BY ORDER OF THE SECRETARY OF THE AIR FORCE

AIR FORCE MANUAL 11-2A-10C, Volume 3

22 JANUARY 2020
Certified Current, 6 NOVEMBER 2023
Flying Operations

A-10C--OPERATIONS PROCEDURES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

ACCESSIBILITY: Publications and forms are available for downloading or ordering on the e-Publishing website at **www.e-publishing.af.mil**.

RELEASABILITY: There are no releasability restrictions on this publication.

OPR: ACC/A3TO

Certified by: AF/A3T
(Maj Gen James A. Jacobson)

Supersedes: AFI11-2A-10CV3, 22 March 2012

Pages: 90

This publication establishes effective and safe operations of the A-10C and implements Air Force Policy Directive (AFPD) 11-2, *Aircrew Operations,* AFPD 11-4, *Aviation Service,* and references Air Force Instruction (AFI) 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*. This Air Force Manual (AFMAN) applies to all A-10C units in the Regular Air Force, Air National Guard and Air Force Reserve. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) AFMAN 33-363, *Management of Records*, and disposed of IAW the Air Force Records Disposition Schedule located in the Air Force Records Information Management System. Refer recommended changes and questions about this publication to the office of primary responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. Air Combat Command/Air Operations (ACC/A3) will coordinate all changes to the basic volume with all Major Command/Air Operations (MAJCOM/A3s). This publication may be supplemented at any level, but route all direct supplements to Air Force Flight Standards Agency (A3OF) and Air Combat Command/Flight Operations and Training (ACC/A3TO) for coordination prior to certification and approval. Field units below MAJCOM, direct reporting unit (DRU), field operating agency (FOA) level should forward copies of their supplements of this publication to their parent MAJCOM/ DRU/FOA OPR for pre-publication review. **Note**: The above applies only to those DRUs/FOAs that report directly to Headquarters Air Force (HAF). Copies of MAJCOM/DRU/FOA-level supplements, after approved and published, will be made available on the e-Publishing website at **https://www.e-publishing.af.mil**. The authorities to waive wing/unit level requirements in this publication are

identified with a Tier ("T-0, T-1, T-2, T-3") number following the compliance statement. See AFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the requestor's commander for non-tiered compliance items. Additional waiver authority to this publication is described in **paragraph 1.2**.

SUMMARY OF CHANGES

This document has been substantially revised and should be completely reviewed. Night Vision Device (NVD) term consolidates all forms of night vision equipment. Tiered waiver authorities (T-levels) have been added per AFI 33-360.

Chapter 1

GENERAL GUIDANCE

1.1. Roles and Responsibilities. This manual prescribes procedures for operating the A-10C aircraft under most circumstances. It is not a substitute for sound judgment or approval to override any existing aircraft limitation. Procedures not specifically addressed may be accomplished if they enhance safe and effective mission accomplishment.

1.1.1. Commanders. Commanders at their respective tier levels are responsible for complying with guidance in this Manual. A-10C flying unit wing commanders, delegated no lower than the operations group commander (or equivalent), are responsible for providing local operating guidance to supplement the requirements in **Chapter 8** of this manual.

1.1.2. Pilot in Command (PIC) Authority. The PIC, regardless of rank, is responsible for, and is the final authority for the operation of the A-10C aircraft. PICs should use their best judgement to safely conduct flying operations.

1.1.3. Deviations. Deviations from these procedures require a specific waiver unless an urgent requirement or an aircraft emergency dictate otherwise. In that case, the PIC will take the appropriate action to safely recover the aircraft.

1.1.4. Supplements. Comply with applicable supplements referenced in this volume. Develop additional supplements IAW AFI 33-360.

1.2. Waivers. Forward waiver requests to the applicable MAJCOM/A3 or equivalent, or Commander Air Force Forces (COMAFFOR) for those pilots and assets under the COMAFFOR's oversight, for approval. The COMAFFOR, MAJCOM/A3 (or equivalent) will notify ACC/A3 of waivers within 72 hours of issuance. **(T-1)** Wing commanders will notify the publication OPR within 72 hours of waiver approval. **(T-1)** IAW AFI 33-360, a copy of the approved waiver must follow within 30 days of issuance **(T-1)**. An email to the waived publication OPR that includes a completed AF Form 679, *Air Force Publication Compliance Item Waiver Request/Approval* or equivalent will suffice. Waiver authority for supplemental guidance will be as specified in the supplement and approved through higher level coordination authority.

Chapter 2

MISSION PLANNING

2.1. Responsibilities. All flight members, as well as the operations and intelligence functions in the unit, share the responsibility for mission planning.

2.2. General Procedures.

2.2.1. Accomplish sufficient flight planning to ensure safe mission accomplishment to include fuel requirements, unit planning center data, map preparation and takeoff/landing data (TOLD). In addition, consult AFIs 11-202V3, *General Flight Rules* and AFI 11-214, *Air Operations Rules and Procedures,* for mission planning.

2.2.2. Standards. The appropriate unit commander is the approval authority for unit standards. Operations Group Standardization/Evaluations (OGV) will review standards for standardization and compliance with AFI/AFMAN 11-series guidance. **(T-2)**.

2.2.3. Fuel Conservation. Aviation fuel is a limited commodity and precious resource. Consider fuel efficiency throughout all phases of mission planning and execution. Design flight plans and routing for optimal fuel use. Consider in-flight procedures such as climb or descent profiles and power settings for efficient fuel usage.

2.3. Map/Chart Preparation.

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

2.3.2. During Visual Flight Rules (VFR) navigation above 3000 feet (ft) above ground level (AGL), Flight Information Publication (FLIP) en route charts may be used instead of maps on navigational flights within areas adequately covered by these charts.

2.3.3. Low Altitude Maps. Reference AFMAN 11-217, *Flight Operations* for low altitude map requirements and procedures. During low altitude segments of a flight (below 3,000 ft AGL), each pilot must operate with at least one of the following maps available for all segments (either Tactical Awareness Display (TAD), paper copy, approved tablet/tactical tablet). **(T-2).** The acceptable maps are:

2.3.3.1. Current sectional aeronautical chart.

2.3.3.2. A current and Chart Update Manual updated (either Electronic- Chart Update Manual or manual) National Geospatial-Intelligence Agency map of the low altitude route/operating area. The chart/map will be of such scale and quality that terrain features and required items are displayed to allow navigation and safe mission accomplishment. Ensure the following items are physically displayed on the chart/map or by other means (overlay, draw file, handwritten, etc.):

2.3.3.2.1. Airports/heliports

2.3.3.2.2. Special use airspace boundaries

2.3.3.2.3. International Civilian Aviation Organization class B/C/D boundaries

2.3.3.2.4. Other airspace boundaries, military training routes, parachute jump

2.3.3.2.5. Other potential high density traffic areas (e.g., flight activity areas and ultra-light/hang glider/glider sites, etc.).

2.3.4. Specifically developed low-level mission products require the previous items indicated within 5 nautical miles (nm) of the route or military training route lateral boundary. **(T-3).**

2.3.5. Use of electronic maps does not relieve pilots from their responsibility to thoroughly brief possible areas of conflict such as: all routes, pertinent obstacles, applicable airfield approach control frequencies in the vicinity of class A/B/C/D airspace, and intersections of other Visual Routes/Instrument Routes (if applicable).

2.3.6. Pilots flying outside the continental United States will follow gaining MAJCOM, theater or host nation guidance on mission planning. **(T-2).** If no gaining MAJCOM, theater or host nation guidance exists, use the best available maps or electronic overlay options to accomplish the requirements of **paragraph 2.3.3.2**

2.4. Unit-Developed Checklist/Local Pilot Aids:

2.4.1. Unit developed checklists of flight manual checklists may be used provided they contain, as a minimum, all items (verbatim and in order) listed in the applicable checklist. OGV will ensure that locally developed pilot aids will include, as a minimum:

2.4.1.1. Briefing guides. **(T-2).**

2.4.1.2. Local radio channelization and airfield diagrams. **(T-2).**

2.4.1.3. Impoundment procedures, emergency action checklists, and No Radio (NORDO)/divert information. **(T-2).**

2.4.1.4. Bailout and jettison areas. **(T-2).**

2.4.1.5. Cross-country procedures to include: command and control, engine documentation, Joint Oil Analysis Program samples, servicing, and other information deemed necessary by individual units (e.g., stereo flight plans, turnaround procedures, and local training areas). **(T-2).**

2.4.1.6. Other information as deemed necessary by the units (e.g., stereo flight plans, local training area diagrams, and local area maps of sufficient detail to provide situational awareness on area boundaries). **(T-2).**

2.5. Mission Data Cards. Squadron-generated line-up cards may be used if they contain the necessary information for the type of mission being flown. Minimum required items are:

2.5.1. Call-sign. **(T-3).**

2.5.2. Minimum TOLD requirements on Mission Data Cards are:

2.5.2.1. Acceleration check speed. **(T-3).**

2.5.2.2. Refusal/maximum abort speed (dry/wet). **(T-3).**

2.5.2.3. Takeoff speed/distance. **(T-3).**

2.5.2.4. Normal/heavyweight landing distance (dry/wet). **(T-3).**

2.5.3. Joker and Bingo fuels. **(T-3).**

2.6. Preflight Brief. Flight Leads (FL) / Instructor Pilots (IP) are responsible for presenting a logical briefing that promotes safe and effective mission accomplishment. All pilots should attend the flight briefing and debriefing unless previously coordinated with the FL/IP and/or unit/squadron supervisors. Anyone not attending the flight brief needs to receive, as a minimum, a brief on mission events and emergency procedures (EP) prior to starting engines.

2.6.1. Brief start time should provide adequate time to discuss required items and accounts for mission complexity. As a minimum, begin briefs at least 1.5 hours before scheduled takeoff. Alert briefs need to start in sufficient time to be completed prior to pilot changeover.

2.6.2. Structure the brief to accommodate the capabilities of each flight member. For all low altitude missions, place emphasis on obstacle/ground avoidance, altitude-warning features (low altitude warning), low altitude comfort level, and complacency avoidance.

2.6.3. Contracts, roles, and responsibilities of each flight member are should be established, briefed, and debriefed.

2.6.4. The briefer should ensure every member of the flight understands TOLD. Place particular emphasis on takeoff abort factors during abnormal situations such as short or wet runway, heavy gross weights, and abort sequence in formation flights.

2.7. Alternate Mission Briefs. The briefer should brief an appropriate alternate mission for each flight.

2.7.1. The briefer should brief an alternate mission that is less complex than the primary mission (e.g., Basic Fighter Maneuvers as alternate for Air Combat Maneuvers, Basic Surface Attack for Surface Attack Tactics).

2.7.2. If the alternate mission does not parallel the planned mission, the briefer should brief the specific mission elements that are different.

2.7.3. Mission elements may be modified and briefed airborne as long as flight safety is not compromised. FL should ensure changes are acknowledged by all flight members.

2.7.4. Do not fly unbriefed (either on the ground or in the air) missions or events. **(T-2).**

2.7.5. **Standard Missions.** Operations group standards may outline alternate missions that don't require a dedicated brief. Standard missions are limited to 'Basic Skill' missions as outlined in *A-10C Ready Aircrew Program Tasking Memorandum* and AFMAN 11-2A-10CV1, *A-10C Aircrew Training*.

2.8. Briefing Guides.

2.8.1. Reference the attachments to this manual for basic briefing guide examples.

2.8.2. Subjects may be briefed in any sequence.

2.8.3. Those items published in AFIs, AFMANs, Air Force Tactics Techniques and Procedures (AFTTPs) or unit standards and understood by all participants may be briefed as standard.

2.9. Multiple Sortie Days.

2.9.1. If all flight members attend an initial or mass flight brief, the FL on subsequent flights need brief only those items that have changed from the previous flight(s).

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

2.9.2.1. Upgrade missions should be flown on the first sortie. Upgrade missions may be flown on the second sortie if the first is non-effective for weather, maintenance, or airspace availability.

2.9.2.2. Operations supervisors will ensure that subsequent missions are of equal or less complexity with no additional upgrade training. **(T-3)**.

2.9.2.3. Participants in continuation training (CT) missions may fly their primary or alternate missions in any sequence.

2.10. Post-flight Debrief. All missions will be debriefed. **(T-2).** All flight debriefs should include, at a minimum, the in-flight execution of flight member responsibilities, de-confliction contracts, tactical employment priorities, and task management. FLs should debrief safety of flight on all missions. Review as much of the tactical portion of each mission as possible; however, FLs should ensure that all learning points of the mission(s) are debriefed.

Chapter 3

NORMAL OPERATING PROCEDURES

3.1. Cockpit Preflight. Pilots will take special care when using and storing extra equipment in the cockpit that is not part of the integral cockpit design. Pilots will secure equipment throughout all phases of flight, night or day, to prevent inadvertent contact with crucial cockpit switches.

3.1.1. Ground Visual Signals. Normally, pilot and ground crew communicate by the intercom system during all Starting Engines, Before Taxi and End of Runway (EOR) checks. Use the intercom system to the maximum extent possible anytime maintenance technicians are performing maintenance actions on the aircraft with the pilot in the cockpit. The pilot will not activate any system that could pose any danger to the ground crew prior to receiving proper acknowledgment from ground personnel. When not using ground intercom, visual signals will be IAW 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.

3.1.2. The following signals augment AFI 11-218

3.1.2.1. Auxiliary Power Unit Start. Pilot rotates three fingers above head in a circular motion.

3.1.2.2. Flight Control Check. Raise arm, clench fist, and make a stirring motion.

3.1.2.3. Trim Check. Pilot forms a "T" with hands: then raises one finger for elevator trim, two for an aileron trim, and three for rudder trim while each system is being checked for proper movement.

3.1.2.4. 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).

3.1.2.5. Slat Check. Pilot points to transducer vane.

3.1.2.6. Gun and Armament Check. Pilots point index finger forward with thumb upward simulating a pistol to indicate a “hot gun” (i.e., arm the gun for live fire) or thumb down to indicate a “cold gun” (i.e., gun remains pinned safe).

3.2. Starting Engines and Before Taxiing.

3.2.1. Pilots are cleared by the crew chief prior to starting the Auxiliary Power Unit, engines or actuating primary or secondary flight controls.

3.2.2. All flights require the bleed air function of the Auxiliary Power Unit. **(T-2).**

3.2.3. Aircraft stall warning devices will be fully operational for all flights. **(T-2).**

3.2.4. In addition to the requirements of AFI 11-202V3, as supplemented, and FLIP, the following equipment will be operative if Instrument Meteorological Conditions (IMC) is anticipated at any point in the flight:

3.2.4.1. Tactical air navigation (TACAN). **(T-2).**

3.2.4.2. Heading attitude reference system (HARS). **(T-2).**

3.2.4.3. Standby attitude indicator. **(T-2).**

3.2.5. Minimum required operational exterior lighting for night flying is:

3.2.5.1. Landing and taxi light, **(T-2).**

3.2.5.2. Both wingtip position lights, **(T-2).**

3.2.5.3. 1 out of 2 wingtip strobe anti-collision lights and at least one of the tail lights, **(T-2).** and

3.2.5.4. Either the fuselage tail position (stinger) light or strobe anti-collision light. **(T-2).**

3.3. Taxi.

3.3.1. Minimum taxi interval is 150 ft. Spacing may be reduced when holding short of or entering the runway. Minimum taxi interval is 300 ft at night, when carrying live bombs, and when operating on a Runway Condition Reading (RCR) of less than 12.

3.3.2. Quick Check and Arming. Place hands in view of ground personnel while the quick check inspection, arming/de-arming, or hot refueling are in progress.

3.3.3. Do not taxi in front of aircraft actively arming/de-arming forward firing ordnance.

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

3.4. Flight Lineup. Flights will line up appropriately based on weather conditions, runway conditions and runway width. Spacing between separated elements/flights will be a minimum of 500 ft. If performing formation takeoffs, wingmen must maintain wingtip clearance with their element leader. If runway width precludes line up with wingtip clearance between all aircraft in the flight, use 500 ft spacing between elements or delay run-up until the preceding aircraft has released brakes. Normally, place wingman on the upwind side if the crosswind component exceeds 5 knots.

3.5. Lineup Checks. After completing the "Lineup Checks" and prior to takeoff, all flight members inspect each other for proper configuration and any abnormalities. Wingmen indicate they are ready for takeoff by a head nod, radio call, or landing/taxi light signal as briefed.

3.6. Takeoff.

3.6.1. Do not attempt a takeoff if the RCR is less than 12 or as specified otherwise by MAJCOM. **(T-2).** MAJCOMs may permit Operations Group Commanders (OG/CC) to waive RCR minimum for specified units operating in cold weather locations, but in no case will takeoffs be conducted with an RCR of less than 8. **(T-2).**

3.6.2. 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 or rolling takeoff.

3.6.3. If a VFR takeoff is required for mission accomplishment, the aircraft must be capable of achieving a minimum single-engine climb rate of 150 ft/minute (gear up, failed engine wind-milling, flaps up, fuel flows normal, and all jettisonable stores-jettisoned), unless a higher rate of climb is required for unique obstacle clearance requirements. **(T-3)**. Instrument flight rules (IFR) takeoffs will be conducted IAW AFI 11-202V3. Aircraft operating under IFR that are unable to comply with the required minimum climb gradients may be required to reduce fuel and ordnance loads, cart selected stores, or wait for environmental conditions to change.

