

1 JULY 1999



Flying Operations

F-16--OPERATIONS PROCEDURES

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OPR: HQ ACC/XOFT
(Maj Douglas E. Young)
Supersedes MCI 11-F16V3, 21 April 1995; EMC
96-1, 041750Z Mar 96; IC 98-1,
211355Z Jan 98; IC 98-2, 162055Z
Jul 98

Certified by: HQ USAF/XOO
(Maj Gen Michael S. Kudlacz)
Pages: 94
Distribution: F

This volume implements AFPD 11-2, *Aircraft Rules and Procedures*; AFPD 11-4, *Aviation Service*; and AFI 11-202V3, *General Flight Rules*. It applies to all F-16 units. MAJCOM/DRU/FOA-level supplements to this volume are to be approved prior to publication IAW AFPD 11-2. Copies of MAJCOM/DRU/FOA-level supplements, after approved and published, will be provided by the issuing MAJCOM/DRU/FOA to HQ AFFSA/XOF, HQ ACC/XOFT, and the user MAJCOM and ANG offices of primary responsibility. Field units below MAJCOM/DRU/FOA level will forward copies of their supplements to this publication to their parent MAJCOM/DRU/FOA office of primary responsibility for post publication review. **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. Keep supplements current by complying with AFI 33-360V1, *Publications Management Program*. See paragraph 1.4. of this volume for guidance on submitting comments and suggesting improvements to this publication. This publication is affected by the Paperwork Reduction Act of 1974 as amended in 1996. Maintain and dispose of records created as a result of processes prescribed in this publication in accordance with AFMAN 37-139, *Records Disposition Schedule*.

This volume, with its complementary unit-specific Local Procedures Supplement, prescribes standard operational and weapons employment procedures to be used by all pilots operating USAF F-16 aircraft. USAFAWC aircraft may deviate from the contents of this volume as outlined in individually approved test plans required for Test and Evaluation purposes. File a copy of all approved waivers with this volume.

This volume contains references to the following field (subordinate level) publications which, until converted to departmental-level publications, may be obtained from the respective MAJCOM publishing office:

Publications: MCR 55-125 (ACC)

Note: This publication incorporates all using MAJCOMs' Sup 1 using the paragraph supplementation method. Supplemental material is prefaced with (MAJCOM).

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Chapter 1

INTRODUCTION

1.1. General:

1.1.1. **Scope.** This volume outlines the procedures applicable to the safe operation of the F-16. With the complementary references cited, this volume prescribes standard operational procedures to be used by all USAF F-16 pilots.

1.1.2. **Pilot's Responsibility.** This volume, in conjunction with other governing directives, prescribes operations procedures for F-16 under most circumstances, but is not to be used as a substitute for sound judgment or common sense. Operations or procedures not specifically addressed may be accomplished if they enhance safe and effective mission accomplishment.

1.1.3. **Deviations.** Deviations from these procedures require specific approval of the MAJCOM/DO unless an urgent requirement or an aircraft emergency dictate otherwise, in which case the pilot in command will take the appropriate action to safely recover the aircraft.

1.1.4. **References.** The primary references for F-16 operations are T.O.s 1F-16-1, 1F-16-1-1, 1F-16-1-2, 1-1C-1, 1-1C-1-30, AFTTP 3-1V5, *Tactical Employment--F-16*; AFTTP 3-3V5, *Combat Aircraft Fundamentals--F-16*; AFI 11-214, *Aircrew, Weapons Director, and Terminal Attack Controller Procedures for Air Operations*; and this volume. Training units may develop phase manuals from the procedures contained in these documents. Phase manuals may be used to augment initial and mission qualification training at operational units. Phase manuals may expand these basic procedures; in no case will they be less restrictive.

1.2. Tech Data. Personnel will not operate new equipment or modified aircraft without properly validated and verified tech data in accordance with 00-5 series T.O.s. If properly procured and verified tech data does not accompany new equipment or aircraft modifications delivered to the field, personnel will not accept these aircraft or modified equipment. Red line (Mark-up) copies are not acceptable. Exceptions to this policy are extremely limited and must be authorized by MAJCOM through DO and LG functional managers. PACAF waiver authority is FW/CC.

1.3. Waivers. Waiver requests will be forwarded through appropriate channels to the applicable MAJCOM/DO for approval. Waivers, if approved, will be issued for a maximum of one year from the effective date. Information copies of approved waivers will be provided to the lead and user MAJCOM OPRs for this volume.

1.4. Volume Changes. Send recommended changes to this publication on AF Form 847, **Recommendation for Change of Publication**, through channels, to HQ ACC/XOFT, 205 Dodd Blvd, Suite 101, Langley AFB VA 23665-2789.

1.5. Distribution. Each F-16 pilot is authorized a copy of this volume.

Chapter 2

MISSION PLANNING

2.1. Responsibilities. The pilot in command of each aircraft and the designated flight lead are ultimately responsible for mission planning. The operations and intelligence functions will provide supplemental planning material and information as required to effectively accomplish the assigned mission.

2.2. General Procedures:

2.2.1. Accomplish sufficient flight planning to ensure safe mission accomplishment to include fuel requirements, map preparation, and takeoff/landing data.

2.2.2. Plan and fly with sufficient ground attack planning information to conduct the attack safely. This may include stick diagrams, attack parameters, and/or unit developed attack cards.

2.2.3. (PACAF) Planned flights over water outside the local training area (e.g., deployments, cross countries, and PDM inputs) will be accomplished two-ship as a minimum. Single-ship over water flights require wing commander approval.

2.2.4. (PACAF) F-16s will carry an Acceleration Monitoring Device (AMD) to the maximum extent possible. AMD carriage is not always possible or desired, but AMDs should be carried when scheduled and mission requirements permit. OG/CC is approval authority for flights without AMD pods.

2.3. Takeoff and Landing Data:

2.3.1. Compute a 2,000 foot acceleration check speed anytime the computed takeoff roll exceeds 2,500 feet. When the computed takeoff roll is 2,500 feet or less, use the actual takeoff distance versus the computed takeoff distance to evaluate aircraft performance.

2.3.2. Compute a refusal speed for all takeoffs.

2.3.3. Minimum Takeoff and Landing Data (TOLD) requirements on Mission Data Cards are: acceleration check speed, refusal/maximum abort speed (dry/wet), rotation speed, takeoff speed and distance, and normal and heavyweight (landing immediately after takeoff) landing speeds and distances (dry/wet).

2.4. Map/Chart Preparation:

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

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

2.4.3. Low Altitude Maps:

2.4.3.1. On low altitude flights, each pilot in the flight will carry a current map of the low altitude route/operating area. The map will be of such scale and quality that terrain features, hazards, and chart annotations are of sufficient detail to allow individual navigation and safe mission accomplishment.

2.4.3.2. Prepare maps for low level IAW MCR 55-125, *Preparation of Mission Planning Materials (Tactical Aircraft)*, and as directed locally. Maps will be updated from the Chart Update Manual (CHUM) and all man-made obstacles which may be a factor to the flight will be highlighted (circled / marked with highlighter, etc) on the maps. Additionally, time and/or distance tick-marks will be annotated on low-level maps to ensure positive positional awareness of obstacles along the planned route of flight plus or minus 5 NM.

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

2.4.4. **Night.** Night or simulated night radar low level flight map preparation:

2.4.4.1. The minimum pilot chart requirement is a flight log or stick chart. The minimum annotations for this log/chart are headings, RAAs, minimum safe altitudes (MSAs), recovery MSA (RMSA - if applicable) and maximum/minimum route structure altitudes.

2.4.4.2. Compute the MSA for each leg of the intended route of flight. The MSA is defined as an altitude which provides 1,000 feet of clearance above the highest obstacle/terrain feature (rounded to the next highest 100 feet) within 5 NM of the planned course, route boundaries, or operating area.

2.4.4.3. To ensure maps accurately reflect planned routes, planned night turn point bank angles will not exceed 45 degrees.

2.4.4.4. A RMSA may also be computed and used in addition to RAA and MSA. RMSA is defined as an altitude which provides 1,000 feet of clearance above the highest obstacle/terrain feature (rounded to the next highest 100 feet) within plus or minus 60 degrees of the planned egress heading within 5 NM of the planned release point for the weapon employed. To use RMSA, the planned weapons delivery recovery, following the planned egress ground track, must be accomplished.

2.4.4.5. For night Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) missions, flight leads should select letdown points that avoid initial descents into rugged or mountainous terrain.

2.4.5. (PACAF) Map coordinates recorded on the Mission Data Card will be cross-checked by at least one other flight member prior to stepping to the aircraft. Bearing and range will be computed from the end of runway to each checkpoint and verified prior to takeoff.

2.5. Briefing/Debriefing:

2.5.1. Flight leads are responsible for presenting a logical briefing which will promote safe and effective mission accomplishment.

2.5.1.1. All pilots/crewmembers/passengers will attend the briefing unless previously coordinated with unit/squadron supervisors.

2.5.1.1.1. (PACAF) All aircrew and passengers will attend the flight briefing.

2.5.1.2. Begin briefings at least 1½ hours before scheduled takeoff. Alert briefings will start in sufficient time to be completed prior to pilot changeover.

- 2.5.1.3. Structure flight briefings to accommodate the capabilities of each pilot in the flight.
- 2.5.1.4. Briefing guides will be used to provide the flight lead/briefer with a reference list of items which may apply to particular missions. Items listed may be briefed in any sequence. Those items understood by all participants, and written in squadron standards, may be briefed as "standard." Specific items not pertinent to the mission need not be covered.
- 2.5.1.5. During the briefing for all low-level missions, emphasis will be placed on the following items: obstacle/ground avoidance, employment of all aircraft altitude warning features such as Automatic Low Altitude Warning (ALOW) and Line in the Sky (LIS), pilot determination of low altitude comfort level and human factors associated with low altitude flying like proper task prioritization.
- 2.5.1.6. For LANTIRN missions, emphasis will be placed on: ensuring the LANTIRN system is fully operational, transition from medium altitude to low-level terrain following (TF) operations and TF maneuvering limitations.
- 2.5.1.7. When dissimilar aircraft are flown in formation, proper position (to ensure adequate wingtip clearance), responsibilities and aircraft-unique requirements will be briefed for each phase of flight.
- 2.5.1.8. Brief an alternate mission for each flight. The alternate mission will be less complex than the primary and should parallel the primary mission. If the alternate mission does not parallel the primary mission, brief the specific mission elements that are different.
- 2.5.1.9. Unbriefed missions/events will not be flown. Mission elements/events may be modified and briefed airborne as long as flight safety is not compromised. Flight leads will ensure changes are acknowledged by all flight members.
- 2.5.1.10. All missions will be debriefed.
- 2.5.2. During deployed operations, exercise and/or Quick Turn missions, 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).
- 2.5.3. Mission briefing guides are contained in [Attachment 2](#). Units may augment these guides as necessary. Pending development by a higher headquarters, units that fly missions not covered by this volume or its supplements (for example, Operational Test & Evaluation (OT&E) weapons delivery profiles) will develop and maintain briefing guides for those missions and submit them to MAJCOM/DO (ANG/DO, HQ AFRC/DO) for review.
- 2.5.4. Pilots will use and assess Airborne Video Tape Recorder (AVTR) tapes during tactical portions of all missions. This review will include analysis of the Anti-G Straining Maneuver (AGSM) effectiveness during all portions of the flight.
- 2.5.4.1. (PACAF) Flight leads will assess the AGSM effectiveness of flight members during mission debriefings. This assessment should not be limited to the G-awareness exercise. It is imperative to evaluate the AGSM after the aircrew has had time to fatigue, as this is usually when the AGSM breaks down and G-induced Loss of Consciousness (GLOC) occurs.
- 2.5.4.2. (PACAF) Aircrews identified as having poor AGSM technique or low G-tolerance will be identified to their flight commander or the appropriate operations supervisor. The operations officer will determine what action is required to improve the aircrews G-tolerance. The squadron

commander has the option of directing refresher centrifuge training in accordance with AFI 11-404, *Centrifuge Training for High-G Aircrew*.

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

2.5.5.1. (PACAF) Upgrade missions will be planned for the first sortie flown. Subsequent missions flown should be of equal or less complexity with no upgrade training planned without OG/CC approval.

2.5.5.2. (PACAF) Pilots participating in continuation training missions may fly their primary or alternate missions in any sequence. The alternate mission will be less complex than the primary mission.

2.6. Unit Developed Checklists/Local Pilot Aids:

2.6.1. Unit developed checklists may be used in lieu of flight manual checklists (except -25 checklists) provided they contain, as a minimum, all items (verbatim and in order, unless specifically addressed in the flight manual) listed in the applicable checklist.

2.6.2. Unit-developed pilot aids will include, as a minimum, the following items:

2.6.2.1. Briefing guides.

2.6.2.2. Local UHF/VHF channelization.

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

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

2.6.2.5. Cable/net barrier information at divert bases.

2.6.2.6. Bailout and jettison areas.

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

2.6.2.8. Other information as deemed necessary by the unit. For example: stereo flight plans, turn-around procedures, local training areas, instrument preflight and alert setup procedures.

2.7. (USAFE) F-16D Operations. Follow procedures in AFI 11-401/USAFE Sup 1, *Flight Management*, for F-16D rear cockpit utilization.

2.8. (USAFE) Airfield Requirements. Refer to USAFEI 11-202, *Control of Aircraft for Off-Station Sorties/Diverts*.

Chapter 3

NORMAL OPERATING PROCEDURES

3.1. 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. The intercom system will also be used to the maximum extent possible anytime maintenance technicians are performing "redballs" on the aircraft and for EPU checks performed in congested areas. The pilot will ensure that no system which could pose any danger to the ground crew is activated prior to receiving proper acknowledgment from ground personnel. Units with an active air defense commitment may waive use of ground intercom during alert scrambles. When ground intercom is not used, visual signals will be in accordance with AFI 11-218, *Aircraft 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.

3.1.1. (USAFE) An operable intercom system is required for all missions (may be waived by OG/CC).

3.1.2. The following signals augment AFI 11-218:

3.1.2.1. **EPU OPERATIONAL CHECK.** Raise two fingers and rotate hand.

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

3.1.2.3. **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).

3.1.2.4. **LOSS OF BRAKES WHILE TAXIING.** Lower tailhook.

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

3.1.2.6. **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.

3.2. Preflight:

3.2.1. (B/D model aircraft) When the rear cockpit is occupied by other than a fully qualified F-16 pilot, the stick control switch will be placed in the FWD position.

3.2.2. Baggage/equipment will not be carried in the avionics bay behind the cockpit or in the aft canopy fixed transparency area (turtle back).

3.2.3. Baggage/equipment will not be carried in an unoccupied F-16B/D rear cockpit.

3.2.4. Objects will not be placed in or on top of the engine intake.

3.2.5. Publications, maps and personal items placed in the cockpit will be secured to avoid flight control/ throttle interference.

3.2.6. Pilots will wear Combat Edge (CE) equipment (if fitted) on any mission where planned/anticipated maneuvering equals or exceeds 6.0 Gs.

3.2.7. Pilots will ensure the ejection seat survival kit deployment switch is in the automatic position.

3.2.8. The CAT III position of the Stores Configuration Switch will be selected when the aircraft is configured with a Category III loading IAW T.O. 1F-16-1-2.

3.2.9. (USAFE) In addition to the requirements in AFI 11-202V3, *General Flight Rules*, and Flight Information Publications (FLIP), the following equipment will be operative for all flights: TACAN, INS, IFF/SIF Modes 3A and C, Pitot/Angle-of-Attack Probe Heat, Standby Attitude Indicator, and Anti-G System.

3.3. Ground/Taxi Operations:

3.3.1. **Taxi Interval.** 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. **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.

3.3.2.1. (USAFE) Units will specify minimum runway condition reading (RCR) for taxi operations. Units will establish local procedures to minimize inlet icing during ground operations.

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

3.3.3.1. If conditions warrant, the Supervisor of Flying (SOF)/Top 3 will have the first flight lead start 5 minutes early to check for inlet ice formation.

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 (i.e. ramp/shelter and EOR). While taxiing, avoid unnecessary stops enroute to EOR. If possible, remain at ramp/shelter until traffic delays are eliminated. Avoid standing water and snow/slush accumulations. When pulling into the arming area, attempt to stop the aircraft over an area clear of water, ice, or snow.

3.3.3.4. Hold in the arming spot with an ice FOD monitor present until cleared 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. A qualified crew chief should accomplish an intake inspection prior to restarting the engine.

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

3.3.4.1. (USAFE) EOR inspections will be accomplished immediately prior to takeoff at a designated location, usually near the end of the runway (not required for quick reaction alert scrambles). At non-USAF bases, make every attempt to coordinate an EOR inspection with the host maintenance unit.

3.3.5. **EPU Check.** Pilots will ensure that maintenance technicians do not approach the aircraft until the EPU check is complete. Use a "thumbs up" signal or the intercom to indicate when it is safe.

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

3.4. Flight Lineup. 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 lead. If runway width permits, lineup with wingtip clearance between all aircraft in the flight.

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.

3.6. Takeoff:

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

3.6.2. 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.

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. When operating from airfields equipped with a compatible, remotely operated cable, ensure the departure end cable is raised for all takeoffs and landings unless another departure end cable is in place.

