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Flying Operations

F-16--OPERATIONS PROCEDURES

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This publication implements AFPD 11-2, *Aircrew Operations* and supports AFPD 11-4, *Aviation Service,* and AFI 11-202V3, *General Flight Rules*. It establishes effective and safe operations and the minimum Air Force operations procedures for personnel performing duties in the F-16. This publication applies to the US Air Force Reserve Command (AFRC) and the Air National Guard (ANG) units. MAJCOMs, Direct Reporting Units (DRU) and Field Operating Agencies (FOA) forward proposed MAJCOM/DRU/FOA-level supplements to this volume to HQ USAF/A3XI, through HQ ACC/A3TO, for approval prior to publication IAW AFPD 11-2, paragraph **2.2.** Copies of approved and published supplements are provided by the issuing office to HQ USAF/A3XI, HQ ACC/A3TO, and the user MAJCOM/ DRU/FOA offices of primary responsibility (OPR). Field units below MAJCOM/DRU/FOA level forward copies of their supplements of this publication to their parent MAJCOM/DRU/FOA OPR for post-publication review. **Note:** The above applies only to those DRUs/FOAs that report directly to HQ USAF. Keep supplements current by complying with AFI 33-360, *Publications and Forms Management*. Unless another approval authority is cited, waiver authority for this volume is the OPR, or COMAFFOR for those aircrew and assets under the COMAFFOR's oversight. Requests for waivers are submitted through the chain of command to the appropriate Tier waiver approval authority or if a non-tier requirement, to the publication OPR for consideration. COMAFFOR will notify HQ ACC/A3 and home station MAJCOM/A3 of waivers within 72 hours of approval. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication;* route AF Forms 847 from the field through the appropriate functional chain of command. HQ ACC/A3 will coordinate all changes to the basic volume with all MAJCOM/A3s. Ensure that all records created as a result of processes prescribed in this publication are maintained in

accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS), located in the Air Force Records Information Management System (AFRIMS).

SUMMARY OF CHANGES

This interim change revises AFI11-2F-16V3 by (1) removing T-1 waiver authority for over water flights, (2) allowing F-16s to take off over a BAK-12 with a centerline mounted -188 pod, (3) aligning chase procedures with AFTTP 3-3.F-16, (4) updating RNAV procedures, (5) re-wording simulated attack guidance to be in compliance with AFI11-214 *Air Operations Rules and Procedures*, and (6) correcting administrative errors.

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Chapter 1

GENERAL GUIDANCE

1.1. Responsibilities. This instruction prescribes procedures for operating F-16 aircraft under most circumstances. It is not a substitute for sound judgment. Procedures not specifically addressed may be accomplished if they enhance safe and effective mission accomplishment.

1.2. Waiver Requests. AFI33-360 directs using Form 679 for waivers.

Chapter 2

MISSION PLANNING

Section 2A—General

2.1. Responsibilities. The responsibility for mission planning is shared jointly by all flight members and the operations and intelligence functions of fighter organizations. Fighter unit personnel must accomplish sufficient flight planning to ensure safe mission execution, to include fuel requirements, map preparation, and takeoff/landing data. **(T-1).**

2.2. Bird/Wildlife Aircraft Strike Hazard (BASH) Programs. Bird Watch Conditions are defined in AFI 91-202, *The US Air Force Mishap Prevention Program*, and AFPAM 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Techniques*. The OG/CC will determine local BASH procedures. **(T-3).**

2.2.1. Takeoffs, landings, or low-levels within one hour of either sunrise or sunset during the phase II period increase likelihood of birdstrike. Significant bird hazards are published in FLIP GP, the IFR Supplement and local airfield guidance.

2.2.2. When operating at airfields where no BASH program exists, pilots should make appropriate decisions based on observable bird conditions and seek assistance from local airfield personnel.

2.2.3. Pilots should consider bird migratory patterns during enroute portion of the mission to minimize the potential of an in-flight bird strike. The Bird Avoidance Model (BAM) on United States Avian Hazard Advisory System (**http://www.usahas.com**) provides BASH information, including regionalized CONUS bird migration, PFPS software overlay, and latest news. See AFPAM 91-212 for additional information.

2.3. Standards. The OG/CC may publish and approve group or wing standards. Operations Group Stan/Eval (OGV) will review all standards for AFI 11-series compliance prior to publication. **(T-1).**

2.4. CBRNE. Aircrew must use the procedures for operation in a CBRNE-threat environment contained in **Attachment 2**. **(T-1).**

2.5. Flight Material Preparation.

2.5.1. Mission Data Card (MDC). The minimum TOLD requirements on the MDC are: 2,000 foot acceleration check speed (if computed takeoff roll exceeds 2,500 feet); refusal speed (dry/wet); rotation speed; takeoff speed; takeoff distance; normal landing speed and distance (dry/wet); heavyweight (immediately after takeoff) landing speed and distance (dry/wet). If computed takeoff roll is less than 2,500 feet, pilots must evaluate aircraft performance by comparing actual takeoff distance to computed takeoff distance or use a 1000 foot acceleration check speed. **(T-1).**

2.5.2. Local Area Maps. Pilots must carry a local area map unless pilot aids include jettison areas, divert information, controlled bailout areas, and provide sufficient detail of the local area to remain within assigned training areas. **(T-1).**

2.5.3. Enroute Charts. Pilots may substitute FLIP enroute charts for maps on navigational flights within areas adequately covered by these charts.

2.5.4. Low Altitude Maps.

2.5.4.1. On low altitude flights, each pilot will carry a current map (updated using Chart Update Manual or electronic equivalent) of the route/operating area. **(T-1).** Pilots will ensure it is of such scale and quality that the detail of terrain features, hazards, and chart annotations permits navigation and safe mission accomplishment. **(T-1).** Pilots will circle/highlight manmade obstacles at above planned flight altitude within 5nm of the planned route. **(T-1).** Pilots will annotate time or distance tick marks and headings. **(T-1).**

2.5.4.2. Pilots will annotate route abort altitude (RAA) using the IFR Off Airways guidance in AFI 11-202V3, **chapter 6**. **(T-1).**

2.5.4.3. For flights inside the Continental United states (CONUS) under Visual Flight Rules (VFR) or inside Military Training Routes (MTR), pilots will comply with the following:

2.5.4.3.1. Use FLIP AP/1B and either sectional aeronautical charts or mission planning software (e.g. Falcon View/JMPS). **(T-1).** Pilots will select the following overlay options for PFPS/Falcon View: airports/heliports, airspace boundaries, airways, MTR, parachute jump and special use airspace boundaries. **(T-1).**

2.5.4.3.2. Annotate low level charts, or locally developed low-level route books, with location and dimensions of class B/C/D airspace, military airfields, civil airfields, and other potential high density traffic areas (e.g., parachute activity areas and ultra light/hang glider/glider sites) within 5 NM of any planned VFR route or MTR lateral boundary. **(T-1).** Pilots will annotate airfield approach control frequencies in the vicinity of class B/C/D airspace as well as the intersection of other VR/IR routes or other areas of conflict. **(T-1).**

2.5.4.4. Outside the CONUS, pilots will follow gaining MAJCOM, theater, or host nation guidance on mission planning. **(T-1).** If no such guidance exists, pilots will use the best charts or flight planning software overlay options available to accomplish the intent of maximizing traffic awareness and awareness of controlled airspace boundaries. **(T-1).**

2.5.5. Digital Terrain System (DTS) and Automatic Ground Collision Avoidance System (AGCAS). F-16 mission planners will ensure RDTED coverage is adequate for the mission area and is loaded to each flight member's ADTC to ensure maximum AGCAS protection. **(T-1).** Without appropriate RDTED coverage, or when corrupted data is present, AGCAS still provides recovery protection to 50 feet MSL, however this may not prevent potential ground collision when MSL elevation is higher.

2.5.6. All qualified crewmembers will carry current and applicable checklists and pilot aids on every flight. **(T-1).**

2.6. Fuel Conservation. Pilots will manage aviation fuel as a limited commodity and precious resource; design procedures for optimal fuel use and efficiencies throughout all phases of mission execution, to include ground operations, flight plans, power settings and climb/descent

profiles. **(T-1).** Incorporate enroute tasks to make maximum use of airborne learning opportunities.

2.7. Overwater. Flight members must accomplish planned flights over water, outside of the local training area (e.g., deployments, cross countries, Programmed Delivery for Maintenance (PDM) inputs, etc.) two-ship as a minimum. The OG/CC must approve all single ship over water flights that are outside of the local training area. **(T-3).** For deployments under ACC/AOS movement control, AFI 11-207 waiver authorities apply.

2.8. Briefing and Debriefing.

2.8.1. All flight members will attend the briefing unless previously coordinated with unit/squadron supervisors. **(T-3).** Flight leads are responsible for presenting a logical briefing to promote a safe and effective mission. Structure flight briefings to accommodate the capabilities of each pilot in the flight. Any item published in CAF/wing/group/squadron standards or AFIs and understood by all participants may be briefed as "standard."

2.8.2. Flight leads must plan adequate time to discuss required briefing items depending on complexity of the mission and pilot capabilities, and start flight briefings at least 1.5 hours before scheduled takeoff. **(T-1).** Flight leads will start alert briefings in sufficient time to be completed prior to pilot changeover. **(T-1).** Items may be briefed in any sequence, provided all minimum requirements listed in this AFI and AFI 11-202V3 are addressed. Additional time and CRM emphasis is necessary in D-model sorties especially on FAM and Incentive flights. Passenger must demonstrate oxygen regulator use, ability to establish multiple airways and mask removal after being strapped in. **(T-1).** Reference **Attachment 3** for example briefing guides. Flight leads will include the following for all flight briefings: **(T-1).**

2.8.2.1. Weather and NOTAMs**.**

2.8.2.2. Emergency procedures**.**

2.8.2.3. Mission priorities and task management.

2.8.2.4. Significant rules (e.g. SPINS, Training Rules, ROE).

2.8.2.5. Flight member responsibilities and deconfliction contracts. Flight leads will brief a formation deconfliction/blind/get well plan for every phase of flight. **(T-1).**

2.8.3. Flight leads will emphasize the following for all low-level briefings: **(T-1)**.

2.8.3.1. Obstacle/terrain acquisition and avoidance, bird hazards, emergency actions and weather avoidance with route abort procedures.

2.8.3.2. Employment of all Collision Avoidance Advisories and Digital Terrain System warnings to include AGCAS.

2.8.3.3. Human factors to include task prioritization, G-excess illusion, and perceptual issues associated with flight over water/featureless terrain.

2.8.3.4. Airfield approach control frequencies in the vicinity of class B/C/D airspace as well as the intersection of other VR/IR routes or other areas of conflict.

2.8.4. Dissimilar Formation Briefing. Flight leads must emphasize proper position to ensure wingtip clearance, flight member responsibilities, and aircraft-unique requirements for each phase of flight. **(T-1).**

2.8.5. Alternate Mission/Events and Multiple Go Days. Flight leads will:

2.8.5.1. Brief an alternate mission for each flight that is less complex than the primary mission. (T-1). Flight leads will ensure unbriefed missions/events are not flown. **(T-1).** Mission elements may be modified and briefed airborne as long as flight safety is not compromised. Flight leads will ensure changes are acknowledged by all flight members. **(T-1).** Continuation training (CT) missions may fly primary or alternate missions in any sequence.

2.8.5.2. During deployed operations, exercises, or multiple-go days when aircraft turn times do not allow follow-on mission brief(s), if all flight members attend an initial flight brief, the flight lead need only brief any changes for subsequent flights.

2.8.5.3. On multiple-go days, subsequent missions are of equal or less complexity. Continuation training (CT) missions may fly primary or alternate missions in any sequence. Units will schedule and plan upgrade events on the first sortie only. **(T-1).** If that sortie is non-effective for weather, maintenance or airspace, IPs may elect to accomplish the planned upgrade events in the second sortie.

2.8.6. Debriefing.

2.8.6.1. Flight leads will ensure all missions are debriefed and address in-flight execution, flight member responsibilities, deconfliction contracts, tactical employment priorities, and sensor management. **(T-1).**

2.8.6.2. Flight leads will review the video/audio record of all tactical portions of the sortie to assess flight members' AGSM effectiveness. **(T-1).** It is imperative to evaluate not only during the G-ex, but also after the pilot has had time to fatigue--typically when the AGSM breaks down and G-induced Loss of Consciousness (GLOC) occurs. Pilots with poor AGSM technique or low G-tolerance will be identified to the operations officer. **(T-1).** The squadron commander has the option of directing refresher centrifuge training in accordance with AFI 11-404, *Centrifuge Training for High-G Aircrew*.

2.9. Unit Developed Checklists/Local Pilot Aids. Unit developed checklists used in lieu of flight manual checklists must contain all items, verbatim and in order, unless specifically addressed in the flight manual. **(T-1).** OGV will ensure pilot aids contain the following items: **(T-1).**

2.9.1. Briefing guides (reference **Attachment 3** for examples).

2.9.2. Local radio channelization.

2.9.3. Appropriate airfield diagrams, to include cable/net barrier information.

2.9.4. Emergency information (impoundment procedures, emergency action checklists, NORDO procedures, divert information, search and rescue procedures, etc).

2.9.5. Divert base cable and barrier information.

2.9.6. Bailout and jettison areas.

2.9.7. Cross-country procedures to include: command and control, engine documentation, Joint Oil Analysis Program (JOAP) samples, and aircraft servicing.

2.9.8. Other information as desired such as: stereo flight plans, turn procedures, local training areas, instrument preflight, and alert setup procedures.

Section 2B—Night (see also night sections Chapter 3, Chapter 5 and Chapter 6

2.10. Minimum Safe Altitude (MSA). Pilots will compute the MSA for each leg of the intended route of flight in accordance with AFI 11-214.

2.11. Night chart requirements. Pilots must comply with the minimum requirement of a Form 70 or chart/map containing headings, RAAs, MSAs, and maximum/minimum route structure altitudes. **(T-1).**

2.12. Video/Audio Recording. Pilots will operate the DVADR/DVR to the maximum extent possible without negatively impacting mission accomplishment and debrief. **(T-1).**

Chapter 3

NORMAL OPERATING PROCEDURES

Section 3A—Ground Operations

3.1. Preflight. Pilots must:

3.1.1. [B/D model aircraft] Place the stick control switch in the FWD position when the rear cockpit is occupied by other than a fully qualified F-16 pilot. **(T-1).**

3.1.2. Not carry baggage/equipment in an unoccupied rear cockpit; in the avionics bay behind the cockpit; or in the aft canopy fixed transparency area (turtle back). **(T-1).**

3.1.3. Not place objects in or on top of the engine intake. **(T-1).**

3.1.4. Secure publications, maps and personal items to avoid flight control/ throttle interference. **(T-1).**

3.1.5. Select Pressure Breathing (PBG) except when using Aircrew Eye and Respiratory Protection System (AERPS) or Aircrew Chemical Defense Equipment (ACDE). **(T-1).**

3.1.6. Remove the port plug on the CRU-94/120 (if installed), if flying with the COMBAT EDGE vest, and stow the plug during flight to prevent a FOD hazard, then re-install upon completion of the sortie. **(T-1).**

3.1.7. Ensure ejection seat survival kit deployment switch is in the automatic position. **(T-1).**

3.1.8. Not select CAT I on the Stores Configuration Switch with Category III configurations IAW T.O. 1F-16-1-2. **(T-1).**

3.2. Ground Visual Signals. Normally, pilot and ground crew communicate by the intercom system during all start-engine, pre-taxi and end of runway (EOR) checks. Pilots and ground crew must use the intercom system to the maximum extent possible anytime maintenance technicians are performing "redballs" on the aircraft and for EPU checks performed in congested areas. **(T-1).** Pilots will not actuate any system which endangers ground crew prior to receiving acknowledgment. **(T-1).** Units with an active air defense commitment may waive use of ground intercom during alert scrambles. When ground intercom is not used, pilots and ground crew will use visual signals in accordance with AFI 11-218, *Aircraft Operation and Movement on the Ground*, and this volume. **(T-1).** The crew chief will repeat the given signal when it is safe to operate the system. **(T-1).**

3.2.1. Pilots and ground crew must use the following signals that augment AFI 11-218. **(T-1).**

3.2.1.1. EPU OPERATIONAL CHECK. Raise two fingers and rotate hand.

3.2.1.2. FLIGHT CONTROLS CLEAR. Raise arm, clench fist, and make a stirring motion.

3.2.1.3. BRAKE CHECK. Hold left or right arm horizontal, open hand and push forward, breaking at the wrist (as in applying rudder pedal pressure with feet).

