

**BY ORDER OF THE  
SECRETARY OF THE AIR FORCE**

**AIR FORCE INSTRUCTION 11-2QF-4 VOL 3**

**31 OCTOBER 2014**

***Flying Operations***

***QF-4--OPERATIONS PROCEDURES***



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This volume implements AFPD 11-2, *Aircraft Rules and Procedures*; AFPD 11-4, *Aviation Service*. It applies to all QF-4 units. This publication does not apply to the Air National Guard (ANG), Air Force Reserve Command (AFRC) or to the Civil Air Patrol. MAJCOMs will coordinate proposed MAJCOM/DRU/FOA-level supplements to this volume through HQ ACC/A3TO to HQ AFFSA/A3OF prior to publication. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located in the Air Force Records Information Management System (AFRIMS). Copies of MAJCOM/DRU/FOA-level supplements, after approved and published, will be made available on the e-Publishing website at [www.e-publishing.af.mil](http://www.e-publishing.af.mil). Refer recommended changes and questions about this publication through 53 WEG/OGV to ACC/A3T via AF Form 847, *Recommendation for Change of Publication*, using procedures in AFI 11-215, *USAF Flight Manuals Program (FMP)* and any supplements to AFI 11-215. MAJCOMS determine the review process for unit-level supplements. **Note:** The terms Direct Reporting Unit (DRU) and Field Operating Agency (FOA) as used in this paragraph refer only to those DRUs/FOAs that report directly to HQ USAF. Request for waivers must be submitted through the chain of command to the appropriate Tier waiver approval authority or if a non-Tiered requirement, to the publication OPR for consideration. This instruction requires the collection or maintenance of information protected by the Privacy Act of 1974. The authority to collect and maintain the records prescribed in this instruction are 37 USC 301a, Incentive Pay; Public Law 92-204 (Appropriations Act for 1973), Section 715; Public Law 93-570 (Appropriations Act for 1974); Public Law 93-294 (Aviation Career Incentive Act of 1974); DOD Instruction 7730.57, *Aviation*

Career Incentive Act of 1974 and Required Annual Report; AFI 11-401, Aviation Management; and E.O. 9397(SSN) as amended by Executive Order 13478, Amendments to Executive Order 9397 Relating to Federal Agency Use of Social Security Numbers, November 18, 2008, “Numbering System for Federal Accounts Relating to individual Persons. System of records notice F011 AF XOA Aviation Resource Management System (ARMS) applies and is available at <http://privacy.defense.gov/notices/usaf/>

**SUMMARY OF CHANGES**

This document has been substantially revised and must be thoroughly reviewed. Major changes include standardized format and terminology in line with other AFI11-2FXX Vol 3 series publications, incorporated operations procedures for QRF-4C, identifies Tiered waiver authorities for unit level compliance items, and deleted information that is repeated from HHQ guidance. Minimum and maximum altitudes for approach to stalls were modified, along with onboard IP requirement. Minimum and emergency fuels defined, touch and go landing restrictions included, and prohibited formation landings. Significantly revised crew duties, Removed air-refueling guidance, radar-assisted trail departure procedures, simulated gun employment restrictions, surface attack NORDO procedures, armament system malfunctions, night operating procedures, and start cartridge authorization. Added aerial gunnery tow procedures, clarified remote rules of engagement.

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## Chapter 1

### GENERAL GUIDANCE

**1.1. General.** This instruction, in conjunction with other governing directives, prescribes procedures for operating QF-4 aircraft under most circumstances. It is not a substitute for sound judgment. Procedures not specifically addressed may be accomplished if they enhance safe and effective mission accomplishment. The QF-4 aircraft is a test asset and is not normally used to deliver air-to-air or air-to-ground ordnance. It has limited avionics for the SP compared to the original F-4, that is, there is no on-board radar or functional INS (other than platform). A limited number of two-seat QF-4s exist, but they are used primarily for instructional, orientation flights, and check ride sorties. For the purposes of this volume, the QF-4 is a single-seat aircraft. Also, procedures in this AFI reflect that QF-4 pilots are chosen from a pool of highly experienced fighter pilots and are tailored to that level.

1.1.1. **Deviations.** Deviations from these procedures require specific waiver (T-1) unless an urgent requirement or an aircraft emergency dictate otherwise. In that case, the pilot in command will take the appropriate action to safely recover the aircraft.

1.1.2. **Supplements.** Develop supplements IAW AFI 33-360, *Publications and Forms Management*.

## Chapter 2

### MISSION PLANNING

**2.1. Responsibilities.** The pilot in command of each aircraft, the designated flight lead and/or the drone controllers (if applicable) are ultimately responsible for mission planning. The operations and other support functions will provide supplemental planning material and information as required to effectively accomplish the assigned mission.

**2.2. General Procedures.** Accomplish sufficient flight planning to ensure safe mission accomplishment to include fuel requirements, map preparation, communication plan, and takeoff/landing data.

2.2.1. **Standards.** The SQ/CC is the approval authority for squadron standards. Group/Wing standards may be published and approved by the 53 WEG/CC. All standards will be reviewed by WEG Stan/Eval (WEG/OGV) for standardization and compliance with AFI 11-series guidance. (T-3)

### 2.3. Map/Chart Preparation.

2.3.1. **Local Area Maps.** A local area map is not required if the unit pilot aid includes jettison areas, divert information, controlled bailout areas, and provides a local area map of sufficient detail to remain within assigned training areas.

2.3.2. **Charts.** FLIP enroute charts may be used instead of maps on navigational flights within areas that are adequately covered by these charts.

2.3.3. **Low Altitude Maps.** Reference AFI 11-202 Vol 3, Chapter 2 *Preflight Requirements* for Low Altitude Map requirements and procedures.

2.3.3.1. Highlight all man-made obstacles at or above the planned flight altitude. Additionally, annotate low level maps with time and/or distance tick-marks to ensure positive positional awareness of obstacles along the planned route of flight plus or minus 5 NM.

2.3.3.2. Annotate all maps with a route abort altitude (RAA). Compute the RAA, for the entire route/area, at a minimum of 1,000 feet above the highest obstacle/terrain feature (rounded up to the next 100 feet) within the lateral limits of the route or training area, but in no case less than 5 NM either side of the planned route corridor.

### 2.4. Briefing/Debriefing. (T-3)

2.4.1. **Briefings.** Flight leads/Lead controllers are responsible for presenting a logical briefing that will promote safe, effective mission accomplishment. All pilots and controllers will attend the flight briefing unless previously coordinated with unit/squadron supervisors.

2.4.1.1. Items published in AFIs, AFTTPs, or squadron standards and understood by all participants may be briefed as "standard." Specific items not pertinent to the mission do not need to be covered.

2.4.1.2. Takeoff and landing data (TOLD) will be annotated on mission data cards. The minimum TOLD required is maximum abort speed (include wet as applicable based on location and potential for wet runway surface), takeoff distance and speed, rotation speed,

and normal/heavy weight landing distance (include wet as applicable based on location and potential for wet runway surface).

2.4.1.3. Review takeoff data and ensure every member of the flight understands it. Place particular emphasis on takeoff and abort factors during abnormal situations such as short/wet runway, heavy gross weights, and non-standard cable configurations.

2.4.1.4. When dissimilar aircraft are flown in formation, brief flight responsibilities, proper formation position (to ensure adequate wingtip clearance), and aircraft-unique requirements and emergency considerations for each phase of flight.

2.4.1.5. For all low altitude mission briefings, place emphasis on obstacle/ground avoidance, altitude-warning features (low altitude warning) low altitude comfort level, and complacency avoidance.

2.4.1.6. Flight leads/Lead controllers will ensure briefing start time provides adequate time to discuss required briefing items depending on complexity of the mission and pilot/controller capabilities. As a minimum, begin briefings at least 1.5 hours before scheduled takeoff.

2.4.1.7. Structure the flight briefing to accommodate the capabilities of each flight member.

2.4.1.8. Brief an appropriate alternate mission for each flight. The alternate mission will be less complex than the primary and should parallel the primary mission. If alternate mission does not parallel the primary mission, specific mission elements different than the primary mission should be briefed. Mission elements/events may be modified and briefed airborne as long as flight safety is not compromised. Flight leads/controllers will ensure all flight members acknowledge changes. Do not fly un-briefed missions/events.

2.4.1.9. On multiple-go days when aircraft turn times do not allow follow-on mission brief(s) and only the initial flight brief is accomplished for all goes, the following guidance applies:

2.4.1.9.1. Upgrade missions will be flown on the first sortie (second sortie if the first is non-effective for weather, airspace, or maintenance). Subsequent missions will be of equal or less complexity with no additional upgrade training without WEG/CC approval.

2.4.1.9.2. Participants in continuation training missions may fly their primary or alternate missions in any sequence.

2.4.1.10. All missions will be debriefed.

**2.4.2. Deployed Operations, Exercise, and Quick Turn Briefings.** If all flight members attend an initial or mass flight briefing, the flight lead on subsequent flights need brief only those items that have changed from the previous flight(s).

2.4.3. Mission Briefing guides are contained in the attachments. Units may supplement these guides as necessary.

## **2.5. Unit Developed Checklists/Local Pilot Aids/Forms.**

2.5.1. Unit developed checklists may be used in lieu of flight manual checklists provided they contain, as a minimum, all items (verbatim and in order) listed in the applicable checklist. These checklists will reflect the same change number, change date and applicable supplement numbers as the flight crew checklist for configuration control.

2.5.2. Units will produce a pilot aid that, as a minimum, includes: (T-3)

2.5.2.1. Briefing Guides.

2.5.2.2. Local radio channelization and airfield diagrams.

2.5.2.3. Impoundment procedures, emergency action checklists, NORDO/divert information, and search and rescue procedures.

2.5.2.4. Arresting gear information for divert bases.

2.5.2.5. Bailout and Jettison Areas.

2.5.2.6. Cross-country procedures to include: command and control, engine documentation, JOAP samples, and aircraft servicing.

2.5.2.7. Other information as deemed necessary by the units. For example: stereo flight plans, turnaround procedures, local training areas, and instrument pre-flight procedures.

### Chapter 3

#### NORMAL OPERATING PROCEDURES (MANNED, NOT UNDER REMOTE CONTROL)

**3.1. General.** This section applies to manned flights not under remote control. For additional procedures while operating under remote control, see [Chapter 6](#).