3.6.5. Wing/group commander or operations group commander (SOF for ANG/AFRC) 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. When centerline stores are carried, start the takeoff roll beyond a raised approach end cable, unless runway length, runway conditions (wet/icy), winds, gross weight or cable availability dictate otherwise.

3.6.7.1. Aircraft configured with a centerline fuel tank may takeoff across approach end BAK-12 arrestment cables which are tied down with an 8-point system. If the tie-downs are not inspected and maintained properly, cable slap and damage to the centerline fuel tank could occur.

3.6.8. Takeoff interval between aircraft/elements will be a minimum of 10 seconds (15 seconds for afterburner). 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.

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

3.6.10. (AETC) Solo FTU students, except current and mission qualified F-16 pilots undergoing formal qualification courses, will not takeoff when the crosswind component, including gusts, exceeds 20 knots (dry runway) or 15 knots (wet runway).

3.7. Formation Takeoff:

- 3.7.1. Formation takeoffs are restricted to elements of two aircraft.
- 3.7.2. Elements will be led by a qualified flight lead unless an IP or flight lead qualified squadron supervisor is in the element.
- 3.7.3. To takeoff in formation, aircraft must be within 2,500 pounds gross weight of each other and symmetrically loaded. Consider symmetrical loading as those store 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.
- 3.7.4. 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 or gust component exceeds 15 knots.
 - 3.7.4.4. Loaded with live munitions (excluding air-to-air missiles, 20mm ammunition, 2.75 rockets, AGM-88, AGM-65, and night illumination flares).
 - 3.7.4.5. Ferrying aircraft from contractor/AFMC facilities.
- 3.7.5. (USAFE) Weather must be 300 feet/1.6 km or the most restrictive pilot weather category in the flight, whichever is higher.

3.8. Join-up/Rejoin:

- 3.8.1. Day weather criteria for a VFR join-up underneath a ceiling is 1,500 foot ceiling and 3 miles visibility.
- 3.8.2. Flight leads will maintain 350 KIAS until join-up is accomplished unless mission requirements necessitate a different airspeed. Pilots may delay coming out of AB to help establish a rate of closure on the lead or lead element.
- 3.8.3. If a turning join-up is to be accomplished, the flight lead will not normally exceed 30 degrees of bank.
- 3.8.4. Flight members will join in sequence. For a straight ahead rejoin, the number two aircraft will join on the left wing and the second element will join on the right wing unless otherwise briefed. For a turning rejoin, the number two aircraft will rejoin on the inside of the turn and the second element to the outside. If mission or flight requirements dictate, the flight lead will specifically direct the desired formation positions.
- 3.8.5. When circumstances permit, flight leads will direct a battle damage/bomb check after each mission prior to or during RTB. This check is mandatory following the expenditure of any ordnance (including all types of 20mm ammunition). Established deconfliction responsibilities and position change procedures will be observed. Fly no closer than normal fingertip spacing.
- 3.8.6. For further join-up procedures, see Night Operational Procedures (paragraph [3.20.3.](#)) and [Chapter 4.](#)

3.9. Formation, General:

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

3.9.2. (PACAF) The flight lead is always responsible for flight actions, regardless of the physical position in which he flies. Wingmen should always be prepared to fly the number one position if, in the judgment of the flight lead, such action is warranted. The term element lead may be used to designate the number three aircraft in a flight of four.

3.9.3. In IMC, the maximum flight size in visual formation is four aircraft except when flying in close formation with a tanker (refer to T.O. 1-1C-30). Flights of greater than four are authorized IAW procedures outlined in paragraph 4.3.

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

3.9.5. Use airborne visual signals in accordance with AFI 11-205, *Aircraft Cockpit and Formation Flight Signals*, or detailed in local procedures. For four-ship flights, configuration changes will be initiated 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 at night or under instrument conditions.

3.9.6. Flight leads will not break up formations until each pilot has a positive fix from which to navigate (visual, radar, INS or TACAN).

3.9.7. The following procedures are for changing leads.

3.9.7.1. General:

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

3.9.7.1.2. The minimum altitude for changing leads within a formation is 500 feet AGL over land or 1,000 feet AGL over water (for night see paragraph 3.20.4.; for IMC see paragraph 4.6.).

3.9.7.2. Procedures:

3.9.7.2.1. 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.

3.9.7.2.2. Flight/element leads will not initiate a lead change, unless the aircraft assuming the lead is in a position from which the lead change can be safely initiated and visual contact maintained.

3.9.7.2.3. The lead change will be initiated by either visual signal or radio call (night/IMC).

3.9.7.2.4. Acknowledge receipt of the lead by a head nod or radio call, as appropriate.

3.9.7.2.5. The lead change is effective upon acknowledgment.

3.9.7.2.6. The former leader then moves to the briefed wing position.

3.9.8. (USAFE) **Close Formation.** Except for lazy-eight or chandelle type maneuvers, close formation aerobatics will not be flown.

3.9.9. (USAFE) **Dissimilar Formations.** Dissimilar aircraft may be flown in the same formation if mission requirements dictate or to expedite traffic flow during departures and recoveries. Specific procedures will be thoroughly briefed before flight.

3.10. Tactical Formations:

3.10.1. General:

3.10.1.1. **Tactical Maneuvering.** The following rules apply for flight path deconfliction during tactical maneuvering:

3.10.1.1.1. Wingmen/elements must maneuver relative to the flight lead/lead element and maintain sight. Trailing aircraft/elements are responsible for deconflicting with lead aircraft/elements.

3.10.1.1.2. Wingmen/elements will cross above the lead /lead element when deconfliction is required.

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

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

3.10.1.2.2. If the other flight member/element is also "Blind," then the flight lead 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. Climbs/descents through the deconfliction altitude should be avoided if possible.

3.10.1.2.3. If there is no timely acknowledgment of the original "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.

3.10.1.2.4. If visual contact is still not regained, the flight lead 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.

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

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

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

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

3.10.2.2.1. Tactical maneuvering places the leader in the wingman's "blind cone" or forces the wingman's primary attention away from the leader (e.g., wingman becomes engaged fighter).

3.10.2.2.2. The wingman calls "padlocked."

3.10.2.2.3. The wingman calls "blind."

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

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

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

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

3.11. Chase Formation:

3.11.1. **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 (i.e., OT&E, Weapon System Evaluation Program (WSEP), live weapons delivery, etc) and training conducted IAW AFI 11-2F-16V1, *F-16--Aircrew Training*, may be chased by Combat Mission Ready (CMR)/Basic Mission Capable (BMC) pilots designated by group/squadron commanders.

3.11.2. Procedures:

3.11.2.1. 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.

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

3.11.2.3. For live ordnance missions, the chase pilot is responsible for ensuring frag deconfliction is maintained for his aircraft.

3.12. Show Formation. These formations will be specifically briefed and flown IAW applicable directives. Refer to AFI 11-209, *Air Force Participation in Aerial Events*, and applicable MAJCOM (ANG/AFRC) directives for specific rules and appropriate approval levels to participate in static displays and aerial events.

3.12.1. (USAFE) Formations will be flown according to USAFER 55-20, *USAFE Participation in Aerial Events*.

3.13. Maneuvering Parameters:

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

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

3.13.1.2. Horn Awareness and Recovery series numbers 1, 2 and 3 - 10,000 feet AGL.

3.13.1.3. Horn Awareness and Recovery series numbers 4 and 5 - 15,000 feet AGL.

3.13.1.4. Aircraft will not descend below 5,000 feet AGL during any portion of aerobatic maneuvering.

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

3.13.3. Do not manually extend the trailing edge flaps in an attempt to improve aircraft performance. **EXCEPTION:** Trailing edge flaps may be manually extended during intercepts performed by air sovereignty tasked unit aircraft on targets traveling at less than 200 KIAS to allow night vision goggle (NVG) IDs at night in VMC.

3.13.4. Do not attempt to bypass flight control limiters to improve performance. Examples are: fuel transfer to alter center of gravity (CG), use of the manual pitch override (MPO) to gain additional negative G or unloading/applying full rudder then rolling and reapplying full aft stick at low airspeed.

3.13.5. The minimum airspeed for all maneuvering is based upon activation of the low speed warning tone. When the low speed warning tone sounds, the pilot will take immediate action to correct the low speed condition.

3.13.6. The following is guidance for Horn Awareness and Recovery Training Series (HARTS):

3.13.6.1. HARTS maneuvers will be flown IAW AFTTP 3-3V5.

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

3.13.6.3. In F-16 C/D Block 40/42 aircraft, HARTS maneuvers 4 and 5 will only be performed with any one of the following configuration combinations: Clean, 300 gallon centerline tank, MAU-12s on stations 3 and 7, and/or AIM-9/AMDs on stations 1 and/or 9.

3.14. Ops Checks:

3.14.1. Accomplish sufficient ops checks to ensure safe mission accomplishment. Additionally, each pilot should monitor the fuel system carefully throughout the flight 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:

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

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

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

3.14.1.4. Prior to entering an air-to-surface range, once while on the range if multiple passes are made and after departing the range.

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

3.14.2.1. (USAFE, ACC, PACAF, ANG, AFRC) If the G-suit malfunctions or becomes disconnected, terminate all ACBT maneuvering until normal operation is reestablished.

3.14.2.2. (AETC) If the G-suit becomes disconnected, terminate all maneuvering until normal operation is reestablished. If the G-suit cannot be reconnected or any other G-suit/Combat Edge malfunction is suspected, terminate all ACBT maneuvering and go to an alternate mission.

3.14.3. For formation flights, the flight lead will initiate ops checks by radio call or visual signal. Response will be made by radio call or visual signal.

3.14.3.1. The query and response for ops checks will be based on the location and amount of fuel (low tank needle, high tank needle, totalizer) with the fuel quantity selector knob in the NORM position. **EXCEPTION:** Total fuel only may periodically be used during high demand phases of flight.

3.14.3.2. 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.

3.14.4. Pilots should use extreme caution when unstrapping their lapbelts in flight because of the potential for lapbelt buckle/side-stick controller/throttle interference.

3.14.5. The G-awareness exercise should be accomplished when directed by AFI 11-214 in accordance with the procedures described in AFTTP 3-3V5.

3.14.5.1. (PACAF) The G-awareness maneuver will consist of at least two 90 degree turns. (The second turn of the g-awareness exercise for air-to-air sorties will be a minimum of 180 degrees of turn). The first turn will be a smooth onset rate to approximately 4 Gs. Pilots will use this turn to ensure proper g-suit operation and to practice their anti-g straining maneuver. Regain airspeed and perform another 90 degree turn at up to 6-7 Gs. If aircraft limits preclude either of the above, turns should be performed so as not to exceed aircraft limits. Do not perform systems checks or other items that detract from the intended purpose of the G-awareness maneuver.

3.14.5.2. A G-awareness maneuver will be accomplished prior to any tactical maneuvering, including range missions. Accomplish this maneuver in day or night VMC only.

3.14.5.2.1. **Night.** This requirement is not affected by the use of NVGs, however, all pilots must have enough visual cues to perform this maneuver. If visibility or discernible horizon is inadequate to fly this maneuver visually, pilots should reduce mission tasking to limit their maneuvering to five Gs. If the night mission is planned at and requires maneuvering of less than five Gs, then a G-awareness exercise is not required. Briefings for night G awareness maneuvers will emphasize wingman deconfliction procedures and maintaining spatial/situational awareness throughout the maneuver.

3.14.5.3. G-awareness exercises will be filmed in HUD and in Hot Mic. In addition, the tactical portion of all basic missions (BFM, SA, ACM, etc) will be flown in Hot Mic to enable assessment of the AGSM. For high task sorties (DACT, Composite Force, Opposed SAT, etc), it is highly desired for pilots to fly in Hot Mic.

3.15. 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. Do not use the radio as a flight "intercom". Use visual signals whenever practical.

- 3.15.1. Make a "Knock-It-Off"/"Terminate" radio call IAW AFI 11-214.
- 3.15.2. Radio channel changes are normally initiated either visually or verbally by the flight/mission lead. Radio check-ins are normally acknowledged in turn, by individual flight members. Exceptions will be briefed.
- 3.15.3. 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.
- 3.15.4. In addition to the standard radio procedures outlined in AFMAN 11-217, *Instrument Flight Procedures*; AFI 11-202V3, Specific Mission Guides and FLIP publications, the following radio transmissions are required:
 - 3.15.4.1. All flight members will acknowledge understanding the initial air traffic control (ATC) clearance. Acknowledge subsequent ATC instructions when directed by the flight lead or anytime during trail departures or trail recoveries.
 - 3.15.4.2. **Gear Checks.** Each pilot will make gear check on base leg or if making a VFR straight-in approach, not later than 3 miles on final. When flying instrument approaches, gear checks will be made in response to ATC instructions or no later than the final approach fix or glide path interception point. The wingman or chase need not make this call during a formation or chased approach.
- 3.15.5. Brevity code and other terminology will be IAW AFI 11-214 and AFTTP 3-1V1, *General Planning and Employment Considerations*.

3.16. Change of Aircraft Control. Both pilots of an F-16B/D must know at all times who has control of the aircraft. Transfer of aircraft control will be made with the statement "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 prebriefed otherwise.

3.17. General Low Altitude Procedures:

- 3.17.1. Low level formation positions/tactics will be flown using AFTTP 3-1V5 and AFTTP 3-3V5 as guides.
- 3.17.2. Line abreast formations are not authorized below 300 feet AGL.
- 3.17.3. Training in the 300 feet to 100 feet AGL altitude block will be in short segments consistent with real-world risks and realistic tactical considerations.
- 3.17.4. 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 overwater/featureless terrain, include specific emphasis on minimum altitudes and spatial disorientation.
- 3.17.5. 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 immediately direct a climb NLT 3 NM prior to the obstacle to an altitude that ensures vertical separation.
- 3.17.6. At altitudes below 1,000 feet AGL, wingmen will not fly at a lower AGL altitude than lead.

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

3.17.8. The minimum airspeed for low level navigation is 300 KIAS.

3.17.9. A pilot's minimum altitude will be determined and certified by the unit commander IAW AFI 11-2F-16V1, as supplemented. Pilots participating in approved step-down training programs will comply with the requirements and restrictions of that program. The following minimum altitudes apply to low level training unless higher altitudes are specified by national rules, route restrictions or a training syllabus:

3.17.9.1. 500 feet AGL for pilots who have not entered step-down training and who are not designated for flights at lower altitudes.

3.17.9.2. For night or IMC operation, the minimum altitude is 1,000 feet above the highest obstacle within 5 NM of course unless operating under the conditions of paragraph 3.18., LANTIRN Operations, or paragraph 3.21., Night Vision Goggles (NVG) Procedures.

3.17.10. 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).

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

3.17.11.1. (USAFE) Weather minimums in countries where minimum low level altitude is 1000 feet AGL are: ceiling 2,000 feet or 500 feet above planned flight altitude, whichever is higher, and visibility 8 KM. Minimums for low altitude intercept training in these countries are: 2,500 feet AGL and 8 KM visibility.

3.17.12. Low Level Route/Area Abort Procedures:

3.17.12.1. VMC Route/Area Abort Procedures:

3.17.12.1.1. Maintain safe separation from the terrain.

3.17.12.1.2. Comply with VFR altitude restrictions and squawk applicable (IFF/SIF) modes and codes.

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

3.17.12.1.4. Attempt contact with controlling agency, if required.

3.17.12.2. IMC Route/Area Abort Procedures:

3.17.12.2.1. Immediately climb to, or above, the computed RAA.

3.17.12.2.1.1. (USAFE) If national rules dictate a higher RAA, it will be used in lieu of computed RAA.

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

3.17.12.2.3. If deviations from normal route/area procedures are required, or if the RAA/MSA is higher than the vertical limits of the route/area, squawk (IFF/SIF) emergency.

3.17.12.2.4. Attempt contact with the appropriate ATC agency for an IFR clearance. If required to fly in IMC without an IFR clearance, cruise at appropriate VFR altitudes until IFR clearance is received.

3.18. LANTIRN Operations:

3.18.1. **Minimum Altitude.** The minimum altitude for LANTIRN training will be the higher of VR/IR/MOA minimum altitude or pilot minimum altitude as certified by the unit commander IAW AFI 11-2F16V1.

3.18.2. Vision Restriction Device (VRD) Restrictions:

3.18.2.1. VRDs will only be worn while conducting LANTIRN low-level training and LANTIRN weapon deliveries.

3.18.2.2. When a VRD is in use, a safety observer must be present. A safety observer is defined as a crewmember qualified in that aircraft in the rear cockpit of a two-place aircraft or another aircraft flying in the chase position (as defined in paragraph 3.11.). The chase aircraft must maintain continuous visual contact and have two-way radio communication between aircraft.

3.18.2.3. All restrictions in AFI 11-202V3 apply. When a VRD is in use with the safety observer in the rear cockpit, pilots are restricted to the same altitude and procedures they are cleared to for night LANTIRN operations.

3.18.3. Operational Procedures. All procedures in AFI 11-214 apply:

3.18.3.1. Terrain following is prohibited after any alignment other than a full performance INS ground alignment or extended interrupted alignment with a flashing RDY/ALIGN (status 10) displayed.

3.18.3.2. TFR/LANTIRN systems will be inflight checked using flight manual procedures on every flight involving TFR/LANTIRN operations.

