

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

**AIR FORCE MANUAL 11-2F-15E,
VOLUME 3**



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Flying Operations

F-15E – OPERATIONS PROCEDURES

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This publication implements Air Force Policy Directive (AFPD) 11-2, *Aircrew Operations*, AFPD 11-4, *Aviation Service*, and references Air Force Instruction (AFI) 11-202 Volume 3, *Generic Flight Rules* and AFI 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*. This publication establishes the effective and safe operations of the F-15E. This Air Force Manual (AFMAN) applies to all F-15E units in the Regular Air Force and the US Air Force Reserve. This publication does not apply to the Air National Guard. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-322, *Records Management and Information Governance Program*, and disposed of in accordance with 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 Air Force (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 (ACC)/A3 will coordinate all changes to the basic volume with all major command (MAJCOM)/A3s. This publication may be supplemented at any level, but route all direct supplements to Air Force Flight Standards Agency (AF/A3OF) and ACC Flight Operations and Training Branch (ACC/A3TO) for coordination prior to certification and approval. Field units below MAJCOM/direct reporting unit (DRU)/field operating agency (FOA) level forward copies of their supplements of this publication to their parent MAJCOM/DRU/FOA OPR for post-publication review. Copies of MAJCOM/DRU/FOA-level supplements, after approval and publishing, will be made available on the e-Publishing website at 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 Department of the

Air Force Instruction (DAFI) 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 requestors commander for non-tiered compliance items. **Para 1.2** describes additional waiver authority to this publication. Compliance with the attachments of this publication is mandatory.

SUMMARY OF CHANGES

This document has been revised and should be completely reviewed. Paragraphs have been reorganized to increase standardization with other AFMAN 11-2MDS Vol 3s and improve logical flow. Aircrew are required to thoroughly review this publication to understand the implications of the reorganization.

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Chapter 1

GENERAL GUIDANCE

1.1. Responsibilities. This manual prescribes procedures for operating F-15E 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. F-15E flying unit Wing Commanders, delegated no lower than the Operations Group (OG) Commander (or equivalent), are responsible for providing local operating guidance to supplement the requirements in **Chapter 8** of this manual. **(T-2)**.

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 F-15E aircraft. Pilots will use best judgement to safely conduct flying operations.

1.1.3. Supplements. Comply with applicable supplements to all guidance reference in this manual. Develop additional supplements in accordance with DAFI 33-360, *Publications and Forms Management*.

1.2. Waivers. Forward waiver requests through appropriate channels to the applicable MAJCOM/A3 or equivalent, or Commander Air Force Forces (COMAFFOR) for those aircrew and assets under the COMAFFOR's oversight, for approval. **(T-3)**. The COMAFFOR or MAJCOM/A3 (or equivalent) will notify ACC/A3 of waivers within 72 hours of issuance. In addition to the waiver processing requirements prescribed by DAFI 33-360, wing commanders will notify the publication OPR within 72 hours of waiver approval. In accordance with DAFI 33-360, a copy of the approved waiver must follow within 30 days of issuance. **(T-3)**. 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.

1.3. Deviations. In the case of an urgent requirement or aircraft emergency the PIC will take appropriate action(s) to safely recover the aircraft. **(T-3)**. A If time permits, the PIC will obtain specific approval of the MAJCOM/A3 or COMAFFOR for one-time deviations from these procedures. **(T-3)**. A Report deviations, without waiver, through channels to MAJCOM/A3 within 48 hours, followed by a written report, if requested. **(T-3)**. **Note:** The requirements of this publication are for default mission planning purposes. Nothing in this manual should be construed as overriding a crew member's judgment due to unforeseen operational necessity or other emergency circumstances. **Note:** The requirements of this publication are for default mission planning purposes. Nothing in this manual should be construed as overriding a crew member's judgment due to unforeseen operational necessity or other emergency circumstances.

1.4. Processing Changes. OPR will coordinate all changes to the basic volume with affected MAJCOM/A3s. **(T-1)**. Forward change recommendations to AFFSA/A3OF for staffing and Air Force Operations and Requirements (AF/A3/5) approval. **(T-1)**.

Chapter 2

MISSION PLANNING

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

2.2. General Procedures.

2.2.1. Planning. Accomplish sufficient flight planning to ensure safe mission execution to include fuel requirements, map preparation, takeoff and landing data (TOLD), as well as the lateral asymmetry (Lat Asymm) of the aircraft due to the planned configuration. Consider foreseeable safety risks and adopt risk mitigation factors in accordance with Operational Risk Management (ORM).

2.2.2. Standards. The Squadron Commander (SQ/CC) is the approval authority for squadron standards. OG Commander (OG/CC) may publish and approve group or wing standards. OG Standardization and Evaluations (Stan/Eval) (OGV) will review all standards for compliance with AFMAN 11-series guidance and Air Force Tactics, Techniques and Procedures (AFTTP) 3-3.F-15E, *Combat Aircraft Fundamentals—F-15E*, [Attachment 5](#), which is the baseline source document for F-15E Administrative Standards. (T-3).

2.3. Unit Developed Checklists and Local Aircrew Aids. Unit developed checklists may be used in lieu of flight manual checklists (**Exception:** -25 checklists (T-1).) provided they contain, as a minimum, all items (verbatim and in order) listed in the applicable checklist. OGV will ensure that Unit produced In-Flight Guides will, as a minimum, include:

2.3.1. Briefing guides (reference Briefing Guide Attachments, [Attachment 2](#) onward, in this volume). (T-1).

2.3.2. Local radio channelization and airfield diagrams. (T-1).

2.3.3. Impoundment procedures, emergency action checklists, No Radio (NORDO), and divert information. (T-1).

2.3.4. Arresting gear information for divert bases. (T-1).

2.3.5. Bailout and jettison areas and On-Scene Commander (OSC) checklist. (T-1).

2.3.6. Cross-country procedures to include: command and control, engine documentation, Joint Oil Analysis Program samples, and aircraft servicing. (T-1).

2.3.7. Other information as deemed necessary by the units (e.g., stereo flight plans, local training area diagrams, local area maps of sufficient detail to provide situational awareness on area boundaries). (T-1).

2.4. Flight Material Preparation.

2.4.1. Mission Data Card. All aircrew will annotate TOLD on mission data cards. (T-3).

2.4.1.1. The minimum TOLD required is maximum abort speed for expected conditions (i.e., dry/wet/icy), rotation/Nose Wheel Lift Off (NWLO)/takeoff speed, takeoff distance, single engine rotation/NWLO/SETOS, and normal/heavy weight landing distance for expected conditions. (T-3). As applicable, aircrew will annotate the following speeds:

Min Go when it is equal to or greater than Max Abort; Adjusted Max Abort if used. (T-3).

2.4.1.2. OG/CC approval is required for operations when Min Go exceeds Max Abort. Units will provide direction in their local supplements on when Adjusted Max Abort will be used. (T-3).

2.4.1.3. The authorized sources for calculating TOLD are Technical Order (TO) 1F-15E-1-1, *Flight Manual Performance Data USAF Series F-15E Aircraft*, TO 1F-15E-1CL-1, *Flight Crew Checklist USAF Series F-15E Aircraft*, and the Joint Mission Planning System.

2.4.1.3.1. The Squadron (SQ) supervisor will verify the unit developed TOLD against TO data. Reviewer will date and sign once verified correct. (T-3).

2.4.1.3.2. OPR for certification of TOLD in automated systems is ACC/A5YG-MP. ACC Stan/Eval (ACC/A3TV) is the OPR for revocation of certification due to TO change. ACC/A3TV will inform units of revocation via MAJCOM Flight Crew Information File (FCIF) message.

2.4.2. Local area maps. A separate local area map is not required if the unit aircrew aid provides a local area map IN ACCORDANCE WITH **para 2.3.7**. On flights from a deployed location, each aircrew will have available a local map annotated with designated flying areas, emergency airfields, buffer zones, control zones, and restricted or danger areas if this information is not available in a deploy-location aircrew aid. (T-3).

2.4.3. Charts. Flight Information Publications (FLIP) enroute charts may be used instead of maps on navigational flights within areas that are adequately covered by these charts.

2.4.4. Low altitude maps.

2.4.4.1. Reference AFMAN 11-217, *Flight Operations*, Chapter 3 for guidance on low-level planning and map preparation.

2.4.4.2. For all flights conducted in the low-level structure (i.e., below 1000 feet Above Ground Level (AGL) or as defined by host nation), each aircraft in the flight will contain a minimum of one Obstruction Change File updated map of the low altitude route or training areas. (T-3). The map will be of a scale and quality that terrain features, hazards, and chart annotations are of sufficient detail to allow navigation and safe mission accomplishment. (T-3).

2.4.4.3. Annotate maximum and minimum route structure altitudes, if applicable. (T-3).

2.4.4.4. Highlight all manmade obstacles starting 100 feet below the planned flight altitude. (T-3).

2.4.4.5. In accordance with AFMAN 11-217, Chapter 3, annotate all maps with both an Emergency Route Abort Altitude (ERAA) for the overall route/area and Minimum Safe Altitudes (MSA) for each leg of the intended route of flight. (T-3).

2.4.4.5.1. Compute the ERAA (also known as Emergency Safe Altitude [ESA]) in accordance with AFMAN 11-217, Chapter 3. (T-3).

2.4.4.5.2. Compute the MSA at a minimum of 1000 feet above the highest obstacle/terrain (rounded up to the next 100 feet) within 5 Nautical Miles (NM) of the planned course or route corridor (whichever is greater) to include the aircraft turn radius. **(T-3)**.

2.4.4.6. **Terrain Following (TF) Flight Map Preparation** . In addition to the low altitude map requirements listed above:

2.4.4.6.1. To ensure maps accurately display planned routes, TF turn point bank angles must reflect realistic systems limitations. **(T-3)**.

2.4.4.6.2. In order to verify proper operation of the TF system, aircrew will compute and brief TF letdown corridors for the primary (and planned alternate[s], if applicable) entry points for low-level routes will be computed and briefed. **(T-3)**. As a minimum, compute MSA and Recovery Initiation Altitude (RIA). **(T-3)**. Also, include values for terrain at 1 NM and command level off based on the following calculations. **(T-3)**.

2.4.4.6.2.1. Terrain at 1 NM equates to 2000 ft + ($\frac{1}{2}$ dive angle 100 ft). For example, using 12° dive and 480 Ground Speed (GS), terrain at 1 NM equates to 2600 ft.

2.4.4.6.2.2. Command level-off begins at 1000 ft + ($\frac{1}{2}$ dive angle 100 ft). For example, using 12° dive and 480 GS, command level-off begins at 1600 ft AGL (NLT 1200 ft AGL).

2.4.4.6.3. For night TF missions select letdown points that avoid initial descents into rugged or mountainous terrain (defined by TO 1F-15E-1, *Flight Manual—F-15E*, Section 5, as any vertical change that exceeds 900 ft/NM).

2.4.4.7. Aircrew flying under Visual Flight Rules (VFR) or inside Military Training Route (MTR)s will supplement existing mission planning materials (e.g., Obstruction Change File, FLIP AP/1B) in accordance with MAJCOM guidance. **(T-3)**. If no MAJCOM, theater, or host nation guidance exists, use the best charts or Mission Planning System overlay options to adhere to the above requirements. **(T-3)**.

2.5. Fuel Conservation. Design procedures for optimal fuel use and efficiency throughout all phases of mission execution. **(T-3)**. Incorporate enroute tasks to maximize use of airborne training opportunities. **(T-3)**.

2.6. Preflight Briefing.

2.6.1. All flight crewmembers and passengers must attend the flight briefing unless previously coordinated with unit supervisors. **(T-3)**.

2.6.2. Anyone not attending the flight briefing must receive, as a minimum, an overview of the expected mission flow and events as well as a thorough crew briefing that includes potential emergency procedures (EP). **(T-3)**. These requirements must be accomplished prior to aircrew step. **(T-3)**.

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

2.6.3.1. Items listed in [Attachment 3](#) are required items that must be briefed on every sortie as applicable. **(T-3)**. Items published in AFIs, AFTTPs, or SQ/wing standards and understood by all participants may be briefed as “standard.”

2.6.3.2. Ensure briefing start time provides adequate time to discuss required items and accounts for mission complexity. **(T-3)**. As a minimum, begin briefings at least 1.5 hours before scheduled takeoff. **(T-3)**. Alert briefings will start in sufficient time to be completed prior to aircrew changeover. **(T-3)**.

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

2.6.3.4. Ensure contracts, roles, and responsibilities of each flight member are established, briefed, and debriefed. **(T-3)**.

2.6.3.5. Include mission priorities, significant rules (e.g., Rules of Engagement [ROE], Special Instructions, Training Rules), task management, weather, Notice to Airmen (NOTAM)s, and EPs. **(T-3)**.

2.6.3.6. Ensure a formation deconfliction, blind, and get-well plan for every phase of flight is briefed and every flight member understands the plan (use [para 3.10](#) as a baseline). **(T-3)**. All flight members are responsible for executing this plan.

2.6.3.7. Review TOLD and ensure every member of the flight understands it. **(T-3)**. Place emphasis on takeoff abort factors during abnormal situations such as short or wet runway, heavy gross weights, non-standard cable configurations, and abort sequence in formation flights. **(T-3)**.

2.6.3.8. Include the following special subjects:

2.6.3.8.1. Radar and visual search responsibilities during departure/enroute/recovery; **(T-3)**.

2.6.3.8.2. High density traffic areas; **(T-3)**.

2.6.3.8.3. Mid-air collision avoidance both from other military aircraft as well as civilian aircraft; **(T-3)**.

2.6.3.8.4. Lateral Asymmetry considerations (as applicable) to include: takeoff asymmetry, tactical portions based on planned weapons expenditure, lateral asymmetry highlight areas (e.g., external tank fuel imbalance combined with high-g/high Angle of Attack (AOA) maneuvering). (see [Table 2.1](#)). **(T-3)**.

Table 2.1. Lateral Asymmetry Severity Index.

Lateral Asymmetry Severity Index				
Flt Phase →	T/O	Employment		Appr/Ldg
↓ Lat Asymm (in thousands [k] of ft-lbs)		(AOA ≤ 30 CPU)	(AOA >30 CPU)	
<5k	Green	Green	Green	Green
5-10k	Green	Yellow (1)	Red (1,2,3,5)	Yellow (1)
10k-20k	Yellow† (1)	Red (1,3,5)	Red (1,2,3,5)	Yellow (1)
>20k	Red† (1)	Red (1,3,4,5)		Red (1,3)

† To the maximum extent practicable, asymmetry at takeoff should be less than 5,000 ft-lbs. Asymmetries at takeoff greater than 10,000 ft-lbs require SQ/CC approval.

Notes:

1. Use caution with rapid AOA onset rates between 25-30 Cockpit Units (CPU) as sudden and uncommanded yaws/rolls away from the heavy wing may occur. (The tendency appears to be greatest between 330 and 400 Knots Calibrated Airspeed (KCAS)). Reference Dash 1, Section 6.
2. Reference TO 1F-15E-1, Section 5, *Prohibited Maneuvers*, for 30 CPU limitations.
3. Due to yaw/roll away from the heavy wing, continual maneuvers with sustained AOA above 25 CPU could lead to out-of-control flight and/or departures. With sustained AOA above 30 CPU, the out-of-control/departure maneuvers could be sudden and abrupt.
4. Rapid AOA onsets between 25-30 CPU, (the tendency appears to be greatest between 330 and 400 KCAS), as well as momentary excursions above 30 CPU, could lead to immediate departures that may take a significant amount of time/altitude to recover once full and correct anti-spin controls are input.
5. If mission necessity dictates continued flight with high lateral asymmetries, aircrew should consider reducing the asymmetry of the aircraft as much as practical (e.g., tank/stores jettison).

2.6.3.9. Include flight responsibilities, proper formation position (to ensure adequate wingtip clearance), and aircraft-unique requirements for each phase of flight when dissimilar aircraft or aircraft configurations are flown in the same formation. **(T-3)**.

