

**BY ORDER OF THE COMMANDER
AIR COMBAT COMMAND**

**AIR COMBAT COMMAND MANUAL
11-2QF-16, VOLUME 3**



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Flying Operations

QF-16--OPERATIONS PROCEDURES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This manual implements Air Force Policy Directive (AFPD) 11-2, *Aircrew Operations*. It applies to all QF-16 aircrew under Air Combat Command (ACC) authority, including Air Force Reserve (AFR) or Air National Guard (ANG) personnel that operate QF-16 aircraft, it does not apply to the United States Space Force. This manual establishes the minimum standards for training and qualifying QF-16 aircrew. Ensure all records generated as a result of processes prescribed in this publication adhere to Air Force Instruction (AFI) 33-322, *Records Management and Information Governance Program*, and are disposed In Accordance With (IAW) the Air Force Records Disposition Schedule, which is located in the Air Force Records Information Management System. Submit recommended changes and questions about this publication to Air Combat Command Director of Operations (ACC/A3) using the Department of the Air Force (DAF) Form 847, *Recommendation for Change of Publication*. Route DAF Forms 847 from the field through the appropriate functional chain of command. This manual may not be supplemented or further implemented or extended. The authorities to waive wing or unit level requirements in this publication are identified with a tier (“T-0, T-1, T-2, T-3”) number following the compliance statement. Submit requests for waivers through the chain of command to the appropriate tier waiver approval authority, or alternately, to ACC/A3 for non-tiered compliance items. **Note:** Non-tiered items will need to be checked against Air Force Manual (AFMAN) 11-2F-16 Volume 3, *F-16—Operations Procedures*, to determine if a T-1 waiver is required. Forward copies of approved T-3 waivers to ACC Standardization and Evaluation Branch (ACC/A3TV) at accdotvsrtb@us.af.mil.

SUMMARY OF CHANGES

This document has been revised and should be completely reviewed. Procedures for simulated flameout patterns and procedures have been added and adjusted. Restrictions for touch and go landings have also been modified. Rewording of subjects have been made to enhance clarity.

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Chapter 1

GENERAL GUIDANCE

1.1. Abbreviations, Acronyms, and Terms. The QF-16 Full Scale Aerial Target (FSAT) is an Optionally Piloted Aircraft (OPA). It can be flown in a manned status (by a pilot), in a manned remote status (by a remote pilot with a pilot onboard acting as a Safety Pilot (SP)), or in an unmanned status (by a remote pilot with no pilot onboard). The unmanned QF-16 FSAT is commonly referred to as a Not Under Live Local Operator (NULLO).

1.1.1. Target Control System (TCS) – TCS, either Gulf Range Drone Control System (GRDCS) at Tyndall AFB, or White Sands Missile Range (WSMR) Integrated Target System (WITS) at Holloman AFB.

1.1.2. X-Ray – TCS FSAT primary remote pilot for unmanned NULLO FSAT missions or TCS FSAT primary remote pilot for manned FSAT missions.

1.1.3. Yankee – TCS Secondary remote pilot for unmanned NULLO FSAT missions.

1.1.4. Tango – Drone Runway Preflight/Launch Coordinator for unmanned NULLO FSAT missions.

1.1.5. For all other abbreviations, acronyms, and terms, see [Attachment 1](#).

1.2. Roles and Responsibilities. This manual prescribes procedures for operating F-16 aircraft under most circumstances. It is not a substitute for sound judgment. Procedures not specifically addressed (night operations (Ops), weapons employment, Night Vision Goggle (NVG) use, etc.) may be accomplished if they enhance safe and effective mission accomplishment, by following the guidance in Air Force Manual (AFMAN)11-2F-16V3.

1.2.1. Commander Waiver Authority: Unless specifically noted, the 53d Weapons Evaluation Group Commander (53 WEG/CC) is the waiver authority for this manual and may be delegated, in writing, to the 82d Aerial Targets Squadron Commander (82 ATRS/CC).

1.2.2. Pilot in Command (PIC) Authority: The PIC is responsible for, and is the final authority, for the operation of the aircraft. Pilots/Remote Pilots will use best judgement to safely conduct flying Ops.

Chapter 2

MISSION PLANNING

2.1. Responsibilities. The responsibility for mission planning is shared jointly by all flight members and the Ops, test, and intelligence functions of the 53 WEG. Accomplish sufficient flight planning to ensure safe mission execution, to include fuel and profile requirements, map preparation, and takeoff/landing data.

2.2. Bird/Wildlife Aircraft Strike Hazard (BASH) Programs. Bird Watch Conditions are defined in Department of the Air Force Instruction (DAFI) 91-202, *The US Air Force Mishap Prevention Program*, and DAFI 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program*.

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 Flight Information Publications (FLIPs) General Planning (FLIP GP), the Instrument Flight Rules (IFR) Supplement and local airfield guidance.

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

2.2.3. Pilots will 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 Continental United States (CONUS) bird migration, Portable Flight Planning System (PFPS) software overlay, and latest news. See DAFI 91-212 for additional information.

2.3. Standards. The 82 ATRS/CC and 82d Aerial Targets Squadron Detachment Commander (82 ATRS DET1/CC) may publish and approve unit standards. 53d Weapons Evaluation Group Standardization/Evaluation (53 WEG/OGV) will review all standards for AFMAN 11-series compliance prior to publication.

2.4. Flight Material Preparation.

2.4.1. Mission Data Card (MDC). The minimum Takeoff and Landing Data (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.

2.4.2. 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.

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

2.4.4. Low Altitude Maps.

2.4.4.1. On low altitude flights, each pilot will carry a current map (updated using Chart Update Manual or electronic equivalent) of the route/operating area. 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. Pilots will circle/highlight manmade obstacles at above planned flight altitude within 5 nautical miles (NM) of the planned route. Pilots will annotate time or distance tick marks and headings.

2.4.4.2. Pilots will annotate route abort altitude (RAA) using the IFR Off Airways guidance in AFMAN 11-202 Volume 3, *Flight Operations*, paragraph 6.2.2.2..

2.4.4.3. For flights inside the CONUS under Visual Flight Rules (VFR) or inside Military Training Routes (MTRs), pilots will comply with the following:

2.4.4.3.1. Use FLIP AP/1B and either sectional aeronautical charts or mission planning software (e.g., FalconView/Joint Mission Planning System (JMPS)). Pilots will select the following overlay options for PFPS/FalconView: airports/heliports, airspace boundaries, airways, MTR, parachute jump and special use airspace boundaries.

2.4.4.3.2. 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. Pilots will annotate airfield approach control frequencies in the vicinity of class B/C/D airspace as well as the intersection of other Visual Route (VR)/instrument Route (IR) routes or other areas of conflict.

2.4.5. All qualified crewmembers will carry current and applicable checklists and pilot aids on every flight.

2.5. Fuel Conservation. 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 Ops, flight plans, power settings and climb/descent profiles. Incorporate enroute tasks to make maximum use of airborne learning opportunities.

2.6. Overwater. Planned flights over water, outside of the local training area (e.g., cross countries) will be accomplished two-ship as a minimum. Single ship over water flights, outside of the local training area, require 53 WEG/CC approval.

2.7. Briefing and Debriefing.

2.7.1. All flight members will attend the briefing unless previously coordinated with unit/squadron supervisors. Flight Leads (FLs)/remote pilots are responsible for presenting a logical briefing to promote a safe and effective mission. Structure flight briefings to accommodate the capabilities of each pilot/remote pilot in the flight. Any item published in Combat Air Forces (CAF)/wing/group/squadron standards or Air Force publications and understood by all participants may be briefed as "standard."

2.7.2. FLs/remote pilots must plan adequate time to discuss required briefing items depending on complexity of the mission and pilot/remote pilot capabilities, and must start flight briefings at least 1.5 hours before scheduled takeoff. Items may be briefed in any sequence, provided all minimum requirements listed in this publication and AFMAN 11-202V3 are addressed.

Additional time and Crew Resource Management (CRM) emphasis is required in D-model sorties especially on Familiarization Flights (FAMs) and incentive flights. Passenger must demonstrate oxygen regulator use, ability to establish multiple airways and mask removal after being strapped in. Reference [Attachment 2](#) for example briefing guides. All flight briefings will include:

- 2.7.2.1. Weather and Notices to Air Missions (NOTAMs).
 - 2.7.2.2. Emergency procedures (EPs).
 - 2.7.2.3. Mission priorities and task management.
 - 2.7.2.4. Significant rules (e.g., Special Instructions (SPINS), Training Rules, Rules of Engagement (ROE)).
 - 2.7.2.5. Flight member responsibilities and deconfliction contracts. FLs/remote pilots will brief a formation deconfliction/blind/get well plan for every phase of flight.
- 2.7.3. Low-level Briefings will emphasize:
- 2.7.3.1. Obstacle/terrain acquisition and avoidance, bird hazards, emergency actions and weather avoidance with route abort procedures.
 - 2.7.3.2. Employment of all Collision Avoidance Advisories, if available.
 - 2.7.3.3. Human factors to include task prioritization, Gravitational Load Factor (G)-excess illusion, and perceptual issues associated with flight over water/featureless terrain.
 - 2.7.3.4. 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.
- 2.7.4. Dissimilar Formation Briefing. Emphasize proper position to ensure wingtip clearance, flight member responsibilities, and aircraft unique requirements for each phase of flight.
- 2.7.5. Alternate Mission/Events and Multiple Go Days.
- 2.7.5.1. Brief an alternate mission for each flight that is less complex than the primary mission. Unbriefed missions/events will not be flown. Mission elements may be modified and briefed airborne as long as flight safety is not compromised. FLs/remote pilots will ensure changes are acknowledged by all flight members. Continuation training (CT) missions may fly primary or alternate missions in any sequence.
 - 2.7.5.2. During 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 FL/remote pilot need only brief any changes for subsequent flights.
 - 2.7.5.3. On multiple-go days, subsequent missions will be of equal or less complexity. Schedule and plan upgrade events on the first sortie only. If that sortie is non-effective for weather, maintenance or airspace, Instructor Pilots (IPs)/Instructor Remote Pilots (IUs) may elect to accomplish the planned upgrade events in the second sortie.
- 2.7.6. Debriefing.
- 2.7.6.1. All missions will be debriefed and address in-flight execution, flight member responsibilities, deconfliction contracts, event priorities, mission execution, and remote pilot coordination/execution if applicable.