3.6.4. If operational requirements dictate, intersection takeoffs may be approved by the OG/CC.

3.6.5. Takeoff interval between aircraft/elements is a minimum of 10 seconds except for chased takeoffs. When accomplishing a join-up on top or when carrying live ordnance, (excluding 30mm, rockets, night illumination flares or air-to-air missiles) increase takeoff interval to a minimum of 20 seconds.

3.6.6. For rolling takeoffs, pilots ensure the aircraft is aligned with the runway centerline prior to engaging anti-skid and advancing throttles. Pilots determine if a rolling takeoff is appropriate based on expected/current runway condition. Rolling takeoffs should be accomplished on icy or unimproved surfaces.

3.7. Formation Takeoff.

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

3.7.2. A certified FL is responsible for leading all elements unless an IP, or FL certified squadron supervisor, is in the element. Formation takeoff weather requirements are 300 ft ceiling/1 statute mile (sm) (1.8 kilometers (km)) visibility or Pilot Weather Category (PWC), whichever is higher. **(T-2).**

3.7.3. Formation takeoffs will not be made when:

3.7.3.1. Runway width is less than 140 ft. **(T-3).**

3.7.3.2. Standing water, ice, slush or snow is on the runway. **(T-3).**

3.7.3.3. RCR is less than 12. **(T-3).**

3.7.3.4. The crosswind or gust component exceeds 15 knots. **(T-3).**

3.7.3.5. Computed takeoff roll in excess of 70 percent of available runway length. **(T-3).**

3.7.3.6. Loaded with live munitions (excluding 30mm, rockets, flares or air-to-air missiles). **(T-3).**

3.7.3.7. Ferrying aircraft from contractor/Air Logistics Center facilities. **(T-3).**

3.7.4. Configure aircraft so as not to exceed an asymmetrical load moment of 12,000 foot-pounds. **(T-3).**

3.7.4.1. When asymmetrical loading is expected to create a noticeable rolling moment, the runway line-up will be such that both aircraft will not roll toward each other on liftoff. **(T-3).**

3.7.4.2. Formation takeoffs with aircraft not similarly configured can be made if the asymmetry in configurations include one of the following:

3.7.4.2.1. A rack plus practice bombs. **(T-3).**

3.7.4.2.2. A rocket/flare dispenser. **(T-3).**

3.7.4.2.3. A Training Guided Missile (e.g., TGM-65). **(T-3).**

3.7.4.2.4. An air-to-air missile or an Electronic Countermeasures (ECM) pod (except ALQ-184). **(T-3).**

3.7.5. Differences in aircraft gross weight will not exceed 2,000 pounds. Takeoff data will be computed for the heavier aircraft. **(T-3).**

3.7.6. Formation Takeoff Procedures. Refer to AFTTP 3-3.A-10 *Combat Aircraft Fundamentals--A-10*.

3.7.6.1. On the FL's signal, set the core revolutions per minute (RPM) at 90 percent or as briefed by the FL and check the engine instruments. In hot weather, 90 percent core RPM may not give predicted takeoff fan speed. In this instance, set one percent below predicted takeoff fan speed.

3.7.6.2. Smoothly add power after brake release. If lead needs to reduce power for the wingman on takeoff, lead will not reduce throttles beyond 3 percent below predicted takeoff fan speed or min/abort fan speed, whichever is higher.

3.7.6.3. Maintain wingtip clearance throughout takeoff roll. If the wingman overruns the leader, the leader will direct the wingman to assume the lead, at which time the wingman will push up to MAX power, maintain his side of the runway, and make his own takeoff. The original leader will then be responsible for in-flight separation and directs appropriate measures to regain flight integrity or initiate lost wingman procedures. The original wingman flies the briefed departure until instructed otherwise by the FL.

3.7.6.4. Retract the gear after the FL observes the wingman to be safely airborne.

3.8. Join-up/Rejoin. Day weather criteria for a join-up underneath a ceiling is 1,500 ft AGL and 3 sm.

3.8.1. FLs maintains 200 knots indicated airspeed (KIAS) until join-up is accomplished unless briefed otherwise.

3.8.2. If accomplishing a turning join-up, the FL will normally not exceed 30 degrees of bank.

3.8.3. Flight members join in sequence. For a straight ahead rejoin, the number two aircraft joins on the left wing and the element joins on the right wing unless otherwise briefed. For a turning rejoin, the number two aircraft rejoins on the inside of the turn and the element to the outside. If mission or flight requirements dictate, the FL specifically calls and states the desired formation positions.

3.8.4. For further join-up procedures, see **paragraph 3.10** and **Chapter 4**.

3.9. Formation, General: FL/IPs are responsible for ensuring contracts, roles and responsibilities of each flight member are established, briefed, executed and debriefed. If any flight member cannot fulfill their basic responsibilities, contracts, or other assigned tasks, the member immediately communicates that information to the flight/element lead. IP/FLs task element leads/wingmen based on their ability to fulfill basic responsibilities and other assigned tasks. For additional formation considerations, reference AFTTP 3-3.A-10 and AFTTP 3-1.A-10, *Tactical Employment--A-10 (U)* this publication is classified. Situational Awareness Data Link (SADL) is not used as the sole or primary source of de-confliction.

3.9.1. The FL supervises formations. The FL retains responsibility for the flight regardless of which physical position he flies. Wingmen should have the situational awareness to be prepared to fly the number one position if, in the judgment of the FL, such action is warranted.

The term element lead may be used to designate the number three aircraft in a flight of four--this, in itself, does not imply FL authority.

3.9.2. Rolling maneuvers are not performed during join-up/rejoins to non-tactical formation.

3.9.3. Rolling maneuvers are not performed to maintain or regain position below 5,000 ft AGL or in airspace where aerobatics are prohibited.

3.9.4. Airborne visual signals will be IAW AFPAM 11-205, *Aircraft Cockpit and Formation Flight Signals*. For four ship flights, initiate configuration changes by radio call, when practical. When formation position changes are directed by radio, all wingmen acknowledge prior to initiating the change. A radio call is mandatory when directing position changes at night or under instrument conditions.

3.9.5. FL will not break up formations until each pilot has a positive fix from which to navigate (visual, Air Traffic Control (ATC), Embedded Global Positioning System (GPS)/Inertial Navigation System (INS) (EGI), or TACAN).

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

3.9.7. Changing Leads. Refer to AFTTP 3-3.A-10.

3.9.7.1. The minimum altitude for changing leads within a formation/element in day visual meteorological conditions (VMC) is 500 ft AGL over land or 1,000 ft AGL over water, except for emergencies (for night see **paragraph 3.19.4**; for IMC, see **paragraph 4.6**).

3.9.7.2. Prior to initiating the lead change, the leader ensures that the wingman assuming the lead is in a position to safely initiate the lead change.

3.9.8. Transitioning to IMC.

3.9.8.1. When flying in VMC with a high potential for IMC, FL should place their formations in close, route, or trail. Avoid using wedge or fighting wing to skirt marginal weather.

3.9.8.2. If loss of sight inadvertently occurs due to weather while in a VMC formation, the following applies:

3.9.8.2.1. Maintain VMC if feasible; transmit “call-sign, blind, altitude, and heading.

3.9.8.2.2. If unable to maintain VMC, immediately transition to instruments, recover to level or climbing flight, and execute the appropriate lost wingman procedures. The FL ensures altitude separation between other aircraft in the flight until separate IFR clearances can be obtained.

3.9.8.2.3. If unable to maintain VMC while low level, execute low level abort procedure while transitioning to instruments. See **paragraph 3.17.16**

3.9.9. Wingmen may practice low altitude tactical navigation (LATN) provided the route was thoroughly briefed and the FL maintains navigation situational awareness. Wingmen may lead portions of a mission provided an IP or FL certified squadron supervisor is in the same element.

3.9.10. Close Formation. Except for lazy-eight or chandelle-type maneuvers, close formation aerobatics will not be flown.

3.10. Tactical Formations.

3.10.1. Tactical Maneuvering. Refer to AFTTP 3-1.A-10 (U) this publication is classified, AFTTP 3-3. A-10 and MAJCOM directives. The following rules apply for flight path de-confliction during tactical maneuvering:

3.10.1.1. Flight/element leads (FL/EL) will consider wingman/element position and ability to safely perform a maneuver before directing it.

3.10.1.2. Wingmen/elements maneuver relative to the FL/lead element and maintain sight. Trailing aircraft/elements are responsible for de-confliction with lead aircraft/elements. SADL may be used to augment situational awareness when flying tactical formations.

3.10.1.3. Wingmen/elements go high and/or outside of the lead/lead element for de-confliction when required.

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

3.10.2. Lost Visual Contact. The following procedures apply when one or more flight members/elements lose visual contact within the formation.

3.10.2.1. If any flight member/element calls “blind,” then the other flight member/element immediately confirm “visual” with an informative/directive radio call.

3.10.2.2. If the other flight member/element is also blind, then the FL takes action to ensure altitude separation based on the cockpit altimeter or sector de-confliction off a known point. Use a minimum of 500 ft altitude separation when directed to de-conflict by altitude. Avoid climbs/descents through the de-confliction altitude. Low Altitude Safety and Targeting Enhancement Head Up Display (HUD) altimeter readings should not be used as the primary altitude reference for de-confliction due to the potential of significantly different altimeter readings if not operating in NAV mode. Once de-confliction is assured, pilots may use SADL to assist in regaining visual.

3.10.2.3. If there is no timely acknowledgment of the original “blind” call, then the flight member/element initiating the call maneuvers away from the last known position of the other flight member/element and alter altitude.

3.10.2.4. If visual contact is still not regained, the FL will take additional positive action to ensure flight path de-confliction within both the flight and the scenario to include a “Terminate/Knock-It-Off,” as appropriate. Consider scenario restrictions such as sanctuary altitudes and adversary blocks.

3.10.2.5. Aircraft maintains altitude or sector separation until regaining visual and will continue to maintain this separation until regaining mutual support.

3.10.3. Two-Ship. Normally, the wingman is responsible for flight path de-confliction. The FL has primary responsibility for de-confliction when:

3.10.3.1. Tactical maneuvering places the leader in a position likely to cause the wingman to lose sight of the leader or forces the wingman's primary attention away from the leader (e.g., wingman becomes the engaged fighter).

3.10.3.2. The wingman calls “padlocked.”

3.10.3.3. The wingman calls “blind.”

3.10.3.4. Primary de-confliction responsibility transfers back to the wingman once the wingman acknowledges “visual” on lead.

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

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

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

3.11. Chase Formation. Refer to AFTTP 3-3.A-10.

3.11.1. Any pilot may fly safety chase for aircraft under emergency or impending emergency conditions. Qualified pilots (pilots who have successfully completed an Instrument/Qualification evaluation including Initial Qualification Training (IQT) / Mission Qualification Training (MQT) pilots) may chase as a safety observer for aircraft performing simulated instrument flight, hung ordnance recovery, or simulated single engine patterns. All other chase events will be flown by flight examiners, IPs, upgrading IPs supervised by an IP, or FL certified squadron supervisors designated by the squadron Director of Operations.

3.11.2. During takeoff, the chase aircraft maintains a minimum of nose-to-tail and wing tip clearance. All formation takeoff restrictions apply except chased takeoffs may be accomplished if computed takeoff roll is in excess of 70 percent of available runway length and/or the crosswind or gust component exceeds 15 knots. Brief specific abort procedures.

3.11.3. In flight, the chase aircraft maneuvers as necessary, but must maintain nose- tail separation. The chase will not stack below the lead aircraft below 1,000 ft AGL. When moving into or out of close formation from chase, the chase pilot will make a radio call indicating intentions. The call indicating a move to close formation will be acknowledged.

3.11.4. In the traffic pattern, the chase aircraft may maneuver as necessary to observe performance.

3.11.5. Chase aircraft will not perform a simultaneous confidence maneuver.

3.11.6. When chasing live ordnance missions, the chase pilot is responsible for ensuring safe escape criteria is met.

3.11.7. A safety observer in a chase aircraft maneuvers in an approximate 30 to 60 degree cone with nose/tail clearance to 1,000 ft, to provide assistance and effective clearing.

3.12. Show Formation. Refer to AFI 11-209, *Participation in Aerial Events*, and applicable MAJCOM directives for guidance. Specifically, brief these formations and fly them IAW applicable directives and AFTTP 3-3.A-10. Wing/group commander approval is required. **(T-2).**

3.13. Maneuvering Parameters.

3.13.1. Use Technical Order (TO) 1A-10C-1, *Flight Manual, USAF Series A-10C Aircraft*, MAJCOM operating procedures, AFTTP 3-1.A-10, and AFTTP 3-3.A-10 to define and describe the performance of weapons deliveries, confidence maneuvers, aerobatics, Air Combat Training (ACBT), or advanced handling maneuvers.

3.13.2. G-awareness exercise will be accomplished IAW AFI 11-214, gaining MAJCOM, theater and host nation guidance. Any mission that plans or is likely to maneuver in excess of five Gs will accomplish a G-awareness exercise IAW AFTTP 3-3.A-10. Missions planned at five Gs or less do not require this exercise. G-awareness exercise will be recorded and in Hot Mic.

3.13.2.1. Unless performing a syllabus-required event (e.g., chase of a G-awareness exercise), flight members will maintain a minimum of 6,000 ft separation between aircraft during the execution of all G-awareness exercises. On board systems (e.g., air-to- air TACAN, data link) should be used to establish and maintain separation prior to maneuver execution. During maneuver execution use visual lookout and briefed formation contracts as primary means of ensuring aircraft de-confliction. If required, use on board systems to enhance situational awareness during the maneuver.

3.13.2.2. G-awareness exercise is not required at night. If a G-awareness exercise is performed, pilots must have NVDs and enough visual cues to perform this maneuver. FL ensures spacing between elements is sufficient to maintain de-confliction between all flight members. Consideration should be given to splitting the elements for separate G-awareness exercises.

3.13.2.3. Flight/element leads ensure the airspace intended for conducting the G-awareness exercise is free from potential traffic conflicts. Use ATC services to the maximum extent practical to make sure the airspace is clear. Conduct the G-awareness exercise in the following airspace with preference to the order as listed:

3.13.2.3.1. Special use airspace (e.g., Restricted/Warning area, ATC assigned airspace, Military Operating Area (MOA) and MAJCOM approved large scale exercise/special missions area).

3.13.2.3.2. Above 10,000 ft Mean Sea Level (MSL) outside of special use airspace.

3.13.2.3.3. Inside the confines of Military Training Routes.

3.13.2.3.4. Below 10,000 ft MSL outside of special use airspace.

3.13.3. Minimum Altitudes.

3.13.3.1. Confidence maneuver entry will be made at a minimum of 10,000 ft AGL.

3.13.3.2. Do not perform aerobatics below 5,000 ft AGL.

3.13.4. Vortices/Jet-wash. Avoid flight through wing tip vortices/jet-wash. If unavoidable, unload the aircraft immediately to approximately 1 G.

3.13.5. Use of Flaps. Do not use flaps as an in-flight maneuvering aid in the conduct of aerial combat maneuvers. The Maneuver position may be used in the landing pattern, when loitering, when escorting another aircraft, etc.

3.14. Ops Checks.

3.14.1. Accomplish sufficient ops checks to ensure safe mission accomplishment. For formation flights, the FL initiates ops checks by radio call or visual signal. Wingmen will respond by radio call or visual signal.

3.14.2. Ops checks are required:

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

3.14.2.2. When internal wing tanks or external fuel tanks (if carried) are empty. When internal wing tanks are dry, ops checks includes "wings dry." When carrying external tanks, ops checks will include "tanks feeding" or "tanks dry" as appropriate. Once the external tank(s) and/or internal wing tanks are confirmed and called dry, omit this call from subsequent ops checks.

3.14.2.3. After completing air refueling.

3.14.2.4. Prior to each air to air engagement (Basic Fighter Maneuvers, ACBT, and Dissimilar Air Combat Training (D)ACBT).

3.14.2.5. Prior to commencing air-to-surface operations, at least once during air-to-surface operations, and after terminating air-to-surface operations.

3.14.3. Do not use data linked fuel status as the primary reference for fuel checks. Data link may not display accurate fuel remaining and does not verify wing tank balance or status of forward/aft main tank balance problems.

3.15. Radio Procedures. Use the complete flight call-sign anytime any flight member initiates a radio transmission. In all other cases, an acknowledgment by flight position is sufficient. Use "Knock It Off" (KIO) or "Terminate" procedures to direct aircraft to stop engagements, scenarios and tactical maneuvering IAW AFI 11-214. All flight members acknowledge by repeating the call.

3.15.1. Brief the use of backup/alternate radios within a flight and monitor closely. Use of these radios as an "intra-flight intercom" or for administrative information that should be held for debriefing is inappropriate and constitutes poor radio discipline.

3.15.2. The flight/mission leader initiates all frequency changes with either the term "PUSH" or the term "GO". If "PUSH" is used flight members change to the new frequency without an acknowledgement. If "GO" is used each flight member acknowledges, in turn, prior to any flight member switching frequencies. Flight/mission leader initiates a radio check on the new frequency which then is acknowledged, in turn, by all flight members. **Exception:** During pre-briefed radio silent training or limited communications operations, channel changes will be as briefed.