3.18.3.3. Pilots must ensure all LANTIRN systems are functioning properly prior to sustained low-level operations. If any feature that is critical to overall system performance - Flight Control System (FLCS), INS, Combined Altitude Radar Altimeter (CARA) - is questionable or disabled, the checks and/or LANTIRN portion of the mission will be discontinued. All pilots will confirm by radio call that the TFR and radar altimeter are on and working properly before descending below the MSA; "(Call Sign), RALT ON, TFR ON."

3.18.3.4. The LANTIRN Attitude Advisory Function (LAAF) must be operational and set at the IP to TGT run-in MSA plus 5,000 feet for all night, self-designated laser-guided bomb (LGB) Loft deliveries.

3.18.3.5. For TFR/LANTIRN operations, the ALOW feature of the CARA will be set no lower than 90 percent of the set clearance plane (SCP). The CARA may be placed to standby or off only during air refueling operations. Pilots need to ensure the CARA is tracking properly when descending through 4,500 feet AGL.

3.18.3.6. Minimum airspeed for TFR navigation is 400 KCAS.

3.18.3.7. During descent, pilots will accomplish a 1,000 foot SCP level off prior to selecting a lower SCP.

3.18.3.8. Pilots will not conduct LANTIRN operations in IMC below the MSA and must abide by FLIP weather minimums while on military training routes.

3.18.4. **Abnormal Operation:**

3.18.4.1. Pilots who experience failure of the terrain following system or failure of the LANTIRN HUD/FLIR imagery system while flying low-level missions will immediately climb to the MSA or above. The mission may be continued at the MSA within the low-level structure provided the aircraft position is known. If aircraft position cannot be positively determined, pilots will terminate that portion of the mission and execute route abort procedures IAW paragraph [3.17.12](#).

3.18.4.2. If the TFR/LANTIRN system fails prior to route entry, pilots may still enter the route and continue the mission at the MSA, provided the above provisions are met.

3.18.4.3. Pilots will honor all system fly-ups and will not continue low-level operations below the MSA without TFR protection. The following procedures will be used at the first indication of a fly-up (pilots need only accomplish sufficient steps of the fly-up procedure to assure terrain clearance or until the fly-up terminates/clears):

3.18.4.3.1. Allow the fly-up to develop. **CAUTION:** If an automatic fly-up is not initiated by the system and aural or visual pull-up warnings are present, pilots will manually initiate a fly-up and comply with these procedures.

3.18.4.3.2. Throttle - As required. **CAUTION:** Military Power may be required to maintain a safe airspeed. Do not hesitate to use AB if required.

3.18.4.3.3. When terrain clearance ensured, Paddle Switch - Depress and release. **CAUTION:** Holding the paddle switch depressed inhibits fly-up commands to the FLCs.

3.18.4.3.4. If the system does not reset:

3.18.4.3.4.1. Climb to MSA. **CAUTION:** Using climb angles greater than 20 degrees can result in rapid airspeed bleed off. The use of AB and/or steep climb angles can result in spatial disorientation.

3.18.4.3.4.2. Level off at or above MSA and refer to checklist (if required).

3.18.4.3.4.3. If the malfunction can be reset, pilots may continue TFR operations.

3.19. **Air Refueling:**

3.19.1. Pilots undergoing initial/recurrency training in air refueling will not refuel with a student boom operator (does not apply to KC-10). IPs must confirm this with the boom operator prior to the initial/recurrency training.

3.19.2. Quick flow procedures are prohibited until procedures are established and incorporated into this volume and applicable air refueling guidance.

3.19.3. Pilots only need to carry T.O. 1F-16-1CL-1 (with associated air refueling portion) for refueling operations. There is no need to also carry the -30 checklist.

3.20. **Night Operational Procedures:**

3.20.1. **Night Ground Operations.** The anti-collision (strobe) light may be OFF and the position lights STEADY if they prove to be a distraction. 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.

3.20.2. **Night Takeoff.** Aircraft will maintain the anti-collision light ON and position lights FLASH for takeoffs, unless IMC will be encountered shortly after takeoff. **EXCEPTION:** For formation takeoffs, flight/element leads will turn the anti-collision light OFF and position lights STEADY after reaching the run-up position on the runway. During a night formation takeoff, brake release, gear retraction and AB termination 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 foot ceiling and 5 miles visibility. After join-up, the anti-collision light will be OFF and position lights will be STEADY for all except the last aircraft, which will keep the anti-collision light ON and position lights 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/EID 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, pilots will cross-check instruments to ensure ground clearance.

3.20.4.2. When operating without NVGs and/or LANTIRN TFR, do not change lead or wing positions below 1,500 feet AGL unless on RADAR downwind. Lead and position changes will be called over the radio and should be initiated from a stabilized, wings-level attitude.

3.20.5. **Night Fingertip Position.** Night fingertip formation is flown in approximately the same position as during the day. If illumination is insufficient to use day references, exterior lighting relationships can be used.

3.20.5.1. Align the upper wingtip light below the canopy position (formation) light. Stabilize, then move forward until the canopy position (formation) light, bottom formation light, and the position light on the engine inlet almost form an equilateral triangle.

3.20.5.2. Align vertically so that the wingtip light is approximately equidistant between the top and bottom formation lights. Another vertical reference is to fly so that the tail, wingtip, and position lights are in a straight line.

3.20.5.3. Align laterally so that the wingman's head is abeam the tail flood light. Avoid fixation on any one light or reference point to help reduce spatial disorientation.

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

3.20.7. **Night Landing.** Landings will normally be accomplished from an instrument straight-in approach. Refer to AFI 11-202V3, as supplemented, for specific procedures.

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

3.21. Night Vision Goggles (NVG) Procedures:

3.21.1. **Guidance.** USAF/MAJCOM guidance (including AFI 11-202V3, AFI 11-214, AFMAN 11-217V2, and AFI 48-123, *Medical Examination and Standards*), outlines NVG procedures. AFTTP 3-1V5 and AFTTP 3-3V5 incorporate expanded tactical guidance. MAJCOMs will establish and approve guidance for NVG operations for their units.

3.21.1.1. NVGs will only be worn in flight by NVG qualified pilots or by upgrading pilots with a qualified NVG IP in the flight. Familiarization flights are authorized in an F-16B/D if appropriate academics are accomplished and if an NVG IP occupies the front seat of the aircraft.

3.21.1.2. Fly with NVGs only in MAJCOM approved NVG compatible lighted cockpits. Permanently modified NVG compatible cockpits that have a degraded light source may be used for NVG missions at the discretion of the unit commander. Black electrical tape and Glendale green can be used for light leaks and lights not originally Night Vision Imaging System (NVIS) modified. Unit changes to MAJCOM authorized NVG lighting configurations, temporary or permanent, must be approved by the MAJCOM.

3.21.1.3. Pilots must ensure all control and performance instruments are sufficiently illuminated by an NVG-compatible light source. Lighting must provide for immediate reference to the pilot in the event they need to transition to instruments with loss of visual references.

3.21.1.4. All flight members will make a radio call when going "NVGs on" (NVGs are mounted, in the down position and in use) or "NVGs raised/stowed" (NVGs are on the helmet and in the raised and locked position / NVGs are off the helmet and secured in the cockpit). Don/doff NVGs in VMC, straight and level or climbing flight, and no closer than route formation. When flying in route, only one flight member per element will don/doff goggles at a time. Flight leads will call turns if forced to maneuver while flight members are donning/doffing NVGs.

3.21.1.5. Flight members must ensure adequate aircraft separation is maintained during donning/doffing and any necessary adjustments.

3.21.2. **Preflight.** NVGs must be preflight tested and adjusted/focused for the individual pilot using (in order of preference) the Hoffman ANV-20/20 Tester, a unit eye lane or equivalent tester prior to NVG operations. See AFI 11-301, *Aircrew Life Support Program*, for specific procedures.

3.21.3. **Takeoffs/Landings.** Do not wear or use NVGs during takeoff or landing. NVGs will be stowed during takeoff and landing. Do not don NVGs until at least 2,000 feet AGL or MSA (whichever is higher) in climbing or level flight and terrain clearance is ensured. Remove and stow NVGs approximately 5 minutes prior to landing to allow enough time to regain adequate visual acuity to perform the approach and landing.

3.21.4. **Illumination Levels:**

3.21.4.1. High Illumination (HI) and Low Illumination (LI) is defined in AFI 11-214.

3.21.4.2. Cease NVG operations anytime environmental conditions degrade NVG performance such that briefed formation positions can not be flown.

3.21.4.3. Weather or other conditions may cause actual illumination levels to be higher or lower than expected. In flight, pilots must estimate whether actual in-flight illumination levels are high or low, and determine if the existing conditions provide sufficient NVG performance to accom-

plish the planned mission and/or events. If weather or other conditions reduce actual in-flight illumination below high illumination levels, low illumination procedures will be followed.

3.21.5. **NVG Minimum Altitudes.** Minimum altitudes and established night weather minimum criteria while using NVGs is IAW AFI 11-202V3 and AFI 11-214.

3.21.5.1. Minimum altitude for combined LANTIRN/NVG operations is IAW **3.18.1**. Minimum altitude for LANTIRN/NVG operations out of TFR limits is 1,000 feet AGL (HI) or MSA (LI).

3.21.6. **Tanker Rejoins.** NVGs may be worn for night tanker operations, but will be in the raised or stowed position no later than the precontact position through actual contact and AAR. Goggles can be returned to the "on" position post-AAR, while still with the tanker.

3.21.7. **Formation.** Only NVG formations introduced in MAJCOM approved NVG upgrade programs will be flown.

3.21.8. **Weather Restrictions.** Fly all NVG sorties in VMC. AFI 11-202V3 and AFI 11-214 established night weather restrictions apply. Pilots wearing NVGs must comply with published VFR cloud clearance and visibility minimums, and have an IFR clearance prior to entering IMC.

3.21.9. **Air-to-Air Training.** All NVG air-to-air training requires a discernable horizon.

3.21.10. **Weapons Delivery:**

3.21.10.1. Range weather restrictions and minimum altitudes during weapons delivery passes are IAW AFI 11-214.

3.21.10.2. On Class A ranges, with the concurrence of the range control officer (RCO), pilots are allowed to choose external aircraft lighting settings that maximize training, minimize interference with NVGs, and still allow the RCO to safely monitor the aircraft. Depending on the lighting conditions and RCO equipment, this could involve normal, reduced, covert, or blacked-out lighting IAW AFI 11-214 (i.e., RCO with NVGs and sufficient aircraft lighting to allow safe control).

3.21.10.3. Pilots may conduct normal, reduced, covert, or blacked-out lighting weapons deliveries IAW AFI 11-214 on ranges which do not require RCO control. However, when working with a FAC-G/FAC-A, pilots, with FAC concurrence, should choose external lighting settings that safely permit final control.

3.21.11. **Battle Damage Checks.** Battle damage checks are authorized for NVG-equipped pilots.

3.21.12. **Inflight Emergencies with NVGs.** If NVGs are a hindrance to handling the emergency or the emergency may deteriorate into an ejection situation, remove and stow the NVGs.

3.21.13. **Abnormal Procedures:**

3.21.13.1. **Lost Sight.** If you lose sight within a flight, immediately ensure deconfliction to include separate altitudes if needed. Apply lost wingman procedures if required. Consider high-lighting position by increasing exterior lighting level, activating the afterburner, or deploying chaff/flares as the situation warrants.

3.21.13.2. **NVG Failure.** Ensure spatial orientation and separation from other aircraft and the ground before attempting to remedy the NVG failure.

3.21.13.2.1. Transition to instruments.

3.21.13.2.2. Perform lost wingman procedures if appropriate.

3.21.13.2.3. Climb above MSA / Route abort altitude if appropriate.

3.21.13.2.4. Terminate/Knock-It-Off (KIO) as applicable.

3.21.13.2.5. If needed, direct other aircraft in the vicinity to increase their external lights to non-NVG visible levels.

3.21.13.2.6. Attempt to regain NVG operation by switching to the opposite battery or changing the battery. If these steps do not solve the problem, stow NVGs and proceed with the non-NVG plan.

3.21.13.3. **Inadvertent Flight into the Weather.** Perform the first five steps under NVG failure, as appropriate, then climb/descend to attempt to regain VMC.

3.22. Fuel Requirements:

3.22.1. **Joker Fuel.** A pre-briefed fuel needed to terminate an event and proceed with the remainder of the mission.

3.22.2. **Bingo Fuel.** A pre-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:

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

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

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

3.22.4. **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:

3.22.4.1. **Minimum Fuel:**

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

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

3.22.4.2. **Emergency Fuel:**

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

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

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

3.23. Approaches and Landings:

3.23.1. The desired touchdown point for a VFR approach is 500 feet from the threshold, or the glide-path interception point for a precision approach. When local procedures or unique runway surface conditions require landing beyond a given point on the runway, the desired touchdown point will be adjusted accordingly.

3.23.2. Final approach will normally be flown at 11 degrees angle of attack (AOA). 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. F-16 following F-16), 6,000 feet for dissimilar fighter aircraft (e.g., F-16 following F-15) or as directed by MAJCOM or the landing base, whichever is higher. When wake turbulence is expected due to calm winds or when landing with a light tail wind, spacing should be increased.

3.23.2.1. (USAFE) Pilots will compare the computed final approach airspeed with AOA for all approaches.

3.23.3. 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 which have been modified with an 8-point tiedown system.

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

3.23.5. The following are landing restrictions:

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

3.23.5.2. When the RCR at the base of intended landing is less than 10, land at an alternate if possible.

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

3.23.5.4. (AETC) Solo FTU students undergoing formal qualification/requalification courses will land at an alternate, if possible, when the crosswind component, including gusts, exceeds 20 knots (dry runway) or 15 knots (wet runway).

3.24. Overhead Traffic Patterns:

3.24.1. Overhead patterns can be made with unexpended practice ordnance and unexpended live forward firing ordnance.

3.24.1.1. Normally, overhead traffic patterns will not be flown with live, unexpended free-fall ordnance.

3.24.1.2. Deployed OG/CCs may authorize overhead traffic patterns with live, unexpended free-fall ordnance when the threat condition at an airbase warrants it for force protection measures. This will allow aircraft to recover into the airbase in the quickest and most tactically prudent manner consistent with the threat. Armament System Malfunctions will be handled IAW paragraph [7.9](#).

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

3.24.3. 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).

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

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

3.25.1. Published overhead pattern altitude and airspeed will be used.

3.25.2. Specific procedures will be developed locally and coordinated with appropriate air traffic control agencies.

3.25.3. Four aircraft are the maximum permitted. Aircraft/elements more than 6,000 feet in trail will be considered a separate flight.

3.25.4. Regardless of the formation flown, no aircraft should be offset from the runway in the direction of the break. The intent is to avoid requiring a tighter than normal turn to arrive on normal downwind.

3.25.5. Normal downwind, base turn positions, and spacing will be flown.

3.26. Touch-and-Go Landings:

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

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

3.27. Low Approaches:

3.27.1. Observe the following minimum altitudes:

3.27.1.1. IP/FEs flying chase position - 50 feet AGL.

3.27.1.2. Formation low approaches - 100 feet AGL.

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

3.27.2. 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/climbout procedures or controller instructions dictate otherwise.

3.28. 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. Plan to arrive on downwind at 200-250 KIAS.

3.29. Back Seat Approaches and Landings:

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

3.29.2. 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.

3.30. Formation Approaches and Landings:

3.30.1. The following are general formation rules:

3.30.1.1. Formation landings will normally be accomplished from a precision approach. If not, use a published instrument approach or a VFR straight-in approach using the VASI lights, if available. In all cases, use a rate of descent similar to that of a normal precision approach.

3.30.1.2. A qualified flight lead must lead formation landings unless an IP or flight lead qualified squadron supervisor is in the element.

3.30.1.3. Aircraft must be symmetrically loaded (as defined in paragraph 3.7.3.).

3.30.1.4. Position the wingman on the upwind side if crosswind exceeds 5 knots.

3.30.1.5. The wingman will maintain a minimum of 10 feet lateral wingtip spacing.

3.30.1.6. If the wingman overruns the leader after landing, accept the overrun and maintain the appropriate side of the runway and aircraft control. Do not attempt to reposition behind the leader. The most important consideration is wingtip clearance.

3.30.2. Formation landings are prohibited when:

3.30.2.1. The crosswind or gust component exceeds 15 knots.

3.30.2.2. The runway is reported wet; or ice, slush or snow is on the runway.

3.30.2.3. The runway width is less than 125 feet.

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

3.30.2.5. Landing with hung ordnance or unexpended live ordnance (excluding live air-to-air missiles and 20mm ammunition).

3.30.2.6. The weather is less than 500 foot ceiling and 1½ miles visibility (or a flight member's weather category, whichever is higher). This applies to chased approaches and formation low approaches.

3.31. Use of Altimeters:

3.31.1. **General.** For those aircraft so equipped, the radar altimeter will be on for all flights. LIS altitude advisory will be used for those missions that are conducive to spatial disorientation (night/IMC) or where minimum altitudes must be observed (ACBT floors).

3.31.1.1. (PACAF) LIS MSL floor will be set, as appropriate, on all missions.