**3.2. Ground Visual Signals.** Normally, aircrew and ground crew will communicate by the intercom system during all start-engine, pre-taxi, and End of Runway (EOR) checks. The intercom system, if operable, will also be used anytime maintenance technicians (specialists) are performing tasks on the aircraft to include "Redballs" on the ramp or at EOR. The aircrew will ensure that no system, which could pose any danger to the ground crew, is activated prior to receiving proper acknowledgement from ground personnel. When ground intercom is not used, visual signals will be in accordance with AFI 11-218, *Aircrew Operation and Movement on the Ground*, and this volume. The crew chief will repeat the given signal when it is safe to operate the system. The following signals augment AFI 11-218: (T-1)

**3.2.1. TURN ON CNI GROUND POWER SWITCH.** Cup hands over ears and point to left wheel well with the left index finger. To turn off CNI power, repeat signal followed by a slicing motion with the right index finger across throat.

**3.2.2. START NUMBER TWO ENGINE.** Rotate the hand at head level with the index and middle fingers extended to query "all clear." For the number one engine, use the index finger.

**3.2.3. AUXILIARY AIR DOORS CLEAR.** Form a clenched fist, palm down, extend the index and middle finger in a back and forth motion.

**3.2.4. SLAT OVERRIDE CHECK.** Make a "half-moon" arcing motion with the fist clenched palm down and index finger extended. (Use the same signal to return the slats to the normal position.)

**3.2.5. FLIGHT CONTROL CHECK.** With clenched fist, make several circular movements as if moving the control stick around the cockpit. The crew chief will indicate the direction of travel of each flight control by the position of hands and arms. Rudder travel direction during yaw stab aug and emergency quick release lever engagement will be indicated by crew chiefs hand motions.

**3.2.6. STAB AUG CHECK.** Raise right hand, fist clenched followed by one, two, then three fingers, respectively, for yaw, roll, and pitch augmentation. The roll aug check will include both wings and each check will be acknowledged by an "OK" signal from the crew chief.

**3.2.7. LOWER/RAISE TAILHOOK.** To lower, extend right fist, thumb down, and lower into horizontal palm of left hand. To raise, extend right fist, thumb up, and raise into horizontal palm of left hand.

**3.2.8. LOSS OF BRAKES WHILE TAXING.** Lower tail hook.

**3.2.9. GUN ARMAMENT CHECK.** Point index finger forward with thumb upward simulating a pistol and shake head "Yes" or "No."

3.2.10. **ARMAMENT SAFETY OVERRIDE SWITCH "IN."** Ground crewman places hands over head with right thumb pressed into palm of left hand. When switch is in, pilot gives "OK" signal.

3.2.11. **CARTRIDGE STARTS.** Cartridge starts are not authorized in the QF-4.

### 3.3. Taxi. (T-1)

3.3.1. Minimum taxi interval is 150 feet staggered or 300 feet in trail. Spacing may be reduced when holding short of or entering the runway.

3.3.2. **Quick Check and Arming.** Place hands in view of ground personnel while the quick check inspection, arming, or de-arming are in progress. If the intercom system is not used during EOR checks, the aircrew will establish and maintain visual contact with the maintenance team chief and/or weapons load chief to facilitate the use of visual signals.

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

**3.4. Flight Line-up.** Flights will line up as appropriate based on weather conditions, runway conditions, and runway width. Spacing between separated elements/flights will be a minimum of 500 feet. If formation takeoffs are planned, wingmen must maintain wingtip clearance with their element leader. If runway width precludes line-up with wingtip clearance between all aircraft in the flight, use 500 feet spacing between elements or delay run-up until the preceding aircraft/element has released brakes. (T-1)

**3.5. Before Takeoff Checks.** After the "Before Takeoff Checks" have been completed and prior to takeoff, all flight members will inspect each other for proper configuration and any abnormalities. (T-1)

### 3.6. Takeoff. (T-1)

3.6.1. Do not takeoff if the Runway Condition Reading (RCR) is less than 12.

3.6.2. Do not takeoff if the computed takeoff roll exceeds 80 percent of the available runway single ship or 70 percent for a formation takeoff.

3.6.3. Ensure a departure end cable is in place for all takeoffs and landings. Exceptions require squadron CC approval.

3.6.4. Takeoffs will be accomplished in afterburner.

3.6.5. Takeoff interval between aircraft/elements will be a minimum of 10 seconds. Takeoff interval behind a formation takeoff will be a minimum of 15 seconds. When join up is to be accomplished on top or when carrying live air-to-surface ordnance, takeoff interval will be increased to a minimum of 20 seconds.

3.6.6. Aircraft/elements will steer toward the center of the runway at the start of the takeoff roll.

3.6.7. Aircraft will normally accelerate to 300 KIAS before coming out of afterburner.

### 3.7. Formation Takeoff. (T-1)

3.7.1. Formation takeoffs are restricted to elements of two aircraft.

3.7.2. Elements will be led by a qualified flight leader unless an Instructor Pilot (IP) is in the element.

3.7.3. Aircraft will be like models and within 3,000 pounds weight of each other and symmetrically loaded. For formation takeoff purposes, symmetrical loading is defined as those store loadings which will not require a trim or control application to counter a heavy wing or yaw during takeoff and acceleration to climb airspeed.

3.7.4. Do not make formation takeoffs when:

3.7.4.1. Runway width is less than 125 feet.

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

3.7.4.3. The crosswind component including max gust exceeds 15 knots.

3.7.4.4. Loaded with live munitions (excluding air-to-air missiles, 20mm ammunition/gun pods, and chaff/flares).

3.7.4.5. Ferrying aircraft from contractor/depot facilities.

**3.7.5. Formation Takeoff Procedures:**

3.7.5.1. If the wingman overruns the leader, the leader will direct the wingman to assume the lead, at which time the wingman will select full afterburner, maintain his side of the runway, and make his own takeoff.

3.7.5.2. Gear will be retracted after the flight leader observes the wingman to be safely airborne. Initial gear movement on the leader's aircraft, head nod, or radio call is the signal for gear retraction. Flaps will be raised 3 seconds after initiation of gear retraction.

**3.8. Join up/Rejoin. (T-1)**

3.8.1. Day weather criteria for a Visual Flight Rules (VFR) join up underneath: ceiling 1,500 feet and visibility 3 miles.

3.8.2. Flight leaders will maintain 350 KIAS until join up is accomplished unless mission requirements necessitate a different airspeed.

3.8.3. If a turning join up is to be accomplished, the flight leader will not exceed 45 degrees of bank.

3.8.4. For further join up procedures, see Night Operational Procedures (paragraph [3.20.3](#)) and [Chapter 4](#).

**3.9. Formation, General. (T-1)**

3.9.1. In Instrument Meteorological Conditions (IMC), maximum flight size is four aircraft.

3.9.2. Do not use exaggerated rolling maneuvers to maintain or regain position below 5,000 feet Above Ground Level (AGL) or in airspace where aerobatics are prohibited.

3.9.3. Airborne visual signals will be in accordance with AFI 11-205, *Aircraft Cockpit and Formation Flight Signals*. 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 at night or under instrument conditions.

3.9.4. Flight leaders will not break up formations until each wingman has a positive fix from which to navigate (visual or TACAN).

**3.9.5. Changing Leads:**

3.9.5.1. During flight in limited visibility conditions (for example, haze, night, or IMC), initiate lead changes from a stabilized, wings level attitude.

3.9.5.2. The minimum altitude for changing leads within a formation is 500 feet AGL over land or 1,000 feet AGL over water. For night or IMC, do not change leads below 1,500 feet AGL or radar downwind, whichever is lower.

3.9.5.3. Prior to initiating the lead change, the leader will ensure that the wingman assuming the lead is in a position from which the lead change can be safely initiated and visual contact maintained.

3.9.6. **Battle Damage Checks.** If circumstances permit, flight leads will direct a battle damage check after each mission prior to or during return to base (RTB). This check is mandatory following the expenditure of ordnance, low level navigation flights, and ACBT sorties exceeding 5 "Gs." Established deconfliction responsibilities and position change procedures will be observed. Formation spacing will be no closer than normal fingertip.

### 3.10. Close Formation. (T-1)

3.10.1. **Echelon.** Relative position is the same as fingertip. Turns into the echelon will be avoided. If a turn is made into the echelon, each aircraft will maintain the same relative position as in straight and level flight. On turns away from the echelon, the fuselages of all aircraft will be maintained in the same horizontal plane.

#### 3.10.2. Crossunders:

3.10.2.1. When the number two aircraft is required to cross under in a flight of three or more, number three (or the element) will move out to allow two sufficient spacing to move into position. Then number two will drop below and behind the leader maintaining nose-tail and vertical clearance and then move up into the wing position on number one. Number three will then move in on number two's wing.

3.10.2.2. When an element is required to cross under, the element will drop below and behind the lead (element) maintaining nose-tail and vertical clearance, cross to the opposite side and then move up into position. Number four changes positions during the crossunder.

3.10.2.3. To return to fingertip formation, the flight leader will make a radio call.

### 3.11. Tactical Formation. (T-1)

3.11.1. Apply the following rules for flight path deconfliction during tactical maneuvering:

3.11.1.1. Flight/element leads will consider wingman/element position and ability to safely perform a maneuver before directing it.

3.11.1.2. Wingmen/elements maneuver relative to the flight lead/lead element and maintain sight. Trailing aircraft/elements will be responsible for deconflicting with lead aircraft/elements.

3.11.1.3. Wingmen/elements will cross above the lead/lead element for deconfliction when below 1000 feet AGL.

3.11.2. **Loss of Visual.** The following procedures apply when one or more flight members/elements lose visual contact within the formation:

3.11.2.1. If any flight member/element calls "Blind," then the appropriate flight member/element will immediately confirm a "Visual" with an informative call.

3.11.2.2. If the other flight member/element is also "Blind," then the flight leader will take action to ensure altitude separation between flight members/elements. The flight lead will specify either AGL or MSL when directing the formation to deconflict. When directed to "deconflict," a minimum of 500 feet altitude separation will be used. Avoid climbs/descents through the deconfliction altitude.

3.11.2.3. If there is no timely acknowledgment of the "Blind," call, then the flight member/element initiating the call will maneuver away from the last known position of the other flight member/element and alter altitude.

3.11.2.4. If visual contact is still not regained, the flight leader will take additional positive action to ensure flight path deconfliction within the flight to include a Terminate/Knock-It-Off if necessary. Scenario restrictions such as sanctuary altitudes and/or adversary blocks must be considered.

