) or with fuel remaining in any external tank.

Section A13D—Instrument Procedures

A13.23. Area Navigation. The F-15 INS is approved for en route Area Navigation (RNAV). The en route navigation may not exceed 1.5 hours between INS updates. An update is defined as establishing a positive position using visual, TACAN, or on-board radar. Do not fly RNAV approaches.

A13.24. Trail Departures.

A13.24.1. Each aircraft/element will accelerate in MIL/AB power until reaching 350 KCAS. Climb at 350 KCAS until reaching cruise mach/TAS, unless otherwise briefed.

A13.24.2. Upon reaching 350 KCAS, the flight leader will set 850 FTIT for PW-100/-220 and 900 FTIT for PW-229 unless otherwise briefed.

A13.25. Trail Recovery.

A13.25.1. Trail recoveries are authorized if approved by ATC. Flight lead must ensure ATC understands that instructions to the lead aircraft will be for the entire flight and ATC will provide radar flight following for the entire formation.

A13.25.2. Once established on a segment of a published approach, each aircraft must comply with all published altitudes and restrictions while maintaining in-trail separation.

A13.25.3. All aircraft must report the final approach fix.

A13.25.4. If contact is lost with the preceding aircraft, the pilot will transmit "Callsign (C/S) lost contact." The preceding aircraft will respond with altitude, airspeed and heading. Establish altitude deconfliction and coordinate a separate clearance with ATC. If contact is lost while established on a segment of a published approach, flight members may continue the approach, but must confirm separation via navigation aids. If separation cannot be confirmed, execute missed approach or climb-out as instructed by ATC.

A13.25.5. Flight leads will coordinate with local ATC prior to penetration if the trail recovery will terminate in a Precision Approach Radar (PAR) or Airport Surveillance Radar (ASR) approach.

A13.26. Use of the Heads Up Display (HUD). Use the HUD as an additional instrument reference not as the sole instrument reference. The HUD is the primary reference for low level/TF operations. Do not use the HUD to recover from an unusual attitude or when executing lost wingman procedures except when no other reference is available.

Section A13E—Air-To-Air Weapons Employment

A13.27. Simulated Gun Employment. Missions may be flown with a loaded gun provided the gun is safed and a trigger check is performed prior to the first engagement.

A13.28. Maneuvering Limitations. Minimum airspeed during low altitude offensive or defensive maneuvering (LOWAT) is 350 KCAS.

Section A13F—Air-To-Surface Weapons Employment

A13.29. Off-Range Attacks. Restrictions in AFI 11-214 apply. Off range attacks may be conducted when carrying authorized practice ordnance provided the A/G training mode is used on the Programmable Armament Control Set (PACS) and stations with inert/training ordnance are not selected on the PACS.

A13.30. Loft Recovery Procedures. Escape maneuvers following loft deliveries are instrument recoveries which exceed numerous TF limits. Use the following procedures to manually recover to within TF limits:

A13.30.1. Recovery Initiation Altitude (RIA) is the sum of the escape corridor MSA and altitude lost during the dive recovery. Compute RIA for the planned escape corridor. The escape corridor is defined as a 10NM wide corridor, starting at the planned roll out point and extending for 8NM along the egress heading. The MSA is 1,000 feet above the highest obstacle within the corridor, rounded up to the nearest 100 feet.

A13.30.2. Following release, roll to 120-135 degrees of bank and execute a 4-5G slicing turn. As the nose passes the horizon, decrease bank angle to 90 degrees and continue to decrease bank angle to keep the nose from dropping lower than 10 degrees nose low. Roll out on egress heading or upon reaching 10 degrees nose low and follow TF steering when it appears. If approaching RIA before rolling out, or before TF steering appears, pull to recover at or above MSA.

A13.30.3. Prior to loft deliveries, aircrews must verify accuracy of the standby ADI with the Electronic Attitude Director Indicator (EADI).

A13.30.4. If the TF system fails during recovery, maintain the appropriate minimum altitude (RAA/MSA) that provides terrain clearance.

A13.30.5. If at any time during a low altitude, nose-high LANTIRN weapons delivery (loft) or recovery, airspeed drops below 300 KCAS, abort the maneuver and recover. Direct primary emphasis towards aircraft attitude, altitude and regaining airspeed.

Section A13G—Abnormal Operating Procedures

A13.31. General. Follow the procedures in this chapter when other than normal circumstances occur. These procedures do not supersede flight manual guidance.

A13.32. Over-G Procedures.

A13.32.1. If an aircraft experiences an over-G, use the following procedures:

A13.32.2. Non-OWS equipped aircraft and OWS equipped aircraft whose OWS is not operational will terminate the mission and land as soon as practical from a straight-in approach.

A13.32.3. Aircraft equipped with an operable OWS system will immediately terminate maneuvering and call up the OWS matrix:

A13.32.4. If level "1" (one) is displayed in any column of the matrix except Mass Items (MIT), perform a battle damage check. If no abnormalities are noted, the flight lead may continue the briefed mission. If a subsequent level "1" or greater over-G occurs, terminate the mission, perform a battle damage check, RTB and fly a straight-in approach.

A13.32.5. If level "1" (one) is displayed in the MIT column, or level "2" (two) or greater is displayed in any column of the matrix, terminate the mission, perform a battle damage check, RTB and fly a straight-in approach.

A13.32.6. Document over-Gs (level 1 or greater) in the AFTO Form 781.

A13.33. Radio Failure:

A13.33.1. General. Individual aircraft experiencing radio failure will comply with procedures outlined in FLIP, AFI 11-202V3, this volume, and local directives.

A13.33.2. Surface Attack NORDO Procedures:

A13.33.2.1. Attempt contact with the RCO on the appropriate back-up frequency. If unable to establish contact, make a pass by the range control tower (over the target if flying on an unmanned range) on the attack heading while rocking wings, and turn in the direction of traffic. The flight leader will either rejoin the flight and RTB, or direct another flight member to escort the NORDO to a recovery base.

A13.33.2.2. If the NORDO aircraft has an emergency, make a pass by the range control tower, if practical, on the attack heading while rocking wings, turn opposite the direction of traffic, and proceed to a suitable recovery base. The flight leader will direct a flight member to join-up and escort the emergency aircraft.

A13.33.3. Unexpended Ordnance. If radio failure occurs and circumstances preclude landing with unexpended ordnance, accomplish a safe jettison of the ordnance. The NORDO aircraft should joins on another flight member which has radio contact with the RCO and the remainder of the flight. Stores jettison visual signals specified in AFI 11-205 (hold fist at top of canopy and make several pumping motions) are relayed to the NORDO aircraft to initiate jettison.

A13.34. Severe Weather Penetration. Avoid flight through severe weather. If unavoidable, flights should break-up and obtain separate clearances prior to severe weather penetration.

A13.35. Lost Wingman Procedures.

A13.35.1. Refer to paragraph 7.9 for specific spatial disorientation (SD) considerations. Smooth application of control inputs is imperative to minimize the effects of SD.

A13.35.2. After executing a lost wingman procedure, do not attempt rejoining with the flight until obtaining permission from the flight lead.

A13.35.3. NORDO aircraft will turn the IFF/SIF to NORMAL code 7600 while proceeding with previous clearance. If an emergency situation arises along with radio failure, turn the IFF/SIF to EMERGENCY for the remainder of the flight.

A13.36. In-flight Practice of Emergency Procedures.

A13.36.1. A Simulated Emergency Procedure is defined as any procedure that produces an effect which closely parallels an actual emergency, such as retarding the throttle to simulate the drag equivalent to a flamed out engine.

A13.36.2. Practice aborted takeoffs only in the flight simulator, Cockpit Procedures Trainer (CPT), or, a static aircraft.

A13.36.3. Simulated in-flight loss of both engines and practice in-flight engine shutdown is prohibited unless part of a syllabus for a formal training course such as TPS. (N/A for FCF profiles.)

A13.36.4. Emergency Landing Patterns (Refer to AFI 11-202V3). Include the type of practice emergency pattern if appropriate in the gear check call.

Attachment 14

F-16 OPERATING PROCEDURES

Section A14A—General Information

A14.1. Scope. This attachment outlines the procedures applicable to the safe operation of the F-16. With the complementary references cited, this volume prescribes standard operational procedures to be used by all AFMC F-16 pilots and AFMC operated F-16s.

A14.2. References. The primary references for F-16 operations are T.O.s 1F-16-1, 1F-16-1-1, 1F-16-1-2, 1-1C-1, 1-1C-1-30, AFTTP 3-1V5, Tactical Employment--F-16; AFTTP 3-3V5, Combat Aircraft Fundamentals--F-16; AFI 11-214, *Aircrew, Weapons Director, and Terminal Attack Controller Procedures for Air Operations*; and this volume. Training units may develop phase manuals from the procedures contained in these documents. Phase manuals may be used to augment initial and mission qualification training at assigned units. Phase manuals may expand these basic procedures; in no case will they be less restrictive.

Section A14B—Mission Planning

A14.3. Map Coordinates. Map coordinates recorded on the Mission Data Card will be cross-checked by at least one other flight member prior to stepping to the aircraft. Bearing and range will be computed from the end of runway to each checkpoint and verified prior to takeoff.

A14.4. Takeoff and Landing Data.

A14.4.1. Compute a 2,000 foot acceleration check speed anytime the computed takeoff roll exceeds 2,500 feet. When the computed takeoff roll is 2,500 feet or less, use the actual takeoff distance versus the computed takeoff distance to evaluate aircraft performance.

A14.4.2. Minimum Takeoff and Landing Data (TOLD) requirements on Mission Data Cards are: acceleration check speed, refusal/maximum abort speed (dry/wet), rotation speed, takeoff speed and distance, and normal and heavyweight (landing immediately after takeoff) landing speeds and distances (dry/wet).

Section A14C—Normal Operating Procedures

A14.5. Preflight.

A14.5.1. (B/D model aircraft) When the rear cockpit is occupied by other than a fully qualified F-16 pilot, the stick control switch will be placed in the FWD position.

A14.5.2. Baggage/equipment will not be carried in the avionics bay behind the cockpit or in the aft canopy fixed transparency area (turtle back).

A14.5.3. Baggage/equipment will not be carried in an unoccupied F-16B/D rear cockpit.

A14.5.4. Objects will not be placed in or on top of the engine intake.

A14.5.5. Publications, maps and personal items placed in the cockpit will be secured to avoid flight control/ throttle interference.

A14.5.6. Pilots will wear Combat Edge (CE) equipment (if fitted) on any mission where planned/ anticipated maneuvering equals or exceeds 6.0 Gs.

A14.5.7. Pilots will ensure the ejection seat survival kit deployment switch is in the automatic position. Notify maintenance if the switch is found in manual position.

A14.5.8. The CAT III position of the Stores Configuration Switch will be selected when the aircraft is configured with a Category III loading IAW T.O. 1F-16-1-2.

A14.5.9. In addition to the requirements in AFI 11-202V3, *General Flight Rules*, and Flight Information Publications (FLIP), the following equipment will be operative for all flights: TACAN, INS, IFF/ SIF Modes 3A and C, Pitot/Angle-of-Attack Probe Heat, Standby Attitude Indicator, and Anti-G System.

A14.6. Ground/Taxi Operations.

A14.6.1. Ice FOD Procedures. The following procedures apply when the conditions in T.O. 1F-16-1 indicate engine damage due to icing is possible.

A14.6.1.1. If conditions warrant, the Supervisor of Flying (SOF)/Top 3 will have the first flight lead start 5 minutes early to check for inlet ice formation.

A14.6.1.2. Position ANTI ICE switch to ON prior to engine start.

A14.6.1.3. An ice FOD monitor must be available to monitor the engine inlet for ice buildup whenever the aircraft is stopped for an extended period of time (i.e. ramp/shelter and EOR). While taxiing, avoid unnecessary stops en route to EOR. If possible, remain at ramp/shelter until traffic delays are eliminated. Avoid standing water and snow/slush accumulations. When pulling into the arming area, attempt to stop the aircraft over an area clear of water, ice, or snow.

A14.6.1.4. Hold in the arming spot with an ice FOD monitor present until cleared for takeoff.

A14.6.1.5. Shutdown immediately if icing is visually detected and notify the SOF/Top 3. Make an appropriate entry in the aircraft forms. A qualified crew chief should accomplish an intake inspection prior to restarting the engine.

A14.6.2. Quick Check and Arming. Place hands in view of ground personnel while the quick check inspection and/or arming/dearming are in progress. If the intercom system is not used during EOR checks, the pilot will establish and maintain visual contact with the maintenance team chief and/or weapons load chief to facilitate the use of visual signals.

A14.6.2.1. EOR inspections will be accomplished immediately prior to takeoff at a designated location, usually near the end of the runway (not required for quick reaction alert scrambles). At non-USAF bases, make every attempt to coordinate an EOR inspection with the host maintenance unit.

A14.6.3. EPU Check. Pilots will ensure that maintenance technicians do not approach the aircraft until the EPU check is complete. Use a "thumbs up" signal or the intercom to indicate when it is safe.

A14.7. Before Takeoff Checks. After the "Before Takeoff Checks" have been completed and prior to takeoff, all flight members will inspect each other for proper configuration and any abnormalities.

A14.8. Takeoff.

A14.8.1. Do not takeoff when the RCR is less than 12.

A14.8.2. Make an afterburner takeoff anytime the computed MIL power takeoff roll exceeds 50 percent of the available runway.

A14.8.3. When centerline stores are carried, start the takeoff roll beyond a raised approach end cable, unless runway length, runway conditions (wet/icy), winds, gross weight or cable availability dictate otherwise.

A14.8.4. Aircraft configured with a centerline fuel tank may takeoff across approach end BAK-12 arrestment cables which are tied down with an 8-point system. If the tie-downs are not inspected and maintained properly, cable slap and damage to the centerline fuel tank could occur.

A14.9. Maneuvering Parameters.

A14.9.1. The following are the minimum altitudes for the prescribed maneuvers.

A14.9.1.1. Confidence Maneuvers/Advanced Handling - 10,000 feet AGL, except dive recovery maneuver (15,000 feet AGL minimum entry altitude).

A14.9.1.2. Horn Awareness and Recovery series numbers 1, 2 and 3 - 10,000 feet AGL.

A14.9.1.3. Horn Awareness and Recovery series numbers 4 and 5 - 15,000 feet AGL.

A14.9.1.4. Aircraft will not descend below 5,000 feet AGL during any portion of aerobatic maneuvering.

A14.9.2. Flight through wingtip vortices/jetwash should be avoided. If unavoidable, the aircraft should be unloaded immediately to approximately 1 G.

A14.9.3. Do not manually extend the trailing edge flaps in an attempt to improve aircraft performance. **EXCEPTION:** Trailing edge flaps may be manually extended during intercepts on targets traveling at less than 200 KIAS to allow night vision goggle (NVG) IDs at night in VMC.

A14.9.4. Do not attempt to bypass flight control limiters to improve performance. Examples are: fuel transfer to alter center of gravity (CG), use of the manual pitch override (MPO) to gain additional negative G or unloading/applying full rudder then rolling and reapplying full aft stick at low airspeed.

A14.9.5. The minimum airspeed for all maneuvering is based upon activation of the low speed warning tone. When the low speed warning tone sounds, the pilot will take immediate action to correct the low speed condition.

A14.9.6. The following is guidance for Horn Awareness and Recovery Training Series (HARTS):

A14.9.6.1. HARTS maneuvers will be flown IAW AFTTP 3-3V5.

A14.9.6.2. HARTS maneuvers will be flown in CAT-1 loaded aircraft only.

A14.9.6.3. In F-16 C/D Block 40/42 aircraft, HARTS maneuvers 4 and 5 will only be performed with any one of the following configuration combinations: Clean, 300 gallon centerline tank, MAU-12s on stations 3 and 7, and/or AIM-9/AMDs on stations 1 and/or 9.

A14.10. Seat Belts. Pilots should use extreme caution when unstrapping their lapbelts inflight.

A14.11. Change of Aircraft Control. Both pilots of an F-16B/D must know at all times who has control of the aircraft. Transfer of aircraft control will be made with the statement such as "You have the aircraft," or “Your jet.” The pilot receiving control of the aircraft will acknowledge with a statement such as "I have the aircraft" or “My jet.” Once assuming control of the aircraft, maintain control until relinquishing it as stated above. **EXCEPTION:** If the intercom fails, the pilot in the front cockpit (if not in control of the aircraft) will rock the wings and assume control of the aircraft, radios and navigational equipment unless prebriefed otherwise.

A14.12. General Low Altitude Procedures.

A14.12.1. Low level formation positions/tactics will be flown using AFTTP 3-1V5 and AFTTP 3-3V5 as guides.

A14.13. LANTIRN Operations.

A14.13.1. Minimum Altitude. The minimum altitude for LANTIRN training will be the higher of VR/IR/MOA minimum altitude or pilot minimum altitude as certified by the unit commander.

A14.13.2. Vision Restriction Device (VRD) Restrictions:

A14.13.2.1. VRDs will only be worn while conducting LANTIRN low-level training and LANTIRN weapon deliveries.

A14.13.2.2. When a VRD is in use, a safety observer must be present. A safety observer is defined as a crewmember qualified in that aircraft in the rear cockpit of a two-place aircraft or another aircraft flying in the chase position (as defined in paragraph A14.3.11.). The chase aircraft must maintain continuous visual contact and have two-way radio communication between aircraft.

A14.13.2.3. All restrictions in AFI 11-202V3 apply. When a VRD is in use with the safety observer in the rear cockpit, pilots are restricted to the same altitude and procedures they are cleared to for night LANTIRN operations.

A14.13.3. Operational Procedures. All procedures in AFI 11-214 apply:

A14.13.3.1. Terrain following is prohibited after any alignment other than a full performance INS ground alignment or extended interrupted alignment with a flashing RDY/ALIGN (status 10) displayed.

A14.13.3.2. TFR/LANTIRN systems will be inflight checked using flight manual procedures on every flight involving TFR/LANTIRN operations.

A14.13.3.3. Pilots must ensure all LANTIRN systems are functioning properly prior to sustained low-level operations. If any feature that is critical to overall system performance - Flight Control System (FLCS), INS, Combined Altitude Radar Altimeter (CARA) - is questionable or disabled, the checks and/or LANTIRN portion of the mission will be discontinued. All pilots will confirm by radio call that the TFR and radar altimeter are on and working properly before descending below the MSA; "(Call Sign), RALT ON, TFR ON."

A14.13.3.4. The LANTIRN Attitude Advisory Function (LAAF) must be operational and set at the IP to TGT run-in MSA plus 5,000 feet for all night, self-designated laser-guided bomb (LGB) Loft deliveries.

A14.13.3.5. For TFR/LANTIRN operations, the ALOW feature of the CARA will be set no lower than 90 percent of the set clearance plane (SCP). The CARA may be placed to standby or off only during air refueling operations. Pilots need to ensure the CARA is tracking properly when descending through 4,500 feet AGL.

A14.13.3.6. Minimum airspeed for TFR navigation is 400 KCAS.

A14.13.3.7. During descent, pilots will accomplish a 1,000 foot SCP level off prior to selecting a lower SCP.

A14.13.3.8. Pilots will not conduct LANTIRN operations in IMC below the MSA and must abide by FLIP weather minimums while on military training routes.

A14.13.4. Abnormal Operation:

A14.13.4.1. Pilots who experience failure of the terrain following system or failure of the LANTIRN HUD/FLIR imagery system while flying low-level missions will immediately climb to the MSA or above. The mission may be continued at the MSA within the low-level structure provided the aircraft position is known. If aircraft position cannot be positively determined, pilots will terminate that portion of the mission and execute route abort procedures.

A14.13.4.2. If the TFR/LANTIRN system fails prior to route entry, pilots may still enter the route and continue the mission at the MSA, provided the above provisions are met.