3.31.2. **Non-TFR Operations.** Set the ALOW function of the radar altimeter at either the briefed minimum altitude or the command-directed minimum altitude, whichever is higher.

3.31.3. **TFR Operations.** Set the ALOW function of the radar altimeter on and no lower than 90 percent of the briefed minimum altitude or 90 percent of the command-directed minimum altitude, whichever is higher.

3.32. (USAFE) Wind and Sea State Restrictions. Normal flying operations will not be conducted when surface winds along the intended route of flight exceed 35 knots steady state or when the sea state

exceeds 4 meters wave height. This is not intended to restrict operations when only a small portion of the route is affected. If possible, alter mission plan to avoid the area. The OG/CC or equivalent is the waiver authority.

Table 3.1. (USAFE) Weather Minimums Summary (In Feet/KM).

EVENT	MINIMUM
Formation Takeoff	300/1.6 (note 5)
Formation Approach/Landing or Chased Approach	500/2.4 (note 5)
VFR Rejoin (DAY)	1,500/5
VFR Rejoin (Night)	3,000/8
Low Level Navigation (Day)	1,500/8 (notes 1 & 3)
Low Altitude Intercepts	2,000/8 (note 4)
Touch-and-go landings	500/2.4
Range (Day Level)	1,500/5 (note 2)
Range (Day Climb/Dive)	2,000/5 (note 2)
Airborne Radar Approach	1,500/5
SFO	Day VMC (note 2)
Approach to Field Without DOD Minimums	1,500/5
<p>Notes:</p> <ol style="list-style-type: none"> 1. Unless national rules are higher. 2. Ceiling will be at least 500 feet above the highest portion of the pattern to be flown. Range orders may dictate higher minimums. 3. 2,000/8 in countries where minimum altitude is 1,000 feet AGL. 4. 2,500/8 in countries where minimum altitude is 1,000 feet AGL. 5. Minimum will be no lower than the most restrictive pilot weather category in the flight. 	

Chapter 4

INSTRUMENT PROCEDURES

4.1. Instrument Approach:

4.1.1. The F-16 is Approach Category E. Missed approach will be accomplished in accordance with flight manual procedures. Missed approach airspeed is 200-250 KIAS.

4.1.2. Approach Category D minimums may be used at an emergency/divert airfield where no Category E minimums are published. Airfields with Category D minimums may be designated as an alternate (divert) airfield. Further, practice instrument approaches may be flown using Category D minimums if VMC can be maintained throughout the procedure. Under these circumstances, Approach Category D minimums may be used provided:

4.1.2.1. A straight-in approach is flown.

4.1.2.2. The aircraft is flown at a final approach airspeed of 165 KIAS or less.

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

4.1.3. F-16s are approved to use INS/GPS only for enroute point to point (Lat/Long) Area Navigation (RNAV). The enroute navigation period may not exceed one and one half (1.5) hours between INS updates. An update is defined as establishing a positive position using visual references or onboard systems. Do not fly RNAV approaches.

4.1.4. GPS approaches are not approved for USAF F-16 aircraft.

4.2. Takeoff and Join-up:

4.2.1. The flight lead must notify the appropriate ATC agency when a VMC join-up is not possible due to weather conditions or operational requirements. Coordinate for an appropriate altitude block or trail formation. Formation in-trail departures will comply with instructions for a nonstandard formation flight as defined in FLIP. Flight lead should coordinate IFF procedures with ATC for wingmen in trail.

4.2.2. If weather is below 1,500 foot ceiling and 3 miles visibility, 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 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, immediately concentrate on flying the instrument procedure, then notify the flight lead. The flight lead will then notify ATC.

4.3.1.1. (USAFE) For all trail formations, flight lead will request non-standard formation from ATC.

4.3.2. Trail Departures:

- 4.3.2.1. Use a minimum of 20 seconds takeoff spacing.
- 4.3.2.2. Each aircraft/element will accelerate in MIL/AB power until reaching 350 KIAS. Climb at 350 KIAS until reaching cruise Mach/TAS, unless otherwise briefed. All turns will be made using 30 degrees of bank.
- 4.3.2.3. Upon reaching 350 KIAS, the flight lead will set a pre-briefed power setting.
- 4.3.2.4. On departure, each aircraft/element will follow the No Radar Contact procedures until all aircraft/elements have gained radar contact and called "tied."
- 4.3.2.5. Each aircraft/element will maintain 2-3 mile trail during the climb, unless otherwise briefed.

4.3.3. No Radar Contact:

- 4.3.3.1. The flight lead will call initiating all turns.
 - 4.3.3.1.1. (PACAF) The flight lead will call the new heading and navaid fix when initiating all turns to ensure all aircraft turn at the same point (**EXAMPLE:** Viper 11, turning right to 200, 180 radial/5 DME).
- 4.3.3.2. During climbs and descents, each aircraft/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/element calls "tied." In addition, each aircraft/element will call initiating any altitude or heading change. Acknowledgments are not required; however, it is imperative that preceding aircraft/elements monitor the radio transmissions and progress of the succeeding aircraft/elements and immediately correct deviations from the departure route or planned course.
- 4.3.3.3. Each aircraft/element will maintain 20 seconds or 2-3 mile spacing using all available aircraft systems and navigational aids to monitor position.
- 4.3.3.4. Each aircraft/element will maintain at least 1,000 feet vertical separation from the preceding aircraft/element during the climb/descent and at level-off until radar/visual contact is established, except in instances where departure instructions specifically preclude compliance.
- 4.3.3.5. In the event a visual join-up cannot be accomplished on top or at level-off, the flight lead will request 1,000 feet of altitude separation for each succeeding aircraft/element providing all aircraft can comply with MSA restrictions. If the MSA cannot be complied with, the 1,000 foot vertical separation may be reduced to 500 feet.

4.3.4. Radar Contact:

- 4.3.4.1. Each aircraft/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.
- 4.3.4.2. In flights of three or more aircraft, every attempt should be made to use radar information to help ensure that trail is maintained on the correct aircraft.
- 4.3.4.3. If radar contact is lost, a "c/s, lost contact" radio call will be made and the flight lead will direct No Radar Contact procedures (paragraph 4.3.3.) be re-established.

4.3.5. Trail Recovery:

4.3.5.1. Trail recovery procedures must be coordinated/approved through the responsible ATC facilities and addressed in a local operating procedure or in the unit supplement to this volume. Trail recoveries will only be accomplished at home stations/deployed locations where procedures have been established and briefed. As a minimum, procedures will address each recovery profile, missed approach, climbout, lost contact, lost communications and desired/maximum spacing requirements.

4.3.5.1.1. (PACAF) Trail recoveries are not authorized for initial arrival at bases other than the pilots' home base. Subsequent radar trail approaches at deployed locations are limited to two aircraft maximum.

4.3.5.2. Trail recovery is limited to a maximum of four aircraft.

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

4.3.5.4. Trail recoveries will not terminate in simultaneous PAR or ASR approaches. Recoveries to separate PAR/ASRs are authorized, flights will split prior to PAR/ASR final.

4.3.5.5. The flight lead will brief the flight on spacing, configuration and airspeeds. Minimum spacing between aircraft is 9,000 feet and will be maintained using on-board radar.

4.3.5.6. The flight lead will coordinate the trail recovery with ATC prior to taking spacing.

4.3.5.7. Prior to split-up, the flight lead will ensure that all wingmen have operative navigational aids and radar.

4.3.5.8. Formation break-up will be accomplished IAW paragraph 4.4. Flight separation will be accomplished in accordance with local ATC directives.

4.3.5.9. The formation will squawk as directed by ATC.

4.3.5.10. ATC instructions to the lead aircraft will be for the entire flight. ATC will provide radar flight following for the entire formation.

4.3.5.11. All turns are limited to a maximum of 30 degrees of bank.

4.3.5.12. Once established on a segment of a published approach, each aircraft will comply with all published altitudes and restrictions while maintaining in-trail separation.

4.3.5.13. Unless local procedures establish defined reference points for airspeed/configuration changes, the flight lead will direct changes by radio. When so directed by the flight lead, all aircraft will simultaneously comply with the directed change.

4.3.5.14. All aircraft will report the final approach fix.

4.3.5.15. If contact is lost with the preceding aircraft, the pilot will transmit "c/s, lost contact." The preceding aircraft will respond with altitude, airspeed and heading. Altitude deconfliction will be established and a separate clearance will be coordinated with ATC. If contact is lost after 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, aircraft will execute missed approach or climbout as instructed by ATC.

4.4. Formation Break-up. Formation break-up should not be accomplished in IMC. If unavoidable, IMC break-up will be accomplished in straight and level flight. Prior to an IMC break-up, the flight lead

will confirm position and transmit attitude, altitude, airspeed, and altimeter setting. Wingmen will acknowledge and confirm good navigational aids.

4.5. Formation Penetration:

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.

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

4.6. Formation Approach. During IMC, formation flights will not change lead or wing positions below 1,500 feet AGL unless on radar downwind.

4.7. Simulated Instrument Flight. Simulated instrument flight requires a qualified safety observer in the aircraft or in a chase aircraft.

4.7.1. The pilot in either cockpit of the F-16B/D may act as safety observer when the pilot in the other cockpit is flying simulated instruments. Under these conditions, an operable intercom is required. If radar is operable, it will also be utilized as an aid to clear the area.

4.7.2. A chase aircraft is required in order to log simulated instrument flight when solo in an F-16. This does not preclude flying multiple approaches in VMC without a chase; however, in this case the primary emphasis will be on the "See and Avoid" concept. Chase aircraft may move into close formation on final if a formation landing is intended and simulated instrument flight is terminated.

4.8. Use of the Heads Up Display (HUD):

4.8.1. In all F-16 Block 25/30/32 aircraft and Block 40/50 aircraft with Operational Flight Program (OFP) 40T5/50T4 (TV Code 117/115) and later OFPs, the HUD may be used as a primary instrument reference in night/IMC conditions. Do not use the HUD to recover from an unusual attitude or while executing lost wingman procedures except when no other reference is available.

4.8.2. For all other F-16 Blocks and OFPs, the HUD may be used as an additional instrument reference in night/IMC conditions; however, it will not be used as the sole instrument reference in these conditions. Do not use the HUD to recover from an unusual attitude or executing lost wingman procedures except when no other reference is available.

4.9. Airborne Radar Approach (ARA):

4.9.1. ARA Planning:

4.9.1.1. ARAs will be processed IAW AFI 11-230, *Instrument Procedures*.

4.9.1.2. ARA minimums will be no lower than ASR or TACAN minimums, whichever is higher.

4.9.1.3. IMC ARAs will only be flown in emergency situations or when the conditions in paragraph **4.9.1.4.** are met.

4.9.1.4. Approved ARAs may be practiced when weather is at or above ARA minimums (as depicted on the ARA approach plate) provided ground radar traffic advisories are available and utilized during the approach or a navigational aid (TACAN/ILS) is operational and monitored by

the pilot during the approach. If a navigational aid or ground radar is not available, ARAs will not be practiced unless weather is at or above 1,500 foot ceiling and 3 miles visibility.

4.9.2. ARA Procedures:

4.9.2.1. Approval for the practice approach will be obtained from the controlling agency prior to commencing the approach. The pilot will request IFR separation with radar flight following.

4.9.2.2. Fly to intercept the penetration heading prior to the fix, with no more than a 60 degree turn to penetration heading, if possible.

4.9.2.3. Begin the penetration when over the fix, descend and level off at the altitude specified for approach, or at 2,000 feet AGL, whichever is higher.

4.9.2.4. Identify the airfield on the radar scope and decrease radar range selection to keep the airfield near the center of the scope.

4.9.2.5. If the runway or reflectors cannot be defined, continue the approach by estimating the runway location in relation to the radar returns from the airfield.

4.9.2.6. Approximately 10 miles from the runway, descend to 1,500 feet AGL or local pattern altitude as specified.

4.9.2.7. At 5 miles from the runway, descend to the MDA or local pattern altitude, as specified. Descend so as to reach the MDA prior to the MAP.

4.9.2.8. Missed approach procedures will be as directed/published.

Chapter 5

AIR-TO-AIR WEAPONS EMPLOYMENT

5.1. References. AFI 11-214 contains air-to-air procedures, to include operations with live ordnance (air-to-air-missiles), applicable to all aircraft. This chapter specifies additional procedures or restrictions which are applicable to F-16 operations.

5.2. Simulated Gun Employment. The gun is considered SAFE and simulated gun employment is authorized if the following conditions are met:

5.2.1. **Preflight.** Accomplished IAW DASH-34 Cold Gun (SAFE) Procedures.

5.2.2. **In-Flight.** A trigger check must be performed with the Master Arm switch in SIMULATE and the aircraft pointed away from other aircraft and inhabited areas. If HUD symbology reads "ARM" or SMS/MFD symbology reads "RDY," do not depress the trigger or continue with simulated weapons employment. Regardless of Master Arm switch position, do not perform a trigger check with a "hot" gun.

5.3. Maneuvering Limitations:

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

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

5.3.3. All CAT 1 configurations are authorized for unlimited maneuvering, as defined by AFI 11-214.

5.3.4. (PACAF) Continuation training high-aspect BFM Training: A dedicated "fighter" and "training aid" must be clearly identified for each engagement. The "fighter" will have some kind of advantage (power, G available, lead turn advantage at the merge). Syllabus (MQT/FLUG/IPUG) high-aspect BFM will be conducted IAW the appropriate syllabus.

Chapter 6

AIR-TO-SURFACE WEAPONS EMPLOYMENT

6.1. References. AFI 11-214 contains air-to-surface procedures applicable to all aircraft. This chapter specifies procedures or restrictions applicable to F-16 operations. Qualification and scoring criteria are contained in AFI 11-2F16V1.

6.2. Off-Range Attacks. With expendable stores (bombs, external fuel tanks, TERs carted at the pylon, etc) loaded on the aircraft, simulated weapons will be loaded (zero quantity) in the SMS/MFD only on empty or uncarted/unexpendable stations. **EXCEPTION:** When loaded, captive Maverick and HARM missiles may be selected. The Master Arm switch will be confirmed in OFF or SIMULATE prior to the first attack.

6.2.1. (PACAF) Flight leads will verbally confirm all flight members have the Master Arm switch in OFF or SIMULATE and an empty weapons or uncarted/unexpendable station is selected on the SMS prior to the attack.

6.2.2. AFI 11-214 and the following apply:

6.2.2.1. Do not conduct off-range simulated weapons employment with hung ordnance aboard the aircraft.

6.2.2.2. Do not conduct off-range simulated weapons employment with live ordnance (except 20 mm) aboard the aircraft.

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

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

6.5. Night Weapons Delivery/Range Operations. All procedures in AFI 11-214 apply.

6.5.1. Compute a MSA for the entire bombing pattern.

6.5.2. Do not exceed 135 degrees of bank when returning to the low altitude structure following practice/actual night weapons deliveries.

6.5.3. (PACAF) For non-LANTIRN (non-TFR) missions, the minimum altitude for night weapons delivery is 2,000 feet AGL.

6.6. LANTIRN Weapons Delivery/Range Operations. All procedures in AFI 11-214 apply.

6.6.1. If CARA ALOW and/or LIS altitude advisory warnings are used for altitude cues on medium altitude weapons deliveries, care must be taken to reset them as appropriate when descending into the low-level structure.

6.6.2. The pilot will perform no duties (i.e., adjusting designation cursor on targeting pod) other than maintaining aircraft control from the initial pull-up during the performance of a night weapons deliv-

ery safe escape maneuver or during a night climbing delivery which employs a descent back to low altitude until the aircraft is recovered back within TFR limits and TFR indications are adequate to continue safe low altitude operations.

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

6.8. Live Ordnance Procedures:

6.8.1. Refer to AFI 11-214.

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

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

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

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

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

6.9. Strafe Procedures. To prevent accidental gun firing, pilots will not squeeze the trigger to the first detent, i.e. to turn the camera on, until they actually intend to fire the gun. This restriction only applies when the gun is armed and selected.

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.

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 indicators (Bit Balls) until it has been approved or cleared by maintenance. Verify that the appropriate technical order fault tree analysis has been accomplished.

7.1.3. Do not taxi an aircraft with nosewheel steering, brake system, or generator malfunctions /failures. F-16C/D aircraft may be taxied with a single generator failure (main or standby) if the other generator is operating normally.

7.1.4. Do not fly an aircraft at night or in IMC if the INS dumps during the EPU check and an INS battery warning PFL/MFL has occurred (F-16A/B: INS 026; F-16C/D: INS BATT WARN/INS 029). Although Block 50/52 aircraft do not have an inertial navigation unit (INU) battery, the PFL/MFL may indicate impending aircraft battery failure, therefore, the above procedures are still valid.

7.1.5. Once a malfunctioning aircraft system is isolated, that system will not be used again unless its use in a degraded mode is essential for recovery. Do not conduct ground or in-flight trouble-shooting after flight manual emergency procedures are completed.

7.1.6. In the F-16B/D, the pilot in command is primarily responsible for handling in-flight emergencies. The additional pilot will confirm that all critical action procedures have been accomplished and will provide checklist assistance at the request of the pilot in command.