3.11.2.5. Aircraft will maintain altitude separation until a visual is regained and, if necessary, will navigate with altitude separation until mutual support is regained.

3.11.3. **Two-Ship.** The following rules apply for flight path deconfliction during tactical maneuvering of two-ship formations:

3.11.3.1. Normally, the wingman is responsible for flight path deconfliction.

3.11.3.2. The flight lead becomes primarily responsible for deconfliction when:

3.11.3.2.1. 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.

3.11.3.2.2. The wingman calls "Padlocked" or "Blind."

3.11.3.2.3. Primary deconfliction responsibility transfers back to the wingman once the wingman acknowledges a visual on his lead.

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

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

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

### 3.12. Chase Formation. (T-1)

3.12.1. **Restrictions.** Any pilot may fly safety chase for another manned aircraft under emergency or impending emergency conditions. All chase events may be flown by IP/Stan/Eval Flight Examiners (SEFEs) or upgrading IPs under the supervision of an IP. Qualified pilots (including Initial Qualification Training/Mission Qualification Training pilots who have successfully completed an Instrument/Qualification Evaluation) may chase as safety observers for aircraft performing simulated instrument flight (but are not required)

or hung ordnance patterns. Simulated emergency patterns may be chased by qualified flight leads.

#### 3.12.2. Procedures:

3.12.2.1. 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 to tail separation. The chase will not stack below the lead aircraft below 1,000 feet AGL. In the traffic pattern, the chase aircraft may maneuver as necessary to observe performance.

3.12.2.2. A safety observer in a chase aircraft will fly a position in a 30 to 60 degree cone with nose/tail clearance to 1,000 feet from which he can effectively clear and/or provide assistance.

3.12.2.3. For live ordnance missions, the chase aircrew is responsible for ensuring safe escape criteria is met for their aircraft.

**3.13. Show Formation.** These formations will be specifically briefed and flown in accordance with (IAW) AFI 11-209, *Aerial Event Policy and Procedures* (as supplemented). Refer to AFI 11-209 for specific rules and appropriate approval levels to participate in static displays and aerial events. (T-1)

#### 3.14. Maneuvering Parameters. (T-1)

3.14.1. Accomplish Rig checks IAW flight manual procedures. If external wing tanks are carried, a rig check will be accomplished after the tanks indicate empty to ensure that the tanks are empty.

3.14.2. Stab aug/slat checks will be accomplished IAW flight manual procedures and are required prior to the performance of stalls, confidence maneuvers, ACBT, or any other maximum performance/high AOA maneuvering.

3.14.3. If an out-of-rig condition, malfunctioning stab aug, or asymmetrical load exists, do not maneuver the aircraft at high AOA and fly a straight-in approach for landing. Chase ships will fly no closer than route.

3.14.4. The roll channel of the stab aug will be disengaged for ACBT, stalls, confidence maneuvers and other maneuvers in which rudder rolls or reversals will be accomplished.

3.14.5. External wing tanks will be empty prior to performing diving weapons delivery patterns, stalls, confidence maneuvers, aerobatics (except Lazy Eights and Chandelles), ACBT or advanced handling maneuvers.

#### 3.14.6. Altitude Restrictions:

3.14.6.1. Aircraft will not descend below 5,000 feet AGL during aerobatic maneuvering or stall recoveries.

3.14.6.2. Minimum recovery altitude for Confidence Maneuvers is 10,000 feet AGL.

3.14.6.3. For clean approach to stall, minimum entry altitude is 15,000 feet AGL and maximum entry altitude is 25,000 feet MSL. For configured approach to stall, minimum entry altitude is 7,000 feet AGL and maximum entry altitude is 18,000 feet MSL.

3.14.6.4. If accelerated stall indications have not been observed before decelerating through 300 KIAS, discontinue the maneuver.

**3.14.7. Airspeed/AOA Restrictions:**

3.14.7.1. QF-4E/G flight maneuvering, except stall demonstrations and confidence maneuvers, is limited to a maximum of 25 units AOA, excessive wing rock, or 175 KIAS, whichever occurs first. When these limits are exceeded, aircrews will devote primary attention to regaining an AOA condition of 25 units or less, and airspeed at/or above 175 KIAS. Should any delay be incurred in reestablishing operating parameters within these maximum and minimum limits, a "Terminate"/"Knock-it-off" will be initiated. Airspeed decreasing to 150 KIAS will result in an immediate "Terminate"/"Knock-It-Off" and recovery.

3.14.7.2. QRF-4C flight maneuvering, except stall demonstrations and confidence maneuvers, is limited to a maximum of 19.2 units AOA, excessive wing rock, or 200 KIAS, whichever occurs first. Below 10,000 feet AGL, the minimum airspeed for AHC maneuvers is 250 KIAS. When these limits are exceeded, aircrews will devote primary attention to regaining an AOA condition of 19.2 units or less, and airspeed at/or above minimum airspeed. Should any delay be incurred in reestablishing operating parameters within these maximum and minimum limits, a "Terminate"/"Knock-it-off" will be initiated. Airspeed decreasing to 150 KIAS will result in an immediate "Terminate"/"Knock-It-Off" and recovery.

3.14.7.3. Confidence maneuvers and AOA orientations are limited to 120 KIAS minimum.

3.14.7.4. Stall maneuvering demonstrations are limited to 120 KIAS, a maximum of 29 units AOA (25 units AOA for QRF-4C hard wing aircraft) (Table 3.1.), nose rise, nose slice, 30 degrees of wing rock, or build-up of side forces. (Configured stall demonstrations will be terminated at the pedal shaker.)

3.14.8. Flight through wingtip vortices/jet wash should be avoided. If unavoidable, the aircraft should be unloaded immediately to approximately 1 G.

3.14.9. Manually selected flaps will not be used as an in-flight maneuvering aid in an attempt to improve aircraft performance.

**3.14.10. Approaches to Stalls/Confidence Maneuvers:**

3.14.10.1. An IP is required in the aircraft for all stall demonstrations until the completion of Initial Qualification Training.

3.14.10.2. Stalls and confidence maneuvers will not be performed with an asymmetrically loaded aircraft.

**Table 3.1. Airspeed/Altitude and AOA Restrictions.**

	<b>ALTITUDE</b>	<b>MINIMUM AIRSPEED</b>	<b>MAXIMUM AOA</b>	<b>NOTES</b>

<b>Aerobatics</b>				
QF-4E/G	5,000 feet AGL Minimum	175 KIAS	25 Units	1, 3
QRF-4C	5,000 feet AGL Minimum	200 KIAS	19.2 Units	2, 3
<b>Confidence Maneuvers</b>				
QF-4E/G	Recover above 10,000 ft AGL	300 KIAS entry.  120 KIAS during maneuver.	25 Units	1, 3
QRF-4C	Recover above 10,000 ft AGL	300 KIAS entry.  120 KIAS during maneuver.	19.2 Units	2, 3
<b>Stall Demonstrations</b>				
QF-4E/G	Enter between 15,000 feet AGL and 25,000 feet MSL.  Enter between 7,000 feet AGL and 18,000 feet MSL. (Conf)  Recover above 5,000 feet AGL.	120 KIAS	29 Units (Clean)  25 Units (Conf)	1, 3, 4
QRF-4C	Enter between 15,000 feet AGL and 25,000 feet MSL. (Clean)  Enter between 7,000 feet AGL and 18,000 feet MSL. (Conf)  Recover above 5,000 feet	120 KIAS	25 Units	2, 3, 4

	AGL.			
<b>Advanced Handling/ACBT</b>				
QF-4E/G	5,000 feet AGL Minimum	175 KIAS	25 Units	1, 3
QRF-4C	5,000 feet AGL Minimum	200 KIAS	19.2 Units	2, 3
<b>Low Altitude Navigation</b>				
QF-4E/G	500 feet AGL	300 KIAS	25 Units	1, 3, 5
QRF-4C	500 feet AGL	300 KIAS	19.2 Units	2, 3, 5
<b>Notes:</b>				
<ol style="list-style-type: none"> <li>1. Successful Rig /Stab Aug/Slat check required.</li> <li>2. Successful Rig/Stab Aug check required.</li> <li>3. Roll stab aug will be disengaged.</li> <li>4. Instructor pilot required during IQT.</li> <li>5. Minimum airspeed during offensive or defensive maneuvering is 350 KIAS.</li> </ol>				

### 3.15. Operations Checks. (T-1)

3.15.1. Sufficient operations checks will be accomplished to ensure safe mission accomplishment. Frequency will be increased during tactical maneuvering at high power settings. Operations checks are mandatory:

3.15.1.1. During climb or at level off after takeoff.

3.15.1.2. When external fuel tanks are empty.

3.15.1.3. Prior to each (D) ACBT engagement or intercept.

3.15.2. Minimum items to check are engine instruments, total and internal fuel quantities, G-suit connection, oxygen system, cabin altitude and G-meter.

3.15.3. For formation flights, the flight leader will initiate ops checks by radio call or visual signal.

3.15.3.1. Response will be made by radio call or visual signal. It will include tape over counter readings. (**Exception:** Total fuel only may periodically be used during high demand phases of flight.)

3.15.3.2. For mandatory operations checks, when external fuel tanks are carried, each flight member will check the external tank(s) and add "Tank(s) feeding/empty" to the ops check. Once the tank(s) have been confirmed and called empty, this may be omitted from subsequent ops checks.

3.15.4. G-awareness Exercise - Reference AFI 11-214, *Aircrew, Weapons Director and Terminal Attack Controller Procedures for Operations*, 14 Aug 2012.

3.15.4.1. Flight/element leads will ensure the airspace intended for conducting the G-awareness exercise is free from potential traffic conflicts. Use Air Traffic Control (ATC) services to the maximum extent practical to make sure the airspace is clear. Conduct the G-awareness exercise in the following airspace with preference to the order listed below:

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

3.15.4.1.2. Above 10,000 MSL outside of special use airspace.

3.15.4.1.3. Inside the confines of a Military Training Route (MTR).

3.15.4.1.4. Below 10,000 feet MSL outside of special use airspace.

3.15.4.2. The G-awareness exercise involves two separate 90 degree turns, beginning at approximately 400 KCAS. Perform the first turn up to 4 G's to practice the proper AGSM and confirm the operation of the G-suit. The second turn should be performed between 4 and 5 G's, not to exceed aircraft limits.

### 3.16. Radio Procedures. (T-1)

3.16.1. Preface all communications with the complete flight call sign (except for wingman acknowledgment). Transmit only that information essential for accomplishment of the mission or to promote safety of flight. Do not use any radio as a flight "intercom." Use visual signals whenever practical.