A14.13.4.3. Pilots will honor all system fly-ups and will not continue low-level operations below the MSA without TFR protection. The following procedures will be used at the first indication of a fly-up (pilots need only accomplish sufficient steps of the fly-up procedure to assure terrain clearance or until the fly-up terminates/clears):

A14.13.4.3.1. Allow the fly-up to develop. CAUTION: If an automatic fly-up is not initiated by the system and aural or visual pull-up warnings are present, pilots will manually initiate a fly-up and comply with these procedures.

A14.13.4.3.2. Throttle - As required. CAUTION: Military Power may be required to maintain a safe airspeed. Do not hesitate to use AB if required.

A14.13.4.3.3. When terrain clearance ensured, Paddle Switch - Depress and release. CAUTION: Holding the paddle switch depressed inhibits fly-up commands to the FLCS.

A14.13.4.3.4. If the system does not reset:

A14.13.4.3.4.1. Climb to MSA. CAUTION: Using climb angles greater than 20 degrees can result in rapid airspeed bleed off. The use of AB and/or steep climb angles can result in spatial disorientation.

A14.13.4.3.4.2. Level off at or above MSA and refer to checklist (if required).

A14.13.4.3.4.3. If the malfunction can be reset, pilots may continue TFR operations.

A14.14. Night Operational Procedures.

A14.14.1. Align the upper wingtip light below the canopy position (formation) light. Stabilize, then move forward until the canopy position (formation) light, bottom formation light, and the position light on the engine inlet almost form an equilateral triangle.

A14.14.2. Align vertically so that the wingtip light is approximately equidistant between the top and bottom formation lights. Another vertical reference is to fly so that the tail, wingtip, and position lights are in a straight line.

A14.14.3. Align laterally so that the wingman's head is abeam the tail flood light. Avoid fixation on any one light or reference point to help reduce spatial disorientation.

A14.15. Fuel Requirements.

A14.15.1. Normal Recovery Fuel. The fuel on initial or at the FAF at the base of intended landing or alternate, if required. This fuel quantity will be the higher of what is established locally or:

A14.15.2. All F-16 Blocks 10 through 32 - 1,000 pounds.

A14.15.3. All F-16 Blocks 40 and higher (LANTIRN or HTS equipped) - 1,200 pounds.

A14.15.4. Minimum/Emergency Fuel. Declare the following when it becomes apparent that an aircraft will enter initial or start an instrument final approach at the base of intended landing or alternate, if required, with:

A14.15.5. Minimum Fuel:

A14.15.6. All F-16 Blocks 10 through 32 - 800 pounds or less.

A14.15.7. All F-16 Blocks 40 and higher (LANTIRN or HTS equipped) - 1,000 pounds or less.

A14.15.8. Emergency Fuel:

A14.15.9. All F-16 Blocks 10 through 32 - 600 pounds or less.

A14.15.10. All F-16 Blocks 40 and higher (LANTIRN or HTS equipped) - 800 pounds or less.

A14.15.11. Afterburner Use. Do not use AB below 2,000 pounds total fuel or established bingo fuel, whichever is higher, unless required for safety of flight.

A14.16. Overhead Traffic Patterns.

A14.16.1. Overhead patterns can be made with unexpended practice ordnance and unexpended live forward firing ordnance.

A14.16.1.1. Normally, overhead traffic patterns will not be flown with live, unexpended free-fall ordnance.

A14.16.2. Initiate the break over the touchdown point or as directed.

A14.16.3. The break will be executed individually in a level 180 degree turn to the downwind leg at minimum intervals of 5 seconds (except IP/FE chase or when in tactical formation).

A14.16.4. Aircraft will be wings level on final at approximately 300 feet AGL and 1 mile from the planned touchdown point.

A14.17. Tactical Overhead Traffic Patterns. Tactical entry to the overhead traffic pattern is permitted if the following conditions are met:

A14.17.1. Published overhead pattern altitude and airspeed will be used.

A14.17.2. Specific procedures will be developed locally and coordinated with appropriate air traffic control agencies.

A14.17.3. Four aircraft are the maximum permitted. Aircraft/elements more than 6,000 feet in trail will be considered a separate flight.

A14.17.4. Regardless of the formation flown, no aircraft should be offset from the runway in the direction of the break. The intent is to avoid requiring a tighter than normal turn to arrive on normal downwind.

A14.17.5. Normal downwind, base turn positions, and spacing will be flown.

A14.18. Use of Altimeters.

A14.18.1. General. For those aircraft so equipped, the radar altimeter will be on for all flights. LIS (Line in the Sky) altitude advisory will be used for those missions that are conducive to spatial disorientation (night/IMC) or where minimum altitudes must be observed (ACBT floors).

A14.18.2. Non-TFR Operations. Set the ALOW function of the radar altimeter at either the briefed minimum altitude or the command-directed minimum altitude, whichever is higher.

A14.18.3. TFR Operations. Set the ALOW function of the radar altimeter on and no lower than 90 percent of the briefed minimum altitude or 90 percent of the command-directed minimum altitude, whichever is higher.

Section A14D—Instrument Procedures

A14.19. Instrument Approach.

A14.19.1. The F-16 is Approach Category E. Missed approach will be accomplished in accordance with flight manual procedures. Missed approach airspeed is 200-250 KIAS.

A14.19.2. Approach Category D minimums may be used at an emergency/divert airfield where no Category E minimums are published. Airfields with Category D minimums may be designated as an alternate (divert) airfield. Further, practice instrument approaches may be flown using Category D minimums if VMC can be maintained throughout the procedure. Under these circumstances, Approach Category D minimums may be used provided:

A14.19.2.1. A straight-in approach is flown.

A14.19.2.2. The aircraft is flown at a final approach airspeed of 165 KIAS or less.

A14.19.2.3. The aircraft is flown at 255 KTAS or less for the missed approach segment of the approach. At high pressure altitudes and temperatures, 255 KTAS may not be compatible with published missed approach airspeeds and Category D approaches should not be flown.

A14.19.3. F-16s are approved to use INS/GPS only for en route point to point (Lat/Long) Area Navigation (RNAV). The en route navigation period may not exceed one and one half (1.5) hours

between INS updates. An update is defined as establishing a positive position using visual references or onboard systems. Do not fly RNAV approaches.

A14.19.4. GPS approaches are not approved for USAF F-16 aircraft.

A14.20. Use of the Heads Up Display (HUD).

A14.20.1. In all F-16 Block 25/30/32 aircraft and Block 40/50 aircraft with Operational Flight Program (OFP) 40T5/50T4 (TV Code 117/115) and later OFPs, the HUD may be used as a primary instrument reference in night/IMC conditions. Do not use the HUD to recover from an unusual attitude or while executing lost wingman procedures except when no other reference is available.

A14.20.2. For all other F-16 Blocks and OFPs, the HUD may be used as an additional instrument reference in night/IMC conditions; however, it will not be used as the sole instrument reference in these conditions. Do not use the HUD to recover from an unusual attitude or executing lost wingman procedures except when no other reference is available.

A14.21. Airborne Radar Approach (ARA).

A14.21.1. ARA Planning:

A14.21.1.1. ARAs will be processed IAW AFI 11-230, *Instrument Procedures*.

A14.21.1.2. ARA minimums will be no lower than ASR or TACAN minimums, whichever is higher.

A14.21.1.3. IMC ARAs will only be flown in emergency situations or when the conditions in paragraph A14.4.9.1.4. are met.

A14.21.1.4. Approved ARAs may be practiced when weather is at or above ARA minimums (as depicted on the ARA approach plate) provided ground radar traffic advisories are available and utilized during the approach or a navigational aid (TACAN/ILS) is operational and monitored by the pilot during the approach. If a navigational aid or ground radar is not available, ARAs will not be practiced unless weather is at or above 1,500 foot ceiling and 3 miles visibility.

A14.21.2. ARA Procedures.

A14.21.2.1. Approval for the practice approach will be obtained from the controlling agency prior to commencing the approach. The pilot will request IFR separation with radar flight following.

A14.21.2.2. Fly to intercept the penetration heading prior to the fix, with no more than a 60 degree turn to penetration heading, if possible.

A14.21.2.3. Begin the penetration when over the fix, descend and level off at the altitude specified for approach, or at 2,000 feet AGL, whichever is higher.

A14.21.2.4. Identify the airfield on the radar scope and decrease radar range selection to keep the airfield near the center of the scope.

A14.21.2.5. If the runway or reflectors cannot be defined, continue the approach by estimating the runway location in relation to the radar returns from the airfield.

A14.21.2.6. Approximately 10 miles from the runway, descend to 1,500 feet AGL or local pattern altitude as specified.

A14.21.2.7. At 5 miles from the runway, begin descent to the MDA or local pattern altitude, as specified. Descend so as to reach the MDA prior to the MAP.

A14.21.2.8. Missed approach procedures will be as directed/published.

Section A14E—Air-To-Air Weapons Employment

A14.22. References. AFI 11-214 contains air-to-air procedures, to include operations with live ordnance (air-to-air-missiles), applicable to all aircraft. This chapter specifies additional procedures or restrictions which are applicable to F-16 operations.

A14.23. Simulated Gun Employment. The gun is considered SAFE and simulated gun employment is authorized if the following conditions are met:

A14.23.1. Preflight. Accomplished IAW DASH-34 Cold Gun (SAFE) Procedures.

A14.23.2. In-Flight. A trigger check must be performed with the Master Arm switch in SIMULATE and the aircraft pointed away from other aircraft and inhabited areas. If HUD symbology reads "ARM" or SMS/MFD symbology reads "RDY," do not depress the trigger or continue with simulated weapons employment. Regardless of Master Arm switch position, do not perform a trigger check with a "hot" gun.

A14.24. Maneuvering Limitations.

A14.24.1. Negative "G" guns jink-out maneuvers are prohibited.

A14.24.2. Minimum airspeed during low altitude offensive or defensive maneuvering is 350 KIAS.

A14.24.3. All CAT 1 configurations are authorized for unlimited maneuvering, as defined by AFI 11-214.

A14.24.4. Continuation training high-aspect BFM Training: A dedicated "fighter" and "training aid" must be clearly identified for each engagement. The "fighter" will have some kind of advantage (power, G available, lead turn advantage at the merge). Syllabus (MQT/FLUG/IPUG) high-aspect BFM will be conducted IAW the appropriate syllabus.

Section A14F—Air-To-Surface Weapons Employment

A14.25. References. AFI 11-214 contains air-to-surface procedures applicable to all aircraft. This chapter specifies procedures or restrictions applicable to F-16 operations. Qualification and scoring criteria are contained in AFI 11-2F16V1.

A14.26. Off-Range Attacks. With expendable stores (bombs, external fuel tanks, TERs carted at the pylon, etc) loaded on the aircraft, simulated weapons will be loaded (zero quantity) in the SMS/MFD only on empty or uncarted/unexpendable stations. **EXCEPTION:** When loaded, captive Maverick and HARM missiles may be selected. The Master Arm switch will be confirmed in OFF or SIMULATE prior to the first attack.

A14.27. Pop-Up Attacks. Abort pop-up attacks if airspeed decreases below 350 KIAS (300 KIAS above 10,000 feet AGL).

A14.28. Night Weapons Delivery/Range Operations. All procedures in AFI 11-214 apply.

A14.28.1. Compute a MSA for the entire bombing pattern.

A14.28.2. Do not exceed 135 degrees of bank when returning to the low altitude structure following practice/actual night weapons deliveries.

A14.28.3. For non-LANTIRN (non-TFR) missions, the minimum altitude for night weapons delivery is 2,000 feet AGL.

A14.29. LANTIRN Weapons Delivery/Range Operations. All procedures in AFI 11-214 apply.

A14.29.1. If CARA ALOW and/or LIS altitude advisory warnings are used for altitude cues on medium altitude weapons deliveries, care must be taken to reset them as appropriate when descending into the low-level structure.

A14.29.2. The pilot will perform no duties (i.e., adjusting designation cursor on targeting pod) other than maintaining aircraft control from the initial pull-up during the performance of a night weapons delivery. During safe escape maneuver or during a night climbing delivery which employs a descent back to low altitude, pilots will focus solely on aircraft control until the aircraft is recovered back within TFR limits and TFR indications are adequate to continue safe low altitude operations.

A14.30. Strafe Procedures. To prevent accidental gun firing, pilots will not squeeze the trigger to the first detent, i.e. to turn the camera on, until they actually intend to fire the gun. This restriction only applies when the gun is armed and selected.

Section A14G—Abnormal Operating Procedures

A14.31. General. Follow the procedures in this chapter when other than normal circumstances occur. These procedures do not supersede procedures contained in the flight manual.

A14.31.1. Do not fly an aircraft with a tripped engine monitoring system (EMS) Go-No-Go indicators (Bit Balls) until it has been approved or cleared by maintenance. Verify that the appropriate technical order fault tree analysis has been accomplished.

A14.31.2. Do not taxi an aircraft with nosewheel steering, brake system, or generator malfunctions/fail-ures. F-16C/D aircraft may be taxied with a single generator failure (main or standby) if the other generator is operating normally.

A14.31.3. Do not fly an aircraft at night or in IMC if the INS dumps during the EPU check and an INS battery warning PFL/MFL has occurred (F-16A/B: INS 026; F-16C/D: INS BATT WARN/INS 029). Although Block 50/52 aircraft do not have an inertial navigation unit (INU) battery, the PFL/MFL may indicate impending aircraft battery failure, therefore, the above procedures are still valid.

A14.31.3.1. Perform an EPU check after INS alignment, if a PFL/MFL has occurred.

A14.31.4. Once a malfunctioning aircraft system is isolated, that system will not be used again unless its use in a degraded mode is essential for recovery. Do not conduct ground or in-flight trouble-shooting after flight manual emergency procedures are completed.

A14.31.5. In the F-16B/D, the pilot in command is primarily responsible for handling in-flight emergencies. The additional pilot will confirm that all critical action procedures have been accomplished and will provide checklist assistance at the request of the pilot in command.

A14.32. Takeoff Aborts.

A14.32.1. When aborting above 120 KIAS, or hot brakes are suspected, declare a ground emergency. Taxi the aircraft to the designated hot brake area and follow hot brake procedures.

A14.32.2. If aborting at or above 100 knots, lower the hook. If aborting below 100 knots, the tailhook should be lowered if there is any doubt about the ability to stop on the remaining runway.

A14.33. Radio Failure.

A14.33.1. Failure to Release/Hung Ordnance. If ordnance fails to release when all appropriate switches are set, proceed as follows.

A14.33.2. Hung Live Ordnance or Aircraft Malfunction which Precludes Further Live Weapons Delivery:

A14.33.2.1. All release and fuzing switches should be noted then safed.

A14.33.2.2. Attempt to release store(s) using an alternate delivery mode. If unsuccessful, attempt to jettison store(s) using selective jettison procedures. Lastly, consider attempting to selectively jettison the rack if ordnance is unsecure or security cannot be determined.

A14.33.2.3. If ordnance remains on the aircraft, follow the hung ordnance recovery procedures.

A14.33.3. Practice/Inert Ordnance:

A14.33.3.1. Re-check switch positions and make an additional attempt to expend. If no release occurs, select an alternate delivery mode in an attempt to expend.

A14.33.3.2. If the secondary release mode fails, ordnance from other stations/dispensers may be released providing the aircraft will remain within symmetrical load limits.

A14.33.3.3. If remaining stores present a recovery hazard, jettison in a suitable area on a single pass, if practical.

A14.33.3.4. If ordnance remains on the aircraft, follow the hung ordnance recovery procedures.

A14.34. Hangfire/Misfire.

A14.34.1. A missile that fires but fails to depart the aircraft is a hangfire. If this occurs, the missile should be closely observed and safety checked by a chase pilot.

A14.34.2. A missile that fails to fire when all appropriate switches were selected is a misfire. If this occurs, safe the Master Arm switch and follow the hung ordnance recovery procedures.

A14.34.3. MAVERICK Misfire. When a misfire occurs, safe the Master Arm switch and have the missile visually checked for smoke or fire. If either exists, the missile should be jettisoned on the range. If neither is noted, another pass may be attempted. If the second attempt fails, remain dry in the pattern for 15 minutes, if able, and proceed to the recovery base following hung ordnance recovery procedures.

A14.34.4. Hung Ordnance/Weapons Malfunction Recovery:

A14.34.4.1. Visually inspect the aircraft for damage, if practical.

A14.34.4.2. Declare an emergency (not required for hung practice/inert ordnance or for live unexpended ordnance).

A14.34.4.3. Obtain a chase aircraft (if available - N/A at night) and avoid populated areas and trail formations.

A14.34.4.4. Land from a straight-in approach.

A14.35. Miscellaneous Procedures.

A14.35.1. Pilots will not attempt to expend ordnance using a delivery system with a known weapons release malfunction.

A14.35.2. When abnormal missile launch or erratic missile flight is noted after launch, the launching aircraft will be visually inspected (if possible) by another pilot to determine if any damage has occurred.

A14.36. Post Arresting Gear Engagement Procedures.

A14.36.1. Do not shut down the engine unless fire/other conditions dictate or directed to do so by the arresting gear crew.

A14.36.2. Raise the tailhook on the signal from the arresting crew.

A14.36.3. Do not taxi until directed to do so by the arresting gear crew.

A14.36.4. Further procedures will be conducted IAW local unit directives (if applicable).

A14.37. In-flight Practice of Emergency Procedures.

A14.37.1. Simulated Emergency Procedure. Any procedure that produces an effect which would closely parallel the actual emergency, such as retarding the throttle to the degree which produces a drag equivalent to a flamed out or idle engine.

A14.37.2. Aborted Takeoff Practice. All practice and/or training related to aborted takeoffs will be accomplished in the flight simulator, Cockpit Familiarization Trainer (CFT) or (if trainer unavailable) a static aircraft.

A14.37.3. Prohibited. Practice in-flight engine shutdown is prohibited.

A14.37.4. Emergency Landing Patterns/Simulated Flameout (SFO). Refer to AFI 11-2FT Vol 3, chap 9.

A14.37.4.1. Field Requirements. Practice of SFO/emergency landing patterns at active airfields is authorized provided that crash rescue and either an active tower or a ROM (or equivalent) is available and in operation.

A14.38. SFO Procedures.

A14.38.1. SFO training will be accomplished in Day/VMC conditions only.

A14.38.2. Specific procedures for conduct of SFO training will be established in letters of agreement with appropriate agencies and published in the unit supplement to this volume.

A14.38.3. The SFO pattern may be entered from any direction or altitude that will ensure the aircraft is properly configured prior to 2,000 feet AGL and in a position to safely complete the approach.

A14.38.4. An SFO will not be initiated or continued if a potential traffic pattern conflict exists which would require that the pilot divide attention between the SFO and sequencing with traffic. In addition, SFOs should be discontinued whenever excessive maneuvering is required, whether as a result of a traffic conflict or when making required/perceived corrections. Once discontinued, a go-around will be initiated and no attempt will be made to re-enter/complete that pattern/approach.

A14.38.5. Radio Calls. Calls will be made IAW local agreements or procedures.

A14.38.6. SFOs will not be flown on incentive rides.

A14.38.7. SFOs can be flown to a low approach or touchdown.

Attachment 15

F-117 OPERATING PROCEDURES

Section A15A—General Information

A15.1. Introduction.

A15.1.1. Pilot's Responsibility. This attachment, in conjunction with other governing directives, prescribes procedures for F-117 aircraft under most circumstances, but is not to be used as a substitute for sound judgment or common sense. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment

Section A15B—Mission Planning

A15.2. Fuel Planning. Plan to land with no less than 2,000 pounds fuel remaining (minimum fuel). If landing is expected to occur with less than 1,500 pounds of usable fuel, declare an emergency to ensure traffic priority (emergency fuel).

Section A15C—Normal Operating Procedures

A15.3. Takeoff.

A15.3.1. Takeoff/Runway Limitations. Abort airspeeds will be computed based on using the aircraft drag chute. No takeoff will be attempted if the single engine speed is greater than the takeoff speed or if the takeoff speed is greater than the maximum abort speed. (Single engine speed will be defined as that speed required for the aircraft to maintain level flight with landing gear up and a zero rate of climb.)

A15.3.2. Intersection Takeoffs. Intersection takeoffs are not authorized.