3.2.1.4. LOSS OF BRAKES WHILE TAXIING. Lower tailhook.

3.2.1.5. GUN ARMAMENT CHECK. Point index finger forward with thumb upward simulating a pistol and shake head (yes or no).

3.2.1.6. EPU ACTIVATION. Raise hand with palm open and perform shoving motion indicating "stay away." Then cup hands over oxygen mask indicating hydrazine vapors may be present.

3.3. Taxi and Arming.

3.3.1. Taxi Interval/Speed. Minimum taxi interval is 150 feet staggered or 300 feet in trail. Spacing may be reduced when holding short of or entering the runway. Unless mission requirements dictate, pilots will limit taxi speed to 30 knots, 15 knots over a raised cable, and 10 knots in turns. **(T-1).**

3.3.2. Ice/Snow Conditions. Pilots will not taxi during ice and/or snow conditions until all portions of the taxi route and runway have been checked for safe conditions. **(T-1).** When ice and/or snow are present on the taxiway, pilots will taxi on the centerline with a minimum of 300 feet spacing. **(T-1).** Minimum RCR for taxi is 10.

3.3.3. Ice FOD Procedures. The following procedures apply when the conditions in T.O. 1F-16-1 indicate engine damage due to icing is possible.

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

3.3.3.2. Pilots must position ANTI ICE switch to ON prior to engine start. **(T-1).**

3.3.3.3. 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). **(T-1).** Avoid standing water and snow/slush accumulations.

3.3.3.4. Pilots must hold in the arming spot with an ice FOD monitor present until cleared for take-off. **(T-1).**

3.3.3.5. Pilots must shutdown immediately if icing is visually detected and notify the SOF/Top 3. **(T-1).** Make an appropriate entry in the aircraft forms and qualified personnel must accomplish an intake inspection prior to restarting the engine. **(T-1).**

3.3.4. EPU Check. Pilots will not allow maintenance technicians to approach the aircraft until the EPU check is complete. **(T-1).** Pilots must use intercom or a "thumbs up" signal to indicate when safe. **(T-1).**

3.4. EOR Inspections and Before Takeoff Checks. Pilots will place hands in view of ground personnel while the quick check inspection and/or arming/de-arming are in progress. **(T-1).** If the intercom system is not used during EOR checks, the pilot will establish and maintain visual contact with the chief and use visual signals. **(T-1).** Pilots must ensure EOR inspections are accomplished immediately prior to takeoff at a designated location, usually near the end of the runway or while departing the chock area (not required for alert scrambles). **(T-1).** At non-USAF bases, pilots will make every attempt to coordinate an EOR inspection with the host maintenance unit. **(T-1).**

3.4.1. Forward Firing Ordnance. Pilots will not taxi in front of aircraft being armed/de-armed with forward firing ordnance. **(T-1).**

3.4.2. Flight members will inspect each other for proper configuration and any abnormalities. **(T-1).**

3.5. Flight Lineup. Consider weather conditions, runway conditions, and runway width. Pilots must comply with minimum spacing between separated elements/flights of 500 feet. **(T-1).** Wingmen must maintain wingtip clearance with their element lead. **(T-1).** If runway width permits, pilots will lineup with wingtip clearance between all aircraft in the flight. **(T-1).**

Section 3B—Takeoff and Departure

3.6. Takeoff. Pilots will:

3.6.1. Not takeoff when the RCR is less than 10. **(T-1).**

3.6.2. Review takeoff data with emphasis on takeoff and abort factors such as short/wet runway, heavy gross weights, cable configurations, and abort sequence in formation flights. **(T-1).**

3.6.3. On training missions, not takeoff if the computed takeoff roll exceeds 80 percent of the available runway single ship or 70 percent for a formation takeoff. **(T-1).**

3.6.4. Ensure a compatible departure end cable is raised for all takeoffs and landings (including remotely operated cables). **(T-3).**

3.6.5. Get OG/CC approval for intersection takeoffs if operational requirements dictate.

3.6.6. Make an afterburner takeoff anytime the computed MIL power takeoff roll exceeds 50 percent of the available runway. **(T-1).**

3.6.7. Centerline Stores: 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. **(T-3).** Exception: aircraft with a centerline mounted fuel tank or a centerline mounted AN/ALQ-188 pod may takeoff across approach end BAK-12 arrestment cables with an 8-point tie down system.

3.6.8. Comply with minimum takeoff interval between aircraft/elements of 10 seconds (15 seconds for afterburner). **(T-1).** Pilots will increase interval to 20 seconds minimum for join-up on top or when carrying live air-to-surface ordnance (excluding BDU-33s and 20mm ammunition). **(T-1).**

3.6.9. Steer the aircraft/element toward the center of the runway after releasing brakes. **(T-1).**

3.6.10. Formation Takeoff. Aircraft/elements will:

3.6.10.1. Restrict formation takeoffs to two aircraft. **(T-1).**

3.6.10.2. Not make formation takeoffs when:

3.6.10.2.1. Runway width is less than 125 feet.

3.6.10.2.2. Standing water, ice, slush or snow is on the runway.

3.6.10.2.3. The crosswind or gust component exceeds 15 knots.

3.6.10.2.4. Loaded with live munitions (excluding air-to-air missiles, BDU-33s, 20mm ammunition, 2.75 rockets, AGM-88, AGM-65, and night illumination flares).

3.6.10.2.5. Ferrying aircraft from contractor/AFMC facilities.

3.6.10.2.6. Asymmetric loading or a difference of more than 2,500 pounds gross weight.

3.7. Initial Join-up and Rejoins. Aircraft/elements will:

3.7.1. Comply with the minimums of 1,500 foot ceiling and 3 miles (5 km) visibility for VFR join-ups below a ceiling. **(T-1).**

3.7.2. Maintain 350 knots indicated air speed (KIAS) until join-up is accomplished unless mission requirements necessitate a different airspeed. **(T-1).** Pilots may delay AB cancellation to establish closure on lead or lead element. OG/CCs may approve different climb and cruise airspeeds within dash one limits.

3.7.3. Accomplish battle damage (BD)/bomb check on RTB, when practical (i.e., weather prohibits accomplishing BD check). **(T-1).** Aircraft/elements are required to complete this check after expending any ordnance (including 20mm ammunition). **(T-1).**

3.7.4. Accomplish air-to-air systems checks above 10,000 feet MSL when practical. **(T-1).**

3.7.5. For further join-up procedures, see Night Operational Procedures (**Section 3E**) and Instrument Procedures (**Chapter 4**).

Section 3C—Enroute

3.8. Air Refueling.

3.8.1. Pilots undergoing initial or recurrency training in air refueling will not refuel with a student boom operator. **(T-1).** Lead/IP will announce when an upgrade or requal pilot is in the formation and request a qualified (non-student) boomer. **(T-1).**

3.8.2. Pilots will inform boom operator when refueling from particular tanker type (e.g., KC-10, KC-135, or KC-46) for the first time. **(T-1).**

3.8.3. Quick flow procedures are authorized and pilots will conduct them IAW ATP-56B and AFTTP 3-3.F-16. **(T-1).**

3.9. Aircraft Handling Characteristics (AHC) and Automated Recovery Training Series (ARTS)/Maneuvering Parameters.

3.9.1. Pilots will comply with the following minimum altitudes for the prescribed maneuvers:

3.9.1.1. Confidence Maneuvers/Advanced Handling - 10,000 feet AGL, except dive recovery maneuver (15,000 feet AGL minimum entry altitude). **(T-1).**

3.9.1.2. Horn Awareness and Recovery Training series (HARTS) numbers 1, 2 and 3 - 10,000 feet AGL. **(T-1).**

3.9.1.3. HARTS series numbers 4 and 5 - 15,000 feet AGL. **(T-1).**

3.9.1.4. Not descend below 5,000 feet AGL during aerobatic maneuvering. **(T-1).**

3.9.1.5. HARTS 3 with PARS – 10,000 feet AGL. **(T-1).**

3.9.1.6. ARTS 2 – 8,000 feet AGL. **(T-1).**

3.9.1.7. ARTS series number 1, 3, 4, and 5 – 5,000 feet AGL. **(T-1).**

3.9.2. Pilots must avoid flight through wingtip vortices/jet wash. **(T-1).** If unavoidable, the aircraft should be unloaded immediately to approximately 1 G.

3.9.3. Pilots will not manually extend the trailing edge flaps in an attempt to improve aircraft performance. **(T-1).** EXCEPTION: Trailing edge flaps may be manually extended during intercepts performed by airspace control alert tasked unit aircraft, or during low/slow (below 5,000 feet AGL) VID training, on targets traveling at less than 200 KIAS.

3.9.4. Pilots will not attempt to bypass flight control limiters to improve performance. **(T-1).** Examples are: transfer fuel to alter center of gravity (CG), manual pitch override (MPO) to gain additional negative G or assaulting two limiters at low airspeed.

3.9.5. 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 action to correct the low speed condition. **(T-1).**

3.9.6. The following is guidance for Horn Awareness and Recovery Training Series (HARTS) (reference AFTTP 3-3.F-16):

3.9.6.1. Pilots will fly HARTS maneuvers in CAT-1 loaded aircraft only. **(T-1).**

3.9.6.2. In F-16 C/D Block 40-52 aircraft, pilots will not fly HARTS maneuvers 4 and 5 unless in one of the following configurations: Clean (no tanks), or 300 gallon centerline tank. MAU-12s may be carried on stations 3 and 7, and/or AIM-9/AMDs/ACMI/CATM-120s may be carried on stations 1, 2, 8 and/or 9. Pilots must ensure CATM-120s are symmetrically loaded if carried. (T-1). AIM-9/AMD/ACMI can be symmetric or one missile asymmetric. Inlet mounted TGP and/or HTS pods may be carried.

3.9.6.3. For all F-16 Blocks, external tanks should be dry to avoid a faster than expected airspeed bleed-off due to excessive weight during the pull up, for all HARTS maneuvers.

3.9.7. The following is guidance for Automated Recovery Training Series (ARTS) for AGCAS/ Pilot Activated Recovery System (PARS) recovery profiles (reference AFTTP3-3.F-16):

3.9.7.1. With exception of the HARTS 3 with PARS maneuver, AGCAS/PARS demo maneuvers may be flown in any aircraft configuration unless concern for over-G exists. However, a CAT I loading is preferred to demonstrate the full maneuvering potential of the automated recovery system. The potential for over-G exists if any Nose-low PARS maneuver is performed when the aircraft configuration has a symmetric G-limit of less than 6.2 G CAT I or 5.2 G CAT III.

3.9.7.2. Pilots will not demonstrate AGCAS recoveries by executing dive maneuvers toward the ground. **(T-1).** AGCAS is designed to provide a minimal buffer above the ground during recovery and pilots must not intentionally activate it. **(T-1).**

3.10. Formation, General. Flight leads and instructors will ensure contracts, roles and responsibilities of each flight member are established, briefed, executed and debriefed. **(T-1).**

Flight members will immediately notify lead if unable to fulfill basic responsibilities, contracts or other assigned tasks. **(T-1).** Flight leads will avoid tasking element leads/wingmen beyond their abilities without sacrificing basic responsibilities. **(T-1).** Reference AFTTP 3-3.F-16 and AFTTP 3-1.F-16.

3.10.1. The flight lead is always responsible for flight actions. Wingmen will be prepared to take the lead when directed. **(T-1).**

3.10.2. In IMC, pilots will comply with the maximum flight size in visual formation of four aircraft except when flying in close formation with a tanker. **(T-1).**

3.10.3. Pilots will not use rolling maneuvers to maintain or regain formation position below 5,000 feet AGL or in airspace where aerobatics are prohibited. **(T-1).**

3.10.4. Pilots must use airborne visual signals in accordance with AFI 11-205, *Aircraft Cockpit and Formation Flight Signals*, or detailed in local procedures. **(T-1).** Pilots must initiate configuration changes for four-ship flights by radio call, when practical. **(T-1).** When formation position changes are directed by radio, all wingmen will acknowledge prior to initiating the change. **(T-1).** Pilots must make a radio call when directing position changes at night or under instrument conditions. **(T-1).**

3.10.5. Flight leads will not break up flights from visual or sensor formations until each pilot has a fix from which to navigate (visual, radar, INS or TACAN). **(T-1).**

3.10.6. Lead changes. Pilots will:

3.10.6.1. Comply with the minimum altitude for changing leads within a formation of 500 feet AGL over land or 1,000 feet AGL over water [see also Night Operational Procedures (**Section 3E**)]. **(T-1).**

3.10.6.2. Initiate lead changes from a stabilized, wings level attitude during limited visibility conditions (e.g., night, IMC). See also Night Operational Procedures (**Section 3E**) and Instrument Procedures (**Chapter 4**). **(T-1).**

3.10.6.3. Not initiate lead changes with the wingman further back than normal fingertip or route position, or greater than 30 degrees back from line abreast. **(T-1).**

3.11. G-Awareness Exercises (G-Ex) (Reference AFTTP 3-3.F-16 and AFI 11-214).

3.11.1. Pilots must accomplish a G-Ex if planned maneuvering exceeds 5G. **(T-1).** Pilots will accomplish the G-Ex day or night, only in VMC, with a discernible horizon, and only when unaided or NVG-aided visual cues are adequate to safely perform the maneuver. **(T-1).** If these requirements are not met, pilots must omit the G-Ex and reduce mission tasking to limit maneuvering to 5G. **(T-1).**

3.11.2. Unless performing a syllabus required event (e.g., chase of a G-Ex), flight members will follow AFTTP 3-3.F-16 G-Awareness Exercise Procedures. **(T-1).** Pilots use on-board systems (e.g. air-to-air TACAN, Radar, data link) to establish separation prior to maneuver execution. **(T-1).**

3.11.3. Pilots must conduct the G-Ex in order of preference listed below to help ensure the airspace is clear from potential traffic conflicts. **(T-1).** If practical, use ATC to help clear the airspace:

3.11.3.1. Special Use Airspace (e.g., Restricted/Warning areas, Air Traffic Control Assigned Airspace (ATCAA), MOAs and MAJCOM approved large scale exercise/special mission areas).

3.11.3.2. In VFR only above 10,000 feet MSL outside of special use airspace.

3.11.3.3. In VFR only inside the confines of a Military Training Route (MTR).

3.11.3.4. In VFR only below 10,000 feet MSL outside of special use airspace.

3.11.4. Flight/element leads flying outside of CONUS will follow gaining MAJCOM, theater or host nation guidance on airspace in which G-Ex may be performed. **(T-1).** If no such guidance exists, follow the above procedures to the maximum practical extent.