2.6.3.10. For missions using Night Vision Goggles (NVG), emphasize proper tuning, use, and limitations. **(T-3)**.

2.6.3.11. Low altitude (i.e., 5000 ft AGL) mission briefings.

- 2.6.3.11.1. Emphasize low altitude flight maneuvering, obstacle and ground avoidance, Low Altitude Warning System (LAWS) and Ground Collision Warning System (GCWS) features and limitations, low altitude comfort level, and complacency avoidance. **(T-3)**.
- 2.6.3.11.2. For low altitude training over water and featureless terrain, include specific considerations with emphasis on minimum altitudes and spatial disorientation. **(T-3)**.
- 2.6.3.11.3. For low-level missions using TF, emphasize proper setup as well as both ground and air checks of the TF system, procedures for transitioning from medium altitude to low-level TF, and TF maneuvering limitations. **(T-3)**.
- 2.6.3.11.4. For low-level missions using TF in conjunction with NVGs, emphasize the inherent limitations of both systems and the necessary maneuvering restrictions that each imposes. **(T-3)**.
- 2.6.3.12. Alternate Mission Briefings. Flight leads will brief an appropriate alternate mission for each flight. **(T-3)**.
- 2.6.3.12.1. The alternate mission must be less complex than the primary and should parallel the primary mission (e.g., Basic Fighter Maneuvers as alternate for Air Combat Maneuvers, Basic Surface Attack for Surface Attack Tactics, and Tactical Intercepts for Defensive Counter Air). **(T-3)**.
- 2.6.3.12.2. If the alternate mission does not parallel the planned mission, brief the specific mission elements that are different. **(T-3)**.
- 2.6.3.12.3. Mission elements may be modified and briefed airborne as long as flight safety is not compromised. Flight leads will ensure changes are acknowledged by all flight members. **(T-3)**.
- 2.6.3.12.4. Do not fly unbriefed (either on the ground or in the air) missions or events.
- 2.6.3.13. Briefing guides.
- 2.6.3.13.1. Reference the attachments to this AFMAN for basic briefing guide examples.
- 2.6.3.13.2. Subjects may be briefed in any sequence.
- 2.6.3.13.3. Those items published in Air Force Tactics, Techniques, and Procedures manuals (AFTTP), AFMANs, AFIs, or unit standards may be briefed as “standard.” Do this only if all items are understood by all present.
- 2.6.4. Multiple sortie days.
- 2.6.4.1. If all flight members attend an initial or mass flight briefing, the flight lead on subsequent flights need brief only those items that have changed from the previous flight(s).
- 2.6.4.2. On multiple-go days when aircraft turn times do not allow follow-on mission briefing(s) and only the initial flight briefing is accomplished for all gos, the following guidance applies (Formal Training Unit (FTU) Basic (B), Transition (TX), Senior Officer

Course (SOC), Instructor (I) course missions may be flown as desired in accordance with syllabus guidance):

2.6.4.2.1. Upgrade sorties are flown on the first sortie (second sortie if the first is non-effective for weather, maintenance, airspace availability or student non-performance).

2.6.4.2.2. Subsequent sorties missions are of equal or less complexity with no additional upgrade training, unless approved by Top 3.

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

2.7. Postflight Debriefing.

2.7.1. Flight leads will conduct flight debriefings for all missions. **(T-3)**.

2.7.2. All flight debriefings include, at a minimum, the in-flight execution of flight member responsibilities, deconfliction contracts, tactical employment priorities, and task management. **(T-3)**.

2.8. Gravitational Load Factor (g)-suit Use. Pilots will wear anti-garments on all flights regardless of anticipated g's. **(T-3)**.

Chapter 3

NORMAL OPERATING PROCEDURES

Section 3A—Ground Operations

3.1. Preflight.

3.1.1. Do not carry baggage or equipment in an unoccupied rear cockpit. (**Exception:** Aircrew may stow forms and maps in the map case).

3.1.2. The pilot will brief the ground crew as required. Prior to starting, the pilot will get an “okay” signal from the rear cockpit occupant. (**T-3**). Use operational headsets to the maximum extent possible during all engine start and pre-taxi checks as well as when technicians are performing tasks on the aircraft. (**T-3**). Hand signals may be used as a last resort or if required during alert scramble or combat operations.

3.1.3. Unless dictated otherwise by superseding guidance (e.g., COMAFFOR guidance, theater SPINS) flying units will set the ejection seat radio beacon selector switch to AUTO. (**T-3**).

3.1.4. Select Pressure Breathing (PBG) as desired. Do not select PBG if using the Aircrew Eye and Respiratory Protection System or Aircrew Chemical Defense Equipment (ACDE).

3.1.5. The use of the COMBAT EDGE vest is optional in the F-15E. If aircrew elect to fly with the COMBAT EDGE vest they will remove the port plug on the CRU-94 (if installed), properly stow the plug during flight to prevent a Foreign Object Damage (FOD) hazard, then re-install upon completion of the sortie. (**T-3**).

3.1.6. Minimum daytime external lighting. The following is the minimum operational external lighting during daytime operations. Reference **Section 3E—Night Procedures** for minimum required nighttime external lighting.

3.1.6.1. The minimum operational lighting to launch (daytime sortie) will be 2 of 3 anti-collision lights (reference AFI 11-202V3, *General Flight Rules*). Aircraft launched with inoperable anti-collision lights are Code 3 upon landing. (**T-3**).

3.1.6.2. Landing or taxi light. (**T-3**).

3.1.6.3. In accordance with AFI 11-202V3, position lights are not required between sunrise and sunset; however they are used to the maximum extent practical during daytime operations. (**T-3**).

3.2. Ground Visual Signals. When ground intercom is not used, use visual signals in accordance with AFMAN 11-218, *Aircraft Operations and Movement on the Ground* and this manual. (**T-3**). All signals pertaining to operation of aircraft systems will originate with the pilot. The crew chief will repeat the given signals when it is safe to operate the system. Aircrew should not activate any system that could pose a danger to the ground crew prior to receiving proper acknowledgment from ground personnel. (**T-3**). The following signals augment AFMAN 11-218.

3.2.1. Jet Fuel Starter (JFS) start: With two fingers extended, pilot makes a pulling motion with the fingers to simulate pulling the JFS. (**T-3**).

3.2.2. Flight controls check: Raise arm, clench fist, and make a stirring motion. **(T-3)**.

3.2.3. Brake check: Hold left or right arm horizontal, open hand and push forward, breaking at the wrist (as in applying rudder pedal pressure with feet). **(T-3)**.

3.2.4. Digital Electronic Engine Control, Improved Digital Electronic Engine Control /Asymmetric Thrust Departure Prevention System check: With the fingers and thumb of each hand extended and joined at the tips, open and close the fingers and thumbs of both hands simultaneously, simulating nozzle opening and closing. **(T-3)**.

3.2.5. Target Pod (TGP) clear: Extend arm and rotate a closed fist in a circular motion. **(T-3)**.

3.2.6. Loss of brakes while taxiing (to the max extent practical regardless if the Emergency Brake/Steer system is successfully engaged): Lower tailhook. **(T-3)**.

3.3. Taxi and Quick Check/Arming.

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

3.3.2. Do not taxi during snow or icy conditions until the taxi route and runway have been checked for safe conditions. **(T-3)**. In this case, taxi on the centerline with a minimum of 300 feet spacing. **(T-3)**. The minimum Runway Condition Reading (RCR) for taxi operations is RCR 10. OG/CCs may waive this to RCR 8. **(T-3)**.

3.3.3. Maximum taxi speed during sharp turns (more than 45 degrees of turn) is 10 knots. Above 10 knots the aircraft may skid or depart the three-point attitude.

3.3.4. At non-USAF bases, aircrew will make every attempt to coordinate for a rollover/End of Runway (EOR) inspection with the host maintenance unit. **(T-3)**.

3.3.5. Keep hands in view of ground personnel during quick check, arming, and de-arming operations. If the intercom system is not used during EOR checks, the pilot will establish and maintain visual contact with the ground personnel to allow the use of visual signals. **(T-3)**.

3.3.6. Pilots will not taxi in front of any aircraft arming or de-arming forward firing ordnance. **(T-3)**.

3.4. Flight Lineup. In accordance with AFTTP 3-3.F-15E, flights will line up as appropriate based on weather, runway conditions, and runway width.

3.4.1. When separating elements use a minimum of 500 feet spacing between elements. **(T-3)**.

3.4.2. For formation takeoffs, wingmen must maintain wingtip clearance with their element lead. **(T-3)**.

3.4.3. If runway width precludes line-up with wingtip clearance between all aircraft in the flight, use 500 feet spacing between elements or delay run-up until the preceding aircraft or element releases brakes. **(T-3)**.

3.5. Before Takeoff Checks. After arming and prior to takeoff, all flight members will inspect each other for proper configuration and any abnormalities. **(T-3)**.

Section 3B—Takeoff and Departure

3.6. Takeoff.

- 3.6.1. Do not takeoff with less than RCR 12. OG/CCs may waive this to RCR 8. **(T-3)**.
- 3.6.2. On training missions, do not takeoff if the computed takeoff roll exceeds 80 percent of the available runway. **(T-3)**. For single-ship takeoffs, if the single-ship computed mil-power takeoff distance exceeds one-half of the available runway, takeoff using afterburner **(T-3)**.
- 3.6.3. When operating from airfields equipped with a compatible, remotely operated cable, ensure the departure end cable is raised for all takeoffs and landings, unless another departure end cable is in place. **(T-3)**.
- 3.6.4. Use a minimum of 10 seconds (15 seconds when using afterburners) takeoff interval between aircraft or elements. **(T-3)**.
- 3.6.5. Use a minimum of 20 seconds takeoff interval when carrying live air-to-surface ordnance (not applicable [N/A] for 20mm ammunition) or when performing a trail departure. **(T-3)**.
- 3.6.6. Pilots will steer toward the center of the runway at the start of the takeoff roll. **(T-3)**.
- 3.6.7. OG/CCs may approve intersection takeoffs, if aircrew have calculated TOLD for the takeoff distance available.
- 3.6.8. Do not takeoff over any raised web barrier (e.g., MA-1A, 61QS11) or loose/slack cable (e.g., BAK-12/13/14).
- 3.6.9. Suspected hot brake speeds.
 - 3.6.9.1. Unit commanders will ensure Suspected Hot Brake speeds are re-calculated during Hot Pit or Quick Turn operations using the TO 1F-15E-1CL-1 Brake Energy Limits Chart **(T-3)**.
 - 3.6.9.2. A takeoff abort made when adequate brake cooling time is not met (usually within one hour of a previous landing) can place the aircraft into the Brake Energy Caution Zone with brake applications as low as 80 knots (see TO 1F-15E-1, Section 5). Use the following guidance: **(T-3)**.
 - 3.6.9.2.1. Absorbed energy from landings made one hour or less prior to subsequent takeoffs will be added in full.
 - 3.6.9.2.2. Use a maximum of 20 million foot-pounds to calculate the abort speed where suspected hot brakes will be declared.

3.7. Formation Takeoff.

- 3.7.1. Formation takeoffs are restricted to elements of two aircraft.
- 3.7.2. Elements must be led by a qualified flight lead unless an Instructor Pilot (IP) is in the element. **(T-3)**.
- 3.7.3. Aircraft must be within 3000 pounds of each other and symmetrically loaded. **(T-3)**. For this purpose, symmetrically loaded is no greater than 8000 ft-lbs of calculated lateral asymmetry.

3.7.4. Do not make formation takeoffs when:

3.7.4.1. The runway width is less than 125 feet.

3.7.4.2. The Runway Surface Condition (RSC) is reported as wet, or ice, slush, or snow is on the runway. OG/CCs may waive this requirement if the center 125 feet of the runway is clear of standing water, ice, slush or snow.

3.7.4.3. The crosswind component exceeds 15 knots.

3.7.4.4. Loaded with live Air-to-Ground (A/G) munitions.

3.7.4.5. Ferrying aircraft from a contractor or Air Logistics Center facility.

3.7.4.6. The computed takeoff roll exceeds 50% of the available runway.

3.8. Initial Join-up and Rejoins.

3.8.1. Minimum day weather criteria for a VFR join-up underneath is ceiling 1500 feet, visibility 3 Statute Mile (SM) (5 kilometers [km]).

3.8.2. Flight leads will maintain TO climb speeds until join-up is accomplished unless mission requirements necessitate a different airspeed. **(T-3)**.

3.8.3. Flight leads should limit their angle of bank to 30 degrees for turning rejoins immediately after takeoff.

3.8.4. For further join-up procedures, see [para 3.31](#) (Night) and [para 4.2](#) (Instruments).

Section 3C—Enroute

3.9. Formation, General. Flight leads/instructors are responsible for ensuring contracts, roles and responsibilities of each flight member are established and executed.

3.9.1. If any flight member cannot fulfill their basic responsibilities, contracts, or other assigned tasks, they will immediately communicate that information to the flight or element lead. **(T-3)**.

3.9.2. Instrument Meteorological Conditions (IMC). In IMC, the maximum flight size is four aircraft except when flying in close formation with a tanker (refer to TO 1-F15E-1, Section VIII, “Air Refueling Procedures” and Allied Tactical Publication (ATP)-56(B), *Air-to-Air Refueling*).

3.9.3. Maneuvers. Do not use rolling maneuvers to maintain or regain formation position below 5000 feet AGL or outside of Special Use Airspace (SUA) (United States Air Forces in Europe-Air Forces Africa (USAFE-AFAFRICA): Aerobatic/tactical maneuvering is only allowed while under a traffic service or better (e.g., CLASS G airspace) while general handling or in SUA as defined by the host nation AIP). **(T-1)**.

3.9.4. Signals. Airborne visual signals will be in accordance with AFPAM 11-205, *Aircrew Quick Reference to Aircraft Cockpit and Formation Flight Signals*. **(T-3)**. For four-ship flights, formation changes will be initiated by radio call when practical. **(T-3)**. When formation position changes are directed by radio all affected wingmen will acknowledge prior to initiating the change. **(T-3)**. A radio call is mandatory when directing position changes at night or in IMC. **(T-3)**.

3.9.5. Recovery. When circumstances permit, flight leads will direct a battle damage (BD) check after each mission prior to or during Return to Base (RTB) (T-3). This check is mandatory following the expenditure of any ordnance (including all types of 20mm ammunition) except at night or in IMC (T-3). Brief deconfliction responsibilities and position change procedures. (T-3).

3.9.6. Breakups. Flight leads will not break up formations until each wingman has a positive fix from which to navigate (i.e., visual, Inertial Navigation System [INS], Embedded Global Positioning System (GPS)/INS [EGI], or Tactical Air Navigation [TACAN]).

3.9.7. Changing leads. Lead changes require a clear transfer of responsibilities from one flight member to another.

3.9.7.1. Lead changes will be initiated and acknowledged with either a radio call or visual signal (T-3).

3.9.7.2. Ensure deconfliction is established before initiating a lead change. (T-3).

3.9.7.3. The lead change is effective upon acknowledgment.

3.9.7.4. All flight members must continue to ensure aircraft separation during position changes. (T-3).

3.9.7.5. When flying in limited visibility conditions, initiate lead changes from a stabilized, wings level attitude (T-3).

3.9.7.6. The minimum altitude for a lead change is 500 feet AGL over land or 1000 feet AGL over water (for night see [para 3.32.3](#), for IMC see [para 4.6](#)).

3.9.7.7. When conducting lead changes from fingertip, route, spread, or tactical, do not initiate lead changes with the wingman further aft than 30 degrees from line abreast.

3.10. Formation Deconfliction.

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

3.10.1.1. Flight leads will consider wingman/position and ability to safely perform a maneuver before directing it. (T-3).

3.10.1.2. Trailing aircraft and elements are responsible for deconfliction from the lead aircraft and elements. Wingmen and elements will deconflict vertically from the lead/lead element to the maximum extent practical. (T-3). During maneuvering ≤ 1000 feet AGL, wingmen and trailing elements will deconflict above the lead/lead element. (T-3).

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

3.10.2.1. When any flight member calls “blind,” they will initially maneuver away from the last known position of the other flight member/element (primarily by altering altitude) and await a response. (T-3). The appropriate flight member will immediately respond with “visual” and a position report or “blind.” (T-3).