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

7.1.8. (PACAF) When a fuel imbalance is greater than dash one limits, terminate tactical maneuvering and investigate. If the fuel problem was caused by a slow feeding external or internal fuel tank that can be corrected, vice a fuel system failure, the mission may continue IAW dash one guidance. If the fuel imbalance cannot be corrected terminate the mission. Instruments, deployment missions, level weapons deliveries and straight through non-maneuvering intercepts are authorized to reduce gross weight.

7.2. Ground Aborts:

7.2.1. If a flight member aborts prior to takeoff, the flight lead will normally renumber the flight to maintain a numerical call sign sequence. Flight leads will advise the appropriate agencies of such changes.

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

7.2.3. Pilots who do not takeoff with the flight may join the flight at a briefed rendezvous point prior to a tactical event or may fly a briefed alternate single ship mission. If 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.

7.3. Takeoff Aborts:

7.3.1. If an abort occurs during takeoff roll give call sign and state 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.

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

7.3.3. If aborting at or above 100 knots, lower the hook. If aborting below 100 knots, the tailhook should be lowered if there is any doubt about the ability to stop on the remaining runway.

7.4. Air Aborts:

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

7.4.2. Aborting aircraft with an emergency condition will be escorted to the field of intended landing. When other than an emergency condition exists, the flight lead will determine if an escort for the aborting aircraft is required.

7.4.3. The mission will be aborted, 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. The aircraft will land as soon as practical out of a straight-in approach.

7.4.3.3. Flight control system anomalies. This does not include flight control system lights that reset IAW flight manual procedures. This does include uncommanded departures from controlled flight.

7.4.3.4. Engine flameout/stagnation or shutdown.

7.4.4. Report all engine anomalies during maintenance debriefing.

7.5. Radio Failure:

7.5.1. Formation:

7.5.1.1. 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 practical and the NORDO aircraft led to the base of intended landing or a divert base. A formation approach to a drop-off on final should be performed unless safety considerations dictate otherwise.

7.5.1.2. 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.

7.5.2. Surface Attack NORDO Procedures:

7.5.2.1. Class A and Manned Class B Ranges:

7.5.2.1.1. Attempt contact with the RCO on the appropriate back-up frequency.

7.5.2.1.2. If contact cannot be re-established, make a pass by the range control tower on the attack heading while rocking wings and turn in the direction of traffic. The flight lead will direct another flight member to escort the NORDO to a recovery base or rejoin the flight and RTB.

7.5.2.1.3. If the NORDO aircraft has an emergency, make a pass by the range control tower, if practical, on the attack heading while rocking wings, turn opposite the direction of traffic, and proceed to a recovery base. The flight lead will direct a flight member to join-up and escort the emergency aircraft.

7.5.2.2. Unmanned Class B and Class C Ranges:

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

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

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

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

7.5.3. DART/Missile Firing NORDO Procedures:

7.5.3.1. Aircraft will not fire without two-way radio contact.

7.5.3.2. If radio failure occurs, safe the armament switches, join on another member of the flight or the tow aircraft, IAW paragraph [7.5.1](#).

7.5.3.3. DART tow aircraft experiencing radio failure will rock wings and continue the turn if an attack is in progress. The flight lead of the attacking aircraft will join on the tow's wing. Remain clear of the DART in the event it is cut. The tow pilot will use standard hand signals to indicate his difficulty. The flight lead will signal when the DART is cleared for cut with a slicing motion across the throat. After the DART is away and the flight lead determines there is no remaining

cable, he will take the lead, RTB with the tow aircraft on the wing, advise the tower of the NORDO and establish the appropriate landing pattern. If cable remains, follow local procedures.

7.5.4. **NORDO Recovery:**

7.5.4.1. The procedures in AFI 11-205 and FLIP apply.

7.5.4.2. 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 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.

7.5.4.3. If the NORDO aircraft intends to make an approach-end arresting gear engagement, he will signal the escorting aircraft by extending the tailhook. If the NORDO aircraft is not escorted, the pilot will fly a straight-in approach flashing the landing light on final to signal the tower/ROM.

7.6. Severe Weather Penetration. Do not attempt flight through severe weather. If unavoidable, flights should split-up and obtain separate clearances prior to severe weather penetration.

7.7. Lost Wingman Procedures. 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 execute the applicable lost wingman procedures while transitioning to instruments. Refer to paragraph 7.8. for specific SD considerations. Smooth application of control inputs is imperative to minimize the effects of SD. Once lost wingman procedures have been executed, permission to rejoin the flight must be obtained from the flight lead.

7.7.1. **Two- or Three-Ship Flights:**

7.7.1.1. **Wings-Level Flight.** In 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 separate clearance.

7.7.1.2. **Turns:**

7.7.1.2.1. **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.

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

7.7.1.2.3. **NOTE:** If in three-ship echelon, refer to four-ship lost wingman procedures.

7.7.1.3. **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 from approach control.

7.7.1.4. **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 from approach control.

7.7.2. **Four-Ship Flights.** If only one aircraft in the flight becomes separated, the previous procedures will provide safe separation; however, 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:

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

7.7.2.2. **Turns:**

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

7.7.2.2.2. **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 separate clearance. Leader will resume turn only when separation is ensured.

7.7.3. **Acknowledgment.** The flight lead should acknowledge the lost wingman's radio call and transmit attitude, heading, altitude, airspeed and other parameters as appropriate. Care must be taken to observe published terrain clearance limits.

7.7.3.1. (USAFE) Flight leads will be directive to ensure aircraft separation as required by the situation.

7.7.4. **IFF/SIF.** 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 select IFF/SIF 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.

7.7.5. **Practice.** Lost wingman procedures will be practiced only in VMC.

7.7.6. **Join-Up.** With flight lead permission, wingmen may rejoin if weather conditions permit and a visual join-up can be accomplished.

7.8. Spatial Disorientation. Conditions which prevent a clear visual horizon or increase pilot tasking are conducive to SD. To prevent SD, the pilot will make a conscious attempt to increase his instrument cross-check rate. When SD symptoms are detected, the following steps will be taken until symptoms abate:

7.8.1. **Single Ship:**

7.8.1.1. Concentrate on flying basic instruments with frequent reference to the attitude indicator. Use heads-down instruments. Defer nonessential cockpit tasks. If flying dual, transfer control to the other pilot.

7.8.1.2. If symptoms persist, bring aircraft to straight and level flight with reference to the attitude indicator, conditions permitting. Maintain straight and level flight, terrain permitting, until symptoms abate, usually 30-60 seconds. Use the autopilot if required.

7.8.1.3. If necessary, declare an emergency and advise ATC.

7.8.1.4. **NOTE:** It is possible for SD to proceed to the point where the pilot is unable to see, interpret or process information from the flight instruments. Aircraft control in such a situation is

impossible. A pilot must recognize when physiological/psychological limits have been exceeded and be prepared to abandon the aircraft.

7.8.2. **Formation Lead:**

7.8.2.1. A flight lead with SD will advise his wingmen that he has SD and he will comply with procedures in paragraph **7.8.1**.

7.8.2.2. If possible, wingmen should confirm attitude and provide verbal feedback to lead.

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

7.8.3. **Formation Wingman:**

7.8.3.1. Wingman will advise lead when disorientation makes it difficult to maintain position.

7.8.3.2. Lead will advise wingman of aircraft attitude, altitude, heading, and airspeed.

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

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 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 2-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 Break-up). The element with the SD pilot will remain straight and level while the other element separates from the flight.

7.9. **Armament System Malfunctions:**

7.9.1. **Inadvertent Release:**

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

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

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

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

7.9.2.1. **Hung Live Ordnance or Aircraft Malfunction which Precludes Further Live Weapons Delivery:**

7.9.2.1.1. All release and fuzing switches should be noted then safed.

7.9.2.1.2. Attempt to release store(s) using an alternate delivery mode. If unsuccessful, attempt to jettison store(s) using selective jettison procedures. Lastly, consider attempting to selectively jettison the rack if ordnance is unsecure or security cannot be determined.

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

7.9.2.2. **Practice/Inert Ordnance:**

7.9.2.2.1. Re-check switch positions and make an additional attempt to expend. If no release occurs, select an alternate delivery mode in an attempt to expend.

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

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

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

7.9.3. **Hangfire/Misfire:**

7.9.3.1. A missile that fires but fails to depart the aircraft is a hangfire. If this occurs, the missile should be closely observed and safety checked by a chase pilot.

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

7.9.3.3. **MAVERICK Misfire.** When a misfire occurs, safe the Master Arm switch and have the missile visually checked for smoke or fire. If either exists, the missile should be jettisoned on the range. If neither is noted, another pass may be attempted. If the second attempt fails, remain dry in the pattern for 15 minutes, if able, and proceed to the recovery base following hung ordnance recovery procedures.

7.9.4. **Hung Ordnance/Weapons Malfunction Recovery:**

7.9.4.1. Visually inspect the aircraft for damage, if practical.

7.9.4.2. Declare an emergency (not required for hung practice/inert ordnance or for live unexpended ordnance).

7.9.4.3. Obtain a chase aircraft (if available - N/A at night) and avoid populated areas and trail formations.

7.9.4.4. Land from a straight-in approach.

7.9.5. **Miscellaneous Procedures:**

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

7.9.5.2. When abnormal missile launch or erratic missile flight is noted after launch, the launching aircraft will be visually inspected (if possible) by another pilot to determine if any damage has occurred.

7.10. **Post Arresting Gear Engagement Procedures:**

- 7.10.1. Do not shut down the engine unless fire/other conditions dictate or directed to do so by the arresting gear crew.
- 7.10.2. Raise the tailhook on the signal from the arresting crew.
- 7.10.3. Do not taxi until directed to do so by the arresting gear crew.
- 7.10.4. Further procedures will be conducted IAW local unit directives (if applicable).

7.11. In-flight Practice of Emergency Procedures:

- 7.11.1. **Simulated Emergency Procedure.** Any procedure that produces an effect which would closely parallel the actual emergency, such as retarding the throttle to the degree which produces a drag equivalent to a flamed out or idle engine.
- 7.11.2. **Aborted Takeoff Practice.** All practice and/or training related to aborted takeoffs will be accomplished in the flight simulator, Cockpit Familiarization Trainer (CFT) or (if trainer unavailable) a static aircraft.
- 7.11.3. **Prohibited.** Practice in-flight engine shutdown is prohibited.
- 7.11.4. **Emergency Landing Patterns/Simulated Flameout (SFO).** Refer to AFI 11-202V3.
 - 7.11.4.1. **Field Requirements.** Practice of SFO/emergency landing patterns at active airfields is authorized provided that crash rescue and either an active tower or a ROM (or equivalent) is available and in operation.
 - 7.11.4.1.1. (USAFE) SFOs may only be practiced at USAF F-16 bases (Aviano, Spangdahlem, and Incirlik).
 - 7.11.4.2. **Supervisory Requirements.** The pilot must be CMR/BMC. IQT pilots (including FTU) require an IP on board the aircraft or in a chase aircraft. MQT pilots (including FTU) require a ROM or equivalent in place, or in-flight supervision from an IP/flight lead in the pattern and in a position to monitor all patterns.
 - 7.11.4.3. **SFO Procedures:**
 - 7.11.4.3.1. SFO training will be accomplished in Day/VMC conditions only.
 - 7.11.4.3.2. Specific procedures for conduct of SFO training will be established in letters of agreement with appropriate agencies and published in the unit supplement to this volume.
 - 7.11.4.3.3. The SFO pattern may be entered from any direction or altitude that will ensure the aircraft is properly configured prior to 2,000 feet AGL and in a position to safely complete the approach.
 - 7.11.4.3.4. An SFO will not be initiated or continued if a potential traffic pattern conflict exists which would require that the pilot divide attention between the SFO and sequencing with traffic. In addition, SFOs should be discontinued whenever excessive maneuvering is required, whether as a result of a traffic conflict or when making required/perceived corrections. Once discontinued, a go-around will be initiated and no attempt will be made to re-enter/complete that pattern/approach.
 - 7.11.4.3.5. **Radio Calls.** Calls will be made IAW local agreements or procedures. As a minimum, the following radio calls will be made:

7.11.4.3.5.1. "High Key."

7.11.4.3.5.2. "Low Key."

7.11.4.3.5.3. "Base Key, Gear Down, Intentions (Low Approach, etc)."

7.11.4.3.6. SFOs will be discontinued and a go-around initiated if airspeed drops below Dash One minimum airspeed any time between base key and the initiation of the flare or if unable to obtain wings level on final by 200 feet AGL.

7.11.4.3.7. SFOs will be flown to a low approach only.

7.12. Search and Rescue (SAR) Procedures. In the event an aircraft is lost in flight, actions must begin to locate possible survivors and initiate rescue efforts. It is imperative that all flight members aggressively pursue location and rescue of downed personnel even though they seem uninjured. 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. Specific procedures will be detailed in the unit supplement to this volume under Section F, Abnormal Procedures.

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

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

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

7.12.4. **Separate.** Remain above the last observed parachute altitudes until the position of all possible survivors is determined. If visual contact with parachute is not maintained, allow 1 minute per thousand feet (16 feet per second) for parachute descent. For example, if an ejection occurs at 10,000 feet AGL, the aircrew will be in the chute for approximately 10 minutes. All involved may be affected by temporal distortion. SARCAP aircrew must take note of parachute descent times to ensure they don't fly below the parachute altitude. This situation is more critical when visual contact with the chute is lost or hampered due to darkness or weather. Deconflict other aircraft assisting in the SAR by altitude to preclude midair collision. Establish high/low CAPs as necessary to facilitate communications with other agencies.

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

7.13. Critical Action Procedures (CAPs). Critical Action Procedures are contained in [Attachment 3](#).

Chapter 8

LOCAL PROCEDURES SUPPLEMENT

8.1. General. This supplement will be distributed to MAJCOM/NAF OPRs, as applicable. This supplement should not duplicate and will not be less restrictive than the provisions of this or any other publication without prior authorization from the appropriate MAJCOM/NAF OPR. Specific items should include, but need not be limited to those specified in paragraph **8.2**.

8.2. Local Operating Procedures. The purpose of the unit local operating procedures supplement is to document specific procedures dictated by local flying areas, missions and/or procedures. Post the unit supplement behind the basic volume. If requirements of this supplement are incorporated in another base instruction, a single page supplement will be used either referencing the base instruction, or as a cover for the entire instruction inserted, as appropriate. This supplement is not intended to be a single source document for procedures contained in other directives or instructions. Unnecessary repetition of guidance provided in other established directives should be avoided; however, reference to those directives is acceptable when it serves to facilitate location of information necessary for local operating procedures. This supplement is authorized to be issued to each F-16 pilot. MAJCOMs, or other subordinate agencies (NAF, Center, etc), may direct publications approval channels and a specific format for this supplement based on unique flying areas, missions and/or procedures. Unless changed by MAJCOM or subordinate agency, the following procedures apply:

8.2.1. When published, units will forward copies to MAJCOM and appropriate subordinate agencies for review. These agencies will forward any comments and/or required changes to the unit(s), if appropriate. The process need not delay distribution unless specified otherwise by MAJCOM or a subordinate agency. If a procedure is determined to be applicable to all F-16 units, it will be incorporated into the basic volume.

8.2.2. The local procedures supplement will be organized in the following format and will include, but is not limited to the following:

- 8.2.2.1. **Section A.** Introduction.
- 8.2.2.2. **Section B.** General Policy.
- 8.2.2.3. **Section C.** Ground Operations.
- 8.2.2.4. **Section D.** Flying Operations.
- 8.2.2.5. **Section E.** Weapons Employment.
- 8.2.2.6. **Section F.** Abnormal Procedures.
- 8.2.2.7. **Attachments.** Illustrations.

8.2.3. This supplement will include procedures for the following, if applicable:

- 8.2.3.1. **Command and Control.**
- 8.2.3.2. **Fuel Requirements and Bingo Fuels.**
- 8.2.3.3. **Diversion Instructions.**
- 8.2.3.4. **Jettison Areas/Procedures/Parameters (IFR/VFR).**

8.2.3.5. **Controlled Bailout Areas.**

8.2.3.6. **Local Weather Procedures.**

8.2.3.7. **Radar Trail Recovery Procedures.**

8.2.3.8. **Approved Alternate Missions.**

8.2.3.9. **Cross-Country Procedures.**

8.2.3.10. **Search and Rescue (SAR) Procedures.**

8.2.3.11. (PACAF) **Environmental Restrictions.** Each unit will establish local environmental restrictions to flight operations (i.e., winds, sea state or temperature) that are applicable to their geographic location. Unit commanders must weigh the risk versus the operational gain when defining these restrictions. These restrictions will be included in the unit local operating procedures.