3.12. Tactical Formations.

3.12.1. Tactical Maneuvering. Wingmen/elements must maneuver relative to the flight lead/lead element and maintain sight. **(T-1).** Trailing aircraft/elements are responsible for deconflicting with lead aircraft/elements and will do so vertically when required. **(T-1).** At low altitude, wingmen/trailing elements will deconflict high. **(T-1).** Trailing aircraft/element(s) will maintain sufficient spacing so that primary emphasis during formation maneuvering/turns is on low altitude awareness and deconfliction within elements, not on deconfliction between elements. **(T-1).** Normally, the wingman is responsible for flight path deconfliction, but the flight/element lead will be primarily responsible when: **(T-1).**

3.12.1.1. Tactical maneuvering places the leader well aft of the wingman's 3/9 line or forces the wingman's primary attention away from the leader (e.g., wingman becomes engaged fighter).

3.12.1.2. The wingman calls "padlocked".

3.12.1.3. The wingman calls "blind". Primary deconfliction responsibility transfers back to the wingman once the wingman acknowledges a visual on his lead.

3.12.2. Loss of Visual ("Blind") Procedures.

3.12.2.1. Flight members will call blind with an altitude to the hundreds of feet, i.e., "Blind 16.9". **(T-1).** The visual flight member will respond with "visual" and talk eyes on. **(T-1).**

3.12.2.2. If the other flight member is also "Blind," they will call blind with an altitude. **(T-1).** Lead will be directive to ensure altitude separation is maintained and direct the wingman's flow direction. **(T-1).** Use a minimum of 500 feet (1,000 feet above 5,000 feet AGL) altitude separation. Avoid climbs/descents through the deconfliction altitude. All flight members must visually clear their flight path. **(T-1).**

3.12.2.3. If there is no timely acknowledgment of the original "Blind 16.9" call, then the flight member/element initiating the call will maneuver away from the last known position of the other flight member/element and climb/descend if necessary. **(T-1).** If visual contact is still not regained, the flight lead will take additional positive action to ensure flight path deconfliction. **(T-1).** Scenario restrictions such as sanctuary altitudes and/or adversary blocks need to be considered.

3.12.3. Sensor formations. If situational awareness (SA) is lost or "Blind" in a sensor formation, pilots must call "Blind" with altitude and follow the above procedures. **(T-1).** Wingmen will strive to maintain an altitude stack at all times in sensor formation. **(T-1).**

3.13. Chase Formation.

3.13.1. Restrictions. Any pilot may fly safety chase for aircraft under emergency or impending emergency conditions. All chase events may be flown by IP/Flight Examiners (FEs) or upgrading IPs under the supervision of an IP. Pilots who have successfully completed an Instrument/Qualification evaluation) may chase as safety observer for aircraft performing simulated instrument flight or hung ordnance patterns. Specialized missions (i.e., OT&E, Weapon System Evaluation Program (WSEP), live weapons delivery, etc) and training conducted IAW AFI 11-2F-16V1, *F-16--Pilot Training*, may be chased by Combat Mission Ready (CMR)/Basic Mission Capable (BMC) pilots designated by group/squadron commanders.

3.13.2. Procedures. (See AFTTP 3-3.F-16)

3.13.2.1. On transition sorties, the chase aircraft will perform a single-ship takeoff. **(T-1).** In-flight, the chase aircraft maneuvers as necessary, but must maintain nose-tail separation. **(T-1).** The chase will not stack lower than lead aircraft below 1,000 feet AGL. **(T-1).** In the traffic pattern, the chase aircraft may maneuver as necessary to observe performance.

3.13.2.2. A safety observer in chase will maneuver in a 30-60 degree cone with nose/tail clearance out to a range of 1,000 feet, from which he can effectively clear and/or provide assistance. **(T-3).**

3.13.2.3. For live ordnance missions, the chase pilot must ensure frag deconfliction for his aircraft. **(T-1).**

3.14. Show Formation. Mission planners will refer to AFI 11-209, *Aerial Event Policy & Procedures*, and applicable MAJCOM or ANG directives for specific rules and appropriate approval levels to participate in static displays and aerial events.

3.14.1. AGCAS SHOW mode may be selected only if operating IAW MAJCOM or ANG approved aerial events.

3.15. Low Altitude Operations (reference AFTTP 3-1.F-16 and AFTTP 3-3.F-16).

3.15.1. Airspeed and Altitude. Pilots will comply with the minimum airspeed for low level navigation of 300 KIAS and the minimum altitude of 1,000 feet AGL (or IAW approved step-down training). **(T-1).** For night or IMC operation, pilots will comply with the minimum altitude of the MSA (see AFI 11-214) unless operating under NVG LOWAT Procedures. **(T-1).**

3.15.2. At low altitude, pilots will immediately climb to a prebriefed safe altitude (minimum 1,000 feet AGL) when experiencing task saturation, diverted attention, knock-it-off, or emergencies. **(T-1).**

3.15.2.1. When a "PULL-UP-PULL-UP" warning sounds, the pilot will take immediate action to ensure terrain clearance, while referencing the primary flight instruments. **(T-1).**

3.15.2.2. F-16's with pilot-selectable GCAS Minimum Terrain Clearance (MTC) settings will set an altitude that does not result in "PULL-UP" warnings at normal operational altitudes. **(T-1).** Pilots will comply with the minimum MTC of 50 feet for strafe and visual bombing, and 25 percent of LOWAT Category minimum altitude for all other operations. **(T-1**). Wings with significant tall trees in the operating area or VR routes will account for average tree height when setting MTC altitudes. **(T-1).**

3.15.2.3. F-16's equipped with an operational AGCAS will ensure NORM mode is selected prior to LOWAT operations down to 500 feet AGL to include HAS and LAS events. **(T-1).** If operations are necessary below 500 feet AGL, AGCAS MIN mode may be selected to prevent nuisance fly-ups.

3.15.3. Weather. Consult FLIP for minimum weather on a VR or IR route. For low altitude training outside the CONUS, pilots will comply with theater/host nation guidance. **(T-1).**

3.15.3.1. Deteriorating weather on a VR Route.

3.15.3.1.1. Able to maintain VMC. If it becomes apparent that weather ahead does not permit continued flight on the VR, pilots will maintain VMC, slow down, maneuver to exit the route structure, and establish a VFR hemispheric altitude. **(T-0).**

3.15.3.1.2. Unable to maintain VMC. Pilots will climb to briefed deconfliction altitudes (reference Paragraph 2.8). **(T-1).** Squawk applicable (IFF/SIF) modes and codes and contact a controlling agency to pick up an IFR clearance if required. Maintain preplanned ground track.

3.15.4. Obstacle/Terrain Avoidance. If unable to visually acquire or ensure lateral separation from known vertical obstructions which are a factor to the route of flight, flight leads will immediately direct a climb NLT 3 NM prior to the obstacle to an altitude that ensures vertical separation. **(T-1).**

3.15.5. At altitudes below 1,000 feet AGL, wingmen will not fly at a lower AGL altitude than lead. **(T-1).**

3.15.6. When crossing high or hilly terrain, pilots will maintain positive G on the aircraft and do not exceed 120 degrees of bank. **(T-1).** Pilots will limit maneuvering at less than 1 G to upright bunting maneuvers. **(T-1).**

Section 3D—Recovery and Landing

3.16. Gear Checks. For a VFR straight in, pilots will call gear down no later than 3 NM final. **(T-1).** For an instrument approach (reference **Chapter 4**), pilots will call gear down at the final approach fix or published glide slope intercept point. **(T-1).** For an overhead, call gear down departing the perch. For a SFO or FO, pilots will call gear down at base key. **(T-1).**

3.17. Angle of Attack (AOA). Final approach normally is flown at 11 degrees AOA. Pilots will compare the computed final approach airspeed with AOA. **(T-1).**

3.18. Landing restrictions. When the computed landing roll exceeds 80 percent of the available runway, land at an alternate if possible. When the RCR at the base of intended landing is less than 10, land at an alternate if possible. Pilots will not land over any raised web barrier (e.g., MA-1A, 61QS11). **(T-1).**

3.19. Desired touchdown point and spacing.

3.19.1. The desired touchdown point is 500 feet from the aim point. The aim point for a VFR approach is the threshold. The aim point for a precision approach is the glide path interception point. To avoid possible speedbrake or nozzle damage, pilots will touch down either past a raised approach-end cable, or 500 feet prior to the cable. **(T-1).** With centerline stores, touchdown is normally past an approach-end cable. Circumstances that may dictate landing prior to the cable include runway length, wind, runway condition (wet or icy), gross weight or an aircraft malfunction where full normal braking may not be available. Single-ship or formation landings with centerline stores may be made across BAK-12 arrestment cables which have been modified with an 8-point-tie-down system.

3.19.2. Pilots will comply with a touchdown spacing behind an aircraft while flying a 13 degree approach as a minimum of 6,000 feet due to susceptibility of the aircraft to wake turbulence and speedbrake/tail scrapes. **(T-1).** Pilots will comply with the minimum pattern and touchdown spacing between landing aircraft of 3,000 feet for similar aircraft (e.g., F-16 following F-16), 6,000 feet for dissimilar fighter aircraft (e.g., F-16 following F-15) or as directed by MAJCOM or the landing base, whichever is higher. **(T-1).**

3.19.2.1. When wake turbulence is expected due to calm winds (less than or equal to 5 knots) or when landing with a light tail wind, pilots will comply with increased pattern/touchdown spacing to 6,000 feet minimum. **(T-1).** Under these conditions, moderate to severe wake turbulence has been reported out to 7,000 foot touchdown spacing.

3.19.3. All aircraft will land in the center of the runway and clear to the cold side when speed/conditions permit. **(T-1).** After achieving a safe taxi speed, pilots will not delay clearing to the cold side as this can create a conflict for subsequent landing aircraft. **(T-1).**

3.19.4. When an F-16 aircraft is used to certify a BAK-12 interconnected with a BAK-14 cable retraction system, the minimum engagement speed will be 75 knots groundspeed and the maximum engagement speed will be 90 knots groundspeed. Pilots should place the airspeed selection switch to GS for their crosscheck in the HUD during the certification. As the F-16 engages a BAK-12/14 at a speed approaching and/or exceeding 100 knots, damage to the underside of the F-16 aircraft may result. For actual emergencies, T.O. limits will apply.

3.20. Low Approaches.

3.20.1. Pilots will observe the following minimum altitudes: **(T-1).**

3.20.1.1. IP/FEs flying chase position: 50 feet AGL.

3.20.1.2. Formation low approaches: 100 feet AGL.

3.20.1.3. Chase aircraft during an emergency: 300 feet AGL unless safety or circumstances dictate otherwise.

3.20.2. During go-around, pilots will remain 500 feet below VFR overhead traffic pattern altitude until crossing the departure end of the runway unless local procedures, missed approach/climbout procedures or controller instructions dictate otherwise. **(T-1).**

3.21. Touch-and-Go Landings. Fly touch-and-go landings IAW AFI 11-202V3. Pilots will not fly them with live or hung external ordnance or with fuel remaining in any external tank. **(T-1).**

3.22. Overhead Traffic Patterns. Unless the OG/CC determines that local conditions (e.g., threat condition, populated areas) dictate otherwise, pilots will not fly overhead patterns with unexpended heavy-weight ordnance (larger than BDU-33). **(T-3).**

3.23. Tactical Overhead Traffic Patterns. Pilots will only execute tactical entry to the overhead traffic pattern if the following conditions are met: **(T-1).**

3.23.1. Published overhead pattern altitude and airspeed are used.

3.23.2. Specific procedures have been developed locally and coordinated with appropriate air traffic control agencies.

3.23.3. The flight consists of a maximum of four aircraft (aircraft/elements more than 6,000 feet in trail are considered a separate flight).

3.23.4. No aircraft 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).

3.23.5. Normal downwind, base turn positions, and spacing are flown.

3.24. Closed Traffic Patterns. Pilots will initiate the pattern at the departure end of the runway unless directed/cleared otherwise by local procedures or the controlling agency. **(T-1).** An element low approach may be followed by a sequential closed with controller approval. Plan to arrive on downwind at 200-250 KIAS.

3.25. Back Seat Approaches and Landings.

3.25.1. An upgrading IP will only accomplish back seat landings when an IP is in the front cockpit. **(T-1).**

3.25.2. During back seat approaches and landings, the front seat pilot will visually clear the area, monitor aircraft parameters/configurations and be prepared to direct a go-around or take control of the aircraft (as briefed by the rear cockpit IP) if necessary. **(T-1).**

3.26. Formation Approaches and Landings.

3.26.1. Aircraft must be symmetrically loaded. **(T-1).** Consider symmetrical as those stores loadings which do not require an abnormal trim or control application to counter a heavy wing or yaw during takeoff and acceleration to climb airspeed.

3.26.2. Elements will be led by a qualified flight lead unless an IP or flight lead qualified squadron supervisor is in the element. **(T-1).**

3.26.3. Pilots will use a rate of descent similar to a precision approach. Fly a published precision instrument approach if one is available. **(T-1).** If not, pilots will fly a non-precision approach or VFR straight in and reference available lighting systems (e.g., VASI, PAPI) for descent angle. **(T-1).**

3.26.4. If the crosswind exceeds 5 knots, lead will position the wingman on the upwind side. **(T-1).**

3.26.5. The wingman will maintain a minimum of 10 feet lateral wingtip spacing. **(T-1).** If the wingman overruns lead after landing, lead will accept the overrun and maintain the appropriate side of the runway and wingtip clearance. **(T-1).** Wingman will not attempt to reposition behind lead. **(T-1).**

3.26.6. Pilots will not make formation landings when: **(T-1).**

3.26.6.1. The crosswind or gust component exceeds 15 knots.

3.26.6.2. The runway is wet or reported wet.

3.26.6.3. There is ice, slush, or snow on the runway.

3.26.6.4. The runway width is less than 125 feet.

3.26.6.5. Arresting gear tape connectors extend onto the runway surface at the approach end of 125 feet wide runways (excluding overrun installations).

3.26.6.6. Landing with hung ordnance or unexpended live bombs.

3.26.6.7. The weather is less than 500 foot ceiling and 1.5 miles visibility (or a flight member's weather category, whichever is higher). This applies to chased approaches and formation low approaches.

***Section 3E—Night (see also night** sections*

Chapter 2, **Chapter 5** ***and*** **Chapter 6***)*

3.27. General Night Procedures.

3.27.1. Night Ground Operations. The anti-collision (strobe) light may be OFF and the position lights STEADY if they prove to be a distraction. Pilots will comply with a taxi spacing minimum of 300 feet and taxi on the centerline. **(T-1).** Pilots will use the taxi light during all night taxiing. **(T-1). 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. **(T-1).**

3.27.2. Night Takeoff. Aircraft will maintain the anti-collision light ON and position lights FLASH for takeoffs, unless IMC is anticipated shortly after takeoff. **(T-3). Exception:** For formation takeoffs, flight/element leads will turn the anti-collision light OFF and position lights STEADY after reaching the run-up position on the runway. **(T-1).** During a night formation takeoff, pilots will call brake release, gear retraction and AB termination on the radio. **(T-1).** Following takeoff, each aircraft/element will climb on runway heading to 1,000 feet AGL before initiating turns, except where departure instructions specifically preclude compliance. **(T-3).**

3.27.3. Night Join-up. For night join-up underneath a ceiling, pilots will comply with the minimums of a 3,000 foot ceiling and 5 miles visibility. **(T-1).** After join-up, pilots must ensure: the anti-collision light is OFF and position lights are STEADY for all except the last aircraft, which keeps the anti-collision light ON and position lights FLASH unless otherwise directed by the flight lead. **(T-3).**

3.27.4. Position/Lead Changes. Unless operating with NVGs, pilots will not change lead or wing positions below 1,500 feet AGL unless on radar downwind. **(T-1).** Pilots will call such

changes over the radio and initiate them from a stabilized, wings-level attitude whenever possible. **(T-1).**

3.27.5. Night Break-up. Prior to a night formation break-up, the flight lead will confirm position and transmit attitude, altitude, airspeed, and altimeter setting. **(T-1).** Wingmen will acknowledge and confirm good navigational aids. **(T-1).**

3.27.6. Night Landing. Land from the most precise approach available. Pilots will only conduct night formation landings when required for safe recovery of the aircraft. **(T-1).**

3.28. Night Vision Goggles (NVG) Procedures.

3.28.1. NVG Preflight. NVGs must be preflight tested and adjusted/focused for the individual pilot using (in order of preference) the Hoffman ANV-20/20 Tester, a unit eye lane, or equivalent. **(T-1).** Reference AFI 11-301V1, *Aircrew Flight Equipment (AFE) Program*.