3.10.2.2. If the other flight member is also “blind,” then the flight lead will take action to ensure altitude separation between flight members and elements. **(T-3)**.

3.10.2.2.1. The flight lead will specify either AGL or Mean Sea Level (MSL) when directing the formation to deconflict and use a minimum of 500 feet altitude separation. **(T-3)**.

3.10.2.2.2. Avoid climbs or descents through the deconfliction altitude when possible.

3.10.2.3. If visual contact is still not regained, the flight lead will take additional action to ensure flight path deconfliction within the flight to include a Terminate or Knock-It-Off (KIO) call if necessary. **(T-3)**. The flight lead should consider scenario restrictions such as sanctuary altitudes and adversary blocks when directing deconfliction.

3.10.2.4. Aircraft will maintain altitude separation until visual and, if necessary, will navigate with altitude separation until mutual support is regained. **(T-3)**.

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

3.10.3.1. The wingman is normally responsible for flight path deconfliction.

3.10.3.2. The flight lead becomes responsible for deconfliction when:

3.10.3.2.1. Tactical maneuvering places the lead in the wingman’s “blind cone” or forces the wingman’s primary attention away from the lead (i.e., wingman becomes the engaged fighter).

3.10.3.2.2. The wingman calls “blind.”

3.10.3.3. Deconfliction responsibility transfers back to the wingman once the wingman positively acknowledges a visual on his lead (except in cases of tactical maneuvering where the flight lead is no longer in the wingman’s blind cone).

3.10.4. Three or 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 or element lead pertain only to the associated element unless specified otherwise by the flight lead.

3.10.4.2. Trailing aircraft and elements will maintain sufficient spacing so that primary emphasis during formation maneuvering and turns is on low altitude awareness and deconfliction within elements, not on deconfliction between elements.

3.11. Chase formation. Any pilot may fly safety chase for aircraft with a problem or under emergency conditions.

3.11.1. Pilots who have successfully completed an Instrument and Qualification evaluation may chase as safety observer for aircraft performing simulated instrument flight or hung ordnance patterns.

3.11.1.1. Specialized missions (i.e., Operational Test and Evaluation, Weapon Systems Evaluation Program, live weapons delivery) and training conducted in accordance with AFMAN 11-2F-15EV1, *F-15E--Aircrew Training* may be chased by Combat Mission

Ready or Basic Mission Capable pilots designated by group or squadron commanders. **(T-1)**.

3.11.1.2. All other chase events may only be flown by an IP, Stan/Eval Flight Examiner (SEFE), or upgrading IP (UIP) under the supervision of an IP.

3.11.2. Procedures.

3.11.2.1. A safety observer in a chase aircraft, except IP/SEFE/specialized mission chase, will maneuver in a 30-60 degree cone and maintain nose/tail separation to effectively clear and provide assistance. **(T-3)**.

3.11.2.2. IP/SEFE/specialized mission aircraft will maneuver as necessary, but must maintain nose/tail separation. **(T-3)**.

3.11.2.3. No chase aircraft will stack lower than the lead aircraft when below 1000 feet AGL. **(T-3)**.

3.11.2.4. For live ordnance missions, the chase pilot is responsible for maintaining own ship frag deconfliction.

3.12. Show Formation. Refer to AFI 11-209, *Participation in Aerial Events* and applicable MAJCOM directives for specific rules and appropriate approval levels to participate in static displays and aerial events.

3.13. Maneuvering Parameters.

3.13.1. If flight through wingtip vortices or jetwash is unavoidable or inadvertently encountered, immediately unload the aircraft to approximately 1 g. **(T-1)**.

3.13.2. Do not extend flaps during Air Combat Training (ACBT).

3.13.3. Minimum altitudes.

3.13.3.1. Nose high, low speed recoveries and Aircraft Handling Characteristics vertical maneuvers: 10,000 feet AGL. **(T-1)**.

3.13.3.2. Aerobatics: 5000 feet AGL. **(T-1)**.

3.13.4. Authorized speeds. (US National Airspace System [NAS]) Below 10,000 feet MSL (outside SUA or MTRs) fly no faster than the maneuvering airspeeds as published in TO 1F-15E-1(e.g., 300 Knots Calibrated Airspeed (KCAS) to 350 KCAS unless in the radar pattern). To aid adherence to this guidance, flight leads and aircrew will comply with the following:

3.13.4.1. **(NAS Only)** Accomplish systems checks and TF checks above 10,000 feet MSL to the maximum extent possible. **(T-1)**. If TF checks must be accomplished below 10,000 feet MSL (i.e., due to weather), aircrew will minimize the time at higher airspeeds. **(T-1)**.

3.13.4.2. Aircrew flying outside the NAS will follow gaining MAJCOM, theater, or host nation guidance on airspeeds. (USAFE-AFAFRICA). **(T-3)**. Aircrew will operate at airspeeds consistent with TO 1F-15E-1, AFTTP 3-3.F-15E, and local guidance). **(T-3)**. If no gaining MAJCOM, theater or host nation guidance exists, use the guidance in this instruction to the maximum extent practical. **(T-3)**.

3.14. G-Awareness Exercise.

3.14.1. Reference AFI 11-214, *Air Operations Rules and Procedures* and AFTTP 3-3.F-15E. The Heads Up Display (HUD) will be recorded during g-awareness exercises with hot mic in both cockpits. **(T-1)**.

3.14.2. During maneuver execution use visual lookout and briefed formation contracts as primary means to ensure aircraft deconfliction. **(T-1)**. Use onboard systems (i.e., Flight Data Link [FDL]) only as an aid to situational awareness.

3.14.3. Do not use g-awareness turns for systems checks or other items that detract from the intended purpose.

3.14.4. Flight leads will ensure the airspace intended for conducting the g-awareness exercise is free from potential traffic conflicts. **(T-1)**. Use Air Traffic Control (ATC) services to the maximum extent practical to aid in clearing the airspace. **(T-1)**. Conduct the g-awareness exercise in the following airspace with preference to the order as listed:

3.14.4.1. SUA (e.g., Restricted or Warning areas, ATC Assigned Airspace, Military Operating Areas [MOA], or MAJCOM-approved large-scale exercise and special mission areas). (USAFE-AFAFRICA: Consider SUA as anytime the aircraft is under Basic, Traffic, or Deconfliction Service) **(T-1)**.

3.14.4.2. Above 10,000 feet MSL outside of SUA. **(T-1)**.

3.14.4.3. Inside the confines of MTRs and above 5000 feet AGL. **(T-1)**.

3.14.4.4. Below 10,000 feet MSL outside of SUA (no lower than 500 feet above aircrew Low Altitude Training (LOWAT) Category). **(T-1)**.

3.15. Radio Procedures.

3.15.1. Any flight member may make a “Knock-It-Off” (KIO) or “Terminate” call in accordance with AFI 11-214. A KIO applies to any phase of flight and any type of mission.

3.15.2. Wingman acknowledgment of flight lead radio calls indicate the wingman understands or that the appropriate action is complete or in the process of being completed.

3.15.3. In addition to the radio procedures outlined in AFI 11-202V3, AFMAN 11-217, and FLIP publications, the following radio transmissions are required:

3.15.3.1. All flight members will acknowledge understanding the initial ATC clearance. Acknowledge subsequent ATC instructions as directed by the flight lead. **(T-1)**.

3.15.3.2. Gear Checks. Each pilot will confirm configuration with crewmate and report gear down in accordance with the following guidance, but in no case later than crossing the runway threshold in accordance with AFI 11-202V3: **(T-1)**.

3.15.3.2.1. Base turn for overhead patterns.

3.15.3.2.2. Prior to 3 NM final for VFR straight-in.

3.15.3.2.3. Final Approach Fix (FAF) or glide slope intercept for instrument approaches.

3.15.3.2.4. A wingman or chase ship need not make this call during a formation or chased approach.

3.16. Air Refueling (AAR). Reference TO 1F-15E-1, Section VIII “Air Refueling Procedures” and ATP-56(B), *Air-to-Air Refueling*. During AAR training that involves unqualified student pilots (i.e., upgrading pilot enrolled in a formal course and under the direct supervision of an IP), it is the responsibility of the Flight Lead or IP to inform the tanker that unqualified student training will be conducted.

3.16.1. This requirement applies any time prior to the student pilot successfully completing Initial (INIT) or requalification (RQ) Instrument (INSTM)/Qualification (QUAL) evaluation. It also applies prior to the student pilot demonstrating proficiency in AR operations or prior to regaining proficiency if regression occurs even if an INIT/RQ INSTM/QUAL evaluation was successfully completed. Day and night demonstration of proficiency shall be considered two different events.

3.16.2. Regardless of qualified status, pilots will inform boom operators when refueling from a particular type tanker for the first time. **(T-3)**.

3.17. Low Altitude (\leq 5000 feet AGL) Procedures.

3.17.1. Formation. Line abreast formation is only authorized at or above 300 feet AGL. **(T-3)**. When flying below 300 feet AGL flight leads will direct the wingman to a wedge formation position.

3.17.2. Terrain and obstacle clearance.

3.17.2.1. All obstacle avoidance planning will be based on MSA and ERAA as defined in AFI 11-202V3 and AFMAN 11-217. **(T-3)**.

3.17.2.2. If unable to visually acquire or ensure lateral separation from known obstacles that could be a factor to the flight, flight leads will direct a climb not later than 3 NM prior to ensure sufficient vertical separation in accordance with AFMAN 11-217. **(T-3)**. Do not descend back into the low-level environment until visual with the obstacle or positional awareness dictates it is safe to do so.

3.17.2.3. During all descents into and operations in the low-level environment (i.e., \leq 1000 feet AGL) the LAWS will be set at 90 percent of the briefed minimum altitude or 90 percent of the command-directed minimum altitude, whichever is higher. **(T-3)**.

3.17.2.4. During all operations in the low-level environment, the immediate reaction to task saturation, diverted attention, KIOs, or emergencies is to climb to 1000 feet AGL or higher if during the day, MSA or ERAA if at night. **(T-3)**.

3.17.3. Maneuvering. When crossing high or hilly terrain, maintain positive g and do not exceed 120 degrees of bank. **(T-3)**. Maneuvering at less than 1G is limited to upright bunting maneuvers only.

3.17.4. Minimum airspeed. The minimum airspeed for low-level (less than 1000 feet AGL) navigation is 300 KCAS. **(T-3)**. Minimum airspeed for tactical maneuvering in a LOWAT environment is 350 KCAS (except during LOFT recoveries). **(T-3)**.

3.17.5. Minimum weather. The minimum weather for visual low-level training is 1500 feet ceiling and 3 SM visibility (USAFE-AFAFRICA: 1500 feet/ 5 km) or as specified in FLIP for MTRs, unit regulations **(T-1)**, or national rules, whichever is higher. **(T-0)**.

3.17.6. Minimum altitude.

- 3.17.6.1. Minimum altitudes are 500 feet AGL for LOWAT Category I qualified aircrew. **(T-3)**.
- 3.17.6.2. Minimum altitudes are 300 feet AGL for LOWAT Category II qualified aircrews and students with instructors when conducting training in accordance with an applicable syllabus. **(T-3)**.
- 3.17.6.3. Minimum altitudes are 100 feet AGL for LOWAT Category III qualified aircrews. **(T-3)**. Training in the 100 feet to 300 feet AGL altitude block will be in short segments consistent with real-world risks and realistic tactical considerations. **(T-3)**.
- 3.17.6.4. For night operations the minimum altitude is MSA unless operating under the conditions of **para 3.18** (TF Operations) and **para 3.34** (Night Vision Goggles Procedures). **(T-3)**.
- 3.17.6.5. For over water operation the minimum altitude is 1000 feet above the surface unless in sight of land or using TF fly-up protection. **(T-3)**. If in sight of land or using TF fly-up protection the minimum altitude may be lowered to at or above aircrew LOWAT minimum. **(T-3)**.
- 3.17.6.6. For Air to Surface range operations, minimum altitudes will be determined by specific range guidance, AFMAN 11-2F-15EV1, or AFI 11-214, whichever is higher. **(T-3)**.
- 3.17.6.7. When determining minimum authorized altitude, aircrew will use the pilot's LOWAT category and currency. **(T-3)**. Weapon Systems Officers (WSO) do not require LOWAT currency, but must be in an authorized training program under appropriate supervision or at least LOWAT Cat 1 certified, to execute low altitude operations. **(T-3)**.
- 3.17.7. Entries/descents into the low altitude (≤ 5000 feet AGL) structure. Accomplish entry and descent into the low altitude structure or training area under an ATC radar service (e.g., flight following or host nation equivalent) to the maximum extent practical. **(T-3)**.
- 3.17.8. Visual Meteorological Conditions (VMC) route and area abort procedures.
- 3.17.8.1. Maintain safe separation from the terrain and other aircraft. **(T-3)**.
- 3.17.8.2. Comply with VFR altitude and national airspace restrictions. Squawk applicable Identification Friend of Foe (IFF) modes and codes. **(T-3)**.
- 3.17.8.3. Maintain VMC at all times. If unable, follow IMC procedures outlined below.
- 3.17.8.4. Attempt contact with controlling agency, if required. **(T-3)**.
- 3.17.9. IMC Route and area abort procedures.
- 3.17.9.1. Immediately climb to (or above) the briefed ERAA. **(T-3)**.
- 3.17.9.2. Maintain preplanned ground track. Execute appropriate lost wingman procedures if necessary. **(T-3)**.
- 3.17.9.3. Squawk emergency if deviations from normal route or area procedures are required, or if the ERAA or MSA is higher than the vertical limits of the route or area. **(T-3)**.

3.17.9.4. Attempt contact with the appropriate ATC agency for an Instrument Flight Rules (IFR) clearance. **(T-3)**. If required to fly in IMC without an IFR clearance, cruise at appropriate VFR altitudes until IFR clearance is received. **(T-3)**.

3.17.10. Low Altitude Target Pod (TGP) use. The TGP may be used down to the PIC's LOWAT category minimum unless under direct supervision of an instructor (either in the aircraft or in chase) on a syllabus ride leading to a lower LOWAT category minimum. This guidance also applies to use of the LASER if not restricted to a higher altitude by specific SUA guidance, weapons delivery minimums, or host nation rules (if outside the US NAS).

3.18. General TF System Operations. (Also see [para 3.33](#) for night TF requirements).

3.18.1. The minimum altitude for TF training will be the higher of MTR minimum altitude or HN restrictions, MOA floor, or pilot's LOWAT category. **(T-3)**.

3.18.2. Unarmed TF operations below MSA are prohibited. **(T-3)**.

3.18.3. The pilot will maintain 400 KCAS minimum airspeed in mountainous terrain (defined by TO 1F-15E-1, Section 5, as any vertical change that exceeds 900 ft/NM). **(T-3)**.

3.18.4. In addition to a fully functioning TF system, a properly functioning Air-toAir (A/A) and A/G radar are required for IMC TF.

3.18.5. Check TF systems in flight using TO 1F-15E-1, Chapter 2, procedures prior to TF operations. If any feature critical to overall system performance (e.g., Radar Altimeter (RALT), INS) is questionable or disabled and cannot be fixed in accordance with TO 1F-15E-1CL-1 or TO 1F-15E-34-1-1CL-1, *Flight Crew Non-Nuclear Weapon Delivery Checklist*, discontinue the TF portion of the mission. **(T-3)**.

3.18.6. Each aircrew will confirm with their crewmate that the TF and RALT are on and working properly before descending below the MSA. **(T-3)**.

3.18.7. Initially set a 1000 feet AGL Set Clearance Plane (SCP) to verify proper systems operation prior to commencing letdown to a lower SCP. **(T-3)**.

3.18.8. During operations in the low-level environment conducted solely on TF, the pilot will not operate any heads down sensor while outside of TF system limits. Sole attention will be placed on re-establishing aircraft parameters within TF limits. **(T-3)**.

3.18.9. Any intentional maneuvering putting the aircraft outside of TF limits will be at or above the MSA (or ERAA if not within 5 NM of course) or within the restrictions of [para 3.34](#) NVG Procedures. **(T-3)**.