3.16.2. Make a "Terminate" radio call to terminate local maneuvering, and a "Knock it Off" call when a dangerous situation is developing. This transmission may be made by any flight member, and applies to all phases of flight and all types of missions. All participants will acknowledge by repeating the call in turn.

3.16.3. The flight/mission lead will initiate all radio checks and channel changes.

3.16.4. Acknowledge radio checks which do not require the transmission of specific data by individual flight members in turn. Acknowledgement by the individual flight member indicates the appropriate check will be initiated or is in the process of being completed.

3.16.5. In addition to the standard radio procedures outlined in AFMAN 11-217V1, *Instrument Flight Procedures*; and FLIP, the following radio transmissions are required:

3.16.5.1. All flight members will acknowledge understanding the initial Air Traffic Control (ATC) clearance.

3.16.5.2. **Gear Checks.** Each pilot will make an individual gear check on base leg or if making a VFR straight-in approach not later than 3 miles on final. When conducting instrument approaches, gear checks will be made in response to ATC instructions or no

later than the final approach fix. The wingman or chase need not make this call during a formation or chased approach.

3.16.6. Use brevity code and other terminology IAW AFI 11-214 and local standards.

**3.17. Change of Aircraft Control Procedures.** Both aircrew members (if applicable) 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 aircrew member 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 shake the stick and assume control of the aircraft, radios, and navigational equipment unless otherwise briefed.) (T-1)

**3.18. General Low Altitude Procedures.** (T-1)

3.18.1. Low level formation positions/tactics will be flown IAW the appropriate phase manuals.

3.18.2. Line abreast formation is authorized at or above 500 feet AGL.

3.18.3. During briefings, emphasis will be placed on low altitude flight maneuvering and observation of terrain features/obstacles along the route of flight. For low altitude training over water or featureless terrain, include specific considerations for operations with emphasis on minimum altitudes and spatial disorientation.

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

3.18.5. If unable to visually acquire or ensure lateral separation from known vertical obstructions which are a factor to the route of flight, flight leads will direct a climb not later than 3 NM prior to the obstacle to ensure vertical separation.

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

3.18.7. Minimum airspeed for low level navigation, including low level route entry, is 300 KIAS.

3.18.8. The radar altimeter will be on and set to the briefed minimum altitude.

3.18.9. **Minimum Altitudes.** The pilot's minimum altitude will be determined and certified by the unit commander IAW local guidance. Pilots participating in approved step-down training programs will comply with the requirements and restrictions of that program. Minimum altitude for pilots who have not completed the step-down training program is 1000 feet AGL. The following minimum altitudes apply to low level training unless higher altitudes are specified by national rules, route restrictions or a training syllabus.

3.18.9.1. 500 feet AGL for:

3.18.9.2. Flying Training Unit (FTU) students and instructors when conducting training IAW applicable syllabus.

3.18.9.3. For over water operation the minimum altitude is 1000 feet above the surface unless there is a discernible horizon. If in sight of land or with a definite horizon, the minimum altitude may be lowered to 500 feet above the surface.

3.18.9.4. QF-4s will not fly night or IMC low levels.

3.18.10. During all low altitude operations, 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).

3.18.11. Weather minimums for visual low level training will be 1,500 feet and 3 miles for any route or area, or as specified in FLIP for Military Training Routes/unit regulations/national rules, whichever is higher.

**3.18.12. Low Level Route/Area Abort Procedures:**

3.18.12.1. Compute and brief a low level route abort altitude (RAA) IAW paragraph **2.3.3.2**

3.18.12.2. Visual Meteorological Conditions (VMC) route/area abort procedures:

3.18.12.2.1. Maintain safe separation from the terrain and other aircraft. (Computed RAA minimum.)

3.18.12.2.2. Comply with VFR altitude restrictions and squawk applicable Identification, Friend or Foe (IFF)/Selective Identification Feature (SIF) modes and codes.

3.18.12.2.3. Maintain VMC at all times. If unable, follow IMC procedures outlined below.

3.18.12.2.4. Attempt contact with controlling agency, if required.

3.18.12.3. IMC route/area abort procedures:

3.18.12.3.1. Immediately climb to or above the briefed RAA utilizing MIL power setting and a 20 degree nose high climb.

3.18.12.3.2. Maintain preplanned ground track. Execute appropriate lost wingman procedures if necessary.

3.18.12.3.3. If deviations from normal route/area procedures are required, or if the RAA is higher than the vertical limits of the route/area, squawk emergency.

3.18.12.3.4. Attempt contact with the appropriate ATC agency for an Instrument Flight Rules (IFR) clearance. If required to fly in IMC without an IFR clearance, cruise at appropriate VFR hemispheric altitudes until IFR clearance is received.

**3.19. Air Refueling.** N/A. The air refueling system is not functional in QF-4s.

**3.20. Night Operational Procedures. (T-1)**

3.20.1. **Night Ground Operations.** When ground personnel are working under the aircraft, the exterior light flasher switch will be placed to steady. Taxi spacing will be a minimum of 300 feet and on the taxiway centerline. The taxi light will normally be used during all night taxiing. (**Exception:** When the light might interfere with the vision of the pilot of an aircraft landing or taking off, the taxiing aircraft will come to a stop if the area cannot be visually

cleared without the taxi light.) For formation takeoffs, flight/element leaders will turn lights to DIM or BRIGHT-STEADY when reaching the run-up position on the runway. Wingmen will maintain lights at BRIGHT-FLASH for takeoffs. All aircraft will turn formation strip lights on.

3.20.2. **Night Takeoff.** During a night formation takeoff, brake release and configuration changes will be called on the radio. Following takeoff, each aircraft/element will climb on runway heading to 1,000 feet AGL before initiating turns, except where departure instructions specifically preclude compliance.

3.20.3. **Night Join up.** Weather criteria for night join up underneath a ceiling is 3,000 feet and 5 miles. After join up, position lights to DIM or BRIGHT-STEADY for all except the last aircraft, which will maintain BRIGHT-FLASH unless otherwise directed by the flight lead.

3.20.4. **Night Formation Procedures:**

3.20.4.1. When in positions other than fingertip or route, aircraft spacing will be maintained primarily by instruments, radar and/or timing with visual reference secondary. If aircraft spacing cannot be ensured, then altitude separation (minimum of 1,000 feet) will be established. At all times, aircrews will cross check instruments to ensure ground clearance.

3.20.4.2. Do not change lead or wing positions below 1,500 feet AGL or Ground Controlled Approach (GCA) downwind altitude, whichever is lower. Lead and position changes will be called over the radio and should be initiated from a stabilized, wings level altitude.

3.20.5. **Night Break-Up.** Prior to a night formation break-up, the flight leader will transmit attitude, altitude, airspeed, and altimeter setting, which will be acknowledged by wingmen. Wingmen will also confirm good navigational aids.

3.20.6. **Night Landing.** Night landings will normally be accomplished from a straight-in approach. Refer to AFI 11-202V3 as supplemented for specific procedures.

3.20.7. Night formation landings will only be performed when required for safe recovery of the aircraft.

3.21. **Fuel Requirements.** (T-1)

3.21.1. **Normal Recovery Fuel.** The fuel on initial or at the FAF at the base of intended landing or alternate, if required. Fuel quantity will be 2,000 pounds (2,500 pounds for IQT students flying solo).

3.21.2. Minimum Fuel. 1,500 pounds or less on initial or at the FAF.

3.21.3. Emergency Fuel. 1,000 pounds or less on initial or at the FAF.

3.22. **Approaches and Landings.** (T-1)

3.22.1. The desired touchdown point for a VFR approach is 500 feet from the threshold.

3.22.2. Minimum pattern and touchdown spacing between landing aircraft is IAW AFI 11-202 v3 and local procedures.

3.22.3. Aircraft will land in the center of the runway and clear to the turnoff (cold) side of the runway when speed/conditions permit.

**3.22.4. Landing Restrictions:**

3.22.4.1. When the computed landing roll exceeds 80 percent of the available runway, select a different runway or land at an alternate, if possible.

3.22.4.2. When the RCR at the base of intended landing is less than 12, land at an alternate, if possible. If an alternate is not available, make an approach-end arrestment.

3.22.4.3. Do not land over any raised web barrier (e.g., MA-1A, BAK 15).

3.22.5. Any pilot experiencing drag chute failure will make a radio call indicating drag chute failure and state intentions. If a cable engagement is anticipated, the aircraft should remain in the center of the runway.

3.22.6. Aircrews must accurately evaluate actual runway environment conditions, touchdown point, and speed when making intentional no-chute landings. If circumstances suggest that safe operations cannot be ensured, then use the drag chute for landing. When an intentional no-chute landing is to be accomplished, it must meet the following conditions:

3.22.6.1. Only dry runway, daylight conditions.

3.22.6.2. The computed no-chute landing roll will be less than two-thirds of the available runway, (Computed from touchdown point) with maximum of 5 knots of tailwind.

3.22.6.3. Operational arresting gear will be in place at the departure end of the runway.

3.22.6.4. 6000' runway separation is required on the previous landing aircraft.

3.22.6.5. Advise ATC of intentional no-chute landings.

**3.23. Overhead Traffic Patterns. (T-1)**

3.23.1. Overhead patterns can be flown with unexpended practice ordnance (including chaff and flares).

3.23.2. Initiate the break over the touchdown point or as directed.

3.23.3. The break will be executed individually in a level 180-degree turn to the downwind leg at minimum intervals of 5 seconds (except IP/FE chase or when in tactical formation).

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

**3.24. Tactical Overhead Traffic Patterns.** Tactical entry to the overhead traffic pattern is permitted when: (T-1)

3.24.1. Published overhead pattern altitude is used.

3.24.2. Specific procedures are developed locally and coordinated with appropriate air traffic control agencies.

3.24.3. No more than four aircraft are in the flight. Aircraft/elements more than 6,000 feet in trail are considered a separate flight.

3.24.4. No aircraft are 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.

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

### **3.25. Touch-and-Go Landings.** (T-1)

3.25.1. **Touch and Go Landings:** Touch and go landings are authorized during IQT (with an IP on board), safety pilot MQT, remote controller IQT/CT and FCS/SAFE sorties provided the following restrictions are met:

3.25.1.1. 7000 feet of dry runway is available.