3.28.2. Cockpit Lighting. Pilots will fly with NVGs only in aircraft whose cockpit lighting MAJCOM designates as NVG compatible. **(T-2).** MAJCOMs will only make such a designation if all control and performance instruments are sufficiently illuminated by the NVG-compatible lighting so as to make them immediately available to the pilot in the event they need to transition to instruments.

3.28.3. Weather/Visibility/Illumination Levels/Minimum Altitudes/Discernable Horizon. Reference AFI 11-214, AFTTP 3-3.F-16, and AFI 11-202V3. All pilots conducting NVG operations that include air-to-air/surface-to-air threat reactions or air-to-ground dynamic/diving deliveries will conduct a "30-Up and 30-Down" horizon orientation maneuver before conducting tactical maneuvering. **(T-1).** Pilots will accomplish this maneuver in VMC and above the MSA. **(T-1).** It should be completed after the G-awareness exercise. The purpose is to evaluate horizon conditions and practice an NVG horizon orientation and crosscheck. If airspace precludes the maneuver, pilots operating on NVGs will limit maneuvers to AFI11-214 "Restricted Maneuvering" guidelines. **(T-1).** Pilots adhere to the following guidelines when conducting the 30-Up and 30-Down maneuver:

3.28.3.1. In VMC conditions (with a discernible horizon), and with sufficient altitude (~3,000-5,000 feet) in approved operating airspace, pilots will accelerate to 350 KIAS minimum and maintain a minimum spacing of 6,000 feet between aircraft throughout the maneuver. **(T-1).** The flight lead will announce, "Standby 30-UP, 30-Down" and communicate a reference heading prior to execution for flight deconfliction. **(T-1).** Flight members will verify correct spacing, heading, and entry parameters and will communicate "stand by" if not ready. **(T-1).**

3.28.3.2. Flight leads will command "30 Up," and all pilots will execute a military power, 3-4 G wings-level pull up to place the bore cross on the 30 degree pitch ladder. **(T-1).** Pilots will evaluate and orient themselves with the horizon in the forward quadrants, both above and below the horizon while maintaining intra-flight deconfliction contracts. **(T-1).** Take note of the physical cranial movement required to move the NVG field of regard back to the horizon, as well as the condition of the horizon due to ambient factors. If at any time the airspeed drops below 250 KIAS, weather is encountered, or symptoms of spatial disorientation are recognized, the pilot will immediately transition to

primary flight instruments, call a "knock it off (with reason)," and conduct an IMC nose-high recovery. **(T-1).**

3.28.3.3. After approximately 5 seconds, or sooner if airspace or altitude restrictions require, the flight lead will command "roll left (or right), 30 down". **(T-1).** All aircraft will roll inverted and accomplish the military power, 3-4 G wings-level pull to place the bore cross at the 30 degree nose-low, then roll upright on the reference heading. **(T-1).** Once intra-flight deconfliction is assured, pilots will repeat the horizon crosscheck and visibility assessment while maintaining the 30 degree-nose low attitude. **(T-1).**

3.28.3.4. If during any portion of the maneuver a flight member determines that the visibility or horizon reference is unsuitable for tactical maneuvering per AFI-11-214 guidance, the flight lead will modify the training profile and either transition to non-NVG formations or NVG formation tactics limited to AFI11-214 "Restricted Maneuvering" guidelines. **(T-1).** Pilots will continually modify profiles or airspace utilization throughout the sortie if conditions change and no longer permit the planned maneuvering. **(T-1).** Flight training modification includes: restricted maneuvering limitations (with or without NVGs) per AFI-11-214, a non-NVG formation IMC game plan, or accomplishing a briefed alternate mission without NVGs.

3.28.3.5. Pilots will continually cross-check visually perceived attitude aided by NVGs with frequent cross-checks of primary flight instruments throughout the mission. **(T-1).**

3.28.4. NVG Qualifications. Pilots will not wear NVGs in flight unless they are NVG qualified or a qualified NVG IP is in the flight (ratio of one NVG IP per non-NVG qualified pilot). **(T-1).** F-16B/D Familiarization flights are authorized but the unit must ensure appropriate academics are accomplished and an NVG IP is in the front seat. **(T-1).**

3.28.5. Radio Calls. All flight members will make a radio call when donning, raising, or stowing NVGs. **(T-1).**

3.28.6. Obstacle/Intra-Flight Deconfliction. When flying in route, only one flight member per element will don/raise/stow NVGs at a time. **(T-1).** Flight leads will call turns if forced to maneuver while flight members are donning/raising/stowing NVGs. **(T-1).**

3.28.7. Takeoffs/Landings. Pilots must stow or raise NVGs during takeoff until at or above 2,000 feet AGL in climbing or level flight and only in VMC. **(T-1).** Pilots must stow or raise NVGs no later than 5 minutes prior to landing unless NVGs are necessary to handle an emergency or mission requirements dictate. **(T-1).**

3.28.8. NVG Use during Air to Air Refueling (AAR). Pilots must stow or raise NVGs no later than the stern position and resume NVG use no earlier than boom disconnect. **(T-1).**

Section 3F—Other

3.29. Targeting Pod Operations . Pilots will not use the TGP for anything other than navigational SA below 1,000 feet AGL (e.g., Only VID aircraft, designate for weapons delivery, etc. above 1,000 feet AGL). **(T-1).** (USAFWC, Test, and AATC: Minimum altitudes for TGP operations are established in WIC or test syllabus requirements, continuation training plans or operational test and evaluation requirements).

3.30. Radio Procedures. Flight members must preface all communications with the complete flight call sign (except for wingman acknowledgment). **(T-1).** Flight members must transmit only that information essential for mission accomplishment or safety of flight. **(T-1).**

3.30.1. Radio Checks. Flight members must acknowledge radio checks, which do not require the transmission of specific data by individual flight members, in turn (EXAMPLE: "2, 3, 4"). **(T-1).** Acknowledgment indicates the appropriate action is either complete, is in the process of being completed or is understood by the flight member.

3.30.2. Clearance Acknowledgement. All flight members will acknowledge understanding the initial air traffic control (ATC) clearance. **(T-1).** If flight members are not monitoring in-flight ATC frequency, the flight lead will pass all ATC instructions to the flight. **(T-1).** Flight members will acknowledge subsequent ATC instructions when directed by the flight lead. **(T-1).**

3.30.3. Flight members will use brevity code and other terminology IAW AFI 11-214 and AFTTP 3-1.General Planning, *General Planning and Employment Considerations*. **(T-1).**

3.30.4. Ops Checks.

3.30.4.1. Pilots will monitor the fuel system carefully to identify low fuel, trapped fuel or an out of balance situation as soon as possible. **(T-1).** Frequency should be increased during tactical maneuvering at high power settings. Pilots must complete the following ops checks:

3.30.4.1.1. During climb or at level-off after takeoff. **(T-1).**

3.30.4.1.2. When external fuel tanks (if carried) are empty. **(T-1).**

3.30.4.1.3. Prior to each (D)ACBT engagement or intercept. **(T-1).**

3.30.4.1.4. Prior to entering an air-to-surface range, once while on the range if multiple passes are made and after departing the range. **(T-1).**

3.30.4.2. Pilots must check the minimum items of engine instruments, total and internal fuel quantities/balance, G-suit connection, oxygen system, and cabin altitude. **(T-1).** If the G-suit malfunctions or becomes disconnected, pilots will terminate all ACBT maneuvering until normal operation is reestablished. **(T-1).**

3.30.4.3. For formation flights, the flight lead will initiate ops checks by radio call or visual signal. (T-1). Flight members will respond by radio call or visual signal. **(T-1).**

3.30.4.3.1. During Ops checks, pilots will ensure the fuel quantity selector knob is returned to the NORM position. **(T-1).** Totalizer-only Ops checks may be used periodically during high demand phases of flight.

3.30.4.3.2. For mandatory ops checks when external tanks are carried, each flight member will check the external tank(s) and add “Tank(s) feeding/dry” to the Ops Check. **(T-1).** Once the tank(s) have been confirmed and called dry, this may be omitted from subsequent ops checks.

3.30.4.3.3. Pilots will not substitute data-linked fuel status for operations checks. **(T-1).**

3.31. Lap Belts. Use extreme caution when disconnecting the lap belt in flight due to potential for lap belt buckle/side-stick controller/throttle interference.

3.32. Change of Aircraft Control. Both pilots of an F-16B/D must know at all times who has control of the aircraft. **(T-1).** Pilots will transfer control of the aircraft with the statement "You have the aircraft." **(T-1).** The pilot receiving control of the aircraft will acknowledge "I have the aircraft." **(T-1).** Once assuming control of the aircraft, the pilot will maintain control until relinquishing it as stated above. **(T-1). 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 briefed otherwise. **(T-3).**

3.33. Fuel Requirements.

3.33.1. Joker Fuel. A briefed fuel quantity needed to terminate an event and proceed with the remainder of the mission.

3.33.2. Bingo Fuel. A briefed fuel state which allows the aircraft to return to the base of intended landing or alternate, if required, using preplanned recovery parameters and arriving with normal recovery fuel as listed below:

3.33.3. Normal Recovery Fuel. The fuel quantity on initial or at the FAF at the base of intended landing or alternate, if required. This fuel quantity is the higher of what is established locally or:

3.33.3.1. All F-16 Blocks 10 through 32 - 1,000 pounds.

3.33.3.2. All F-16 Blocks 40 and higher - 1,200 pounds.

3.33.4. Minimum/Emergency Fuel. Pilots will declare the following when it becomes apparent that an aircraft is entering initial or start an instrument final approach at the base of intended landing or alternate, if required, with: **(T-1).**

3.33.4.1. Minimum Fuel:

3.33.4.1.1. All F-16 Blocks 10 through 32 - 800 pounds or less.

3.33.4.1.2. All F-16 Blocks 40 and higher - 1,000 pounds or less.

3.33.4.2. Emergency Fuel:

3.33.4.2.1. All F-16 Blocks 10 through 32 - 600 pounds or less.

3.33.4.2.2. All F-16 Blocks 40 and higher - 800 pounds or less.

3.33.5. Afterburner Use. Pilots will not use AB below 2,000 pounds total fuel or established bingo fuel, whichever is higher, unless required for safety of flight. **(T-1).**

3.34. Radar Altimeters and Terrain Warning/Avoidance Systems.

3.34.1. If the aircraft is equipped with such systems (CARA, DTS, PGCAS, AGCAS, etc.), the pilot will turn them on for all flights and set LIS altitude advisory as appropriate on all missions. **(T-1).** Pilots will enable PGCAS with a minimum altitude setting of 200 feet for day operations and 700 feet for night operations. **(T-1).** Pilots will confirm the correct AGCAS mode (NORM/MIN/SHOW) is selected per mission requirements. **(T-1).** AGCAS should only be turned off if a known system malfunction affecting safety of flight requires system deactivation. Pilots will ensure that the appropriate values are set prior to takeoff. **(T-**

1). For low altitude operations GCAS settings, reference **3.15.2.2** and **3.15.2.3** in this publication.

3.34.2. Pilots must set the ALOW function of the radar altimeter and the LIS at the briefed minimum altitude, the command-directed minimum altitude, or as briefed, whichever is highest. **(T-1).** They should be set at sufficient altitudes, during various phases of flight, to allow for safe recovery of the aircraft when activated.

3.34.3. Prior to commencing an approach during night or IMC, pilots should reset the LIS and/or ALOW warning system to an altitude appropriate to the instrument approach procedure being flown or the general terminal area. Refer to 1F-16C/CM-34-1-1 for warning limitations when the gear is down.

3.35. Wind and Sea State Restrictions. Pilots will not conduct training missions when surface winds along the intended route of flight exceed 35 knots steady state. **(T-1).** Pilots will not conduct over water training missions when surface winds exceed 25 knots steady state or when the sea state exceeds 10 feet (or 4 meters-USAFE). **(T-3).** This is not intended to restrict operations when only a small portion of the route is affected.

3.36. Airborne Interrogator Friend Foe (AIFF) Operation.

3.36.1. To reduce the potential for adverse effects on Combat Identification, Air Traffic Control, and Traffic Collision Avoidance systems, pilots will limit interrogations to the minimum required for the mission. **(T-1).**

3.36.2. For AIFF operations within the United States and its Possessions (US&P), pilots will comply with the equipment and operational restrictions as specified in the applicable Radio Frequency Authorizations (RFA's) which can be obtained from the unit spectrum management office. **(T-1).**

Chapter 4

INSTRUMENT PROCEDURES

4.1. General.

4.1.1. Head-Up Display (HUD) Use. Regardless of Block, pilots will use the ADI as the primary reference to recover from an unusual attitude or while executing lost wingman procedures. **(T-1).** The HUD should be used as a crosscheck in these situations. The HUD in F-16 Block 25/30/32 aircraft and Block 40/42/50/52 aircraft has been certified as a primary flight instrument and may be used as a primary flight reference in night/IMC conditions. The HUD in all other F-16 Blocks may be used as an additional instrument reference only. No F-16 Block may use the HUD as the sole reference in night/IMC conditions.

4.1.2. The F-16 is approved for RNAV 2 and BRNAV for enroute navigation IAW with AC 90-108 change 1 and ICAO Doc 7030. RNAV waypoints, routes and NAVAIDs must be pulled from the approved DAFIF database by name. Terminal area RNAV procedures, (RNAV approaches, missed approaches, arrivals and departures) are not authorized until such a time as the procedure in its entirety can be pulled by name from an approved database and auto sequenced during the procedure.

4.1.3. Simulated Instrument Flight. Follow AFI11-202V3 guidance. A qualified safety observer must be in the aircraft or in a chase aircraft when conducting simulated instrument flight. **(T-1).** A safety observer may occupy either seat of the F-16B/D provided the intercom is operable. Use the radar to aid in clearing the area. Pilots in F-16A/C aircraft may not log simulated instrument flight without a chase. They may fly multiple approaches in VMC without a chase, but pilots should place their primary emphasis on seeing/sensing and avoiding other aircraft. Chase aircraft may move into close formation on final for a formation landing provided simulated instrument flight is terminated.