2.7.6.2. FLs will review the video/audio record of all tactical portions of the sortie to assess flight members' Anti G-Straining Maneuver (AGSM) effectiveness. It is imperative to evaluate not only during the G awareness exercise (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 Ops officer. The squadron commander has the option of directing refresher centrifuge training IAW AFMAN 11-404, *Fighter Aircrew Acceleration Training Program*.

2.8. 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. Pilot aids will contain:

- 2.8.1. Briefing guides (reference [Attachment 2](#) for examples).
- 2.8.2. Local radio channelization.
- 2.8.3. Appropriate airfield diagrams, to include cable/net barrier information.
- 2.8.4. Emergency information (impoundment procedures, emergency action checklists, No Radio (NORDO) procedures, divert information, search and rescue procedures, etc.).
- 2.8.5. Divert base cable and barrier information.
- 2.8.6. Bailout and jettison areas.
- 2.8.7. Cross-country procedures to include: command and control, engine documentation, Joint Oil Analysis Program (JOAP) samples, and aircraft servicing.
- 2.8.8. Other information as desired such as: stereo flight plans, turn procedures, local training areas, and instrument preflight.

2.9. Minimum Safe Altitude (MSA). Compute the MSA for each leg of the intended route of flight IAW AFMAN 11-214, *Air Operations Rules and Procedures*, if conducting missions at night.

2.10. G-Suit Use. Pilots will wear anti-G garments on all flights regardless of anticipated Gs.

Chapter 3

NORMAL OPERATING PROCEDURES

3.1. Preflight.

- 3.1.1. [B/D model aircraft] when the rear cockpit is occupied by other than a fully qualified QF-16 pilot, place the stick control switch in the FWD position.
- 3.1.2. Do 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).
- 3.1.3. Do not place objects in or on top of the engine intake.
- 3.1.4. Secure publications, maps and personal items to avoid flight control/ throttle interference.
- 3.1.5. Select Pressure Breathing (PBG).
- 3.1.6. Ensure ejection seat survival kit deployment switch is in the automatic position.
- 3.1.7. Do not select Category (CAT) I on the Stores Configuration Switch with CAT III configurations IAW current Technical Orders (TOs).

3.2. Ground Visual Signals. Normally, pilot and ground crew will communicate by the intercom system during all start-engine, pre-taxi and End Of Runway (EOR) checks. Use the intercom system to the maximum extent possible anytime maintenance technicians are performing “red-balls” on the aircraft and for Emergency Power Unit (EPU) checks performed in congested areas. Do not actuate any system that endangers ground crew prior to receiving acknowledgment. When ground intercom is not used, visual signals will be IAW AFMAN 11-218, *Aircraft Operations and Movement on the Ground*, and this publication. The crew chief will repeat the given signal when it is safe to operate the system.

3.2.1. The following signals augment AFMAN 11-218

- 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 (if required). 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, limit taxi speed to 30 knots, 15 knots over a raised cable, and 10 knots in turns.

3.3.2. **Ice/Snow Conditions.** Do not taxi during ice and/or snow conditions until all portions of the taxi route and runway have been checked for safe conditions. When ice and/or snow are present on the taxiway, taxi on the centerline with a minimum of 300 feet spacing. 53 WEG/CC approval is required to conduct Ops when Runway Condition Reading (RCR) for taxi is less than 10.

3.3.3. **Ice Foreign Object Damage (FOD) Procedures.** The following procedures apply when the conditions in TOs. 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 FL start 5 minutes early to check for inlet ice formation.

3.3.3.2. Position ANTI ICE switch to ON prior to engine start.

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 (e.g., ramp/shelter and EOR). Avoid standing water and snow/slush accumulations.

3.3.3.4. Hold in the arming spot with an ice FOD monitor present until cleared to continue to taxi for take-off.

3.3.3.5. Shutdown immediately if icing is visually detected and notify the SOF/Top 3. Make an appropriate entry in the aircraft forms and qualified personnel must accomplish an intake inspection prior to restarting the engine.

3.3.4. **EPU Check.** Do not allow maintenance technicians to approach the aircraft until the EPU check is complete. Use intercom or a “thumbs up” signal to indicate when safe.

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

3.4.1. **Forward Firing Ordnance.** Do not taxi in front of aircraft being armed/de-armed with forward firing ordnance.

3.4.2. Flight members will inspect each other for proper configuration and any abnormalities.

3.5. Flight Lineup. Consider weather conditions, runway conditions, and runway width. Minimum spacing between separated elements/flights is 500 feet. Wingmen must maintain wingtip clearance with their element lead. If runway width permits, lineup with wingtip clearance between all aircraft in the flight.

3.6. Takeoff.

3.6.1. Do not takeoff when the RCR is less than 10.

3.6.2. Pilots will 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.

3.6.3. On training missions, do not takeoff if the computed takeoff roll exceeds 80 percent of the available runway single ship or 70 percent for a formation takeoff.

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

3.6.5. 53 WEG/CC may approve 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.

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. **Exception:** aircraft with a centerline fuel tank may takeoff across approach end BAK-12 arrestment cables with an 8-point tie down system or a MB-100 with a 10-point tie down system.

3.6.8. Minimum takeoff interval between aircraft/elements is 10 seconds (15 seconds for afterburner). Increase interval to 20 seconds minimum for join-up on top of the weather.

3.6.9. After releasing brakes, aircraft/elements will steer toward the center of the runway.

3.6.10. Formation Takeoff.

3.6.10.1. Formation takeoffs are restricted to two aircraft with like engines.

3.6.10.2. Do 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. Ferrying aircraft from contractor/Air Force Materiel Command (AFMC) facilities.

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

3.7. Initial Join-up and Rejoins.

3.7.1. Day weather minimums for VFR join-ups below a ceiling are 1,500 foot ceiling and 3 statute miles (5 kilometers) visibility.

3.7.2. Maintain 350 Knots Calibrated Air Speed (KCAS) while climbing or 300 KCAS at cruise until join-up is accomplished unless mission requirements necessitate a different airspeed. Pilots may delay Afterburner (AB) cancellation to establish closure on lead or lead element.

3.7.3. Battle Damage (BD)/bomb check will be accomplished on Return to Base (RTB), when practicable (not required when weather prohibits accomplishing BD check). This check is mandatory after expending any ordnance.

3.7.4. For further join-up procedures, see Instrument Procedures ([Chapter 4](#)).

3.8. Air Refueling.

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

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

3.8.3. Quick flow procedures are authorized and will be conducted IAW North Atlantic Treaty Organization (NATO) Standard Allied Tactical Publication (ATP)-3.3.4.2, *Air-To-Air Refuelling*, located at: <https://www.coi.japcc.org/aar/> and Air Force Tactics, Techniques, and Procedures (AFTTP) 3-3.F-16, *Combat Fundamentals F-16*.

3.9. Aircraft Handling Characteristics (AHC) and Maneuvering Parameters.

3.9.1. The following are the minimum altitudes for the prescribed maneuvers.

3.9.1.1. Confidence Maneuvers/Advanced Handling - 10,000 feet Above Ground Level (AGL), except dive recovery maneuver (15,000 feet AGL minimum entry altitude).

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

3.9.1.3. HARTS series numbers 4 and 5 - 15,000 feet AGL.

3.9.1.4. Aircraft will not descend below 5,000 feet AGL during aerobatic maneuvering.

3.9.2. Avoid flight through wingtip vortices/jet wash. If unavoidable, the aircraft should be unloaded immediately to approximately 1 G.

3.9.3. Do not manually extend the trailing edge flaps in an attempt to improve aircraft performance. **Exception:** Trailing edge flaps may be manually extended during low/slow (below 5000 feet AGL) if mission/test requirements dictate.

3.9.4. Do not attempt to bypass flight control limiters to improve performance. 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.

3.9.6. The following is guidance for HARTS (reference AFTTP 3-3.F-16):

3.9.6.1. HARTS maneuvers will be flown in CAT-1 loaded aircraft only.

3.9.6.2. For all QF-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.

3.10. Formation, General. FLs and instructors will ensure contracts, roles and responsibilities of each flight member are established, briefed, executed and debriefed. Flight members will immediately notify lead if unable to fulfill basic responsibilities, contracts or other assigned tasks. FLs will avoid tasking element leads/wingmen beyond their abilities without sacrificing basic responsibilities. Reference AFTTP 3-3.F-16 and AFTTP 3-1.F-16, *Tactical Employment--F-16*.

3.10.1. The FL is always responsible for flight actions. Wingmen will be prepared to take the lead when directed.

3.10.2. In Instrument Meteorological Conditions (IMC), the maximum flight size in visual formation is four aircraft except when flying in close formation with a tanker.

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

3.10.4. Use airborne visual signals IAW Air Force Pamphlet (AFPAM) 11-205, *Aircrew Quick Reference to Aircraft Cockpit and Formation Flight Signals*, or detailed in local procedures. Initiate configuration changes for four-ship flights by radio call, when practical. When formation position changes are directed by radio, all wingmen will acknowledge prior to initiating the change. A radio call is mandatory when directing position changes under instrument conditions.

3.10.5. FLs will not break up flights from visual or sensor formations until each pilot has a fix from which to navigate (visual, radar, Internal Navigation System (INS) or Tactical Air Navigation System (TACAN)).

3.10.6. Lead changes.

3.10.6.1. The minimum altitude for changing leads within a formation is 500 feet AGL over land or 1,000 feet AGL over water).