3.18.10. Abnormal operation during TF. Aircrew who experience failure of any portion of the TF system or A/A / A/G radar while flying TF will immediately climb to (or above) the MSA (or ERAA if not within 5 NM of course). **(T-3)**.

3.18.10.1. If the failure(s) can be cleared and safe TF regained, TF operations may resume.

3.18.10.2. If the aircraft position cannot be accurately determined, aircrews will terminate the low-level portion of the mission and execute route abort procedures in accordance with [para 3.17.9](#) **(T-3)**.

3.19. Fuel Requirements.

- 3.19.1. Joker and Bingo Fuel. As defined in AFI 11-214.
- 3.19.2. Normal Recovery Fuel is the fuel on initial or at the FAF at the base of intended landing or alternate, if required. Fuel quantity will be as established locally or 2500 pounds, whichever is higher. **(T-3)**.
- 3.19.3. Minimum and Emergency Fuel. Declare the following to the applicable ATC agency when it becomes apparent that an aircraft may land at the intended destination or alternate, if required, with:
 - 3.19.3.1. Minimum Fuel. 1900 pounds or less. **(T-3)**.
 - 3.19.3.2. Emergency Fuel. 800 pounds or less. **(T-3)**.

Section 3D—Recovery and Landing

3.20. Overhead Traffic Patterns.

- 3.20.1. Overhead patterns may be flown with unexpended A/G practice ordnance (to include inert heavyweight), live air-to-air missiles, and any 20 mm ammunition. Overhead patterns may be performed at deployed locations with unexpended live ordnance if required by local force protection arrival procedures or approved by the owning OG/CC.
- 3.20.2. Initiate the break in accordance with local procedures or as directed by ATC.
- 3.20.3. Execute individual breaks at minimum interval of 5 seconds (except IP/SEFE chase or when in tactical formation).
- 3.20.4. Aircraft should be wings level on final at approximately 300 feet AGL and 1 mile from the planned touchdown point.

3.21. Tactical Overhead Traffic Patterns. Tactical entry to the overhead traffic pattern is permitted when:

- 3.21.1. Executed in accordance with local ATC procedures.
- 3.21.2. No more than four aircraft are in the flight. **(T-3)**.
- 3.21.3. No aircraft are offset from the runway in the direction of the break. The intent is to avoid requiring a tighter than normal turn to arrive on normal downwind. **(T-3)**.
- 3.21.4. Downwind, base turn, and formation spacing are flown such that aggressive or abnormal pattern corrections are not required. **(T-3)**.

3.22. Low Approaches.

- 3.22.1. Minimum Altitudes.
 - 3.22.1.1. Normal and no-flap single ship low approaches: Ensure touchdown does not occur. **(T-3)**.
 - 3.22.1.2. Practice single-engine go-around: Initiate in sufficient time to ensure the aircraft does not descend below 300 feet AGL. **(T-3)**.
 - 3.22.1.3. IP/SEFEs flying chase position: 50 feet AGL. **(T-3)**.

3.22.1.4. Formation low approaches and non-IP/SEFE chase: 100 feet AGL. **(T-3)**.

3.22.1.5. Chase aircraft during an emergency: 300 feet AGL unless safety or circumstances dictate otherwise. **(T-3)**.

3.22.2. Go-Around. Unless local ATC procedures, missed approach, climb-out procedures, or ATC instructions dictate otherwise, remain no higher than 500 feet below VFR overhead traffic pattern altitude until crossing the departure end of the runway.

3.23. Landing.

3.23.1. The desired touchdown point is 500 feet to 1000 feet past the runway threshold for a VFR pattern or non-precision approach, or 500 feet to 1000 feet past the Runway Point of Intercept for a precision approach.

3.23.2. Minimum touchdown spacing is in accordance with AFI 11-202V3 as supplemented by MAJCOM. **(T-3)**. F-15A-D and foreign variants are similar fighter type aircraft to the F-15E. Increase spacing whenever wake turbulence or jetwash could be a factor. **(T-3)**.

3.23.3. Normally, all aircraft will land in the center of the runway and clear to the turnoff (cold) side of the runway when speed and conditions permit. **(T-3)**. Do not delay clearing to the cold side as this can create a conflict for subsequent landing aircraft. **(T-3)**.

3.23.4. Landing restrictions.

3.23.4.1. When the computed landing roll exceeds 80 percent of the available runway, land at an alternate airfield if possible. **(T-3)**.

3.23.4.2. Do not land over any raised web barrier (e.g., MA-1A, 61QS11), or loose or slack cable (e.g., BAK-12/13/14)

3.23.4.3. During the aerobrake portion of a normal, dry runway landing, leave flaps down to provide increased aerodynamic drag and normal nose fall. **(T-3)**.

3.23.4.4. When the RCR at the base of intended landing is less than 12, land at an alternate if possible. **(T-3)**. If an alternate is not available, an approach end or mid-field arrestment is recommended. **(T-3)**.

3.24. Touch-and-Go Landings. Fly touch-and-go landings in accordance with AFI 11-202V3, as supplemented by MAJCOM. **(T-2)**. Do not fly touch-and-go landings with any of the following:

3.24.1. Live A/A or A/G ordnance (**Exception:** any 20 mm ammunition). **(T-3)**.

3.24.2. Hung ordnance or gun malfunction of any kind. **(T-3)**.

3.24.3. Fuel remaining in any external tank. **(T-3)**.

3.25. Closed Traffic Patterns.

3.25.1. Initiate the pattern at the departure end of the runway unless directed otherwise by local procedures or ATC. **(T-3)**.

3.25.2. If executing a formation low approach, a sequential closed may be flown with ATC concurrence.

3.25.3. Plan to arrive on downwind at 200 KCAS to 250 KCAS.

3.26. Back Seat Approaches and Landings. During back seat approaches and landings, the front seat pilot will visually clear the area, monitor aircraft parameters and configurations, and be prepared to direct a go-around or take control of the aircraft (as briefed by the rear cockpit pilot) if necessary. **(T-3)**.

3.27. Formation Approaches.

3.27.1. Do not practice formation approaches with a combined fuel and stores weight greater than 10,000 pounds (N/A for SEFE Chase). **(T -3)**. Aircraft must be within 3000 pounds of each other and symmetrically loaded. **(T -3)**. Consider “symmetrically loaded” as no greater than 8000 ft-lbs of calculated lateral asymmetry.

3.27.2. Minimum weather for formation approaches is 500 feet ceiling and 1.5 SM (2.4 km) or the highest Pilot Weather Category (PWC) in the flight, whichever is higher. **(T -3)**.
Exception: An actual emergency requiring a formation landing.

3.28. After Shutdown Procedures. All flight members will accomplish a post flight walk-around. **(T-3)**. The intent of this inspection is to find evidence of bird strike, lost panels, damaged ordnance, structural damage resulting from over-g’s, or other in-flight abnormalities.

Section 3E—Night Procedures

3.29. Night Ground Operations.

3.29.1. When ground personnel are working under the aircraft, the anti-collision lights should be OFF and the position lights ON and not flashing. **(T-3)**.

3.29.2. Taxi with a minimum of 300 feet spacing. **(T-3)**.

3.29.3. Use the taxi light while taxiing unless it might interfere with an aircraft landing or taking off. The taxiing aircraft will come to a stop if the area cannot be visually cleared without the taxi light. **(T-3)**.

3.29.4. Minimum required operational exterior lighting for night flying operations is: landing and taxi light, both wing-root anti-collision lights, both wingtip position lights, and the Right Vertical Stab (RVS) anti-collision light. **(T-3)**. Substituting a formation light in lieu of a wingtip position light is not permitted. **Exception:** Reduced or lights-out operations conducted in accordance with published guidance or as dictated by real-world tactical considerations.

3.30. Night Takeoff.

3.30.1. During a night formation takeoff, direct brake release and configuration changes on the radio. **(T-3)**.

3.30.2. Following takeoff, each aircraft and element climbs on runway heading to 1000 feet AGL before initiating turns unless directed otherwise by ATC or local procedures. **(T-3)**.

3.31. Night Join-Up.

3.31.1. Weather criteria for night join-up underneath a ceiling is a minimum 3000 feet ceiling and 5 SM (8 km) visibility. **(T-3)**.

3.31.2. After join-up, turn the anti-collision lights OFF except for the last aircraft in formation. **(T-3)**. The last aircraft will keep the anti-collision lights ON unless otherwise directed by the flight lead. **(T-3)**.

3.32. Night Formation Procedures.

3.32.1. When in trail formation, whether IMC or VMC, use all available aircraft systems to maintain aircraft spacing backed up with timing. **(T-3)**. If aircraft spacing cannot be ensured, then establish altitude separation (1000 feet minimum). **(T-3)**.

3.32.2. To preclude incidents of Spatial Disorientation as well as ensure proper ground clearance at all time, aircrew will not depend solely on HUD information and ensure they are using a consistent instrument cross-check to include periodic use of an Electronic Attitude Director Indicator (EADI).

3.32.3. Except in case of emergency, do not direct lead or formation changes below 1,500 feet AGL unless on radar downwind. Above 1,500 feet AGL, direct lead or formation changes using the radio and from a stabilized, wings-level attitude. **(T-3)**.

3.32.4. Prior to a formation break-up at night, the flight lead will transmit attitude, altitude, airspeed, and altimeter setting, which will be confirmed and acknowledged with “good NAVAIDs” by the flight. **(T-3)**. **Note:** Navigational Aid (NAVAID)

3.32.5. Battle damage checks will not be performed at night without NVGs (see [para 3.34.6](#)).

3.33. Night TF Operations.

3.33.1. A fully functioning TF system is required to conduct night TF operations (VMC or IMC). In addition to the minimum equipment listed in [para 3.18.5](#), a usable Navigation/Forward Looking Infrared (NAV/FLIR) HUD image is required. NVGs may be used in place of the NAV/FLIR. **(T-3)**.

3.33.2. TF failure prior to low-level route entry: If the TF system fails prior to route entry, aircrew may still enter the route and continue the mission either at the MSA (or ERAA if greater than 5 NM from course) or by using NVG procedures in accordance with [para 3.34](#) and the AFI 11-214 defined minimum altitudes for Hi/Low illumination with NVGs and no TF protection. **(T-3)**.

3.33.3. TF failure while in the low-level environment: Aircrew who experience failure of any portion of the TF system or NAV/FLIR imagery (or NVGs if used in place of the NAV/FLIR) while flying night TF low-level will immediately climb to (or above) the MSA (or ERAA if not within 5 NM of course) or transition to NVG procedures in accordance with [para 3.34](#)

3.33.4. Climb to MSA (or ERAA if not within 5 NM of course) when NAV/FLIR transmissivity or NVG visibility (if NVG is used in place of the NAV/FLIR) is insufficient for use as an aid for terrain avoidance. This is N/A for IMC TF qualified crews and supervised crews in an IMC TF upgrade using IMC procedures).

3.34. NVG Procedures.

3.34.1. NVGs must be preflight tested and adjusted by the individual in the unit eyelane prior to NVG operations. **(T-3)**.

3.34.2. General NVG use.

3.34.2.1. NVGs must be off and secured during takeoff and landing.

3.34.2.2. Do not don NVGs until at least 2000 feet AGL in climbing or level flight.

3.34.2.3. Remove NVGs prior to initial, the FAF, or glide slope intercept. **(T-3)**.

3.34.2.4. Flight members will communicate when donning or doffing NVGs. Only one crewmember per aircraft will don or doff NVGs at a time. **(T-3)**.

3.34.3. NVGs may not be worn in IMC. **(T-3)**.

3.34.4. Wingmen will fly no closer than NVG close formation (as defined in AFTTP 3-3.F-15E Chapter 8). **(T-3)**.

3.34.5. NVGs may be worn for tanker rejoins, but are raised to the up and locked position or removed and stowed no later than the pre-contact position. **(T-3)**. Exception: KC-46A covert AAR for aircrews who are certified AAR on KC-46A Night Air Refueling (NAAR). For NAAR on tankers not equipped for covert operations, NVGs must be raised to the up and locked position or removed and stowed no later than the pre-contact position. **(T-3)**.

3.34.6. Night BD Checks.

3.34.6.1. Night BD checks are permitted only when wearing NVGs.

3.34.6.2. The crew performing the BD check will approach with position lights bright and steady and beacons on while the aircraft being checked sets external lights to a minimum (with at least anti-collision beacons off). **(T-1)**.

3.34.7. NVG abnormal procedures.

3.34.7.1. During in-flight emergencies, immediately assess whether the NVGs aid or hinder completion of EPs. **(T-3)**. If they are a hindrance or the emergency may deteriorate into an ejection situation, remove and stow the NVGs. **(T-3)**.

3.34.7.2. For NVG failure or inadvertent flight into IMC while in formation or close proximity to other aircraft:

3.34.7.2.1. Immediately transition to instruments (see [para 4.1.1](#)). **(T-3)**.

3.34.7.2.2. Perform appropriate lost wingman procedures if applicable. **(T-3)**.

3.34.7.2.3. Terminate or KIO as appropriate. **(T-3)**.

3.34.7.2.4. Move NVGs to the up and locked position or remove and stow completely if possible. **(T-3)**.

3.34.7.2.5. Maintain or regain VMC as soon as possible. **(T-3)**.

3.34.7.3. For NVG failure while in the low-level environment, ensure separation from other aircraft and climb to (or above) MSA (or ERAA if not within 5 miles of course) prior to troubleshooting. **(T-3)**.

3.34.7.4. For inadvertent flight into IMC while in the low-level environment, follow IMC route abort procedures in [para 3.17.9](#) **(T-3)**.

3.35. Night Landing.

3.35.1. Normally land from an instrument straight-in approach. **(T-3)**. Refer to AFI 11-202V3 night approaches, as supplemented, for specific procedures.

3.35.2. Only perform night formation landings when required for safe recovery of the aircraft.

Section 3F—Miscellaneous Procedures

3.36. Change of Aircraft Control. Aircrew must know at all times who has control of the aircraft. Use the statement “you have the aircraft” to transfer aircraft control. The aircrew member receiving control of the aircraft will acknowledge, “I have the aircraft” and lightly shake the stick. **(T-3)**. Once assuming control of the aircraft, maintain control until relinquishing it as stated above. **(T-3)**. **Exception:** If the intercom fails, the crewmember not flying the aircraft who intends to assume control of the aircraft will lightly shake the stick and assume control of both the aircraft and radios unless otherwise prebriefed (i.e., “shake to take”). **(T-3)**. With intercom out, if either crewmember who is in control of the aircraft intends for the other crewmember to assume control, they will lightly push the rudder pedals back and forth (i.e., “push to pass”). **(T-3)**.

3.37. Ops Checks.

3.37.1. Accomplish sufficient ops checks to ensure safe mission accomplishment. Each aircrew should monitor the fuel system carefully throughout the flight to identify low or trapped fuel or imbalance situations as soon as possible. Ops checks are required:

3.37.1.1. After takeoff during initial climb out (to the maximum extent practical when passing 10,000 feet) and at level off. **(T-3)**.

3.37.1.2. A/A. Prior to each ACBT engagement or intercept. In addition, perform a check for proper operation of all transfer tanks (wing tanks balanced and tank 1 feeding) prior to and between engagements or planned maneuvering above 30 CPU AOA. **(T-3)**.

3.37.1.3. A/G. Prior to entering an A/G range and at least once after departing the range (at least once on range if multiple passes are flown). **(T-3)**.

3.37.1.4. Following Air Refueling. **(T-3)**.

3.37.2. Minimum Ops Check items are engine instruments, total and internal fuel quantities and balance (as well as external fuel quantities and balance, if loaded), g-suit connection, oxygen system, cabin altitude, and Overload Warning System (OWS).