A15.3.3. Takeoff Interval/Formation Takeoffs. Standard takeoff interval between two F-117A aircraft or an F-117A and a dissimilar chase aircraft is 20 seconds. Formation takeoffs are not authorized.

A15.4. Inflight.

A15.4.1. Maneuver Descriptions. Acrobatic and advanced handling maneuvers will be flown using the parameters listed in Table A15.1.

A15.4.1.1. Lazy-8. Begin the maneuver in level flight. Attain +20 degrees of pitch at 45 degrees of turn, 0 degree of pitch and 90 degrees of bank at 180 degrees of turn, -20 degrees of pitch at 135 degrees of turn, and wings level at 180 degrees of turn.

Table A15.1. Maneuver Descriptions.

Maneuver	Entry	Power Setting
Lazy-8	350-400 KCAS	90% - Mil
Chandelle	425 KCAS	90% - Mil
Aileron Roll	>300 KCAS	As Desired
Loop	450 KCAS - aircraft limits	Mil
Cuban 8	450 KCAS - aircraft limits	Mil
Immelman	450 KCAS - aircraft limits	Mil
Split-S	200-230 KCAS, 15,000 ft AGL min entry	As Desired
Barrel Roll	300-400 KCAS	>85%
AOA Limiter	250 and 350 KCAS, 10,000 ft AGL min entry	Mil

A15.4.1.2. Chandelle. Begin maneuver at -10 degrees of pitch. Execute climbing turn so as to reach +20 degrees of pitch at the 180 degree turn point. Unload to +0.5 g, and complete maneuver at 0 degrees of pitch.

A15.4.1.3. Aileron Roll. Begin the maneuver by pulling to +5 to +10 degrees of pitch.

A15.4.1.4. Loop. Begin maneuver with a wings level pull to a minimum of 4.5 gs. (If 4.5 gs cannot be attained, immediately discontinue the maneuver by accomplishing a nose-high recovery.) Intercept the on speed tone (9.5 AOA) over the top. Check for wings level and minimum airspeed of 170 KCAS at the apex. Maintain approximately 9.5 AOA until the entry g level is attained, then maintain that g until the maneuver is complete.

A15.4.1.5. Cuban-8. Begin maneuver with a wings level pull to 4.5 gs. (If 4.5 gs cannot be attained, immediately discontinue the maneuver by accomplishing a nose-high recovery.) Intercept the on speed tone (9.5 AOA) over the top. Check for wings level and minimum airspeed of 170 KCAS at the apex. When the nose is -45 degrees of pitch on the back side, perform an unloaded roll to wings level, and accelerate to entry speed for the second half of the Cuban-8.

A15.4.1.6. Immelman. Begin maneuver with a wings level pull to 4gs. Intercept the on speed tone (9.5 AOA) over the top. When the top of the HUD combining glass meets the horizon, check for minimum airspeed of 170 KCAS and perform an unloaded roll to level flight.

A15.4.1.7. Split-S. Raise the nose to approximately 5 degrees of pitch. Perform a 1g 180 degree roll. Pull to on speed (9.5 AOA) and intercept 4gs as speed increases. Use g as required to control airspeed as the nose passes through vertical.

A15.4.1.8. Barrel Roll. Perform a barrel roll so that the nose is not raised higher than 30 degrees above the horizon.

A15.4.1.9. AOA Limiter Confidence Maneuvers. Apply both rapid and smooth full aft stick applications to gain confidence in the positive AOA limiter. Use sufficient entry bank angle to prevent a nose-high low speed situation. Terminate the maneuver when airspeed reaches 200 KCAS or pitch attitude reaches 20 degrees (which ever occurs first). Unload to +0.5gs and return to level flight. Note maximum AOA attained, and pitch rate at the beginning and at the end of the maneuver.

A15.5. Mission Termination.

A15.5.1. Drag Chute Procedures. Take every reasonable precaution to jettison the drag chute with some headwind and minimal crosswind. Any sharp turn may cause aircraft damage due to riser/end cap interference, so avoid making sharp turns with the chute in tow.

Section A15D—Abnormal Operating Procedures

A15.6. Hung Stores Recovery Procedures. When a hung store situation is encountered and jettison is impractical or not advisable pilots will leave the weapons bay doors open for all but practice BDU-33 and MK-106 stores. Plan to fly a straight in to an active runway that will not place the aircraft over any populated areas. Pilots will declare an emergency for hung full-scale stores. After landing, pilots will clear the runway, if practical. Aircraft with BDU-33s or Mk-106s will taxi to parking and ensure the ground crew is aware of the possible hung store condition. Aircraft with full-scale munitions will shut down with maintenance support after clearing the runway.

Attachment 16

T-38 OPERATING PROCEDURES

Section A16A—General Information

A16.1. Responsibilities. This attachment, in conjunction with other governing directives, prescribes T/AT-38 procedures under most circumstances, but is not to be used as a substitute for sound judgment or common sense. The pilot in command (PIC) is ultimately responsible for the safe and effective operation of the aircraft.

A16.2. References. The primary references for T/AT-38 operations are Technical Order (T.O.) 1T-38A-1, *USAF Series T-38A* and AT-38B, *Flight Manual* and this instruction. Additional publications are available for reference and technique only and are not considered restrictive. These include MCMAN 11-238, Volume 1, (A)T-38 Flying Fundamentals; and MCMAN 11-238, Volume 2, (A)T-38 Mission Employment Fundamentals.

Section A16B—Mission Planning

A16.3. Local Aircrew Aids. Aircrew aids should be developed locally to support the unit mission. The contents of these aids will be at the discretion of the unit.

A16.4. Takeoff Requirements.

A16.4.1. Compute takeoff and landing data for all flights. MAJCOM approved tab data may be used when available.

A16.4.2. Do not takeoff in category II or Category III conditions, unless approved by the DFO or designated representatives.

A16.5. Pilots must take into consideration deviations from standard day temperatures at altitude when planning flights above FL300. The engine compressor stall/flameout susceptibility area chart will be consulted and flight will not be planned into the black stripped area.

Section A16C—Formation Procedures

A16.6. Formation Takeoff.

A16.6.1. Do not make a formation takeoffs when standing water, ice, slush, or snow is on the runway.

A16.6.2. If any aircraft in the formation is a student solo, minimum wingtip clearance on takeoff will be 50 feet.

A16.7. Formation landings are prohibited when:

A16.7.1. The runway is reported wet; or ice, slush, or snow is on the runway.

A16.7.2. Arresting gear tape connectors extend onto the runway surface at the approach end of 125-feet-wide runways.

A16.7.3. Landing with hung ordnance.

A16.7.4. The weather is less circling minimums.

Section A16D—Air To Air Employment

A16.8. References. AFI 11-214 contains air-to-air procedures applicable to all aircraft. This chapter specifies additional procedures or restrictions that are applicable to T/AT-38 operations.

A16.9. Maneuvering Limitations.

A16.9.1. Negative "G" guns jink-out maneuvers are prohibited.

A16.9.2. Minimum airspeed during low altitude offensive or defensive maneuvering (low altitude training [LOWAT]) is 350 KIAS.

A16.9.3. Minimum maneuvering airspeed during ACBT is 150 KIAS.

Section A16E—Low Level

A16.10. The minimum airspeed on low-level navigation routes is 300 KIAS.

A16.11. Low-level missions will be flown no lower than 500 feet AGL unless specified in the approved test plan or approved by the DFO.

Section A16F—Air To Surface Employment

A16.12. References. AFI 11-214 contains air-to-surface procedures applicable to all aircraft. This chapter specifies procedures or restrictions applicable to T/AT-38 operations.

A16.13. 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.

A16.14. Weather Minimums. Basic weather minimums established in AFI 11-214 apply. In no case will the ceiling be lower than 2,000 feet AGL for climbing or diving deliveries or 1,500 feet AGL for level deliveries.

A16.15. Popup Attacks. Abort popup attacks if airspeed decreases below 300 KIAS.

A16.16. Night Weapons Delivery and Range Operations. Night weapons delivery and range operations are prohibited.

A16.17. Armament System Malfunctions.

A16.17.1. Inadvertent Release:

A16.17.1.1. Record the switch positions at the time of inadvertent release and provide it to armament and safety personnel. Record the impact point, if known.

A16.17.1.2. Check the armament switches safe and do not attempt further release in any mode. Treat remaining stores as hung ordnance and obtain a chase aircraft during RTB, if practical.

A16.17.1.3. If remaining stores present a recovery hazard, jettison them in a suitable area on a single pass, if practical.

A16.17.1.4. Impound the aircraft upon landing.

A16.17.2. Failure to Release (or Hung Ordnance). If ordnance fails to release when all appropriate switches are set, proceed as follows:

A16.17.2.1. Verify the proper switch position.

A16.17.2.2. Recheck switch positions and make an additional attempt to expend.

A16.17.2.3. If remaining stores present a recovery hazard, jettison them in a suitable area on a single pass, if practical.

A16.17.2.4. If ordnance remains on the aircraft, follow the hung ordnance recovery procedures.

Section A16G—Instrument Procedures

A16.18. Approach Category.

A16.18.1. The T/AT-38 is approach category E. A missed approach will be accomplished in accordance with flight manual procedures.

A16.18.2. Approach category D minimums may be used at an emergency or divert airfield where no category E minimums are published if:

A16.18.2.1. A straight-in approach is flown.

A16.18.2.2. The aircraft is flown at a final approach airspeed of 165 KIAS or less.

A16.18.2.3. The aircraft is flown at 260 knots true airspeed (KTAS) or less for the missed approach segment of the approach. (**NOTE:** At high pressure altitudes and temperatures, 260 KTAS may not be compatible with published missed approach airspeeds and category D approaches should not be flown.)

A16.19. Icing Restrictions. Do not cruise in forecast or reported icing conditions. Climbs or descents through forecast icing conditions more severe than light rime are prohibited.

Section A16H—Operational Limits And Restrictions

A16.20. Maneuvering Parameters.

A16.20.1. On other than FCF missions, enter T-38 stalls and slow flight below 20,000 feet MSL and terminate above 8,000 feet AGL.

A16.20.2. Trim aircraft for 200 KIAS before beginning full aft stick stalls.

A16.21. Aerobatic Maneuvers.

A16.21.1. Aircraft will not descend below 5,000 feet AGL during any portion of aerobatic maneuvering. Aerobatic flight must be performed in special use airspace.

A16.21.2. Do not extend the flaps in an attempt to improve aircraft performance.

A16.21.3. Use T-38 aerobatic maneuver guidelines in Table A16.1.

A16.22. Transfer of Aircraft Control. Both pilots of the T/AT-38 must know at all times who has control of the aircraft. Transfer of aircraft control will be made with the statement "You have the aircraft." The pilot receiving control of the aircraft will acknowledge "I have the aircraft." Once assuming control of the aircraft, maintain control until relinquishing it as stated above. If the intercom fails, the pilot assuming control will shake the stick, unless prebriefed otherwise.

A16.23. Minimum and Emergency Fuel. When it becomes apparent an aircraft will enter initial or start an instrument final approach at the base of intended landing or alternate (if required), declare the following (as applicable):

A16.23.1. Minimum fuel – 600 pounds or less.

A16.23.2. Emergency fuel – 400 pounds or less.

Table A16.1. T-38 Aerobatic Maneuvers.

	A MANEUVER	B ENTRY	C POWER SETTING	D REMARKS
1	Lazy-8	300 to 400 KIAS	90% RPM minimum	
2	Chandelle	350 to 400 KIAS	90% RPM minimum	
3	Aileron Roll	150 KIAS minimum	As required	
4	Barrel Roll	300 to 500 KIAS	90% RPM minimum	
5	Split-S/Sliceback	200 to 300 KIAS	As required	Enter above 15,000 feet AGL
6	Cloverleaf	400 KIAS minimum	90% RPM minimum	
7	Cuban 8, Loop, or Immelmann	450 to 500 KIAS 350 KIAS	500_C EGT minimum AB	
8	Pitch Back	300 to 500 KIAS	500_C EGT minimum	

Attachment 17

T-39 OPERATING PROCEDURES

Section A17A—General Information

A17.1. Responsibilities. This attachment outlines the procedures applicable to the safe operation of the T-39. With the complementary references cited, this regulation prescribes standard operational procedures for all active duty and reserve AFMC T-39 pilots. The T-39 will be considered in the Bomber/Tanker/Cargo category for purposes of this regulation.

Section A17B—Mission Planning

A17.2. General. All missions will be planned and briefed according to Air Force instructions. Test mission planning will ensure that all appropriate restrictions and minimizing procedures as specified by the safety and technical reviews are adhered to.

A17.3. Responsibility. The responsibility for mission planning resides with the aircraft commander. If required, units may develop planning guidelines addressing specific missions.

A17.4. Flight Logs. Flight logs generated using the command approved mission planning software is authorized or AF form 70 using TO 1T-39A-1 chart data.

A17.4.1. Briefing, Mission Cards. A T-39 mission card will be used all for training flights. The pilot in command will indicate on the mission card all activities planned for the flight. Leave one copy at the squadron operations center. For test support missions, leave a copy of the mission card at the operations desk.

Section A17C—Normal Operating Procedures

A17.5. Preflight. For normal training missions, preflight briefings should start one hour thirty minutes prior to scheduled takeoff. Test mission briefings will be performed as required.

A17.6. Communications.

A17.6.1. Takeoff. Pilot not performing the takeoff will call “60 knots” and ensure nosewheel disengagement and will make the “go” and “rotate” calls at the appropriate speeds.

A17.7. Ground Procedures. Pilots will be cleared by the crew chief prior to starting the engines or actuating flight controls.

A17.7.1. Taxi. Minimum taxi interval is 2 ship lengths staggered or 4 ship lengths in trail. When ice or snow is present, aircraft will not be taxied until all portions of the taxi route and runway have been checked for safe conditions. Do not taxi the aircraft with a reported RCR of or less anywhere on the taxi route.

A17.7.2. Engine Running Crew Changes. Are authorized with the #1 engine at idle.

A17.8. Takeoff.

A17.8.1. Do not attempt a takeoff if the RCR is less than 8.

A17.8.1.1. Per MAJCOM guidance, DFOs may waive RCR minimum for specified units operating in cold weather locations, but in no case will takeoffs be conducted with an RCR of less than 8.

A17.8.2. If a VFR takeoff is required for mission accomplishment, the aircraft must be capable of achieving a minimum single-engine climb rate of 200 feet/minute (gear up, failed engine wind-milling), unless a higher rate of climb is required for unique obstacle clearance requirements. IFR takeoffs will be conducted IAW AFI 11-20 Vol 3. Aircraft operating under IFR that are unable to comply with the required minimum climb gradients may be required to reduce fuel and test loads, or wait for environmental conditions to change.

A17.8.3. Takeoff interval between aircraft/elements will be a minimum of eight seconds except for chased takeoffs. When accomplishing a join-up on top increase takeoff interval to a minimum of 20 seconds.

A17.9. Formation Takeoff.

A17.9.1. Two options are available for takeoff, a takeoff with spacing or delayed takeoff for an airborne pickup. In either case, the line-up is the same. Formation takeoffs are not authorized. Lead should taxi onto the runway, taking the center of one half of the runway. #2 will taxi onto the runway, taking the center of one half of the runway and pull up abeam the lead aircraft. The cockpit windows will be aligned in the abeam position (minimum runway width for this alignment is 150 feet). Lead gives the run-up signal and #2 acknowledges with a head nod. A normal, takeoff with spacing consists of #2 taking spacing on lead by delaying takeoff roll until lead is airborne. Lead releases brakes and #2 releases brakes once lead is airborne. An airborne pickup may be initiated with #2 taking off first. Lead will visually indicate to #2 that lead is ready for takeoff with a head nod. #2 commences takeoff roll after receiving this head nod, while lead maintains position on the runway for the airborne pickup. Lead may adjust power as necessary while awaiting timing calls from #2 (see airborne pickup procedures below).

A17.9.2. Dissimilar Aircraft. Takeoff with dissimilar aircraft will be done using an airborne pickup or separate takeoffs for a rejoin once airborne. Both aircraft should use the primary radio on tower frequency for executing an airborne pickup. If staggered on the runway during line-up, maneuver the aircraft towards the center of the runway after brake release. If performing separate takeoffs and following a heavier aircraft, minimum ATC wake turbulence criteria apply.

A17.9.3. Airborne Pickup.

A17.9.3.1. As safety/photo chase, the purpose is to be in position to monitor or photograph the event of interest on the lead aircraft.

A17.9.3.2. Lead must advise ground and tower of the intended airborne pickup. If off-station coordinate with tower before taxi to avoid problems and clarify any potentially confusing clearances.

A17.9.3.3. Radio Calls. The chase aircraft pilot will transmit the following on tower frequency. The pilot flying should be prepared to backup any radio calls on intra-plane frequency if tower frequency is congested:

A17.9.3.3.1. "30 seconds" - the lead pilot will begin timing.

A17.9.3.3.2. "10 seconds" - this call overrides any previous timing call (remember, to use as many 10 second calls as required).

A17.9.3.3.3. "Release brakes now" - Lead should release brakes only upon hearing this call.

A17.9.3.4. Pattern Standards: #2 should fly a normal closed pattern with base and final airspeed no slower than final turn/approach airspeed. Just after initiating the final turn, #2 will call "30 seconds". Based on a ground speed of 120-140 knots (2 miles/minimum), call "10 seconds" just after rolling out on final (approximately 3/4 mile). In 10 seconds you will travel 1/3 to 1/4 mile. As your distance from lead approaches lead's takeoff roll distance, call "release brakes now".

A17.9.3.5. Minimum altitude for the airborne pickup is 200 feet AGL.

A17.9.3.6. During takeoff roll, lead is accelerating, so as soon as lead rotates retract gear and flaps and add power as required. Gear and flap retraction may be adjusted as necessary to obtain the proper chase position.

A17.9.3.7. Pause in a route position and request "CALL SIGN, Permission to come aboard." After scanning the lead aircraft, report "CALL SIGN, you're clean and dry on the (right/left) side."

A17.9.3.8. For dissimilar aircraft, brief an airspeed and climb rate, or some combination of the two. For similar (T-39/T-39) airborne pickups, lead sets power at 93% after takeoff.

A17.10. Crossunders/overs. Both pilots should be able to observe the lead aircraft during the maneuver. Use extra caution with large aircraft and their associated vortices.

A17.11. Fingertip Position.

A17.11.1. Minimum wingtip spacing for T-39/T-39 formations is 5 feet.

A17.11.2. Looking out the side window, the #2 pilot should be able to look down the lead T-39's wing leading edge and stabilizer trailing edge of the stabilizer. Observing a little of lead's wing under side will ensure #2 is not too high and will provide more escape options.

A17.11.3. Minimum wingtip spacing with dissimilar aircraft is one-half the wing span of the largest aircraft in the formation. Position your aircraft from lead by extending a line from the leading edge of lead's wing, unless chase requirements dictate another position.

A17.12. Wingwork. Wingwork is flown only to build confidence and judgment. Aggressive wingwork will not be flown. Lead's roll rates will be smoother if looking at the horizon vs the attitude indicator. Lead will plan maneuvers to preclude either aircraft from using over 90° of bank.

A17.13. Echelon Turns. Due to limited visibility out of the top of the T-39 cockpit, do not perform echelon turns past 45° bank.

A17.14. Close Trail. Position your aircraft one to two ship lengths (tail to nose) and just below leads jet-wash. If you get too high, you will begin to feel the wash effects on your aircraft. This can be dangerous behind large aircraft.

A17.15. Extended Trail (T-39/T-39 only).

A17.15.1. Extended trail is flown to gain confidence in maneuvering a T-39 with respect to another aircraft and gain experience in closure and cutoff. A power setting of 93% normally will maintain the desired energy level.

A17.15.2. Fly extended trail in a 60 to 90_ cone (30_ to 45_ from either side of the extended longitudinal axis of the lead aircraft) and approximately 500 to 1,000 feet behind lead.