4.2. Takeoff and Initial Join-up.

4.2.1. If weather is below 1,500 foot ceiling and 3 miles (5 km), each aircraft and element will climb on takeoff heading to 1,000 feet AGL before initiating any turns, except when departure instructions specifically preclude compliance. **(T-1).**

4.3. Trail Procedures.

4.3.1. General. During trail formations, basic instrument flying is the first priority and is not to be sacrificed when performing secondary trail tasks. Pilots will strictly adhere to the briefed airspeeds, power settings, altitudes, headings and turn points. **(T-1).** If task saturation occurs, pilots will cease attempts to maintain radar contact, immediately concentrate on flying the instrument procedure, and then notify the flight lead. **(T-1).** The flight lead will notify ATC. **(T-1).**

4.3.1.1. Flight leaders will request non-standard formation from ATC. **(T-1).**

4.3.1.2. ATC instructions issued to the lead aircraft apply to the entire flight.

4.3.1.3. Normal spacing is 2-3 NM.

4.3.1.4. Each aircraft and element will follow the No Radar/Sensor Contact procedures until the aircraft or element immediately in trail has radar/sensor contact and called "tied." **(T-1).**

4.3.2. No Radar/Sensor Contact.

4.3.2.1. The flight leader will call initiating all turns. **(T-1).** Subsequent aircraft must delay turns to maintain the desired spacing. **(T-1).**

4.3.2.2. Each aircraft and element will maintain 20 seconds or 2-3 NM spacing using all available aircraft systems and navigational aids to monitor position. **(T-1).**

4.3.2.3. During climbs and descents, each aircraft or element will call passing each 5,000 foot altitude increment with altitude and heading (or heading passing) until join-up, level-off, or the following aircraft or element calls "tied." **(T-1).**

4.3.2.4. Each aircraft and element will call initiating any altitude or heading change. **(T-1).** Acknowledgments are not required; however, it is imperative that preceding aircraft or elements monitor the radio transmissions and progress of the succeeding aircraft and elements, and immediately correct deviations from the planned route.

4.3.2.5. Each aircraft and element will maintain at least 1,000 feet vertical separation from the preceding aircraft or element until establishing radar or visual contact, except in instances where departure instructions specifically preclude compliance. **(T-1).** Reduce vertical separation to 500 feet if necessary to comply with MSA restrictions.

4.3.2.6. In the event a visual join-up cannot be accomplished on top or at level-off, the flight leader will request altitude separation for each succeeding aircraft or element to meet the requirements of the above paragraph. **(T-1).**

4.3.3. Radar Contact.

4.3.3.1. Each aircraft and element will call "tied" when radar contact is established with the preceding aircraft. **(T-1)**. Once all aircraft are tied, no further radio calls are necessary, except to acknowledge ATC instructions, unless radar contact is lost.

4.3.3.2. In flights of three or more aircraft, pilots will use all available aircraft systems (i.e., radar, TACAN, AAI, etc.) to ensure that trail is maintained on the correct aircraft. **(T-1).**

4.3.4. Trail Departures.

4.3.4.1. Pilots will use a minimum of 20 seconds takeoff spacing. **(T-1).**

4.3.4.2. Each aircraft/element will accelerate in MIL or AB power until reaching 350 KIAS (or as required by local procedures). **(T-1).** Upon reaching this speed, the flight leader will set a pre-briefed power setting. **(T-1).** Climb at 350 KIAS until reaching cruise Mach/TAS, unless otherwise briefed.

4.3.4.3. Pilots will make all turns using 30 degrees of bank. **(T-1).**

4.3.5. Enroute Trail. Flight leads must brief airspeeds, power settings, and configurations. (**T-1).**

4.3.6. Trail Recovery.

4.3.6.1. Trail recoveries are only authorized at locations where procedures have been established. Appropriate ATC agencies must approve. **(T-1).** OG/CCs must ensure trail recovery procedures are included in local procedures. **(T-3).** As a minimum, OG/CCs must ensure procedures address each recovery profile, missed approach, climb-out, desired and maximum spacing requirements, lost contact and lost communications. **(T-1).**

4.3.6.2. OG/CCs must limit trail recovery to a maximum of four aircraft. **(T-1).**

4.3.6.3. Trail recoveries are authorized when weather at the base of intended landing is at or above the highest pilot weather category in the flight or approach minimums, whichever is higher.

4.3.6.4. The flight lead must brief the flight on spacing, configuration and airspeeds. **(T-1).**

4.3.6.5. The flight lead must coordinate the trail recovery with ATC prior to taking spacing. **(T-1).**

4.3.6.6. Prior to wingmen taking spacing for the trail recovery, the flight lead will ensure that all wingmen have operative navigational aids and radar. **(T-1).**

4.3.6.7. Accomplish flight separation IAW local directives and in VMC if possible.

4.3.6.8. The formation must squawk as directed by ATC. **(T-1).**

4.3.6.9. ATC will provide radar flight following for the entire formation. **(T-1).**

4.3.6.10. Pilots must limit all turns to a maximum of 30 degrees of bank. **(T-1).**

4.3.6.11. Once established on a segment of a published approach, each aircraft must comply with all published altitudes and restrictions while maintaining in-trail separation. **(T-1).**

4.3.6.12. Unless local procedures establish defined reference points for airspeed and configuration changes, the flight lead must direct changes by radio. **(T-1).** At flight lead's call all aircraft must simultaneously comply with the directed change. **(T-1).**

4.3.6.13. All aircraft must report the final approach fix. **(T-1).**

4.3.6.14. If contact is lost with the preceding aircraft, the pilot will transmit "Callsign (C/S) lost contact." **(T-1)** The preceding aircraft will respond with altitude, airspeed and heading. **(T-1).** The aircraft will establish altitude deconfliction and coordinate a separate clearance with ATC. **(T-1).** If contact is lost while established on a segment of a published approach, flight members may continue the approach, but must confirm separation via navigation aids. **(T-1).** If separation cannot be confirmed, the pilot will execute missed approach or climb-out as instructed by ATC. **(T-1).**

4.3.6.15. Flight leads will coordinate with local ATC prior to penetration if the trail recovery terminates in a Precision Approach Radar (PAR) or Airport Surveillance Radar (ASR) approach. **(T-1).**

4.4. Formation Break-up. Pilots must execute formation break-up from a visual formation in VMC. **(T-1).** If IMC is unavoidable, pilots must breakup from a visual formation in straight and level flight. **(T-1).** This restriction does not apply to trail formation. Prior to an IMC break-up, the flight lead will confirm position and transmit attitude, altitude, airspeed, and altimeter setting.

(T-1). Wingmen will acknowledge and confirm good navigational aids (reception of appropriate TACAN, ILS and/or appropriate GPS/INS waypoint). **(T-1).**

4.5. Formation Penetration.

4.5.1. Pilots must restrict formation penetrations in route or close formation to two aircraft when the weather at the base of intended landing is less than overhead traffic pattern minimums. **(T-1).**

4.5.2. If a formation landing is intended, the wingman should be positioned on the appropriate wing prior to weather penetration.

4.5.3. Formation penetrations using radar trail procedures are authorized when weather at the base of intended landing is at or above the highest pilot weather category in the flight or approach minimums, whichever is higher.

4.6. Formation Approach. During IMC formation flights, pilots will not change lead or wing positions below 1,500 feet AGL unless on radar downwind or if required during a formation approach with an F-16 experiencing an emergency. **(T-1).**

4.7. Instrument Approach Procedures.

4.7.1. Pilots will not fly any published instrument procedure (e.g. DoD, Jeppesen, ICAO) that requires airspeeds less than those specified in T.O. 1F-16x-1. **(T-1).**

4.7.2. The F-16 is Approach Category E. If no Category E minimums are published, Category D minimums can be used, provided:

4.7.2.1. A straight-in approach is flown.

4.7.2.2. For the final approach segment, the aircraft is flown at 165 KIAS or less.

4.7.2.3. For the missed approach segment, the aircraft is flown at 260 knots true airspeed (KTAS) or less. At high density altitudes 260 KTAS may require a KIAS below the speed specified in T.O. 1F-16x-1 and pilots shall not fly Category D approaches. **(T-1).**

Chapter 5

AIR-TO-AIR WEAPONS EMPLOYMENT

5.1. General. Reference AFI 11-214 for procedures and restrictions.

5.2. Simulated Gun Employment. Aircrew must comply with the below restrictions and procedures. **(T-1).**

5.2.1. Never perform simulated gun employment with a hot gun (one that is not safe IAW T.O. 1F-16x-34-1-1). Never perform a trigger check with a hot gun, regardless of Master Arm switch position.

5.2.2. Prior to flight, confirm the status of the gun system. Prior to simulated gun employment, perform a trigger check with the Master Arm switch in SIMULATE and the aircraft pointed away from other aircraft and populated areas. If HUD symbology reads "ARM" or SMS/MFD symbology reads "RDY," do not squeeze the trigger or continue with simulated weapons employment.

5.3. Maneuvering Limitations. Aircrew must comply with the below restrictions and procedures. **(T-1).**

5.3.1. Negative "G" guns jink maneuvers are prohibited.

5.3.2. Minimum airspeed during low altitude offensive or defensive maneuvering is 350 KIAS.

5.3.3. All configurations are authorized for unlimited maneuvering as defined by AFI 11-214. Before conducting unlimited maneuvering in a CAT III configured aircraft, consider gross weight, drag, departure susceptibility and training requirements.

5.3.4. For D-model F-16s, restrict maximum-commanded or abrupt control inputs below 150 KIAS when flying ACBT sorties. Full maneuvering may be resumed at or above 150 KIAS.

Chapter 6

AIR-TO-SURFACE WEAPONS EMPLOYMENT

Section 6A—General

6.1. General. Reference AFI 11-214 for procedures and restrictions.

6.2. Simulated Gun Employment. Aircrew must comply with the below restrictions and procedures. **(T-1).**

6.2.1. Never perform a trigger check with a hot gun, regardless of Master Arm switch position.

6.2.2. Never perform simulated gun employment (squeezing the trigger with the Master Arm switch in SIM) with a hot gun (one that is not safe IAW T.O. 1F-16x-34-1-1). This restriction does not apply on a controlled range against targets approved for gun employment with ammunition loaded.

6.2.3. Prior to flight, confirm the status of the gun system. Prior to simulated gun employment, perform a trigger check with the Master Arm switch in SIMULATE and the aircraft pointed away from other aircraft and populated areas. If HUD symbology reads "ARM" or SMS/MFD symbology reads "RDY," do not squeeze the trigger or continue with simulated weapons employment.

6.3. Training Missions with a Hot Gun.

6.3.1. Pilots will not select strafe submode until immediately prior to roll in and deselect strafe submode immediately after completing the safe escape maneuver. **(T-1).**

6.3.2. When firing the laser, ensure you are not in a mode that allows the gun to fire.

6.3.3. Pilots will not disable AGCAS for strafe operations. **(T-3).** During LAS an automated recovery may occur near 2000 feet slant range; therefore pilots must cease fire prior to 2000 feet slant range or rounds may be employed well long of the target during automated pull-up. **(T-1).**

6.4. Simulated Air-to-Surface Weapons Employment.

6.4.1. A simulated attack is defined as an attack in which the pilot presses the weapons release (pickle) button and/or pulls the trigger with the intention of conducting a dry pass.

6.4.2. Simulated Attacks against off-Range or Manned Targets. Do not conduct such attacks with internally/externally loaded live ordnance (except for 20 mm ammunition in a gun safed IAW T.O. 1F-16x-34-1-1), externally loaded heavyweight inert ordnance, or hung ordnance. When the aircraft is loaded with expendable stores (e.g., external fuel tanks, TERs carted at the pylon), load simulated weapons (zero quantity) in the SMS/MFD only on empty or uncarted/unexpendable stations (Exception: Captive Maverick and HARM missiles may be selected). Confirm the Master Arm switch is in OFF or SIMULATE prior to the first attack. Flight lead will query and flight members will reply to a "check zero quantity, uncarted station" radio call. **(T-1)**.

6.5. Weather. In training, pilots will not conduct climbing or diving deliveries with a ceiling below 2,000 feet AGL or level deliveries with a ceiling below 1,500 feet AGL. **(T-1).**

6.6. Pop-Up Attacks. Pilots will abort pop-up attacks if airspeed decreases below 350 KIAS (300 KIAS above 10,000 feet AGL). **(T-1).**

6.7. Target Identification. Pilots shall positively identify the target prior to weapons release. **(T-1).** For wartime or contingency sorties, pilots must comply with ROE. **(T-1).** For training sorties, pilots must achieve positive identification by either visually acquiring the target or by confirming target location through valid on-board/off-board cues. **(T-1).** Cues may include, but are not limited to, radar, GPS, marking rounds, TGP or IR Maverick lock on, IR pointers or NVG-compatible marking devices. Exercise caution when relying on a single cue to confirm target location.

6.8. Safety of Ground Personnel. When ground controllers are present on Class B/C ranges, range personnel will brief pilots on locations of these personnel. **(T-1).** Each pilot will acknowledge. **(T-1).** Pilots must know applicable range weapons delivery procedures, appropriate targets and weapons footprints. **(T-1).** Pilots shall not expend ordnance if any doubt exists as to the ground personnel or intended target locations. **(T-1).**

Section 6B—Night

6.9. Altitude. Compute an MSA for the entire bombing pattern using the guidance in AFI 11-214. The minimum altitude for night High Angle Strafe (HAS) is the Target MSA (as defined in Attachment 1) unless executed by an "NVG-LOWAT" or "NVG High Angle Strafe Low Altitude" qualified pilot (as defined in AFI 11-2F-16 V1) under high-illumination conditions (as defined in AFI 11-214). For HAS, pilots will review and confirm parameters prior to roll-in. **(T-1).**

6.10. Bank Angle. Pilots will not exceed 135 degrees of bank when returning to the low altitude structure (<5,000 feet AGL). **(T-1).**

Chapter 7

ABNORMAL OPERATING PROCEDURES

7.1. General. Follow the procedures in this chapter when other than normal circumstances occur. These procedures do not supersede procedures contained in the flight manual. Pilots will:

7.1.1. Not accept an aircraft for flight with a malfunction which is addressed in the emergency/abnormal procedures section of the flight manual until appropriate corrective actions have been accomplished. **(T-1).**

7.1.2. Not fly an aircraft with a tripped engine monitoring system (EMS) Go-No-Go indicator (Bit Ball) until maintenance has accomplished the appropriate procedures and cleared the fault. **(T-1).**

7.1.3. Not taxi with a known malfunction of the nose-wheel steering system, the brake system, or a generator [**Note:** F-16C/D aircraft may be taxied with a single generator failure (main or standby) if the other generator is operating normally]. **(T-1).**

7.1.4. Once a malfunctioning aircraft system is isolated, do not use that system again unless its use in a degraded mode is essential for recovery. **(T-1).** Pilots will not conduct ground or in-flight trouble-shooting after flight manual emergency procedures are complete. **(T-1).**

7.1.5. 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 provide checklist assistance at the request of the pilot in command. **(T-1).**

7.1.6. For actual/perceived flight control malfunctions, pilots will terminate maneuvering and take appropriate action. **(T-1).** If the problem was due to crew/passenger stick or rudder interference, the pilot will take positive action to ensure no further control interference occurs. **(T-1).**

7.1.7. When a fuel imbalance exceeds dash one limits, terminate tactical maneuvering and investigate. **(T-1).** If the problem was caused by a slow feeding external or internal fuel tank and can be corrected, the mission may continue IAW TO 1F-16A/C-1. If not, terminate the mission. Instruments, deployment missions, level weapons deliveries and straight-through-non-maneuvering intercepts are authorized to reduce gross weight until a safe landing is possible.