3.37.3. In formation flights, the flight lead may initiate ops checks by radio call or visual signal and wingmen will respond appropriately. The query and response for ops checks will include the following:

3.37.3.1. Pointer over counter readings (e.g., “13 over 25, externals” or “13 over 18, CFTs”). **(T-3) Note:** Conformal Fuel Tank. (CTF)

3.37.3.2. Following external wing tank and CFT fuel consumption, ensure tank one is feeding correctly; add a “balanced” call to the normal Ops Check reply when wing tank fuel balance checks are required and the difference is no greater than 200 lbs. (e.g., “8

squared, balanced, tank 1”) (T-3). **Exception:** Total fuel only may periodically be used during high demand phases of flight. (T-3).

3.37.4. Fighter Data Link (FDL) fuel status will not be used as the primary source of fuel checks. (T-3).

3.38. F-15E Crew Duties. Both crewmembers are responsible for successful sortie completion. A crew briefing will be accomplished before each flight to ensure an understanding of all aspects of the mission. (T-3).

3.38.1. The crew briefing will include radar and visual lookout responsibilities, crew coordination, and specific duties for each phase of flight. (T-3). For night sorties, the crew briefing will include expected crew coordination for deviations from planned/expected flight parameters. (T-3). Aircrew will reference AFTTPs 3-3.F15E, *Combat Aircraft Fundamentals—F-15E* and 3-1.F-15E, *Tactical Employment—F-15E (Classified)* for a thorough discussion of standardized F-15E crew responsibilities and coordination. (T-3).

3.38.2. Below 10,000 feet MSL, crew members will limit crew interaction and cockpit tasks only to those necessary either for tactical training, employment or safe recovery of the aircraft (to include radio drills). (T-3).

3.38.3. Unless briefed otherwise, the following duties apply. **Note:** The restrictions listed in [para 3.38.3.1](#) may not be altered.

3.38.3.1. WSO flying. WSOs will not fly during:

3.38.3.1.1. Takeoff or landing. (T-3).

3.38.3.1.2. AAR operations. (T-3).

3.38.3.1.3. Close formation or rejoins to close formation. (T-3).

3.38.3.1.4. Tactical maneuvering. (T-3). **Exception:** During FTU syllabus missions, student WSOs may practice flying tactical formation turns and position keeping if accompanied by an IP.

3.38.3.1.5. Weapons delivery (actual or simulated). (T-3).

3.38.3.1.6. Below 1000 feet AGL (unless flying practice instrument approaches and no lower than non-precision approach minimums, the pilot’s weather category, or 500 feet AGL, whichever is higher). (T-3).

3.38.3.1.7. Overhead patterns. (T-3).

3.38.3.2. Takeoff. The aircrew will check the Min Go/Max Abort speed when required, monitor engine and flight instruments, check gear and flaps up prior to their TO speed limits, and advise the pilot of any discrepancies. (T-3).

3.38.3.3. Climb/Departure. The aircrew member flying the aircraft will call altimeter setting to 29.92 when passing the transition altitude. (T-3).

3.38.3.4. Cruise, Navigation, and Instrument Flight. The WSO will relay aircraft attitude, altitude, and airspeed information to the pilot when departing a formation at night or in IMC. (T-3).

3.38.3.5. Air refueling.

- 3.38.3.5.1. Pilot Responsibilities. Be prepared to immediately use the air refueling release Hands on Throttle and Stick (HOTAS) if an IP/UIP in the Rear Cockpit (RCP) is accomplishing the refueling and either the RCP air refueling release button on the stick doesn't work or safety dictates.
- 3.38.3.5.2. WSO Responsibilities. Advise the pilot of boom position and call when boom is positively disconnected and clear.
- 3.38.3.6. Instrument penetrations and descents.
- 3.38.3.6.1. The aircrew member in control of the aircraft will advise the other crewmember of intentions when performing any penetration or approach. **(T-3)**.
- 3.38.3.6.2. Both crewmembers must confirm the Decision Height (DH)/Decision Altitude (DA) or Minimum Descent Altitude (MDA) for an approach, or the ERAA and MSA altitudes for descents into the low-level environment. **(T-3)**.
- 3.38.3.6.3. Both crewmembers will refer to appropriate FLIP publications during the holding, penetration and approach. **(T-3)**.
- 3.38.3.6.4. The crewmember not in control of the aircraft will verbally check altimeter settings when passing the transition level. **(T-3)**.
- 3.38.3.6.5. The crewmember not in control of the aircraft will advise the other crewmember when 1000 feet above any intermediate level off altitude, 100 feet above DH/DA or MDA for the approach being flown, or when 1000 feet above the minimum altitude during descents into the low-level environment. **(T-3)**.
- 3.38.3.7. Pattern and landing. The crewmember not in control of the aircraft will:
- 3.38.3.7.1. Monitor the pattern with emphasis on engine power, altitude, airspeed, landing gear, and flap position. **(T-3)**.
- 3.38.3.7.2. Visually clear the area. **(T-3)**.
- 3.38.3.7.3. Monitor ground speed versus runway remaining during the landing roll to assess aerobraking effectiveness and available stopping distance. **(T-3)**.
- 3.38.3.8. After landing. If an IP/UIP accomplished the landing from the RCP, the pilot in the Front Cockpit will assume control of the aircraft as briefed by the pilot in the RCP to perform the taxiing. **(T-3)**.

3.39. Air-to-Air Interrogator (AAI), Identification Friend or Foe (IFF)/Selective Identification Feature. Military use of AAI Mode 4 interferes with ATC and civil Mode 3/C codes. F-15E AAI use in the NAS will comply with the following:

- 3.39.1. To reduce the potential for adverse effects on Combat Identification, ATC, and Traffic Collision Avoidance systems, aircrew will limit interrogations to the minimum required for the mission. **(T-3)**.
- 3.39.2. For AAI operations within the United States and its Possessions, aircrew will comply with the restrictions as specified in the applicable Radio Frequency Authorization(s) that can be obtained from the base/wing spectrum management office. **(T-3)**.
- 3.39.3. OCONUS, follow gaining MAJCOM, Theater or Host Nation guidance for AAI.

Chapter 4

INSTRUMENT PROCEDURES

4.1. General.

4.1.1. The F-15E HUD is not certified as a Primary Flight Reference (PFR) in accordance with AFI 11-202V3; therefore, it cannot be used as a sole attitude reference. **(T-0)**.

4.1.1.1. IMC operations. “Aircrew shall use a composite crosscheck of all flight instrumentation (including the HUD) when operating in IMC. **(T-1)**. These actions are in accordance with the Federal Aviation Regulation/Aeronautical Information Manual (FAR/AIM), International Civil Aviation Organization (ICAO) definitions, and VFR cloud clearance guidance in AFMAN 11-202V3. If aircrew are operating without a discernible horizon, or are flying inside minimum VFR cloud clearances (Federal Aviation Administration (FAA) or ICAO depending on airspace), IMC guidance in this volume applies. **(T-0)**. Use the EADI and the PFR as the primary attitude source for the aircrew’s instrument crosscheck. **(T-1)**. Aircrew flying in IMC will adhere to the following:

4.1.1.1.1. Display an EADI in both front and rear cockpits at all times. **(T-3)**.

4.1.1.1.2. Make an inter-cockpit verbalization of “ADI Up” when first entering IMC. **(T-3)**. **Note:** Attitude Director Indicator (ADI).

4.1.1.1.3. The rear seat occupant may momentarily scroll off an EADI as needed to facilitate safe mission accomplishment; however, the front seat occupant may only scroll off an EADI for higher priority safety-of-flight purposes. **(T-3)**.

4.1.1.2. Night VMC (non-tactical operations). Both occupants will display an EADI. **(T-3)**. Verbalization of “ADI Up” is not required. Generally speaking, aircrew will consider themselves executing “Non-Tactical Operations” anytime they are:

4.1.1.2.1. Adhering to ATC instructions during departure, enroute, and approach.

4.1.1.2.2. Executing published IFR procedures (e.g., Standard Instrument Departures, Standard Terminal Arrivals, Instrument Approach Procedures) or receiving vectors for IFR procedures (includes practice IFR procedures). **Note:** This does not restrict periodic use of displays and sensors during the enroute phase of flight for the purpose of increasing weapons systems proficiency (e.g., RTTs, enroute exercises, systems checks).

4.1.1.3. Tactical operations (all flight conditions). Both occupants will bring up and maintain an EADI as well as verbalize inter-cockpit “ADI Up” as soon as practical in the following situations: **(T-3)**.

4.1.1.3.1. Aggressive night maneuvering (e.g., threat reactions, vertical maneuvering). **Note:** either occupant may momentarily scroll off their EADI to maintain situational awareness of the tactical environment.

4.1.1.3.2. Night TF recoveries from low altitude weapons deliveries (e.g., Lofts, Low Altitude Toss (LATs))

4.1.1.3.3. Night TF fly-ups.

4.1.1.4. Mandatory EADI use regardless of operations or flight conditions. In addition to the above circumstances, both occupants will immediately display an EADI as well as verbalize inter-cockpit “ADI Up” in the following circumstances:

4.1.1.4.1. Unusual attitude recoveries. **(T-3)**.

4.1.1.4.2. When executing lost wingman procedures. **(T-3)**.

4.1.1.4.3. Anytime spatial disorientation is suspected, recognized, or confirmed. **(T-3)**.

4.1.1.4.4. If an EADI is not available due to system malfunctions, the HUD will be used as the primary attitude reference backed up by the standby ADI. **(T-3)**.

4.1.2. The HUD is the primary reference for flight parameters during low-level and TF operations.

4.1.3. The F-15E INS and EGI are approved for Enroute Area Navigation (RNAV); however, they are not approved for use on RNAV and GPS approaches. The enroute navigation may not exceed 1.5 hours between INS updates. An update is defined as establishing a positive position using visual, TACAN, GPS, or on-board radar. Additionally, they may not be used as a substitute for any NAVAID on an Instrument Approach Procedure. (They may be used to identify fixes up to but not including the FAF (coordinates for navigation should be acquired from aviation approved sources such as Joint Mission Planning System, NGA AeroApp/FLIP, Skyvector, ForeFlight, and Airnav)).

4.2. Takeoff and Join-Up.

4.2.1. The flight lead must get an appropriate ATC clearance (altitude block or trail formation) when a flight join-up is not possible due to weather or operational requirements. **(T-3)**.

4.2.2. Formation trail departures must comply with instructions for a nonstandard formation flight as defined in FLIP. **(T-0)**.

4.2.3. If weather is below 1500 feet ceiling and 3 SM (5 km) visibility, each aircraft and element will climb on takeoff heading to 1000 feet AGL before initiating any turns, except when departure instructions specifically preclude compliance. **(T-3)**.

4.3. Trail Procedures.

4.3.1. General.

4.3.1.1. The flight lead must brief the flight on spacing, configuration and airspeeds in all phases of flight that trail formations will be flown. **(T-3)**.

4.3.1.2. Flight leads will request non-standard formation from ATC. **(T-3)**.

4.3.1.3. ATC instructions to the lead aircraft will be for the entire flight. **(T-3)**.

4.3.1.4. Limit all turns to a maximum of 30 degrees of bank. **(T-3)**.

4.3.2. Trail departure.

4.3.2.1. Use a minimum of 20 seconds takeoff spacing. **(T-3)**.

4.3.2.2. During trail departures, basic instrument flying is the first priority. **(T-3)**. Strictly adhere to the briefed airspeeds, power settings, altitudes, headings, and turn points. **(T-3)**. If task saturation occurs, cease attempts to maintain trail, concentrate on flying the instrument departure, and then notify the flight lead. The flight lead will then notify ATC. **(T-3)**.

4.3.2.2.1. Each aircraft or element will follow the No Radar Contact procedures until the aircraft or element immediately in trail has radar contact and called “tied.” **(T-3)**. If briefed by the flight lead, the FDL may be used as a backup to the radar once airborne should the radar become suspect or inoperative. Use EGI or RLN Present Position Keeping Source (PPKS) with indication of good Precise Participant Location and Identification (PPLI)s from preceding flight members. **(T-3)**.

4.3.2.2.2. Do not use FDL at the detriment of proper instrument flying.

4.3.2.2.3. If at any time, the FDL becomes suspect or inoperative, aircrew will immediately transition to the No radar Contact procedures listed below. **(T-3)**.

4.3.3. Radar contact.

4.3.3.1. Each aircraft and element will call “tied” when radar contact is established with the preceding aircraft. **(T-3)**.

4.3.3.2. Once all aircraft are tied, no further radio calls are required unless radar contact is lost.

4.3.3.3. In flights of three or more aircraft, use all available aircraft systems (i.e., RADAR, TACAN, AAI, FDL, etc.) to ensure that trail is maintained on the correct aircraft. **(T-3)**.

4.3.4. No radar contact.

4.3.4.1. The flight lead will call initiating all turns. **(T-3)**. Subsequent aircraft must delay turns to maintain the desired spacing. **(T-3)**.

4.3.4.2. Each aircraft and element will maintain 20 seconds or 2 to 3 mile spacing using all available aircraft systems and NAVAIDs to monitor position. **(T-3)**.

4.3.4.3. During climbs and descents, each aircraft or element will call passing each 5000 foot altitude increment with altitude and heading (or heading passing) until join-up, level-off, or the following aircraft or element calls “tied.” **(T-3)**.

4.3.4.4. Each aircraft and element will call initiating any altitude or heading changes. **(T-3)**. Acknowledgments are not required; however, it is imperative that preceding aircraft or elements monitor the radio transmissions and progress of the succeeding aircraft and elements, and immediately correct deviations from the planned route. **(T-3)**.

4.3.4.5. Each aircraft and element will maintain at least 1000 feet vertical separation from the preceding aircraft or element until establishing radar or visual contact except in instances where departure instructions specifically preclude compliance. **(T-3)**. Reduce vertical separation to 500 feet if necessary to comply with MSA restrictions. **(T-3)**.

4.3.4.6. In the event a visual join-up cannot be accomplished on top or at level off, the flight lead will request altitude separation for each succeeding aircraft or element to meet the requirements of the above paragraph. **(T-3)**.

4.3.5. Enroute trail. Flight leads must pre-brief or direct in the air the airspeeds, power settings, and configurations that will be flown. **(T-3)**.

4.3.6. Trail recovery.

4.3.6.1. Trail recoveries are only authorized at home station, deployed locations (with pre-coordinated procedures through local ATC and/or host nation as applicable), and locally designated primary divert bases where trail recovery procedures already exist.

4.3.6.1.1. Reference AFI 13-204V3 “in-trail” guidance for the minimum procedures that must be described by local guidance (either local supplement to this AFMAN or local airfield ops guidance).

4.3.6.1.2. In accordance with AFI 13-204V3, trail recovery procedures are not allowed at airfields with FAA ATC unless a Letter of Agreement is in effect. At a minimum, the Letter of Agreement must be agreed upon by local OG leadership and the FAA ATC representatives. **(T-3)**.

4.3.6.1.3. In addition to the below guidance, reference AFI 13-204V3 and local airfield operations guidance for further guidance/restrictions.

4.3.6.2. Unless otherwise restricted, limit trail recovery to a maximum of four aircraft.

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

4.3.6.4. Minimum spacing between aircraft is 6000 feet and will be maintained using all available aircraft systems (e.g., RADAR, AAI, A/A TACAN, FDL, etc.) and NAVAIDs.

4.3.6.5. Prior to taking spacing the flight lead must do the following:

4.3.6.5.1. Coordinate the trail recovery with ATC. **(T-3)**.

4.3.6.5.2. Ensure that all wingmen have “good NAVAIDS.” **(T-3)**.

4.3.6.5.3. Accomplish the spacing maneuver in VMC to the max extent possible. **(T-3)**.

4.3.6.6. Once established on a segment of a published approach, each aircraft must comply with all published altitudes and restrictions while maintaining in-trail separation. **(T-3)**.

4.3.6.7. Unless local procedures establish defined reference points for airspeed and configuration changes, the flight lead must direct changes by radio. At flight lead’s call, all aircraft must simultaneously comply with the directed change. **(T-3)**.

4.3.6.8. All aircraft must report the FAF or glide slope intercept. **(T-3)**.

4.3.6.9. Lost contact. If contact is lost with the preceding aircraft, the following will be accomplished:

4.3.6.9.1. The pilot will transmit, “[Callsign (C/S)], lost contact.” **(T-3)**.

4.3.6.9.2. The preceding aircraft will respond with altitude, airspeed, and heading. **(T-3)**.

4.3.6.9.3. If separation/deconfliction cannot be confirmed the flight lead will establish altitude deconfliction and coordinate a separate IFR clearance with ATC. **(T-3)**.