A17.16. Pitchouts. Lead should give the pitchout signal and make a moderate 180_ turn using 45_ bank and no more than 95 percent power. The pitchout need not be a level turn. #2 should delay 4 seconds and turn to duplicate leads turn.

A17.17. Rejoins.

A17.17.1. Turning. After the pitchout, allow time for #2 to complete their pitchout and acquire lead. Lead will indicate the direction of the rejoin and establish a turn using 25-40 degrees of bank and 230 knots. Maintain the prebriefed air speed unless another airspeed is called.

A17.17.2. Straight Ahead. Lead calls for the rejoin and states the side for the rejoin. Lead maintains 230 knots unless another airspeed is called.

A17.18. Dynamic Rejoins. The purpose of dynamic rejoins is to simulate the rejoin commonly required on chase test missions. This maneuver develops the pilot's appreciation for 3-dimensional cutoff, closure, and aircraft performance.

A17.18.1. Initiate dynamic rejoins from the fingertip or route position.

A17.18.2. Lead will announce the reference heading and altitude and direct the flight separation. "CALL SIGN lead is heading ___ at _____ feet; split now."

A17.18.3. Lead and #2 should make moderate 45° bank turns away from each other. #2 will climb or descend at least 1000 feet from lead's base altitude to obtain vertical separation. Maintain 100 feet vertical separation until both aircraft call visual. Roll out after 45° of turn or on lead's call.

A17.18.4. Lead will monitor the increasing separation, and call "CALL SIGN flight reverse now", to place the aircraft on a nose-to-nose intercept (see Figure 1).

A17.18.5. Prior to the merge, lead will call for the rejoin "CALL SIGN flight, cleared to rejoin." Perform either a turning or straight-ahead rejoin.

A17.18.6. If either aircraft does not have visual contact, call "Knock it off". Other aircraft will echo "knock it off". Lead will be directive, ensuring aircraft maintain vertical separation until visual contact is made and a rejoin is effected.

A17.19. Overshoots. If the wing aircraft develops an excessive closure rate, make an early decision to overshoot by reducing power and extending speedbrake as necessary.

A17.20. Slow Flight. Minimum airspeed while chasing another aircraft at low speeds is approach speed for the aircraft configuration and gross weight. Maneuver as necessary to chase aircraft flying slower than minimum chase speed. Normal chase position is slightly above lead's altitude for pilot and photographer visibility. Check configuration of both aircraft following low-speed profile.

A17.21. Stall/Spins. Chase should be abeam or slightly forward of lead at stall or spin entry. Pre-brief lead to call airspeed reduction in 5 knot increments from 20 knots above stall/spin entry airspeed. For spin documentation, fly a descending, constant-banked flight path around lead. Attempt to keep lead in the same position in the windscreen.

A17.22. Lead Change. Lead signals #2 to move to the route position by fishtailing aircraft. Lead states "CALL SIGN flight , lead change". #2 moves to the line abreast position. Lead directs "#2, you have the lead on the left/right". The new leader acknowledges "Roger, #2 has the lead on the left/right" while passing forward of the abeam position. All lead changes (except during radio failure escort) will be accomplished over the primary radio.

A17.22.1. The minimum altitude for changing leads within a formation/element in day VMC is 500 feet AGL over land or 1,000 feet AGL over water, except for emergencies

A17.22.2. Do not initiate lead changes with the wingman further aft of normal fingertip, route, or greater than 30 degrees back from line abreast.

A17.22.3. Prior to initiating the lead change, the leader will ensure that the wingman assuming the lead is in a position to safely initiate the lead change and maintain visual contact.

A17.23. Wing Approach.

A17.23.1. Normally flown from the #2 position to observe the lead aircraft during touch-and-go landing/low approach, and then rejoin. Minimum altitude for #2 to chase the lead aircraft is 200 feet AGL. #2 has two options during the approach. First option is to fly a conventional wing position from the FAF to the spread altitude (200ft AGL). Second option is to fly a wider, chase position; this is primarily used when lead aircraft's approach speed is below minimum T-39 chase airspeed or when traffic/ flight conditions require other than conventional approach.

A17.24. Leaving Formation (Breaking Out).

A17.24.1. It is the wingman's duty to leave the formation when:

A17.24.1.1. directed to do so

A17.24.1.2. lose sight of the preceeding aircraft

A17.24.1.3. unable to join up or stay in formation without crossing under or in front of the preceeding aircraft

A17.24.2. When leaving formation, clear in the direction of breakaway and notify lead. If sight is lost, break away form lead's last known position or in a direction that will ensure immediate separation. A power reduction and/or speed brake may be used to expedite separation. Lead aircraft must

continue same maneuver and will be directive in ensuring separation. An aircraft which has left formation must not rejoin until permission is granted by lead.

A17.25. Lost Wingman Procedures.

A17.25.1. All formation flights must be planned to remain in VMC. If airborne and unable to maintain VMC, split the formation and obtain separate clearances prior to penetrating the weather. If IMC is inadvertently encoutered, wingmen execute the appropriate lost wingman procedures when they lose sight of lead. Immediately transition to instrument flight, make no attempt to find lead, and advise lead and the controlling agency of the situation seek controlling agency's help to ensure positive separation). In all cases lead will be directive and transmit current flight parameters to the lost wingman to facilitate aircraft separation.

A17.25.2. Wings-Level Flight. Simultaneously inform lead ("#2 is lost wingman"), turn 15 degrees away from lead's heading, roll wings level and maintain that heading for 15 seconds; resume course and obtain a separate clearance.

A17.25.3. Turns. On the outside of the turn, roll out of the turn and inform lead. Continue straight ahead for at least 15 seconds to ensure separation before resuming turn. Obtain a separate clearance. On the inside of a turn, momentarily reduce power to ensure nose-tail clearance, and direct lead to roll out of the turn. Maintain angle of bank to ensure lateral separation and obtain a separate clearance.

A17.25.4. Final Approach. The wingman will momentarily turn away to ensure clearance, inform lead, and commence the published missed approach procedure while obtaining a separate clearance from approach control.

A17.25.5. Missed Approach. The wingman will momentarily turn away to ensure clearance, inform lead, and continue the published missed approach procedure while climbing 500 feet above the published missed approach altitude and obtaining a separate clearance.

A17.26. Knock-it-Off Procedures.

A17.26.1. Whenever an aircraft calls "knock-it-off", all other formation aircraft will acknowledge and discontinue maneuvering. The lead aircraft will maintain a predictable flight path and direct rejoins as appropriate.

A17.27. Aircraft Emergencies.

A17.27.1. The aircraft with the emergency will normally be given the lead.

A17.28. Lost Communications.

A17.28.1. Pre-brief recovery intentions for radio-out aircraft. Normally the NORDO aircraft will be led back to the pattern for a straight-in. The lead aircraft will go-around approaching the overrun and the NORDO aircraft will land. If landing clearance is denied, lead will initiate a go-around and start a gentle turn into #2.

A17.29. Formation/Chase Requirements.

A17.29.1. Formation qualified T-39 pilots may fly chase missions with the following limitations.

A17.29.2. Formation operations are defined as flights typically involving similar aircraft performing maneuvers (i.e. pitch-outs, rejoins, and wing-work) with both aircraft in close formation.

A17.29.3. Chase operations are defined as flights involving similar or dissimilar aircraft performing maneuvers with a "non-cooperative" lead aircraft (i.e. moderate banked turns, shallow climbs, and descents) from a route or observation position.

A17.30. Formation/Chase Restrictions.

A17.30.1. Daylight only.

A17.30.2. VMC only.

A17.30.3. No wing takeoffs or landings.

A17.30.4. Abeam line-ups on 150 ft-wide runways.

A17.30.5. Minimum ATC wake turbulence criteria applies when chasing larger aircraft.

A17.30.6. Min wingtip spacing for T-39/T-39 flights is 5 feet.

A17.30.7. For dissimilar formations, min spacing is one-half the wing span of the largest aircraft.

A17.30.8. Min chase altitude is 500ft AGL.

A17.30.9. 200ft AGL min for airborne pickup.

A17.30.10. Min airspeed for airborne pickup and low speed chase is final turn/final approach airspeed for established configuration.

A17.30.11. Min airspeed above FL350 is 180 KIAS.

Section A17D—Low Level Procedures

A17.31. Wingman Altitudes.

A17.31.1. Unless performing photographer duties on an approved test mission, at altitudes below 1,000 feet AGL, wingmen will not fly at a lower AGL altitude than lead.

A17.32. Safe Altitude.

A17.32.1. Flights operating in the low altitude environment will climb to a prebriefed safe altitude (minimum 1,000 feet AGL) when a Knock-It-Off is called.

A17.32.1.1. If unable to visually acquire or ensure lateral separation from known vertical obstructions, which are a factor to the planned route or flight, flight leads will direct a climb to ensure vertical separation 2NM prior to the obstacle.

A17.32.1.2. During all low altitude operations, the immediate reaction to task saturation, diverted attention, or an emergency, is to climb.

A17.33. Radar Altimeter.

A17.33.1. Flight profiles planned for operations below 500 feet AGL outside of the ATA require aircraft to have a radar altimeter installed to provide another altitude cross-check in this inherently hazardous environment. Proposed requirements for such low altitude test profiles will be closely

reviewed and discussed as early as possible in the test program development and pilots will complete the low level check-out training.

A17.33.1.1. The radar altimeter will be on and set at either the briefed minimum altitude or the command-directed low level altitude, whichever is higher. This restriction also applies to simulated and actual weapons delivery events.

A17.34. Low Level Navigation.

A17.34.1. Navigate using a combination of pilotage, dead reckoning (DR) and INS/GPS information. DR will be the primary means of navigation.

A17.34.2. Minimum flight planning airspeed for low altitude flight/navigation is 240 KIAS. Minimum airspeed during low altitude flight/navigation is 200 KIAS.

A17.35. Low-Level Route/Area Abort Procedures.

A17.35.1. Minimum airspeed for the route abort is 180 KIAS. Maximum pitch angle is 30 degrees nose high.

A17.35.2. VMC Route/Area Abort Procedures

A17.35.2.1. Maintain safe separation from the terrain.

A17.35.2.2. Comply with VFR altitude restrictions and squawk appropriate (IFF/SIF) modes and codes.

A17.35.2.3. Maintain VMC at all times. If unable, follow IMC procedures outlined below.

A17.35.2.4. Attempt contact with controlling agency, if required.

A17.35.3. IMC Route/Area Abort Procedures

A17.35.3.1. During low level flight, every safe effort will be made to avoid entering IMC. If IMC is encountered, pilots will transmit Callsign, knock-it-off and route abort.

A17.35.3.2. Immediately climb to, or above the briefed RAA. Transition to instruments if entering IMC.

A17.35.3.3. Maintain preplanned ground track. Execute appropriate lost wingman procedures if necessary. The flight/element leader is responsible for ensuring heading and/or altitude deconfliction during an IMC route abort procedure. Ensure altitude deconfliction is based on the prebriefed altimeter setting.

A17.35.3.4. Attempt contact with the appropriate ATC agency for an IFR clearance. If required to fly in IMC without an IFR clearance, cruise at appropriate VFR altitudes until receiving an IFR clearance.

Section A17E—Operational Limits And Restrictions

A17.36. System Operating Guidelines or Restrictions.

A17.36.1. Aircraft will not be flown in the vicinity of convective activity without an operable radar unless VMC can be maintained to maneuver around cells.

A17.37. Weight and Balance Data.

A17.37.1. The Weight and Balance Section of Quality Control (412 TW/TSIST) will furnish DD Forms 365-4 for T-39 aircraft, including all possible seat installation configurations (note: seat installations are not chart "C" entries). The original copies of these Forms F will be filed in the weight and balance book located at the operations desk. The duplicate will be filed in the aircraft weight and balance manual. Flight plans will indicate Form F on file, 418 FLTS/EDW with date. If a load configuration is required which is not covered by a Form F in this book, notify 412 TW/TSIST.

A17.37.2. Upon completion of a modification, demodification, equipment removal, etc., 412 TW/TSIST will furnish a new Form F or Chart C.

A17.37.3. Weight and balance changes due to modification equipment changes while TDY will be entered as "Corrections" on the Form F, and an entry made in the orange bordered AFTO Form 781A. Aircrew members will not make Chart C entries.

A17.37.4. The original Form F on file in the weight and balance book is invalid 180 days after the date shown in the upper left hand corner. If a Form F has expired, and there has been no change in the basic condition, it must be revalidated by 412 TW/TSIST or a new Form F must be prepared.

A17.38. Minimum Fuels.

A17.38.1. The following normal, minimum and emergency fuel requirements (useable fuel) are to be used for T-39 aircraft. Pilots should plan to be on final with normal fuel and land with no less than minimum fuel at any airfield. Minimum landing fuel may be used as part of the AFI 11-202 Volume 3 required fuel reserve. Use the greater value of AFI 11-202 Volume 3 AFMCS1 fuel reserve or minimum fuel listed below, in Table A17.1.

Table A17.1. T-39 Minimum Fuels.

Normal Fuel	1000 pounds
Minimum Fuel	800 pounds
Emergency Fuel	600 pounds

A17.39. Minimum Oxygen Requirements. T.O. T-39-1 minimum oxygen requirements are 600 psig on the oxygen cylinder pressure gage or 50 psi on the oxygen regulator.

A17.40. Runway Requirements.

A17.40.1. The minimum runway available for T-39 aircraft must be at least CFL plus 2,000 feet or 6,000 feet (whichever is greater) for intersection takeoffs. Pilots are encouraged to use the entire runway length, mission permitting. The minimum length of useable runway for T-39 missions is 6,000 feet. Aircraft gross weight, performance and weather conditions may dictate longer runway requirements than the minimum prescribed above. Runway available for takeoff must exceed CFL by at least 1,000 feet. Runway available for landing must exceed total planned landing distance by at least 1,000 feet. Total planned landing distance must account for landing over a 50 feet obstacle and landing flare distance. If applicable, inoperative systems (anti-skid, etc.) must be taken into account.

A17.41. SFO Landings.

A17.41.1. T-39 pilots may perform SFO low approaches and T-39 instructor pilots may supervise or perform SFO landings in accordance with T.O. 1T-39A-1, AFI 11-2FT Vol 1 and AFI 11-2FT Vol 3, Chap 9, Table 9.1.

A17.41.2. For T-39A/B aircraft SFO landing training, the maximum aircraft weight is 17,500 pounds (to allow 600 FPM maximum rate of descent landing), maximum fuel load is full fuel (6975 pounds), unless otherwise restricted in the PFM/POS.

A17.41.3. SFO patterns will not be flown at night or in marginal weather conditions. Ceiling must be at least 500 feet above the requested entry altitude with flight and ground visibility of at least 5 miles.

A17.42. Cross-country Mission Authorization.

A17.42.1. Off-station tests employing the T-39 as the primary aircraft will be authorized by a T-39 Operations Directive signed by DFO or deputy.

A17.43. Touch-and-Go Landing Criteria.

A17.43.1. Touch-and-go landing criteria apply to full stop taxi-back landings performed for training. Runway length for touch-and-go landings must allow for a normal full stop landing under existing conditions. Instructor pilots may fly training sorties at any airfield in accordance with AFI 11-202 Vol 3_AFMCSUP1 requirements. Mission pilots may fly training sorties in accordance with AFI 11-202 Vol 3_AFMCSUP1 and AFI 11-2FT Vol 1 at satellite training fields in the local flying area.

A17.43.1.1. Minimum length of useable runway for T-39 touch-and-go landings with an instructor pilot at a set of controls is 6,000 feet. When authorized, the minimum length of useable runway for T-39 touch-and-go landings performed by mission pilots is increased to 7,000 feet.

Section A17F—Abnormal Operating Procedures

A17.44. General.

A17.44.1. This section contains procedures to follow when other than normal operations occur. They do not, however, replace or supersede procedures contained in the flight manual or the use of sound judgment.

A17.45. Fuel Imbalance.

A17.45.1. When a fuel imbalance is greater than T.O. T-39-1 limits, terminate tactical maneuvering and investigate. Terminate the mission if fuel imbalance cannot be corrected.

A17.46. Ground Aborts.

A17.46.1. When a flight member aborts prior to takeoff, the flight leader will normally realign (or align as briefed) flight positions to maintain a numerical call sign sequence. Flight leaders will advise the appropriate agencies of such changes.

A17.46.2. A flight of two or more aircraft with only one designated flight lead in the formation must either sympathetically abort or proceed on a pre-briefed single-ship mission should the flight lead abort.

A17.46.3. Pilots who do not takeoff with the flight may join the flight at a briefed rendezvous point prior to a tactical event, or may fly a briefed alternate single-ship mission. If accomplishing a join-up on an air-to-ground range, terminate all events until the joining aircraft has achieved proper spacing.

A17.47. Takeoff Aborts.

A17.47.1. Prior to flight, every member of the flight will review and understand takeoff data. Place particular emphasis on takeoff and abort factors during abnormal situations such as short/wet runway, heavy gross weights, and abort sequence in formation flights.

A17.47.2. If an abort occurs during takeoff roll, clear to the appropriate side of the runway as expeditiously as possible based on position within the element. If this is not feasible because of possible barrier engagement, clear straight ahead. As soon as possible, give call sign and state intentions. Following aircraft will alter takeoff roll to ensure clearance or will abort takeoff if unable to maintain adequate clearance.

A17.47.3. Anytime an aircraft experiences a high speed abort and hot brakes are suspected:

A17.47.3.1. Declare a ground emergency

A17.47.3.2. Taxi the aircraft to the designated hot brake area and perform hot brake procedures.

A17.48. Air Aborts.

A17.48.1. The pilot of an aborting aircraft will advise the flight leader of the conditions necessitating the abort, intentions and assistance required.

A17.48.2. If the flight leader aborts, the designated deputy leader will assume command of the flight.

A17.48.3. Escort aborting aircraft with an emergency condition to the field of intended landing. When other than an emergency condition exists, the flight leader will determine if the aborting aircraft requires an escort.

A17.48.4. Abort the mission, regardless of apparent damage or subsequent normal operation, for any of the following:

A17.48.4.1. Birdstrike/Foreign Object Damage.

A17.48.4.2. Over-G. The aircraft will land as soon as practical out of a straight-in approach.

A17.48.4.3. Flight control system anomalies. Declare an emergency, even if the malfunction appears corrected.

A17.48.4.4. Engine flameout/stagnation or shutdown. This applies even if a successful restart is accomplished. Exception: Intentional shutdowns for Functional Check Flights (FCF).

A17.49. Radio Failure.

A17.49.1. Formation.

A17.49.1.1. Flight members who experience total radio failure while in close or route formation will maneuver within close/route parameters to attract the attention of another flight member and give the appropriate visual signals. Terminate the mission as soon as practical and lead the NORDO aircraft to the base of intended landing or a divert base. Perform a formation approach to a drop-off on final unless safety, fuel, weather, or other considerations dictate otherwise.

A17.49.1.2. If flying other than close/route formation when radio failure occurs, the NORDO aircraft should attempt to rejoin to a route position on another flight member. The joining/wing aircraft is responsible for deconfliction until the other flight member acknowledges his presence by a wing rock, signifying clearance to join. Once joined, the NORDO aircraft will give the appropriate visual signals. If prebriefed, the NORDO aircraft may proceed to a rendezvous point and hold. If no one has rejoined prior to reaching BINGO fuel, the NORDO aircraft should proceed to the base of intended landing or a divert base.

A17.50. Unsafe Landing Gear Indication, After Landing.

A17.50.1. If normal brakes are not available, after landing have the aircraft towed to parking. Aircraft commanders may taxi clear of the runway if they determine it is safe to do so.

Attachment 18

UH-1 OPERATING PROCEDURES

Section A18A—General Information

A18.1. General. This attachment provides standard operating procedures for employment of H-1 aircraft in AFMC. Aircrew members are to place annexes 1- 9 into their checklist binder (or in-flight guide) for use as briefing guides.

A18.2. Terms.

A18.2.1. Mark. The time when an aircraft passes over the landing zone or ground party.

A18.2.2. 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.