3.15.3. Individual flight members, in turn, acknowledge radio checks that do not require the transmission of specific data. Acknowledgment by the individual flight member indicates the initiation or completion of the appropriate check.

3.15.4. All flight members acknowledge understanding the initial ATC clearance. Acknowledge subsequent ATC instructions when directed by the FL or anytime during trail departures.

3.15.5. When requiring simultaneous action by other flight members, the voice command is then followed by the word of execution "NOW".

3.15.6. Brevity code and other terminology will be IAW AFI 11-214, AFTTP 3-1 and 3-3, and other applicable manuals and instructions.

3.16. Airborne Communications Jamming Procedures. Refer to AFI 11-214.

3.17. General Low Altitude Procedures.

3.17.1. Fly low-level formation positions/tactics using AFTTP 3-1.A-10 (U) this publication is classified and AFTTP 3-3.A- 10 as guides.

3.17.2. When flying in formation below 300 ft AGL the wingman will be directed to a wedge, trail, or combat trail formation position. Training in the 300 to 100 ft AGL altitude block will be in short segments consistent with real-world risks and realistic tactical considerations.

3.17.3. For air-to-surface range operations, minimum altitudes will be determined by area/range restrictions, AFI 11-214 restrictions or delivery restrictions, whichever is greater. "Show of Force" is not a weapons delivery maneuver and will be flown IAW the pilot's minimum altitude, area/range restrictions or theater Special Instructions, whichever is higher.

3.17.4. At altitudes below 1,000 ft AGL, wingmen will not fly at a lower AGL altitude than FL or a wingman's EL if split from FL. Some formations will have the FL Low Altitude Step Down Training (LASDT) certified lower than their wingmen. The FL/EL that flies lower than other formation members will, prior to descending to their block, confirm their wingmen's low altitude warning is set to their minimum altitude.

3.17.5. Flights operating in the low altitude environment climb to a pre-briefed safe altitude (minimum 1,000 ft AGL) when a Knock-It-Off is called.

3.17.6. Navigate using a combination of pilotage, dead reckoning (DR) and EGI information. DR is then the primary means of navigation.

3.17.7. If unable to visually acquire or ensure lateral separation from known vertical obstructions, which are a factor to the planned route of flight, FL directs a climb to ensure vertical separation 2 nm prior to the obstacle.

3.17.8. When crossing high or hilly terrain, do not exceed 120 degrees of bank. Limit zero or negative G crossings to upright bunting maneuvers that are within the zero/negative G limitations for the aircraft and external stores.

3.17.9. Minimum flight planning airspeed for low altitude flight/navigation is 240 KIAS. Minimum airspeed during low altitude flight/navigation is 200 KIAS.

3.17.10. For aircraft equipped with an operable radar altimeter, the system will be on and set at either the briefed minimum altitude or the command-directed low-level altitude, whichever is higher.

3.17.11. The unit commander, IAW AFMAN 11-2A-10CV1, *A-10—Aircrew Training,* as supplemented, will determine and certify a pilot's minimum altitude. **(T-2).** Pilots participating in approved step-down training programs will comply with the requirements and restrictions of that program. **(T-2).** Unless higher altitudes are specified by national rules, route restrictions, or training syllabus, a 500 ft AGL minimum altitude applies to the following low level training:

3.17.11.1. Formal Training Unit (FTU) students and IPs when conducting training IAW an applicable syllabus.

3.17.11.2. Pilots who have not entered step-down training or are not certified for flight at lower altitudes.

3.17.11.3. Overwater flight if duration is more than 1 minute or if out of sight of land or if there is an indefinite horizon.

3.17.12. Minimum Safe Altitude (MSA) provide a clearance of 1,000 ft above the highest obstacle/terrain feature (rounded to the next highest 100 ft) within 5 nm of the planned course, route boundaries, or operating area (e.g., MOA, low fly area, restricted area, etc.). Pilots may compute an MSA for each leg/segment of the intended route of flight or for a specific target. For night (non-NVD) or IMC operations, the minimum altitude is MSA.

3.17.13. When external tanks are installed, do not fly missions requiring tactical maneuvering at low altitudes. **Exception**: Low altitude tactical maneuvering within Dash 1 limits is authorized with an installed centerline Sergeant Fletcher or Conversion Fuel Tank external tank.

3.17.14. During all low altitude operations, the immediate reaction to task saturation, diverted attention, or an emergency, is to climb.

3.17.15. Weather minimums for visual low-level training will be 1,500 ft AGL and 3 sm, or as directed by Host Nation for any route or area or as specified in FLIP for Military Training Routes (e.g., 3,000 ft AGL/5 sm for Visual Routes), whichever is higher.

3.17.16. Low-Level Route/Area Abort Procedures. Compute and brief a low-level route abort altitude (RAA). The RAA provides a clearance of 1,000 ft above the highest obstacle/terrain feature (rounded to the next highest 100 ft) within 5 nm of the entire planned course, route boundaries or operating area (e.g., MOA, low fly area, restricted area, etc.). Minimum airspeed for the route abort is 160 KIAS. Maximum pitch angle is 30 degrees nose high.

3.17.16.1. VMC Route/Area Abort Procedures.

3.17.16.1.1. Maintain safe separation from the terrain.

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

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

3.17.16.1.4. Attempt contact with controlling agency, if required.

3.17.16.2. IMC Route/Area Abort Procedures.

3.17.16.2.1. During low level flight, every safe effort will be made to avoid entering IMC. If IMC is encountered, pilots will transmit call-sign, knock-it-off and route abort.

3.17.16.2.2. Immediately climb to, or above the briefed RAA. Transition to instruments if entering IMC.

3.17.16.2.3. A route abort is an emergency procedure and the pilot's judgment is paramount. The FL ensures safe separation while complying with local/host nation procedures. If deviation from local/host nation procedures is necessary to avoid a collision, the FL will direct the appropriate action.

3.17.16.2.4. Maintain preplanned ground track. Execute appropriate lost wingman procedures if necessary. The flight/element leader is responsible for ensuring heading and altitude de-confliction during an IMC route abort procedure. Ensure de-confliction is based on the same altimeter setting.

3.17.16.2.5. Use the current altimeter setting until changed by the FL and squawk emergency or in compliance with host nation procedures.

3.17.16.2.6. If required to deviate from normal route/area procedures, or if the RAA is higher than the vertical limits of the route/area, squawk (IFF/SIF) emergency.

3.17.17. Targeting Pod (TGP) Minimum Altitudes. These minimums apply to heads down operations while manipulating the TGP such as searching for targets through the Multi-Function Color Display (MFCD). Minimum AGL altitude for this type of TGP employment is 5,000 ft AGL night/ 2,000 ft AGL day, except during self-mark weapons delivery and recovery altitude IAW AFI 11-214 minimums. Pilots who have completed the TGP LASDT upgrade use the following minimum altitudes:

3.17.17.1. 1,000 ft AGL during day.

3.17.17.2. 2,000 ft AGL for night/high illumination.

3.17.17.3. 2,000 ft AGL or MSA, whichever is higher, for night/low illumination.

3.17.17.4. Air Warfare Center, Test and Air National Guard Air Force Reserve Command Test Center: Minimum altitudes for TGP operations are established at the Warfighting Integration Center or test syllabus requirements, continuation training plans or operational test and evaluation requirements.

3.17.18. Use of TGP Laser Spot Search/Laser Spot Track (LSS/LST) capability below altitudes prescribed in **paragraph 3.17.17** above is limited to hands on throttle and stick (HOTAS) actions required to initiate and display LSS/LST symbology in the HUD or Helmet Mounted Cueing System. Intent of low altitude LSS/LST use is for pilots to keep their eyes outside the cockpit for target area situation awareness and acquisition. These systems should be used to provide pilots a "pure heads up and outside" capability without requiring heads down time during employment.

3.18. Air Refueling.

3.18.1. Pilots undergoing initial/recurrency training in air refueling will not refuel with a student boom operator (does not apply to KC-10). **(T-2).**

3.18.2. Pilots will inform boom operator when refueling from particular tanker type (e.g., KC-10, KC-135, KC-46, etc.) for the first time. **(T-2).**

3.18.3. Pilots will not attempt a night hook-up if slipway lights are inoperative unless refueling is necessary to safely complete the mission. **(T-2).**

3.19. Night Operational Procedures.

3.19.1. Night Ground Operations. Taxi spacing will be a minimum of 300 ft and the aircraft will taxi on the taxiway centerline. Normally, use the taxi light during all night taxiing.

3.19.2. Night Takeoff. For formation takeoffs, flight/element leaders turn the anti- collision strobes OFF and position lights BRIGHT (DIM as desired) STEADY when reaching the run-

up position on the runway. The flight/element lead may direct wingmen to turn or leave the strobes OFF anytime the lights cause distraction. All aircraft turn formation lights ON. During a night formation takeoff, call brake release and configuration changes over the radio. Following takeoff, each aircraft/element then climbs on runway heading to 1,000 ft AGL and accelerate to 200 KIAS before initiating turns, except where departure instructions/local procedures/obstructions specifically preclude compliance.

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

3.19.4. Night Formation Procedures.

3.19.4.1. Non-NVD Equipped. When in positions other than fingertip or route formation, maintain aircraft spacing primarily by instruments (radial/distance measuring equipment (DME), or Air-to-Air TACAN) and/or timing, with visual reference and SADL secondary. If unable to ensure aircraft spacing, then establish altitude separation (minimum of 1,000 ft). At all times, pilots will cross-check instruments to ensure ground clearance.

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

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

3.20. Night Vision Device (NVD) Procedures. Pilots must not become overconfident in the capabilities of NVDs. Many things can cause a pilot to lose outside visual references, to include entering the weather (intentionally or inadvertently), NVD battery failure, flight into smoke or dust, flight into a shadowed area, sudden illumination or an incompatible light source inside or outside of the cockpit, or sudden distractions due to an aircraft malfunction, etc. Pilots ensure primary and secondary flight instruments are sufficiently illuminated to allow for immediate transition to instruments if experiencing spatial disorientation or if outside visual references are lost.

3.20.1. Published Guidance. USAF/MAJCOM guidance (including AFIs 11-202V3 and 11-214) outline NVD procedures.

3.20.1.1. NVDs are only be worn in flight by NVD certified pilots or by upgrading pilots with a certified NVD IP in the flight.

3.20.1.2. NVD operations below 5,000 ft AGL require an operational Ground Collision Avoidance System.

3.20.1.3. All flight members make a radio call when going "goggles on" or "goggles off" and only one flight member will don/doff goggles at a time.

3.20.2. NVDs are preflight tested and adjusted for the individual pilot in a unit eye lane or equivalent tester prior to NVD operations

3.20.3. Takeoff and Landing.

3.20.3.1. Non-NVD Takeoff and Landing certified pilots will not wear NVDs during takeoff or landing. Do not don NVDs until at least 2,000 ft AGL or MSA, whichever is higher, in climbing or level flight. Remove NVDs at least 5 minutes prior to landing.

3.20.3.2. NVD takeoff and landing certified pilots may wear NVDs for takeoff and landing. NVD takeoffs and landings at a blacked-out aerodrome configured with Airfield Marking Pattern-3 (covert) lighting are to be flown in aircraft equipped with the Covert/Overt Lighting Assembly or a Night Vision Imaging System (NVIS) compatible infrared cover installed on the taxi light. NVD operations at airfields with normal (overt) lighting do not require the infrared cover installed on the taxi light. Do not accomplish NVD approaches to an airfield with a combination of covert and overt runway lighting unless that specific configuration is tested and approved. Weather minimums for certified pilots to perform NVD takeoff and landing operations are 1,500 ft AGL/3 sm. Weather minimums during upgrade training for certification are 3,000 ft AGL/5 sm.

3.20.4. Illumination Levels.

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

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

3.20.5. NVD Minimum Altitudes. Minimum altitudes for NVD operations are based on illumination levels, in-flight visibility, and the pilot's NVD certification.

3.20.5.1. The minimum altitude for all NVD upgrade sorties, familiarization sorties/events, sorties flown under low illumination levels, or sorties flown when in-flight visibility is less than 5 sm is the MSA, as defined in **paragraph 3.17.12**, or IAW AFI 11-214, whichever is higher.

3.20.5.2. The minimum altitude for all other NVD sorties flown under high illumination levels and with at least 5 sm in-flight visibility is IAW AFI 11-214 and MAJCOM supplements to AFI 11-214.

3.20.6. Tanker Rejoin. NVDs may be worn for all Air-to-Air refueling operations.

3.20.7. Close Formation. Wingmen wearing NVDs fly no closer than route formation.

3.20.8. Weather Restriction. MAJCOM established night weather restrictions apply. Pilots must be ready to transition to instruments and execute appropriate lost wingman or route abort procedures in the event they inadvertently enter the weather. Under certain IMC or marginal VFR conditions, NVDs may allow pilots to maintain visual references with relation to the ground, the horizon, other aircraft, etc. However, while wearing NVDs pilots must still comply

with published VFR cloud clearance and visibility minimums, have an IFR clearance prior to entering IMC, and follow all IFR procedures while in IMC.

3.20.9. Weapons Delivery.

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

3.20.9.2. On Class A ranges, NVD certified pilots, with the concurrence of the Range Control Officer (RCO), are allowed to choose external aircraft lighting settings that maximize training, minimize interference with NVDs, 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.

3.20.9.3. NVD certified pilots may conduct normal, reduced, covert or blacked-out lighting weapons deliveries IAW AFI 11-214 on ranges which do not require RCO control. When working with a Joint Terminal Attack Controller or Forward Air Controller (Airborne), pilots should choose external lighting settings that safely facilitate final control.

3.20.9.4. During all range sorties for upgrading NVD pilots (basic NVD upgrade), covert or blacked-out lighting weapons deliveries may only be conducted dry (without releasing ordnance).

3.21. Fuel Requirements.

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

3.21.2. Bingo Fuel. A pre-briefed fuel state that allows the aircraft to return to the base of intended landing or alternate, if required, using preplanned recovery parameters and arriving with normal recovery fuel as defined below.

3.21.3. Normal Recovery Fuel. The fuel on initial or at the final approach fix at the base of intended landing or alternate. Establish fuel quantity locally or 1,500 pounds, whichever is higher.

3.21.4. Minimum Fuel. Declared whenever it becomes apparent that an aircraft will enter initial or start an instrument final approach at the base of intended landing, or alternate if required, with 1,200 pounds or less (or as established locally), or when either the Left or Right Main Fuel Low light illuminates, whichever occurs first.

3.21.5. Emergency Fuel. Declared whenever it becomes apparent that an aircraft will enter initial or start an instrument final approach at the base of intended landing, or alternate if required, with 800 pounds or less, or 400 pounds in either the left or right main system, whichever occurs first.

3.22. Approaches and Landings.

3.22.1. Minimum pattern and touchdown spacing. Minimum pattern and touchdown spacing between landing aircraft is 3,000 ft for similar aircraft (e.g., A-10C versus A-10C), 6,000 ft for dissimilar aircraft (e.g., A-10C versus F-16) or as directed by MAJCOM or the landing base, whichever is higher. When wind conditions increase the likelihood of encountering wake

turbulence, dissimilar fighter spacing requirements should be used. Under these conditions, moderate to severe wake turbulence has been reported out to 7,000 ft touchdown spacing. Refer to AFI 11-202V3, ACCSUP, *General Flight Rules,* Chapter 5.

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

3.22.3. Landing Restrictions.

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

3.22.3.2. Minimum landing RCR is 12. OG/CC may waive the minimum RCR, but in no case will landing be attempted with an RCR below 8. **(T-2).**

3.22.3.3. Do not land over any raised web barrier (e.g., MA-1A, 61QS11). **(T-2).**

3.22.4. Normally, pilots land in the center of the runway and clear to the cold side when speed/conditions permit. Pilots should not delay clearing to the cold side, after achieving a safe taxi speed, as this can create a conflict for subsequent landing aircraft.

3.23. Overhead Traffic Patterns.

3.23.1. Use altitude and airspeed IAW TO 1A-10C-1 or as directed locally.

3.23.2. Overhead patterns may be flown with unexpended practice ordnance to include heavyweight inerts, night illumination flares, 30 mm, unexpended live air-to-air and forward firing ordnance. Overhead patterns may be performed at deployed locations with unexpended live ordnance if required by local force protection arrival procedures.

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

3.23.4. Execute the break individually in a level 180 degree turn to the downwind leg at minimum intervals of 5 seconds (except IP/Flight Evaluator (SEFE) chase or when in tactical formation).

3.23.5. Aircraft are wings level on final at approximately 300 ft AGL and 1 mile from the planned touchdown point.

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

3.24.1. Use published overhead pattern altitude and airspeed.

3.24.2. Locally develop and coordinate with appropriate air traffic control agencies specific procedures.

3.24.3. Four aircraft are the maximum permitted. Aircraft/elements more than 6,000 ft in trail are considered a separate flight.

3.24.4. Normally position wingmen opposite the direction of the break.

3.24.5. 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.