3.10.6.2. During limited visibility conditions (e.g., IMC) initiate lead changes from a stabilized, wings level attitude [see also Instrument Procedures ([Chapter 4](#))].

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

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

3.11.1. A G-Ex is required if planned maneuvering will exceed 5Gs. Accomplish the G-Ex day or night, only in Visual Meteorological Conditions (VMC), with a discernible horizon, and only when unaided visual cues are adequate to safely perform the maneuver. If these requirements are not met, omit the G-Ex and reduce mission tasking to limit maneuvering to 5Gs.

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-ex Procedures. Use on-board systems (e.g., air-to-air TACAN, Radar, data link) to establish separation prior to maneuver execution.

3.11.3. Conduct the G-Ex in order of preference listed below to help ensure the airspace is clear from potential traffic conflicts. If practical, use Air Traffic Control (ATC) to help clear the airspace:

3.11.3.1. Special Use Airspace (e.g., Restricted/Warning areas, Air Traffic Control Assigned Airspace (ATCAA), Military Operating Areas (MOAs) and Major Command (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 an MTR.

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

3.12. Tactical Formations.

3.12.1. Tactical Maneuvering. Wingmen/elements must maneuver relative to the FL/lead element, and they must maintain sight. Trailing aircraft/elements are responsible for deconflicting with lead aircraft/elements and will do so vertically when required. At low altitude, wingmen/trailing elements will deconflict high. 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. Normally, the wingman is responsible for flight path deconfliction, but the flight/element lead becomes primarily responsible when:

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, e.g., "Blind 16.9". The visual flight member will respond with "visual" and talk eyes on.

3.12.2.2. If the other flight member is also "Blind," they will call blind with an altitude. Lead will be directive to ensure altitude separation is maintained and direct the wingman's flow direction. 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.

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. If visual contact is still not regained, the FL will take additional positive action to ensure flight path deconfliction. Scenario restrictions such as sanctuary altitudes and/or adversary blocks must be considered.

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. Qualified pilots, including Initial Qualification Training (IQT)/Mission Qualification Training (MQT) 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 (e.g., Operational, Test and Evaluation (OT&E), Weapon System Evaluation Program (WSEP), live weapons delivery, etc.) and training conducted IAW Air Combat Command Manual (ACCMAN) 11-2QF-16 Volume 1, *QF-16--Aircrew Training*, may be chased by Mission Capable (MC)/Basic Mission Capable (BMC) pilots designated by 82 ATRS/CC or 82 ATRS DET1/CC.

3.13.2. Procedures.

3.13.2.1. On transition sorties, the chase aircraft will perform a single-ship takeoff. In-flight, the chase aircraft will maneuver as necessary, but must maintain nose-tail separation. The chase will not stack lower than lead aircraft below 1,000 feet AGL. 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 NM, from which he can effectively clear and/or provide assistance.

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

3.14.1. Airspeed and Altitude. The minimum airspeed for low level navigation is 300 Knots Indicated Airspeed (KIAS) and the minimum altitude is 1,000 feet AGL (or IAW approved step-down training). For IMC operation, the minimum altitude is the MSA (see AFMAN 11-214).

3.14.2. At low altitude, the immediate reaction to task saturation, diverted attention, knock-it-off, or emergencies is to climb to a prebriefed safe altitude (minimum 1,000 feet AGL).

3.14.3. Weather. Consult FLIP for minimum weather on a VR or IR route.

3.14.3.1. Deteriorating weather on a VR Route.

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

3.14.3.1.2. Unable to maintain VMC. Climb to briefed deconfliction altitudes (reference **Chapter 2**). Squawk applicable (Identification, Friend or Foe (IFF)/Selective Identification Feature (SIF)) modes and codes and contact a controlling agency to pick up an IFR clearance if required. Maintain preplanned ground track.

3.14.4. Obstacle/Terrain Avoidance. If unable to visually acquire or ensure lateral separation from known vertical obstructions that are a factor to the route of flight, FLs will immediately direct a climb No Later Than (NLT) 3 NM prior to the obstacle to an altitude that ensures vertical separation.

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

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

3.15. Gear Checks. For a VFR straight in, call gear down NTL 3 NM final. For an instrument approach (reference **Chapter 4**), call gear down at the Final Approach Fix (FAF) or published glide slope intercept point. For an overhead, call gear down departing the perch. For a Simulated Flameout (SFO) or Flameout (FO), call gear down at base key.

3.16. Angle of Attack (AOA). Final approach will normally be flown at 11 degrees AOA. Pilots will compare the computed final approach airspeed with AOA.

3.17. 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. Do not land over any raised web barrier (e.g., MA-1A, 61QS11).

3.18. Desired Touchdown Point and Spacing.

3.18.1. 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, touch down either past a raised approach-end cable, or 500 feet prior to the cable. With centerline stores, touchdown will normally be 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 that have been modified with an 8-point-tie-down system or MB-100 with a 10-point tie down system.

3.18.2. Touchdown spacing behind an aircraft while flying a 13 degree approach will be a minimum of 6,000 feet due to susceptibility of the aircraft to wake turbulence and speedbrake/tail scrapes. Minimum pattern and touchdown spacing between landing aircraft is 3,000 feet for similar aircraft (e.g., QF-16 following QF-16), 6,000 feet for dissimilar fighter aircraft (e.g., QF-16 following F-35) or as directed by ACC or the landing base, whichever is higher.

3.18.2.1. When wake turbulence is expected due to calm winds or when landing with a light tail wind, spacing will be increased to 6,000 feet minimum. Under these conditions, moderate to severe wake turbulence has been reported out to 7,000 foot touchdown spacing.

3.18.3. All aircraft will land in the center of the runway and clear to the cold side when speed/conditions permit.

3.19. Low Approaches.

3.19.1. Observe the following minimum altitudes:

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

3.19.1.2. Formation low approaches: 100 feet AGL.

3.19.1.3. Drone Chase: 100 feet AGL.

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

3.19.2. During go-around, remain 500 feet below VFR overhead traffic pattern altitude until crossing the departure end of the runway unless local procedures, missed approach/climb-out procedures or controller instructions dictate otherwise.

3.20. Touch-and-Go Landings. Fly touch-and-go landings IAW AFMAN 11-202V3. Do not fly them with fuel remaining in any external tank. Touch-and-go landings are authorized in the QF-16 with the following restrictions:

3.20.1. Weather must be a minimum of 1500/3, a dry runway and within aircraft crosswind limits.

- 3.20.1.1. 7000 feet of runway is available.
- 3.20.1.2. Operative departure-end arresting system is in place.
- 3.20.1.3. Daytime with an appropriate level of BASH that allows multiple approaches.
- 3.20.1.4. Military airfield or auxiliary airfields (e.g., Tyndall AFB, Tyndall's Droneway), or civil airports with a letter of agreement are available.
- 3.20.1.5. No cords showing on tire preflight.
- 3.20.1.6. No more than 5 total landings per sortie. (Touch-and-go and/or full stop)
- 3.20.1.7. Must discontinue the approach if touch down will happen outside the flight manual published zone.

3.21. Overhead Traffic Patterns. Unless the 53 WEG/CC determines that local conditions (e.g., threat condition, populated areas) dictate otherwise, do not fly overhead patterns with unexpended heavy-weight ordnance (larger than BDU-33 or AGTS).

3.22. Tactical Overhead Traffic Patterns. Tactical entry to the overhead traffic pattern is permitted if the following conditions are met:

- 3.22.1. Published overhead pattern altitude and airspeed are used.
- 3.22.2. Specific procedures have been developed locally and coordinated with appropriate ATC agencies.
- 3.22.3. The flight consists of a maximum of four aircraft (aircraft/elements more than 6,000 feet in trail will be considered a separate flight).
- 3.22.4. 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).
- 3.22.5. Normal downwind, base turn positions, and spacing are flown.

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

3.24. Back Seat Approaches and Landings.

- 3.24.1. An upgrading IP may only accomplish back seat landings when an IP is in the front cockpit.
- 3.24.2. 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.

3.25. Formation Approaches and Landings. Formation approaches and landings are authorized in the QF-16 with the following conditions met:

- 3.25.1. Aircraft must be symmetrically loaded. 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.

3.25.2. Elements will be led by a qualified FL unless an IP or FL qualified squadron supervisor is in the element.

3.25.3. Use a rate of descent similar to a precision approach. Fly a published precision instrument approach if one is available. If not, fly a non-precision approach or VFR straight in and reference available lighting systems (e.g., Visual Approach Slope Indicator (VASI), Paper and Pencil Instrument (PAPI)) for descent angle.

3.25.4. If the crosswind exceeds 5 knots, lead will position the wingman on the upwind side.

3.25.5. The wingman will maintain a minimum of 10 feet lateral wingtip spacing. If the wingman overruns lead after landing, accept the overrun and maintain the appropriate side of the runway and wingtip clearance. Do not attempt to reposition behind lead.

3.25.6. Do not make formation landings when:

3.25.6.1. The crosswind or gust component exceeds 15 knots.

3.25.6.2. The runway is wet or reported wet.

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

3.25.6.4. The runway width is less than 125 feet.

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

3.25.6.6. Landing with hung ordnance or unexpended live bombs.

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

3.26. Radio Procedures. Preface all communications with the complete flight call sign (except for wingman acknowledgment). Transmit only that information essential for mission accomplishment or safety of flight.

3.26.1. Radio Checks. Acknowledge radio checks, which do not require the transmission of specific data by individual flight members, in turn (*Example:* "2, 3, 4"). Acknowledgment indicates the appropriate action is either complete, is in the process of being completed or is understood by the flight member.

3.26.2. Clearance Acknowledgement. All flight members will acknowledge understanding the initial ATC clearance. If flight members are not monitoring in-flight ATC frequency, the FL will pass all ATC instructions to the flight. Flight members will acknowledge subsequent ATC instructions when directed by the FL.

3.26.3. Brevity code and other terminology will be IAW AFMAN 11-214 and AFTTP 3-1.IPE, *Integrated Planning and Employment*.