7.2. Critical Action Procedures (CAPs). CAPs are in **Attachment 4**.

7.3. Ground Aborts.

7.3.1. If a flight member aborts prior to takeoff, the flight lead normally renumbers the flight to maintain a numerical call sign sequence. Flight leads will advise the appropriate agencies of such changes. **(T-1).**

7.3.2. Pilots who do not takeoff with the flight may join the flight in accordance with the brief or flight lead instructions. If a join-up is to be accomplished on an air-to-ground range, the flight lead must terminate all events until the joining aircraft has achieved proper spacing. **(T-1).**

7.4. Takeoff Aborts.

7.4.1. If an abort occurs during takeoff roll, the aborting pilot must say call sign and intentions when practical. **(T-1).** Following aircraft will alter takeoff roll to ensure clearance or abort takeoff if adequate clearance cannot be maintained. **(T-1).** Pilots must use the phrase "Cable, Cable, Cable" to indicate a departure-end cable arrestment. **(T-1).** Pilots must use the phrase "Barrier, Barrier, Barrier" to indicate a departure-end net arrestment. **(T-1).** OG/CCs must ensure local procedures address net barrier raising procedures. **(T-1).**

7.4.2. When aborting above 120 KIAS, or whenever hot brakes are suspected, pilots will declare a ground emergency, taxi the aircraft to the designated hot brake area and follow hot brake procedures. **(T-1).**

7.4.3. If aborting at or above 100 KIAS, pilots will lower the hook. **(T-1).** If aborting below 100 KIAS, pilots will lower the hook if there is any doubt about the ability to stop on the remaining runway. **(T-1).**

7.5. Air Aborts.

7.5.1. If an abort occurs after takeoff, all aircraft will maintain their original numerical call sign. **(T-1).**

7.5.2. Escort aborting aircraft with an emergency condition to the field of intended landing. When other than an emergency condition exists, the flight lead will determine if an escort for the aborting aircraft is necessary. **(T-3).**

7.5.3. Pilots will abort the mission, regardless of apparent damage or subsequent normal operation, for any of the following: **(T-1).**

7.5.3.1. Bird strike

7.5.3.2. Actual or suspected foreign object damage.

7.5.3.3. Recovery below FRAG altitude with live ordnance.

7.5.3.4. Moderate to severe icing.

7.5.3.5. Over-G (**Note:** Land as soon as practical out of a straight-in approach).

7.5.3.6. Flight control system anomalies, including uncommanded departures from controlled flight (**Exception:** intentional departures from controlled flight conducted IAW a MAJCOM-approved syllabus), but not including flight control system lights that reset IAW flight manual procedures.

7.5.3.7. Engine flameout/stagnation or shutdown.

7.5.3.8. Lightning strike.

7.6. Radio Failure/No Radio (NORDO). Reference AFI 11-205 and the Flight Information Handbook.

7.6.1. NORDO in Formation.

7.6.1.1. A pilot who experiences 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. **(T-1).** The mission should be terminated as soon as practical and the NORDO aircraft led to the base of intended landing or a divert base.

A formation approach to a drop-off on final should be performed unless safety considerations dictate otherwise.

7.6.1.2. If flying other than close/route formation when radio failure occurs, the NORDO aircraft should attempt to rejoin to a route position at approximately 500 feet on another flight member. The NORDO aircraft is responsible for maintaining clearances from other flight members until his presence is acknowledged by a wingrock, signifying clearance to join. Once joined, the NORDO aircraft will give the appropriate visual signals. **(T-1).** If pre-briefed, 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. Aircraft experiencing any difficulty/emergency in addition to NORDO will proceed as required by the situation. **(T-1).**

7.6.2. NORDO on a Class A Range or a Manned Class B Range.

7.6.2.1. Pilots will attempt contact with the RCO on the appropriate back-up frequency or back up radio. **(T-1).**

7.6.2.2. If contact cannot be reestablished, pilots will make a pass by the range control tower on the attack heading while rocking wings and turn in the direction of traffic. **(T-1).** The flight lead will direct another flight member to escort the NORDO aircraft to a recovery base or rejoin the flight and RTB. **(T-1).**

7.6.2.3. If the NORDO aircraft has an emergency, the NORDO aircraft will 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 recovery base. **(T-1).** The flight lead will direct a flight member to join-up and escort the emergency aircraft. **(T-1).**

7.6.3. NORDO on an Unmanned Class B Range or on a Class C Range.

7.6.3.1. The NORDO aircraft will make a pass on the target maintaining normal pattern spacing, if possible, while rocking wings. **(T-1).** The flight lead will direct another flight member to escort the NORDO aircraft to a recovery base or rejoin the flight in sequence and recover. **(T-1).** If the NORDO aircraft has an emergency, if practical, it will make a pass on the target maintaining normal pattern spacing, rocking wings, turn opposite direction of traffic and proceed to a recovery base. **(T-1).** The flight lead will direct a flight member to join-up and escort the emergency aircraft. **(T-1).**

7.6.3.2. Unexpended Ordnance. If radio failure occurs and circumstances preclude landing with unexpended ordnance, safe jettison of ordnance may be accomplished provided the following conditions are met:

7.6.3.3. The NORDO aircraft joins on another flight member who has radio contact with the RCO and the remainder of the flight.

7.6.3.4. Stores jettison visual signals specified in AFI 11-205 are relayed to the NORDO aircraft to initiate jettison.

7.6.4. NORDO during Missile or Air-to-Air Gunnery Firing.

7.6.4.1. Aircraft will not fire without two-way radio contact. **(T-1).**

7.6.4.2. If radio failure occurs, the pilot will safe the armament switches, join on another member of the flight or the tow aircraft, IAW paragraph **7.6.1. (T-1).**

7.6.4.3. Gunnery target tow aircraft experiencing radio failure will rock wings and continue the turn if an attack is in progress. **(T-1).** The flight lead of the attacking aircraft will join on the tow's wing. **(T-1).** Remain clear of the banner in the event it is cut. The tow pilot will use standard hand signals to indicate his difficulty. **(T-1).** The flight lead will signal when the banner is cleared for cut with a slicing motion across the throat. **(T-1).** After the banner is away and the flight lead determines there is no remaining cable, he will take the lead, RTB with the tow aircraft on the wing, advise the tower of the NORDO and establish the appropriate landing pattern. **(T-1).** If cable remains, follow local procedures.

7.6.5. NORDO during Recovery.

7.6.5.1. If a formation straight-in approach is flown and a go-around becomes necessary, the chase will go-around, pass the NORDO aircraft and rock his wings. **(T-1).** The NORDO aircraft will go-around, if the situation allows. **(T-1).** If the NORDO aircraft is in formation as a wingman, the leader will initiate a gentle turn into the wingman and begin the go-around. **(T-1).**

7.6.5.2. To signal the need for an approach-end arrestment, the pilot will lower the tailhook (visual formation) or fly a straight in approach flashing the landing light (unescorted). **(T-1).**

7.7. Severe Weather Penetration. Do not fly through severe weather. If unavoidable, flights will split-up and obtain separate clearances prior to severe weather penetration. **(T-1).**

7.8. Spatial Disorientation (SD). SD has proven to be a leading killer of F-16 pilots. Although SD is most common at night or in IMC, it can and has happened in day VMC. Reference AFPAM11-417 for information on the causes of SD, how to avoid it, and how to mitigate its consequences.

7.8.1. Enabling PARS is an acceptable recovery method from SD induced unusual attitudes, reference AFTTP 3-3.F16 for recommended throttle techniques during PARS recoveries.

7.8.2. Pilots should ensure deconfliction from other aircraft (primarily above or below their position) prior to PARS activation.

7.9. Lost Wingman.

7.9.1. Priorities. The first priority is to establish safe separation from other aircraft (e.g., tanker or wingman). Next, obtain a separate clearance to ensure obstacle/terrain clearance and clearance from other traffic.

7.9.2. Prohibitions. Do not practice lost wingman procedures in other than day VMC conditions.

7.9.3. General Procedures. Simultaneously transition to instruments and inform lead while executing lost wingman procedures (ref AFTTP 3-3.F16 for amplifying data). Lead will acknowledge the radio call and transmit attitude, heading, altitude and airspeed. **(T-1).** Once lost wingman procedures have been executed, permission to rejoin must be obtained from the flight lead. **(T-1).**

7.9.4. Two- or Three-Ship Flights. (**Note:** If in three-ship echelon, refer to four-ship lost wingman procedures.)

7.9.4.1. 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.

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

7.9.4.3. Inside the Turn. Momentarily reduce power to ensure nose-tail separation and inform the flight lead 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.

7.9.4.4. Precision/Non-precision Final. The wingman will momentarily turn away to ensure clearance, inform lead, and commence the published missed approach procedure while obtaining a separate clearance. **(T-1).**

7.9.4.5. Missed Approach. The wingman will momentarily turn away to ensure clearance, inform lead, and continue the published or assigned missed approach procedure while climbing to 500 feet above missed approach altitude. **(T-1).** Obtain a separate clearance.

7.9.5. Four-Ship Flights. If only one aircraft in the flight becomes separated, the previous procedures would provide safe separation, but since it is impossible for number 4 to immediately ascertain that number 3 still has visual contact with the leader, it is imperative that number 4's initial action be based on the assumption that number 3 has also become separated. Numbers 2 and 3 will follow the procedures outlined above. **(T-1).** Number 4 will follow the appropriate procedure listed below: **(T-1).**

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

7.9.5.2. Outside the Turn. Reverse direction of turn using 30 degrees of bank for 30 seconds to ensure separation from lead and number 3 and obtain a separate clearance.

7.9.5.3. Inside the Turn. Momentarily reduce power to ensure nose-tail separation and increase bank angle by 15 degrees. Inform the leader to roll out. Obtain a separate clearance. Leader will resume turn only when separation is ensured. **(T-1).**

7.10. Armament System Malfunctions.

7.10.1. General. Do not attempt to expend ordnance using a weapons release system with a known malfunction. If abnormal missile launch or erratic missile flight occurs, have the launching aircraft visually inspected by a chase pilot, if possible, to determine if any damage has occurred.

7.10.2. Inadvertent Release. Record switch positions at the time of inadvertent release and impact point, if known, and provide the information to debrief personnel. Check switches safe and do not attempt further release in any mode. Treat remaining stores as hung and

obtain a chase aircraft for RTB, if practical. If remaining stores present a recovery hazard, jettison in a suitable area on a single pass, if practical.

7.10.3. Hung Freefall Ordnance or Missile Hangfire/Misfire. First confirm switches/SMS settings were correct. If they were, record all relevant switch/SMS settings and proceed as follows.

7.10.3.1. Hung Live Freefall Ordnance. Attempt delivery using an alternate delivery mode, if applicable. If unsuccessful, use selective jettison procedures for the store. If unsuccessful and the ordnance is either unsecure or the security of the ordnance cannot be determined, consider selective jettison of the rack.

7.10.3.2. Hung Practice/Inert Freefall Ordnance. Make an additional attempt to expend. If unsuccessful, select an alternate delivery mode and try again. If unsuccessful, ordnance from other stations/dispensers may be released provided this does not violate load symmetry limits. If remaining stores present a recovery hazard, jettison in a suitable area on a single pass, if practical.

7.10.3.3. Maverick Missile Hangfire. A missile that fires but fails to depart the aircraft is a hangfire. If able, have a chase pilot inspect such a missile.

7.10.3.4. Maverick Missile Misfire. A missile that fails to fire when all appropriate switches were selected is a misfire. If this occurs, safe the Master Arm switch. If able, have a chase pilot inspect the missile for smoke or fire. If either exists, jettison the missile on the range. If not, pilots may attempt another pass. If the second attempt fails and conditions permit, remain dry in the pattern for 15 minutes, then proceed to the recovery base following hung ordnance/weapons malfunction recovery procedures.

7.10.3.5. Hung Ordnance/Weapons Malfunction Recovery Procedures. Visually inspect the aircraft for damage, if practical. Declare an emergency (not required for hung practice/inert ordnance or hung rockets). Obtain a chase aircraft, if available. Avoid populated areas and trail formations. Land from a straight-in approach.

7.11. In-flight Practice of Emergency Procedures. Reference AFI 11-202V3. A simulated emergency procedure is any procedure that produces an effect closely paralleling the actual emergency. One example would be retarding the throttle sufficiently to emulate the performance of an aircraft with a flamed out or idle engine.

7.11.1. Prohibitions. Do not practice aborted takeoffs in the aircraft. Instead, use the flight simulator, Cockpit Familiarization Trainer or a static aircraft, in that order of preference. Do not practice in-flight engine shutdown. Do not practice SFO patterns unless crash rescue is available and either an active tower or a ROM (or equivalent, e.g. SOF) is in operation. Pilots will not practice SFO patterns in conditions other than day VMC. **(T-1).**

7.11.2. Simulated Flameout (SFO)/Emergency Landing Patterns. OG/CCs will establish specific procedures for SFO training and establish letters of agreement with appropriate agencies. **(T-1).** They will publish those procedures in their supplement to this volume. **(T-1).** General SFO procedures follow:

7.11.2.1. The SFO pattern may be entered from any direction or altitude that ensures the aircraft is properly configured above 2,000 feet AGL and in a position to safely complete the approach.

7.11.2.2. Do not initiate or continue an SFO if a potential traffic pattern conflict exists that would require division of the pilot's attention between the SFO and sequencing with traffic. Discontinue an SFO whenever excessive maneuvering is required, whether as a result of a traffic conflict or when making corrections. Discontinue an SFO if unable to obtain wings level on final by 200 feet AGL. Discontinue an SFO if airspeed drops below Dash One minimum airspeed any time between base key and the initiation of the flare. Once the decision to discontinue an SFO has been made, initiate a go-around and do not attempt to resume the SFO.

7.11.2.3. Except when operating IAW a MAJCOM-approved syllabus (e.g., AFMC high angle of attack training), do not touch down from an SFO.

7.11.2.4. Make radio calls IAW local procedures, but as a minimum call.

7.11.2.4.1. "High Key"

7.11.2.4.2. "Low Key"

7.11.2.4.3. "Base Key, Gear Down, (Intentions)"

7.12. Search and Rescue (SAR) Procedures. General directive procedures are listed below. OG/CCs will establish specific procedures in the unit supplement to this volume. **(T-1).**

7.12.1. Squawk. Immediately cease tactical maneuvering by executing Knock-It-Off procedures. Place IFF to EMER to alert ATC/GCI/AWACS of the emergency situation.

7.12.2. Talk. Establish an On Scene Commander (OSC). Communicate the emergency situation and intentions immediately to applicable control agencies. Use GUARD frequency if necessary.

7.12.3. Mark. Mark the last known position of survivors/crash site using any means available, e.g. visual ground references, TACAN, INS, EGI, ATC/GCI/AWACS, HMCS, or TGP. Pass this information to follow-on SAR forces.

7.12.4. Separate. Remain above the last observed parachute altitudes until the position of all possible survivors is determined. If visual contact with parachute is not maintained, allow approximately 1 minute per thousand feet (16 feet per second) for parachute descent. The OSC will establish deconfliction between all aircraft involved in the SAR. **(T-1).**

7.12.5. Update Bingo/Recovery Base. Revise bingo fuels or recovery bases as required to maintain maximum SAR coverage over survivor(s). Pilots will not overfly bingo. **(T-1).** Relinquish OSC duties to more qualified rescue forces (e.g., SANDY 1, US Coast Guard) upon their arrival.

7.12.6. For overwater SAR/CSAR, OSC will utilize every means available (visual, TGP, Radar Ground Map, or Ground Moving Target Modes) to locate vessels that may aid in recovery. **(T-1).**

7.13. Post Arresting Gear Engagement Procedures. Do not shut down the engine unless fire/other conditions dictate or directed to do so by the arresting gear crew. Raise the tailhook on the signal from the arresting crew. Pilots will not taxi until directed to do so by the arresting gear crew. **(T-1).**

Chapter 8

LOCAL OPERATING PROCEDURES

8.1. General. This chapter provides a consolidated framework for wings to supplement (IAW AFI 33-360) local operating procedures. Units composed of multiple aircraft types may publish guidance in a single, stand-alone local operating instruction instead of supplementing this AFI. Added or stand-alone procedures cannot be less restrictive than those contained elsewhere in this volume. This chapter is not intended to be a single source document for procedures contained in other directives or regulations. Avoid unnecessary repetition of guidance provided in other established directives; however, reference to those directives is acceptable when it serves to facilitate the location of information. This chapter is authorized to be issued to each pilot. Units will supplement the following paragraphs for local operating guidance: **(T-1).**

8.1.1. Section A. Introduction.

8.1.2. Section B. General Policy.

8.1.3. Section C. Ground Operations.

8.1.4. Section D. Flying Operations.

8.1.5. Section E. Weapons Employment.

8.1.6. Section F. Abnormal Procedures.

8.1.7. Attachments (Illustrations).

8.2. Units will include procedures for the following in the appropriate sectionove (as applicable): (T-1).

8.2.1. Command and Control.

8.2.2. Fuel Requirements and Bingo Fuels.

8.2.3. Diversion Instructions.

8.2.4. Jettison Areas, Procedures and Parameters (IFR/VFR).

8.2.5. Controlled Bailout Areas.

8.2.6. Local Weather Procedures.

8.2.7. Unit Standards.

8.2.8. Approved Alternate Missions.

8.2.9. Cross-Country/Aircraft Servicing Procedures.

8.2.10. Search and Rescue and On-Scene Commander Procedures.

8.2.11. Bird/Wildlife Aircraft Strike Hazard (BASH) program guidance IAW AFI 91-202, *The US Air Force Mishap Prevention Program* and AFPAM 91-212, *Bird Aircraft Strike Hazard (BASH) Management Techniques*.