3.24.6. Fly normal downwind and base position.

3.25. Low Approaches.

3.25.1. Observe the following minimum altitudes:

3.25.1.1. Normal single ship low approaches—so that touchdown does not occur.

3.25.1.2. IP/SEFE chase position—50 ft AGL.

3.25.1.3. Formation low approaches (and non-IP/SEFE chase)—100 ft AGL.

3.25.1.4. Chase aircraft during an emergency—300 ft AGL unless safety or circumstances dictate otherwise.

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

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

3.27. Formation Approaches and Landings.

3.27.1. General:

3.27.1.1. Normally accomplish formation landings from a precision approach. If not, accomplish landing utilizing a published instrument approach or a VFR straight-in approach using the Visual Approach Slope Indicator (VASI) if available. In all cases, the rate of descent should be similar to a normal precision approach.

3.27.1.2. FLs lead continuation training formation landings. An upgrading FL requires an IP or FL certified squadron supervisor designated by the squadron Director of Operations.

3.27.1.3. When only one aircraft is landing from a formation approach, normally the lead will execute a low approach and the wingman will land. In this event, the wingman will break off for landing as briefed, as cleared by the leader, or in the case of poor positioning, accomplish a low approach.

3.27.1.4. Do not perform practice formation approaches above 40,000 pounds gross weight.

3.27.2. Formation Landing Restrictions. Aircraft configuration will be IAW **paragraph 3.7.4**. Formation landings are prohibited:

3.27.2.1. When steady state cross winds exceed 15 knots or there is a gust factor of greater than 15 knots from any direction.

3.27.2.2. When the runway is reported wet; or ice, slush, or snow are on the runway.

3.27.2.3. If runway width is less than 140 ft.

3.27.2.4. When landing with hung ordnance or unexpended live ordnance (excluding live air-to-air missiles, rockets, night illumination flares and 30mm ammunition).

3.27.2.5. If the weather is less than 500 ft AGL and 1 ½ sm or a flight member's weather category, whichever is higher.

3.27.3. Lead Procedures. Refer to AFTTP 3-3.A-10.

3.27.3.1. Establish an approach speed consistent with the heavier aircraft. Approach speeds may be adjusted higher than standard approach speeds, depending on turbulence, runway length, runway condition, etc.

3.27.3.2. Position the wingman on the upwind side if the cross wind component exceeds 5 knots.

3.27.3.3. Plan to land near the center of your half of the runway to ensure enough runway is available for the wingman.

3.27.4. Wingman Procedures. Refer to AFTTP 3-3.A-10.

3.27.4.1. Maintain a minimum of 10 ft lateral wingtip spacing.

3.27.4.2. Cross-check the runway to ensure proper runway alignment.

3.27.4.3. Execute a climbout/missed approach if sufficient runway/aircraft clearance is not available.

3.27.4.4. Roll-out Procedures. Refer to AFTTP 3-3.A-10. If the wingman overruns the leader, accept the overrun and maintain aircraft control on the appropriate side of the runway. Do not attempt to reposition behind the leader. The most important consideration is wing tip clearance.

3.28. Chaff/Flare Procedures. AFI 11-214 contains basic procedures for employment of Chaff/Flare.

3.29. IMC Training.

3.29.1. Combat Mission Ready (CMR)/Basic Mission Capable (BMC) A-10 pilots may conduct air to air and air to ground training in IMC conditions IAW 11-214 and this regulation.

3.29.2. Pilots conducting training in IMC prioritize maintaining awareness on attitude, position, and de-confliction over tactical maneuvering. If awareness on any of these lost, pilots will cease tactical maneuvering until SA is regained.

3.29.3. Minimum altitude is 5,000 ft AGL or MSA whichever is higher.

3.29.4. Maneuvering parameters are up to 60 degrees of bank and ±15 degrees of pitch.

Chapter 4

INSTRUMENT PROCEDURES

4.1. Approach Category.

4.1.1. The A-10 is Approach Category D. Accomplish missed approach IAW the flight manual procedures. Missed approach airspeed is 200 to 220 KIAS.

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

4.1.2.1. A straight-in approach is flown.

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

4.1.2.3. Missed approach airspeed is 200 to 210 KIAS.

4.1.3. Missed approach airspeeds are based on 260 knots true airspeed (KTAS) or less for Category D approaches and 240 KTAS or less for Category C approaches. At high pressure altitudes and temperatures, these true airspeeds may not be compatible with published missed approach airspeeds and the approach should not be flown.

4.1.4. A-10s are approved to use INS for en-route Area Navigation (RNAV) for a period not to exceed 1 ½ hours between INS updates. An update is defined as establishing/validating a positive position using visual references, GPS, or TACAN. A-10s may use EGI for point-to-point navigation only. Do not fly (GPS or RNAV) on Q and T-routes, or terminal procedures (approaches and Standard Terminal Arrivals (STARs)) without MAJCOM approval.

4.2. Takeoff and Join-up. The FLs 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 and trail formation. Formation trail departures comply with instructions for a non-standard formation flight as defined in FLIP. FL should request IFF squawks for wingmen in trail.

4.3. Trail Procedures.

4.3.1. General. Do not sacrifice basic instrument flying when performing secondary tasks during trail departures in IMC. Strictly adhere to the briefed airspeeds, power settings, altitudes, headings, and turn points. If task saturation occurs, cease attempts to maintain trail, immediately concentrate on flying the instrument procedure, and notify the FL. FL notifies ATC.

4.3.2. Trail Departure.

4.3.2.1. Use a minimum of 20 seconds takeoff spacing.

4.3.2.2. Each aircraft/element will accelerate in MAX power to 200 KIAS. Climb speed will be 200 KIAS and power setting will be 800 degrees Interstage Turbine Temperature (ITT) unless specifically briefed otherwise.

4.3.2.3. Each aircraft/element climbs on takeoff heading to 1,000 ft AGL and accelerate to 200 KIAS before initiating any turns, except when departure instructions specifically preclude compliance.

4.3.2.4. Each aircraft/element calls passing each 2,000 ft altitude increment (or as briefed) with altitude and heading passing if in a turn until join-up or level off. In addition, each aircraft/element calls 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 adhere to the departure route.

4.3.2.5. Each aircraft/element maintains the briefed trail takeoff spacing using all available aircraft systems and navigational aids to monitor positions.

4.3.2.6. Each aircraft/element maintains at least 1,000 ft vertical separation from the preceding aircraft/element during the climb, at level off, and in cruise until visual contact is established, except in instances where departure instructions specifically preclude compliance. If unable to comply with minimum en route altitude (MEA) or ATC is unable to accommodate 1,000 ft blocks, vertical separation may be reduced to 500 ft.

4.3.3. Trail Recovery.

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

4.3.3.2. Trail recoveries are limited to a maximum of four aircraft.

4.3.3.3. 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.

4.3.3.4. Trail recoveries do not terminate in simultaneous radar or circling approaches. If these are required, flights break up IAW **paragraph 4.4** and obtain separate IFR clearances prior to the final segment of the approach.

4.3.3.5. FL briefs spacing, configuration, and airspeeds. Minimum spacing between aircraft is 6,000 ft and is to be maintained using all available aircraft systems and navigational aids.

4.3.3.6. Prior to taking spacing, the FL coordinates with ATC and ensure that all wingmen have operative navigational aids IAW **paragraph 4.4** The formation will squawk as directed by ATC.

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

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

4.3.3.9. Once established on a segment of a published approach, each aircraft complies with all published altitudes and restrictions while maintaining trail separation.

4.3.3.10. Unless local procedures establish defined reference points for airspeed/configuration changes, the FL directs changes by radio. When directed, all aircraft in the formation comply simultaneously.

4.3.3.11. If situational awareness is lost or separation/de-confliction cannot be guaranteed during recovery, the FL establishes altitude de-confliction and coordinate a separate IFR clearance with ATC. If this occurs after established on a segment of a published approach, the pilot executes a missed approach or climb out as directed by ATC.

4.4. Formation Breakup/Spacing Procedures. Formation breakup should not be accomplished in IMC; however, if unavoidable, accomplish the breakup in straight and level flight. Prior to a weather breakup, the FL transmits attitude, airspeed, altitude, altimeter setting, and heading. All wingmen acknowledge the transmission 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 flying a formation landing, the wingman should be positioned on the appropriate wing prior to weather penetration.

4.6. Formation Lead Changes in IMC. In IMC, formation flights will not change lead/wing positions below 1,500 ft AGL or instrument downwind altitude, whichever is lower.

4.7. Use of the HUD. The HUD is not certified as a primary flight instrument. It may be used as an additional instrument reference in night/IMC conditions; however, do not use it as the sole instrument reference in these conditions. In addition, do not use the HUD to recover from an unusual attitude or when executing lost wingman procedures except when no other reference is available.

Chapter 5

AIR-TO-AIR WEAPONS EMPLOYMENT

5.1. General.

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

5.1.2. This chapter applies to all missions where the intent is to conduct maneuvers used to defeat aerial attacks or to employ ordnance against airborne fixed wing aircraft or helicopters.

5.1.3. During high-aspect basic fighter maneuver training, a dedicated defender and offender must be clearly identified for each engagement. The offender will have some kind of advantage (power, G available, lead turn advantage at the merge, energy state at start of engagement).

5.1.4. Prior to conducting ACBT, pilots maneuver the aircraft to confirm proper operation of slats, peak performance (steady tone) and stall warning (chopped tone). If any component of the stall warning system does not appear to be functioning properly, do not conduct ACBT maneuvering.

5.1.5. Do not conduct Air-to-Air training with hung ordnance.

5.2. Maneuvering Limits.

5.2.1. The minimum airspeed during ACBT is 120 KIAS.

5.2.2. During ACBT maneuvering, pilots will not maintain an angle of attack that triggers the chopped stall warning tone. If the chopped tone is activated, relax back pressure immediately to return to an angle of attack that deactivates the chopped tone.

5.2.3. The minimum maneuvering airspeed during low altitude air-to-air training is 240 KIAS for both defensive and offensive maneuvering.

5.2.4. Negative G guns jinks are prohibited.

5.2.5. Night Air-to-Air training maneuvering category is LIMITED with a minimum altitude of 2000 ft AGL or MSA whichever is higher.

5.3. Simulated Gun/AIM-9 Employment. If the gun is PINNED or UNPINNED, simulated air-to-air weapons employment using the gun trigger or AIM-9 pickle button are allowed when the following conditions are met:

5.3.1. No live or heavyweight inert ordnance aboard the aircraft (30MM, BDU-33, and 2.75 inch rockets are authorized). During air-to-air maneuvering in LFE training with live or heavyweight ordnance aboard, the gun trigger and AIM-9 pickle button will not be actuated. Also, the FL must verbally confirm the Master Arm and Gun/ Precision Altitude Control (PAC) arm switches are safe.

5.3.2. No hung ordnance.

5.3.3. Master Arm switch is in TRAIN.

5.3.4. GUN/PAC Arm switch is in SAFE.

5.3.5. FL verbally confirms training mode (TRN in the HUD or TRAIN on the MFCD) and GUN/PAC Arm switch SAFE and acknowledged throughout the flight.

5.3.6. Cold trigger and pickle check is accomplished and acknowledged throughout the flight.

Chapter 6

AIR-TO-SURFACE WEAPONS EMPLOYMENT

6.1. General. AFI 11-214 contains air-to-surface procedures applicable to all aircraft. The procedures contained in this chapter specify additional procedures or restrictions that are applicable to A-10 operations.

6.2. Range Sorties. Range sorties with planned bomb dummy unit (e.g., BDU-33) deliveries from a triple ejector rack (e.g., TER-9) should be scheduled in elements of two aircraft to the maximum extent possible to allow a Battle Damage Check. This does not preclude scheduling single ship Forward Air Controller (Airborne) sorties.

6.3. Battle Damage/Bomb Checks. If circumstances permit, the FL will direct a battle damage/bomb check prior to or during return to base (RTB). This check is mandatory, unless tasked single ship or a rejoin is unreasonable, following the expenditure of live ordnance (including all types of 30mm ammunition). Observe established de-confliction responsibilities and position change procedures. Formation spacing will be no closer than normal fingertip. Do not conduct bomb checks at night.

6.4. Training Rules.

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

6.4.2. Pilots positively identify the target and de-conflict ordnance footprints from friendly force positions prior to weapons release. Use all available means in order to acquire the target visually, acquire the target through a TGP or by confirming target location through valid on-board/off-board cues. These cues include target talk-on description, marking rounds, LSS/LST, TGP, HUD symbology, infrared pointers or other NVD compatible marking devices. For Inertially Aided Munition deliveries using Bomb on Coordinate, target coordinate read back to the Joint Terminal Attack Controller/Forward Air Controller (Airborne) must be off the Digital Stores Management System page.

6.4.2.1. LSS/LST.

6.4.2.1.1. LSS/LST employment utilizes the concepts of a safety and optimum attack zones.

6.4.2.1.2. Reference Joint Publication 3-09.3, *Close Air Support*, for laser safety and optimal attack zones.

6.4.2.1.3. LSS/LST is not used as a sole source for target identification. In some situations, laser spots shift from the designated target to the laser source while operating in the optimal attack zone—precluding total reliance on the laser spot.

6.4.2.1.4. Attack heading will avoid the target-to-laser designator safety zone to preclude false target indications.

6.4.3. FTU/MQT Pilots.

6.4.3.1. Will not change targets once roll-in to final is initiated except during two-target strafe.

6.4.3.2. Will not perform element pop-ups. This does not preclude IP chase or tactical formation ingress to the target.

6.4.4. Local operational guidance specifies night spacing techniques and order of night weapons deliveries commensurate with:

6.4.4.1. 1) aircraft performance

6.4.4.2. 2) flight manual restrictions

6.4.4.3. 3) peculiarities of local range geography

6.4.4.4. 4) target sets.

6.4.4.5. Guidance should ensure performance of the most demanding events after the pilot is acclimated to night weapons deliveries.

6.5. Live Ordnance Procedures.

6.5.1. Refer to AFI 11-214.

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

6.5.2.1. All pilots are to be familiar with applicable range weapons delivery procedures, appropriate targets and weapons footprints.

6.5.2.2. Ground personnel locations are to be briefed and acknowledged by all pilots.

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

6.6. Simulated Air-to-Surface Weapons Employment.

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

6.6.2. If the gun is PINNED or UNPINNED, simulated attacks against off-range targets are permitted using the gun trigger and pickle button when the following conditions are met:

6.6.2.1. No live or heavyweight inert ordnance aboard the aircraft (30MM, BDU-33, night illumination flares and 2.75 inch rockets are authorized).

6.6.2.2. No hung ordnance.

6.6.2.3. Master Arm switch is in TRAIN.

6.6.2.4. GUN/PAC Arm switch is in SAFE.

6.6.2.5. FL verbally confirms training mode (TRN in the HUD or TRAIN on the MFCD) and GUN/PAC Arm switch SAFE and acknowledged throughout the flight.

6.6.2.6. Cold trigger and pickle check accomplished and acknowledged throughout the flight.

6.7. Weapons delivery through an undercast weather ceiling or in IMC.

6.7.1. Comply with AFI 11-214 requirements for aircraft employing Inertially Aided Munitions in bomb-on-coordinate mode or aircraft employing any ordnance in a system delivery mode on coordinates only.

6.7.2. On a Class A range, an RCO must be available to clear the range and spot the ordnance impact. A Joint Terminal Air Controller, other aircrew, or range personnel may be used on a Class B or C range.

6.7.3. Use a Blended EGI Solution with a Figure of Merit (FOM) of 1 and Estimated Vertical Error (EVE) < 50.

6.8. Joint Air Attack Team (JAAT).

6.8.1. References. Reference AFTTP 3-1.A-10 (U) this publication is classified, Joint Publication 3-09.3, *Close Air Support* and AFTTP 3-2.6 JFIRE, *Multi-Service Tactics, Techniques, and Procedures for the Joint Application of Firepower* for additional Tactics, Techniques, and Procedures.

6.8.2. Aircraft/Helicopter Separation. Ensure separation through one or both of the following methods:

6.8.2.1. Altitude blocks with at least 100 ft separation between the top of the helicopter block and the bottom of the A-10 block.

6.8.2.2. Routes, sectors, or timing procedures that ensure de-confliction.

6.8.3. Training Rules. Normal air-to-surface training rules apply, to include calling Knock- It-Off if situational awareness of helicopter positions is lost.

6.8.4. Radio Frequencies. All participants monitor one common frequency.

6.9. Search and Rescue Training. AFTTPs are the primary reference for wartime search and rescue (SAR) procedures, techniques and planning. For peacetime SAR considerations, see **paragraph 7.12**. of this volume.

6.10. Laser Command Pointer (LCP) and Laser Eye Protection (LEP) Procedures. The list of authorized LCPs can be found in AFI 11-214.

6.10.1. Train personnel using MAJCOM approved academics and conduct vision testing IAW the ACC approved hazard minimization plan.

6.10.2. LEP will be utilized IAW AFI 11-214 & AFI 11-301V1, *Aircrew Flight Equipment Program*.

6.10.3. LCPs will be utilized IAW AFI 11-214.

6.10.4. LCPs can be used in all warning, restricted, and military operating areas.

Chapter 7

ABNORMAL OPERATING PROCEDURES

7.1. General. This chapter contains procedures to follow when other than normal operations occur. They do not, however, replace or supersede procedures contained in the flight manual or the use of sound judgment.

7.1.1. Accept no aircraft for flight with a known malfunction that would compromise the safe conduct of the flight until completing appropriate corrective actions.