3.25.1.2. Operative departure-end arresting system is in place.

3.25.1.3. Daytime.

3.25.1.4. Military airfield or auxiliary airfields (i.e., Tyndall's Droneway), or civil airports with a letter of agreement.

3.25.2. Do not fly touch-and-go landings with live or hung ordnance or with fuel remaining in any external tank (excluding unexpended chaff or flares).

### **3.26. Low Approaches.** (T-1)

3.26.1. Observe the following minimum altitudes:

3.26.1.1. IP/SEFEs flying chase patterns - 50 feet AGL

3.26.1.2. Formation low approaches - 100 feet AGL.

3.26.1.3. Chase aircraft during an emergency - 300 feet AGL unless safety or circumstances dictate otherwise.

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

**3.27. Closed Traffic Patterns.** Initiate the pattern at the departure end of the runway unless directed/cleared otherwise by local procedures or the controlling agency. When in formation, a sequential closed may be flown with ATC concurrence at an interval to ensure proper spacing. (T-1)

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

**3.29. Formation Approaches.** QF-4s do not perform formation landings (T-1)

#### **3.29.1. General:**

3.29.1.1. Accomplish formation approaches from the most precise approach available. Use a published instrument approach or a VFR straight-in approach using the Visual Approach Slope Indicator (VASI)/Precision Approach Path Indicator (PAPI), if available. In all cases, the rate of descent should be similar to a normal precision approach.

#### **3.29.2. Wingman Procedures:**

- 3.29.2.1. Maintain a minimum of 10 feet lateral wingtip spacing.
- 3.29.2.2. Stack level with the lead aircraft as briefed by the flight lead when aircraft are VMC and configured on final approach.
- 3.29.2.3. Cross-check the runway to ensure sufficient runway is available.
- 3.29.2.4. Go around or execute a missed approach if sufficient runway/aircraft clearance is not available.

**3.30. Automatic Flight Control System (AFCS) Restriction.** The basic aircraft autopilot will not be used below 5,000 feet AGL, during formation join ups or in close formation. (T-1)

**3.31. Crew Duties.** If more than one crewmember is aboard, the following procedures apply: The front-seat pilot or IP/SEFE will establish and brief the other crewmember on flight parameters anticipated during each phase of flight. Both crewmembers will monitor aircraft instruments, aircraft position, nav aids, fuel status, and armament. (T-1)

3.31.1. **Unqualified Crewmember Flying.** Crewmembers who are not qualified QF-4 pilots (unless in a formal upgrade syllabus) will not fly during the following phases of flight:

- 3.31.1.1. Takeoff or landing.
- 3.31.1.2. Close formation or rejoins to close formation.
- 3.31.1.3. Tactical maneuvering other than tactical turns..
- 3.31.1.4. Weapons delivery (actual or simulated).
- 3.31.1.5. Below 1,000 feet AGL (**Exception:** Instrument approaches may be flown to a minimum of 500 feet AGL providing an IP is in the aircraft.)
- 3.31.1.6. VFR patterns.

## Chapter 4

### INSTRUMENT PROCEDURES

#### 4.1. Approach Category. (T-1)

4.1.1. The QF-4 is Approach Category E. Accomplish missed approach IAW flight manual procedures.

4.1.2. Approach Category D minimums may be used to an emergency/divert airfield where no Category E minimums are published provided:

4.1.2.1. A straight-in approach is flown.

4.1.2.2. Final approach airspeed is 165 KIAS or less.

4.1.2.3. The aircraft is flown at 255 knots true airspeed (KTAS) or less for the missed approach segment of the approach. At high pressure altitudes and temperatures, 255 KTAS may not be compatible with flight manual missed approach airspeeds and Category D approaches should not be flown.

4.1.3. Do not fly GPS approaches.

#### 4.2. Takeoff and Join-up. (T-1)

4.2.1. The flight leader must get an appropriate ATC clearance (altitude block or trail formation) when a flight join-up is not possible due to weather conditions or operational requirements. Formation trail departures must comply with instructions for a nonstandard formation flight as defined in FLIP.

4.2.2. In IMC conditions, each aircraft/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 Departures. (T-1)

##### 4.3.1. General:

4.3.1.1. During trail departures, basic instrument flying is the first priority and will not be sacrificed when performing secondary trail tasks. Strictly adhere to the briefed climb speeds, power settings, altitudes, headings and turn points. If task saturation occurs, cease attempts to maintain trail, immediately concentrate on flying the instrument departure and notify the flight lead.

4.3.1.2. Takeoff spacing will be no less than 20 seconds and restricted to two aircraft.

4.3.1.3. Minimum spacing between aircraft is 2 NM.

4.3.1.4. The flight leader will call initiating all turns and use 30 degrees of bank.

4.3.1.5. Flight leads will call passing each 5,000 foot altitude increment with altitude and heading (or heading passing) until join-up or level-off.

4.3.1.6. Flight leads will call initiating any altitude or heading change. Acknowledgments are not required; however, it is imperative that wingmen monitor the

radio transmissions and progress of lead and immediately correct deviations from the planned route.

4.3.1.7. Wingmen will maintain at least 1,000 feet vertical separation from lead during the climb and at level-off until visual contact is established, except in instances where departure instructions specifically preclude compliance. If the MEA cannot be complied with, the 1,000 foot vertical separation may be reduced to 500 feet.

4.3.1.8. In the event a visual join-up cannot be accomplished on top or at level-off, the flight leader will request 1,000 feet of altitude separation for the wingman providing all aircraft can comply with MEA restrictions.

**4.4. Formation Break-up.** If possible, accomplish formation break-up in VMC. If IMC, accomplish the break-up in straight and level flight. Prior to a break-up in IMC, the flight lead will transmit attitude, airspeed, altitude, and altimeter setting which will be acknowledged by wingmen. Wingmen will confirm good navigational aids. (T-1)

**4.5. Formation Penetration.** (T-1)

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

**4.6. Formation Approach.** During IMC, formation flights will not change lead or wing positions below 1,500 feet AGL or radar downwind altitude, whichever is lower. (T-1)

**4.7. Simulated Instrument Flight.** Fly IAW AFI 11-202V3. (T-1)

## Chapter 5

### AIR-TO-AIR ADVERSARY SUPPORT PROCEDURES

**5.1. References.** AFI 11-214 contains air-to-air procedures, to include operations with live ordnance applicable to all aircraft. This chapter specifies additional procedures or restrictions applicable to QF-4 Air-to-Air Adversary Support operations. (T-1)

**5.2. General.** The purpose of Air-to-Air Adversary support is to provide training aids and learning opportunities for Air-to-Air units. (T-1)

**5.3. Maneuvering Limitations.** (Also reference paragraph [3.14](#)) (T-1)

5.3.1. Minimum airspeed during low altitude offensive, low altitude defensive maneuvering or other low altitude training (LOWAT) is 350 KIAS.

5.3.2. Negative "G" guns jinks are prohibited.

5.3.3. Minimum airspeed for ACBT above 5,000' AGL is 175 KIAS for QF-4E/G and 200KIAS for the QRF-4C. A "Terminate/Knock-It-Off" is not normally required; however, at 175 KIAS or 200 KIAS, as applicable, terminate individual aircraft ACBT and devote primary attention to regaining airspeed. Airspeed decreasing to 150 KIAS will result in an immediate "Terminate" and recovery.

**5.4. Aerial Gunnery Tow Procedures.** AFI 11-214 applies. (T-1) In addition:

5.4.1. **TDU-32 A/B Banner Deployment.** Enroute to the range, chase aircraft will ensure a stable flying Banner. While in straight and level flight, the chase pilot will pass the direction of "Banner lean" (if any) in clock position to the tow pilot. This will establish the best turn direction for employment. (If Banner is flying at the 10 o'clock position; tow will turn right).

5.4.2. **Abnormal Procedures.** (T-3)

5.4.2.1. **Unable to Release Banner.** If possible, the tow will gain chase aircraft (shooter desired) and proceed to local jettison area and attempt jettison. If Banner still remains, recover IAW local procedure.

5.4.2.2. **Banner Shot Off, Cable Remaining.** Release cable in working area. Shooter rejoins with tow to ensure no cable remains. If cable remains, recover IAW local procedures.

## Chapter 6

### MANNED/REMOTE CONTROL PROCEDURES

#### 6.1. General. (T-1)

6.1.1. The QF-4 flight manual and local operating procedures are the primary references for manned target operation and remote-controlled flight with the automatic flight-control system (AFCS) engaged. Units will develop local procedures for operating NULLO QF-4s, which is beyond the scope of this volume.

6.1.2. QF-4 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.

6.1.3. The procedures contained in this chapter are designed to provide pilots and controllers with standard methods of operation under normal conditions for qualification and continuation training.

6.1.4. 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.

#### 6.2. Responsibilities. (T-1)

6.2.1. A safety pilot (SP) in a captive QF-4 is responsible to monitor aircraft performance as commanded by the remote controller and to take control if safety of flight is jeopardized. Certain conditions such as momentary loss of communication between the SP and controller or loss of down-link data by the controller 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. 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 controller.

6.2.2. The SP has ultimate authority and responsibility for safe conduct of the mission. Controllers of captive QF-4s 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 controller's aircraft control capability becomes degraded, he will inform the SP. He will also notify the SP to take control when appropriate.

6.2.3. The controller will verify the control console is correct and complete for all consoles to be used before the mission is started. If circumstances preclude this, the mission will be delayed or canceled as necessary.

#### 6.3. General Manned Target Procedures. (T-1)

6.3.1. Prior to any captive flight, the SP will perform an operational check of the AFCS disengage paddle switch and caution light. If the switch is inoperative or malfunctions, the mission will be aborted.

6.3.2. During an ATO or captive 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.

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

6.3.4. SPs will use extreme caution during captive flight at low altitude.

#### **6.4. General Manned Target ROE. (T-1)**

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

6.4.2. SP will maintain situational awareness at all times.

6.4.3. SP will not rely on verbal warnings from controllers to initiate action.

6.4.4. Controller will continue to fly the aircraft until positive transfer to SP is assured.

6.4.5. SP will guard the stick at all times below 2000 ft AGL.

6.4.6. Improperly performed maneuvers should normally be terminated, based upon improper bank, speed, pitch or "G". Maneuver termination may be accomplished by either the controller or safety pilot.

6.4.7. Unless clear of clouds, the aircraft should not exceed 60 degrees of bank or 30 degrees of pitch.

6.4.8. When less than 2000' AGL, aircraft should remain clear of clouds. Without a discernable horizon, the aircraft should not exceed 30 degrees of bank or 15 degrees of pitch.