8.2.12. Environmental Restrictions to Flight Operations (winds, sea state, temperature, etc.) applicable to unit operating locations.

8.3. Instructions. Prior to publishing, units will forward copies of the local supplement of this document to MAJCOM and appropriate subordinate agencies, which will review and return comments back to the unit(s). **(T-1).**

JOHN W. RAYMOND, Lt Gen, USAF
Deputy Chief of Staff, Operations

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 11-202, Volume 3, *General Flight Rules,* 7 November 2014

AFI 11-205, *Aircraft Cockpit and Formation Flight Signals,* 19 May 1994

AFI 11-207, *Combat Aircraft Delivery*, 31 March 2015

AFI 11-209, *Aerial Event Policy & Procedures*, 4 May 2006

AFI 11-214, *Air Operations Rules and Procedures,* 14 August 2012

AFI 11-218, *Aircraft Operations and Movement on the Ground,* 28 October 2011

AFI 11-246, Volume 1, *Air Force Aircraft Demonstrations (A-10, F-15, F-16, F-22),* 23 October 2014

AFI 11-301 Volume 1, *Aircrew Flight Equipment (AFE) Program,* 25 February 2009

AFI 11-301 Volume 4, *Aircrew Laser Eye Protection (ALEP),* 21 February 2008

AFI 11-404, *Centrifuge Training for High-G Aircrew*, 28 October 2005

AFI 90-201, *The Air Force Inspection System*, 21 April 2015

AFI 33-360 *Publications and Forms Management,* 1 December 2015

AFMAN 11-217 Volume 1, *Instrument Flight Procedures,* 22 October 2010

AFMAN 11-217 Volume 3, *Supplemental Flight Information*, 23 February 2009

AFMAN 33-363, *Management of Records,* 1 March 2008

AFPAM 11-216, *Air Navigation*, 1 March 2001

AFPAM 11-417, *Orientation in Aviation*, 9 April 2015

AFPAM 11-419. *G-Awareness for Aircrew,* 17 October 2014

AFPD 11-2, *Aircrew Operations,* 19 January 2012

AFPD 11-4, *Aviation Service,* 1 September 2004

AFTTP 3-1 Volume 1, *General Planning and Employment Considerations,* 11 January 2016

AFI 11-2F-16V1, *F-16--Aircrew Training,* 20 April 2015

AFTTP 3-1.F-16, *Tactical Employment--F-16*, 29 5 September 2014

AFTTP 3-3.F-16, *Combat Aircraft Fundamentals--F-16,* 5 September 2014

AFI 91-202, *The US Air Force Mishap Prevention Program*, 24 June 2015

AFPAM 91-212, *Bird Aircraft Strike Hazard (BASH) Management Techniques,* 1 February 2004

Adopted Forms

AF Form 70, *Pilot's Flight Plan and Flight Log*

AF Form 679, *Air Force Publication Compliance Item Waiver Request/Approval*

AF Form 847, *Recommendation for Change of Publication*

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

AFTO FORM 781A*, Maintenance Discrepancy and Work Document.*

Abbreviations and Acronyms

ACBT—Air Combat Training

ACM—Air Combat Maneuver

ACMI—Air Combat Maneuvering Instrumentation

AFTTP—Air Force Tactics, Techniques, and Procedures

AGCAS—Automatic Ground Collision Avoidance System

AGL—Above Ground Level

AGSM—Anti-G Straining Maneuver

ALOW—Automatic Low Altitude Warning

AMD—Acceleration Monitoring Device

AOA—Angle of Attack

ARTS—Automated Recovery Training Series

ASR—Airport Surveillance Radar

ATC—Air Traffic Control

AWACS—Airborne Warning and Control System

BFM—Basic Fighter Maneuver

BMC—Basic Mission Capable

CAP—Critical Action Procedure

CARA—Combined Altitude Radar Altimeter

CG—Center of Gravity

CMR—Combat Mission Ready

CE—Combat Edge

DVADR—Digital Video Audio Data Recorder

DVR—Digital Video Recorder

ECM—Electronic Counter Measure

EMCON—Emission Control

EMR—Emergency Release

EMS—Engine Monitoring System

EOR—End of Runway

EP—Emergency Procedure

FAC—Forward Air Controller

FAF—Final Approach Fix

FCIF—Flight Crew Information File

FE—Flight Examiner

FLCS—Flight Control System

FLIP—Flight Information Publications

FOD—Foreign Object Damage

GCAS—Ground Collision Avoidance System

GCI—Ground Control Intercept

GLOC-G—induced Loss of Consciousness

HARTS—Horn Awareness and Recovery Training Series

HUD—Heads-Up Display

IFF—Identification, Friend or Foe

IFR—Instrument Flight Rules

ILS—Instrument Landing System

IMC—Instrument Meteorological Conditions

INS—Inertial Navigation System

IP—Instructor Pilot or Initial Point

IQT—Initial Qualification Training

IR—Instrument Route

JOAP—Joint Oil Analysis Program

LANTIRN—Low Altitude Navigation and Targeting Infrared for Night

LEP—Laser Eye Protection

LIS—Line in the Sky

MOA—Military Operating Area

MPO—Manual Pitch Override

MQT—Mission Qualification Training

MSA—Minimum Safe Altitude

MSL—Mean Sea Level

NVG—Night Vision Goggles

OAP—Offset Aim Point

OFP—Operational Flight Program

PAR—Precision Approach Radar

PARS—Pilot Activated Recovery System

PDM—Programmed Depot Maintenance

RAA—Route Abort Altitude

RBS—Radar Bomb Scoring

RCO—Range Control Officer

RCR—Runway Conditions Reading

RDTED—Re-Gridded Digital Terrain Data

RMSA—Recovery Minimum Safe Altitude

RNAV—Area Navigation

ROE—Rules of Engagement

ROM—Runway Operations Monitor

SAR—Search and Rescue

SCP—Set Clearance Plane

SD—Spatial Disorientation

SFO—Simulated Flame Out

SOF—Supervisor of Flying

TDA—Tactical Decision Aid

TOLD—Takeoff and Landing Data

VFR—Visual Flight Rules

VMC—Visual Meteorological Conditions

VR—Visual Route

VRD—Vision Restriction Device

VTR—Video Tape Recorder

WSEP—Weapon System Evaluation Program

Terms

Air Combat Training (ACBT)—A general term which includes (D)BFM, (D)ACM, and (D)ACT (AFI 11-214).

Air Combat Tactics (ACT)—Training in the application of BFM, ACM, and tactical intercept skills to achieve a tactical air-to-air objective.

Basic Mission Capable (BMC)—See AFI 11-2F-16V1.

Combat Edge (CE)—A positive-pressure breathing-for-G (PPG) system which provides pilots additional protection against high positive G accelerations experienced during flight. The system consists of aircrew equipment (high-pressure mask, counter-pressure suit, G-suit), and aircraft equipment (oxygen regulator, G-valve, and interfacing sense line). At 4-G and above, regulated air and oxygen are supplied to provide automatic mask tensioning, vest inflation, and positive pressure breathing to the mask.

Combat Mission Ready (CMR)—See AFI 11-2F-16V1.

Continuation Training (CT)—See AFI 11-2F-16V1.

Flight Lead (FL)—As designated on flight orders, the individual responsible for overall conduct of mission from preflight preparation/briefing to postflight debriefing, regardless of actual position within the formation. A certified 4-ship FL may lead formations and missions in excess of four aircraft, unless restricted by the unit CC. A 2-ship FL is authorized to lead an element in a larger formation.

Initial Qualification Training (IQT)—See AFI 11-2F-16V1.

Low Altitude Navigation and Targeting Infrared for Night (LANTIRN)—A navigation and targeting system that provides tactical aircraft with a low-altitude, under-the-weather, day and night operational capability.

Low Altitude Training (LOWAT)—See AFI 11-2F-16V1.

Mission Qualification Training (MQT)—See AFI 11-2F-16V1

Target MSA—An altitude that provides at least 1,000 feet of clearance above all obstacles within 5 nautical miles of the target.

Squadron Supervisor—Squadron Commander, Asst/Operations Officers, and Flight CCs. ANG and AFRC only: as designated by the OG/CC.

Attachment 2

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, NUCLEAR, AND HIGH YIELD EXPLOSIVE (CBRNE) OPERATIONS

A2.1. General Information. Potential adversary use of CBRNE weapons against a friendly airfield presents a serious threat to flying operations. Although the most effective way for aircrews to avoid this threat is to be airborne before those weapons are detonated/dispersed and then land at a field that has not been contaminated, all personnel must be prepared to operate from a field that has come under CBRNE attack.

A2.2. Mission Preparation. Be aware of the status of the CBRNE environment at the planned launch and recovery airfields, potential divert bases, and throughout the area in which the sortie may fly. Know the current and forecast surface wind direction and the MOPP level in effect for relevant sectors of the airfield. Don appropriate aircrew chemical defense equipment (ACDE) or Ground Crew Ensemble (GCE) to match the appropriate MOPP level (reference AFMAN 10-100) and carry individual protective equipment (IPE) as required.

A2.3. Stepping to Fly and Aircraft Preflight. This may entail donning ACDE or transitioning from GCE to ACDE. Take precautions to protect aircrew from injury and or contamination while in transit from the squadron facility to the aircraft. If possible, transport aircrew in a vehicle that provides overhead cover (enclosed vehicle). If aircrew travel on foot is unavoidable, choose a route that takes maximum advantage of available overhead cover (sun shades, buildings, etc.) to avoid agents that may be settling from the air. If extra aircrew members are available for preflight duties, consider assigning them to do so wearing GCE. This will allow the aircrew actually flying to minimize exposure.

A2.3.1. Alarm Red (or Theater Equivalent) Prior to Engine Start. If Alarm Red occurs during the step or preflight process, take cover and don appropriate MOPP. This may require use of the ground crew mask. A hardened aircraft shelter (HAS) provides optimum protection, if available. Use caution if entering a HAS that contains aircraft and/or equipment. Close doors after entry. If a HAS or other overhead cover is not immediately available, accept the best rapidly reachable cover.

A2.4. Engine Start to Takeoff . If a HAS is available, use it to minimize exposure time by accomplishing aircraft arming and End of Runway (EOR) procedures inside it (if local procedures permit) and by delaying taxi time as long as possible prior to takeoff.

A2.4.1. Aircraft Launch to Survive (LTS). Units will develop local procedures to provide this option to the commander. In general, aircraft may LTS any time after engine start if they have sufficient fuel and safe, expeditious access to a runway. This option may only be practical for aircraft that are near EOR prior to takeoff or that have just landed.

A2.4.2. Alarm Red Prior to Taxi. If in a HAS, the normal procedure is to shut down. Engine noise may preclude effectiveness of normal alert notification procedures, so ensure ground personnel are aware of the alarm warning, assume proper MOPP, and close HAS doors. Use hand signals if necessary.

A2.4.3. Alarm Red (or Theater Equivalent) After Taxi. Units typically establish procedures for this contingency depending on whether additional protection is available along the taxi route (empty HAS, for instance). Ideally, ground crew sheltering in such a HAS would be

available to assist in normal engine shutdown procedures and to close HAS doors. If protection is not available, the best option may be LTS. Maintain contact with Command and Control (C2) entities (Wing Operations Center, Maintenance Operations Center, Supervisor of Flying, etc.) to ensure unity of effort in the overall plan.

A2.5. Takeoff to Landing.

A2.5.1. Contamination. If Chemical Warfare (CW) agent contamination occurred prior to takeoff, flying the aircraft will dissipate the agent to some degree. The total amount of dissipation will be greater with lower flight altitudes and longer flight times. Because the agent may have entered wheel wells, flaps, etc., consider flying in landing configuration to increase airflow to these areas. In any circumstances, merely flying the aircraft is unlikely to achieve complete decontamination.

A2.5.2. Preparing to Land. Aircrew should remain aware of the status of primary and alternate landing locations. Do not attempt to land during Alarm Red situations unless there is no other option. Follow C2 directions and either hold or divert. If mission needs preclude divert, hold until the Alarm Red (or theater equivalent) has cleared or become an Alarm Black. Prior to landing, gain awareness of contaminated sectors of the airfield and of current/forecast surface winds. Use this information in conjunction with C2 direction to plan a route from landing to engine shutdown. The liquid deposition phase following a CW airburst attack can extend up to 1 hour. If landing during Alarm Black, expect a contaminated environment and MOPP 4.

A2.6. Landing to Engine Shutdown. Take advantage of any protection available, minimizing taxi time and distance. Maintain contact with C2 in order to remain aware of unexploded ordnance and/or damage to airfield movement surfaces. If a HAS is available and local procedures permit, accomplish aircraft de-arm and EOR procedures there. If Alarm Red (or Theater Equivalent) occurs between landing and engine shutdown, considerations are similar to those discussed in the engine-start-to-takeoff section.

A2.7. After Engine Shutdown . Don appropriate MOPP if not already worn. If circumstances permit, accomplish normal post-flight inspection procedures. If the aircraft is not contaminated, close the canopy. If there is any suspicion of personnel contamination, aircrew will process through an aircrew contamination control area (ACCA). Accomplish maintenance debriefings under cover to the maximum extent possible.

Attachment 3

FLIGHT BRIEFING GUIDES

Table A3.1. General Briefing Guide.