7.1.2. Do not taxi aircraft with malfunctions that affect the nose-wheel steering or brake systems.

7.1.3. After isolating or correcting a malfunctioning system, do not use that system again unless its use in a degraded mode is essential for recovery. Do not conduct in-flight trouble-shooting after completing flight manual emergency procedures.

7.1.4. When a fuel imbalance is greater than TO 1A-10C-1 limits, terminate tactical maneuvering and investigate. If the fuel imbalance was caused by a slow feeding tank that can be corrected, vice a fuel system failure, the mission may continue IAW TO 1A-10C-1 guidance. Terminate the mission if fuel imbalance cannot be corrected. Instruments, medium altitude navigation, deployment missions, and level weapons deliveries are authorized profiles to reduce gross weight.

7.2. Ground Aborts.

7.2.1. When a flight member aborts prior to takeoff, the FL normally realigns (or aligns as briefed) flight positions to maintain a numerical call-sign sequence. The FL then advises the appropriate agencies of such changes.

7.2.2. A flight of two or more aircraft with only one designated FL in the formation either sympathetically aborts or proceeds on a pre-briefed single-ship mission should the FL 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. FTU students may also follow this procedure if allowed by the appropriate syllabus, and approved by the squadron commander or operations officer. If accomplishing a join-up on an air-to-ground range, terminate all events until the joining aircraft has achieved proper spacing.

7.3. Takeoff Aborts.

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

7.3.2. If an abort occurs during takeoff roll, clear to the appropriate side of the runway as expeditiously as possible based on position within the element. If this is not feasible because of aircraft control issues, clear straight ahead and consider directing a flight abort for subsequent flight members. As soon as possible, give call-sign and state intentions. Following aircraft alter takeoff roll to ensure clearance or abort takeoff if unable to maintain adequate clearance.

7.3.3. Anytime an aircraft experiences a high speed abort and hot brakes are suspected:

7.3.3.1. Declare a ground emergency.

7.3.3.2. Taxi the aircraft to the designated hot brake area and perform hot brake procedures.

7.4. Air Aborts.

7.4.1. If an abort occurs after takeoff, all aircraft maintain their original numerical call-sign when communicating with agencies outside of the flight. The FL may renumber members for ease of communication within the flight.

7.4.2. The pilot of an aborting aircraft advises the FL of the conditions necessitating the abort, intentions and assistance required.

7.4.3. If the FL aborts, the designated deputy leader assumes command of the flight.

7.4.4. Escort aborting aircraft with an emergency condition to the field of intended landing. When other than an emergency condition exists, the FL determines if the aborting aircraft requires an escort.

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

7.4.5.1. Birdstrike/foreign object damage.

7.4.5.2. Over-G. The aircraft land as soon as practical out of a straight-in approach.

7.4.5.3. Flight control system anomalies. Declare an emergency, even if the malfunction appears corrected.

7.4.5.4. Engine flameout, stagnation, or shutdown. This applies even if a successful restart is accomplished. **Exception**: Intentional shutdowns for Functional Check Flights (FCF).

7.5. Radio Failure.

7.5.1. General. Individual aircraft experiencing radio failure will comply with procedures outlined in FLIP, AFPAM 11-205, AFI 11-202V3, this volume, and local directives.

7.5.2. Formation.

7.5.2.1. Flight members who experience total radio failure while in close or route formation will maneuver within close/route parameters to attract the attention of another flight member and give the appropriate visual signals. Consider using a J28.2 text message to make contact with other flight members. Using the survival radio is an option as well. Terminate the mission as soon as practical and lead the NORDO aircraft to the base of intended landing or a divert base. Perform a formation approach to a drop-off on final unless safety, fuel, weather, or other considerations dictate otherwise.

7.5.2.2. If flying other than close/route formation when radio failure occurs, the NORDO aircraft should attempt to rejoin to a route position on another flight member. The joining/wing aircraft is responsible for de-confliction until the other flight member acknowledges his presence by a wing rock, signifying clearance to join. Once joined, the NORDO aircraft will give the appropriate visual signals. If 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 IAW **paragraph 7.5.1** above. Aircraft experiencing any difficulty/emergency in addition to NORDO will proceed as required by the situation.

7.5.3. Surface Attack NORDO Procedures for Class A/Manned Class B Ranges.

7.5.3.1. Attempt contact with the RCO on the appropriate backup frequency.

7.5.3.2. If unable to re-establish contact, make a pass by the range control tower on the attack heading while rocking wings, and turn in the direction of traffic. The FL will either rejoin on the NORDO aircraft, or direct another flight member to rejoin on the NORDO aircraft, in order to escort the NORDO aircraft to a recovery base.

7.5.3.3. If the NORDO aircraft has an emergency, then if practical, make a pass by the range control tower, on the attack heading while rocking wings, turn opposite the direction of traffic, and proceed to a recovery base. The FL either rejoins on the NORDO aircraft, or directs another flight member to rejoin on the NORDO aircraft, in order to escort the emergency aircraft.

7.5.3.4. If the RCO experiences radio failure, the flight holds high and maintain spacing while attempting contact on primary and backup frequencies.

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

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

7.5.3.5.2. Relay stores jettison visual signals specified in AFPAM 11-205 to the NORDO aircraft to initiate jettison.

7.5.4. Surface Attack NORDO Procedures for Unmanned Class B and Class C Ranges:

7.5.4.1. Make a “high and dry” pass on the target, if possible, while rocking wings.

7.5.4.2. The leader either rejoins the flight in sequence and recovers, or directs another flight member to escort the NORDO aircraft to a recovery base.

7.5.4.3. If the NORDO has an emergency, the NORDO, if practical, makes a pass on the target, rocking wings, turn opposite direction of traffic, and proceeds to a recovery base. The FL either rejoins on the NORDO aircraft, or directs a flight member to rejoin on the NORDO aircraft, in order to escort the emergency aircraft.

7.5.5. NORDO Recovery.

7.5.5.1. The procedures in AFPAM 11-205 and FLIP apply.

7.5.5.2. If flying a straight-in approach and a go-around becomes necessary, the chase will go-around, pass the NORDO aircraft and rock his wings.

7.5.5.3. The NORDO aircraft gos-around if the situation allows. If the NORDO aircraft is in formation as a wingman, the leader initiates a gentle turn into the wingman and begins the go-around.

7.6. Severe Weather Penetration. Do not attempt flight through severe weather. (T-2). However, if unavoidable, obtain separate clearances prior to severe weather penetration. If not feasible, flights may assume an in-trail formation with a minimum of 1 nm separation between aircraft/elements. Obtain ATC clearance for a non-standard formation.

7.7. Lost Wingman Procedures. In any lost wingman situation, immediate separation of aircraft is essential. Upon losing sight of the leader or unable to maintain formation due to spatial disorientation (SD), the wingman simultaneously execute the applicable lost wingman procedures while transitioning to instruments and inform the FL. Refer to **paragraph 7.8** for specific SD considerations. Smooth application of control inputs is imperative to minimize the effects of SD. Permission from the FL is required to rejoin the flight once lost wingman procedures have been executed.

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 lead 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 lead. 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 FL to roll out of the turn. Maintain angle of bank to ensure lateral separation and obtain separate clearance. Once assured separation, the leader may resume turn. **Note:** If in three-ship echelon, refer to four-ship lost wingman procedures.

7.7.1.3. Precision/Non-Precision Final. The wingman momentarily turns away to ensure separation, inform lead, and commences the published missed approach procedure while obtaining a separate clearance from approach control.

7.7.1.4. Missed Approach. The wingman momentarily turns away to ensure separation, informs lead, and continues the published or assigned missed approach procedure while climbing to 500 ft above missed approach altitude. Obtains a separate clearance from approach control.

7.7.2. Four-Ship Flights. If only one aircraft in the flight becomes separated, the previous procedures provide safe separation. Since it is impossible for number 4 to immediately ascertain that number 3 still has visual contact with lead, it is imperative that initial action of number 4's be based on the assumption that number 3 has also become separated. Number 2 and 3 follow the procedures outlined above. Number 4 follows the appropriate procedure listed below:

7.7.2.1. Wings-Level Flight. Simultaneously inform lead 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 lead to roll out. Obtain separate clearance. Lead resumes turn only when separation is ensured.

7.7.3. Flight Lead. The FL should acknowledge the lost wingman's radio call and transmit attitude, heading, altitude, airspeed and other parameters as appropriate. Wingman will base lost wingman procedure on the FL's transmitted parameters (use caution observing published terrain clearance limits). The FL will be directive to ensure aircraft separation as required by the situation.

7.7.4. Wingman. If a wingman becomes separated and any aircraft experiences radio failure, the aircraft with the operational radio will obtain a separate clearance. NORDO aircraft will ensure the appropriate IFF/SIF code is selected IAW either the Flight Information Handbook or national rules while proceeding with the previous clearance. If an emergency situation arises along with radio failure, select IFF/SIF to emergency (7700) for the remainder of the flight.

7.7.5. Practice. Practice lost wingman procedures only in VMC.

7.8. Spatial Disorientation. Conditions which prevent a clear visual horizon or increase pilot tasking are conducive to SD. To prevent SD, the pilot makes a conscious attempt to increase instrument cross-check rate. When SD symptoms are detected, take the following steps 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 non-essential cockpit tasks.

7.8.1.2. If symptoms persist, bring aircraft to straight and level flight with reference to the attitude indicator and maintain straight and level flight, terrain permitting, until symptoms abate, (usually 30 to 60 seconds), and conditions permitting.

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

7.8.1.4. 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 FL with SD will advise wingmen that lead has SD and will comply with procedures in **paragraph 7.8.1** above.

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 to 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 situation 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 Two-Ship Formation. Lead should separate the flight into elements to more effectively handle a wingman with persistent SD symptoms. Establish straight and level flight IAW **paragraph 4.4** (Formation Breakup). The element with the SD pilot remains 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. Live Ordnance. For hung live ordnance or an aircraft malfunction that precludes further live weapons delivery, refer to TO 1A-10C-34-1-1, *A-10C Non-Nuclear Weapon Delivery Manual*. The following procedures also apply:

7.9.2.1.1. Note all release and fusing switches, then safe.

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

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 another mode of delivery in an attempt to expend. Re-attempted release of a BDU-33 from a TER-9 should be accomplished from a diving delivery followed by a climbing safe escape maneuver in order to provide positive G- loading to potentially separate the bomb from a malfunctioning TER.

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. Hang Fire/Misfire—General:

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

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. TO 1A-10C-34-1-1 contains hangfire/misfire procedures for specific ordnance types.

7.9.4. Gun Unsafe. Refer to TO 1A-10C-34-1-1. The following procedures also apply:

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

7.9.4.2. Accomplish gear lowering over an unpopulated area.

7.9.5. Recovery with Weapons Malfunction/Hung Ordnance.

7.9.5.1. If practical, visually inspect the aircraft for damage.

7.9.5.2. Declare an emergency (not required for hung practice/inert ordnance or secure 2.75 inch rockets).

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

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

7.9.5.5. In case of a delayed BDU-33 release, write up the incident in the AFTO Forms 781, *ARMS Aircrew/Mission Flight Data Document* and declare the aircraft code-3 during maintenance debrief. A delayed release occurs when the BDU-33 releases from the TER-9/A later than planned by the pilot and impacts more than 300 meters long of the target or hangs and subsequently falls off the aircraft later in the sortie.

7.9.6. Miscellaneous Procedures.

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

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

7.10. In-flight Practice of Emergency Procedures.

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

7.10.2. Emergency Practice.

7.10.2.1. Accomplish all practice and training related to aborted takeoffs in a Cockpit Familiarization Trainer, Full Motion Trainer or a static aircraft (if trainers unavailable).

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

7.10.2.3. While in-flight, simulated loss of both engines is prohibited.

7.10.3. Simulated Single Engine Approach/ Landing:

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

7.10.3.2. Follow procedures in TO 1A-10C-1 for emergency landing patterns and actual single engine approaches as appropriate for the simulated engine failure situation. Pilots engage anti-skid prior to landing.

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

7.10.3.4. IQT pilots do not perform simulated single engine full stop landings unless chased by an IP.

7.10.3.5. Simulated single engine approaches not terminating in a full stop landing utilize both engines during go-around, except single engine training conducted above 5,000 ft AGL.

7.10.4. Practice of emergency landing patterns at active airfields is authorized provided that:

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

7.10.4.2. IQT pilots are chased by an IP.

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

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

7.11.1. Flying in manual reversion is something that is done infrequently and must be treated accordingly. A thorough review of manual reversion procedures in TO 1A-10C-1, TO 1A-10C-1CL, and/or TO 1A-10C-6CL-1 is accomplished before any flights where manual reversion is a mandatory part of the flight profile. Particular attention is placed on actions to be taken when problems arise with manual reversion flight. The first action is to revert to the normal flight control mode. If that action does not solve the problem and the aircraft is uncontrollable, then ejection is recommended.

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

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

7.11.2.2. Aircraft must have less than 350 rounds of 30 mm and a configuration of symmetrically loaded TERs, empty TERs, rocket pods or clean to use manual reversion.

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

7.12. Search and Rescue Combat Air Patrol (SARCAP) Procedures. In the event an aircraft is lost in flight, actions must begin to locate possible survivors and initiate rescue efforts. It is critical 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 may require adjustment to meet each unique search and rescue situation. **Chapter 8**, Local Operating Procedures, **paragraph 8.2.1.6**, Abnormal Procedures, where pilots can find details on unit specific procedures.

7.12.1. SQUAWK. Immediately terminate maneuvering using appropriate Knock-It-Off procedures. Establish a SARCAP commander. Place IFF to EMER to alert ATC or Ground Control Intercept (GCI) of the emergency situation.

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

7.12.3. MARK. Mark the last known position of survivor/crash site using any means available. Use TACAN/INS position, TAD or TGP marks, ATC/GCI positioning, or ground references to identify the immediate area for subsequent rescue efforts.

7.12.4. SEPARATE. Remain above the last observed parachute altitudes until determining the position of all possible survivors. De-conflict other aircraft in the SARCAP by altitude to preclude midair collision. Establish high/low Combat Air Patrols as necessary to facilitate communications with other agencies.

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

7.13. Chemical, Biological, Radiological, Nuclear and High Yield Explosive (CBRNE) Operations. For CBRNE operations see **Attachment 16**.

Chapter 8

LOCAL OPERATING PROCEDURES

8.1. General. This chapter is reserved for unit local operating procedures. Units composed of dissimilar aircraft may publish guidance in a single, stand-alone local operating instruction (OI) instead of supplementing this AFMAN. Added or stand-alone procedures will not be less restrictive than those contained elsewhere in this volume. This chapter is not intended to be a single source document for procedures contained in other directives or regulations. Avoid unnecessary repetition of guidance provided in other established directives; however, reference to those directives is acceptable when it serves to facilitate location of information necessary for local operating procedures. Issue the supplement to this chapter or the local OI to each A-10 pilot.

8.2. Procedures. Unless changed by MAJCOM or subordinate agency, the following procedures apply:

8.2.1. Organize the local chapter in the following format to include, but not limited to, the following:

8.2.1.1. Section A—Introduction

8.2.1.2. Section B—General Policy

8.2.1.3. Section C—Ground Operations

8.2.1.4. Section D—Flying Operations

8.2.1.5. Section E—Weapons Employment

8.2.1.6. Section F--Abnormal Procedures

8.2.1.7. Attachments (Illustrations)

8.2.2. This chapter includes procedures for the following, if applicable:

8.2.2.1. Command and Control

8.2.2.2. Fuel Requirements and Bingo Fuels

8.2.2.3. Diversion Instructions

8.2.2.4. Jettison Areas (IFR/VFR)

8.2.2.5. Jettison Procedures/Parameters

8.2.2.6. Controlled Bailout Areas

8.2.2.7. Local Weather Procedures

8.2.2.8. Securing Aircraft After Emergencies

8.2.2.9. Approved Alternate Missions

8.2.2.10. Cross-Country/Servicing Procedures

8.2.2.11. SARCAP Procedures

8.3. Distribution of Local Supplements. See Opening Paragraph for coordination instructions. Distribution of local supplements may begin before the review process is complete unless MAJCOM or appropriate subordinate agency determine otherwise.