A18.2.3. Landing Zone (LZ). An area of sufficient size to allow discharge or pickup of passengers or cargo by touchdown or low hover.

A18.2.4. Visual Reconnaissance. Aerial survey of areas, routes, or LZs.

A18.2.5. Operational Site. An LZ that has (1) been surveyed by an instructor pilot (IP) experienced in remote operations to ensure no hazards exist, (2) a photograph available for aircrews to study the site prior to landing, and (3) approval from the DFOs to be designated an operational site. Whenever practical, operational sites should have permanently installed and properly maintained wind indicators (wind sock, streamer, etc.).

Section A18B—General

A18.3. Simulated Emergency Procedures.

A18.3.1. Emergency procedures practice will be briefed during the flight briefing.

A18.3.2. Emergency procedures will be practiced with an IP occupying a duty position with a set of controls.

A18.3.3. Emergency procedures will be conducted at an approved landing area under positive radio communications with the appropriate controlling agency (for example, tower, runway supervisory unit, UNICOM, etc.). Proper crash and rescue equipment will be immediately available. Slide landings will only be accomplished to runways or suitable taxiways, with ATC approval. Exercise extreme caution on barrier-equipped runways. Slide landings may also be accomplished to other approved surfaces meeting helicopter runway criteria specified in AFI 32- 1026, *Planning and Designing of Airfields*.

A18.3.4. Applicable emergency procedures include:

A18.3.4.1. Autorotations, hydraulic boost off (system one only), manual fuel, and simulated single engine landings.

A18.3.5. Practice Autorotations. The following policy is established for practice autorotations:

A18.3.5.1. Due to the risk associated with this maneuver, carefully consider wind, density altitude, aircraft gross weight, and individual pilot proficiency prior to training/ currency.

A18.3.5.2. The initial autorotation for training/ currency will be a straight-ahead autorotation accomplished by the instructor to evaluate aircraft performance (not required for evaluation flights).

A18.3.5.3. IPs will terminate the maneuver and initiate a power recovery at the first indication of abnormally high/ low rotor RPM, excessive sink rate, low airspeed, ineffective flare or at any time an inadvertent touchdown might occur.

A18.3.5.4. Autorotations will be accomplished to a runway, taxiway or approved slide area, if possible. When such an area is not available, a smooth level area is to be selected, and the instructor/flight examiner will ensure it is free of obstructions prior to commencing training.

A18.3.5.5. Power recovery autorotations require the aircraft to be aligned within 45 degrees of the wind direction on final approach. For hovering autorotations, the wind must be aligned within 15 degrees. A functional wind indicating device must be close enough to the recovery point to provide readily discernible, accurate wind information.

A18.3.5.6. Autorotation Procedures:

A18.3.5.6.1. Minimum entry altitude is 800 feet above ground level (AGL) for 180 degree turning autorotations; 500 feet AGL for all others (except hovering autorotations). Power recovery will be accomplished no lower than 4 feet.

A18.3.5.6.2. Simulated instrument autorotation must be terminated with full power recovery no lower than 500 feet AGL, unless conducted to an area meeting the requirements above.

NOTE. Simulated forced landings may be initiated on training missions by qualified IPs. The simulated emergency will be preceded by the IP stating "simulated" prior to initiation. Recovery will be completed above 500 feet AGL unless the maneuver is executed at an approved training site. If accomplished at an approved training site, recovery will be no lower than flight manual guidance.

A18.3.6. Simulated single engine practice will not be initiated below 300 feet AGL and 70 KIAS.

A18.3.7. Simulated hydraulics malfunctions may be initiated on the ground, or above 300 feet AGL and 70 KIAS.

A18.4. Fuel Requirements.

A18.4.1. H- lN. Final landing will be planned for no less than 200 pounds of fuel remaining.

A18.5. Minimum Crew Requirements. Minimum crew requirements are established by the appropriate flight manual. The following exceptions apply:

A18.5.1. H- 1 helicopters will have a qualified pilot, copilot, and flight engineer (FE) for mountainous or remote landings. Landings may be made into an operational site with one pilot and one FE/ scanner.

A18.5.2. H- 1 helicopters will have a qualified pilot and copilot or pilot and FE for VIP transport, low- level flight (below 300 feet above ground level), and when passengers are carried in the rear compartment.

A18.5.3. All planned instrument operations (simulated or actual), emergency procedures training flights and night flights will have two qualified pilots. (Exception: One of the pilots may be unqualified if receiving qualification/requalification training provided the pilot in command is a current and qualified instructor.)

Section A18C—Mission Planning

A18.6. General. While many parties may participate in the planning of a given mission (individual crewmembers, operations staff, test mission coordinator, etc.), the ultimate responsibility for the adequacy and completeness of mission planning rests with each aircraft commander who participates in that mission. Mission planning will be completed prior to the mission briefing. All planning/ calculations for the mission will be completed prior to flight. The importance of complete and thorough mission planning to include emergency situations and alternate missions cannot be overemphasized.

A18.7. Aircrew Responsibilities. The mission/ aircraft commander, in conjunction with the aircrew, will:

A18.7.1. Analyze mission requirements.

A18.7.2. Study mission weather.

A18.7.3. Select alternate airfields and recovery bases.

A18.7.4. Identify hazards to flight (terrain features, birds, aircraft, etc.).

A18.7.5. Consult appropriate flight planning publications.

A18.7.6. Compute weight and balance, if applicable.

A18.7.7. Compute takeoff/ landing data and fuel reserves.

A18.7.8. File flight plan.

A18.7.9. Conduct or attend mission briefing.

A18.8. Power Requirements. All operations will be conducted with a minimum 5 percent power reserve. DFOs may waive this requirement for emergency missions.

A18.9. Power Restrictions on Remote Area Operations Training.

A18.9.1. Clear Escape Route.

A18.9.1.1. Hover Power + 5%.

A18.9.1.2. Restricted Escape Route:

A18.9.1.3. OGE + 5%.

NOTE:

Prior to the first remote area operation into any LZ, a power available check will be accomplished.

A18.10. Power Available Check. Perform a power available check prior to any time use of maximum or near-maximum power is anticipated. Compare this maximum power available with:

A18.10.1. Power required for out of ground effect (OGE), or maximum hover height if OGE is not available.

A18.10.2. Power required for the intended hover heights.

NOTE:

The power available check may be performed either en route to, or at the intended area of operation.

A18.11. Weather Minimums:

A18.11.1. Operational Minimums.

A18.11.1.1. VFR - Day 700 foot ceiling/1 mile visibility.

A18.11.1.2. Night 1000 foot ceiling/1 mile visibility.

NOTE:

Emergency search and rescue (SAR) missions may be conducted VFR IAW minimums prescribed in AFI 11- 202 Vol 3, with DFO approval.

A18.11.1.3. IFR - Compatible approach minimums or suitable departure alternate within 30 minutes flying time.

A18.11.2. Training Missions.

A18.11.2.1. VFR - 1000 foot ceiling/ 3 mile visibility.

A18.11.2.2. IFR - Compatible approach minimums or a suitable departure alternate within 30 minutes flying time.

A18.12. Wind Limitations.

A18.12.1. Operational - 45 knots peak wind.

A18.12.1.1. May be waived with DFO approval on a case-by-case basis.

A18.12.1.2. Flight manual limits still apply on rotor starting/stopping.

A18.12.2. Training - 30 knots peak wind.

Section A18D—General Operating Procedures

A18.13. Checklists. Accomplish all checklists with strict discipline. A checklist is not complete until all items have been done in sequence.

A18.14. Ground Operations.

A18.14.1. Engine Start and Rotor Engagement. Crew must be alert at all times for vehicles and personnel.

A18.14.2. Taxi and Hover. Pilots must exercise caution when operating in areas having partially prepared surfaces and/or loose objects that may be picked up by the rotor downwash:

A18.14.2.1. Caution must be used when taxiing in the vicinity of light aircraft to prevent damage caused by rotor wash.

A18.14.2.2. The helicopter is susceptible to adverse effects from the rotor/propeller/jet wash of heavier aircraft. Therefore, avoid the propeller/jet wash of any aircraft that is preparing for a pre-takeoff runup check.

A18.15. Takeoff.

A18.15.1. Prior to departing from an airfield with marginal weather conditions, the aircraft commander will brief the appropriate instrument approach for emergency IFR return.

A18.15.2. Wake Turbulence Considerations. In accordance with FLIP and local operating procedures.

A18.15.3. When operating in areas having minimal traffic control, caution must be exercised to ensure that the departure and approach areas are clear prior to takeoff.

A18.16. Traffic Patterns. Fly traffic patterns in accordance with the flight manual and local directives.

A18.17. Precautionary Landings. Aircraft commanders must consider a precautionary landing as an option when mechanical malfunctions or deteriorating weather interfere with mission accomplishment. The following procedures apply to all precautionary landings:

A18.17.1. Make every effort to notify a controlling agency (i.e., declare an emergency if necessary) before making a precautionary landing (time permitting).

A18.17.2. Every effort will be made to contact the SOF (ground-to ground/ground-to-air/telephone) once the aircraft is safely on the ground.

A18.17.3. For precautionary landings due to deteriorating weather, the flight may be continued at the discretion of the aircraft commander.

A18.17.4. For actual, impending, or potential malfunctions, corrective action will be completed before continuing flight.

A18.17.5. DFOs approval must be received prior to continuing flight after any precautionary landing for any maintenance malfunction (i.e., smoke and fumes, fuel or electrical problems, etc.).

EXCEPTION: If contact cannot be established, flight may be resumed if:

A18.17.5.1. The aircraft commander determines flight manual actions have corrected the malfunction and the flight may be continued safely.

A18.17.5.2. If the aircraft commander determines it is potentially more hazardous to await maintenance assistance, he/she may continue the flight to the nearest suitable area.

Section A18E—FE Procedures

A18.18. General. This chapter contains normal procedures for FEs not contained in the flight manual and/ or applicable T.O.s.

A18.19. Authority to Clear a "Red X." If a situation is encountered where the aircraft is on Red X and qualified maintenance personnel are not available, the home station chief of maintenance may authorize the FE to clear a Red X.

A18.20. Refueling/ Defueling. Flight Engineers may refuel/ defuel when maintenance personnel are not available. Use the refueling/defueling checklist during all refueling and defueling operations. If ground support personnel are not available, the aircraft commander will designate other crewmembers to assist the FE.

A18.21. Preflight. FEs are authorized to perform preflight IAW applicable TOs.

A18.22. Aircraft Systems Management. The FE will monitor aircraft systems during flight and ground operations. Notify the pilot of all abnormal indications and take action as directed. When noting a malfunction during takeoff that may be cause for an abort, state the problem (e. g., rotor RPM low).

A18.23. Flight Monitoring. The FE will assist with flight monitoring.

A18.23.1. Notify the pilot when observing abnormal deviations from airspeed, altitude, and heading. Also, advise pilot when approaching any aircraft flight manual limitation and comply with other duties as briefed by the pilot.

A18.23.2. Notify the pilot if aircraft configuration (e.g., rotor RPM, gear, cargo door, ramp) is not correct for the maneuver being performed.

A18.23.3. Maintain outside vigilance during flight.

A18.23.4. Monitor the primary radio, interplane radio, interphone, and HOT MIC.

A18.23.5. Assist in navigation as necessary.

A18.23.6. Monitor fuel status.

A18.24. Takeoff and Landing Data (TOLD).

A18.24.1. Complete TOLD prior to takeoff. Whenever possible, TOLD should be completed prior to the aircrew briefing. Compute data applicable to the type takeoff/ landing to be made (in and out of ground effect, power available/required at intended hover height, single engine capability, etc.).

A18.24.2. During multiple takeoffs/ landings, only affected parameters need be recomputed if favorable conditions afford an additional margin of safety in all other areas (e.g., gross weight decreases due to fuel burn- off, while pressure altitude and temperature remain constant).

A18.24.3. Prebrief TOLD data for remote LZs prior to high reconnaissance and confirm prior to the low reconnaissance. Recompute TOLD data if the difference between predicted and actual landing conditions is greater than 500 feet pressure altitude and/or 5 degrees centigrade.

A18.25. Fuel Management.

A18.25.1. Preflight. The FE will ensure the preplanned fuel load is on board the aircraft.

A18.25.2. Inflight. The FE will monitor fuel management. He/she will compute fuel consumption, bingo fuel, and keep the pilot advised of fuel status at all times.

A18.26. Weight and Balance. A new or corrected DD Form 365-4, **Form F - Weight and Balance Clearance-Transport/Tactical**, need not be re-computed provided the initial takeoff gross weight is not changed by more than 500 pounds. Although no written adjustment may be required, the FE will compute these changes to ensure center of gravity limits are not exceeded. The aircraft commander will be informed of these changes.

A18.27. Use of DD Form 365-4.

A18.27.1. Unit DOV will determine whether "zero fuel" weights/ computations are required on the DD Form 365- 4. If "zero fuel" is not utilized, the following applies to the DD Form 365-4:

A18.27.1.1. Line through item 21.

A18.27.1.2. Enter "less fuel" under item 22. (Item 10 minus item 23.)

A18.27.1.3. Enter the aircraft's minimum fuel in item 23 and line through the adjoining index/ mom squares.

A18.27.1.4. All other zero fuel references on the DD Form 365-4 may be left blank.

A18.27.2. Passengers. Item 13 will indicate the number of passengers in a compartment/ seat/position, their weight and the compartment/arm/station.

A18.27.3. Cargo. Use the last cargo and compartment/arm/station column on the right side of the form.

Section A18F—Medical Evacuation

A18.28. Aeromedical Evacuation Missions. Aircraft will not be used for routine patient transfer. Medical evacuation flights may be operated to transport seriously ill or injured persons and/or to transport medical personnel, equipment, or supplies under emergency conditions when other means are not suitable or readily available. Prior to dispatching an aeromedical evacuation mission, obtain the best medical evaluation available to determine the need for rescue assistance. This evaluation is not the final determinant that the mission will be performed.

A18.29. Medical Assistance. SAR missions involving life threatening injuries/illnesses will not launch until properly authorized (SQ CC/ DO) and until thorough mission planning is complete. Aircraft will not be launched without a flight surgeon/ physician or trained medical personnel. The medical personnel will assist in emergencies and are in charge of the medical aspects of the mission. Unit commanders should continuously coordinate their local mission response criteria and requirements with the flight surgeons office so potential delays can be avoided.

A18.30. Hazardous Medical Equipment Aboard Aircraft.

A18.30.1. Any nonstandard medical equipment used during air evacuations should be regarded as potentially hazardous. Nonstandard electronic or oxygen equipment is defined as an item designated by manufacturer and model number that is not listed in the current Status Report on Medical Material Items Tested and Evaluated for Use in the Aeromedical Evacuation System, Brooks AFB TX 78235 (see Note). Two types of nonstandard equipment are of major concern:

A18.30.1.1. Electronic medical equipment that produces electromagnetic interference (EMI) which can interfere with aircraft communication and navigation equipment.

A18.30.1.2. Therapeutic oxygen systems which present an increased hazard of fire/explosion.

A18.30.2. Take the following precautions for nonstandard electronic medical equipment:

A18.30.2.1. Aircraft commanders must question medical technicians to determine when nonstandard electronic medical equipment is brought aboard the aircraft. Include the anticipated period of use of the equipment during the mission.

A18.30.2.2. Be alert for any interference with aircraft communication or navigation equipment caused by this equipment.

A18.30.2.3. When continuous use of the equipment is required throughout the duration of the mission, flight is restricted to VFR conditions. Use additional caution on night VFR missions to ensure there are no adverse effects on navigation equipment.

A18.30.3. Take the following precautions for nonstandard oxygen equipment:

A18.30.3.1. All compressed oxygen equipment with exposed unprotected cylinder neck, manifold, or regulator must be completely secured from all movement.

A18.30.3.2. Medical technicians must continually monitor the operation of the equipment to detect possible malfunction during flight.

NOTE:

Units will coordinate a medical equipment list of special equipment (nonstandard) that may be required for medevacs.

Section A18G—Remote/Mountainous Operations Procedures

A18.31. General. This chapter provides guidance for the successful accomplishment of remote landing site operations. The aircraft commander must consider crew qualification, aircraft power and capability, weather (including winds), terrain, environmental factors, illumination and mission requirements before performing any approach to an unprepared landing area. The final decision to accomplish the approach or landing rests with the aircraft commander. Safety of flight must not be compromised for mission accomplishment.

A18.32. Aircraft Control Techniques. Remote operations depend upon individual pilot technique. The smoother the pilot flies, the greater the efficiency of the helicopter. Maintaining a steady rotor disc gives you the greatest lift with the least power. All remote approaches must be flown with the utmost precision, especially during the final approach phase. A pilot must not get in a hurry with fast or erratic approaches.

Remote area approaches must not be so fast as to cause translational lift to be lost before the helicopter is in an immediate position to land. These procedures require practice to perfect.

A18.33. Preparation. During premission preparation, use all available parameters to ensure aircraft and crew limitations are not exceeded. Consider available winds, terrain, power available/required and operating altitudes to prevent an inadvertent entry into an unrecoverable flight regime. Altitude and temperature are major factors in determining helicopter power performance. However, this information may not be available for the site of intended operation and will require evaluation on scene. Keep fuel load, equipment, and personnel to the minimum required to safely accomplish the mission. Accurate wind information is more difficult to obtain and more variable than other planning data. It is not advisable to include wind information in advanced planning (for power), even though it may serve to improve performance. The aircraft commander must obtain and utilize all information available to him for adequate premission planning. Factors to be considered for flight planning:

A18.33.1. Mission requirements.

A18.33.2. Maps and charts.

A18.33.3. Crew qualification.

A18.33.4. Weather - winds, ceilings, visibility.

A18.33.5. TOLD.

A18.33.6. Suitability of expected site.

A18.33.7. Route of flight.

A18.33.8. Fuel requirements.

A18.33.9. Communications.

A18.33.10. Special equipment.

A18.34. Area and Site Evaluation.

A18.34.1. As a minimum, both a high and low reconnaissance are required prior to landing at an unfamiliar area. The pattern flown during the landing site evaluation is dictated by terrain, wind, obstacles, and emergency landing areas. Plan the pattern to remain oriented in relation to the wind and intended landing areas. Although there is not a standard pattern that covers all situations, a modified rectangular traffic pattern is recommended. A pinnacle landing area may require flying around it at a constant altitude to afford you a look at the site from all possible angles. This reconnaissance may also give you areas of up and down drafts indicating wind speed and direction. Execute as many fly- bys as necessary. Complete power available checks prior to commencing the low reconnaissance.

A18.34.1.1. High Reconnaissance. The high reconnaissance is flown at a minimum of 300 feet above the site, offset to the side and into the wind (if the direction is known). Minimum airspeed is 50 KIAS. During this reconnaissance, evaluate the site IAW the Remote Operations Briefing Guide.

A18.34.1.2. Low Reconnaissance. The low reconnaissance confirms items noted in the high reconnaissance. The pilot should fly the low reconnaissance on the same approach angle and route selected as the final approach. If the selected approach route is not satisfactory, select

another route and execute another low reconnaissance. Pilots may descend to a minimum of 50 feet above the highest obstacle along the flight path and at a minimum of 50 knots to reconfirm items noted on the high reconnaissance. Accomplish the low reconnaissance IAW the Remote Briefing Guide. The low reconnaissance may be accomplished on final approach if OGE power is available.

A18.34.2. Site Evaluations Without a High Reconnaissance. During successive approaches to the same area where conditions are equal to or less stringent than a previous approach, the high reconnaissance need not be performed.

A18.34.3. Wind Determination. Prior to descent for a high reconnaissance, the pilot should have a general idea of wind direction and velocity. The most reliable method is the use of smoke generators. In situations that do not permit use of smoke generating devices to evaluate the wind, other methods may be used. Acceptable methods are helicopter drift, deploy a streamer, foliage, ripples on water, blowing sand, snow, or dust.

A18.34.4. Power Checks. Power required to hover should be recomputed, or verified, by using the most current meteorological data available and the performance section of the appropriate flight manual. The altimeter will be used to verify pressure altitude (set 29. 92) and the outside air temperature gauge to verify temperature. Prior to low reconnaissance, a power available check will be accomplished.