Mission Data.
- Time Hack
- EP / Threat of the Day
- Mission Objective(s)
- Mission Overview
- Mission Data Card
  - Mission Commander / Deputy Lead
  - Joker / Bingo Fuel
  - Takeoff and Landing Data
- Weather / Sunrise / Sunset / Moon Illumination
- Tactical Decision Aid / Transmissivity / Absolute Humidity
- NOTAMs / Bird Strike Potential
- Personal Equipment
- FCIF / Pubs / Maps

Ground Procedures.
- Step
- Pre-Flight
  - Aircraft
  - Armament
- Boresight
- Check-In
- Taxi / Marshalling / Arming
- Spare Procedures

Takeoff.
- Runway Lineup
- Formation Takeoff
- Takeoff Interval
- Abort
- Jettison Procedures
- Low Altitude Ejection
- Landing Immediately After Takeoff

Departure/En Route.
- Routing
- Trail Departure
- Join-Up / Formation
- Systems / Ops Checks

Airspace.
- Area
- Times
- Restrictions (Chaff/Flare/Supersonic)
- Bailout (Controlled/Uncontrolled)

Recovery.
- Rejoin
- Battle Damage / Bomb Check
- Type Recovery
- ALOW and LIS Settings
- Flight Break-Up
- Pattern and Landing
- After Landing / De-Arm
- Emergency / Alternate Airfields

Special Subjects (As Applicable).
- General Roles and Responsibilities (IP, Flight Lead, Wingman)
  - Formation Specific Responsibilities and Priorities
  - Flight Member Mission Priorities
  - Task / Sensor Prioritization
  - Deconfliction Contracts
- Chase Procedures
- IFF Procedures
- DVADR/DVR Use – Maximum Possible
- Collision Avoidance
  - Radar / Visual Search Responsibilities
    - Departure/Enroute/Recovery
    - High Density Traffic Areas
  - Mid-Air Collision Avoidance
    - From Other Military Aircraft
    - From Civilian Aircraft
- Dissimilar Formations
- Terrain Avoidance
  - Departure / Enroute / Recovery
  - Use of Controlled Flight Into Terrain Prevention Systems
    - CARA ALOW
    - MSL Line-In-The-Sky
    - Ground Collision Avoidance System (GCAS)/Minimum Terrain Clearance (MTC) (AGCAS)/MODE/Chevrons
    - Targeting Pod Attitude Advisory Function
- Bird Strike Procedures / Use of Visor(s)
- Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization and Complacency)
- G-Awareness Turn / G-Suit connection / G-tolerance
  - Use of L-1 Anti-G Straining Maneuver
- Visual Illusions / Perceptions

MSA	Spatial Disorientation / Unusual Attitudes / G-excess illusion PARS Considerations Lost Wingman Radio Inoperative SAR / CSAR Recall Procedures SIIs Pilot currencies for events to be flown **Training Rules / Special Operating Instructions / Rules of Engagement** **Tactical Portion of Mission**

Table A3.2. Additional Briefing Items, NVG.

Weather / Illumination: Civil / Nautical Twilight Moon Rise/Set Times / Phase / Elevation / Azimuth Ceiling / Visibility LUX / EO TDA Obscurants to Visibility **NVG Preflight:** Check Adjustments / Helmet Fit and Security Batteries Resolution / Focus (Hoffman ANV-20/20 Tester, Eye Lane) NVG Compatible Flashlight **Cockpit Preflight:** Cockpit Setup Cockpit Lighting (Leaks) Cockpit FAM Check Focus and Stow for Taxi **Before Takeoff:** Don NVGs / Check and Adjust Stow for Takeoff **Airborne:** Exterior Lights NVG Donning Scan Pattern Forward Scan Narrow Field of View vs. Field of Regard Peripheral Vision Scan Techniques Join-up and Enroute Considerations Rejoin / Closure Air-to-Air TACAN G-Awareness Considerations	**F-16D NVG Procedures / Crew Coordination** **NVG Abnormal Situations / Emergencies** Lost Sight-NVGs Lost Wingman-NVGs Transition to Instruments Visual Illusions / Depth Perception Disorientation / Mis-orientation / Vertigo / PARS Fatigue NVG Failure Battery Failure / Swap Out Overconfidence in NVG Capabilities Correct Lighting of Primary / Secondary Flight Instruments Lost Comm (with Wingman / Target) Aircraft Emergency Ejection-Goggles-OFF Target Fixation Lack of Dive Information Target / Fighter Enters IMC No Tally by 1,500 feet Slant Range 700 feet in VID mode [except tanker rejoins] Radar Break Lock Inside 1,500 feet Excessive Overtake / Target Maneuvers Laser Eye Protection (LEP) Use Laser / IR Pointer Safety NVG FOD Considerations (Batteries, Equipment, etc) **NVG ROE/Training Rules**

Lighting Visible Horizon/30 Up & Down Maneuver Deconfliction / Separation Route Study / Scene Interpretation NVG Predictions Terrain/Shadowing/Visual Illusions/Visible Horizon Terrain Avoidance Radar Altimeter City / Cultural Lighting Direction / Orientation of Lighting Formation Maneuvering Map Reading	

Table A3.3. Additional Briefing Items, Air Refueling.

General Tanker Call Sign(s) / Receiver Assignments Refueling Track(s) Altitude Airspeed Airspace Restrictions ARIPs, ARCPs, ARCTs Radio Frequencies **Buddy Procedures:** Departure Join-Up **En Route:** Route of Flight Formation Ops Checks **Rendezvous:** Type Rendezvous Holding Procedures / Formation Ground Radar Assistance Tanker Identification - TACAN / Radar / Visual Radar Procedures / Techniques Wingman / Deputy Lead Responsibilities Receiver Formation / Join-Up Procedures Rendezvous Overrun	**Refueling:** Checklist Procedures Radio Calls Refueling Order Techniques EMCON Level Visual Signals Fuel Off-Load Bingo Fuel (Abort Points / Abort Bases) Drop-Off Procedures Wake Turbulence **Reform and Exit:** Formation Clearance **Emergency Procedures:** Breakaway Procedures Systems Malfunctions Damaged Receptacle **IMC/Night Considerations:** Loss of Visual Contact Aircraft Lighting **Special Subjects:** Fuel Awareness / AB Use / Consumption Rates Flight Path Deconfliction / Other Receiver Considerations Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization and Complacency)

Table A3.4. Additional Briefing Items, Low-Level Navigation.

General Route / Clearance / Restrictions Flight Responsibilities Navigation Radar / Visual Search Entry / Spacing / Holding / Initial Altitude / MSA **Route Procedures:** Fence Checks Tactical Formation / Turns **Low-Level Navigation** Dead Reckoning/Use of Nav Aids/Equipment (EGI) Radar Procedures / Techniques / Predictions Visual Procedures / Techniques / IR Predictions Updates / Calibrations Time / Fuel Control Terrain Following / Wingman Considerations / Pilot Comfort Level Leg Altitudes/Set Clearance Plane/Obstacles (MSL/AGL) Turnpoint Acquisition Obstacle / Ground Avoidance Use of Altitude Warning Features (GCAS, ALOW and Line-In-The-Sky MSL Floor Settings, AGCAS MODE/Chevrons Enabled/Disabled) Threat Reactions RWR / ECM / Chaff / Flares Engagement Criteria Flight Path Deconfliction Termination	**Contingencies** Aircraft Fallout Plan Rejoin After Late Takeoff **Emergencies:** Aircraft Malfunctions Route Abort Procedures (RAA / MSA) / ATC Frequencies **Alternate Mission** Type Mission (refer to appropriate mission briefing guide) Mission Objectives **Special Subjects** Airspace Restrictions G-Awareness / Ops Checks Fuel Awareness / AB Use / Consumption Rates Flight Path Deconfliction Maneuvering Limitations Airspeed and G Recognition/Prevention/Recovery from Out of Control Time to Ground Impact Wings Level Overbank / Under G Night Considerations Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization and Complacency)

Table A3.5. Additional Briefing Items, Air-to-Surface Range Operations.

Range Information Target / Range Description Restrictions Range Entry / Holding Radio Procedures Formation Sequence of Events Pattern Procedures Aircraft Fallout Plan Rejoin on Range for Late Takeoffs **Employment Procedures/Techniques:** Avionics / Switch Positions	**Night Procedures:** Aircraft Lighting Radio Calls Target ID / Range Lighting Night Spacing Techniques Instrument Cross-check / Disorientation Flare Pattern Flare Release Points and Interval Wind Effect / Offset Dud Flare Procedures Switching Aircraft Patterns **Over Water Range Operations:**

- Weapons Switchology / Delivery Mode
- Radar Switchology
- Special Weapons Switchology
- Laydown / Loft Events
  - Ground track / Altitude / Airspeed
  - Radar / Optical Depiction (OAP / TGT)
  - Radar / Optical Tuning / Techniques
  - Pickle / Release Point
  - Breakaway / Recovery Technique
  - Backup Deliveries / EMR
  - Delivery Spacing
- Pop-Up Delivery
  - Entry Airspeed / Altitude
  - Pop Point / Pull-Up Angle / Power Setting
  - Target Acquisition
  - Pull Down / Apex Altitudes
  - Pattern Corrections
- Roll-In
  - Position
  - Techniques (Pitch / Bank / Power)
  - Roll-Out / Wind Effect
- Final
  - Aim-Off Distance
  - Dive Angle
  - Airspeed
  - HUD Depiction
  - Sight Picture / Corrections / Aim-Point
  - Release Parameters
  - Release Indications
  - Recovery Procedures

Special Procedures:

- Live Ordnance Considerations
  - Safe Escape / Safe Separation
  - Fuse Arming / Frag Avoidance
- RBS Operations
- Laser Operations
- Employment Techniques
  - Depth Perception / Reduced Visual Cues
  - Distance / Altitude Estimation
  - Pop-Up Positioning
    - Timing
    - Visual/Aircraft References to Establish Pull-Up Pt
- Special Considerations
  - Adjusted Minimum Altitudes

Range Departure Procedures:

- Armament Safety Checks
- Rejoin
- Battle Damage / Bomb Check
- Jettison Procedures / Parameters
- Hung / Unexpended Ordnance
- Inadvertent Release
- Gun Unsafe / Jam

Alternate Mission

- Type Mission (refer to appropriate mission briefing guide)
- Mission Objectives

Special Subjects

- Error Analysis
- Fouls
- Minimum Altitudes
- Target Fixation
- G-Awareness
- Fuel Awareness / Ops Checks / AB Use / Consumption Rates
- Maneuvering Limitations
  - Airspeed / G / Stress (Carriage / Release)
  - Recognition/Prevention/Recovery from Out of Control
- Time to Ground Impact
  - Wings Level
  - Overbank / Under G
  - Chevron Cues Enabled/Disabled
- Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization, and Complacency)

Table A3.6. Crew Coordination / Passenger / Ground Crew Briefing Guide.

Crew Coordination / Passengers:	**Ground Crew:**
Pre-Flight	Act Only On Pilot's Instructions
Prohibited Items	Ground Emergency Procedures
Cockpit Layout	Hand Signals
Flight Maneuvering Parameters	Aircraft Danger Areas
Change of Aircraft Control	
Rear Seat Landing Procedures	
Emergencies	
Runway Departure	
Canopy Loss	
Ejection / Egress (With and Without Intercom) / Ejection Mode Selector Handle Position	
Loss of Intercom	
Bird Strike Procedures / Use of Visor(s)	
Flight Control Interference	
Rudder Interference - Rudder Pedal Adjustment	
Stick Interference - Lapbelt, Utility Light, Personal Equipment, Leg Position, Paddle Switch Override	

Table A3.7. Mission Debriefing Guide.

Ground Procedures	**Mission Accomplishment/Analysis:**
Takeoff/Join-Up/Departure	Mission Reconstruction
En Route Procedures	Mission Support
Recovery/Landing/After Landing	VTR / Film Assessment
General:	Anti-G Straining Maneuver Effectiveness
SIIs	Tactical Employment Priorities
Radio Procedures	Learning Objectives Achieved
Flight Member Responsibilities	Lessons Learned
Formation and Deconfliction Contracts	Recommendations for Improvement
Sensor Management/Prioritization	**Comments/Questions**
Training Rules/Special Operating Instructions	

Attachment 4

CRITICAL ACTION PROCEDURES (CAPS)

A4.1. General. Pilots will be evaluated on the following procedures IAW MAJCOM guidelines. **(T-1).** Pilots shall be able to immediately accomplish these procedures in the published sequence without reference to the checklist. **(T-1).** Certain steps (e.g., Stores - Jettison) may be performed out of sequence, if conditions warrant. CAPs may be abbreviated when written, but pilots must convey clear procedural intent. **(T-1).**

Table A4.1. Critical Action Procedures (CAPs).

FIRE/OVERHEAT/FUEL LEAK (GROUND)

1. Throttle - Off
2. JFS – Off
3. Fuel Master Switch - Off

GROUND EGRESS

1. Throttle - Off
2. Seat - Safe
3. Belt / Kit / Harness / G-Suit - Release

ABORT

1. Throttle - Idle
2. Hook - Down (Above 100 Knots or If Required)

AB MALFUNCTION ON TAKEOFF (TAKEOFF CONTINUED)

1. Throttle - MIL
2. Stores - Jettison (If Required)

ENGINE FAILURE ON TAKEOFF (TAKEOFF CONTINUED)

1. Zoom
2. Stores-Jettison (If Possible)
3. Eject

ENGINE FIRE ON TAKEOFF (TAKEOFF CONTINUED)

1. Climb
2. Stores - Jettison (If Required)

***PW 200]* LOW THRUST ON TAKEOFF/AT LOW ALTITUDE (NON-AB)**

1. EEC/BUC Switch - Off.

If Thrust Is Still Insufficient:

2. Throttle - MAX AB.

***[PW 220/229]* LOW THRUST ON TAKEOFF/AT LOW ALTITUDE (NON-AB)**

1. Throttle - AB
2. Stores - Jettison (If Required)

If PRI thrust is insufficient to maintain level flight at a safe altitude:

3. Engine Control Switch - SEC

***[PW200]* ENGINE FAILURE/AIRSTART**

1. Zoom (If at Low Altitude)
2. Stores - Jettison (If Required)
3. Throttle – OFF
4. Airspeed - As Required
5. EEC/BUC Switch - As Required.

When RPM Is Between 40-25 Percent And FTIT Is Below 700 Degrees:

6. Throttle - IDLE
7. JFS - Start 2 When Below 20,000 Feet and 400 KIAS

***[PW220]* ENGINE FAILURE/AIRSTART**

1. Zoom (If At Low Altitude)
2. Stores - Jettison (If Required)
3. Throttle - OFF
4. Airspeed - As Required.

When RPM Is Between 50-25 Percent And FTIT Is Below 700 Degrees:

5. Throttle - IDLE
6. JFS - Start 2 When Below 20,000 Feet and 400 KIAS

***[PW229]* ENGINE FAILURE/AIRSTART**

1. Zoom (If at Low Altitude)
2. Stores - Jettison (If Required)
3. Throttle - OFF, then Midrange
4. Airspeed - As Required
5. JFS - Start 2 When Below 20,000 Feet and 400 KIAS

[LESS M6.2]OUT-OF-CONTROL RECOVERY

1. Controls - Release
2. Throttle - Idle
3. FLCS Switch – RESET

If Thrust Is Still Insufficient: 3. Throttle - MIL 4. EEC/BUC Switch - BUC **If Nozzle Fails To Close After Transferring To BUC Or If Thrust Is Still Insufficient:** 5. EEC/BUC Switch - OFF 6. Throttle - MAX AB 7. Stores - Jettison (If or When Required) ***[GE100/129]*** **LOW THRUST ON TAKEOFF / AT LOW ALTITUDE (NON-AB)** 8. Throttle - AB. 9. Stores-Jettison (If Required).	**If Still Out-Of-Control:** 4. MPO Switch - OVRD and Hold **After Yaw Rotation Stops or is Minimized:** 5. Stick - Cycle in Phase **[M6.2+]OUT-OF-CONTROL RECOVERY** 1. Controls - Release 2. Throttle - Idle **If Still Out-Of-Control:** 3. MPO Switch - OVRD and Hold **After Yaw Rotation Stops or is Minimized:** 4. Stick - Cycle in Phase **[ANALOG FLCS]OUT-OF-CONTROL RECOVERY** 1. Controls - Release 2. Throttle - Idle **If In An Inverted Deep Stall:** 3. Rudder - Opposite Yaw Direction **If Still Out-Of-Control:** 4. MPO Switch - OVRD and Hold **After Yaw Rotation Stops or is Minimized:** 5. Stick - Cycle in Phase
[**If thrust is insufficient to maintain level flight at a safe altitude:** 10. Engine Control Switch – SEC, then PRI ***[GE100/129]*** **ENGINE FAILURE/AIRSTART** 11. Zoom (If at Low Altitude) 12. Stores - Jettison (If Required) 13. Engine Control Switch – SEC, Then PRI 14. Airspeed – As Required JFS – Start 2 When Below 20,000 Feet and 400 KIAS	