MARK D. KELLY, Lt Gen, USAF
Deputy Chief of Staff, Operations

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

A-10 RTM, *A-10C Ready Aircrew Program Tasking Memorandum*

AFMAN 11-2A-10CV1, *A-10C--Aircrew Training*, 9 Jul 2019

AFMAN 11-217, *Flight Operations*, 10 Jun 2019

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

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

AFPAM 11-205, *Cockpit and Formation Flight Signals*, 9 Aug 2018

AFI 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*, 21 Sep 2018

AFI 11-202V3, *General Flight Rules*, 10 Aug 2016

AFI 11-202V3, ACCSUP, *General Flight Rules*, 7 Jul 2019

AFI 11-209, *Participation in Aerial Events*, 22 May 2018

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

AFI 11-301V1, *Aircrew Flight Equipment Program*, 10 Oct 2017

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

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

AFPD 11-4, *Aviation Service*, 12 Apr 2019

AFTTP 3-1.A-10, *Tactical Employment--A-10 (Secret)*, 9 Mar 2018

AFTTP 3-2.6 JFIRE, *Multi-Service Tactics, Techniques, and Procedures for the Joint Application of Firepower*, Jan 2016

AFTTP 3-3.A-10, *Combat Aircraft Fundamentals--A-10*, 9 Mar 2018

AFTTP 3-4, Airman's Manual, 11 Jan 2019

FLIP, *Flight Information Publication*

JP 3-09.3, *Close Air Support*, 10 Jun 2019

TO 1A-10C-1, *Flight Manual—A-10C*, 10 Feb 2017

TO 1A-10C-1CL, *Flight Crew Chelist-A-10C*, 10 Feb 2017

TO 1A-10C-6CL-1, *Acceptance and Functional Check Flight Manual-A-10C*, 10 Nov 2010

TO 1A-10C -34-1-1, *A-10C Non-Nuclear Weapon Delivery Manual*, 10 Jan 2013

Adopted Forms

AF Form 679, Publication Compliance Item Waiver Request/Approval

AF Form 847, Recommendation for Change of Publication

AFTO Form 781, ARMS Aircrew/Mission Flight Data Document

Abbreviations and Acronyms

A3OF—Air Force Flight Standards Agency

ACBT—Air Combat Training

(D) ACBT—(Dissimilar) Air Combat Training

ACC/A3—Air Combat Command/Air Operations

ACC/A3TO—Air Combat Command/Flight Operations and Training

ADF—Automatic Direction Finder

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFTTP—Air Force Tactics, Techniques and Procedures

AFPD—Air Force Policy Directive

AGL—Above Ground Level

AGSM—Anti-G Straining Maneuver

ARCP—Air Refueling Control Point

ARCT—Air Refueling Control Time

ARIP—Air Refueling Initiation Point

ARMS—Aviation Resource Management System

ASC—Air Strike Control

ATC—Air Traffic Control

BDU—Bomb Dummy Unit (practice munition)

BFM—Basic Fighter Maneuvers

BMC—Basic Mission Capable

C2—Command and Control

CBRNE—Chemical, Biological, Radiological, Nuclear and High Yield Explosive

COMAFFOR—Commander Air Force Forces

CMR—Combat Mission Ready

COLA—Covert/Overt Lighting Assembly

CT—Continuation Training

DR—Dead Reckoning

DRU—Direct Reporting Unit

E&E—Evasion and Escape

ECM—Electronic Countermeasures

EGI—Embedded GPS/INS

EL—Element Lead

EOR—End of Runway

EVE—Estimated Vertical Error

EP—Emergency Procedure

FAC—Forward Air Controller

FAM—Familiarization

FCF—Functional Check Flight

FEBA—Forward Edge of the Battle Area

FL—Flight Lead

FLIP—Flight Information Publications

FOA—Field Operating Agency

FOM—Figure of Merit

ft—feet

FTU—Formal Training Unit

GCI—Ground Control Intercept

GPS—Global Positioning System

HAF—Headquarters Air Force

HARS—Heading Attitude Reference System

HAS—Hardened Aircraft Shelter

HMIT—Helmet Mounted Integrated Targeting

HOTAS—Hands on Throttle and Stick

HUD—Head Up Display

IAW—in accordance with

ID—Identify

IFF—Identification, Friend or Foe

IFR—Instrument Flight Rules

IMC—Instrument Meteorological Conditions

INS—Inertial Navigation System

IP—Instructor Pilot

IQT—Initial Qualification Training

IR—Infrared

ITT—Interstage Turbine Temperature

JAAT—Joint Air Attack Team

KIAS—Knots Indicated Airspeed

KIO—Knock-It-Off

km—kilometers

KTAS—Knots True Airspeed

LASDT—Low Altitude Step Down Training

LCP—Laser Command Pointer

LEP—Laser Eye Protection

LSS—Laser Spot Search

LST—Laser Spot Track

LATN—Low Altitude Tactical Navigation

LOWAT—**-** Low Altitude Training

MAJCOM/A3—Major Command/Air Operations

MEA—Minimum en route altitude

MFCD—Multi-Function Color Display

MOA—Military Operating Area

MOPP—Mission-Oriented Protective Posture

MSA—Minimum Safe Altitude

MSL—Mean Sea Level

MQT—Mission Qualification Training

nm—nautical miles

NORDO—No Radio

NVD—Night Vision Device

NVIS—Night Vision Imaging System

OI—Operating Instruction

OPR—Office of Primary Responsibility

OPS—Operational

OG—Operations Group

OG/CC—Operations Group Commander

OGV—Operations Group Standardization/Evaluations

PA—Public Affairs

PAC—Precision Altitude Control

PIC—Pilot in Command

PWC—Pilot Weather Category

RAA—Route Abort Altitude

RCO—Range Control Officer

RCR—Runway Condition Reading

RNAV—Area Navigation

RPM—Revolutions per Minute

RTB—Return to Base

RWR—Radar Warning Receiver

SCAR—Strike Coordination and Reconnaissance

SD—Spatial Disorientation

SADL—Situational Awareness Data Link

SAR—Search and Rescue

SARCAP—Search and Rescue Combat Air Patrol

SEFE—Flight Evaluator

SIF—Selective Identification

sm—statute miles

SORN—System of Records Notice

STAR—Standard Terminal Arrivals

TACAN—Tactical Air Navigation

TAD—Tactical Awareness Display

TER—Triple Ejector Rack

TGP—Targeting Pod

TGM—Training Guided Missile

TO—Technical Order

TOLD—Takeoff and Landing Data

VASI—Visual Approach Slope Indicator

VFR—Visual Flight Rules

VMC—Visual Meteorological Conditions

Terms

Air Combat Training (ACT)—A general term that includes (D)BFM, (D)ACM, and (D)ACT.

Bingo Fuel—A pre-briefed fuel state that allows the aircraft to return to the base of intended landing or alternate, if required, using preplanned recovery parameters and arriving with normal recovery fuel.

Class A Range—A manned range as defined in AFI 13-212, Volume 1 Range Planning and Operations, where a range control officer is present with two-way radio voice communication capability.

Class B Range—A manned or unmanned range with scoring capability, but no range control officer.

Class C Range—An unmanned range with no scoring or control capability.

Close Air Support (CAS)—Air action by aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces.

Forward Air Controller—An officer (aviator/pilot) member of the tactical air control party who, from forward ground or airborne position, controls aircraft in close air support of ground troops.

Forward Edge of the Battle Area (FEBA)—The foremost limits of a series of areas in which ground combat units are deployed to coordinate fire support, the positioning of forces, or the maneuver of units, excluding areas in which covering or screening forces are operating.

G—Gravity (G) force of attraction exerted on an object by the mass of the earth; acts vertically downward through centre of gravity of the object.

Goggles On—Descriptive term to notify flight members that the pilot has donned NVDs.

Goggles Off—Descriptive term to notify flight members that the pilot has doffed NVDs.

Head-up Display (HUD)—A display of flight, navigation, attack, or other information superimposed upon the pilot's forward field of view.

High and Dry—Descriptive term to notify flight members/RCO an aircraft is transiting through a final approach to a target without descending or releasing ordnance.

Hot Microphone (Hot Mic)—A microphone that is turned on and recording.

Hung Ordnance—Any item attached to the aircraft for the purpose of dropping or firing which has malfunctioned or failed to releaseF. In addition, hung ordnance includes the following items: (1) External fuel tanks after unsuccessful jettison attempt; (2) Remaining ordnance after an inadvertent release; (3) 20/30 mm ammunition after a gun malfunction (no fire, unplanned cease fire, runaway gun, or gun unsafe indication); (4) Any stores determined to be in an unsafe condition.

Inert Ordnance—Ordnance with no explosive or incendiary material (Includes BDU-50).

Jettison—The selective release of stores from an aircraft for other than a normal attack.

Jink—A sudden quick change of direction typically used as a tactical evasive maneuver.

Joint Terminal Attack Controller—A qualified (certified) Service member who, from a forward position, directs the action of combat aircraft engaged in close air support and other offensive air operations.

Joker Fuel—A pre-briefed fuel state above Bingo at which separation/bugout/event/termination should begin.

Knock-it-off—Directive phrase to direct all participants to cease tactical operations. Typically utilized in conjunction with a safety of flight incident.

Live Ordnance—Combat type ordnance incorporating explosive or incendiary material. Do not consider self-protection flares, night illumination flares and spotting charges as live ordnance.

Low-Altitude Training—Mission oriented operations in the low block altitude.

Minimum Safe Altitude—The defined altitude that provides 1,000 ft of clearance above the highest obstacle/terrain feature (rounded to the next highest 100 ft) within 5 nm of the planned course, routed boundaries, or operations area.

Night-Vision Device (NVD)—Any electro-optical device used to detect visible and infrared energy and provide a visible image.

Night—The time between the end of evening civil twilight and the beginning of morning civil twilight as published in the American Air Almanac, converted to local time.

Offensive Maneuvering—Maneuvers against an opponent to achieve weapons parameters.

Operations Checks (Ops Checks)—Procedural checks pilots perform during different phases of flight as defined by To 1A-10C-1CL-1.

Padlocked—Descriptive term to notify flight members that the pilot is unable to maintain visual contact with an object if they look away.

Practice Ordnance—Ordnance specifically designed or modified for practice. BDU-33, ATM, CATM, and classify ball (or tracer - TPT) gun ammunition as practice ordnance.

Release—The intentional separation of a free-fall aircraft store, from its suspension equipment, for purposes of employment of the store.

Show of Force—An operation planned to demonstrate United States resolve that involves increased visibility of United States deployed forces in an attempt to defuse a specific situation that, if allowed to continue, may be detrimental to United States interests or national objectives. (JP 3-0)

Situational Awareness (SA)—The level the warfighter/aircrew is able to recognize, process, and react to both external and internal factors in a dynamic environment to increase lethality, survivability, and mission effectiveness.

Switchology—The settings of switches on panels. Describes a sequence of cockpit/HOTAS switch placement/actuations.

Tactical Formation—Formations, as defined by AFTTP 3-1.A-10 and AFTTP 3-3.A-10, that provides mutual support.

Target—A directive call to assign group responsibility. Area on a range complex where the desired mean point of impact is located.

Terminate—Procedures used when safety of flight is not a factor and to indicate stopping ownship maneuvering.

Training Ordnance—Ordnance used in conduct of training. This includes practice ordnance, inert ordnance, and live ordnance.

Training Rules (TR)—Peacetime rules, procedures, and standards governing Air- to-Air and Air-to-Surface training that, when violated, jeopardize flight safety.

Unexpended Ordnance—Ordnance that is still onboard because no release was attempted.

Unintentional Release—Ordnance fired or dropped through pilot error.

Attachment 2

GENERAL BRIEFING GUIDE

A2.1. Mission Preparation.

A2.1.1. Time Hack

A2.1.2. EP/Threat of the Day

A2.1.3. Mission Objective(s)

A2.1.4. Mission Overview

A2.1.5. Mission Data Card

A2.1.5.1. Mission Commander/Deputy Lead

A2.1.5.2. Joker/Bingo Fuel

A2.1.5.3. Takeoff and Landing Data

A2.1.5.4. Working Area

A2.1.6. Environmental Conditions

A2.1.6.1. Weather/TDA

A2.1.6.2. Sunrise/Sunset (If Applicable)

A2.1.6.3. Moon Illumination (If Applicable)

A2.1.7. NOTAMs

A2.1.8. Personal Equipment

A2.1.9. Flight Crew Information File/Pubs/Maps

A2.2. Ground Procedures.

A2.2.1. Pre-Flight

A2.2.1.1. Aircraft

A2.2.1.2. Armament

A2.2.2. Ground Crew Briefing (When Applicable)

A2.2.2.1. Act only on Pilot’s instructions

A2.2.2.2. Ground emergency procedures

A2.2.2.3. Hand signals

A2.2.2.4. Aircraft Danger Areas

A2.2.3. Check-in

A2.2.4. Taxi/Marshalling/Arming

A2.2.5. Spare Procedures

A2.3. Takeoff.

A2.3.1. Runway Lineup

A2.3.2. Formation Takeoff

A2.3.3. Takeoff Interval

A2.3.4. Abort

A2.3.5. Landing Immediately After Takeoff

A2.4. Departure.

A2.4.1. Routing

A2.4.2. Trail Departure

A2.4.3. Rejoin

A2.4.4. Formation

A2.4.5. Ops Checks

A2.5. Recovery.

A2.5.1. Rejoin

A2.5.2. Battle Damage/Bomb Check (If Applicable)

A2.5.3. Flight Breakup (If Applicable)

A2.5.4. Contingency Routing

A2.5.4.1. Hung/Unexpended Ordnance (If Applicable)

A2.5.4.2. Weapons/Aircraft Malfunction (If Applicable)

A2.5.5. Pattern and Landing

A2.5.6. Landing/De-Arm

A2.5.7. Emergency / Alternate Airfields

Attachment 3

SPECIAL SUBJECTS BRIEFING GUIDE

A3.1. General Roles and Responsibilities (IP, FL, Wingman).

A3.1.1. Formation Specific Responsibilities and Priorities

A3.1.2. Flight Member Mission Priorities

A3.1.3. Sensor Prioritization

A3.1.4. De-confliction Contracts

A3.1.5. IP Responsibilities

A3.2. Chase Procedures.

A3.3. IFF Procedures.

A3.4. Visual Search Responsibilities/Midair Collision Avoidance/Flight Path De-confliction.

A3.4.1. Departure/En route/Recovery

A3.4.2. High Density Traffic Areas

A3.4.3. From Other Military Aircraft

A3.4.4. From Civilian Aircraft

A3.5. Dissimilar Formations.

A3.6. Terrain Avoidance.

A3.6.1. Departure/En Route/Recovery

A3.6.2. Use of Radar Altimeters / Ground Collision Avoidance System

A3.6.3. Ejection decision (i.e., immediately after T/O, prior to landing, departing a prepared surface, high altitude, low altitude)

A3.6.4. Use of TAD for obstacle avoidance

A3.7. Bird Strike Procedures.

A3.8. Hazards Associated With Human Factors (i. e., Channelized Attention, Task Saturation/Prioritization, and Complacency).

A3.9. G-Awareness.

A3.9.1. Turn/G-Suit Connection/G-tolerance

A3.9.2. Use of L-1 Anti-G Straining Maneuver (AGSM)

A3.10. Visual Illusions/Perceptions.

A3.11. Spatial Disorientation/Unusual Attitudes/G-Excess Illusion.

A3.12. Lost Wingman.

A3.13. Radio Inoperative.

A3.14. SARCAP.

A3.15. Recall Procedures.

A3.16. SIIs.

A3.17. Training Rules / Special Operating Instructions.

Attachment 4

INSTRUMENT/NAVIGATION BRIEFING GUIDE

A4.1. Climb.

A4.1.1. Instrument Departure

A4.1.1.1. Power Setting/Airspeed

A4.1.1.2. Trail Departure (If Applicable)

A4.1.1.3. Routing (Standard Instrument Departure Route, Radar Vectors, etc.)

A4.1.2. Level Off

A4.1.3. Formation

A4.2. Cruise.

A4.2.1. En route

A4.2.2. Cruise Data

A4.2.3. Navigation Aids

A4.2.4. Fuel Awareness/Ops Checks

A4.3. Area.

A4.3.1. Airwork

A4.3.1.1. Airspace Restrictions

A4.3.1.2. Area Orientation

A4.3.1.3. IP Responsibilities (If Applicable)

A4.3.1.4. Maneuvers/G-Awareness

A4.4. Approaches.

A4.4.1. Frequencies

A4.4.2. Holding

A4.4.3. Penetration

A4.4.4. Missed Approach/Climb out

A4.5. Special Subjects.

A4.5.1. Alternate Mission

A4.5.2. Emergency/Alternate Airfields

A4.5.3. Spatial Disorientation

A4.5.4. Unusual Attitudes

A4.5.5. Hazards Associated With Human Factors (e.g., Channelized Attention, Task Saturation/Prioritization, and Complacency)

A4.5.6. Low Altitude Ejection

A4.5.7. Lost Wingman

A4.5.8. Aircraft Lighting Considerations

Attachment 5

AIR REFUELING BRIEFING GUIDE

A5.1. General.

A5.1.1. Tanker Call-sign(s), Receiver Assignments

A5.1.2. Refueling Track(s), (Altitude and airspeed)

A5.1.3. Radio Frequencies

A5.1.4. ARIPs, ARCPs, ARCTs

A5.2. Buddy Procedures.

A5.2.1. Departure

A5.2.2. Join-up

A5.3. En route.

A5.3.1. Route of Flight

A5.3.2. Formation

A5.3.3. Ops Checks

A5.4. Rendezvous.

A5.4.1. Type Rendezvous

A5.4.2. Holding Procedures/Formation

A5.4.3. Ground Radar Assistance

A5.4.4. Tanker Identification—Air-to-Air TACAN/ Ground Radar/ADF/Visual

A5.4.5. Wingman/Deputy Lead Responsibilities

A5.4.6. Receiver Formation/Join-up Procedures

A5.4.7. Rendezvous Overrun

A5.5. Refueling.

A5.5.1. Checklist Procedures

A5.5.2. Radio Calls

A5.5.3. Refueling Order

A5.5.4. Techniques

A5.5.5. Radio Silent Procedures (Emission Control/Visual Signals)

A5.5.6. Fuel Off-Load

A5.5.7. Abort Points and Bases

A5.5.8. Drop-Off Procedures

A5.5.9. Wake Turbulence

A5.6. Rejoin and Exit.