3.26.4. Ops Checks.

3.26.4.1. Monitor the fuel system carefully to identify low fuel, trapped fuel or an out of balance situation as soon as possible. Frequency should be increased during tactical maneuvering at high power settings. Ops checks are required:

3.26.4.1.1. During climb or at level-off after takeoff.

3.26.4.1.2. When external fuel tanks (if carried) are empty.

3.26.4.1.3. Prior to each (D) Air Combat Training (ACBT) engagement or intercept.

3.26.4.2. Minimum items to check are engine instruments, total and internal fuel quantities/balance, G-suit connection, oxygen system and cabin altitude. If the G-suit malfunctions or becomes disconnected, terminate all ACBT maneuvering until normal operation is reestablished.

3.26.4.3. For formation flights, the FL will initiate ops checks by radio call or visual signal. Response will be made by radio call or visual signal.

3.26.4.3.1. During Ops checks, ensure the fuel quantity selector knob is returned to the NORM position. Totalizer-only Ops checks may be used periodically during high demand phases of flight.

3.26.4.3.2. 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. Once the tank(s) have been confirmed and called dry, this may be omitted from subsequent ops checks.

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

3.28. Change of Aircraft Control. Both pilots of a QF-16B/D must know at all times who has control of the aircraft. Transfer of aircraft control will be made with the statement "You have the aircraft." The pilot receiving control of the aircraft will acknowledge "I have the aircraft." Once assuming control of the aircraft, maintain control until relinquishing it as stated above. **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.

3.29. Fuel Requirements.

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

3.29.2. 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:

3.29.3. 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 will be the higher of what is established locally or:

3.29.3.1. All QF-16 Blocks 15 through 32 - 1,000 pounds.

3.29.4. Minimum/Emergency Fuel. Declare the following when it becomes apparent that an aircraft will enter initial or start an instrument final approach at the base of intended landing or alternate, if required, with:

3.29.4.1. Minimum Fuel:

3.29.4.1.1. All QF-16 Blocks 15 through 32 - 800 pounds or less.

3.29.4.2. Emergency Fuel:

3.29.4.2.1. All QF-16 Blocks 15 through 32 - 600 pounds or less.

3.29.5. AB Use. Do not use AB below 2,000 pounds total fuel or established bingo fuel, whichever is higher, unless required for safety of flight.

3.30. Radar Altimeters and Terrain Warning/Avoidance Systems. If the aircraft is equipped with such systems (Combined Altitude Radar Altimeter (CARA), DTS, Predictive Ground Collision Avoidance System (PGCAS)), turn them on for all flights. Set Line in the Sky (LIS) altitude advisory as appropriate on all missions.

3.31. Automatic Low Altitude Warning (ALOW) Setting. Set the ALOW function of the radar altimeter at the briefed minimum altitude, the command-directed minimum altitude, or as briefed, whichever is highest.

3.32. Wind and Sea State Restrictions. Do not conduct training missions when surface winds along the intended route of flight exceed 35 knots steady state. Do not conduct over water training missions when surface winds exceed 25 knots steady state or when the sea state exceeds 10 feet. This is not intended to restrict operations when only a small portion of the route is affected.

3.33. Show Formation. Mission planners will refer to DAFI 11-209, *Participation in Aerial Events*, and applicable MAJCOM or ANG directives for specific rules and appropriate approval levels to participate in static displays and aerial events.

Chapter 4

INSTRUMENT PROCEDURES

4.1. General.

4.1.1. Head-Up Display (HUD). Use: Regardless of Block, do not use the HUD to recover from an unusual attitude or while executing lost wingman procedures except when no other reference is available. The HUD in QF-16 Block 25/30/32 aircraft has been certified as a primary flight instrument and may be used as a primary flight reference in IMC conditions. The HUD in all other QF-16 Block 15 aircraft may be used as an additional instrument reference only. No QF-16 Block may use the HUD as the sole reference in IMC conditions.

4.1.2. Embedded INS/Global Positioning System (GPS) (EGI). Use. The QF-16 INS/GPS and EGI are approved for enroute Area Navigation (RNAV). Neither RNAV nor GPS approaches are authorized.

4.1.3. Simulated Instrument Flight. Follow AFMAN 11-202V3 guidance. A qualified safety observer must be in the aircraft or in a chase aircraft when conducting simulated instrument flight. A safety observer may occupy either seat of the F-16B/D provided the intercom is operable. Use the radar, if equipped, 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 statute miles, 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.

4.3. Trail Procedures.

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

4.3.1.1. FLs will request non-standard formation from ATC.

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 Contact procedures until the aircraft or element immediately in trail has radar contact (if available) and called "tied."

4.3.2. No Radar Contact.

4.3.2.1. The FL will call initiating all turns. Subsequent aircraft must delay turns to maintain the desired spacing.

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.

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.”

4.3.2.4. Each aircraft and element will call initiating any altitude or heading change. 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. 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 Fler will request altitude separation for each succeeding aircraft or element to meet the requirements of the above paragraph.

4.3.3. Radar Contact (If available).

4.3.3.1. Each aircraft and element will call “tied” when radar contact is established with the preceding aircraft. Once all aircraft are tied, no further radio calls are required, except to acknowledge ATC instructions, unless radar contact is lost.

4.3.3.2. In flights of three or more aircraft, use all available aircraft systems (e.g., radar, TACAN) to ensure that trail is maintained on the correct aircraft.

4.3.4. Trail Departures.

4.3.4.1. Use a minimum of 20 seconds takeoff spacing.

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

4.3.4.3. Make all turns using 30 degrees of bank.

4.3.5. En Route Trail. FLs must brief airspeeds, power settings, and configurations.

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 and local operating procedures must address trail recovery procedures. As a minimum, procedures must address each recovery profile, missed approach, climb-out, desired and maximum spacing requirements, lost contact and lost communications.

4.3.6.2. Limit trail recovery to a maximum of four aircraft.

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 FL must brief the flight on spacing, configuration and airspeeds.

4.3.6.5. The FL must coordinate the trail recovery with ATC prior to taking spacing.

4.3.6.6. Prior to wingmen taking spacing for the trail recovery, the FL will ensure that all wingmen have operative navigational aids and radar (if applicable).

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.

4.3.6.9. ATC will provide radar flight following for the entire formation.

4.3.6.10. Limit all turns to a maximum of 30 degrees of bank.

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.

4.3.6.12. Unless local procedures establish defined reference points for airspeed and configuration changes, the FL must direct changes by radio. At FL's call all aircraft must simultaneously comply with the directed change.

4.3.6.13. All aircraft must report the FAF.

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

4.3.6.15. FLs will coordinate with local ATC prior to penetration if the trail recovery will terminate in a Precision Approach Radar (PAR) or Airport Surveillance Radar (ASR) approach.

4.4. Formation Break-up. Formation break-up from a visual formation will occur in VMC. If IMC is unavoidable, breakup from a visual formation will occur in straight and level flight. This restriction does not apply to trail formation. Prior to an IMC break-up, the FL will confirm position and transmit attitude, altitude, airspeed, and altimeter setting. Wingmen will acknowledge and confirm good navigational aids (reception of appropriate TACAN, Instrument Landing System (ILS) and/or appropriate GPS/INS waypoint).

4.5. Formation Penetration.

4.5.1. 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.

4.5.2. If a formation landing is intended, position the wingman 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, do not change lead or wing positions below 1,500 feet AGL unless on radar downwind or if required during a formation approach with a QF-16 experiencing an Emergency.

4.7. Instrument Approach Procedures.

4.7.1. Pilots will not fly any published instrument procedure (e.g., Department of Defense (DoD), Jeppesen, International Civil Aviation Organization (ICAO)) that requires airspeeds less than those specified in TOs.

4.7.2. The QF-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 TO 1F-16x-1 and Category D approaches will not be flown.

Chapter 5

AIR-TO-AIR WEAPONS EMPLOYMENT

5.1. General. Reference AFMAN 11-214 for procedures and restrictions. In addition, QF-16 pilots shall comply with the requirements of this chapter.

5.2. Maneuvering Limitations.

5.2.1. Negative “G” guns jink maneuvers are prohibited.

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

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

Chapter 6

AIR-TO-SURFACE WEAPONS EMPLOYMENT

6.1. Simulated Attacks against off-Range or Manned Targets. When the aircraft is loaded with expendable stores (e.g., bombs, external fuel tanks) load simulated weapons (zero quantity) in the Stores Management System (SMS)/Multi Function Display (MFD) only on empty or uncarted/unexpendable stations. Confirm the Master Arm switch is in OFF or SIMULATE prior to the first attack. FL will query and flight members will reply to a “check zero quantity, uncarted station” radio call.

6.2. Weather. In training, do 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.

6.3. Pop-Up Attacks. Abort pop-up attacks if airspeed decreases below 350 KIAS (300 KIAS above 10,000 feet AGL).

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. **Note:** All directive statements in this chapter require HAF level waivers unless otherwise annotated.

7.1.1. Do 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.

7.1.2. Do 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.

7.1.3. Do not taxi with a known or suspected physiological incident or a known malfunction of the nose-wheel steering system, the brake system, or a generator. **Note:** QF-16C/D aircraft may be taxied with a single generator failure (main or standby) if the other generator is operating normally.

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. Do not conduct ground or in-flight troubleshooting after flight manual EPs are complete.

7.1.5. In the QF-16B/D, the PIC is primarily responsible for handling in-flight emergencies. The additional pilot will confirm that all Critical Action Procedures (CAPs) have been accomplished and will provide checklist assistance at the request of the PIC.

7.1.6. For actual/perceived flight control malfunctions, pilots will terminate maneuvering and take appropriate action. 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.

7.1.7. When a fuel imbalance exceeds TO 1F-16A/C-1, *Flight Manual*, limits, terminate tactical maneuvering and investigate. 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/ferry 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 3](#).