#### **6.5. Weather Restrictions and Operating Limits. (T-1)**

6.5.1. The ceiling and visibility for captive takeoffs and landings will be at least 1500 feet and three statute miles.

6.5.2. During captive flight in IMC, do not exceed 60 degrees of bank or 30 degrees of pitch. While in VMC, the SP will disengage the AFCS if these parameters are exceeded and it becomes apparent that flight into IMC is imminent.

6.5.3. Remain clear of clouds during captive flight on-range below 2000 feet AGL. When below 2000 feet AGL, do not exceed 30 degrees of bank or 15 degrees of pitch unless there is a discernible horizon.

6.5.4. It is the SP's responsibility to ensure adequate terrain clearance will be available during coupled flight. If there is any doubt, the SP should disengage the AFCS and climb to a safe altitude and/or VMC conditions where terrain clearance can be assured.

**6.6. Fuel Check Requirements.** The controller 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 (with S-3 and S-4 set to remote enable, cockpit fuel readings are not available to the SP). (T-1)

#### **6.7. Chase Restrictions. (T-1)**

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

6.7.2. Minimum weather for drone chase is a ceiling of 2500 feet and visibility of five statute miles.

**6.8. Landing Patterns.** The SP will terminate the mission if at any time the aircraft command and telemetry systems appear to operating abnormally. (T-1)

6.8.1. Prior to the first captive approach and landing, the SP will confirm "S9 - off" and leave the switch off. Calls are not required for subsequent approaches and landings on the same sortie.

6.8.2. Touch-and-go landings are authorized on captive missions for controller continuation training, but a qualified SP must be on board the aircraft. After touchdowns, the SP or chase pilot (as briefed) will give appropriate descriptive commentary to the controller for steering, and the SP will take control of the aircraft with enough runway remaining to safely permit an abort or single-engine 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. Afterburner may be selected by the SP if desired.

6.8.3. The controller will continue to fly the aircraft until positive transfer of control to the SP is assured.

6.8.4. Captive full-stop landings will not use wheel brake, hook, or chute consent unless these items are specific mission objectives and have been covered in the mission briefing. Normally, the SP will be responsible for deploying the drag chute and applying wheel brakes. On the TAFB droneyway, the controller will provide descriptive commentary regarding the drag chute and ground speed during the landing rollout. If stopping within the available runway remaining appears questionable while captive, the SP will take control and either stop or takeoff if circumstances permit. Do not attempt a captive full-stop landing without sufficient fuel for a go-around.

6.8.5. Units may develop local guidance on criteria for using the tail hook during full stop landings (manned or captive).

**6.9. Ordnance Release.**

6.9.1. The controller will initiate the request and receive clearance from the SP prior to ordnance release.

6.9.2. Normal release/jettison will be performed using local procedures and applicable technical data. (T-1)

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

**6.10. MCS/FCS Pattern Rules of Engagement.** Unless pre-coordinated otherwise, the SP and controllers will ensure: (T-1)

6.10.1. 60° of bank is not exceeded.

6.10.2. 500 feet AGL minimum prior to final.

6.10.3. 190 KIAS minimum until on final (230 KIAS with flaps up).

6.10.4. Max touchdown speed of 210 knots ground speed.

6.10.5. SP executes the go-around.

6.10.6. Wheels remain on the runway.

6.10.7. No hard landings.

6.10.8. Surface winds are in the following limits prior to performing the event:

6.10.8.1. **Takeoff.** 15 knots maximum crosswind, 10 knots maximum tailwind.

6.10.8.2. **Landing.** 15 knots maximum crosswind, 15 knots maximum tailwind (20 knots maximum for touch and go only).

## Chapter 7

### ABNORMAL OPERATING PROCEDURES

**7.1. General.** Follow the procedures in this chapter when other than normal operations occur. (T-1)

7.1.1. Do not accept an aircraft for flight with a malfunction that is addressed in the emergency/abnormal procedures section of the flight manual until it has been corrected.

7.1.2. An aircraft with a known malfunction in the AOA aural tone warning system will not be accepted for flight.

7.1.3. Do not use a malfunctioning system unless its use in a degraded mode is essential for safe recovery of the aircraft. Do not conduct ground or in-flight trouble-shooting after flight manual emergency procedures are completed.

7.1.4. Only conduct fuel dumping to reduce aircraft gross weight for safety of flight. When circumstances permit, dump above 10,000 feet AGL over unpopulated areas. Ensure the dump switch is returned to normal before landing.

7.1.5. Do not taxi aircraft with malfunctions that affect the nose wheel steering or brake system.

**7.2. Ground Aborts.** (T-1)

7.2.1. A flight of two or more aircraft with only one designated flight lead in the formation must either sympathetically abort or proceed on a prebriefed single-ship mission should the flight lead abort.

7.2.2. Flight members who do not take off with the flight may join the flight at a briefed rendezvous point prior to a tactical event or may fly a prebriefed alternate single ship mission. If accomplishing a joinup, cease tactical maneuvering until the delayed aircraft is joined and all aircrews are ready to continue.

**7.3. Takeoff Aborts.** (T-1)

7.3.1. Prior to flight, takeoff data will be reviewed and understood by every member of the flight. Particular emphasis should be placed on takeoff and abort factors during abnormal situations such as short/wet runway, heavy gross weights, non-standard cable configurations and abort sequence in formation flights.

7.3.2. If aborting a single-ship takeoff at or above 100 KIAS, lower the tail hook. If aborting below 100 KIAS, lower the tail hook if there is any doubt about the ability to stop on the runway. Formation abort scenarios may not allow for hook extension, in order to avoid having multiple aircraft in the same cable.

7.3.3. If an abort occurs during takeoff roll, give callsign and state intentions when practical. Following aircraft will alter takeoff roll to ensure clearance or abort takeoff if adequate clearance cannot be maintained. Call "Cable, Cable, Cable" to indicate a departure-end arrestment.

7.3.4. Anytime brakes are applied above 100 KIAS during a takeoff abort or hot brakes are suspected, declare a ground emergency, taxi the aircraft to the designated hot brake area and perform hot brake procedures.

#### **7.4. Air Aborts. (T-1)**

7.4.1. If an abort occurs after beginning takeoff roll, all aircraft will maintain their original numerical callsign.

7.4.2. Escort aborting aircraft with an emergency to the field of intended landing. In other cases, the flight leader will determine if an escort is required.

7.4.3. Abort the mission and land out of a straight-in, regardless of apparent damage or subsequent normal operation, for any of the following:

7.4.3.1. Birdstrike/Foreign Object Damage.

7.4.3.2. Over-G.

7.4.3.3. Flight control malfunction.

7.4.3.4. Engine flameout or shutdown.

#### **7.5. Radio Failure. (T-1)**

7.5.1. **General.** Individual aircraft experiencing radio failure will comply with procedures outlined in FLIP, this volume, and local directives.

##### **7.5.2. Formation:**

7.5.2.1. Flight members who experience total radio failure while in close or route formation will give the appropriate visual signals. Terminate the mission and escort the NORDO aircraft to base of intended landing or a divert base. Perform a formation approach to a drop-off on final unless safety considerations dictate otherwise.

7.5.2.2. If flying other than close or route formation when radio failure occurs, the NORDO aircraft should rejoin to a route position of approximately 500 feet on another flight member. The NORDO aircraft is responsible for maintaining clearance from other flight members until his presence is acknowledged by a wing rock, signifying clearance to join. Once joined, the NORDO aircraft will give the appropriate visual signals. If not in visual contact and prebriefed, the NORDO aircraft may proceed to a rendezvous point and hold. If no one has rejoined prior to reaching BINGO fuel, the NORDO aircraft should proceed to the base of intended landing or a divert base. Aircraft experiencing any difficulty/emergency in addition to NORDO will proceed as required by the situation.

##### **7.5.3. NORDO Recovery:**

7.5.3.1. Apply the procedures in AFI 11-205, local directives, and FLIP.

7.5.3.2. 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 follow, 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. Severe Weather Penetration.** Avoid flight through severe weather. If unavoidable, flights should break up and obtain separate clearances prior to adverse weather penetration.

**7.7. Lost Wingman Procedures. (T-1)**

7.7.1. In any lost wingman situation, immediate separation of aircraft is essential. Upon losing sight of the leader or if unable to maintain formation due to spatial disorientation (SD), the wingman will simultaneously:

7.7.1.1. Execute the applicable lost wingman procedures.

7.7.1.2. Transition to instruments. Refer to **paragraph 7.8** for specific SD considerations. Smooth application of control inputs is imperative to minimize the effects of SD.

7.7.1.3. Inform lead by transmitting "C/S is lost wingman."

7.7.1.4. After executing lost wingman procedures, do not attempt rejoining with the flight until obtaining permission from the flight lead.

7.7.1.5. When able, and necessary, obtain a separate clearance.

7.7.1.6. Observe all published terrain clearance limits.

**7.7.2. Two or Three-Ship Flights.** (For three-ship echelon, refer to four-ship procedures.)

7.7.2.1. **Wings-Level Flight (Climbing, Descending, or Straight and Level).** Turn away using 15 degrees of bank for 15 seconds, then resume heading.

7.7.2.2. **Turns:**

7.7.2.2.1. **Outside the Turn.** Reverse the direction of turn using 15 degrees of bank for 15 seconds. Continue straight ahead to ensure separation prior to resuming the turn.

7.7.2.2.2. **Inside the Turn.** Momentarily reduce power to ensure nose-tail separation and direct the flight leader to roll out of the turn. Maintain angle of bank to ensure lateral separation. The leader may resume turn only when separation is ensured.

7.7.2.3. **Final Approach.** Momentarily turn away from lead to ensure clearance and commence the published missed approach procedure.

7.7.2.4. **Missed Approach.** Momentarily turn away from lead to ensure clearance, inform lead and continue the published or assigned missed approach procedure while climbing to 500 feet above missed approach altitude.

**7.7.3. Four-Ship Flights.** Number 2 and 3 follow the procedures outlined above. Number 4's initial action assumes that number 3 has also gone lost wingman. In addition to **paragraph 7.7**, number 4 will:

7.7.3.1. **Wings-Level Flight (Climbing, Descending, or Straight and Level).** Turn away using 30 degrees of bank for 30 seconds, to ensure separation from lead and number 3.

7.7.3.2. **Turns:**

7.7.3.2.1. **Outside the Turn.** Reverse direction of turn using 30 degrees of bank for 30 seconds to ensure separation from lead and number 3.