4.3.6.9.4. If contact is lost while established on a segment of a published approach, flight members may continue the approach, but must confirm separation via all available aircraft systems and NAVAIDs. **(T-3)**. If separation deconfliction cannot be guaranteed, the aircrew that lost contact will execute missed approach or climb-out as directed by ATC. **(T-3)**.

4.4. Formation Split-Up.

4.4.1. Accomplish formation split-ups in VMC to the maximum extent possible. **(T-3)**.

4.4.2. If IMC, accomplish the split-up in straight and level flight. **(T-3)**.

4.4.3. Prior to a split-up in IMC, the flight lead must transmit attitude, airspeed, altitude, and altimeter setting which will be acknowledged by wingmen. Wingmen must confirm good NAVAIDS. **(T-3)**.

4.5. Formation Penetration.

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

4.5.2. If a formation approach is intended, position the wingman on the appropriate wing prior to weather penetration. **(T-3)**.

4.6. IMC Lead Change. During IMC formation flights, do not change leads below 1500 feet AGL unless on radar downwind.

4.7. Approach Procedures.

4.7.1. Aircrew will not fly any published instrument approach procedure (e.g., DoD, Jeppesen, ICAO) that requires airspeeds less than those specified in the TO.

4.7.2. The F-15E is Approach Category E. Approach Category D minimums may be used at an emergency or divert airfield or with OG/CC approval at a planned destination if no Category E minimums are published, provided:

4.7.2.1. A straight-in approach is flown (i.e., circling is not allowed).

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

4.7.2.3. For the missed approach segment, the aircraft is flown at 255 knots true airspeed (KTAS) or less. **(T-3)**. In those cases where a high-density altitude may cause 255 KTAS to equal a KCAS below the speeds specified in TO 1F-15E-1, Category D approaches may not be flown.

Chapter 5

AIR-TO-AIR WEAPONS EMPLOYMENT

5.1. References. AFI 11-214 contains A/A procedures and restrictions, to include operations with live ordnance applicable to all aircraft. This chapter contains procedures and restrictions specific to F-15E operations.

5.2. Simulated Gun Employment.

5.2.1. Simulated A/A gun employment is defined as the combined use of Master Arm and trigger actuation.

5.2.2. Always confirm the status of the gun system prior to flight in accordance with TO 1F-15E-34-1-1CL-1. **(T-3)**.

5.2.3. Simulated A/A gun employment is permitted with a cold gun (in accordance with TO 1F-15E-34-1-1CL-1), loaded or unloaded, provided a trigger check is previously accomplished.

5.2.4. Never perform simulated A/A gun employment with a “hot” gun. A “hot” gun is one that is not safed in accordance with TO 1F-15E-34-1-1CL-1). Never perform a trigger check with a hot gun, regardless of Master Arm switch position.

5.3. Maneuvering Limitations.

5.3.1. Minimum airspeed during LOWAT maneuvering is 350 KCAS.

5.3.2. Aircraft training maneuver categories will be a function of lateral asymmetry calculations regardless of aircraft configuration. Aircraft can execute UNLIMITED maneuvering if lateral asymmetry is <5000 ft-lbs as defined by AFI 11-214. Aircraft execute LIMITED maneuvering for lateral asymmetries of 5000 ft-lbs to 10,000 ft-lbs. Aircraft execute RESTRICTED maneuvering with lateral asymmetries of 10,000 ft-lb to 20,000 ft-lb. Aircraft execute in the NON-MANEUVERING category with lateral asymmetry greater than 20,000 ft-lbs. Aircrew will continue to monitor, re-calculate and apply maneuvering category restrictions based on actual lateral asymmetry, since lateral asymmetries can change throughout the flight. **(T-3)**. Maximum AOA restrictions for the aircraft (in accordance with TO 1F-15E-1) will not be exceeded regardless of later asymmetry calculations.

5.3.3. Negative-g guns jinks are prohibited. **(T-3)**.

5.3.4. When acting as a restricted maneuvering target for low altitude (≤ 5000 feet AGL) intercepts, the minimum airspeed is 300 KCAS. **(T-3)**.

5.3.5. Discontinue tactical maneuvering involving rapid AOA onset rates if the combined lateral asymmetry of the aircraft results in a 30 CPU restriction in accordance with TO 1F-15E-1, Chapter 5. (Examples: Discontinue when due to a fuel imbalance or laterally asymmetric stores loading.)

Chapter 6

AIR-TO-SURFACE WEAPONS EMPLOYMENT

6.1. References. AFI 11-214 contains A/G procedures and restrictions applicable to all aircraft. This chapter contains procedures and restrictions specific to F-15E operations.

6.1.1. In accordance with AFI 11-214, Chapter 5 restrictions on final switch configurations when expending A/G ordnance, “final switch configuration” is defined as Master Arm “ARM.”

6.1.2. Aircrew will ensure they are completely familiar with range restrictions regarding Master Arm usage as well as run-in heading adherence and verification/confirmation of targeting (if applicable). Pilots shall positively identify the target prior to weapons release. For wartime or contingency sorties, comply with ROE. For training sorties, achieve positive identification by either visually acquiring the target or by confirming target location through valid on-board/off-board cues. Exercise caution when relying on a single cue to confirm target location. For night training sorties when actual training, inert or live weapons will be released via a visual attack mode, do not rely on visual cues alone; confirm visual acquisition of the target with at least one additional on-board/off-board cue before releasing weapons. Cues may include, but are not limited to, radar, GPS, marking rounds, TGP or Infrared (IR) Maverick lock on, IR pointers or NVG compatible marking devices.

6.1.2.1. For multiple passes, unless otherwise stipulated in range restrictions, do not Master Arm hot until aircraft is in such a position that any inadvertent/unintentional release is contained within the range boundaries.

6.1.2.2. If in doubt or loss of target situation awareness is lost, ensure the Master Arm is “SAFE” to mitigate the change of an inadvertent/unintentional release.

6.2. Simulated Attacks against Off-Range or Manned Targets. In addition to AFI 11-214, Chapter 5, restrictions, the following guidance applies (in addition to any host nation restrictions if applicable):

6.2.1. “Simulated attacks” are defined as the combined use of A/G Training Programmable Armament Control Set (PACS), A/G Master Mode, Master Arm “ARM,” and pickle button actuation.

6.2.2. Stations loaded with actual carted ordnance may not be selected on any Training PACS program. This applies to Suspended Utility Unit (SUU)-20s loaded with Bomb Dummy Unit (BDU)-33s, but does not apply to empty SUU-20s unless the SUU-20 itself is carted.

6.2.3. The laser is only to be used in approved areas as stipulated in FLIP, Range Guidance, Letters of Agreement, and/or Host Nation guidance as applicable. **(T-0)**.

6.3. Strafe.

6.3.1. The 17th Weapons Squadron will manage and publish the F-15E-standard strafe card that will be used by all F-15E aircrew when executing strafe attacks, actual or simulated. **(T-2)**. Individual units will not modify the card and will forward all recommendations for change directly to the 17th Weapons Squadron. **(T-2)**.

6.3.2. Aircrew will execute strafe from a single planned dive angle (e.g., 25°); however, different deliveries (i.e., High Angle Strafe and Low Angle Strafe) may be employed on different passes of the same sortie. **(T-3)**.

6.3.3. Flights will thoroughly pre-brief planned use of and the requirement to honor GCWS alerts during strafe attacks, especially High Angle Strafe. **(T-3)**.

6.3.4. Flight members will use all available tools to provide mutual support in the dynamic and high risk High Angle Strafe environment. **(T-3)**. Any perceived breakdown in planned/expected attack parameters will result in an immediate Knock-it-off call by the supporting flight member. **(T-3)**.

6.3.5. Prior to roll-in on all strafe attacks aircrew will review and confirm the planned parameters in accordance with AFTTP 3-3.F15E, *Combat Aircraft Fundamentals—F-15E*. **(T-1)**. Confirmation may be accomplished in the flight briefing for pre-planned targets and standardized deliveries such as on a training range during a Basic Surface Attack mission.

6.3.6. Simulated strafe.

6.3.6.1. Simulated strafe is defined as the combined use of A/G Training PACS, A/G Master Mode, Master Arm “ARM,” and trigger actuation.

6.3.6.2. Simulated strafe is permitted with a cold gun (in accordance with TO 1F-15E-34-1-1CL-1), loaded or unloaded, provided a trigger check is previously accomplished.

6.3.6.3. Do not perform simulated strafe (as defined in [para 6.3.6.1](#)) with a hot gun (loaded or empty.) **Exception:** With XXX displayed in the HUD following hot strafe, aircrew may continue training with simulated strafe on the same range within the required parameters for strafe-approved targets. Do not perform a trigger check in this specific case.

6.3.7. Flight debriefings of strafe attacks will include reviews of strafe employment to identify trends/problem areas (e.g., release parameters, abort cues, recognition of ranging errors, etc.) **(T-3)**.

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

6.5. Night System Delivery Procedures.

6.5.1. The maximum angle of bank during night recovery maneuvers (e.g., from loft, LAT, or climbing safe escape) is 135 degrees in accordance with AFI 11-214. **(T-1)**.

6.5.2. When performing weapons deliveries on a range using only TF procedures, (i.e., NVGs are not used) all maneuvering in the bombing pattern below MSA must be inside TF limits. **(T-3)**.

6.5.3. TF loft and LAT deliveries.

6.5.3.1. TF loft and LAT deliveries are instrument maneuvers that exceed numerous TF limits. Aircrew will reference AFTTP 3-3.F-15E for a comprehensive list of delivery and recovery techniques and considerations. **(T-3)**.

6.5.3.2. TF loft escape corridor. The TF loft escape corridor is defined as a 10 NM wide corridor centered on planned flight path, starting at the planned roll out point and

extending for 8 NM along the egress heading. Aircrew will calculate and annotate both an RIA and MSA for every planned escape corridor. **(T-3)**.

6.5.3.3. Prior to initiating the pull up on a TF loft or LAT delivery, both aircrew will scroll to an EADI on one of their screens, verify accuracy of their standby ADI against an EADI, and verbalize inter-cockpit “ADI up.” **(T-3)**.

6.5.3.4. If the TF system fails during recovery, maintain the appropriate minimum altitude based on positional awareness (RAA, MSA, or NVG minimum) until the TF system recovers. **(T-3)**.

6.5.3.5. If at any time during the TF loft airspeed drops below 300 KCAS or LAT airspeed drops below 350 KCAS, abort the maneuver and recover to level flight. **(T-3)**. Direct primary emphasis towards aircraft attitude, altitude, and regaining airspeed. **(T-3)**.

6.6. Night and IMC Surface Attack Range Procedures.

6.6.1. For night range weapons deliveries, the weather must allow the Range Control Officer (RCO) (for a class A range), or a flight member or range personnel (for a class B or C range) to clear the target area and spot or score the ordnance impact. **(T-3)**.

6.6.2. Multiple weapons deliveries may be accomplished at night and/or during IMC if range patterns and procedures that ensure positive aircraft separation are established and briefed.

6.6.2.1. TF altitude and maneuvering restrictions apply throughout the pattern for TF deliveries. If the downwind is flown at MSA or above, do not begin a TF descent to the planned delivery altitude until in a position to remain within TF limits.

6.6.2.2. Minimum pattern altitude for non-TF deliveries is MSA or above, range restrictions permitting, unless complying with [para 3.34](#) (NVG Procedures).

6.6.3. For IMC range deliveries through or above the weather comply with the applicable Range Orders and the following restrictions:

6.6.3.1. A fully functional EGI PPKS is selected for delivery. **(T-3)**.

6.6.3.2. Unguided ordnance. **(T-3)**.

6.6.3.2.1. If SYSB is used as the Height Above Target calculation source (i.e., SYSG is non-functional or showing as invalid) and MN or INS PPKS is set, accomplish a system altitude update within five minutes of release. **(T-3)**.

6.6.3.2.2. Radar designations from an APG-70/82 or ASQ-236 High Resolution Map patch map require a target direct designation (APG-70: 0.67 NM, ASQ-236: 4000 ft or better) with correlation verified between the target, and at least one offset on a minimum 1.3 NM patch map. **(T-3)**.

6.6.3.2.3. Nav target designation may be used in MN and/or INS PPKS only if a MN and/or INS update has been accomplished within five minutes prior to release. **Exception:** This restriction is not applicable if AUTO INS UPDT is enabled.

6.6.3.2.4. After target designation, verify weapons release will result with on-range impacts. **(T-3)**. This may be accomplished by checking designation accuracy against published range coordinates, utilizing Tactical Situational Display or Situational

Display, or by verifying designation symbology through HUD/TPOD if illumination/atmospheric conditions permit.

6.6.3.3. Inertially Aided Munitions.

6.6.3.3.1. Prior to moving Master Arm switch to “ARM,” verify that the Smart Weapons Page priority weapon coordinates match the published range coordinates. **(T-3)**.

6.6.3.3.2. Verify weapon TXA position quality is reported as “GOOD” or “MARG” and the weapon INU platform quality is a “1” (QUAL GOOD 1 or QUAL MARG 1). **(T-3)**.

6.6.3.3.3. Release in the IN-ZONE Launch Acceptability Region (LAR) or at the planned Designated Ground Range if no LAR exists. **(T-3)**. For any weapon Degraded driving the weapon to INS-only (QUAL MARG 1, NO GPS KEYS, etc.), ensure TOF is ≤ 70 sec. **(T-3)**.

6.7. Nighttime Targets of Opportunity. Prior to beginning a nighttime diving attack (to include strafe) against a target of opportunity either in combat or during peacetime training, the following procedures will be applied:

6.7.1. Each aircraft within the formation must make an independent determination of target elevation. **(T-3)**.

6.7.2. All flight members will calculate the target area MSA. **(T-3)**. The target area MSA includes the highest elevation within at least 5 NM of the planned target (or as briefed by the flight lead).

6.7.3. The lead aircraft passes target elevation and MSA to the flight (to include open/cease fire range if conducting night strafe). **(T-3)**. Each flight member will either respond “[C/S] Same” or “[C/S] Shows [###],” where “[###]” is the target elevation and/or target area MSA calculated in accordance with [para 2.4.4.5.2](#) that was different. **(T-3)**.

6.7.4. Weapons deliveries may be conducted below the target area MSA if operating in accordance with [para 3.34](#), NVG Procedures.

6.7.5. If Yo-Yo operations (detached mutual support) are being employed, to the maximum extent practical, the verification of target elevation and target area MSA is made while flight members are still in radio contact. **(T-3)**. If unable radio contact between flight members or for single-ship operations, the verification is accomplished inter-cockpit prior to commencing attacks. **(T-3)**.

6.7.6. For targets that are either provided by a qualified outside agency (e.g., Joint Terminal Attack Controller (JTAC), Joint Surveillance and Target Attack (JSTARS), Forward Air Controller-Airborne (FAC-A)) or are preplanned with known coordinates and elevation, own ship determine action of target elevation is not required. This also applies to pre-calculated target area MSAs. In this instance, at a minimum, inter-cockpit confirmation of attack parameters is accomplished prior to commencing attacks.

Chapter 7

ABNORMAL OPERATING PROCEDURES

7.1. General. These procedures do not supersede TO guidance.

7.1.1. Do not accept an aircraft for flight with a malfunction addressed in the EP and Abnormal Operations section of the TO until it has been corrected.

7.1.2. Do not use a malfunctioning system unless it is required for safe recovery of the aircraft. Do not continue troubleshooting a malfunction after completing flight manual EP and the aircraft may be safely recovered.

7.1.3. Fuel dumping.

7.1.3.1. Follow AFI 11-202V3 procedures for notification of applicable ATC agencies when fuel dumping is in progress. **(T-1)**.