7.3. Ground Aborts.

7.3.1. If a flight member aborts prior to takeoff, the FL will normally renumber the flight to maintain a numerical call sign sequence. FLs will advise the appropriate agencies of such changes.

7.3.2. Pilots who do not takeoff with the flight may join the flight IAW the brief or FL instructions. If a join-up is to be accomplished on an air-to-ground range, all events will be terminated until the joining aircraft has achieved proper spacing.

7.4. Takeoff Aborts.

7.4.1. If an abort occurs during takeoff roll, say call sign and intentions when practical. Following aircraft will alter takeoff roll to ensure clearance or abort takeoff if adequate clearance cannot be maintained. The phrase “Cable, Cable, Cable” will be used to indicate a departure-end cable arrestment. The phrase “Barrier, Barrier, Barrier” will be used to indicate a departure-end net arrestment. Local procedures will address net barrier raising procedures.

7.4.2. When aborting above 120 KIAS, or whenever hot brakes are suspected, declare a ground emergency. Taxi the aircraft to the designated hot brake area and follow hot brake procedures.

7.4.3. If aborting at or above 100 KIAS, lower the hook. If aborting below 100 KIAS, lower the hook if there is any doubt about the ability to stop on the remaining runway.

7.5. Air Aborts.

7.5.1. If an abort occurs after takeoff, all aircraft will maintain their original numerical call sign.

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

7.5.3. Abort the mission, regardless of apparent damage or subsequent normal operation, for any of the following:

7.5.3.1. Bird strike

7.5.3.2. Actual or suspected FOD.

7.5.3.3. Moderate to severe icing.

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

7.5.3.5. Flight Control System (FLCS) anomalies, including un-commanded departures from controlled flight (**Exception:** intentional departures from controlled flight conducted IAW a MAJCOM-approved syllabus), but not including FLCS lights that reset IAW flight manual procedures.

7.5.3.6. Engine FO/stagnation or shutdown.

7.5.3.7. Lightning strike.

7.6. Radio Failure (NORDO). Reference AFPAM 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. The mission should be terminated as soon as practicable 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. 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.

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

7.6.2.1. Gunnery target tow aircraft experiencing radio failure will rock wings and continue the turn if an attack is in progress. The FL of the attacking aircraft will join on the tow's wing. Remain clear of the banner in the event it is cut. The tow pilot will use standard hand signals to indicate his difficulty. The FL will signal when the banner is cleared for cut with a slicing motion across the throat. After the banner is away and the FL 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. If cable remains, follow local procedures.

7.6.3. NORDO during Recovery.

7.6.3.1. 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. The NORDO aircraft will go-around, if the situation allows. 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.

7.6.3.2. To signal the need for an approach-end arrestment, lower the tailhook (visual formation) or fly a straight in approach flashing the landing light (unescorted).

7.7. Severe Weather Penetration. Do not fly through severe weather (**T-2**). If unavoidable, flights will split-up and obtain separate clearances prior to severe weather penetration. (**T-2**)

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 AFMAN 11-202 V3 for information on the causes of SD, how to avoid it, and how to mitigate its consequences.

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, *Combat Fundamentals F-16*, for amplifying data). Lead will acknowledge the radio call and transmit attitude, heading, altitude and airspeed. Once lost wingman procedures have been executed, permission to rejoin must be obtained from the FL.

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 FL 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.

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. 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. Number 4 will follow the appropriate procedure listed below:

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.

7.10. In-flight Practice of Emergency Procedures (EPs). Reference AFMAN 11-202V3. A simulated EP 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.

7.10.1. 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 Runway Operations Monitor (ROM) (or equivalent, e.g., SOF) is in operation. Do not practice SFO patterns in conditions other than day VMC.

7.10.2. SFO/Emergency Landing Patterns. 53 WEG/CC will establish specific procedures for SFO training and establish letters of agreement with appropriate agencies. The 53 WEG will publish those procedures in their supplement to this volume. General SFO procedures follow:

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

7.10.2.2. 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 TO 1F-16x-1 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.

7.10.2.3. SFO's may be flown to touch-and-go's IAW 3.20 or full stop with the following limitations:

7.10.2.3.1. Practice in-flight engine shutdown is prohibited unless conducting authorized airstart training.

7.10.2.3.2. SFO's will not be performed to a touch-and-go or full stop landing if aircraft gross weight exceeds 23,000 pounds for A/B models or 25,000 pounds for C/D models.

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

7.10.2.4.1. "High Key"

7.10.2.4.2. "Low Key"

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

7.11. Search and Rescue (SAR) Procedures. General directive procedures are listed below.

7.11.1. Squawk. Immediately cease tactical maneuvering by executing Knock-It-Off procedures. Place IFF to EMER to alert ATC/Ground Control Intercept (GCI)/Airborne Warning And Control System (AWACS) of the emergency situation.

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

7.11.3. 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. Pass this information to follow-on SAR forces.

7.11.4. 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.

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

7.11.6. For overwater SAR, OSC will utilize every means available (visual, Radar Ground Map, or Ground Moving Target Modes) to locate vessels that may aid in recovery.

7.12. 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. **(T-2)** Raise the tailhook on the signal from the arresting crew. Do not taxi until directed to do so by the arresting gear crew.

7.13. Functional Check Flights (FCF).

7.13.1. If an FCF is flown for engine-related causes, a maximum afterburner takeoff will be performed to maximize climb capability to obtain an immediate SFO high key position.

7.13.2. A ceiling, if present, must be confirmed to be at least 500 feet above computed high key altitude. In all cases, departure-field weather must permit an immediate overhead SFO pattern where VMC can be maintained throughout the pattern.

7.13.3. All engine-related FCF checks must be accomplished within gliding range of a suitable landing field and weather must permit a VMC descent to high key and VMC SFO at that airfield.

7.13.4. Pilots flying engine-related FCFs will verify that these requirements can be met prior to takeoff.

Chapter 8

LOCAL OPERATING PROCEDURES

8.1. General. The 82 ATRS will produce an In-Flight Guide (IFG) Annex and/or Squadron Standards will and cover at a minimum, all topics listed below.

- 8.1.1. Introduction.
- 8.1.2. General Policy.
- 8.1.3. Ground Operations.
- 8.1.4. Flying Operations.
- 8.1.5. Abnormal Procedures.
- 8.1.6. Attachments (Illustrations).
- 8.1.7. Fuel Requirements and Bingo Fuels.
- 8.1.8. Diversion Instructions.
- 8.1.9. Jettison Areas, Procedures and Parameters (IFR/VFR).
- 8.1.10. Controlled Bailout Areas.
- 8.1.11. Local Weather Procedures.
- 8.1.12. Approved Alternate Missions.
- 8.1.13. Cross-Country Procedures.
- 8.1.14. SAR and OSC Procedures.
- 8.1.15. BASH program guidance IAW DAFI 91-202, *The US Air Force Mishap Prevention Program* and AFI 91-212.
- 8.1.16. Environmental Restrictions to Flight Operations (winds, sea state, temperature, etc.) applicable to unit operating locations.

Chapter 9

MANNED/REMOTE CONTROL PROCEDURES

9.1. General. The QF-16 flight manual and local operating procedures are the primary references for manned target operation and remote-controlled flight with the Automatic FLCS (AFCS) engaged.

9.1.1. QF-16 aircraft are expendable assets, and no mission is so important as to risk human life or endanger other assets. Pilots should, in all cases, consider ejection rather than attempt to recover an aircraft which might pose a greater risk.

9.1.2. The procedures contained in this chapter are designed to provide pilots and remote pilots with standard methods of operation under normal conditions for qualification and CT.

9.1.3. To acquire additional knowledge and experience of the target system capabilities and limitations, units are encouraged to exploit the capabilities of the system and promote aircrew proficiency in the target system in all anticipated environments.

9.2. Responsibilities.

9.2.1. An SP in a remote controlled QF-16 is the PIC and is responsible to monitor aircraft performance as commanded by the remote pilot and to take control if safety of flight is jeopardized. Certain conditions such as momentary loss of communication between the SP and remote pilot or loss of down-link data by the remote pilot may interrupt or delay normal crew coordination. Therefore it is absolutely imperative that the SP keep a high level of Situational Awareness (SA). If he feels he is losing SA he should immediately take control of the aircraft. The SP should disengage the AFCS at the earliest possible indication of a problem or at the activation of the slow speed warning horn. The computer can out-perform human reaction, therefore the initial indication of a minor malfunction may be the only warning of a more serious problem. Under no circumstances will the SP rely solely on verbal warnings from the remote pilot.

9.2.2. The QF-16 remote pilot for manned remote missions utilizes the call sign "Yankee" and is responsible for planning and briefing manned remote missions, overall execution of preflight remote checks, coordinating with the Whiskey for drone mission parameters and maneuvers, controlling the FSAT through all phases of remote flight, coordinating with outside agencies on issues directly related to drone mission parameters and coordination of transfer of aircraft control to/from the SP.

9.2.3. In the event it appears that the SP is incapacitated, the remote pilot has the ability to utilize the Fixed Control System (FCS) override function which allows remote operation of all aircraft systems. This would allow the remote pilot to establish a safe, wings-level 1-G environment to determine SP status. Especially during high-G maneuvering, the remote pilot should closely monitor aircraft performance and SP response to communications to determine if this action is required.

9.2.4. The SP has ultimate authority and responsibility for safe conduct of the mission. Remote pilots for manned remote QF-16s are responsible for safety of flight of their aircraft until transferring control back to the SP, or unless overridden by the SP at any time. If the remote

pilot's aircraft control capability becomes degraded, he will inform the SP. He will also notify the SP to take control when appropriate.

9.2.5. The remote pilot will verify the TCS console is functioning correctly during preflight aircraft checks. If the console is not functioning correctly, the mission will be delayed or cancelled.

9.3. Manned Remote Procedures.

9.3.1. Prior to any manned remote flight, the SP will perform an operational check of the AFCS disengage paddle switch. If the switch is inoperative or malfunctions, the mission will be aborted.