A5.6.1. Formation

A5.6.2. Clearance

A5.7. Emergency Procedures.

A5.7.1. Breakaway Procedures

A5.7.2. Systems Malfunctions

A5.7.3. Damaged Receptacle

A5.8. IMC/Night Considerations (If Applicable).

A5.8.1. Lost Wingman Procedures

A5.8.1.1. En route

A5.8.1.2. On the Tanker

A5.8.2. Aircraft Lighting

A5.9. Special Subjects.

A5.9.1. Alternate Mission

A5.9.2. Spatial Disorientation

A5.9.3. Hazards Associated with Human Factors (e.g., Channelized Attention, Task Saturation/Prioritization, and Complacency)

Attachment 6

(D)ACBT BRIEFING GUIDE

A6.1. General.

A6.1.1. Call-signs

A6.1.2. Number and Type Aircraft

A6.1.3. Dissimilar Formation (If Applicable)

A6.1.3.1. Formation References

A6.1.3.2. In-flight Visual Signals

A6.1.4. Debriefing (Time/Place)

A6.1.5. G-Awareness/Tolerance/Warm-up

A6.1.6. Area Information

A6.1.6.1. Controlling Agency

A6.1.6.2. Airspace Limits/Restrictions

A6.1.6.3. Frequencies

A6.1.6.4. Squawks

A6.1.6.5. Block Altitudes/Minimum Altitudes

A6.2. Tactical.

A6.2.1. Scenario

A6.2.1.1. Type Threat Simulated/Tactics Limitations

A6.2.1.2. Safe Areas/FEBA

A6.2.1.3. Ingress/Egress Routing/Target Locations

A6.2.2. Low Altitude Training (LOWAT) (If Applicable)

A6.2.2.1. Minimum Altitudes

A6.2.2.2. Maneuvering Limitations

A6.2.3. Basic Fighter Maneuvers

A6.2.3.1. Setups

A6.2.3.2. Offensive

A6.2.3.3. Defensive

A6.2.4. Flight/Element Tactics

A6.2.4.1. Tactics/Mutual Support

A6.2.4.2. Formation /Look out Responsibilities

A6.2.4.3. Roles and Responsibilities

A6.2.4.3.1. Engaged

A6.2.4.3.2. Supporting

A6.2.4.4. Clearance for Wingman to Engage

A6.2.4.5. Radio Usage

A6.2.4.6. Egress/Separate/Rejoin

A6.2.4.7. Termination

A6.2.5. Weapons Employment

A6.2.5.1. Weapons System/RWR/ECM/IFF Checks

A6.2.5.2. Simulated Ordnance (Type/Quantity)

A6.2.5.3. Shot Criteria/Air-to-Air Weapons Switchology

A6.2.5.4. Kill Criteria/Removal

A6.3. Specific Mission Considerations.

A6.3.1. Air to Air Training Rules

A6.3.2. Midair Collision Avoidance/Flight Path De-confliction (With/Without Visual)

A6.3.3. Maneuvering Limitations

A6.3.3.1. Angle of Attack /Airspeed and G

A6.3.3.2. Recognition/Prevention/Recovery from Out of Control

A6.3.3.3. Heavy Gross Weight Effect on Maneuvering

A6.3.3.4. Limitations

A6.3.3.4.1. Aircraft

A6.3.3.4.2. Ordnance

A6.3.3.5. Asymmetrical Configuration/Thrust

A6.3.3.6. Adverse Yaw/Accelerated Stalls

A6.3.3.7. Stalls/Departures

A6.3.3.7.1. Engine Stall Susceptibility

A6.3.3.7.2. Flight Control Effectiveness

A6.3.3.7.3. Use of Angle of Attack and Aural Tones

A6.3.3.8. A-10 vs A-10 unique considerations

A6.3.3.9. A-10 vs High Speed Fighter

A6.3.3.10. Energy/Thrust Limitations

A6.4. Special Subjects.

A6.4.1. Emergencies/Escort/Dissimilar Formation Recovery (If Applicable)

A6.4.2. Additional Considerations

A6.4.2.1. Mission Recording Devices

A6.4.2.2. Air-to-Air TACAN

A6.4.2.3. Codewords

A6.4.2.4. Environmental Considerations (e.g., sun angle, etc.)

A6.4.3. Hazards Associated with Human Factors (e.g., Channelized Attention, Task Saturation/Prioritization, and Complacency)

A6.4.4. Alternate Mission

Attachment 7

ESCORT MISSION BRIEFING GUIDE

A7.1. En route To Rendezvous/Post-Mission Navigation.

A7.1.1. Formation

A7.1.2. Route of Flight/Applicable Restrictions

A7.1.3. Control Agency Call-sign/Frequency

A7.2. Rendezvous.

A7.2.1. Protected Force Call-sign/Common Frequency

A7.2.2. Number/Type Aircraft

A7.2.3. Rendezvous Point/Time

A7.2.4. Altitude

A7.2.5. Airspeed

A7.3. Escort Procedures.

A7.3.1. Type Formation

A7.3.2. Tactics/Mutual Support

A7.3.3. Escort Route/Airspeed

A7.3.4. Weapons Considerations

A7.3.5. ECM/RWR

A7.4. Training Rules.

Attachment 8

LOW LEVEL NAVIGATION/LOW ALTITUDE TACTICAL NAVIGATION (LATN) BRIEFING GUIDE

A8.1. General.

A8.1.1. Route/Clearance/Restrictions

A8.1.2. Flight Responsibilities

A8.1.2.1. Navigation

A8.1.2.2. Visual Search Responsibilities

A8.1.2.3. Radio Procedures

A8.1.2.4. Entry/Spacing/Holding

A8.2. Route Procedures.

A8.2.1. Airspace Restrictions

A8.2.2. Fence Checks

A8.2.3. Tactical Formation/Turns

A8.2.4. G-Awareness/Warm-up

A8.2.5. Low Level Navigation

A8.2.5.1. TAD usage/Map Preparation/Pilotage/Dead Reckoning

A8.2.5.2. Use of Navigational Aids/EGI

A8.2.5.3. Visual Search Techniques

A8.2.5.4. Updates

A8.2.5.5. Time/Fuel Control

A8.2.5.6. Use of Terrain/Wingman Considerations

A8.2.5.7. Leg Altitudes/Obstacles (MSL/AGL)

A8.2.5.8. Turn Point Acquisition

A8.2.6. Threat Reactions

A8.2.6.1. Countermeasure System Employment/Restrictions

A8.2.6.2. Engagement Criteria

A8.2.6.3. LOWAT (If Applicable)

A8.2.6.4. Flight Path De-confliction (With/Without Visual)

A8.3. Special Subjects.

A8.3.1. Fuel Awareness/Ops Checks

A8.3.2. Two/Three Ship Options

A8.3.3. Low Level Safety Procedures

A8.3.3.1. Terrain Avoidance

A8.3.3.1.1. AGL/MSL Altitude Alerts

A8.3.3.2. Time to Ground Impact

A8.3.3.2.1. Wings Level

A8.3.3.2.2. Over Bank/Under G

A8.3.3.3. Aircraft and Flight Maneuvering Parameters

A8.3.3.4. Knock-It-Off Criteria/Response

A8.3.3.5. Low Level Emergencies/Malfunctions

A8.3.3.6. Route Abort Procedures (RAA)

A8.3.3.7. Hazards Associated with Human Factors (e.g., Channelized Attention, Task Saturation/Prioritization, and Complacency)

A8.3.3.8. Task Saturation/Prioritization

A8.3.3.9. Visual Illusions/Perceptions

A8.3.4. Alternate Mission/Routing

A8.3.5. Emergency/Alternate Airfields

A8.3.6. Special Operating Instructions (If Applicable)

A8.4. Weapons Employment. Refer to Appropriate Air-to-Surface Employment Briefing Guide.

Attachment 9

AIR-TO-SURFACE WEAPONS EMPLOYMENT RANGE MISSION BRIEFING GUIDE

A9.1. En route—G-Awareness/Warm-up.

A9.2. Range Information.

A9.2.1. Target/Range Description

A9.2.2. Restrictions

A9.2.3. Range Entry/Holding

A9.2.4. Radio Procedures

A9.2.5. Formation

A9.2.6. Sequence of Events

A9.2.7. Pattern Procedures

A9.3. Employment Procedures/Techniques.

A9.3.1. Switch Positions

A9.3.1.1. Arming

A9.3.1.2. Displays

A9.3.1.3. Use of EGI/HUD/Low Altitude Safety and Targeting Enhancement

A9.3.2. Pop-up Delivery

A9.3.2.1. Entry Airspeed/Altitude

A9.3.2.2. Pop Point/Pull-up Angle/Power Setting

A9.3.2.3. Target Acquisition

A9.3.2.4. Pull Down/Apex Altitudes

A9.3.2.5. Pattern Corrections

A9.3.3. Roll-In

A9.3.3.1. Position

A9.3.3.2. Techniques (Pitch/Bank/Power)

A9.3.3.3. Roll-out/Wind Effect

A9.3.4. Final

A9.3.4.1. Aim-Off Distance/IPP

A9.3.4.2. Dive Angle

A9.3.4.3. Airspeed

A9.3.4.4. HUD Depiction

A9.3.4.5. Sight Picture/Corrections/Aim-Point

A9.3.4.6. Release Parameters

A9.3.4.7. Release Indications

A9.3.4.8. Recovery Procedures

A9.4. Night Procedures (If Applicable).

A9.4.1. Aircraft Lighting

A9.4.2. Radio Calls

A9.4.3. Target ID/Range Lighting

A9.4.4. Night Spacing Techniques

A9.4.5. Instrument Cross-check/Disorientation

A9.4.6. Flare Pattern

A9.4.6.1. Flare Release Points and Interval

A9.4.6.2. Wind Effect/Offset

A9.4.6.3. Dud Flare Procedures

A9.4.6.4. Switching Aircraft Patterns

A9.5. Over Water Range Operations.

A9.5.1. Employment Techniques

A9.5.1.1. Depth Perception/Reduced Visual Cues

A9.5.1.2. Distance/Altitude Estimation

A9.5.1.3. Pop-Up Positioning

A9.5.1.3.1. Timing

A9.5.1.3.2. Visual/Aircraft References to Establish Pull-up Point

A9.5.2. Special Considerations

A9.5.2.1. Adjusted Minimum Altitudes

A9.5.2.2. Training Rules/Special Operating Procedures

A9.6. Range Departure/Recovery.

A9.6.1. Armament Safety Checks

A9.6.2. Rejoin

A9.6.3. Battle Damage/Bomb Check

A9.6.4. Hung Ordnance

A9.6.5. Inadvertent/Unintentional Release

A9.6.6. Gun Unsafe/Jam

A9.7. Special Subjects:

A9.7.1. Error Analysis

A9.7.2. Air to Surface Training Rules/Special Operating Instructions

A9.7.3. Fouls

A9.7.4. Minimum Altitudes

A9.7.5. Maneuvering Limitations

A9.7.5.1. Aircraft

A9.7.5.2. Stores (Carriage/Release)

A9.7.6. Target Fixation/Channelized Attention

A9.7.7. Time to Ground Impact

A9.7.7.1. Wings Level

A9.7.7.2. Over Bank/Under G

A9.7.8. Hazards Associated with Human Factors (e.g., Channelized Attention, Task Saturation/Prioritization, and Complacency)

A9.7.9. Alternate Mission

Attachment 10

AIR-TO-SURFACE WEAPONS EMPLOYMENT SURFACE ATTACK TACTICS BRIEFING GUIDE

A10.1. General Mission Data.

A10.1.1. Intelligence/Threat Scenario

A10.1.2. Low Level (See Low Level Briefing Guide)

A10.1.3. Fence Checks

A10.1.4. G-Awareness/Warm-up

A10.1.5. Operating Area Entry/Description/ Boundaries

A10.1.6. Target Area/Clearing Pass

A10.1.6.1. Location/Description/Elevation/TOT

A10.1.6.2. Visual Cues in the Target Area

A10.1.6.3. Target Area Weather

A10.1.6.3.1. Ceiling/Visibility

A10.1.6.3.2. Winds/Altimeter

A10.1.6.3.3. Sun Angle/Shadows

A10.1.7. Threat Array

A10.1.7.1. Type/Capabilities

A10.1.7.2. Locations

A10.1.7.3. Countermeasures

A10.1.7.3.1. Chaff/Flare

A10.1.7.3.2. Terrain Masking

A10.1.7.3.3. Radio Silent Procedures

A10.1.7.3.4. Authentication/Communications-Jamming/Chattermark Procedures

A10.1.7.4. Threat Reactions

A10.1.7.5. LOWAT (If Applicable)

A10.2. Delivery.

A10.2.1. Tactics

A10.2.1.1. Overview

A10.2.1.2. Ingress

A10.2.1.2.1. Formation

A10.2.1.2.2. Speed/Altitude

A10.2.1.3. Weapons Delivery

A10.2.1.3.1. Type Delivery

A10.2.1.3.2. Switchology

A10.2.1.3.3. Attack Parameters

A10.2.1.3.3.1. Action Point/Pop Point

A10.2.1.3.3.2. Altitudes (Pull-Down/Apex/Release/Minimum)

A10.2.1.3.4. Visual Lookout/Mutual Support Responsibilities

A10.2.1.4. Egress

A10.2.1.4.1. Recovery/Return to Low Altitude

A10.2.1.4.2. Loss of Mutual Support/Rendezvous Point

A10.3. Night Procedures (If Applicable).

A10.3.1. Aircraft Lighting

A10.3.2. Radio Calls

A10.3.3. Target ID/Range Lighting

A10.3.4. Night Spacing Techniques/Minimum Altitudes

A10.3.5. Instrument Cross-check/Disorientation

A10.3.6. Flare Pattern

A10.3.6.1. Flare Release Points and Interval

A10.3.6.2. Wind Effect/Offset

A10.3.6.3. Dud Flare Procedures

A10.3.6.4. Switching Aircraft Patterns

A10.3.7. Rejoin/Range Departure

A10.3.8. Battle Damage/Bomb Check

A10.3.9. Mission Reporting (BDA/In-flight Report)

A10.4. Contingencies.

A10.4.1. Two/Three Ship Options

A10.4.2. Tactical Lead Changes

A10.4.3. Air-to-Air TACAN

A10.4.4. Codewords

A10.4.5. Weather Backup Deliveries

A10.4.6. Degraded Systems

A10.4.7. Reattack

A10.4.8. Asymmetric Considerations

A10.4.9. Jettison Procedures/Parameters

A10.4.10. Hung/Unexpended Ordnance Procedures

A10.4.11. Wounded Bird/Escort Procedures

A10.5. Special Subjects.

A10.5.1. Air-to-Surface Training Rules/Special Operating Instructions

A10.5.2. LOWAT Training Rules (If Applicable)

A10.5.3. Maritime Training Rules (If Applicable)

A10.5.4. Night Procedures (If Applicable)

A10.5.5. Hazards Associated with Human Factors (e.g., Channelized Attention, Task Saturation/ Prioritization, and Complacency)

A10.5.6. Alternate Mission

Attachment 11

AIR-TO-SURFACE WEAPONS EMPLOYMENT CLOSE AIR SUPPORT/INTERDICTION/ARMED RECCE FAC/JAAT BRIEFING GUIDE

A11.1. General Information.

A11.1.1. Intelligence/Threat Scenario

A11.1.2. Low Level (See Low Level Briefing Guide)

A11.1.3. Ordnance/Weapons Data

A11.1.3.1. Type/Fuzing

A11.1.3.2. Weapon Settings

A11.1.3.3. Live Ordnance Procedures/Minimum Altitudes

A11.1.3.3.1. Safe Escape/Safe Separation

A11.1.3.3.2. Fuse Arming/Frag Avoidance

A11.1.3.4. Laser Operations

A11.1.4. En route Formation(s)/Look Out Responsibilities/LOWAT (If Applicable)

A11.1.5. Fence Checks

A11.1.6. G-Awareness/Warm-up

A11.1.7. Control Agency

A11.1.7.1. Call-sign

A11.1.7.2. Frequencies

A11.2. Armed Recce Procedures.

A11.2.1. Recce Route/Altitudes

A11.2.2. Formations

A11.2.3. Target Types

A11.2.4. Engagement Criteria

A11.2.5. Attack Tactics--Refer to Weapons Delivery

A11.3. JAAT Procedures.

A11.3.1. Controlling Agencies

A11.3.1.1. Air Battle Captain

A11.3.1.2. HeloFAC

A11.3.2. Coordination

A11.3.2.1. AVN CDR/HeloFAC-to-Fighter Brief

A11.3.2.2. Unmask Call/Code Words

A11.3.2.3. Airspace Restrictions

A11.3.2.3.1. Helicopter Altitude Block

A11.3.2.3.2. Fighter Altitude Block

A11.3.2.3.3. Artillery Corridor/Separation

A11.4. FAC Procedures.