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

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

AFI 11-202V3, *General Flight Rules*

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

AFI 11-209, *Air Force Participation in Aerial Events*

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

AFI 11-218, *Aircraft Operation and Movement on the Ground*

AFI 11-230, *Instrument Procedures*

AFI 11-2F-16V1, *F-16--Aircrew Training*

AFI 11-301, *Aircrew Life Support Program*

AFI 11-401, *Flight Management*

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

AFI 33-360V1, *Publications Management Program*

AFI 48-123, *Medical Examination and Standards*

AFMAN 11-217, *Instrument Flight Procedures*

AFTTP 3-1V1, *General Planning and Employment Considerations*

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

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

MCR 55-125, *Preparation of Mission Planning Materials (Tactical Aircraft)*

Abbreviations and Acronyms

ACBT—Air Combat Training

ACM—Air Combat Maneuver

ACMI—Air Combat Maneuvering Instrumentation

AFTTP—Air Force Tactics, Techniques, and Procedures

AGL—Above Ground Level

AGSM—Anti-G Straining Maneuver

ALOW—Automatic Low Altitude Warning

AMD—Acceleration Monitoring Device

AOA—Angle of Attack

ARA—Airborne Radar Approach

ASR—Airport Surveillance Radar
ATC—Air Traffic Control
AVTR—Airborne Video Tape Recorder
AWACS—Airborne Warning and Control System
BFM—Basic Fighter Maneuver
BMC—Basic Mission Capable
CAP—Critical Action Procedure
CARA—Combined Altitude Radar Altimeter
CFT—Cockpit Familiarization Trainer
CG—Center of Gravity
CHUM—Chart Update Manual
CMR—Combat Mission Ready
CE—Combat Edge
DACT—Dissimilar Air Combat Tactics
DLO—Desired Learning Objective
DMPI—Desired Mean Point of Impact
ECM—Electronic Counter Measure
EMCON—Emission Control
EMS—Engine Monitoring System
EOR—End of Runway
EP—Emergency Procedure
FAC—Forward Air Controller
FAC-A—Forward Air Controller-Air
FAC-G—Forward Air Controller-Ground
FAF—Final Approach Fix
FCIF—Flight Crew Information File
FE—Flight Examiner
FLCS—Flight Control System
FLIP—Flight Information Publications
FLUG—Flight Lead Upgrade Program
FOD—Foreign Object Damage
FTU—Formal Training Unit

GCI—Ground Control Intercept

GLOC—G-induced Loss of Consciousness

HARTS—Horn Awareness and Recovery Training Series

HI—High Illumination

HUD—Heads-Up Display

IFF—Identification, Friend or Foe

IFR—Instrument Flight Rules

ILS—Instrument Landing System

IMC—Instrument Meteorological Conditions

INS—Inertial Navigation System

INU—Inertial Navigation Unit

IP—Instructor Pilot or Initial Point

IPUG—Instructor Pilot Upgrade

IQT—Initial Qualification Training

IR—Instrument Route

JOAP—Joint Oil Analysis Program

KIO—Knock-It-Off

LAAF—Low Altitude Advisory Function

LANTIRN—Low Altitude Navigation and Targeting Infrared for Night

LEP—Laser Eye Protection

LGB—Laser-Guided Bomb

LI—Low Illumination

LIS—Line in the Sky

MAP—Missed Approach Procedure (Joint Pub 1-02); [Missed Approach Point] {USAF}

MDA—Minimum Descent Altitude

MFL—Maintenance Fault List

MOA—Military Operating Area

MPO—Manual Pitch Override

MQT—Mission Qualification Training

MSA—Minimum Safe Altitude

MSL—Mean Sea Level

NVG—Night Vision Goggles

NVIS—Night Vision Imaging System
OAP—Offset Aim Point
OFP—Operational Flight Program
OT&E—Operational Test & Evaluation
PAR—Precision Approach Radar
PDM—Programmed Depot Maintenance
PFL—Pilot Fault List
RAA—Route Abort Altitude
RCO—Range Control Officer
RCR—Runway Conditions Reading
RMSA—Recovery Minimum Safe Altitude
RNAV—Area Navigation
ROE—Rules of Engagement
ROM—Runway Operations Monitor
SA—Surface Attack or Situational Awareness
SAR—Search and Rescue
SAT—Surface Attack Tactics
SCP—Set Clearance Plane
SD—Spatial Disorientation
SFO—Simulated Flame Out
SOF—Supervisor of Flying
TAMSA—Target Area MSA
TDA—Tactical Decision Aid
TF—Terrain-Following
TFR—Terrain-Following Radar
TOLD—Takeoff and Landing Data
TOT—Time on Target
VFR—Visual Flight Rules
VMC—Visual Meteorological Conditions
VR—Visual Route
VRD—Vision Restriction Device
VTR—Video Tape Recorder

WSEP—Weapon System Evaluation Program**Terms**

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

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

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

Combat Edge (CE)—A positive-pressure breathing-for-G (PPG) system which provides pilots/WSOs 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 5-G and above, regulated air and oxygen are supplied to provide automatic mask tensioning, vest inflation, and positive pressure breathing to the mask.

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

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

Dissimilar ACBT (DACBT)—ACBT in conjunction with another MDS aircraft as adversary. The connotation (D)ACBT refers to either similar or dissimilar ACBT. These connotations correspond to all facets of ACBT (i.e., BFM, ACM, ACT).

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

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

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

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

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

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

Addresses

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1535 Command Dr, Suite D-309
Andrews AFB MD 20762-7002

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Attachment 2**FLIGHT BRIEFING GUIDES****A2.1. General Briefing Guide:****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. Tactical Decision Aid / Transmissivity / Absolute Humidity
- A2.1.1.8. NOTAMs / Bird Strike Potential
- A2.1.1.9. Personal Equipment
- A2.1.1.10. 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. FLIR Tuning / Boresight
- A2.1.2.3. Check-In
- A2.1.2.4. Taxi / Marshalling / Arming
- A2.1.2.5. Spare Procedures

A2.1.3. Takeoff:

- A2.1.3.1. Runway Lineup
- 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

A2.1.4.5. TFR Checks

A2.1.5. Recovery:

A2.1.5.1. Rejoin

A2.1.5.2. Battle Damage / Bomb 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

A2.1.6. Special Subjects (As Applicable):

A2.1.6.1. Instructor Responsibilities

A2.1.6.2. Chase Procedures

A2.1.6.3. IFF Procedures

A2.1.6.4. Radar / Visual Search Responsibilities / Midair Collision Avoidance

A2.1.6.5. Dissimilar Formations

A2.1.6.6. Terrain Avoidance

A2.1.6.6.1. Departure / En Route / Recovery

A2.1.6.6.2. Use of Radar Altimeters / Line-In-The-Sky MSL Floor Settings

A2.1.6.7. Bird Strike Procedures / Use of Visor(s)

A2.1.6.8. Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization and Complacency)

A2.1.6.9. G-Awareness

A2.1.6.9.1. Turn / G-Suit connection / G-tolerance

A2.1.6.9.2. Use of L-1 Anti-G Straining Maneuver

A2.1.6.10. Visual Illusions / Perceptions

A2.1.6.11. Spatial Disorientation / Unusual Attitudes / G-excess illusion

- A2.1.6.12. Lost Wingman
- A2.1.6.13. Radio Inoperative
- A2.1.6.14. SAR
- A2.1.6.15. Recall Procedures
- A2.1.6.16. SIIs
- A2.1.6.17. Pilot currencies for events to be flown

A2.2. NVG Considerations Briefing Guide. This guide is meant to highlight general NVG considerations, and provides a reference for a basic NVG briefing. All applicable NVG considerations should be incorporated into the specific briefing for the mission being flown.

A2.2.1. Weather / Illumination:

- A2.2.1.1. Civil / Nautical Twilight
- A2.2.1.2. Moon Rise/Set Times / Phase / Elevation / Azimuth
- A2.2.1.3. Ceiling / Visibility
- A2.2.1.4. LUX / EO TDA
- A2.2.1.5. Obscurants to Visibility

A2.2.2. NVG Preflight:

- A2.2.2.1. Check Adjustments / Helmet Fit and Security
- A2.2.2.2. Batteries
- A2.2.2.3. Resolution / Focus (Hoffman ANV-20/20 Tester, Eye Lane)
- A2.2.2.4. NVG Compatible Flashlight

A2.2.3. Cockpit Preflight:

- A2.2.3.1. Cockpit Setup
- A2.2.3.2. Cockpit Lighting (Leaks)
- A2.2.3.3. Cockpit FAM
- A2.2.3.4. Check Focus and Stow for Taxi

A2.2.4. Before Takeoff:

- A2.2.4.1. Don NVGs / Check and Adjust
- A2.2.4.2. Stow for Takeoff

A2.2.5. Airborne:

- A2.2.5.1. Exterior Lights
- A2.2.5.2. NVG Donning
- A2.2.5.3. Scan Pattern
 - A2.2.5.3.1. Forward Scan

A2.2.5.3.2. Narrow Field of View vs. Field of Regard

A2.2.5.3.3. Peripheral Vision

A2.2.5.3.4. Scan Techniques

A2.2.5.4. Join-up and Enroute Considerations

A2.2.5.4.1. Rejoin / Closure

A2.2.5.4.2. Air-to-Air TACAN

A2.2.5.4.3. G-Awareness Considerations

A2.2.5.4.3.1. Lighting

A2.2.5.4.3.2. Visible Horizon

A2.2.5.4.3.3. Deconfliction / Separation

A2.2.6. Mission:

A2.2.6.1. Route Study / Scene Interpretation

A2.2.6.1.1. NVG Predictions

A2.2.6.1.2. Terrain / Shadowing / Visual Illusions / Visible Horizon

A2.2.6.1.2.1. Terrain Avoidance

A2.2.6.1.2.2. Radar Altimeter

A2.2.6.1.2.3. TFR Usage

A2.2.6.1.3. City / Cultural Lighting

A2.2.6.1.3.1. Direction / Orientation of Lighting

A2.2.6.1.3.2. Formation Maneuvering

A2.2.6.2. Map Reading

A2.2.7. NVG Air-to-Air Employment Specifics:

A2.2.7.1. Tasking / Mission

A2.2.7.2. Tactics / Roles / Responsibilities

A2.2.7.3. Comm / NVG Specific Terminology

A2.2.7.4. Commit

A2.2.7.5. Intercept

A2.2.7.6. Merge

A2.2.7.7. NVG Visual Flying / Deconfliction

A2.2.7.8. Overshoot / Reposition Procedures

A2.2.7.9. Separations / KIOs

A2.2.8. Target Area:

A2.2.8.1. Rendezvous / Holding Procedures (NVG Differences)

A2.2.8.2. Target Study / Acquisition (NVG Predictions)

A2.2.8.3. Deliveries / Pattern Procedures

A2.2.8.3.1. Minimum Altitudes

A2.2.8.3.2. Flight Member Responsibilities

A2.2.8.3.3. Moth Effect / Vertical SD

A2.2.8.3.4. Deconfliction

A2.2.8.3.5. External Lighting

A2.2.8.4. Laser / IR Pointer Operations

A2.2.8.5. Threat ID and Reaction

A2.2.8.6. Egress

A2.2.9. F-16D NVG Procedures/Crew Coordination

A2.2.10. NVG Abnormal Situations/Emergencies:

A2.2.10.1. Lost Sight-NVGs

A2.2.10.2. Lost Wingman-NVGs

A2.2.10.3. Transition to Instruments

A2.2.10.4. Visual Illusions / Depth Perception

A2.2.10.5. Disorientation / Misorientation / Vertigo

A2.2.10.6. Fatigue

A2.2.10.7. NVG Failure

A2.2.10.8. Battery Failure / Swap Out

A2.2.10.9. Overconfidence in NVG Capabilities

A2.2.10.10. Correct Lighting of Primary / Secondary Flight Instruments

A2.2.10.11. Lost Comm (with Wingman / Target)

A2.2.10.12. Aircraft Emergency

A2.2.10.13. Ejection-Goggles-OFF

A2.2.10.14. Target Fixation

A2.2.10.15. Lack of Dive Information

A2.2.10.16. Target / Fighter Enters IMC

A2.2.10.17. No Tally by 1,500' Slant Range

A2.2.10.18. Radar Break Lock Inside 1,500'

A2.2.10.19. Excessive Overtake / Target Maneuvers

A2.2.10.20. Laser Eye Protection (LEP) Use

A2.2.10.21. Laser / IR Pointer Safety

A2.2.10.22. NVG FOD Considerations (Batteries, Equipment, etc)

A2.2.11. NVG ROE/Training Rules

A2.3. Specific Mission Briefing Guides:

Table A2.1. Index of Specific Mission Briefing Guides.

Specific Mission Briefing	Paragraph
Advanced Handling / Instrument Briefing Guide	A2.3.1.
Air Refueling Briefing Guide	A2.3.2.
Air Combat Training / Intercept Briefing Guide	A2.3.3.
Basic Fighter Maneuvers / Air Combat Maneuvering Briefing Guide	A2.3.4.
Escort Mission Briefing Guide	A2.3.5.
DART TOW Coordination Briefing Guide	A2.3.6.
DART Briefing Guide	A2.3.7.
Low-Level Navigation Briefing Guide	A2.3.8.
Air-to-Surface Weapons Employment Briefing Guides	A2.3.9.
A. Range Mission	A2.3.9.1.
B. Surface Attack Tactics	A2.3.9.2.
C. SEAD / Armed RECCE / Close Air Support	A2.3.9.3.
D. LANTIRN	A2.3.9.4.
E. Killer Scout	A2.3.9.5.
Alert Briefing Guide	A2.3.10.
Crew Coordination / Passenger / Ground Crew Briefing Guide	A2.3.11.
Mission Debriefing Guide	A2.3.12.

A2.3.1. Advanced Handling/Instrument Briefing Guide:

A2.3.1.1. Airwork:

A2.3.1.1.1. Airspace Restrictions

A2.3.1.1.2. Area Orientation

A2.3.1.1.3. Instructor Responsibilities

A2.3.1.1.4. Maneuvers

A2.3.1.2. Approaches:

A2.3.1.2.1. Frequencies

A2.3.1.2.2. Holding

A2.3.1.2.3. Penetration

A2.3.1.2.4. Missed Approach / Climb Out

A2.3.1.3. Special Subjects:

A2.3.1.3.1. G-Awareness

A2.3.1.3.2. Fuel Awareness / AB Use / Consumption Rates

A2.3.1.3.3. Maneuvering Limitations

A2.3.1.3.3.1. Airspeed and G

A2.3.1.3.3.2. Recognition / Prevention / Recovery From Out of Control

A2.3.1.3.3.3. Maneuvering at Heavyweight / High Angles of Attack / Asymmetrical Configuration

A2.3.1.3.3.4. Effects of CG Throughout the Flight

A2.3.1.3.3.5. Time to Ground Impact (Low Altitude)

A2.3.1.3.3.5.1. Wings Level

A2.3.1.3.3.5.2. Overbank / Under G

A2.3.1.3.4. Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization and Complacency)

A2.3.2. Air Refueling Briefing Guide:

A2.3.2.1. General:

A2.3.2.1.1. Tanker Call Sign(s) / Receiver Assignments

A2.3.2.1.2. Refueling Track(s)

A2.3.2.1.2.1. Altitude

A2.3.2.1.2.2. Airspeed

A2.3.2.1.2.3. Airspace Restrictions

A2.3.2.1.3. ARIPs, ARCPs, ARCTs

A2.3.2.1.4. Radio Frequencies

A2.3.2.2. Buddy Procedures:

A2.3.2.2.1. Departure

A2.3.2.2.2. Join-Up

A2.3.2.3. En Route:

A2.3.2.3.1. Route of Flight

A2.3.2.3.2. Formation

A2.3.2.3.3. Ops Checks

A2.3.2.4. Rendezvous:

A2.3.2.4.1. Type Rendezvous

- A2.3.2.4.2. Holding Procedures / Formation
- A2.3.2.4.3. Ground Radar Assistance
- A2.3.2.4.4. Tanker Identification - TACAN / Radar / Visual
- A2.3.2.4.5. Radar Procedures / Techniques
- A2.3.2.4.6. Wingman / Deputy Lead Responsibilities
- A2.3.2.4.7. Receiver Formation / Join-Up Procedures
- A2.3.2.4.8. Rendezvous Overrun

A2.3.2.5. Refueling:

- A2.3.2.5.1. Checklist Procedures
- A2.3.2.5.2. Radio Calls
- A2.3.2.5.3. Refueling Order
- A2.3.2.5.4. Techniques
 - A2.3.2.5.4.1. EMCON Level
 - A2.3.2.5.4.2. Visual Signals
- A2.3.2.5.5. Fuel Off-Load
- A2.3.2.5.6. Bingo Fuel (Abort Points / Abort Bases)
- A2.3.2.5.7. Drop-Off Procedures
- A2.3.2.5.8. Wake Turbulence

A2.3.2.6. Reform and Exit:

- A2.3.2.6.1. Formation
- A2.3.2.6.2. Clearance

A2.3.2.7. Emergency Procedures:

- A2.3.2.7.1. Breakaway Procedures
- A2.3.2.7.2. Systems Malfunctions
- A2.3.2.7.3. Damaged Receptacle

A2.3.2.8. IMC/Night Considerations:

- A2.3.2.8.1. Lost Wingman Procedures
- A2.3.2.8.2. Aircraft Lighting

A2.3.2.9. Special Subjects:

- A2.3.2.9.1. Fuel Awareness / AB Use / Consumption Rates
- A2.3.2.9.2. Flight Path Deconfliction / Other Receiver Considerations
- A2.3.2.9.3. Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization and Complacency)

A2.3.3. Air Combat Training/Intercept Briefing Guide:**A2.3.3.1. General/Adversary Coordination/GCI Coordination:**

A2.3.3.1.1. Call Signs

A2.3.3.1.2. Number and Type Aircraft

A2.3.3.1.3. Scenario

A2.3.3.1.3.1. Objective(s)