9.3.2. During an Automatic Takeoff (ATO) or manned remote touch-and-go landing, the SP will take control if the aircraft gets to within 25 feet of the runway edge. This does not preclude the SP taking control when in his judgment the situation is approaching abnormal operation.

9.3.3. Unless specifically briefed as a mission objective or requirement, the SP will not engage the AFCS below 1000 feet AGL.

9.3.4. SPs will use extreme caution during manned remote flight at low altitude.

9.4. Manned Remote Rules of Engagement (ROE).

9.4.1. SP has ultimate responsibility for safety of aircraft and safe conduct of mission.

9.4.2. SP will not rely on verbal warnings from remote pilots to initiate action.

9.4.3. Remote pilots will continue to fly the aircraft until positive transfer to SP is assured.

9.4.4. SP will guard the stick at all times below 5000 feet AGL.

9.4.5. Unsafe maneuvers based upon improper bank, speed, pitch or "G" should be terminated immediately by either the remote pilot or the SP.

9.4.6. If in IMC conditions or without a discernible horizon, the aircraft should not exceed 90 degrees of bank or 30 degrees of pitch. Less than 2000 feet the aircraft should not exceed 30 degrees of bank, 15 degrees of pitch nose up, or 10 degrees of pitch nose low.

9.5. Weather Restrictions and Operating Limits. The ceiling and visibility for manned remote takeoffs and landings will be at least 1500 feet and three statute miles. Surface winds are within the following limits prior to performing the event:

9.5.1. **Takeoff:** 20 knots crosswind, 15 tailwind, 20 knots headwind.

9.5.2. **Landing:** 15 knots crosswind / tailwind (w/ fuel < 3000 pounds), 5 knots tailwind (w/ fuel > 3000 pounds), 20 knots headwind.

9.6. Fuel Check Requirements. The remote pilot will initiate a fuel check at level-off or upon taking control (whichever occurs last) and periodically thereafter throughout the mission. Down-linked fuel readings will be compared with cockpit readings.

9.7. Chase Restrictions.

9.7.1. The minimum altitude for drone chase (takeoff and landing) is 100 feet AGL.

9.7.2. Minimum weather for drone chase is VMC.

9.8. Landing Patterns.

9.8.1. Prior to the first manned remote approach and landing, the SP will verbally confirm “Brakes Normal” and leave the brakes button in NORMAL until attempting a full-stop landing. Calls are not required for subsequent approaches and landings on the same sortie. The SP will place and verbally confirm “Brakes Remote” for a full-stop landing.

9.8.2. Touch-and-go (T&G) landings are authorized on manned remote missions for remote pilot CT. SP will take control of the aircraft with enough runway remaining to safely permit an abort or a takeoff should the need arise. After a touch-and-go takeoff, no attempt will be made to turn the aircraft until above 200 KIAS and above 200 feet AGL. AB may be selected by the SP if desired/required. SP or chase pilot (as briefed) will give descriptive commentary of T&G to the remote pilot for steering on crosswind as appropriate.

9.8.3. The remote pilot will continue to fly the aircraft until positive transfer of control to the SP is assured.

9.9. Ordnance Release.

9.9.1. Normal release/jettison will be performed using local procedures and applicable technical data.

9.9.2. Emergency jettison may be accomplished in any clear area.

9.10. Formation Control System (FCS) Pattern Rules of Engagement (ROE). Unless pre-coordinated otherwise, the SP and remote pilots will ensure:

9.10.1. 45 degrees of bank is not exceeded.

9.10.2. 185 KIAS minimum until Landing Mode 6.

9.10.3. SP executes the go-around with throttle in MIL power NLT 3500 feet down.

9.10.4. No hard landings.

Chapter 10

UNMANNED (NULLO) REMOTE CONTROL PROCEDURES

10.1. General. The QF-16 flight manual and local operating procedures are the primary references for unmanned target operation.

10.1.1. QF-16 aircraft are expendable assets, and no mission is so important as to risk human life or endanger other assets. Remote pilots and Drone Mission Commanders (DMCs) should, in all cases, consider destruction of the aircraft in a safe area rather than attempt to recover an aircraft which might pose a greater risk.

10.1.2. The procedures contained in this chapter are designed to provide remote pilots with standard methods of operation under normal conditions for qualification and CT.

10.2. Responsibilities.

10.2.1. X-Ray is the call sign/designation of the primary NULLO remote pilot, responsible for planning and briefing mission, overall execution of preflight checks, and coordinating with the GRDCS technician (call sign - “Whiskey”) for drone mission parameters and maneuvers. The X-Ray provides launch recommendation to the DMC (call sign - “Mike”) and is responsible for controlling the FSAT through all phases of flight. The X-Ray executes emergency checklist procedures in the event of a FSAT malfunction/emergency, coordinates mission duties with the Yankee, handles Ultra-High Frequency (UHF) communication with controlling agencies, and provides alternate destruct capability via TCS destruct system.

10.2.2. Yankee is the call sign/designation of the secondary NULLO remote pilot, responsible for backing up X-Ray(s) during preflight checks, receiving the boat report from the chase aircraft, monitoring drone performance through all phases of flight, assisting with emergency checklist procedures in the event of a FSAT malfunction/emergency, and coordinating with outside agencies on issues directly related to drone mission parameters. The Bravo also monitors chase status in TCS.

10.3. General Unmanned Target Procedures. Unmanned QF-16 Ops will be accomplished IAW TO 1F-16(Q) A-1, *Flight Manual*, and locally developed operating checklists.

10.4. General Unmanned Target Rules of Engagement (ROE).

10.4.1. DMC will only approve launch of a Code 1 aircraft. If not Code 1 aircraft, squadron commander approval is required.

10.4.2. Chase aircraft is required for NULLO QF-16 launch.

10.5. Weather Restrictions and Operating Limits.

10.5.1. IAW TO 1F-16(Q) A-1, *Flight Manual* and 53 WEGI 11-250, *53 Weapons Evaluation Group Air Operations*.

10.6. Fuel Check Requirements. The remote pilot will initiate a fuel check at level-off and periodically thereafter throughout the mission. Down-linked fuel readings will be compared with cockpit readings prior to the cockpit safety officer leaving the cockpit during prelaunch checks.

10.7. Chase Restrictions.

10.7.1. The minimum altitude for drone chase (takeoff and landing) is 100 feet AGL.

10.7.2. Operations Group Commanders will publish guidance concerning minimum weather for drone chase.

DAVID G. SHOEMAKER, Brig Gen, USAF
Director of Operations

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFI 33-322, *Records Management and Information Governance Program*, 23 March 2020

ACCMAN 11-2QF-16V1, *QF-16--Aircrew Training*, 29 April 2019

AFMAN 11-2F-16V3, *F-16--Operations Procedures*, 4 February 2020

AFMAN 11-202V3, *Flight Operations*, 10 January 2022

AFMAN 11-214, *Air Operations Rules and Procedures*, 29 November 2022

AFMAN 11-218, *Aircraft Operations and Movement on the Ground*, 5 April 2019

AFMAN 11-404, *Fighter Aircrew Acceleration Training Program*, 27 November 2019

AFPAM 11-205, *Aircrew Quick Reference to Aircraft Cockpit and Formation Flight Signals*, 9 August 2018

AFPD 11-2, *Aircrew Operations*, 31 January 2019

AFTTP 3-1.F-16, *Tactical Employment--F-16*, 6 October 2017

AFTTP 3-3.F-16, *Combat Fundamentals--F-16*, 22 August 2022

ATP-3.3.4.2, *Air-To-Air Refuelling*, 26 April 2019

DAFI 11-209, *Participation in Aerial Events*, 20 May 2021

DAFI 91-202, *The US Air Force Mishap Prevention Program*, 12 March 2020

DAFI 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program*, 13 April 2023

TO 1F-16A-1, *Flight Manual*, 15 Feb 2023

TO 1F-16C-1, *Flight Manual*, 15 June 2023

TO 1F-16(Q) A-1, *Flight Manual*, 10 August 2023

53 WEGI 11-250, *53 Weapons Evaluation Group Air Operations*.

Prescribed Forms

None

Adopted Forms

DAF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

AAR—All Altitude Recovery

AB—Afterburner

ACBT—Air Combat Training

AHC—Aircraft Handling Characteristics
ACC—Air Combat Command
ACCMAN—Air Combat Command Manual
ACM—Air Combat Maneuver
ADTC—Advanced Data Transfer Cartridge
AFCC—Advanced Flight Control Computer
AFCS—Automatic Flight Control System
AFI—Air Force Instruction
AFMAN—Air Force Manual
AFMC—Air Force Materiel Command
AFPD—Air Force Policy Directive
AFR—Air Force Reserve
ARIP—Air Refueling Initial Point
AFTTP—Air Force Tactics, Techniques, and Procedures
AGL—Above Ground Level
AGSM—Anti-G Straining Maneuver
ALOW—Automatic Low Altitude Warning
ANG—Air National Guard
AOA—Angle of Attack
ARCP—Air Refueling Contact Point
ARCT—Air Refueling Contact Time
ASR—Airport Surveillance Radar
ATC—Air Traffic Control
ATCAA—Air Traffic Control Assigned Airspace
ATO—Automatic Takeoff
ATP—Allied Tactical Publication
AWACS—Airborne Warning and Control System
BAM—Bird Avoidance Model
BASH—Bird/Wildlife Aircraft Strike Hazard
BD—Battle Damage
BFM—Basic Fighter Maneuver
BMC—Basic Mission Capable