7.1.3.2. Only conduct fuel dumping to reduce aircraft gross weight for safety of flight.

7.1.3.3. When circumstances permit, dump above 10,000 feet AGL over unpopulated areas. **(T-3)**.

7.1.3.4. Ensure the dump switch is returned to normal before landing. **(T-3)**.

7.1.3.5. After landing, make an appropriate entry in the AFTO Forms 781, *ARMS Aircrew/Mission Flight Data Document*. **(T-3)**.

7.1.4. Do not taxi aircraft with malfunctions that effect the nose wheel steering or brake system.

7.1.5. Flight control malfunctions.

7.1.5.1. For actual or perceived flight control malfunctions, terminate maneuvering and take appropriate action. **(T-3)**.

7.1.5.2. If the flight control problem was due to crewmember or passenger stick or rudder interference, the crewmember flying the aircraft will take appropriate action to ensure no further flight control interference occurs. **(T-3)**.

7.2. Ground Aborts.

7.2.1. Delayed aircraft may join the flight at a briefed rendezvous point or may fly a briefed alternate single ship mission.

7.2.2. If accomplishing a join-up to spread, route, or fingertip, cease tactical maneuvering until the delayed aircraft is joined and all flight members are ready to continue. **(T-3)**.

7.3. Takeoff Aborts.

7.3.1. If aborting the takeoff, clear to the appropriate side of the runway as expeditiously as possible based on position within the element. **(T-3)**. If this is not feasible because of possible cable engagement, clear straight ahead. **(T-3)**.

7.3.2. As soon as practical, give call sign and state intentions on appropriate frequency or frequencies. **(T-3)**. A “Cable, Cable, Cable” radio call indicates intent for a departure-end arrestment.

7.3.3. Lower the tailhook if there is any doubt about the ability to stop on the runway. **(T-3)**.

7.3.4. Subsequent aircraft hold position, abort, or continue to takeoff as appropriate to maintain adequate clearance. **(T-3)**.

7.3.5. Brake overheat. While the TO indicates that brake overheat should be considered for brake applications above 100 knots, numerous factors may be considered that reduce the possibility of actual hot brakes. Examples include gross weight of the aircraft, length of time between initial brake application and taxiing clear of the runway, airflow over the brakes due to current wind conditions, etc.

7.3.5.1. Anytime the brakes are applied during a takeoff abort above 120 KCAS or any time the aircrew suspect hot brakes declare a ground emergency, taxi the aircraft to the designated hot brake area and follow hot brake procedures. **(T-3)**.

7.3.5.2. See TO 1F-15E-1, Section 3 for list of brake overheat considerations.

7.4. Air Aborts.

7.4.1. If an abort occurs after takeoff, all aircraft maintain their original ATC call sign. **(T-3)**.

7.4.2. If a chase is desired by the aircrew experiencing an airborne emergency, the chase aircraft follows the problem aircraft to the field of intended landing unless cleared off sooner. **(T-3)**. The flight lead determines if a chase is required for non-emergency aborts. **(T-3)**.

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

7.4.3.1. Bird strike or FOD. **(T-3)**.

7.4.3.2. Flight control system anomalies (not including flight control system lights that reset in accordance with TO procedures). **(T-3)**.

7.4.3.3. Engine flameout, stagnation, or shutdown. **(T-3)**.

7.4.4. If an aircraft experiences an over-g, use the following procedures:

7.4.4.1. Immediately terminate maneuvering and call up the OWS matrix to analyze the displayed parameters. **(T-3)**.

7.4.4.2. If level “1” (one) is displayed in any column of the matrix except Mass Items (MIT), perform a BD check with emphasis on the overall condition of the aircraft. **(T-3)**. If no abnormalities are noted, the flight lead may continue the briefed mission. If a subsequent level “1” or greater over-g occurs, terminate the mission, perform a BD check, RTB, and fly a straight-in approach. **(T-3)**.

7.4.4.3. If level “1” (one) is displayed in the MIT column, or level “2” (two) or greater is displayed in any column of the matrix, terminate the mission, perform a BD check, RTB, and fly a straight-in approach. **(T-3)**.

7.4.4.4. After landing, document all over-g’s in the AFTO Form 781. **(T-3)**.

7.5. Radio Failure.

7.5.1. General. In addition to this manual, individual aircraft experiencing radio failure will comply with procedures outlined in FLIP, AFI 11-202V3, Host Nation, and local directives. **(T-0)**. As able, NORDO F-15Es will enter the Voice Call Sign “NRDO” into their Link-16 system to alert other Link-capable aircraft. **(T-3)**. Aircraft experiencing any difficulty or emergency in addition to NORDO will proceed as required by the situation. **(T-3)**.

7.5.2. Formation.

7.5.2.1. Close or route.

7.5.2.1.1. Flight members who experience total radio failure while in close or route formation will maneuver within formation parameters to attract the attention of another flight member and give the appropriate visual signals. **(T-3)**.

7.5.2.1.2. Terminate the mission as soon as practical and lead the NORDO aircraft to the base of intended landing or a divert base. **(T-3)**.

7.5.2.1.3. Perform a formation approach to a drop-off on final unless safety considerations dictate otherwise. **(T-3)**.

7.5.2.2. Other than close or route.

7.5.2.2.1. If flying other than close or route formation when radio failure occurs, the NORDO aircraft should attempt to rejoin to a route position at approximately 500 feet on another flight member. **(T-3)**.

7.5.2.2.2. The NORDO aircraft is responsible for maintaining clearances from other flight members until his presence is acknowledged by a wing rock, signifying clearance to join. **(T-3)**.

7.5.2.2.3. Once joined, the NORDO aircraft gives the appropriate visual signals. **(T-3)**.

7.5.2.2.4. NORDO aircraft may proceed to a rendezvous point and hold if pre-briefed. **(T-3)**.

7.5.2.2.5. NORDO aircraft proceed to the base of intended landing or a divert base upon reaching the minimum fuel required for a NORDO recovery (not below BINGO) regardless of rejoin status. **(T-3)**.

7.5.3. Surface attack NORDO procedures. In all cases, applicable Range or Host Nation procedures take precedence.

7.5.3.1. Class A/Manned Class B Ranges

7.5.3.1.1. Attempt contact with the RCO on the appropriate backup frequency. **(T-3)**.

7.5.3.1.2. 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. **(T-3)**. The flight leader 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. **(T-3)**.

- 7.5.3.1.3. If the NORDO aircraft has an emergency, make a pass by the range control tower, if practical, on the attack heading while rocking wings, turn opposite the direction of traffic, and proceed to a recovery base. **(T-3)**. The flight leader will either rejoin on the NORDO aircraft, or direct another flight member to rejoin on the NORDO aircraft, in order to escort the emergency aircraft. **(T-3)**.
- 7.5.3.1.4. If the RCO experiences radio failure, the flight holds high and dry and maintains spacing while attempting contact on primary and backup frequencies. **(T-3)**.
- 7.5.3.2. Unmanned Class B and Class C Ranges:
- 7.5.3.2.1. Make a “high and dry” pass on the target, if possible, while rocking wings. **(T-3)**.
- 7.5.3.2.2. The leader will either rejoin the flight in sequence and recover, or direct another flight member to escort the NORDO aircraft to a recovery base. **(T-3)**.
- 7.5.3.2.3. If the NORDO aircraft has an emergency, aircrew will, if practical, make a pass on the target, rocking wings, turn opposite direction of traffic, and proceed to a recovery base. **(T-3)**. The flight lead will either rejoin on the NORDO aircraft, or direct a flight member to rejoin on the NORDO aircraft, in order to escort the emergency aircraft. **(T-3)**.
- 7.5.3.3. Jettison of unexpended ordnance. If radio failure occurs and circumstances preclude landing with unexpended ordnance, accomplish a safe jettison of the ordnance provided the following conditions are met:
- 7.5.3.3.1. The NORDO aircraft joins on another flight member that has radio contact with the remainder of the flight and the RCO (on a manned range). **(T-3)**.
- 7.5.3.3.2. Stores jettison visual signals specified in AFPAM 11-205 (hold fist at top of canopy and make several pumping motions) are relayed to the NORDO aircraft to initiate jettison. **(T-3)**.
- 7.5.4. NORDO recovery.
- 7.5.4.1. Go-around.
- 7.5.4.1.1. The chase aircraft executes a go-around, passes the NORDO aircraft, and rocks its wings. **(T-3)**.
- 7.5.4.1.2. The NORDO aircraft executes a go-around if in a safe position to do so. **(T-3)**.
- 7.5.4.1.3. If the NORDO aircraft is in formation as a wingman, the lead will initiate a gentle turn into the wingman and begin the go-around. **(T-3)**.
- 7.5.4.2. Approach end arrestment.
- 7.5.4.2.1. The NORDO aircraft will signal intent for an approach-end cable engagement to the chase aircraft by extending the tailhook. **(T-3)**.

7.5.4.2.2. The pilot of a non-escorted NORDO aircraft intending to make an approach-end cable engagement will fly a straight-in approach flashing the landing light on final to signal the tower. **(T-3)**.

7.6. Severe Weather Penetration. Do not attempt flight through severe weather. **(T-3)**. 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. **(T-3)**.

7.7. Lost Wingman Procedures. In any lost wingman situation, immediate separation of aircraft is essential.

7.7.1. General procedures.

7.7.1.1. Upon losing sight of the flight/element lead or if unable to maintain formation the wingman will simultaneously:

7.7.1.1.1. Transition to instruments. **(T-3)**.

7.7.1.1.2. Execute the applicable lost wingman procedures. **(T-3)**.

7.7.1.1.3. Inform lead by transmitting "C/S, lost wingman." **(T-3)**.

7.7.1.1.4. After executing lost wingman procedures, wingman will not attempt to rejoin with the flight until the flight lead clears the wingman to do so. **(T-3)**.

7.7.1.2. Flight/Element lead must acknowledge the lost wingman's radio call and, when appropriate, transmit attitude, heading, altitude, airspeed, and other parameters necessary for safe separation. **(T-3)**. When practical and if required, the flight lead will obtain separate clearances. **(T-3)**.

7.7.1.3. At all times, all aircraft involved shall observe all published terrain clearance limits. **(T-3)**.

7.7.1.4. If a wingman becomes separated and any aircraft experiences radio failure, the aircraft with the operational radio will obtain a separate clearance for both aircraft. **(T-3)**.

7.7.1.4.1. The NORDO aircraft will squawk code 7600 while proceeding with the last known clearance. **(T-3)**.

7.7.1.4.2. If an emergency situation arises along with radio failure, the NORDO aircraft will turn the IFF to EMERGENCY for the remainder of the flight. **(T-3)**.

7.7.1.5. Only practice lost wingman procedures in VMC.

7.7.2. Two and three-ship procedures. For three-ship echelon, refer to four-ship procedures.

7.7.2.1. Wings-level flight (climbing, descending, or straight and level). **(T-3)**. Turn away using 15 degrees of bank for 15 seconds, then resume original heading. **(T-3)**.

7.7.2.2. Turns.

7.7.2.2.1. Outside the Turn. Reverse the direction of turn using 15 degrees of bank for 15 seconds. **(T-3)**. Continue straight ahead to ensure separation prior to resuming the turn. **(T-3)**.

- 7.7.2.2.2. Inside the Turn. Momentarily reduce power to ensure nose-tail separation and direct the flight lead to roll out of the turn. **(T-3)**. Maintain the original turn. The lead may only resume the turn when separation is ensured. **(T-3)**.
- 7.7.2.3. Final Approach. Momentarily turn away from lead to ensure clearance and execute the published missed approach procedure. **(T-3)**.
- 7.7.2.4. Missed Approach. Momentarily turn away from lead to ensure clearance and continue the published or assigned missed approach procedure while climbing to 500 feet above missed approach altitude. **(T-3)**.
- 7.7.3. Three-ship echelon and four-ship procedures. Number 2 and 3 follow the procedures outlined above. **(T-3)**. Number 4's initial action assumes that number 3 has also gone lost wingman:
- 7.7.3.1. Wings-level flight (climbing, descending, or straight and level). Turn away using 30 degrees of bank for 30 seconds, then resume the original heading. **(T-3)**.
- 7.7.3.2. Turns.
- 7.7.3.2.1. Outside the Turn. Reverse direction of turn using 30 degrees of bank for 30 seconds to ensure separation from lead and number 3. **(T-3)**.
- 7.7.3.2.2. Inside the Turn. Momentarily reduce power to ensure nose-tail separation and increase bank angle by 15 degrees. **(T-3)**. Direct the flight lead to roll out. The flight lead will only resume the turn when separation is ensured. **(T-3)**.
- 7.7.4. Fighter-tanker lost wingman procedures are governed by ATP-56(B), *Air-to-Air Refueling*.

7.8. Spatial Disorientation (SD). Conditions which prevent a clear visual horizon or increase pilot tasking are conducive to SD. To prevent SD, the pilot must make a conscious effort to increase the instrument crosscheck rate. Execute the following procedures if SD symptoms are encountered and until symptoms abate:

- 7.8.1. Single ship.
- 7.8.1.1. Concentrate on flying basic instruments. **(T-3)**. Ensure an EADI is displayed in accordance with [para 4.1.1.4 \(T-3\)](#). If able, communicate to the other crewmember that SD symptoms are being experienced. **(T-3)**. The HUD is only referenced as a backup to the EADI or if the EADI is unavailable due to system malfunctions. **(T-3)**.
- 7.8.1.2. Consider turning on the autopilot or transferring control to the other crewmember.
- 7.8.1.3. If symptoms persist and conditions permit, fly straight and level until symptoms abate. **(T-3)**.
- 7.8.1.4. If necessary, declare an emergency and advise ATC. **(T-3)**.
- 7.8.1.5. It is possible for SD to proceed to the point where the aircrew is unable to see or interpret the flight instruments. In this situation, aircraft control may be impossible. If this occurs, the aircrew should consider ejecting. **(T-3)**.
- 7.8.2. Flight/element lead.

7.8.2.1. Advise the Wingmen of the disorientation and comply with procedures in [para 7.8.1 \(T-3\)](#).

7.8.2.2. Use the Wingmen to confirm attitude and provide verbal feedback. **(T-3)**.

7.8.2.3. If symptoms persist, terminate the mission and recover the flight by the simplest and safest means possible. **(T-3)**.

7.8.3. Wingman.

7.8.3.1. Advise lead of the disorientation and comply with procedures in [para 7.8.1 \(T-3\)](#).

7.8.3.2. Lead will advise wingman of aircraft attitude, altitude, heading, and airspeed. **(T-3)**.

7.8.3.3. If symptoms persist and conditions permit, lead will establish straight and level flight for 30 sec to 60 sec. **(T-3)**.

7.8.3.4. If the above procedures are not effective flight lead should consider passing the lead to the wingman, provided the flight lead will be able to maintain situational awareness from a chase position.

7.8.3.4.1. Change leads while in straight and level flight. **(T-3)**.

7.8.3.4.2. Once assuming the lead, maintain straight and level flight for at least 60 seconds if practical. **(T-3)**.

7.8.3.5. If necessary, terminate the tactical mission and recover by the simplest and safest means possible.

7.8.4. Greater than two-ship formation.

7.8.4.1. Lead should separate the flight into elements to more effectively handle a wingman with persistent SD symptoms. **(T-3)**.

7.8.4.2. Accomplish split-up in accordance with [para 4.4](#) (Formation Split-up). **(T-3)**.

7.8.4.3. Plan to keep the element with the SD pilot straight and level while the other element separates. **(T-3)**.

7.9. Armament System Malfunctions.

7.9.1. General. Aircrew will not attempt to expend ordnance with a known weapons release malfunction except as noted below.

7.9.2. Inadvertent release or firing (i.e., not due to aircrew error).

7.9.2.1. In accordance with the AFI 11-214 definition of an inadvertent release, if commanding a single release, do not consider a double bomb release as inadvertent if the release occurs from a practice bomb dispenser (e.g., BDU-33s from a SUU-20).

7.9.2.2. **Note** : switch positions at the time of inadvertent release or firing and provide to armament and safety personnel. **(T-3)**. Record the impact point if known. **(T-3)**.

7.9.2.3. Safe the armament switches and do not attempt further release or firing in any mode. Treat remaining ordnance as hung and follow hung ordnance procedures during RTB. **(T-3)**.