A2.3.3.1.3.2. Type Threat Simulated / Tactics Limitations (If Any)

A2.3.3.1.3.3. CAP Points / Target Locations

A2.3.3.1.3.4. Safe Areas / FEBA / Ground Threats

A2.3.3.1.3.5. VID / EID / BVR Criteria

A2.3.3.1.4. Mission Contingencies

A2.3.3.1.4.1. Single Radar Scope / No GCI

A2.3.3.1.4.2. Single Frequency

A2.3.3.1.4.3. Area Weather / Alternate Mission

A2.3.3.1.4.4. Aircraft Fallout Plan (Primary / Alternate Missions)

A2.3.3.1.4.5. Rejoin in Area for Late Takeoffs

A2.3.3.1.5. Area Information

A2.3.3.1.5.1. Controlling Agency (GCI / AWACS / ACMI)

A2.3.3.1.5.1.1. GCI / Flight

A2.3.3.1.5.1.2. Comm Requirements

A2.3.3.1.5.1.3. Type / Level of Control

A2.3.3.1.5.2. Airspace Restrictions

A2.3.3.1.5.3. CAP Points / Target Locations

A2.3.3.1.5.4. Frequencies

A2.3.3.1.5.5. Squawks

A2.3.3.1.5.6. Block Altitudes / Min Altitudes / Flight Parameters

A2.3.3.1.5.7. Transmissions

A2.3.3.1.5.7.1. KIO

A2.3.3.1.5.7.2. Shots / Kills

A2.3.3.1.5.7.3. Fuel / Altitude Awareness

A2.3.3.1.6. Rendezvous / Recovery Procedures / Dissimilar Formation

A2.3.3.1.7. Weapons Employment

- A2.3.3.1.7.1. Simulated Ordnance (Type / Quantity)
- A2.3.3.1.7.2. Shot Criteria
- A2.3.3.1.7.3. Kill Criteria / Removal
- A2.3.3.1.7.4. Shot / Kill Passage
- A2.3.3.1.8. Training Rules
- A2.3.3.1.9. Emergency Procedures
 - A2.3.3.1.9.1. Recovery
 - A2.3.3.1.9.2. Escort Procedures
- A2.3.3.1.10. Debriefing (Time / Place)
- A2.3.3.2. Flight/Element Tactics:**
 - A2.3.3.2.1. Avionics Set-up
 - A2.3.3.2.1.1. Radar
 - A2.3.3.2.1.2. INS
 - A2.3.3.2.1.3. IFF
 - A2.3.3.2.1.4. Air-to-Air TACAN
 - A2.3.3.2.2. CAP / Patrol Phase
 - A2.3.3.2.2.1. Type Pattern
 - A2.3.3.2.2.2. Formation / Altitude / Airspeed
 - A2.3.3.2.2.3. Search Responsibilities
 - A2.3.3.2.2.4. Commit
 - A2.3.3.2.2.4.1. Criteria / Range
 - A2.3.3.2.2.4.2. Procedures
 - A2.3.3.2.3. Ingress / Intercept Phase
 - A2.3.3.2.3.1. Formation / Altitude / Airspeed
 - A2.3.3.2.3.2. Detection
 - A2.3.3.2.3.2.1. Search Responsibilities (Radar / Visual)
 - A2.3.3.2.3.2.2. Radar Sorting
 - A2.3.3.2.3.3. Targeting Plan
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A2.3.4.6.4. Maneuvering Limitations

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A2.3.5.5.1. Type Mission (refer to appropriate mission briefing guide)

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A2.3.5.6. Special Subjects:

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A2.3.5.6.2. G-Awareness

A2.3.5.6.3. Fuel Awareness / AB Use / Consumption Rate

A2.3.5.6.4. Flight Path Deconfliction

A2.3.5.6.5. Maneuvering Limitations

A2.3.5.6.5.1. Airspeed and G

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A2.3.8.5. Training Rules/Special Operating Instructions

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A2.3.8.6.1. Type Mission (refer to appropriate mission briefing guide)

A2.3.8.6.2. Mission Objectives

A2.3.8.7. Special Subjects:

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A2.3.8.7.2. G-Awareness / Ops Checks

A2.3.8.7.3. Fuel Awareness / AB Use / Consumption Rates

A2.3.8.7.4. Flight Path Deconfliction

A2.3.8.7.5. Maneuvering Limitations

A2.3.8.7.5.1. Airspeed and G

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A2.3.8.7.6. Time to Ground Impact

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- A2.3.9.1.1.5. Formation
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A2.3.9.1.8.1. Type Mission (refer to appropriate mission briefing guide)

A2.3.9.1.8.2. Mission Objectives

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A2.3.9.1.9.5. G-Awareness

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A2.3.9.1.9.8.1. Wings Level

A2.3.9.1.9.8.2. Overbank / Under G

A2.3.9.1.9.9. Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization, and Complacency)

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A2.3.9.2.1.2. Low-Level (See Low-Level Briefing Guide)

A2.3.9.2.1.3. Fence Checks

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A2.3.9.2.2.1.3.3.1. Action Point / Pop Point

A2.3.9.2.2.1.3.3.2. Altitudes (Pull-Down / Apex / Release / Minimum)

A2.3.9.2.2.1.3.4. Visual Lookout / Mutual Support Responsibilities

A2.3.9.2.2.1.4. Egress

A2.3.9.2.2.1.4.1. Recovery / Return to Low Altitude

A2.3.9.2.2.1.4.2. Loss of Mutual Support / Rendezvous Point

A2.3.9.2.3. Range Departure Procedures:

A2.3.9.2.3.1. Armament Safety Checks

A2.3.9.2.3.2. Rejoin

A2.3.9.2.3.3. Battle Damage / Bomb Check

A2.3.9.2.3.4. Jettison Procedures / Parameters

A2.3.9.2.3.5. Hung / Unexpended Ordnance

A2.3.9.2.3.6. Inadvertent Release

A2.3.9.2.3.7. Gun Unsafe / Jam

A2.3.9.2.4. Mission Reporting (BDA/In-Flight Report)

A2.3.9.2.5. Contingencies:

A2.3.9.2.5.1. Rejoin for Late Takeoff

A2.3.9.2.5.2. Two / Three Ship Options

A2.3.9.2.5.3. Tactical Lead Changes

A2.3.9.2.5.4. Air-to-Air TACAN

A2.3.9.2.5.5. Codewords

A2.3.9.2.5.6. Weather Backup Deliveries

A2.3.9.2.5.7. Degraded Systems

A2.3.9.2.5.8. Reattack

A2.3.9.2.5.9. Wounded Bird / Escort Procedures

A2.3.9.2.6. Night Procedures:

A2.3.9.2.6.1. Aircraft Lighting

A2.3.9.2.6.2. Radio Calls

A2.3.9.2.6.3. Target ID / Range Lighting

A2.3.9.2.6.4. Night Spacing Techniques

A2.3.9.2.6.5. Instrument Cross-check / Disorientation

A2.3.9.2.6.6. Flare Pattern

A2.3.9.2.6.6.1. Flare Release Points and Interval

A2.3.9.2.6.6.2. Wind Effect / Offset

A2.3.9.2.6.6.3. Dud Flare Procedures

A2.3.9.2.6.6.4. Switching Aircraft Patterns

A2.3.9.2.7. Training Rules/Special Operating Instructions

A2.3.9.2.8. Alternate Mission:

A2.3.9.2.8.1. Type Mission (refer to appropriate mission briefing guide)

A2.3.9.2.8.2. Mission Objectives

A2.3.9.2.9. Special Subjects:

A2.3.9.2.9.1. Error Analysis

A2.3.9.2.9.2. Fouls

A2.3.9.2.9.3. Minimum Altitudes

A2.3.9.2.9.4. Target Fixation

A2.3.9.2.9.5. G-Awareness

A2.3.9.2.9.6. Fuel Awareness / Ops Checks / AB Use / Consumption Rates

A2.3.9.2.9.7. Maneuvering Limitations

A2.3.9.2.9.7.1. Airspeed / G / Stress (Carriage / Release)

A2.3.9.2.9.7.2. Recognition / Prevention / Recovery from Out of Control

A2.3.9.2.9.8. Time to Ground Impact

A2.3.9.2.9.8.1. Wings Level

A2.3.9.2.9.8.2. Overbank / Under G

A2.3.9.2.9.9. Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization and Complacency)

A2.3.9.3. Suppression of Enemy Air Defense (SEAD)/Armed Recce/Close Air Support:

A2.3.9.3.1. General Information:

A2.3.9.3.1.1. Intelligence / Threat Scenario

A2.3.9.3.1.2. Low Level

A2.3.9.3.1.3. En Route Formation(s) / Look Out Responsibilities / LOWAT (if applicable)

A2.3.9.3.1.4. Fence Checks

A2.3.9.3.1.5. Ordnance / Weapons Data

A2.3.9.3.1.5.1. Type / Fuzing

A2.3.9.3.1.5.2. Weapons Settings

A2.3.9.3.1.5.3. Live Ordnance Procedures / Minimum Altitudes

A2.3.9.3.1.5.3.1. Safe Escape / Safe Separation

A2.3.9.3.1.5.3.2. Fuse Arming / Frag Avoidance

A2.3.9.3.1.5.3.3. Missile Launch Parameters

A2.3.9.3.1.5.4. Laser Operations

A2.3.9.3.1.6. Control Agency

A2.3.9.3.1.6.1. Call Sign

A2.3.9.3.1.6.2. Frequencies

A2.3.9.3.1.7. Coordination

A2.3.9.3.1.7.1. Attack Package Times / Support

A2.3.9.3.1.7.2. Other Electronic Combat Assets

A2.3.9.3.1.7.3. Data Gathering / Passage

A2.3.9.3.1.7.4. Airspace Restrictions

A2.3.9.3.1.7.5. Mission Number

A2.3.9.3.1.7.6. Friendly Forces

A2.3.9.3.1.7.7. Play Time

A2.3.9.3.2. Suppression of Enemy Air Defense (SEAD)/Armed Recce/Close Air Support Procedures:

A2.3.9.3.2.1. Working Area

A2.3.9.3.2.2. Formations / Working Altitudes

A2.3.9.3.2.3. Target Types / Threat Array

A2.3.9.3.2.4. Attack Tactics

A2.3.9.3.3. Weapons Delivery:

A2.3.9.3.3.1. Tactics

A2.3.9.3.3.1.1. Type Delivery

A2.3.9.3.3.1.2. Switchology

A2.3.9.3.3.1.3. Attack Parameters

A2.3.9.3.3.1.3.1. Action Point / IP / Pop Point

A2.3.9.3.3.1.3.2. Altitude (Pull-Down / Apex / Release / Minimum)

A2.3.9.3.3.1.4. Visual Lookout / Mutual Support Responsibilities

A2.3.9.3.3.1.5. Egress

A2.3.9.3.3.1.5.1. Recovery / Return to Low Altitude

A2.3.9.3.3.1.5.2. Loss of Mutual Support / Rendezvous Point

A2.3.9.3.3.2. Battle Damage / Bomb Check

A2.3.9.3.3.3. Mission Reporting (BDA / In-Flight Report)

A2.3.9.3.4. Combat SAR Procedures:

A2.3.9.3.4.1. Communications Procedures

A2.3.9.3.4.2. Downed Aircraft Procedures

A2.3.9.3.4.3. On-Scene Commander

A2.3.9.3.4.4. Fuel Considerations

A2.3.9.3.4.5. Ordnance Considerations

A2.3.9.3.5. Contingencies:

A2.3.9.3.5.1. Two- / Three-Ship Option

A2.3.9.3.5.2. Tactical Lead Changes

A2.3.9.3.5.3. Air-to-Air TACAN

A2.3.9.3.5.4. Code Words / Comm Out Signals

A2.3.9.3.5.5. Weather Back-Up Deliveries

A2.3.9.3.5.6. Degraded Systems

A2.3.9.3.5.7. Reattack

A2.3.9.3.5.8. Asymmetrical Considerations

A2.3.9.3.5.9. Jettison Procedures / Parameters

A2.3.9.3.5.10. Hung / Unexpended Ordnance Procedures

A2.3.9.3.5.11. Wounded Bird / Escort Procedures

A2.3.9.3.6. Training Rules/Special Operations Instructions

A2.3.9.3.7. Alternate Mission:

A2.3.9.3.7.1. Type Mission (Refer to appropriate mission briefing guide)

A2.3.9.3.7.2. Mission Objectives

A2.3.9.3.8. Special Subjects:

A2.3.9.3.8.1. Error Analysis

A2.3.9.3.8.2. Fouls

A2.3.9.3.8.3. Minimum Altitudes

A2.3.9.3.8.4. Target Fixation

A2.3.9.3.8.5. G-Awareness

A2.3.9.3.8.6. Fuel Awareness / Ops Checks / AB Use / Consumption Rates

A2.3.9.3.8.7. Maneuvering Limitations

A2.3.9.3.8.7.1. Airspeed / G / Stress (Carriage / Release)

A2.3.9.3.8.7.2. Recognition / Prevention / Recovery from Out of Control

A2.3.9.3.8.8. Time to Ground Impact

A2.3.9.3.8.8.1. Wings Level

A2.3.9.3.8.8.2. Overbank / Under G

A2.3.9.3.8.9. Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization and Complacency)

A2.3.9.4. LANTIRN:**A2.3.9.4.1. Weather:**

A2.3.9.4.1.1. Sunset / Moonrise / Moonset / Illumination

A2.3.9.4.1.2. Tactical Decision Aid

A2.3.9.4.1.2.1. Transmissivity

A2.3.9.4.1.2.2. Absolute Humidity

A2.3.9.4.1.2.3. Solar Elevation

A2.3.9.4.1.2.4. IR Visibility

A2.3.9.4.2. Personal Equipment:

A2.3.9.4.2.1. Flashlight

A2.3.9.4.2.2. VRD / HUD Bonnet (If Required, Day Only) / NVG

A2.3.9.4.3. Preflight:

A2.3.9.4.3.1. Nav Pod

A2.3.9.4.3.2. Manual TF Fly-up Switch - ENABLE (Inboard)

A2.3.9.4.4. After Engine Start:

A2.3.9.4.4.1. DFLCS Check

A2.3.9.4.4.2. Nav Pod Power-up

A2.3.9.4.4.3. IBITS

A2.3.9.4.4.4. FLIR / TGP Tuning

A2.3.9.4.4.5. FLIR / TGP Boresight

A2.3.9.4.4.6. Maverick Boresight

A2.3.9.4.5. **Takeoff FLIR Visual Illusions**

A2.3.9.4.6. **TFR Check:**

A2.3.9.4.6.1. Setup

A2.3.9.4.6.2. Formation

A2.3.9.4.6.3. Procedures

A2.3.9.4.6.4. Abnormal Procedures

A2.3.9.4.7. **Holding Procedures**

A2.3.9.4.8. **Letdown:**

A2.3.9.4.8.1. Checks

A2.3.9.4.8.2. Transition to TF Operations

A2.3.9.4.8.3. Cross-check

A2.3.9.4.8.4. Priorities / Responsibilities

A2.3.9.4.9. **Route:**

A2.3.9.4.9.1. IR Factors

A2.3.9.4.9.2. Formation

A2.3.9.4.9.2.1. Priorities

A2.3.9.4.9.2.2. Responsibilities

A2.3.9.4.9.3. Timing

A2.3.9.4.9.4. Airspeed / Altitude (SCP)

A2.3.9.4.9.5. RAA / MSA

A2.3.9.4.9.6. Route Abort Procedures

A2.3.9.4.9.7. Emergency Airfields

A2.3.9.4.9.8. Terrain / Obstacle Avoidance

A2.3.9.4.9.9. Updates

A2.3.9.4.9.10. Snaplooks / Look-into-the-Turn

A2.3.9.4.9.11. IR Predictions

A2.3.9.4.9.12. Radar Predictions

A2.3.9.4.10. **Target Area:**

A2.3.9.4.10.1. IR Factors

- A2.3.9.4.10.2. Formation
- A2.3.9.4.10.3. Deconfliction
- A2.3.9.4.10.4. Timing
- A2.3.9.4.10.5. Airspeed / Altitude (SCP)
- A2.3.9.4.10.6. RAA / MSA
- A2.3.9.4.10.7. Obstacles
- A2.3.9.4.10.8. Target Description / Acquisition
 - A2.3.9.4.10.8.1. Photos
 - A2.3.9.4.10.8.2. IR
 - A2.3.9.4.10.8.3. Radar
 - A2.3.9.4.10.8.4. OAP / VRP / VIP
- A2.3.9.4.10.9. Visual References
- A2.3.9.4.10.10. Delivery Options
 - A2.3.9.4.10.10.1. Parameters
 - A2.3.9.4.10.10.2. Escape Maneuver
 - A2.3.9.4.10.10.3. DMPI
 - A2.3.9.4.10.10.4. Obstacles
- A2.3.9.4.10.11. Egress
- A2.3.9.4.11. **Landing:**
 - A2.3.9.4.11.1. FLIR Visual Illusions
 - A2.3.9.4.11.2. FLIR Boresight Shift
- A2.3.9.4.12. **Abnormal Procedures:**
 - A2.3.9.4.12.1. FLIR / TFR Fail
 - A2.3.9.4.12.2. FLIR / TFR Degraded
 - A2.3.9.4.12.3. Poor IR Visibility
 - A2.3.9.4.12.4. Fly-ups Procedures
 - A2.3.9.4.12.5. Prism Stall / Spin
 - A2.3.9.4.12.6. Hung Bomb / No-Spot
 - A2.3.9.4.12.7. Aircraft Emergencies
- A2.3.9.4.13. **Special Subjects:**
 - A2.3.9.4.13.1. Ops Checks
 - A2.3.9.4.13.2. LANTIRN Training Rules