A18.34.5. Abort. Execute the abort/departure as briefed during the high/ low reconnaissance.

A18.35. Approach.

A18.35.1. There is no one approach that should be used for every situation. The type of approach angle and direction of approach should be determined by the height of the obstacles at the landing site. The transition period (transitioning from forward flight to hover flight) is the most difficult part of any approach. As helicopter performance decreases, select an approach angle which will make the transition more gradual. As the height of obstacles increases, larger landing areas or additional power will be required. If marginal operating conditions exist, either lighten the helicopter, locate a more suitable area, or abandon the mission. Wind direction must be positively determined prior to beginning final approach.

A18.35.2. Approach Techniques. All approach angles are apparent, the exact angle of a remote site approach cannot be dictated. Aircrews should attempt to establish a specific final approach entry altitude prior to attempting an approach so they are using a familiar sight picture. The normal approach should be considered for use in almost all cases. The steep approach requires the pilot to stop the rate of descent at the same time the helicopter is coming out of translational lift, which may require more power than is available. However, a steeper than normal approach may be required for adequate clearance of obstacles and avoiding null areas (due to wind). A shallower than normal approach allows the rate of descent to be stopped prior to the loss of translational lift. This allows the ground cushion to be picked up with the pilot in full control of the sequence of events. Remote site approaches require an aircrew to be alert and keep a comparison of indicated airspeed and ground speed prior to actual touchdown with a go- around planned at all times. On short final, before the helicopter is committed to land, analyze these variables: proper rate of closure with translational lift; rate of descent under control; power smoothly increasing but below hover power.

WARNING. Extreme caution must be exercised to avoid low airspeeds while downwind, especially in strong winds. High angle bank turns should be avoided. Normally, rates of descent should not be in excess of those used in rectangular patterns. These factors are most critical at high density altitudes and/ or high gross weights. If speed becomes too fast or slow, or rate of descent too fast, GO- AROUND. Improperly executed descending turns under such conditions can result in rapid loss of lift from which there may be insufficient altitude/ power to recover.

Note 1. Plan the approach to a touchdown if a brownout or whiteout condition is anticipated.

Note 2. If approaching a site surrounded by obstacles, the crew must be aware of possible loss of wind effect as the helicopter descends below the obstacles.

Note 3. Make the decision to abort or go- around as early as possible during the approach. If an approach is aborted early at a high altitude, less power will be required to go- around and rotor RPM will not be as critical a problem. If the approach is aborted at a low altitude, higher power settings must be used to establish a climb and avoid obstacles; and rotor RPM may become a critical problem.

A18.36. Landing.

A18.36.1. When landing in an unfamiliar LZ, plan the approach to a hover to avoid landing on hidden obstacles. Check for stumps, rocks, depressions, etc., before landing. After landing, maintain power to remain light on the landing gear until surface stability is assured. This procedure will facilitate an immediate departure as well as prevent possible tipping due to unnoticed obstacles. The crew must remember that with the landing gear on the ground, there is little clearance from the ground to the bottom of the aircraft.

NOTE:

Care must be exercised when landing in low brush. Some bushes and branches which flatten in the rotor wash may spring up into the blades during shutdown.

A18.36.2. When landing at areas with unstable surfaces, an approach to a touchdown is recommended to minimize blowing dust, snow, or debris. An ITO/ go- around should be accomplished if visual references are lost.

A18.37. Takeoff. Recompute or confirm adequate power required to hover if you have added personnel/ weight to the helicopter or if ambient conditions have changed. Complete the before takeoff checklist. Recheck the wind direction and velocity. Brief the departure route (consistent with the wind direction) selected during the high/ low reconnaissance. Use maximum rotor RPM for takeoff and attain a safe single engine envelope as soon as possible. If the wind is light and variable, an inadvertent downwind takeoff could adversely affect aircraft performance. Consider the effects of crosswinds on tail rotor authority when determining takeoff direction.

A18.38. Mountain Flying Considerations. Reference the dash-1.

Section A18H—Aerial Delivery Operations

A18.39. General. Airdrop operations refer to air movement of personnel, supplies, or equipment in which unloading is accomplished from the aircraft while in flight.

A18.40. Drop Procedures. Units conducting aerial delivery operations will develop specialized training programs and operational procedures. Units will employ AFMCI 11-301, *Life Support Program*, AFJI 13-210, 11-402, *Aviation and Parachutist Service, Aeronautical Rating and Badges*, FM 31-19 (US Army), and applicable T.O.s for all operations.

Section A18I—Cargo Sling Operations

A18.41. General. The aircraft commander is responsible for selection of the hookup and release point and proper sling configuration. Good coordination with the requesting unit is essential. Determine wind direction and estimated velocity, however, wind is not considered in computations for power required to hover. Thoroughly brief all personnel concerned with the mission on their duties and responsibilities during the operation. Give particular attention to the increased rotor downwash and its effect on loose equipment, personnel, and debris.

A18.41.1. Sling Procedures. Complete preflight inspections according to the applicable dash-1.

A18.41.1.1. Cargo Pickup. Hookup to the cargo load is accomplished using interphone instructions between the FE and the pilot and, when required, hand signals between FE and hookup person. Brief the hookup person on hookup procedures to include: hook grounding, ingress/ egress routes, hand signals, and emergency procedures.

A18.41.2. Accomplish an inflight power available check prior to sling operations. Compare computed power required to lift the load with power available to ensure an adequate margin is available.

A18.41.2.1. Hookups may be accomplished by landing near the load or hovering over the load depending on the availability of personnel to perform hookup duties.

A18.41.2.2. Normally, turn the sling arming switch off at altitudes above 500 feet AGL and turn it on at or below 500 feet AGL.

WARNING. If at any time load oscillations cannot be controlled and increase to a point where loss of aircraft control is imminent, the load should be jettisoned immediately.

NOTE: When operating in sandy or dusty conditions, avoid abrupt power changes in order to minimize the possibility of reduced visibility.

NOTE: Objects which take on water should be allowed to drain while the helicopter is in a hover prior to takeoff.

A18.41.2.3. Inflight. Limit forward flight to an airspeed commensurate with the aerodynamic stability of the load or dash- 1 limit.

A18.41.2.3.1. Avoid flying over personnel, buildings, or equipment.

A18.41.2.3.2. Avoid areas of known or suspected turbulence.

A18.41.2.3.3. Under normal circumstances, aircraft control should not be transferred while the cargo sling is armed. If a requirement exists to transfer controls with the sling armed, extreme caution should be taken by the pilot assuming control.

A18.41.2.4. Delivery. Closely monitor power requirements and anticipate power changes. AVOID STEEP APPROACHES and maintain smooth, positive aircraft control. DO NOT drag

the load on the ground. Stabilize in a hover with the load approximately 6- 8 feet above the ground before initiating the vertical descent.

A18.41.2.5. Interphone Procedures. Use the term "load hooked" for completion of hookup and "load released" when cargo is released. The FE should provide additional information to include cargo ground clearance during approach and hover and the condition of cargo during flight.

A18.41.3. Safety Procedures. The following procedures will apply to all cargo sling missions:

A18.41.3.1. At the aircraft commanders discretion, the hookup person may be positioned at the two o'clock position until cleared in for the hookup. Position the hookup person at the load to effect an immediate hookup. After the hookup, the hookup person egresses at the two to three o'clock position as necessary.

A18.41.3.2. The hookup person must wear goggles or helmet with visor down for eye protection and appropriate hearing protection.

A18.41.3.3. Check all cargo sling releases and lift straps/ cables for proper operation/ condition prior to picking up a sling load.

A18.41.3.4. Move all cargo sling loads slightly before pickup to ensure that they are not frozen or otherwise held fast to the surface.

A18.41.3.5. Recommend the lower strobe light be turned off during pickup and delivery. Other lights should be turned off and retracted if they could distract the hookup person or interfere with the hookup.

A18.41.4. Emergency Procedures. It is not practical or necessary to cover all emergency situations that could occur during cargo sling operations. Good training procedures and sound judgment by all concerned should minimize problems when emergencies do occur.

A18.41.4.1. If loss of power occurs prior to hookup, execute a hovering autorotation to the left of the load. Hold sufficient pitch and left cyclic after autorotation is entered to clear the load.

A18.41.4.2. Should engine failure or loss of power occur after hookup, make every attempt to release the load and execute a hovering autorotation (if required) to the left of the load.

A18.41.4.3. If engine failure or loss of power occurs, the ground crew will perform the following:

A18.41.4.3.1. Marshaller. Turn away from the aircraft and lie face down on the ground, covering head with both arms to protect from flying objects should the aircraft crash.

A18.41.4.3.2. Hookup Person. Take action prebriefed with the crew, i. e., hug the load, dive clear to the right, etc.

A18.41.4.4. If an inflight emergency is encountered, external cargo should be jettisoned if necessary.

Section A18J—Formation Flying/Chase Procedures

A18.42. General. The primary purposes of helicopter formation flight are mutual support and control. In addition, formation flight enhances discipline, maneuverability, and flexibility. Helicopters will not fly formation in IMC conditions. When penetration of IMC conditions is unavoidable, the formation will be broken up, and individual clearances obtained. The minimum lateral separation between aircraft in any

formation is 200 feet measured from blade tip to blade tip for all helicopters. When formation currency is not maintained, minimum lateral separation is increased to 300 feet.

A18.43. Responsibilities. Every crewmember has well- defined responsibilities which, if not strictly adhered to, may jeopardize the safety and mission of the entire formation:

A18.43.1. Flight Leader. The flight leader must know and consider the capabilities of all members of the flight. Flight lead is responsible for all aspects of the flight to include flight integrity and discipline.

A18.43.2. Wingman. The wingman must be considerate of others in the formation and capable of reacting positively and precisely to any situation. The wingman is responsible for:

A18.43.2.1. Maintaining position in the formation until authorized or directed to change. The wingman will advise flight lead when it is necessary to deviate from any directed position.

A18.43.2.2. Acknowledging a directed change in the formation position prior to initiation.

A18.43.2.3. Assisting lead in navigation and terrain/obstacle clearance.

A18.43.2.4. Backing up the flight lead where necessary and being able to assume the lead if required.

A18.43.2.5. Crewmembers. In view of the extremely limited visibility below and aft in most helicopters, each crewmember has the responsibility to provide mutual coverage for other aircraft in the formation.

A18.44. Briefing. The flight leader will conduct the briefing for the formation phase of the mission using the formation briefing guide. A deputy lead will be designated.

A18.45. Communications. Formation flight will not be accomplished without positive interaircraft radiocommunications. Prior to taxi, a communications check of all aircraft in the formation will be conducted:

A18.45.1. Radio Procedures. After initial radio contact has been established between aircraft, the lead is responsible for making all calls pertaining to the flight:

A18.45.1.1. Frequency changes will be initiated only by lead.

A18.45.1.2. Wingmen will acknowledge (by numerical position in the flight) a frequency change prior to switching to the new frequency.

A18.45.1.3. Lead will check in on the new frequency followed by all wingmen (in order).

A18.45.1.4. If a wingman fails to check in after a reasonable length of time, lead will direct all members of the flight back to the previous (or a prebriefed rendezvous) frequency to re- establish contact.

A18.45.1.5. Both the pilot and copilot in each aircraft in the flight will monitor the interaircraft frequency.

A18.45.1.6. Only essential transmissions will be made. Strict radio procedures and discipline must be enforced in order to avoid jeopardizing safety and mission effectiveness.

A18.45.2. Signals. All crewmembers who engage in formation flight will know the visual formation signals contained in AFI 11- 205, *Aircraft Cockpit and Formation Flight Signals*, as supplemented.

A18.45.3. Unless otherwise briefed, the lead aircraft will squawk the appropriate transponder code for the flight, and all other formation members will squawk standby. If lead changes, the new lead aircraft will pick up the squawk upon assumption of lead. If any member of the formation moves more than one nautical mile laterally or 500 feet vertically from the lead aircraft, the aircraft will obtain and squawk an appropriate transponder code.

A18.46. Formations. Only route formation is authorized for helicopters. This is a formation with the wingmen maintaining a variable position no closer than 200/300 feet from the preceding aircraft. Wingmen maintain a position from left abeam around to right abeam as required.

A18.47. Engine Start and Taxi. Start engines by visual signal, radio call, or at prebriefed time. Prior to requesting taxi clearance, flight lead will check- in the flight. Wingmen will acknowledge with their position in the formation when ready. The flight normally taxies in order with at least 100 feet clearance between tail rotor and blade tip.

A18.48. Takeoff. When given clearance onto the active runway/ takeoff position, aircraft will move into position with 100 feet clearance from the preceding aircraft. On direction of flight lead, aircraft complete all pretakeoff checks required, move into takeoff position and report "Ready for Takeoff." Upon takeoff, lead may be required to hold a slightly lower than normal power setting to enable the wingman to maintain position without requiring excessive power. Takeoff interval between each aircraft should be adjusted to allow a minimum of 200/300 feet lateral spacing.

A18.49. Aborts. Should an abort be required prior to takeoff, aborting aircraft will notify lead and pull out of the takeoff stream if practical. All other aircraft will assume new positions and call signs. Spare aircraft or the original aircraft may rejoin the formation in last position at the discretion of the flight leader. If an abort occurs during takeoff, the aborting aircraft will announce abort on primary frequency by stating call sign, position number and the word "abort" three times. The aborting aircrew will, if possible, maintain the side of the runway from which takeoff was started and announce their intentions as soon as possible. Succeeding aircraft may continue takeoffs or delay as the situation dictates.

A18.50. Join-Up. Should a join- up be necessary, use either a straight ahead or turning rejoin. Type of join- up will be prebriefed.

A18.50.1. Straight Ahead. Lead will establish a heading while wingmen accelerate until established in position. To expedite the maneuver, lead may reduce airspeed until wingmen call in position. This type of join- up is most advantageous when it is desired to depart on course or when a turn after takeoff would not be practical. Use 70 KIAS or predetermined airspeed. If the prebriefed airspeed changes, lead must state the new airspeed over the radio.

A18.50.2. Turning. Lead establishes an angle of bank no greater than 25 degrees. Wingmen join inside of lead/ preceding aircraft to establish a cutoff.

NOTE:

Any time a potentially dangerous situation develops-- OVERSHOOT. Maintain visual contact with lead (preceding aircraft) and slightly below or overshoot immediately. All overshooting aircraft will request permission to rejoin the flight.

A18.50.3. Night Join-Up. Extreme caution must be exercised during night join- ups due to the difficulty in determining distance and closure rate. Lights of the preceding aircraft may be dimmed or the rotating beacon/ strobes turned off at the request of wingmen.

A18.51. Night Formation. Night formation procedures are the same as for day but increased vigilance is an absolute necessity due to decreased visual references. All corrections by wingmen must be slower and more cautious. Wingmen should fly at a comfortable distance; however, if the distance becomes excessive, relative movement of the lead aircraft is difficult to detect. The following light settings are recommended:

A18.51.1. Position Light - ON (as required).

A18.51.2. Fuselage Light - ON (if applicable).

A18.51.3. Cargo Loading Light - ON (if applicable).

A18.51.4. Cargo Compartment Dome Light - ON (red, if available).

A18.51.5. Pilot's Compartment Spotlights - ON (red) - aimed out and to the rear of the pilot's compartment upper side window (if applicable).

A18.51.6. Rotating Anticollision Light/ Strobe Light - OFF (as directed by lead), (ON for last aircraft in formation and ON for lead during join- up/ crossover).

A18.51.7. Formation Light - ON bright (if applicable).

A18.52. Changing Lead. Lead changes should be thoroughly briefed and only made when required for mission accomplishment or training. Changes in formation should be made from an echelon or fingertip position. All lead changes must be fully coordinated and understood by all formation members. The wingman designated as the new lead will maintain adequate clearance and accelerate to pass lead. As the wingman passes abreast of lead, the wingman becomes lead and will assume control. The former lead will then move to the last position in the formation. Changes in the lead aircraft do not change the designated formation leader's responsibility for the flight. If the formation lead aborts, the designated deputy lead will assume responsibility for the formation regardless of the position within the formation.

A18.53. Lost Wingman Procedures. Whenever a wingman loses sight of the preceding aircraft, it is imperative that all members of the formation react quickly and precisely to prevent a midair collision. In such a case, the aircraft losing contact will call "(call sign), lost visual contact" and immediately turn 30 degrees away from the formation's base heading and climb 500 feet. If another aircraft calls lost visual contact and you still have sight of the preceding aircraft, maintain position on that aircraft. Successive aircraft losing visual will turn 30 degrees away from the preceding aircraft and climb 500 feet higher. (This will result in #4 proceeding 90 degrees away from the flight and 1500 feet higher than lead.) Aircraft executing a lost visual breakup must maintain the new heading long enough to provide sufficient lateral separation from the flight. Lost visual procedures will be specifically addressed during the formation

briefing. Individual aircraft commanders may be required to obtain clearance with the appropriate controlling agency when initiating the altitude changes required by the lost contact procedures.

A18.54. Inadvertent IMC. Do not attempt to maintain visual contact in IMC. Initiate lost wingman procedures described above.

A18.55. Approach and Landing. The method of approach and landing will vary with the number of aircraft, mission requirements, and weather. Lead may elect to break up the formation with each aircraft accomplishing an individual approach and landing. Do not change lead or wing positions below 300 feet AGL (day), 500 feet AGL (night). Maintain minimum 200/300 feet lateral separation throughout approach and landing.

A18.56. Safety Chase:

A18.56.1. Preflight Briefing. A good safety chase sortie begins with a good flight briefing. The chase pilot should arrive at the briefing with information concerning his/ her aircraft, such as the maintenance status, configuration, and any unusual limitations which may affect the mission. The test aircraft pilot or test conductor should very clearly define the duties and requirements of the chase helicopter. The chase pilot should ensure that the mission requirements are within the capability and limitations of the chase helicopter and brief any considerations required to successfully accomplish the mission. All parties involved in the test mission should leave the briefing with a clear understanding of the events which will take place at each point during the flight. The chase pilot will have a copy of the appropriate mission cards. Last minute changes should also be briefed even at the expense of delaying the mission.

A18.56.2. Chase Limitations. The chase pilot seldom has the luxury of flying an aircraft capable of matching the test article throughout the flight envelope. The chase helicopter pilot must compensate for this with advanced planning and skill. Without a conscious awareness of the helicopter's limitations, it is possible to maneuver into a position which seriously compromises safety. Be particularly aware of the hazard which could result from a combination of high density altitude and low airspeed. Do not slow below translational lift out of ground effect unless OGE power is available and confirmed.

A18.57. Photo Chase. The essential difference between photo and safety chase is the added teamwork between the lead, the chase pilot and the chase pilot's responsibilities to the photographer. The amount of teamwork required between the lead and chase pilot will depend on the maneuver being flown, aircraft differences, and the photo position required. Procedures to be used for a particular mission should be discussed and resolved during the briefing.

Section A18K—Hoist Operations

A18.58. General. The following hoist procedures apply only to daylight operations. Night hoist operations are authorized only for emergency rescue missions and will be specifically approved by the DFO. Aircrews will adjust all airspeeds and altitudes to ensure adequate margins of safety during night operations.

A18.59. Rescue Devices. The aircrew determines which device to use. A survivor unfamiliar with the rescue device should be assisted by a crewmember, briefed over a loud hailer, or provided printed instructions attached to the device to ensure proper entry and security for a safe pickup. The rescue hoist will not be used to relay messages except when all other possible means of communication (i. e., radio, message streamers, loud hailer) have been exhausted. In this event, the rescue hoist may be used only when necessary in a life or death situation, or to determine if one exists.

NOTE:

Rescue devices used for hoist training will be identical to and configured the same as operational equipment. If live hoist training is to be conducted, only operational equipment will be used.