7.7.3.2.2. **Inside the Turn.** Momentarily reduce power to ensure nose-tail separation and increase bank angle by 15 degrees. Direct the leader to roll out. The leader will only resume the turn when separation is ensured.

7.7.4. The flight leader will acknowledge the lost wingman's radio call and transmit attitude, heading, altitude, airspeed, and other appropriate parameters.

7.7.5. If a wingman becomes separated and any aircraft experiences radio failure, the aircraft with the operational radio will obtain a separate clearance. The NORDO aircraft will turn the IFF/SIF NORMAL code 7600 while proceeding with previous clearance. If an emergency situation arises along with radio failure, turn the IFF/SIF to EMERGENCY for the remainder of the flight.

7.7.6. Only practice lost wingman procedures in VMC.

**7.8. Spatial Disorientation (SD).** Conditions which prevent a clear visual horizon or increase pilot tasking are conducive to SD. To prevent SD, the pilot must increase his instrument crosscheck rate. (T-1) If SD symptoms are detected:

**7.8.1. Single Ship:**

7.8.1.1. Concentrate on flying basic instruments with frequent reference to the attitude indicator. Defer nonessential cockpit tasks. The crewmember not in control of the aircraft will assist the spatially disoriented crewmember.

7.8.1.2. If symptoms persist and conditions permit, fly straight and level with reference to the attitude indicator until symptoms abate. Use the autopilot if required.

7.8.1.3. If necessary, declare an emergency and advise ATC. **Note:** It is possible for SD to proceed to the point where the pilot is unable to see or interpret the flight instruments. In this situation, aircraft control may be impossible. If this occurs, the pilot should consider ejecting.

**7.8.2. Formation Lead:**

7.8.2.1. Advise the other crewmember and wingmen that he has SD and comply with procedures in paragraph **7.8.1**

7.8.2.2. Use the other crewmember or wingmen to confirm attitude and provide verbal feedback.

7.8.2.3. If symptoms persist, terminate the mission and recover the flight by the simplest and safest means possible.

**7.8.3. Wingman:**

7.8.3.1. Advise the other crewmember and lead when disorientation makes it difficult to maintain position.

7.8.3.2. The crewmember not in control of the aircraft or lead, if applicable, will advise wingman of aircraft attitude, altitude, heading, and airspeed.

7.8.3.3. If symptoms persist and conditions permit, lead will establish straight and level flight for 30-60 seconds.

7.8.3.4. If the above procedures are not effective, lead should consider passing the lead to the wingman, provided the leader will be able to maintain situational awareness from a wing/chase position. Transfer lead while in straight and level flight. Once assuming the lead, maintain straight and level flight for 60 seconds. If necessary, terminate the tactical mission and recover by the simplest and safest means possible.

7.8.4. **Greater than Two-Ship Formation.** Lead should separate the flight into elements to more effectively handle a wingman with persistent SD symptoms. Establish straight and level flight IAW [paragraph 4.4](#) (Formation Breakup). The element with the SD pilot will remain straight and level while the other element separates.

#### **7.9. Post Arresting Gear Engagement Procedures. (T-1)**

7.9.1. Do not shut down the engine(s) unless fire or other conditions dictate, or directed by the ground gear crew.

7.9.2. Raise the tailhook on the ground crew's signal.

7.9.3. Do not taxi until directed.

#### **7.10. In-flight Practice of Emergency Procedures. (T-1)**

7.10.1. **Simulated Emergency Procedure.** Any procedure that produces an effect that would closely parallel the actual emergency, such as retarding a throttle to idle.

7.10.2. **Aborted Takeoff Practice.** All practice and/or training related to aborted takeoffs will be accomplished in the emergency procedures trainer or a static aircraft.

7.10.3. Practice in-flight engine shutdown is prohibited.

7.10.4. Simulated in-flight loss of both engines is prohibited.

7.10.5. **Emergency Landing Patterns (Refer to AFI 11-202V3).** Practice of emergency landing patterns is authorized provided that:

7.10.5.1. **Field Requirements.** Adequate crash rescue and air traffic control facilities are available and in operation.

7.10.5.2. **Supervisory Requirements.** IQT pilots require an instructor in the aircraft or an IP in chase.

7.10.5.3. Pilots simulating engine-out low approaches will initiate go-arounds in sufficient time to ensure that the aircraft does not descend below 300 feet above the terrain. Simulated engine-out approaches may descend below this established altitude provided the approach terminates in a full stop landing or the go-around from a low approach or touch-and-go landing is performed with both engines.

**7.11. Search and Rescue (SARCAP) Procedures.** If an aircraft is lost in flight, immediately attempt to locate possible survivors and initiate rescue efforts. Many downed aircrews initially suffer from shock or have delayed reactions to ejection injuries. The following procedures are by no means complete and should be adjusted to meet each unique search and rescue situation. (T-1)

7.11.1. Immediately knock off maneuvering.

7.11.2. Establish a SARCAP commander.

7.11.3. Squawk 7700 to alert ATC/GCI of the emergency situation.

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

7.11.5. Mark the last known position of survivors/crash site using any means available (TACAN/INS, ATC/GCI positioning, or ground references).

7.11.6. Remain above the highest ejection altitude, if known, or the highest observed parachute until determining the position of all possible survivors.

7.11.7. Deconflict other aircraft assisting in the SARCAP by altitude to preclude midair collision. Establish high/low CAPs as necessary to facilitate communications with other agencies.

7.11.8. Revise BINGO fuels or recovery bases as required to maintain maximum SARCAP coverage over survivors/crash site. Do not overfly BINGO fuel.

7.11.9. Relinquish SARCAP operation to designated rescue forces upon their arrival.

**Chapter 8**

**LOCAL OPERATING PROCEDURES**

**8.1. Local operating procedures are IAW WEGI 11-250 and HAFBI 11-250. (T-3)**

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DCS, Operations

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

AFI 10-220, *Contractor's Flight and Ground Operations*, 01 Mar 2007  
AFI 11-202V3, *General Flight Rule*, 22 Oct 2010  
AFI 11-205, *Aircraft Cockpit and Formation Flight Signals*, 19 May 1994  
AFI 11-209, *Aerial Event Policy and Procedures*, 4 May 2006  
AFI 11-214, *Aircrew, Weapons Director and Terminal Attack Controller Procedures for Operations*, 14 Aug 2012  
AFI 11-218, *Aircrew Operation and Movement on the Ground*, 28 Oct 2011  
AFI 33-360, *Publications and Forms Management*, 25 Sep 2013  
AFI 90-201, *Publications and Forms Management*, 2 Aug 2013

***Adopted Forms***

AF Form 847, *Recomendation for Change of Publication*  
AFTO Form 781, *ARMS Aircrew/Mission Flight Data Document*  
AFTO FORM 781 A, *Maintenance Discrepancy and Work Document*  
Unit Development Checklists/Local Pilot Aids/Forms

***Abbreviations and Acronyms***

**AOA**—Angle of Attack  
**ACBT**—Air Combat Training  
**AFCS**—Automatic Flight Control System  
**AGL**—Above Ground Level  
**ATC**—Air Traffic Control  
**ATO**—Automatic Takeoff  
**DH**—Decision Height  
**EOR**—End of Runway  
**FLIP**—Flight Information Publications  
**GCA**—Ground Controlled Approach  
**IAW**—In Accordance With  
**IFF**—Identification, Friend or Foe  
**IFR**—Instrument Flight Rules  
**IMC**—Instrument Meteorological Conditions

**INS**—Inertial Navigation System  
**IP**—Instructor Pilot  
**JOAP**—Joint Oil Analysis Program  
**LOWAT**—Low Altitude Training  
**MCS**—Mobil Control System  
**MDA**—Minimum Descent Altitude  
**MEA**—Minimum Enroute Altitude  
**MSA**—Minimum Safe Altitude  
**N/A**—Not Applicable  
**NORDO**—No Radio  
**NULLO**—Not Using Local Live Operator  
**PAPI**—Precision Approach Path Indicator  
**RAA**—Route Abort Altitude  
**RCO**—Range Control Officer  
**RCR**—Runway Condition Reading  
**RNAV**—Area Navigation  
**RTB**—Return to Base  
**SA**—Situational Awareness  
**SARCAP**—Search and Rescue Procedures  
**SD**—Spatial Disorientation  
**SEFE**—Stan/Eval Flight Examiners  
**SIF**—Selective Identification Feature  
**SP**—Safety Pilot  
**VASI**—Visual Approach Slope Indicator  
**VID**—Visual Identification  
**VFR**—Visual Flight Rules  
**VMC**—Visual Meteorological Conditions

### *Terms*

**ATO**—Automatic Takeoff of a captive or NULLO QF-4.

**Bingo Fuel**—A prebriefed fuel state that 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:

**Captive Flight**—A manned QF-4 under remote-control from a ground facility (fixed or mobile).

**Controller**—A person qualified to remotely control the QF-4 from a ground site (fixed or mobile).

**Dispense**—The release of external stores through any normal mode.

**Drone**—An unmanned QF-4 mission aircraft (Not Using Local Live Operator).

**Emergency Fuel**—Declared whenever 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 1,000 pounds or less.

**Hung Ordnance**—Any externally mounted ordnance, store, or fuel tank which fails to release or jettison.

**Inadvertent Release**—The release of any store or ordnance which was not commanded by the pilot or controller.

**Jettison**—The release of external stores (either manually or remotely) through the use of the jettison mode.

**Joker Fuel**—A prebriefed fuel needed to terminate an event and proceed with the remainder of the mission.

**Minimum Fuel**—Declared whenever 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 1,500 pounds or less.

**NULLO**—Not Using Local Live Operator (NULLO)--An unmanned QF-4 mission aircraft.

**Unexpended Ordnance**—No attempt has been made to fire or release the item.

**Wiggle**—A ground check of remote-controlled systems and flight controls to verify proper operation.

**Attachment 2****GENERAL BRIEFING GUIDE****A2.1. General Briefing Guide.** See below.**A2.1.1. MISSION DATA.**

- A2.1.1.1. Time Hack
- A2.1.1.2. EP/Threat of the Day
- A2.1.1.3. Mission Objective(s)
- A2.1.1.4. Mission Overview
- A2.1.1.5. Mission Data Card
  - A2.1.1.5.1. Mission Commander/Deputy Lead
  - A2.1.1.5.2. Joker/Bingo Fuel
  - A2.1.1.5.3. Takeoff and Landing Data
  - A2.1.1.5.4. Working Area
- A2.1.1.6. Weather/Sunrise/Sunset/Moon Illumination
- A2.1.1.7. NOTAMs/Bird Strike Potential
- A2.1.1.8. Personal Equipment
- A2.1.1.9. FCIF/Pubs/Maps