A2.3.9.4.13.3. LANTIRN Operational Restrictions

A2.3.9.4.13.4. LANTIRN Maneuvering Limitations

A2.3.9.4.13.5. Descent Checks

A2.3.9.4.13.6. Transition from Medium to Low Level TF Ops (Comfort Level, Complacency)

A2.3.9.4.13.7. Spatial Disorientation

A2.3.9.4.13.8. Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization and Complacency)

A2.3.9.5. Killer Scout:

A2.3.9.5.1. General Information:

A2.3.9.5.1.1. Frag

A2.3.9.5.1.1.1. Kill Zone Grid

A2.3.9.5.1.1.1.1. Description

A2.3.9.5.1.1.1.2. Threats

A2.3.9.5.1.1.1.3. Coordinates

A2.3.9.5.1.1.1.4. GEOREFs

A2.3.9.5.1.1.1.5. Friendlies Who Share Grid / Call Signs for Swapout (In / Out)

A2.3.9.5.1.1.2. Vul Times

A2.3.9.5.1.1.3. Ordnance / Fuzing

A2.3.9.5.1.1.4. Flights To Be Controlled

A2.3.9.5.1.1.4.1. Call Sign

A2.3.9.5.1.1.4.2. Mission Number

A2.3.9.5.1.1.4.3. Fraggd Tgt and TOT

A2.3.9.5.1.1.5. High Value Tgts in Kill Zone

A2.3.9.5.1.1.6. Area Flow Plan

A2.3.9.5.2. Killer Scout Employment Procedures:

A2.3.9.5.2.1. Ingress

A2.3.9.5.2.1.1. Check-In

A2.3.9.5.2.1.2. Fence Check

A2.3.9.5.2.1.3. Formation / RADAR Search

A2.3.9.5.2.1.4. Flow Plan / Deconfliction

A2.3.9.5.2.1.5. Swapout Options

A2.3.9.5.2.2. Area Coordination Radio Procedures (VHF/UHF)

A2.3.9.5.2.3. Scouting Procedures

A2.3.9.5.2.3.1. Formation Responsibilities

A2.3.9.5.2.3.2. Binocular Use

A2.3.9.5.2.3.3. Lead Changes

A2.3.9.5.2.3.4. INS Marks

A2.3.9.5.2.4. Killer Scout Control / Fighter Briefing Procedures

A2.3.9.5.2.4.1. Fighter Check-In

A2.3.9.5.2.4.2. Fighter Brief

A2.3.9.5.2.4.3. Target Marks

A2.3.9.5.2.4.4. Fighter / Scout Flow Plan

A2.3.9.5.2.4.5. Target BDA

A2.3.9.5.2.4.5.1. From Fighters

A2.3.9.5.2.4.5.2. Scout Assessment

A2.3.9.5.2.5. Scout Weapons Delivery

A2.3.9.5.2.5.1. Mixed Ordnance Considerations

A2.3.9.5.2.5.2. Drop Priority

A2.3.9.5.2.5.3. Attack Plans / Procedures / Techniques

A2.3.9.5.2.6. Scout Egress Plan

A2.3.9.5.2.6.1. Joker / Bingo

A2.3.9.5.2.6.2. Exit Flow Plan / Deconfliction

A2.3.9.5.2.6.3. Handoff / Swapout / Transition

A2.3.9.5.2.6.4. In-flight Reports / BDA

A2.3.9.5.2.7. Contingencies

A2.3.9.5.2.7.1. Weather

A2.3.9.5.2.7.2. High / Low Altitude Employment Considerations

A2.3.9.5.2.7.3. Battle Damage / Wounded Bird Procedures

A2.3.9.5.2.7.4. Ejection / SAR Plan

A2.3.9.5.3. **Special Subjects:**

A2.3.9.5.3.1. G-Awareness

A2.3.9.5.3.2. Fuel Awareness / AB Use / Consumption Rates

A2.3.9.5.3.3. Flight Path Deconfliction

A2.3.9.5.3.4. Maneuvering Limitations

A2.3.9.5.3.4.1. Airspeed and G

A2.3.9.5.3.4.2. Recognition / Prevention / Recovery from Out of Control

A2.3.9.5.3.4.3. Time to Ground Impact

A2.3.9.5.3.4.3.1. Wings Level

A2.3.9.5.3.4.3.2. Overbank / Under G

A2.3.9.5.3.5. Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization, and Complacency)

A2.3.10. **Alert Briefing Guide.** This guide is all inclusive and is designed to incorporate all the applicable items from the General Briefing Guide. If a specialized mission such as air refueling is anticipated, the specific briefing guide for that mission should also be used.

A2.3.10.1. **Mission Data:**

A2.3.10.1.1. Time Hack

A2.3.10.1.2. Mission Data Card

A2.3.10.1.2.1. Call Signs

A2.3.10.1.2.2. Aircraft / Location / Status

A2.3.10.1.2.3. Takeoff / Landing Data (Worst Case)

A2.3.10.1.2.4. Joker / Bingo Fuel

A2.3.10.1.3. Actual / Forecast Weather

A2.3.10.1.3.1. Homebase

A2.3.10.1.3.2. Alternates

A2.3.10.1.3.3. Individual Weather Category / Mandatory Status

A2.3.10.1.4. NOTAMs

A2.3.10.1.5. FCIF / Pubs / Maps

A2.3.10.1.6. Personal Equipment

A2.3.10.1.7. Alert Packet

A2.3.10.1.7.1. Authenticators / Duress Code

A2.3.10.1.7.2. Security Procedures

A2.3.10.1.8. Airfield Status

A2.3.10.1.8.1. Actual versus Max Allowable Tailwind

A2.3.10.1.8.2. Barriers

A2.3.10.1.8.3. Navigation Aids

A2.3.10.1.8.4. Hazards to Taxi / RCR

A2.3.10.2. **Ground Procedures:**

A2.3.10.2.1. Aircraft / Armament Preflight

A2.3.10.2.2. Cockpit Set-Up

A2.3.10.2.3. Engine Run / Hot Preflight

A2.3.10.2.4. Crew Chief Briefing

A2.3.10.2.5. Quick Check Procedures

A2.3.10.3. Launch Procedures:

A2.3.10.3.1. Notification / UHF Frequency / Authentication Requirement

A2.3.10.3.2. Status

A2.3.10.3.2.1. Airborne Order

A2.3.10.3.2.2. Battle Stations

A2.3.10.3.2.3. Runway Alert

A2.3.10.3.2.4. Scramble

A2.3.10.3.3. Taxi

A2.3.10.3.4. Takeoff / Runway Lineup / Interval / Formation

A2.3.10.3.4.1. Day VMC

A2.3.10.3.4.2. Day IMC

A2.3.10.3.4.3. Night VMC

A2.3.10.3.4.4. Night IMC

A2.3.10.3.5. Join Up / Trail Formation / Power Settings / Airspeeds

A2.3.10.4. In-Flight Procedures:

A2.3.10.4.1. Formation

A2.3.10.4.2. Airspeeds

A2.3.10.4.3. Weapons Safe Checks

A2.3.10.4.4. Radar Search Responsibilities

A2.3.10.4.5. Degraded Fire Control System

A2.3.10.4.6. Transfer of Lead Procedures

A2.3.10.4.7. Ops Checks

A2.3.10.4.8. EMCON Procedures

A2.3.10.4.9. Region MSA

A2.3.10.4.10. VID Procedures

A2.3.10.4.10.1. Authority Required to Close

A2.3.10.4.10.2. Formation / Tactics

A2.3.10.4.10.3. Range / Altitude Separation Requirements on Target Prior Permission to Close With / Without Visual Contact

A2.3.10.4.10.4. Radar Lock-On Requirements

A2.3.10.4.10.5. Maximum Closure Speed

A2.3.10.4.10.6. Minimum Airspeed

A2.3.10.4.10.7. Loss of Contact Procedures

A2.3.10.4.10.8. Breakaway Procedures

A2.3.10.4.10.9. Restrictions

A2.3.10.4.11. Aircraft in Distress

A2.3.10.4.11.1. Minimum Closure Distance

A2.3.10.4.11.2. Visual Signals - Day / Night

A2.3.10.4.11.3. Escort Procedures

A2.3.10.4.11.4. Recovery / Landing Visual Signals

A2.3.10.4.11.5. Dissimilar Formation Procedures

A2.3.10.4.12. Jettison Procedures

A2.3.10.4.13. Lost Wingman

A2.3.10.4.14. SAR

A2.3.10.4.15. Emergency Airfields

A2.3.10.5. Special Subjects:

A2.3.10.5.1. Emergency of the Day

A2.3.10.5.2. Fuel Awareness

A2.3.10.5.3. Maneuvering Limitations

A2.3.10.5.4. Recognition / Prevention / Recovery from Loss of Control

A2.3.10.5.5. Spatial Disorientation

A2.3.10.5.6. Recall Procedures

A2.3.10.5.7. Rules of Engagement / Training Rules / Special Operating Instructions

A2.3.10.5.8. Human Factors Considerations (i.e., Channelized Attention, Task Saturation / Prioritization, and Complacency)

A2.3.10.6. Ground Crew Briefing:

A2.3.10.6.1. Act Only On Pilot's Instructions

A2.3.10.6.2. Ground Emergency Procedures

A2.3.10.6.3. Hand Signals

A2.3.10.6.4. Aircraft Danger Areas

A2.3.11. Crew Coordination/Passenger/Ground Crew Briefing Guide:**A2.3.11.1. Crew Coordination/Passengers:**

A2.3.11.1.1. Pre-Flight

A2.3.11.1.2. Prohibited Items

A2.3.11.1.3. Cockpit Layout

A2.3.11.1.4. Flight Maneuvering Parameters

A2.3.11.1.5. Change of Aircraft Control

A2.3.11.1.6. Rear Seat Landing Procedures

A2.3.11.1.7. Emergencies

A2.3.11.1.7.1. Runway Departure

A2.3.11.1.7.2. Canopy Loss

A2.3.11.1.7.3. Ejection / Egress (With and Without Intercom) / Ejection Mode Selector Handle Position

A2.3.11.1.7.4. Loss of Intercom

A2.3.11.1.7.5. Bird Strike Procedures / Use of Visor(s)

A2.3.11.1.8. Flight Control Interference

A2.3.11.1.8.1. Rudder Interference - Rudder Pedal Adjustment

A2.3.11.1.8.2. Stick Interference - Lapbelt, Utility Light, Personal Equipment, Leg Position, Paddle Switch Override

A2.3.11.2. Ground Crew:

A2.3.11.2.1. Act Only On Pilot's Instructions

A2.3.11.2.2. Ground Emergency Procedures

A2.3.11.2.3. Hand Signals

A2.3.11.2.4. Aircraft Danger Areas

A2.3.12. Mission Debriefing Guide:

A2.3.12.1. Ground Procedures

A2.3.12.2. Takeoff/Join-Up/Departure

A2.3.12.3. En Route Procedures

A2.3.12.4. Recovery/Landing/After Landing

A2.3.12.5. General:

A2.3.12.5.1. SIIs

A2.3.12.5.2. Radio Procedures

A2.3.12.5.3. Flight Discipline / Effectiveness

A2.3.12.6. Training Rules/Special Operating Instructions

A2.3.12.7. Mission Accomplishment/Analysis:

A2.3.12.7.1. Mission Reconstruction

A2.3.12.7.2. Mission Support

A2.3.12.7.3. VTR / Film Assessment

A2.3.12.7.4. Anti-G Straining Maneuver Effectiveness

A2.3.12.7.5. Learning Objectives Achieved

A2.3.12.7.6. Lessons Learned

A2.3.12.7.7. Recommendations for Improvement

A2.3.12.8. Comments/Questions

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 (i.e., Stores - Jettison) may be performed out of sequence, if conditions warrant.

A3.1.1. FIRE/OVERHEAT/FUEL LEAK (GROUND):

A3.1.1.1. Throttle - Off

A3.1.1.2. JFS - Off

A3.1.1.3. Fuel Master Switch - Off

A3.1.2. GROUND EGRESS:

A3.1.2.1. Throttle - Off

A3.1.2.2. Seat - Safe

A3.1.2.3. Belt / Kit / Harness / G-Suit - Release

A3.1.3. ABORT:

A3.1.3.1. Throttle - Idle

A3.1.3.2. Hook - Down (Above 100 Knots or If Required)

A3.1.4. AB MALFUNCTION ON TAKEOFF (TAKEOFF CONTINUED):

A3.1.4.1. Throttle - MIL

A3.1.4.2. Stores - Jettison (If Required)

A3.1.5. ENGINE FAILURE ON TAKEOFF (TAKEOFF CONTINUED):

A3.1.5.1. Zoom

A3.1.5.2. Stores-Jettison (If Possible)

A3.1.5.3. Eject

A3.1.6. ENGINE FIRE ON TAKEOFF (TAKEOFF CONTINUED):

A3.1.6.1. Climb

A3.1.6.2. Stores - Jettison (If Required)

A3.1.7. LOW THRUST ON TAKEOFF/AT LOW ALTITUDE (NON-AB):**A3.1.7.1. PW 200:**

A3.1.7.1.1. EEC/BUC Switch - Off.

A3.1.7.1.2. If Thrust Is Still Insufficient:

A3.1.7.1.3. Throttle - MAX AB.

A3.1.7.1.4. If Thrust Is Still Insufficient:

A3.1.7.1.5. Throttle - MIL

A3.1.7.1.6. EEC/BUC Switch - BUC

A3.1.7.1.7. If Nozzle Fails To Close After Transferring To BUC Or If Thrust Is Still Insufficient:

A3.1.7.1.8. EEC/BUC Switch - OFF

A3.1.7.1.9. Throttle - MAX AB

A3.1.7.1.10. Stores - Jettison (If or When Required)

A3.1.7.2. GE100/129 / PW220/229:

A3.1.7.2.1. Throttle - AB.

A3.1.7.2.2. If Thrust Is Still Insufficient Or AB Does Not Light:

A3.1.7.2.3. Engine Control Switch - SEC

A3.1.7.2.4. Stores - Jettison (If Required)

A3.1.8. ENGINE FAILURE/AIRSTART:

A3.1.8.1. PW200:

A3.1.8.1.1. Zoom (If at Low Altitude)

A3.1.8.1.2. Stores - Jettison (If Required)

A3.1.8.1.3. Throttle - OFF

A3.1.8.1.4. Airspeed - As Required

A3.1.8.1.5. EEC/BUC Switch - As Required.

A3.1.8.1.6. When RPM Is Between 40-25 Percent And FTIT Is Below 700 Degrees:

A3.1.8.1.7. Throttle - IDLE

A3.1.8.1.8. JFS - Start 2 When Below 20,000 Feet and 400 KIAS

A3.1.8.2. PW220:

A3.1.8.2.1. Zoom (If At Low Altitude)

A3.1.8.2.2. Stores - Jettison (If Required)

A3.1.8.2.3. Throttle - OFF

A3.1.8.2.4. Airspeed - As Required.

A3.1.8.2.5. When RPM Is Between 50-25 Percent And FTIT Is Below 700 Degrees:

A3.1.8.2.6. Throttle - IDLE

A3.1.8.2.7. JFS - Start 2 When Below 20,000 Feet and 400 KIAS

A3.1.8.3. PW229:

A3.1.8.3.1. Zoom (If at Low Altitude)

A3.1.8.3.2. Stores - Jettison (If Required)

A3.1.8.3.3. Throttle - OFF, then Midrange

A3.1.8.3.4. Airspeed - As Required

A3.1.8.3.5. JFS - Start 2 When Below 20,000 Feet and 400 KIAS

A3.1.8.4. GE100/129:

A3.1.8.4.1. Zoom (If at Low Altitude)

A3.1.8.4.2. Stores - Jettison (If Required)

A3.1.8.4.3. Throttle - OFF, then Midrange.

A3.1.8.4.4. If A Relight Does Not Occur Before RPM Decays Below 50 Percent, Or If Below 10,000 Feet AGL:

A3.1.8.4.5. Engine Control Switch - SEC

A3.1.8.4.6. Airspeed - As Required

A3.1.8.4.7. JFS - Start 2 When Below 20,000 Feet and 400 KIAS

A3.1.9. OUT-OF-CONTROL RECOVERY:

A3.1.9.1. Controls - Release

A3.1.9.2. Throttle - (GE) Idle, (PW) MIL if in AB.

A3.1.9.3. If In An Inverted Deep Stall:

A3.1.9.4. Rudder - Opposite Yaw Direction (Delete this step for Block 40/42/50/52 aircraft).

A3.1.9.5. If Still Out-Of-Control:

A3.1.9.6. MPO Switch - OVRD and Hold

A3.1.9.7. Stick - Cycle in Phase