A18.59.1. Forest Penetrator:

A18.59.1.1. The forest penetrator can be used for single or multiple recoveries from land or water. It is recommended for recovering personnel whose parachutes have become entangled in trees. It allows assisting personnel use of both hands to aid the survivor. The forest penetrator can be used to recover incapacitated or injured personnel safely with the exception of those with back injuries.

A18.59.1.2. Procedures:

A18.59.1.2.1. Establish a stable hover. Fold the seat paddles and stow safety straps with the zippers closed before lowering the forest penetrator through trees or dense foliage.

A18.59.1.2.2. If the hoist operator loses sight of the rescue device, the cable tension must be relied upon to detect when the penetrator has reached the ground. If it appears that the penetrator has reached the ground, it should be raised several feet and relowered to ensure that it is not hung up.

A18.59.1.2.3. When there is no visual or oral communication with the survivor, the hoist operator will hold the hoist cable for the survivor's signal. Jerks on the cable is the signal to start retrieving the cable. Hoist retrievals from trees must be slow enough to allow survivors to fend off branches, and prevent cable entanglement.

A18.59.1.2.4. It may be possible for a crewmember on the penetrator to recover the survivor without unstrapping from the penetrator.

A18.59.1.2.5. It is possible to recover three people at one time with the penetrator. However, this should only be done when time is critical since it may load the hoist to the limit.

A18.59.1.2.6. If the crewmember leaves the penetrator to assist the survivor during a tree recovery, fold the seat paddles and stow the safety straps with zippers closed so that they will not snag on obstructions if the helicopter moves or the hoist cable has to be retracted.

A18.59.1.2.7. For water recoveries, install the flotation collar prior to lowering the penetrator. Place at least one seat paddle in the down position and remove one safety strap from the stowed position. Do not unhook the safety strap fastener from the penetrator.

A18.59.2. Stokes Litter.

NOTE:

The stokes litter should be used to immobilize the survivor. Once the survivor is strapped securely in this device, he/she need not be moved until arrival at the medical facility. The stokes litter will be secured to the helicopter prior to takeoff.

A18.59.2.1. Procedures.

A18.59.2.1.1. To lower the litter, place it outside the aircraft foot end first; then move it parallel to the side of the helicopter. The hoist operator may be required to lean out of the door to maneuver the litter. For water recoveries, the stokes litter may be deployed utilizing the low and slow deployment procedures. This is the quickest means of deployment and subjects a critically injured survivor in the water to less exposure to rotor wash. Lower the stokes litter to the survivor after the helicopter is established in a hover. The hoist operator provides enough slack so that the crewmember can disconnect the hoist cable. It is not necessary to stay over the survivor once the litter is removed. After the survivor is secured in the litter and ready for hoisting, the crewmember reconnects the hoist cable and ensures that rescue hook safety pin and carebiner locking sleeves are properly positioned. When using the stokes litter, ensure that the survivor is securely strapped in the litter prior to hoisting. For small patients, the belt can be routed directly across the patient. For large patients, the belt can be routed outside and over the top bar before securing patient to the litter.

A18.59.2.1.2. Use extreme care when hoisting the stokes litter because of litter pendulum action and rotation. These actions may increase to unmanageable proportions if they are not quickly stopped by the hoist operator. The pendulum action is dampened by moving the cable in the opposite direction of the litter movement. Litter rotation can be stopped by rotating the hoist cable in a small diameter circle in the opposite direction of the rotation of the litter. In extreme emergencies, if litter rotation cannot be stopped by the hoist operator, the pilot can transition to forward flight at an airspeed of up to 30 knots to stop oscillation and rotation.

A18.59.2.1.3. A tag line may be attached to the stokes litter to prevent pendulum or spinning motion during hoisting.

A18.59.2.1.4. Stop the litter just below the helicopter, then maneuver the litter to align it parallel to the aircraft. At the same time, push the litter outward so that the basket does not contact the side of the helicopter. Litter maneuvers may require both hands. This maneuvering may be accomplished by using the litter cables.

A18.59.2.1.5. When the stokes litter is parallel, raise the litter to the full- up position so that the litter is above the cabin floor level. Turn the litter perpendicular to the aircraft and pull it into the cabin head first. The pilot or another crewmember may have to provide cable slack at this point.

A18.60. Hoist Operator. The primary hoist operator will be the FE; however, all crewmembers should understand these duties. The hoist operator's duties are to relay directional instructions on interphone and to operate the hoist from the cabin position leaving the pilot free to concentrate on hovering. When radio contact is not available, hand signals will be used between ground personnel and the recovery helicopter.

A18.60.1. Ground the hoist to discharge static electricity to prevent personnel on the ground or in the water from sustaining a shock. To preclude ignition of fuel, do not ground the hoist near spilled fuel from damaged aircraft or vehicles.

A18.60.2. Use caution during hoist operations; ensure that slack cable is held to the minimum necessary to perform the recovery. Excessive slack can be especially dangerous during water recovery where the survivor cannot see the cable.

A18.60.3. Notify the aircraft commander any time the hoist cable cannot be adequately monitored. In such cases, alternate methods of making the pickup should be considered or an additional crewmember should be used to help monitor the hoist cable.

A18.60.4. Greater than normal oscillations may occur when the hoist cable is raised and lowered without some weight attached.

A18.60.5. If pendulum action and rotation of the rescue device are not quickly stopped, the rotations may increase to unmanageable proportions. The pendulum action may be dampened by moving the cable in the opposite direction of the movement of the rescue device. Rotation of the rescue device can be stopped if detected early, by rotating the hoist cable in a small diameter circle in the opposite direction of rotation of the rescue device.

A18.60.6. Do not conduct hoist training with the hoist operator's interphone inoperative.

A18.61. Land Hoist Procedures. Procedures contained in Chapter 7 also apply for high/low reconnaissance.

A18.61.1. Smoke Drop Pattern. Determination of wind direction and velocity is important to successful hoist operations. If a smoke device is used, plan an approach to drop the smoke device as low and slow as terrain permits. Complete the smoke drop checklist and deploy the smoke device. Deploy smoke close enough to the survivor to get accurate wind information and, if possible, in an area that can be seen from anywhere in the hoist pattern. Select a nonflammable target area for the smoke device.

A18.61.2. Hoist Pattern:

A18.61.2.1. Complete the before landing checklist and the hoist operator's checklist prior to starting final approach for hoist recovery.

A18.61.2.2. If possible, establish a right- hand, rectangular pattern with a final approach oriented into the wind. This aids in keeping the survivor in sight while preparing for the pickup.

A18.61.2.3. Keep the hoist operator informed of position in the pattern at all times. Likewise, the hoist operator informs the pilot when ready to deploy smoke markers or accomplish the pickup.

A18.61.2.4. During descent under adverse weather conditions, the copilot will call out altitudes in 100 foot increments when above 300 feet AGL and 50 foot increments when below 300 feet AGL.

A18.61.2.5. If the survivor appears to be injured and attached to the parachute, hover at an adequate distance away from the parachute to prevent the rotor wash from billowing the parachute and endangering the survivor and/or the recovery.

A18.61.3. When the pilot has determined that the recovery can safely be accomplished, direct the hoist operator to "GO Hot Mike" prior to losing sight of the survivor. Devote full attention to main-

taining a steady hover, use all available references and follow the hoist operator's instructions. The copilot will monitor the engine instruments, monitor blade tip clearance and remain oriented with the horizon throughout the hoisting operation to assist the pilot should the need arise. The hoist operator will assist the pilot in maintaining adequate rotor tip clearance to the rear and right side of the helicopter.

A18.61.4. When the survivor is in the rescue device and ready for hoisting, the hoist operator will give instructions to position the helicopter over the survivor and take up any slack in the cable. Normally, the hoist operator will raise the survivor but may request the pilot to "raise helicopter." The hoist operator will keep the pilot advised of the survivor's position. When the survivor is in the cabin, the hoist operator will notify the pilot and complete the after pickup checklist. When over trees, the hoist operator will advise the pilot when the survivor is clear of the trees.

A18.62. Water Hoist Procedures. Lack of depth perception, and possible disorientation in marginal weather require more precise smoke drop patterns and procedures. The hover position for water hoist is directly over the survivor. However, once the rescue device is lowered to the water, the pilot may elect to back to a holding hover. Once the survivor is ready for hoisting, the pilot should establish the hover over the rescue device prior to hoisting the survivor out of the water.

CAUTION. Smooth water adversely affects depth perception.

A18.62.1. Complete pilot's before landing checklist and hoist operator's checklist prior to final approach.

A18.62.2. After initial sighting of the survivor, maneuver to a position downwind of the survivor from which an observation pass can be accomplished. If the survivor's condition is unknown or swimmer deployment is anticipated, the observation pass will be made at a maximum of 10 feet above water level (AWL) and 10 knots to allow for swimmer deployment. If swimmer deployment is not required, make the observation pass above translational lift airspeed at an appropriate altitude.

A18.62.3. After the observation pass, initiate a climbing right turn to a 100 foot AWL minimum downwind altitude. Deploy sea dye or smoke markers as directed by the pilot. Use sea dye instead of smoke markers when an oil or fuel spill is near the survivor. In high sea states or high winds, use of more than one sea dye is recommended. If use of sea dye or smoke markers is prohibited or not required, proceed without them.

A18.62.4. Roll out on downwind and then continue turn to final. If the survivor is not ready for immediate pickup, establish a holding hover approximately downwind of the survivor.

A18.62.5. On final, descend to hover altitude and slow to arrive over the survivor in a stable hover.

A18.63. Adverse Weather Water Hoist Pattern:

A18.63.1. Upon initial sighting of the survivor, deploy a smoke marker in the immediate vicinity of the survivor.

A18.63.2. After the wind direction is determined, establish a smoke drop pattern at 300 feet and 70 KIAS.

A18.63.3. Commence before landing checklist and hoist operator's checklist prior to initiating final for the pickup.

A18.63.4. When immediately over the survivor, the hoist operator will deploy all three markers with 1 second intervals - the first two markers should be dropped straight downward while the third should be thrust outward and downward at an approximate 45 degree angle from the heading of the aircraft. The pilot may delay the deployment of the smoke markers after passing over the survivor when conditions warrant extended hover, i. e., exceptionally high hover heights, or strong wind/ current conditions. Sea dye may be used in addition to or in lieu of smoke markers (i. e., the sea dye marker is a safer method of establishing a hover reference when an oil/fuel spill is near the survivor). If sea dye is used in addition to smoke markers, deploy it prior to the smoke marker.

A18.63.5. Normally, a right- hand rectangular hoist pattern is flown with a final approach into the wind. Unnecessarily extending the hoist pattern may result in losing the survivor's position.

A18.63.6. he pilot will keep the hoist operator informed of the position of the aircraft in the pattern at all times. The hoist operator will acknowledge each position report and keep the pilot abreast of all changes.

A18.63.7. Establish final approach using the survivor and smoke markers as references. Begin the approach at 300 feet AWL and 30 knots. Decrease airspeed and altitude to reach a minimum hover as determined by sea state, salt spray, and power reserve. During the last 100 feet of the approach, the rate of descent will be a maximum of 300 feet per minute. The hover altitude should be established approximately 75 feet short and downwind from the survivor while allowing the helicopter to continue moving slowly forward to the hover point. If the helicopter instrument panel interferes with forward visibility, the initial hover may be offset to the left.

A18.63.7.1. Normally, use all available lighting. Lighting configuration may be varied in conditions of restricted visibility. Large and excessive movements when adjusting the search or landing light may induce vertigo.

A18.63.7.2. Cross- reference the barometric altimeter throughout the pattern and hover. The pilot not flying calls out passing altitudes in 50 foot increments below 300 feet AWL. Monitor rate of descent and call out excessive descent rates. A steep and/ or fast final approach at night is extremely hazardous. If air-speed and/ or rate of descent are excessive on final, go- around. Flight Engineers will also monitor altitude and descent rates.

A18.63.7.3. Attempt to determine where the smoke generated by the markers is drifting. Under light or variable wind conditions, the smoke may pose a visibility and orientation hazard. Be prepared to execute a go- around, if necessary.

A18.64. Recovery Phase. Pilots must devote full attention to altitude control and power settings during the transition from the approach to the hover phase. Prior to losing sight of the survivor, direct the hoist operator to "Go Hot Mike." The hoist operator should shift visual references from the water to the horizon at frequent intervals to prevent spatial disorientation. When the survivor is in the rescue device and ready, the hoist operator gives instructions to position the helicopter over the survivor, and takes up any slack in the cable. Normally, the hoist operator will raise the survivor but may request the pilot to "raise helicopter." The hoist operator will keep the pilot informed of the survivor's position. When the survivor is in the cabin, complete the after pickup checklist.

NOTE:

A raft approached very slowly will be blown along slowly in advance of the rotor wash. As a raft is approached, do not excessively slow the closing speed, but move smoothly toward and directly over the raft. Hovering over small boats may present the same drift difficulties as a raft. Personnel supported by life jackets present no drift problem.

A18.65. Incapacitated Survivor Recovery. Hoisting procedures for the recovery of an unconscious or inert survivor from water or land areas are as follows:

A18.65.1. The hoist operator determines if the victim is unconscious or unable to enter the rescue device. The pilot directs one of the crewmembers to be lowered by the hoist and another to act as hoist operator. The medical specialist, when available, is the primary crewmember for deployment to aid an injured or inert survivor.

A18.65.2. The hoist operator ensures that the crewmember being lowered is properly equipped and the equipment is properly adjusted. Advise the pilot when the crewmember is ready to be lowered.

A18.65.3. Enter the rescue device after the approach. Secure the survivor for hoisting and give a "thumb up" signal to indicate that the survivor is ready for pickup.

A18.65.3.1. If the survivor appears to be injured and is attached to the parachute, hover at an adequate distance to prevent the rotor wash from billowing the parachute and dragging the injured survivor.

A18.65.3.2. The pilot must not attempt to watch the pickup as spatial disorientation may result. Pilot vertigo can become a problem during adverse weather conditions. Use the attitude indicator as an additional reference in conjunction with the dye and smoke markers.

A18.65.3.3. Beware of the tendency to drift backwards while hovering during adverse weather conditions over water. This may result in a loss of relative wind and loss of lift causing the helicopter to descend. If allowed to continue, sufficient power may not be available or over- torque of the main gear box may be required to recover.

A18.66. Water Hoist Precautionary Measures. Water training will be conducted at approved water operating areas.

A18.66.1. Conduct all water hoist training a minimum of 100 yards offshore.

A18.66.2. The hoist operator directs the pilot over the survivor or hover point using standard terminology. Instructions should be clear and concise with commentary on the progress of the approach and hover operation. The hoist operator can aid the pilot with airspeed control during the approach by describing the reduction of distance, in a numerical sequence, from a given point from the survivor, to a hover point over the survivor. The frequency of numerical calls that are made should indicate the speed of the helicopter toward the survivor or closure rate. A closure rate is not necessarily given in a preset distance of feet, yards, or meters, but is normally associated with one of them. An example would be "survivor at twelve for one hundred, seventy five, fifty, forty, etc." The faster the call, the more rapid the closure. Five, four, three, two, one, stop." If too fast, initiate a "go- around."

A18.67. Safety Procedures.

A18.67.1. Throughout the entire recovery phase, the pilot not flying/ FE monitors the flight instruments and advises the pilot when reaching the altitudes, airspeeds, and rates of descent briefed. When in a hover, the copilot/ FE cross- references the altitude indicator and the reference smoke. If the pilot becomes disoriented, initiate an instrument takeoff or direct the other pilot to assume control of the aircraft.

A18.67.2. Monitor the hoist mechanism to ensure proper cable feedout and retrieval. Crew briefings prior to hoisting will include positive actions to be taken in the event of equipment malfunctions or impending failures such as overheating, oil seepage, unusual vibrations, etc. During training missions, terminate live hoisting immediately at the first indication of equipment malfunction. If possible, return the individual to the surface by lowering the aircraft. For actual SAR missions, existing circumstances must dictate actions to be taken. The hoist operator will advise the pilot, check hoist power sources and hoist controls, and request another crewmember to operate the hoist, if necessary.

A18.67.3. Exercise the utmost caution during hovering operations to preclude snagging the helicopter hoist hook or cable around an immovable object. The hook and cable should be kept in view at all times to prevent the cable from becoming entangled with ground objects. If the hook or cable should become fouled, attempt to free it by paying out slack and manipulating the hoist. Use caution when applying tension to the cable. If the cable should break, cable whiplash can cause rotor damage.

A18.67.4. The hoist operator will wear a heavy, work- type glove on the hand used to guide the hoist cable and have the helmet visor down.

A18.67.5. When hovering over salt water, the helicopter will maintain a hover OGE, if possible, to preclude salt spray buildup on the windscreen.

A18.67.6. When pulling the survivor into the helicopter, the easiest method is to turn the survivor's back to the helicopter and pull in. This procedure reduces the possibility of semiconscious or injured survivor fighting the hoist operator. The rescue device should never be removed form the hoist cable or the survivor until the survivor is safely inside the helicopter and clear of the door.

A18.67.7. To prevent dropping the rescue device, use the hoist hook safety/retaining pin.

EXCEPTION: When raising or lowering an empty stokes litter for water recoveries, the use of the safety/retaining pin is not required. This makes it easier to remove the litter from the hoist cable. Install the safety/retaining pin prior to hoisting the litter with a survivor.

A18.67.8. If a loss of aircraft power is experienced while hoisting, attempt to lower the person being hoisted to the surface. It may be necessary to cut the cable. Should an inadvertent landing occur, primary consideration must be given to moving away from personnel on the ground.

A18.67.9. Interphone Failure. If interphone failure occurs between the pilot and hoist operator and cannot be remedied by changing interphone cords, have the copilot or another crewmember relay the hoist operator signals to the pilot. The hoist operator gives directions by moving an open hand with the palm turned in the desired direction of movement. To hold position, clench the fist. The hoist operator can direct use of the hoist control or indicate hoist operation by extending the thumb of a clenched fist either up, down, in or out, as applicable. To indicate "survivor in and secure and ready for takeoff," point in the direction of intended takeoff.

Section A18L—Search Procedures

A18.68. General. AFMC helicopters, on occasion, may be tasked to support search/ rescue missions. This will be contingent on the availability/ suitability of other local rescue/ search organizations.

A18.69. Mission Planning. Mission planning is the key to any successful search mission. As a minimum, the mission/aircraft commander must consider the following factors:

A18.69.1. Weather.

A18.69.2. Terrain characteristics.

A18.69.3. Sea conditions.

A18.69.4. Light conditions (visibility).

A18.69.5. Signal aids of survivors.

A18.69.6. Size, shape, and color of search objective.

A18.69.7. Status of objective (overdue, lost, or crashed).

A18.69.8. Estimated location.

A18.69.9. Endurance of search aircraft.

A18.70. Search Methods. The two basic methods of aerial search are visual and electronic. Normally both procedures are used in concert.

A18.70.1. Use visual search procedures when electronic devices are not available.

A18.70.2. Use electronic search when searching for survivors with transceivers/ radio beacons. Monitor distress or preplanned beacon frequencies and home on the signal. Monitor applicable distress frequencies at all times while on search missions, except when making required transmissions.

NOTE:

Civilian- used emergency locator transmitters (ELT) may broadcast on both 243.0 UHF and 121.5 VHF. Military emergency beacons broadcast only on 243.0 UHF.

A18.71. Intensity of Coverage. The intensity of search coverage will be determined by the size of the area to be searched, number of aircraft available for search, and the probability of finding the objectives. Search coverage is of two types:

A18.71.1. Preliminary. This type of coverage will be provided during the initial phase of a mission and during night searches. It is designed for a rapid, reasonably thorough coverage of the primary area when it is likely that the objective will be easily sighted. Route, parallel, and/ or creeping line search patterns should be used and flown at higher altitudes, faster airspeeds, and with greater track spacing than the concentrated search patterns.

A18.71.2. Concentrated. This type of coverage will be provided during the "maximum effort" phase of the mission or when attempting to locate an objective whose position is reasonably well known. This type of search will ensure that an area is thoroughly searched. Expanding square, parallel, or

creeping line search patterns should be used and flown at lower altitudes, slower airspeeds, and with smaller track spacing.