C/S—Callsign
CAF—Combat Air Forces
CAP—Critical Action Procedure
CARA—Combined Altitude Radar Altimeter
CAT—Category
CG—Center of Gravity
CONUS—Continental United States
CRM—Crew Resource Management
CT—Continuation Training
DAF—Department of the Air Force
DAFI—Department of the Air Force Instruction
DAFMAN—Department of the Air Force Manual
DMC—Drone Mission Commander
DoD—Department of Defense
DTS—Digital Terrain System
ECM—Electronic Countermeasures
EGI—Embedded Internal Navigation System/Global Positioning System
EMS—Engine Monitoring System
EOR—End of Runway
EP—Emergency Procedure
EPU—Emergency Power Unit
FAF—Final Approach Fix
FAM—Familiarization Flight
FCIF—Flight Crew Information File
FCS—Fixed Control System
FE—Flight Examiner
FL—Flight Lead
FLCS—Flight Control System
FLIP—Flight Information Publication
FLIP GP—Flight Information Publication General Planning
FO—Flameout
FOD—Foreign Object Damage

FSAT—Full Scale Aerial Target
G—**Gravitational**—Load Factor
G-ex—G awareness exercise
GCI—Ground Control Intercept
GLOC—G-induced Loss of Consciousness
GPS—Global Positioning System
GRDCS—Gulf Range Drone Control System
HARTS—Horn Awareness and Recovery Training Series
HTA—Hold To Arm
HUD—Head-Up Display
IAW—In Accordance With
ICAO—International Civil Aviation Organization
IFF—Identification, Friend or Foe
IFR—Instrument Flight Rules
ILS—Instrument Landing System
IMC—Instrument Meteorological Conditions
INS—Internal Navigation System
IP—Instructor Pilot
IQT—Initial Qualification Training
IR—Instrument Route
IU—Instructor Remote Pilot
JFS—Jet Fuel Starter
JMPS—Joint Mission Planning System
JOAP—Joint Oil Analysis Program
KCAS—Knots Calibrated Air Speed
KIAS—Knots Indicated Airspeed
KTAS—Knots True Airspeed
LIS—Line in the Sky
LOWAT—Low Altitude Training
MAJCOM—Major Command
MC—Mission Capable
MDC—Mission Data Card

MOA—Military Operating Area
MPO—Manual Pitch Override
MTC—Minimum Terrain Clearance
MTR—Military Training Route
MQT—Mission Qualification Training
MSA—Minimum Safe Altitude
MSL—Mean Sea Level
NATO—North Atlantic Treaty Organization
NLT—No Later Than
NM—Nautical Mile(s)
NORDO—No Radio
NOTAM—Notice to Air Missions
NULLO—Not Under Live Local Operator
NVG—Night Vision Goggle
OPA—Optionally Piloted Aircraft
Ops—Operations
OSC—On Scene Commander
OT&E—Operational, Test and Evaluation
OVRD—Override
PAPI—Paper and Pencil Instrument
PAR—Precision Approach Radar
PBG—Select Pressure Breathing
PFPS—Portable Flight Planning System
PGCAS—Predictive Ground Collision Avoidance System
PIC—Pilot in Command
PPG—Positive-Pressure breathing-for-G
RAA—Route Abort Altitude
RCR—Runway Condition Reading
RD TED—Re-gridded Digital Terrain Elevation Data
RNAV—Area Navigation
ROE—Rules of Engagement
ROM—Runway Operations Monitor

RPM—Revolutions Per Minute
RTB—Return to Base
RWR—Radar Warning Receiver
SA—Situational Awareness
SAR—Search and Rescue
SCP—Set Clearance Plane
SD—Spatial Disorientation
SFO—Simulated Flameout
SIF—Selective Identification Feature
SOF—Supervisor of Flying
SP—Safety Pilot
SPINS—Special Instructions
TACAN—Tactical Air Navigation System
T&G—Touch and Go Landing
TAS—True Air Speed
TCS—Target Control System
TO—Technical Order
TOA—Take Off Abort
TOLD—Takeoff and Landing Data
UHF—Ultra-High Frequency
VASI—Visual Approach Slope Indicator
VFR—Visual Flight Rules
VMC—Visual Meteorological Conditions
VR—Visual Route
VTR—Video Tape Recorder
WITS—White Sands Missile Range Integrated Target System
WSEP—Weapon System Evaluation Program
WSMR—White Sands Missile Range

Office Symbols

53 WEG/CC—53d Weapons Evaluation Group Commander
53 WEG/OGV—53d Weapons Evaluation Group Standardization/Evaluation
82 ATRS/CC—82d Aerial Targets Squadron Commander

82 ATRS DET1/CC—82d Aerial Targets Squadron Detachment Commander

ACC/A3—Air Combat Command Director of Operations

ACC/A3TV—Air Combat Command Standardization and Evaluation Branch

Terms

Air Combat Training (ACBT)—A general term which includes (D) Basic Fighter Maneuver (BFM), (D) Air Combat Maneuver (ACM), and (D) ACT (AFMAN 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 ACCMAN11-2QF-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.

Continuation Training (CT)—See ACCMAN11-2QF-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 ACCMAN11-2QF-16V1.

Low Altitude Training (LOWAT)—See ACCMAN11-2QF-16V1.

Mission Capable (MC)—The minimum training required for aircrews to be familiarized in all, and may be qualified and proficient in some, of the primary missions tasked. All squadron assigned and attached pilots are designated MC upon completion of MQT. See AF11-2QF-16V1.

Mission Qualification Training (MQT)—See ACCMAN11-2QF-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.

Attachment 2

FLIGHT BRIEFING GUIDES

Table A2.1. General Briefing Guide.

<p>Mission Data.</p> <ul style="list-style-type: none"> Time Hack EP Mission Objective(s) Mission Overview Mission Data Card <ul style="list-style-type: none"> 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 <p>Ground Procedures.</p> <ul style="list-style-type: none"> Step Pre-Flight <ul style="list-style-type: none"> Aircraft Armament – if required Boresight Check-In Taxi / Marshaling / Arming Spare Procedures <p>Takeoff.</p> <ul style="list-style-type: none"> Runway Lineup Formation Takeoff Takeoff Interval Abort Jettison Procedures Low Altitude Ejection Landing Immediately After Takeoff <p>Departure/En Route.</p> <ul style="list-style-type: none"> Routing Trail Departure Join-Up / Formation Systems / Ops Checks <p>Airspace.</p> <ul style="list-style-type: none"> Area Times Restrictions (Chaff/Flare/Supersonic) Bailout (Controlled/Uncontrolled) 	<p>Recovery.</p> <ul style="list-style-type: none"> Rejoin BD / Bomb Check – if required Type Recovery Flight Break-Up Pattern and Landing After Landing / De-Arm Emergency / Alternate Airfields <p>Special Subjects (As Applicable).</p> <ul style="list-style-type: none"> General Roles and Responsibilities (IP, FL, Wingman) Formation Specific Responsibilities and Priorities Flight Member Mission Priorities Task / Sensor Prioritization Deconfliction Contracts Chase Procedures IFF Procedures Collision Avoidance <ul style="list-style-type: none"> Radar / Visual Search Responsibilities Departure/Enroute/Recovery High Density Traffic Areas Mid-Air Collision Avoidance <ul style="list-style-type: none"> From Other Military Aircraft From Civilian Aircraft Dissimilar Formations Terrain Avoidance <ul style="list-style-type: none"> Departure / En Route / Recovery Use of Controlled Flight Into Terrain Prevention Systems CARA ALLOW MSL Line-In-The-Sky Bird Strike Procedures / Use of Visor(s) Human Factors Considerations (e.g., Channelized Attention, Task Saturation / Prioritization and Complacency) G-Awareness Turn / G-Suit connection / G-tolerance <ul style="list-style-type: none"> Use of L-1 AGSM Visual Illusions / Perceptions Spatial Disorientation / Unusual Attitudes / G-excess illusion Lost Wingman Radio Inoperative SAR Recall Procedures SIIs
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MSA	Pilot currencies for events to be flown Training Rules / Special Operating Instructions / ROE Tactical Portion of Mission
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Table A2.2. Additional Briefing Items, Air Refueling.

<p>General</p> <p>Tanker Call Sign(s) / Receiver Assignments</p> <p>Refueling Track(s)</p> <p> Altitude</p> <p> Airspeed</p> <p> Airspace Restrictions</p> <p>ARIPs, ARCPs, ARCTs</p> <p>Radio Frequencies</p> <p>Buddy Procedures:</p> <p> Departure</p> <p> Join-Up</p> <p>En Route:</p> <p> Route of Flight</p> <p> Formation</p> <p> Ops Checks</p> <p>Rendez-vous:</p> <p> Type Rendez-vous</p> <p> Holding Procedures / Formation</p> <p> Ground Radar Assistance</p> <p> Tanker Identification - TACAN / Radar / Visual</p> <p> Radar Procedures / Techniques</p> <p> Wingman / Deputy Lead Responsibilities</p> <p> Receiver Formation / Join-Up Procedures</p> <p> Rendezvous Overrun</p>	<p>Refueling:</p> <p> Checklist Procedures</p> <p> Radio Calls</p> <p> Refueling Order</p> <p> Techniques</p> <p> EMCON Level</p> <p> Visual Signals</p> <p> Fuel Off-Load</p> <p> Bingo Fuel (Abort Points / Abort Bases)</p> <p> Drop-Off Procedures</p> <p> Wake Turbulence</p> <p>Reform and Exit:</p> <p> Formation</p> <p> Clearance</p> <p>Emergency Procedures:</p> <p> Breakaway Procedures</p> <p> Systems Malfunctions</p> <p> Damaged Receptacle</p> <p>IMC Considerations:</p> <p> Loss of Visual Contact</p> <p> Aircraft Lighting</p> <p>Special Subjects:</p> <p> Fuel Awareness / AB Use / Consumption Rates</p> <p> Flight Path Deconfliction / Other Receiver Considerations</p> <p> Human Factors Considerations (e.g., Channelized Attention, Task Saturation / Prioritization and Complacency)</p>
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Table A2.3. Additional Briefing Items, Low-Level Navigation.