**A2.1.2. GROUND PROCEDURES.**

- A2.1.2.1. Pre-Flight
  - A2.1.2.1.1. Aircraft
  - A2.1.2.1.2. Armament
- A2.1.2.2. Check-In
- A2.1.2.3. Taxi/Marshaling/Arming
- A2.1.2.4. Spare Procedures

**A2.1.3. TAKEOFF.**

- A2.1.3.1. Runway Line-up
- A2.1.3.2. Formation Takeoff
- A2.1.3.3. Takeoff Interval
- A2.1.3.4. Abort
- A2.1.3.5. Jettison Procedures
- A2.1.3.6. Low Altitude Ejection
- A2.1.3.7. Landing Immediately After Takeoff

**A2.1.4. DEPARTURE/EN ROUTE.**

- A2.1.4.1. Routing
- A2.1.4.2. Trail Departure
- A2.1.4.3. Join-up/Formation
- A2.1.4.4. Systems/Ops Checks

**A2.1.5. RECOVERY.**

- A2.1.5.1. Rejoin
- A2.1.5.2. Battle Damage Check
- A2.1.5.3. Type Recovery
- A2.1.5.4. Flight Break-up
- A2.1.5.5. Pattern and Landing
- A2.1.5.6. After Landing/De-arm
- A2.1.5.7. Emergency/Alternate Airfields

**Attachment 3****SPECIAL SUBJECT BRIEFING GUIDE****A3.1. Special Subject Briefing Guide.** See below.

A3.1.1. Instructor Responsibilities

A3.1.2. Chase Procedures

A3.1.3. IFF Procedures

A3.1.4. Radar/Visual Search Responsibilities/Midair Collision Avoidance/Flight Path Deconfliction

A3.1.5. Dissimilar Formations

A3.1.6. Terrain Avoidance

A3.1.6.1. Departure/En Route/Recovery

A3.1.6.2. Use of Radar Altimeters/MSL Floor Settings

A3.1.7. Bird Strike Procedures/Use of Visor(s)

A3.1.8. Fuel Awareness/Use of AB/Consumption Rates

A3.1.9. Maneuvering Limitations

A3.1.9.1. Airspeed and G

A3.1.9.2. Recognition/Prevention/Recovery from Adverse Yaw, Accelerated Stalls, and Loss of Control

A3.1.10. G-Awareness

A3.1.10.1. G-Suit Connection/G-Tolerance/G-Awareness Turn

A3.1.10.2. L-1 Anti-G Straining Maneuver (AGSM)

A3.1.11. Visual Illusions/Perceptions

A3.1.12. Spatial Disorientation/Unusual Attitudes

A3.1.13. Lost Wingman

A3.1.14. Radio Inoperative

A3.1.15. SARCAP

A3.1.16. Recall Procedures

A3.1.17. Hazards Associated with Human Factors (i.e., Channelized Attention, Task Saturation/Prioritization, and Complacency)

A3.1.18. ORM/CRM

A3.1.19. Special Interest Items (SIIs)

A3.1.20. Training Rules

**Attachment 4****ADVANCED HANDLING/INSTRUMENT BRIEFING GUIDE****A4.1. Advanced Handling/Instrument Briefing Guide.** See below.**A4.1.1. AIRWORK.**

- A4.1.1.1. Airspace Restrictions
- A4.1.1.2. Area Orientation
- A4.1.1.3. Instructor Responsibilities
- A4.1.1.4. Maneuvers

**A4.1.2. APPROACHES.**

- A4.1.2.1. Frequencies
- A4.1.2.2. Holding
- A4.1.2.3. Penetration
- A4.1.2.4. Missed Approach/Climb Out

**A4.1.3. SPECIAL SUBJECTS.**

- A4.1.3.1. "G" Awareness
  - A4.1.3.1.1. G-Suit Connection/G-Tolerance/G-Awareness Turn
  - A4.1.3.1.2. L-1 Anti-G Straining Maneuver (AGSM)
- A4.1.3.2. Fuel Awareness/AB Use/Consumption Rates
- A4.1.3.3. Maneuvering Limitations
  - A4.1.3.3.1. Airspeed and "G"
  - A4.1.3.3.2. Recognition/Prevention/Recovery From Adverse Yaw, Accelerated Stalls, and Loss of Control
  - A4.1.3.3.3. Maneuvering at Heavy Weight/High AOA/Asymmetrical Configuration/In the Transonic Region
  - A4.1.3.3.4. Effects of CG throughout the Flight
  - A4.1.3.3.5. Time to Ground Impact
    - A4.1.3.3.5.1. Wings Level
    - A4.1.3.3.5.2. Overbank/Under "G"
- A4.1.3.4. Hazards Associated with Human Factors (i.e., Channelized Attention, Task Saturation/Prioritization, and Complacency)

**Attachment 5****LOW LEVEL NAVIGATION BRIEFING GUIDE****A5.1. Low Level Navigation Briefing Guide.** See below.**A5.1.1. GENERAL.**

A5.1.1.1. Route/Clearance/Restrictions

A5.1.1.2. Flight Responsibilities

A5.1.1.2.1. Navigation

A5.1.1.2.2. Radar/Visual Search

A5.1.1.3. Entry/Spacing/Holding/Initial Altitude (MSA)

**A5.1.2. ROUTE PROCEDURES.**

A5.1.2.1. Fence Checks

A5.1.2.2. Tactical Formation/Turns

A5.1.2.3. Low Level Navigation

A5.1.2.3.1. Dead Reckoning/Use of Navigation Aids/Equipment (i.e., INS)

A5.1.2.3.2. Radar Procedures/Techniques/Predictions

A5.1.2.3.3. Visual Procedures/Techniques

A5.1.2.3.4. Updates/Calibrations

A5.1.2.3.5. Time/Fuel Control

A5.1.2.3.6. Terrain Following/Avoidance/Wingman Considerations

A5.1.2.3.7. Leg Altitudes/Obstacles (MSL/AGL)

A5.1.2.3.8. Turnpoint Acquisition

A5.1.2.4. Threat Reactions

A5.1.2.4.1. RWR/ECM/CHAFF/FLARES

A5.1.2.4.2. Engagement Criteria

A5.1.2.4.3. Flight Path Deconfliction

A5.1.2.4.4. Termination

**A5.1.3. EMERGENCIES.**

A5.1.3.1. Aircraft Malfunctions

A5.1.3.2. Route Abort Procedures (RAA)/ATC Frequencies

**A5.1.4. TRAINING RULES/SPECIAL OPERATING INSTRUCTIONS/ALTERNATE MISSION.**

A5.1.4.1. Type mission (refer to appropriate mission briefing guide)

A5.1.4.2. Mission Objectives

**A5.1.5. SPECIAL SUBJECTS.**

A5.1.5.1. Airspace Restrictions

A5.1.5.2. "G" Awareness/Ops Checks

A5.1.5.2.1. G-Suit Connection/G-Tolerance/G-Awareness Turn

A5.1.5.2.2. Anti-G Straining Maneuver (AGSM)

A5.1.5.3. Fuel Awareness/AB Use/Consumption Rates

A5.1.5.4. Flight Path Deconfliction

A5.1.5.5. Maneuvering Limitations

A5.1.5.5.1. Airspeed and "G"

A5.1.5.5.2. Recognition/Prevention/Recovery From Adverse Yaw Accelerated Stalls and Loss of Control

A5.1.5.5.3. Maneuvering at Heavy Weight/High Angles of Attack Asymmetrical Configuration/In the Transonic Region

A5.1.5.5.4. Effects of CG Throughout the Flight

A5.1.5.6. Time to Ground Impact

A5.1.5.6.1. Wings Level

A5.1.5.6.2. Overbank/Under "G"

A5.1.5.7. Night Considerations

A5.1.5.8. Hazards Associated with Human Factors (i.e., Channelized Attention, Task Saturation/Prioritization, and Complacency)

**Attachment 6****CREW COORDINATION/PASSENGER/GROUND CREW BRIEFING GUIDE****A6.1. Crew Coordination/Passenger/Ground Crew Briefing Guide.** See below.**A6.1.1. CREW COORDINATION/PASSENGER.**

A6.1.1.1. Pre-Flight

A6.1.1.2. Prohibited Items

A6.1.1.3. Cockpit Layout

A6.1.1.4. Flight Maneuvering Parameters

A6.1.1.5. Mission Duties

A6.1.1.6. Change of Aircraft Control

A6.1.1.7. WSO Flying Parameters

A6.1.1.8. Rear Seat Landing Procedures

A6.1.1.9. Emergencies

A6.1.1.9.1. Runway Departure

A6.1.1.9.2. Canopy Loss

A6.1.1.9.3. Ejection/Egress (With and Without Intercom)/Command Selector Valve Position

A6.1.1.9.4. Loss of Intercom

A6.1.1.9.5. Bird Strike Procedures/Use of Visor(s)

**A6.1.2. GROUND CREW.**

A6.1.2.1. Act only on pilot's instructions

A6.1.2.2. Ground emergency procedures

A6.1.2.3. Hand signals

A6.1.2.4. Aircraft danger areas

**Attachment 7****MISSION DEBRIEFING GUIDE**

**A7.1. Mission Debriefing Guide.** See below.

A7.1.1. **GROUND PROCEDURES.**

A7.1.2. **TAKEOFF/JOINUP/DEPARTURE.**

A7.1.3. **ENROUTE PROCEDURES.**

A7.1.4. **RECOVERY/LANDING/AFTER LANDING.**

A7.1.5. **GENERAL.**

A7.1.5.1. Special Interest Items (SIIs)

A7.1.5.2. Radio Procedures

A7.1.5.3. Flight Discipline/Effectiveness

A7.1.6. **MISSION ACCOMPLISHMENT/ANALYSIS.**

A7.1.6.1. Mission Reconstruction

A7.1.6.2. Mission Support

A7.1.6.3. CAVR/Film Assessment

A7.1.6.4. Anti-G Straining Maneuver Effectiveness

A7.1.6.5. Learning Objectives Achieved

A7.1.6.6. Lessons Learned

A7.1.6.7. Recommendations for Improvement

A7.1.7. **COMMENTS/QUESTIONS.**