A18.72. Selection of Search Area. When selecting a search area, the crew will compute the maximum size area that could be searched based on aircraft endurance.

A18.73. Search Patterns. Select a search pattern suited to the situation. The search patterns listed below are provided as basic examples and may be modified as necessary.

A18.73.1. Route:

A18.73.1.1. The route search is employed when the only information available is a dead reckoning position or the intended track of the objective. It is usually the first type of search to be employed as it is assumed that the objective is on or adjacent to its intended track. It also assumes that the objective will be easily discernible.

A18.73.1.2. Route search consists of one search leg along a given track. The leg is normally started at either the objective's departure point or at the last known position, and ended at the objective's intended destination or point where the next position report was due. The search leg should be extended at least 25 nautical miles beyond either of the above to allow for objective navigation error.

A18.73.2. Parallel. A parallel search is used to cover large rectangular areas where the objective is expected to be between two points and possibly off track due to navigation error. It may be employed simultaneously or immediately after a route search. It is applicable to either a preliminary or concentrated search effort. The search is characterized by successive legs, parallel to the missing party's intended track. This search is most useful when two aircraft are available, one for each side of the objective's intended track.

A18.73.3. Creeping Line. A creeping line search is adaptable to rectangular areas where the objective is expected to be between two points. It is similar to the parallel search. Fly each leg perpendicular to, and beyond the missing party's intended track. Begin at the missing party's last known location, and work toward their destination.

A18.73.4. Expanding Square/ Rectangle. An expanding square will be used for concentrated search of a small area where a sighting has been reported. The expanding rectangle may be used if the objective is suspected to have drifted or is moving. This is the most difficult pattern to fly.

A18.73.5. Contour Search. Contour search is used to search mountains or hilly terrain. Begin above the highest peak or ridge. Legs are then flown around a peak or back and forth along the side of a peak or ridge. As one circuit or leg is completed, altitude is decreased as terrain dictates and a new leg begins. Turns are always made away from the highest terrain.

A18.74. Track Spacing. Regardless of the type of search pattern, the pilot must carefully establish and maintain track spacing. Generally, track spacing will be greater during preliminary search than during concentrated search. Track spacing should not be greater than twice the detection range.

A18.75. Search Altitudes. Optimum search altitude will primarily be based upon the terrain, weather, and nature of the objective.

A18.76. Search Speed. Search will be conducted at a speed which permits rapid coverage yet allows the scanners to visually detect large objectives, signals, or wreckage. During preliminary searches, use recommended cruise speed computed from the flight manual. This allows the maximum area coverage for the least fuel.

A18.77. On-Scene Procedures.

A18.77.1. Maintain vertical and horizontal separation of all aircraft in the search area. Helicopters are normally assigned the lower altitude in a joint search with fixed wing aircraft.

A18.77.2. Operation normal (position) reports are usually transmitted each hour or as required by the controlling agency.

A18.77.3. Compute bingo fuel time as soon as possible after takeoff and relay the information to the mission commander.

A18.77.4. Report deviations from planned search procedures to the on- scene commander or mission commander.

A18.78. Scanning Techniques. Precise scanning is the heart of a search. Crewmembers in the cargo compartment are the primary scanners:

A18.78.1. Use a routine scanning pattern. The eyes should move and pause each 3 or 4 degrees to cover 10 degrees in approximately 10 seconds. Start scan at a distance and work back toward the aircraft. Avoid turning away from the scanning pattern, closing your eyes, or focusing short of the scanning area.

A18.78.2. Scanning is tiring and requires periodic rest. With 2 scanners available, limit scanning to 30 minutes and alternate from one side of the aircraft to the other. With 3 scanners, switch positions each 30 minutes, for example, left side, right side, rest.

A18.78.3. Telltale signs to look for:

A18.78.3.1. Water searches. Oil slicks, debris, wakes, life boats, rafts. Debris is normally found downwind of oil slicks and rafts/ boats downwind of debris.

A18.78.3.2. Land searches. Smoke, broken or scarred trees, shiny metal, fires, freshly burned out areas, parachutes, signals.

A18.79. Sighting Procedures.

A18.79.1. When a sighting is made, notify the rest of the crew using the clock system and estimated distance to indicate the position of the sighting.

A18.79.2. Immediately upon making a sighting, drop a smoke signal or sea dye to mark the approximate location of the sighting. This marker will assist in returning to the search pattern if the sighting was false. If the sighting is lost prior to confirmation, a return to the marker can assist in reacquiring the objective. Use caution when dropping a smoke device over a wooded area to prevent forest fire.

A18.79.3. If the scanner can keep the objective in sight, turn in the direction of the objective. The scanner will continue to call out the target position and distance for orientation. As the turn progresses, the pilot or copilot should be able to see the target.

A18.79.4. Confirmed sighting procedures:

A18.79.4.1. Keep the target in sight at all times.

A18.79.4.2. Mark with dye marker/smoke.

A18.79.4.3. Report the sighting to the rescue center, on- scene commander, air/ ground station, or operating agency as appropriate. Include, as applicable:

A18.79.4.3.1. Position.

A18.79.4.3.2. Number of survivors.

A18.79.4.3.3. Condition of survivors/ objectives.

A18.79.4.3.4. Type of recovery planned.

A18.79.4.3.5. Assistance needed.

A18.79.4.3.6. Sea conditions.

A18.79.4.3.7. Fuel remaining.

A18.80. Safety Considerations. The following procedures are applicable to all types of search and particularly important for operations in rough terrain:

A18.80.1. The pilot will devote full attention to flying the aircraft and evaluating the terrain for clearance and hazards to flight.

A18.80.2. Power available/required will be continually evaluated. A power available check (IAW paragraph 3.7) will be accomplished prior to slowing below single engine capability or translational lift airspeed. Continuous flight below an altitude or airspeed where a safe autorotation or single engine recovery would be unlikely should be avoided.

A18.80.3. All crewmembers will scan for hazards to flight and not become preoccupied with searching for the objective.

A18.80.4. The crew will constantly evaluate weather conditions and be alert for changes.

A18.80.5. The crew will evaluate the effects of turbulence prior to establishing a search pattern close to mountains.

A18.80.6. The pilot will assure adequate terrain clearance prior to search in canyons and valleys.

A18.80.7. In mountainous or rough terrain, the pilot will plan an escape route.

A18.81. General Aircrew Briefing Guide.

A18.81.1. Roll Call.

A18.81.2. Time Hack:

A18.81.3. Mission:

A18.81.3.1. Mission/JON number.

A18.81.3.2. Classification.

A18.81.3.3. Primary and alternate.

A18.81.3.4. Sequence of events.

A18.81.3.5. Aircraft maneuvering limitations/operational restrictions.

A18.81.4. Weather (departure/en route/destination/alternate).

A18.81.5. Flight Planning:

A18.81.5.1. Aircraft number, call sign.

A18.81.5.2. Fuel load, aircraft configuration.

A18.81.5.3. Takeoff time, duration.

A18.81.5.4. NOTAMS, FCIF/flight orders.

A18.81.5.5. Passengers.

A18.81.5.6. Antihijacking procedures.

A18.81.6. Weight and balance.

A18.81.7. TOLD.

A18.81.8. Hazards.

A18.81.9. Equipment:

A18.81.9.1. Personal/life support.

A18.81.9.2. Publications.

A18.81.9.3. Special mission.

A18.81.9.4. Rings removed/ID tags.

A18.81.10. Crew Duties and Responsibilities:

A18.81.10.1. Emergency procedures.

A18.81.10.2. Safety considerations.

A18.81.10.3. Changing aircraft control

A18.81.10.4. Scanner’s duties.

A18.81.11. Midair Avoidance.

A18.82. Rescue Hoist Briefing Guide (H-1).

A18.82.1. Mission Objective.

A18.82.2. Hoist Limitations.

A18.82.2.1. Lateral CG.

A18.82.2.2. Weight.

A18.82.3. Pick-up Location.

A18.82.4. Pick-up Procedures.

A18.82.5. Number of personnel and their condition.

A18.82.6. Communications.

A18.82.7. Destination.

A18.82.8. Formation Procedures.

A18.82.9. Emergency Proecedures.

A18.83. Formation Procedures Briefing Guide.

A18.83.1. Mission Objectives.

A18.83.2. Tail numbers and call signs (spares).

A18.83.3. Parking spots.

A18.83.4. Communications check.

A18.83.5. Taxi plan.

A18.83.6. Takeoff procedures.

A18.83.7. Communications procedures en route:

A18.83.7.1. Interphone.

A18.83.7.2. Visual signals.

A18.83.7.3. Light signals.

A18.83.8. Abort procedures.

A18.83.9. Headings, Airspeed and Altitudes.

A18.83.10. Type formation.

A18.83.11. Join-up Procedures.

A18.83.11.1. Rejoin airspeed straight ahead.

A18.83.11.2. Rejoin airspeed turning.

A18.83.12. Lead change procedures.

A18.83.13. Emergency procedures, aborts, lost wingman, and inadvertent IMC procedures.

A18.83.14. Transponder/lights.

A18.84. Remote/Mountainous Area Operations Briefing.

A18.84.1. Mission Objective.

A18.84.2. Landing Site Evaluation.

A18.84.2.1. High Reconnaissance.

A18.84.2.1.1. Temp and pressure altitude.

A18.84.2.1.2. Wind.

A18.84.2.1.3. Site evaluation.

A18.84.2.1.4. Power available/required (recompute if conditions change i.e., + 500 PA, + 50C).

A18.84.2.1.5. Size, shape, slope, surface, etc., (suitability).

A18.84.2.1.6. Approach, departure, and escape routes.

A18.84.2.1.7. Obstacles.

A18.84.2.1.8. Turbulence.

A18.84.3. Low Reconnaissance.

A18.84.3.1. Size, shape, slope, surface, etc.

A18.84.3.2. Obstructions.

A18.84.3.3. Wind (smoke drop).

A18.84.3.4. Power required.

A18.84.3.5. Type approach and landing.

A18.84.3.6. Intended touchdown/hover point.

A18.84.4. Crew Coordination.

A18.84.5. Before landing check.

A18.85. Cargo Sling Briefing Guide.

A18.85.1. Mission Objective.

A18.85.2. Type of load and weight.

A18.85.3. Location.

A18.85.4. Contact and pick-up point.

A18.85.5. Communications.

A18.85.6. Hook-up and release procedures.

A18.85.7. Power available.

A18.85.8. Hand signals and safety considerations.

A18.85.9. Destination.

A18.85.10. Route.

A18.85.11. Hazards to personnel on the ground.

A18.85.12. Emergency procedures.

A18.86. Search Procedures Briefing Guide.

A18.86.1. Mission Objectives.

A18.86.2. Area.

A18.86.3. Search patterns/track spacing.

A18.86.4. Search altitudes.

A18.86.5. Other aircraft.

A18.86.5.1. Search aircraft.

A18.86.5.2. Civil/military/non tasked aircraft.

A18.86.5.3. Mid-air collision avoidance.

A18.86.6. Communications.

A18.86.7. Scanning duties and techniques.

A18.86.8. Action upon sighting objective.

A18.86.9. Emergency procedures.

A18.87. Instrument Approach Briefing.

A18.87.1. Briefing applicable items prior to each approach/landing. Only changed data need be briefed for multiple approaches/landings.

A18.87.2. Approach to be used.

A18.87.3. Navigation and communications radios set.

A18.87.3.1. TACAN/VOR select switch.

A18.87.3.2. Final approach course.

A18.87.4. Altimeters.

A18.87.5. Sector Altitude/DH/MDA/Field Elevation.

A18.87.6. Weather Required For Approach.

A18.87.7. Missed Approach Point, Climbout And Intentions.

A18.87.8. Review Aerodrome Sketch.

A18.87.8.1. Terrain/Obstacle Hazards.

A18.87.8.2. Ceiling and Visibility Requirements/RVR.

A18.87.9. Crew Duties And Responsibilities.

A18.87.10. Lost Comm Intentions.

A18.87.11. Backup approach and frequency.

A18.87.12. Heading and altitude systems.

A18.87.13. Before landing check.

Attachment 19

U-2 OPERATING PROCEDURES

Section A19A—General Information

A19.1. General. This attachment outlines operational guidance that applies to both Air Force and Contractor aircrew flying U-2 aircraft in AFMC. The detachment commander is the DFO and GFR for flying operation purposes responsible for all Air Force and contractor aircrew. Flying operations at Site 2, Palmdale CA are a combined operation between the Air Force, Det 2, WR-ALC and the lead U-2 contractor, Lockheed Martin Skunk Works (LMSW).

Section A19B—Mission Planning

A19.2. Flight Logs. Flight logs generated using the approved mission planning software "Green Card" is authorized.

A19.3. Minimum Fuel. Command minimum landing fuel for U-2 aircraft is 150 gallons with emergency fuel defined as 100 gallons. All missions will be planned to insure command fuel minimums are met.

A19.4. Minimum Oxygen Requirements. T.O. U-2S-1minimum oxygen requirements may be waived by the DFO for a short ferry flight or during mission unique situations. This waiver will be documented and attached to the flight mission paperwork.

Section A19C—Normal Operating Procedures

A19.5. General. The following operating procedures apply to all U-2 operations within AFMC. Procedures specified in an approved test plan are authorized within the context of the flight test program.

A19.6. Specific Maneuvers.

A19.6.1. Approach and Landings. Conduct multiple patterns, touch and go landings, and simulated emergency patterns only when a qualified SOF is occupying the mobile vehicle and in a position to monitor the pattern and landing. (Note: An ACC qualified mobile meets the requirements of this paragraph.)

A19.6.2. Do not intentionally perform touch and go landings or practice emergency patterns with Primary Mission Equipment (PME) on board.

A19.6.3. All AFMC U-2 pilots are authorized to perform SFOs to a touch and go or full stop.

A19.6.4. All AFMC U-2 pilots are authorized to perform touch and go landings at any military airfield in the local training area, to include Beale AFB, consistent with the above mobile requirement.

A19.7. Supervisory Requirements. A qualified SOF or Flight Safety Supervisor (FSS) will monitor all initial takeoffs and full stop landings. Additional information about the SOF and FSS program is contained in Det 2, WR-ALC sup to AFMCI 11-201.

A19.8. Personal GPS Units (PGUs). Aircrew members will not use PGUs for routine en-route navigation. (Note: PGUs carried by U-2 pilots are used for emergency use only)

Section A19D—Operational Limits And Restrictions

A19.9. General. Limits and restrictions apply to all U-2 operations of AFMC crewmembers. All test missions will be flown in accordance with approved test plans adhering to specific safety board recommendations. In all cases follow the most restrictive guidance.

A19.10. Weather Restrictions. Operations during high winds result in an increased risk, primarily caused by higher possibility of crosswind problems, windshear, and turbulence. The following wind limits will be used when determining go-no go weather.

A19.10.1. Maximum forecast wind, to include gust effects, for launch is 30 knots. Once airborne, a recall should be initiated if the forecast wind (gust) exceeds 35 knots. Maximum wind for actual landing is not specified, however, consideration should be given to the crosswind component, gust factors, and the aircraft tow limit of 40 knots. Note: Sorties may launch if the landing is planned for one hour prior to the effective time of the out of limit wind forecast. Planned landings one hour after the effective time are not recommended. The DFO may waive these wind restrictions dependent on mission priorities.

A19.10.2. Takeoff. Maximum tail wind for initial takeoff is 10 knots.

A19.10.3. Touch and Gos. When flying touch and go landings: maximum crosswind component limit is 12 knots and a maximum tail wind component is 5 knots.

A19.11. Functional Check Flight (FCF). Initial FCF/ACF weather minimums are a 5000 foot ceiling, with 5 miles visibility. This limit may be waived by the DFO to command minimums. Additionally, weather should allow continuous visual contact with the ground sufficient to allow a VMC recovery to either the primary airport or emergency alternates.

A19.11.1. Subsequent ACF and FCF minimums: 3000 foot ceiling and 3 miles visibility. This limit may be waived by the DFO to the command minimums.

A19.12. Minimum weather required for engineering support flights, if not otherwise specified, is 1500 and 3 miles visibility or as outlined in the test plan, whichever is more restrictive. The DFO may waive this minimum but will not deviate from the specifics of the approved test plan and safety review board recommendations.

A19.13. Operational, Training and Delivery flights will follow command weather minimums.

A19.14. Crew Rest Requirements. Fatigue associated with flights in pressure suits and at high cabin altitudes is very insidious and accelerated by less than ideal crew rest prior to flight. The following restrictions apply to high altitude pressure suit flights:

A19.14.1. Pressure suit flying in excess of 6.5 hours, in a 24-hour period requires 18 hours recovery time between high flight landing and any subsequent takeoff.

A19.14.2. No more than two pressure suit flights allowed in a 12-hour period or three total sorties allowed in a 24-hour period. (A sortie includes an engine start, take off, and engine shutdown).

A19.14.3. No more than 13 flying hours in a 48 hour period.

A19.14.4. Maximum high altitude pressure suit sortie hours in any seven-day period is 25 hours.

A19.14.5. Crew duty day for pressure suit flying is 10 hours. The DFO, GFR, operations officer, or LMSW Chief pilot may waive this to 12 hours, but not by the pilot flying. Waivers to 12 hours for any flight during hours of official night will be approved by the DFO and only under extreme circumstances. For flights requiring duty periods greater than 12 hours, MAJCOM /DO approval is required. Document all waiver action in the remarks section of the flight authorization.

A19.15. Pressure Suit Requirments. A full pressure suit will be worn for all high flights (flights above FL 450) and crewmembers will prebreath 100 percent oxygen for a minimum of one hour prior to takeoff.

Attachment 20

PASSENGER BRIEFING GUIDE

Table A20.1. PASSENGER BRIEFING CHECKLIST.

A20.1. Egress Procedures

A20.1.1. Ground Egress.

A20.1.1.1. General methods (normal and emergency).

A20.1.1.2. Emergency signals.

A20.1.1.3. Location of primary and alternate exits, slides, escape ropes, etc.

A20.1.1.4. Activation of hatches, exits, and slides.

A20.1.1.5. Egress direction and safety precautions.

A20.1.2. Inflight Egress/Bailout.

A20.1.2.1. Donning of required equipment.

A20.1.2.2. Location of primary and alternate exits.

A20.1.2.3. Emergency signals.

A20.1.2.4. Exiting aircraft.

A20.1.3. Ditching (ground and water).

A20.1.3.1. Location and use of primary and alternate exits.

A20.1.3.2. Donning of equipment and floatation devices.

A20.1.3.3. Activation of hatches, exits, life rafts, and floatation devices.

A20.1.3.4. Emergency signals and crash position.

A20.2. Emergency Procedures

A20.2.1. Location and use of fire extinguishers.

A20.2.2. Location and use of walkaround bottles.

A20.2.3. Location and use of crash axes.

A20.2.4. Location and use of first aid kits.

A20.3. Life Support Systems/Equipment Information

A20.3.1. Use of oxygen system/quick dons.

A20.3.2. Location and use of Parachutes/Associated Equipment.

A20.3.3. Location and use of POK's, smoke masks, EEBD's.

A20.4. Precautions and Restrictions

A20.4.1. Seat and Safety Belt Requirements.

A20.4.2. FOD Hazards.

A20.4.3. Hearing Protection.

A20.5. Special Procedures

A20.5.1. Passenger Loading and Unloading.

A20.6. Prohibitions

A20.6.1. Portable Electronic Transmitting Devices (Cell phones, CB radio's, etc.) Not authorized for ground or flight operations.

A20.6.2. Portable Nontransmitting Devices Authorized above 10,000 ft AGL: AV recorders/playback, computers and peripherals, electronic entertainment devices, radio receivers.

A20.6.3. Devices Authorized Anytime: hearing aids, pacemakers, electronic watches, hand-held non-printing calculators, portable tape player w/o record capability such as Walkmans, etc, electric shavers.

A20.6.4. Portable GPS Units.

A20.6.5. Cameras.

A20.6.6. Hazardous Cargo.

A20.6.7. Smoking.