<p>General</p> <p>Route / Clearance / Restrictions</p> <p>Flight Responsibilities</p> <p> Navigation</p> <p> Radar / Visual Search</p> <p>Entry / Spacing / Holding / Initial Altitude / MSA</p> <p>Route Procedures:</p> <p> Fence Checks</p> <p> Tactical Formation / Turns</p> <p>Low-Level Navigation</p> <p> Dead Reckoning/Use of Nav Aids/Equipment (EGI)</p>	<p>Contingencies</p> <p> Aircraft Fallout Plan</p> <p> Rejoin After Late Takeoff</p> <p>Emergencies:</p> <p> Aircraft Malfunctions</p> <p> Route Abort Procedures (RAA / MSA) / ATC Frequencies</p> <p>Alternate Mission</p> <p> Type Mission (refer to appropriate mission briefing guide)</p> <p> Mission Objectives</p> <p>Special Subjects</p> <p> Airspace Restrictions</p>
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<p>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 (SCP)/Obstacles (MSL/AGL) Turnpoint Acquisition Obstacle / Ground Avoidance Use of Altitude Warning Features (DTS, ALOW and Line-In-The-Sky MSL Floor Settings) Threat Reactions RWR / ECM / Chaff / Flares Engagement Criteria Flight Path Deconfliction Termination</p>	<p>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 Human Factors Considerations (e.g., Channelized Attention, Task Saturation / Prioritization and Complacency)</p>
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Table A2.4. Crew Coordination / Passenger / Ground Crew Briefing Guide.

<p>Crew Coordination / Passengers: Pre-Flight Prohibited Items Cockpit Layout Flight Maneuvering Parameters 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 – Lap belt, Utility Light, Personal Equipment, Leg Position, Paddle Switch Override</p>	<p>Ground Crew: Act Only On Pilot's Instructions Ground Emergency Procedures Hand Signals Aircraft Danger Areas</p>
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Table A2.5. Mission Debriefing Guide.

<p>Ground Procedures Takeoff/Join-Up/Departure En Route Procedures Recovery/Landing/After Landing General: SIs Radio Procedures Flight Member Responsibilities Formation and Deconfliction Contracts Sensor Management/Prioritization Training Rules/Special Operating Instructions</p>	<p>Mission Accomplishment/Analysis: Mission Reconstruction Mission Support VTR / Film Assessment AGSM Effectiveness Tactical Employment Priorities Learning Objectives Achieved Lessons Learned Recommendations for Improvement Comments/Questions</p>
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Attachment 3

CRITICAL ACTION PROCEDURES (CAPS)

A3.1. General. The following procedures will be evaluated IAW MAJCOM guidelines. Pilots shall be able to immediately accomplish these procedures in the published sequence without reference to the checklist. Certain steps (e.g., Stores - Jettison) may be performed out of sequence, if conditions warrant. CAPs may be abbreviated when written, but procedural intent must be clear.

Table A3.1. Critical Action Procedures (CAPs).

<u>FIRE/OVERHEAT/FUEL LEAK (GROUND):</u>	<u>ENGINE FAILURE/AIRSTART</u>
1. THROTTLE - OFF	<u>PW220</u>
2. JFS - OFF	1. ZOOM (If at low altitude)
3. FUEL MASTER SWITCH - OFF	2. STORES - JETTISON (If required)
<u>GROUND EGRESS:</u>	3. THROTTLE - OFF
1. THROTTLE - OFF	4. AIRSPEED - AS REQUIRED.
2. SEAT - SAFE	WHEN RPM IS BETWEEN 50-25 PERCENT AND FTIT IS BELOW
3. BELT/KIT/HARNES/G-SUIT - RELEASE	700 DEGREES:
<u>ABORT:</u>	5. THROTTLE - IDLE
1. THROTTLE - IDLE	6. JFS - START 2 WHEN BELOW 20,000 FEET AND 400 KIAS
2. HOOK - DOWN (Above 100 Knots or If Required)	<u>GE100</u>
<u>A/B MALFUNCTION ON TAKEOFF (TAKEOFF CONTINUED):</u>	1. ZOOM (If at low altitude)
1. THROTTLE - MIL	2. STORES - JETTISON (If required)
2. STORES - JETTISON (If Required)	3. ENGINE CONTROL SWITCH - SEC, THEN PRI
<u>ENGINE FAILURE ON TAKEOFF (TAKEOFF CONTINUED):</u>	4. AIRSPEED - AS REQUIRED
1. ZOOM	5. JFS - START 2 WHEN BELOW 20,000 FEET AND 400KIAS
2. STORES-JETTISON (If Possible)	
3. EJECT	<u>[ANALOG FLCS] OUT OF CONTROL RECOVERY:</u>
<u>ENGINE FIRE ON TAKEOFF (TAKEOFF CONTINUED):</u>	1. CONTROLS - RELEASE
1. CLIMB	2. THROTTLE - IDLE
2. STORES - JETTISON (IF REQUIRED)	If in an inverted deep stall:
<u>LOW THRUST ON TAKEOFF / AT LOW ALTITUDE (NON-AB):</u>	3. RUDDER - OPPOSITE YAW DIRECTION
<u>PW 220</u>	If still out of control:
1. THROTTLE - AB	4. MPO SWITCH - OVRD AND HOLD
2. STORES - JETTISON (If Required)	After Yaw Rotation Stops or is Minimized:
If PRI thrust is insufficient to maintain level flight at a safe altitude:	5. STICK - CYCLE IN PHASE
3. ENGINE CONTROL SWITCH - SEC	
<u>GE 100</u>	<u>FSAT EMERGENCIES:</u>
1. THROTTLE - AB	1. FSAT AFCS - DISENGAGE
2. STORES - JETTISON (If Required)	
If thrust is insufficient to maintain level flight at a safe altitude:	
3. ENGINE CONTROL SWITCH - SEC, THEN PRI	

Table A3.2. Unmanned Remote Pilot Critical Action Procedures (CAPs).

<p>ABORT:</p> <ol style="list-style-type: none"> 1. TOA – COMMAND 	<p>FIRE/OVERHEAT/FUEL LEAK (GROUND):</p> <ol style="list-style-type: none"> 1. THROT OFF – COMMAND 2. FUEL MASTER – OFF
<p>LOSS /NO INDICATED AIRSPEED ON TAKEOFF:</p> <ol style="list-style-type: none"> 1. ABORT 	<p>A/B MALFUNCTION ON TAKEOFF:</p> <p>If decision is made to stop:</p> <ol style="list-style-type: none"> 1. ABORT
<p>LOSS OF DIRECTIONAL CONTROL ON T/O:</p> <ol style="list-style-type: none"> 1. SWITCH AFCC (IF POSSIBLE) 2. ATO - COMMAND 3. CONTROL STICK – STEER (IF REQUIRED) 	<p>If takeoff is continued:</p> <ol style="list-style-type: none"> 1. AB – DESELECT (MIL) 2. JETTISON – COMMAND (IF REQUIRED)
<p>ATO FAILURE:</p> <ol style="list-style-type: none"> 1. SWITCH AFCC (IF POSSIBLE) 2. ATO- COMMAND <p>If manual control is required:</p> <ol style="list-style-type: none"> 3. CONTROL STICK TRIGGER – PRESS (MANUAL) 4. ATO - CANCEL 	<p>If takeoff is continued and when safely airborne:</p> <ol style="list-style-type: none"> 1. TRIGGER – PRESS (MANUAL) 2. ATO – CANCEL 3. AB – DESELECT (MIL) 4. JETTISON – COMMAND (IF REQUIRED)
<p>UNUSUAL ATTITUDE RECOVERY:</p> <ol style="list-style-type: none"> 1. AAR - COMMAND <p>If control is not regained:</p> <ol style="list-style-type: none"> 2. SWITCH AFCC (IF POSSIBLE) 3. AAR – COMMAND 	<p>ENGINE FAILURE ON TAKEOFF:</p> <p>If conditions permit:</p> <ol style="list-style-type: none"> 1. ABORT <p>If conditions do not permit an abort:</p> <p>Perform appropriate ENGINE FAILURE/AIRSTART CAPs</p>
<p>LOSS OF DOWNLINK/CMD/TEL EMERGENCY PROCEDURES:</p> <p>If terrain clearance or other factors require immediate action:</p> <ol style="list-style-type: none"> 1. SWITCH URAP (IF POSSIBLE) 2. ATO - COMMAND 3. SWITCH TVI (IF POSSIBLE) 4. WL – COMMAND 5. SWITCH AFCC (IF POSSIBLE) 6. CONTROL STICK TRIGGER – PRESS 7. AAR - COMMAND 	<p>ENGINE FIRE/OVERHEAT ON TAKEOFF:</p> <p>If on takeoff and the conditions permit:</p> <ol style="list-style-type: none"> 1. ABORT <p>If takeoff is continued:</p> <ol style="list-style-type: none"> 1. ATO MODE - MAINTAIN 2. JETTISON – COMMAND (IF REQUIRED)
<p>DESTRUCT PROCEDURE:</p> <ol style="list-style-type: none"> 1. HTA – ON 2. ARM – ON, then OFF 3. DESTRUCT – ON 	<p>ENGINE FAILURE/AIRSTART (GE100):</p> <p>If engine failure or flameout occurs:</p> <ol style="list-style-type: none"> 1. ZOOM CLIMB – COMMAND (IF REQUIRED) 2. AIRSTART – COMMAND 3. JETTISON – COMMAND (IF POSSIBLE) 4. AIRSPEED – AS REQUIRED
	<p>ENGINE FAILURE/MANUAL AIRSTART (PW220):</p> <p>If engine failure or flameout occurs:</p> <ol style="list-style-type: none"> 1. ZOOM CLIMB – COMMAND (IF REQUIRED) 2. JFS START – COMMAND (below 20,000 feet & 400KIAS) 3. JETTISON – COMMAND (IF POSSIBLE) 4. THROT OFF - COMMAND

5. SHOP – COMMAND

6. AIRSPEED – AS REQUIRED

When RPM is between 40-25% with FTIT below 700°C:

7. THROT OFF - DESELECT