A11.4.1. Call-sign/Mission Number

A11.4.2. Primary/Alternate Target Area

A11.4.2.1. Description

A11.4.2.2. Frequencies

A11.4.3. Rendezvous Point/TOT/Authentication Procedures

A11.4.4. Fighter--FAC Briefing

A11.4.4.1. Mission Number

A11.4.4.2. Ordnance (Simulated/Actual)

A11.4.4.3. Playtime

A11.4.5. FAC--Fighter Briefing

A11.4.5.1. Friendly Position

A11.4.5.2. Restrictions

A11.4.6. Target Description

A11.4.6.1. Location/Elevation

A11.4.6.2. Highest Obstacle within 5 nm

A11.4.6.3. Description

A11.4.6.4. Positions of Enemy/Friendly Troops

A11.4.7. Attack Tactics

A11.4.7.1. Type Attack/Attack Restrictions

A11.4.7.2. Direction of Attack Recovery

A11.4.7.3. Ordnance Delivery Procedures (Refer to Weapons Delivery)

A11.5. Weapons Delivery.

A11.5.1. Tactics

A11.5.1.1. Type Delivery

A11.5.1.2. Switchology

A11.5.1.3. Attack Parameters

A11.5.1.3.1. Action Point/Pop Point

A11.5.1.3.2. Altitudes (Pull-Down/Apex/Release/Minimum)

A11.5.1.4. Visual Lookout/Mutual Support Responsibilities

A11.5.1.5. Egress

A11.5.1.5.1. Recovery/Return to Low Altitude

A11.5.1.5.2. Loss of Mutual Support/Rendezvous Point

A11.5.2. Battle Damage/Bomb Check

A11.5.3. Mission Reporting (Battle Damage Assessment/In-flight Report)

A11.6. Contingencies.

A11.6.1. Two/Three Ship Options

A11.6.2. Tactical Lead Changes

A11.6.3. Air-to-Air TACAN

A11.6.4. Codewords

A11.6.5. Weather Backup Deliveries

A11.6.6. Degraded Systems

A11.6.7. Reattack

A11.6.8. Asymmetric Considerations

A11.6.9. Jettison Procedures/Parameters

A11.6.10. Hung/Unexpended Ordnance Procedures

A11.6.11. Wounded Bird/Escort Procedures

A11.7. Special Subjects.

A11.7.1. Air-to-Surface Training Rules

A11.7.2. LOWAT Training Rules (If Applicable)

A11.7.3. Night Procedures (If Applicable)

A11.7.4. Hazards Associated with Human Factors (e.g., Channelized Attention, Task Saturation/Prioritization, and Complacency)

A11.7.5. Alternate Mission

Attachment 12

AIR-TO-SURFACE WEAPONS EMPLOYMENT COMBAT SEARCH AND RESCUE BRIEFING GUIDE

A12.1. Combat SAR Procedures:

A12.1.1. En route to SAR Area

A12.1.1.1. Formation

A12.1.1.2. Route

A12.1.1.3. Cruise Data

A12.1.1.4. Control Agency(s) Call-sign/Frequencies

A12.1.1.5. Holding Points And Procedures

A12.1.1.6. Safe Areas

A12.1.2. Electronic/Visual Search

A12.1.2.1. Minimum Altitudes/Airspeeds

A12.1.2.2. Patterns and Wingman Position/Responsibilities

A12.1.2.3. Radio Procedures

A12.1.2.4. Look-Out Doctrine

A12.1.2.5. Low Altitude Hazards

A12.1.2.6. IP Selection and Ingress Route

A12.1.2.7. Survivor Briefing/Authentication

A12.1.3. Helicopter Rendezvous/Escort

A12.1.3.1. Helicopter Call-sign

A12.1.3.2. Altitude/Airspeed

A12.1.3.3. Helicopter Briefing

A12.1.3.4. Type Formation/Patterns for Escort

A12.1.3.5. Tactics

A12.1.3.6. ECM/RWR

A12.1.3.7. Suppression

A12.1.3.8. Pick-Up Techniques

A12.1.3.9. Hover Cover Patterns

A12.1.3.10. Egress Route/Altitude

A12.1.4. Air Strike Control (ASC) & Strike Coordination and Reconnaissance (SCAR) Procedures

A12.1.5. Ordnance Considerations (Refer to Weapons Delivery)

A12.1.6. Ops Checks

A12.1.7. Fuel Considerations (Tanker Availability)

A12.1.8. After Pick-up Procedures

A12.1.8.1. Target Area Egress, Rejoin, Ordnance Checks and Return Navigation

A12.1.8.2. Recovery with Weapons Malfunctions.

Attachment 13

AIR-TO-SURFACE WEAPONS EMPLOYMENT AIR STRIKE CONTROL BRIEFING GUIDE

A13.1. Intelligence.

A13.1.1. Controlling Agencies

A13.1.2. Enemy Positions/Defenses

A13.1.3. Friendly Positions

A13.1.3.1. Call-sign/Ground Commander/Joint Terminal Attack Controller

A13.1.3.2. Frequencies

A13.1.3.3. Minimum Altitudes

A13.1.4. Threat Information

A13.1.5. E&E/SAFE Areas

A13.1.6. SAR

A13.1.7. Authentication/Code Words

A13.2. Local Operating Procedures.

A13.3. Range/MOA Data:

A13.3.1. Frequencies

A13.3.2. Boundaries

A13.3.3. Entry/Exit

A13.3.4. Restrictions

A13.3.5. G-Awareness/Warm-up

A13.4. FAC Strike Data.

A13.4.1. Fighters/ATO Information

A13.4.1.1. Call-sign/Mission Number/Frequencies

A13.4.1.2. Type Ordnance

A13.4.1.3. Contact Point/TOT

A13.4.1.4. Restrictions

A13.4.2. Sequence of Delivery/Fuzing

A13.4.3. FAC Tactics

A13.4.3.1. Alternate Plan for Weather

A13.4.3.2. Late/No Fighters

A13.4.3.3. Worsening Ground Situation

A13.4.4. Target Description

A13.4.4.1. Location / Elevation

A13.4.4.2. Highest Obstacle Within 5 nm

A13.4.4.3. Description

A13.4.4.4. Positions of Enemy / Friendly Troops

A13.4.5. Target Marking

A13.4.5.1. Switch Procedures

A13.4.5.2. Delivery Data

A13.4.5.3. Minimum Delivery Altitudes

A13.4.5.4. Footprint Data

A13.4.5.5. Ground Marking Techniques

A13.4.6. Clearance Procedures

A13.4.6.1. Cold/Hot/Dry

A13.4.6.2. Ground Commander/FAC

A13.4.7. Mandatory Calls

A13.4.7.1. Clearance

A13.4.7.2. Armament Safety Check/Fuel

A13.4.8. Minimum Airspeeds

A13.4.9. Battle Damage Check

A13.4.10. BDA

A13.4.11. FAC to ASOC Brief/Debrief

A13.5. Contingencies.

A13.5.1. Range/MOA Emergency Procedures/ NORDO

A13.5.2. Hung/Unexpended Ordnance Procedures

A13.6. FAC-to-Fighter Pre-mission Brief.

A13.7. Air-to-Surface Training Rules.

Attachment 14

NVD CONSIDERATIONS

A14.1. General. This guide highlights general NVD considerations, and provides a reference for a basic NVD briefing. Incorporate all applicable NVD considerations into the specific briefing for the mission being flown.

A14.2. Weather/Illumination.

A14.2.1. Civil/nautical twilight

A14.2.2. Moon rise/set times/phase/elevation/azimuth

A14.2.3. Ceiling/visibility

A14.2.4. Illumination Levels / IR TDA

A14.2.5. Obscurants to visibility

A14.3. NVD Preflight.

A14.3.1. Check adjustments/helmet fit and security

A14.3.2. HMIT/Spare NVD Mount/HMIT Visor/Batteries

A14.3.3. Resolution/focus (eye lane)

A14.3.4. NVD compatible flashlight

A14.4. Cockpit Preflight.

A14.4.1. Cockpit setup

A14.4.2. Cockpit lighting (leaks)/mirrors up

A14.4.3. Cockpit FAM

A14.4.4. Check focus, stow for taxi

A14.5. Before Takeoff.

A14.5.1. Don NVDs/check and adjust/disconnect

A14.5.2. Stow for takeoff

A14.6. Airborne.

A14.6.1. Exterior lights

A14.6.2. Scan pattern

A14.6.2.1. Forward scan

A14.6.2.2. Narrow field of view

A14.6.2.3. Peripheral vision

A14.6.2.4. Scan techniques

A14.6.3. Join-up and en route altitude/airspeed

A14.6.3.1. Rejoin/closure

A14.6.3.2. Air-to-Air TACAN

A14.6.3.3. SADL/Data link usage

A14.7. Mission.

A14.7.1. Route study/scene interpretation

A14.7.1.1. NVD predictions/ALBIDO

A14.7.1.2. Terrain/shadowing/visual illusions

A14.7.1.3. City/cultural lighting

A14.7.1.3.1. Direction/orientation of lighting

A14.7.2. Aggressive formation maneuvering

A14.7.3. Radar altimeter usage

A14.7.4. TAD / TGP / Tablet / Map Reading / Product usage

A14.8. Target Area.

A14.8.1. Rendezvous/Holding procedures/Altitude blocks (NVD differences)

A14.8.2. Friendly Unit Locations, Compositions, Markings

A14.8.3. Target study/acquisition (NVD predictions)

A14.8.4. Deliveries/Pattern procedures

A14.8.4.1. Minimum altitudes

A14.8.4.2. Flight member responsibilities

A14.8.4.3. Moth effect/De-confliction

A14.8.5. Laser/Infrared Pointer Operations

A14.8.6. Threat I.D and reaction

A14.8.7. Egress

A14.9. NVD Safety.

A14.9.1. Lost sight—NVDs

A14.9.2. Lost wingman—NVDs

A14.9.3. Depth perception

A14.9.4. Visual illusions

A14.9.5. HMIT Power / Battery Failure

A14.9.6. NVD failure / Battery failure

A14.9.7. Overconfidence in NVD Capabilities

A14.9.8. Transition to Instruments

A14.9.9. Correct lighting of primary/secondary flight instruments

A14.9.10. Disorientation/misorientation/vertigo

A14.9.11. Target fixation

A14.9.12. Lack of dive information

A14.9.13. Fatigue

A14.9.14. Aircraft emergency

A14.9.15. Ejection--GOGGLES—OFF

Attachment 15

MISSION DEBRIEFING GUIDE

A15.1. Ground Procedures.

A15.2. Takeoff, Join-up, Departure.

A15.3. En route Procedures.

A15.4. Mission Accomplishment/Analysis.

A15.4.1. Mission Reconstruction

A15.4.2. Mission Support (FAC, GCI, Helicopters, etc.)

A15.4.3. Mission Recording Assessment (If Applicable)

A15.4.4. Learning Objectives Achieved

A15.4.5. Lessons Learned

A15.4.6. Anti-G Straining Maneuver Effectiveness

A15.4.7. Recommendations for Improvement

A15.5. Recovery/Landing/After Landing.

A15.6. General.

A15.6.1. Radio Procedures

A15.6.2. Flight Discipline/Effectiveness

A15.6.3. General Areas for Improvement

A15.7. Comments/Questions.

Attachment 16

CBRNE OPERATIONS

A16.1. General Information. Potential adversary use of CBRNE weapons against a friendly airfield presents a serious threat to flying operations. Although the most effective way for pilots to avoid this threat is to be airborne before those weapons are detonated/dispersed (and then land at a field that has not been contaminated), all personnel must be prepared to operate from a field that has come under CBRNE attack.

A16.2. Mission Preparation. Be aware of the status of the CBRNE environment at the planned launch and recovery airfields, potential divert bases, and throughout the area in which the sortie may fly. Know the current and forecast surface wind direction and the Mission-Oriented Protective Posture (MOPP) level in effect for relevant sectors of the airfield. Don appropriate aircrew chemical defense equipment (ACDE) or Ground Crew Ensemble (GCE) to match the appropriate MOPP level (reference AFTTP 3-4, *Airman's Manual*) and carry individual protective equipment (IPE) as required.

A16.3. Stepping to Fly and Aircraft Preflight. This may entail donning ACDE or transitioning from GCE to ACDE. Take precautions to protect pilot from injury and or contamination while in transit from the squadron facility to the aircraft. If possible, transport pilot in a vehicle that provides overhead cover (enclosed vehicle). If pilots travel on foot is unavoidable, choose a route that takes maximum advantage of available overhead cover (sun shades, buildings, etc.) to avoid agents that may be settling from the air. If extra pilots are available for preflight duties, consider assigning them to do so wearing GCE. This allows the pilot actually flying to minimize exposure. Alarm Red (or Theater Equivalent) Prior to Engine Start. If Alarm Red occurs during the step or preflight process, take cover and don appropriate MOPP. This may require use of the ground crew mask. A hardened aircraft shelter (HAS) provides optimum protection, if available. Use caution if entering a Hardened Aircraft Shelter (HAS) that contains aircraft and/or equipment. Close doors after entry. If a HAS or other overhead cover is not immediately available, accept the best rapidly reachable cover.

A16.4. Engine Start to Takeoff. If a HAS is available, use it to minimize exposure time by accomplishing aircraft arming and EOR procedures inside it (if local procedures permit) and by delaying taxi time as long as possible prior to takeoff.

A16.4.1. Aircraft Launch to Survive (LTS). OG supplements will include local procedures to provide this capability. **(T-2).** In general, aircraft may LTS any time after engine start if they have sufficient fuel and safe, expeditious access to a runway. This option may only be practical for aircraft that are near EOR prior to takeoff or that have just landed.

A16.4.2. Alarm Red Prior to Taxi. If in a HAS, the normal procedure is to shut down. Engine noise may preclude effectiveness of normal alert notification procedures, so ensure ground personnel are aware of the alarm warning, assume proper MOPP, and close HAS doors. Use hand signals if necessary.

A16.4.3. Alarm Red (or Theater Equivalent) After Taxi. Units typically establish procedures for this contingency depending on whether additional protection is available along the taxi route (empty HAS, for instance). Ideally, ground crew sheltering in such a HAS would be available to assist in normal engine shutdown procedures and to close HAS doors. If protection

is not available, the best option may be LTS. Maintain contact with Command and Control (C2) entities (Wing Operations Center, Maintenance Operations Center, Supervisor of Flying, etc.) to ensure unity of effort in the overall plan.

A16.5. Takeoff to Landing.

A16.5.1. Contamination. If Chemical Warfare (CW) agent contamination occurred prior to takeoff, flying the aircraft will dissipate the agent to some degree. The total amount of dissipation will be greater with lower flight altitudes and longer flight times. Because the agent may have entered wheel wells, flaps, etc., consider flying in landing configuration to increase airflow to these areas. In any circumstances, merely flying the aircraft is unlikely to achieve complete decontamination.

A16.5.2. Preparing to Land. Pilots should remain aware of the status of primary and alternate landing locations. Do not attempt to land during Alarm Red situations unless there is no other option. Follow C2 directions and either hold or divert. If mission needs preclude divert, hold until the Alarm Red (or theater equivalent) has cleared or become an Alarm Black. Prior to landing, gain awareness of contaminated sectors of the airfield and of current/forecast surface winds. Use this information in conjunction with C2 direction to plan a route from landing to engine shutdown. The liquid deposition phase following a CW airburst attack can extend up to 1 hour. If landing during Alarm Black, expect a contaminated environment and MOPP 4.

A16.6. Landing to Engine Shutdown. Take advantage of any protection available, minimizing taxi time and distance. Maintain contact with C2 in order to remain aware of unexploded ordnance and damage to airfield movement surfaces. If a HAS is available and local procedures permit, accomplish aircraft de-arm and EOR procedures there. If Alarm Red (or Theater Equivalent) occurs between landing and engine shutdown, considerations are similar to those discussed in the engine-start-to-takeoff section.

A16.7. After Engine Shutdown. Don appropriate MOPP if not already worn. If circumstances permit, accomplish normal post-flight inspection procedures. If the aircraft is not contaminated, close the canopy. If there is any suspicion of personnel contamination, pilots will process through an aircrew contamination control area. Accomplish maintenance debriefings under cover to the maximum extent possible.

Attachment 17

WEATHER AND OPERATING MINIMUMS

A17.1. Weather Minimums. Table A17.1 dictates the weather minimums required for several training events.

Table A17.1. Weather Minimum Summary:

Event	**Minimum Ceiling (AGL)/Visibility**
Formation Takeoff	300 ft/1 sm (1.8 km) or PWC*
Formation Landing	500 ft/1.5 sm (2.7 km) or PWC*
VFR Rejoin	1,500 ft/3 sm (5.4 km)
Low Level Navigation	1,500 ft/3 sm (5.4 km)
Approach to Field Without DOD Minimums	1,500 ft/3 sm (5.4 km)
* Whichever is higher	

A17.2. Minimum Altitudes. Table A17.2 lists the minimum altitudes required for various events and chase positions.

Table A17.2. Minimum Altitude Summary:

Event	**Minimum (AGL)**
Aerobatics, ACBT, Stalls, or Man Reversion	5,000 ft
Change Lead	500 ft (see note)
Chase (emergency)	300 ft
Chase (IP/SEFE)	50 ft
Formation Low Approaches	100 ft
Low Approaches	Not to touchdown
Knock-It-Off	1,000 ft
Note: 1,000 ft over water; 1,500 ft AGL at night or IMC unless on radar downwind.	