7.9.2.4. If remaining stores present a recovery hazard, jettison them in a suitable area on a single pass, if practical. **(T-3)**.

7.9.3. Failure to release, failure to fire, or hung ordnance. **Note:** switch positions and PACS settings. If ordnance delivery failed with proper setup, proceed as follows:

7.9.3.1. Live bombs.

7.9.3.1.1. Attempt to release store(s) using an alternate delivery mode. **(T-3)**.

7.9.3.1.2. If unsuccessful, attempt to jettison store(s) using selective jettison procedures. **(T-3)**.

7.9.3.1.3. Lastly, consider attempting to selectively jettison the pylon if ordnance is unsecured or status of the weapon cannot be determined. **(T-3)**.

7.9.3.1.4. All release and fuse settings should be noted, then safe the system. **(T-3)**.

7.9.3.1.5. If bombs remain on the aircraft, follow the Hung Ordnance and Weapons Malfunction Recovery procedures. **See paragraph 7.9.6 (T-3)**.

7.9.3.2. Practice or inert bombs.

7.9.3.2.1. Re-check switch positions and make an additional attempt to expend. **(T-3)**.

7.9.3.2.2. If no release occurs, select an alternate delivery mode in an attempt to expend. **(T-3)**.

7.9.3.2.3. If the secondary release mode fails, bombs from other stations and dispensers may be released providing the aircraft remains within symmetrical load limits. **(T-3)**. Upon RTB, follow the Hung Ordnance and Weapons Malfunction Recovery procedures. **(T-3)**. **See paragraph 7.9.6**

7.9.4. Missile malfunctions.

7.9.4.1. When abnormal missile launch or erratic missile flight is noted after launch, visually inspect the launching aircraft to determine if any damage has occurred. **(T-3)**.

7.9.4.2. A missile that fires but fails to depart the aircraft is a hangfire. If this occurs, the missile should be closely observed and safety checked by a chase pilot. **(T-3)**.

7.9.4.3. A missile that fails to fire when all appropriate switches were selected is a misfire.

7.9.4.4. For either a hangfire or misfire safe the Master Arm switch and follow the Hung Ordnance and Weapons Malfunction Recovery procedures **(T-3)**. **See paragraph 7.9.6**

7.9.5. Gun malfunctions.

7.9.5.1. For a hung or jammed gun immediately cease the delivery and safe the system. **(T-3)**.

7.9.5.2. Do NOT attempt to use the gun again or further damage could result. **(T-3)**.

7.9.5.3. If the HUD gun cross is on after selecting Master Arm "SAFE" or the gun cannot be verified safe, upon landing recover to a designated Hot Gun area. **(T-3)**.

7.9.5.4. Follow the Hung Ordnance and Weapons Malfunction Recovery procedures. **(T-3)**.

7.9.6. Hung ordnance and weapons malfunction recovery.

7.9.6.1. If practical, obtain a chase aircraft and visually inspect the aircraft for damage. **(T-3)**.

7.9.6.2. Declare an emergency when carrying hung or malfunctioning live ordnance, to include 20mm High Explosive Incendiary (HEI). **(T-3)**.

7.9.6.3. Declaration of an emergency for hung practice or inert ordnance, 20mm TP, or live unexpended ordnance is in accordance with local directives and aircrew discretion. **(T-3)**.

7.9.6.4. Avoid populated areas and trail formations. **(T-3)**.

7.9.6.5. Land from a straight-in approach. **(T-3)**.

7.10. Post Arresting Gear Engagement Procedures.

7.10.1. Do not shut down the engine(s) unless directed by the ground crew, there is a fire, or safety dictates.

7.10.2. Raise the tailhook only on the ground crew's signal. **(T-3)**.

7.10.3. Do not taxi unless directed. **(T-3)**.

7.11. In-flight Practice of EP.

7.11.1. A Simulated EP is defined as any procedure that produces an effect, which closely parallels an actual emergency, such as retarding the throttle to simulate a flamed out engine.

7.11.2. Only practice aborted takeoffs in the simulator, or best available ground device trainer. If the trainer is unavailable practice in a static aircraft.

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

7.11.4. Practice in-flight engine shutdown is prohibited.

7.11.5. Emergency Landing Patterns (also refer to AFI 11-202V3).

7.11.5.1. Field requirements. Practice of emergency landing patterns at active airfields is authorized provided that crash rescue and ATC facilities are available and in operation.

7.11.5.2. Pattern procedures.

7.11.5.2.1. Include the type of practice emergency pattern in the gear down call.

7.11.5.2.2. Practice Single-Engine Go-Around.

7.11.5.2.2.1. Initiate practice single-engine go-around in sufficient time to ensure the aircraft does not descend below 300 feet AGL. **(T-3)**.

7.11.5.2.2.2. Simulated single-engine approaches may descend below 300 feet AGL provided the approach terminates in a full stop landing or the go-around from a low approach or touch and go landing is performed with both engines.

7.12. Search and Rescue (SAR) Procedures. If an aircraft crashes, immediately attempt to locate possible survivors and initiate rescue efforts. **(T-1)**. Expect that the aircrew may initially suffer from shock or have delayed reactions due to ejection injuries. The following procedures are not exhaustive and should be adjusted to meet each unique SAR situation.

7.12.1. Knock off maneuvering.

7.12.2. Establish an OSC (usually the wingman of the aircraft that is down). **(T-3)**.

7.12.3. Notify ATC or Ground Controlled Intercept (GCI) of the emergency situation. **(T-3)**. Squawk 7700 if requested by control agency. **(T-3)**.

7.12.4. Communicate the emergency situation, aircraft involved, and flight intentions immediately to applicable control agencies. Use GUARD (UHF and/or VHF) if necessary. **(T-3)**.

7.12.5. Mark the last known position of survivors (and the crash site if practical) using any means available (e.g., TACAN, EGI/INS, ATC/GCI, visual references). **(T-3)**.

7.12.6. Remain above the highest ejection altitude, if known, or the highest observed parachute until determining the position of all possible survivors. **(T-3)**.

7.12.7. Deconflict other aircraft assisting in SAR by altitude to preclude midair collision. Establish high and low Combat Air Patrol (CAP)s as necessary to facilitate communications. **(T-3)**.

7.12.8. Revise BINGO fuels or recovery bases as required to maintain maximum Search and Rescue Combat Air Patrol (SARCAP) coverage. Do not overfly the adjusted BINGO fuel. **(T-3)**.

7.12.9. Relinquish SAR operation to designated rescue forces upon their arrival. **(T-3)**.

7.12.10. Follow local or briefed procedures. **(T-3)**.

7.13. Lateral Asymmetry. Reference TO 1F-15E-1, Section 5 for restrictions associated with lateral asymmetry and Section 6 for detailed information on lateral asymmetry flight characteristics.

7.13.1. When an unplanned lateral asymmetry is encountered due to weapons configuration and/or fuel imbalance, aircrew will maintain awareness of their condition using CRM and all available tools to include the Lateral Asymmetry calculator provided in the TO checklist ("N" pages). **(T-3)**.

7.13.2. At OG/CC discretion, units may provide aircrew with rule-of-thumb (ROT) lateral asymmetry calculation worksheets based on TO-derived information. **(T-3)**.

7.13.3. When the calculated lateral asymmetry exceeds AFTTP 3-1.F-15E limits for maneuvering above 30 CPU, terminate maneuvering and investigate. **(T-3)**. To the maximum extent possible, set the cockpit-selectable AOA tone at 25 CPU until it is determined that the asymmetry is less than 10,000 ft-lbs. **(T-3)**.

7.13.4. Restrict flight operations to the events listed below if a calculated lateral asymmetry exceeds 10,000 ft-lbs and is caused in whole or in part by either: 1) a fuel imbalance due to a slow feeding CFT/external/internal wing tank (restriction only applies while imbalance exists), or 2) trapped fuel. If, due to trapped fuel, the calculated lateral asymmetry exceeds

20,000 ft-lbs, terminate the mission and land as soon as practical. **(T-3)**. **Note:** Even though external wing tank fuel imbalances up to 1500 lbs are considered “normal” in accordance with the TO, fuel imbalances of as little as 400 lbs when combined with weapons configurations resulting in greater than 10,000 ft-lbs require increased aircrew vigilance and maneuvering finesse. Events listed below may be used to reduce gross weight:

7.13.4.1. Instrument procedures.

7.13.4.2. Deployment/Redeployment and PDM missions (i.e., CORONET).

7.13.4.3. Level training weapons deliveries.

7.13.5. If mission necessity dictates continued flight with lateral asymmetries above 20,000 ft-lbs, aircrew should consider reducing the asymmetry of the aircraft as much as practical (e.g., tank/stores jettison).

7.13.6. If the computed lateral asymmetry is equal to or greater than 40,000 ft-lbs, aircrew shall limit their AOA to 25 CPU until the asymmetry is reduced. **(T-3)**

7.14. Engine Malfunctions. Report all engine anomalies during maintenance debriefing. **(T-3)**.

Chapter 8

LOCAL OPERATING PROCEDURES

8.1. General. This chapter is reserved for unit local operating procedures. In accordance with DAFI 33-360, the paragraph method is the only authorized way to supplement an AFI and added material is arranged according to the basic publication. Units composed of dissimilar aircraft may publish guidance in a single, stand-alone local operating instruction (OI) or field instruction instead of supplementing this AFI. Added or stand-alone procedures may 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. Units may supplement the following paragraphs for local operating guidance:

- 8.1.1. Section A. Introduction.
- 8.1.2. Section B. General Policy.
- 8.1.3. Section C. Ground Operations.
- 8.1.4. Section D. Flying Operations.
- 8.1.5. Section E. Weapons Employment.
- 8.1.6. Section F. Abnormal Procedures.
- 8.1.7. Attachments (Illustrations).

8.2. Applicable Procedures. If applicable, include procedures for the following in the appropriate section above:

- 8.2.1. Command and control.
- 8.2.2. Fuel requirements and bingo fuels.
- 8.2.3. Diversion instructions.
- 8.2.4. Jettison areas, procedures, and parameters (IFR/VFR).
- 8.2.5. Controlled bailout areas.
- 8.2.6. Local weather procedures.
- 8.2.7. Unit standards.
- 8.2.8. Approved alternate missions.
- 8.2.9. Cross-country procedures.
- 8.2.10. SAR and OSC procedures.
- 8.2.11. Bird/Wildlife Aircraft Strike Hazard (BASH) program guidance in accordance with AFI 91-202, *The US Air Force Mishap Prevention Program* and AFI 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program*.

8.2.12. Environmental restrictions to flight operations (winds, sea state, temperature, etc.) applicable to unit operating locations.

8.3. Distribution of Local Supplements. When published, units will forward copies of the local supplement to MAJCOM and appropriate subordinate agencies, who will review and return comments back to the unit(s). **(T-3)**. Distribution of local supplements may begin before the review process is complete unless otherwise specified by MAJCOM or appropriate subordinate agency. If a procedure is deemed applicable to all F-15E units, it will be incorporated into the basic AFMAN volume.

JOSEPH T. GUASTELLA Jr., Lt Gen, USAF
Deputy Chief of Staff, Operations

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

Allied Tactical Publication (ATP)-56(B), *Air-to-Air Refueling*, 22 January 2010

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

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

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

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

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

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

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

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

AFMAN 11-2F-15EV1, *F-15E--Aircrew Training*, 20 June 2019

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

AFPAM 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Techniques*, 31 May 2018

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

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

AFTTP 3-1.F-15E, *Tactical Employment—F-15E (Classified)*, 22 April 2016

AFTTP 3-3.F15E, *Combat Aircraft Fundamentals—F-15E*, 22 April 2016

AFTTP 3-4, *Airman's Manual*, 11 January 2019

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

Flight Information Publication (FLIP)

TO 1F-15E-1, *Flight Manual--F-15E*, 1 September 2017

TO 1F-15E-1-1, *Flight Manual Performance Data USAF Series F-15E Aircraft*, 1 May 2009

TO 1F-15E-1CL-1, *Flight Crew Checklist USAF Series F-15E Aircraft*, 1 September 2017

TO 1F-15E-34-1-1CL-1, *Flight Crew Non-Nuclear Weapon Delivery Checklist*, 15 July 2017

Adopted Forms

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

AF Form 847, *Recommendation for Change of Publication*

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

AFTO Form 781 A, *Maintenance Discrepancy and Work Document*

Abbreviations and Acronyms

A/A—Air-to-Air

A/G—Air-to-Ground

AAI—Air-to-Air Interrogator

ACC—Air Combat Command

ACBT—Air Combat Training

ACDE—Aircrew Chemical Defense Equipment

ACMI—Air Combat Maneuvering Instrumentation

ADI—Attitude Director Indicator

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFPD—Air Force Policy Directive

AFTTP—Air Force Tactics, Techniques, and Procedures

AGL—Above Ground Level

AGSM—Anti-gStraining Maneuver

AOA—Angle of Attack

ARCP—Air Refueling Control Point

ARCT—Air Refueling Control Time

ARIP—Air Refueling Initiation Point

ATC—Air Traffic Control

ATP—Allied Tactical Publication

AWACS—Airborne Warning and Control System

BASH—Bird/Wildlife Aircraft Strike Hazard

BD—Battle Damage

BDA—Battle Damage Assessment

BDU—Bomb Dummy Unit

BVR—Beyond Visual Range

C2—Command and Control

CAP—Combat Air Patrol

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

CFT—Conformal Fuel Tank

CG—Center of Gravity

COMAFFOR—Commander, Air Force Forces

Comm—Communications

CPU—Cockpit Units

C/S—Callsign

DA—Decision Altitude

DH—Decision Height

DMS—Digital Map System

DVRS—Digital Video Recording System

DoD—Department of Defense

DRU—Direct Reporting Unit

EADI—Electronic Attitude Director Indicator

ECM—Electronic Counter Measures

EGI—Embedded GPS/INS

EID—Electronic Identification

EMCON—Emissions Condition

EOR—End of Runway

EP—Emergency Procedure

ERAA—Emergency Route Abort Altitude

ESA—Emergency Safe Altitude

FOA—Field Operating Agency

FAA—Federal Aviation Administration

FAC-A—Forward Air Controller Airborne

FAF—Final Approach Fix

FAR/AIM—Federal Aviation Regulation/Aeronautical Information Manual

FCIF—Flight Crew Information File

FDL—Fighter Data Link

FEBA—Forward Edge of the Battle Area

FENCE—Firepower, Emitters, Navigation, Communications, and Electronic Countermeasures

FLIP—Flight Information Publications

FOD—Foreign Object Damage

FTU—Formal Training Unit

g—Gravitational Load Factor
GCE—Ground Crew Ensemble
GCI—Ground Controlled Intercept
GPS—Global Positioning System
HAS—Hardened Aircraft Shelter
HEI—High Explosive Incendiary
HOTAS—Hands on Throttle and Stick
HUD—Heads Up Display
ICAO—International Civil Aviation Organization
ICS—Internal Countermeasures Set
IFF—Identification Friend or Foe
IFR—Instrument Flight Rules
IMC—Instrument Meteorological Conditions
INIT—Initial
INS—Internal Navigation System
INSTM—Instrument
IP—Instructor Pilot
IR—Infrared
JSTARS—Joint Surveillance and Target Attack Radar System
JTAC—Joint Terminal Attack Controller
JFS—Jet Fuel Starter
KCAS—Knots Calibrated Airspeed
k—Thousand
KIO—Knock-It-Off
km—Kilometer
KTAS—Knots True Airspeed
LAR—Launch Acceptability Region
LAWS—Low Altitude Warning System
LOWAT—Low Altitude Training
LUX—Luminous flux
MAJCOM—Major Command
MDA—Minimum Descent Altitude

MIT—Mass Item
MOA—Military Operating Area
MOPP—Mission Oriented Protective Posture
MSA—Minimum Safe Altitude
MSL—Mean Sea Level
MTR—Military Training Route
N/A—Not Applicable
NAAR—Night Air Refueling
NAS—National Airspace System
NAV/FLIR—Navigation Forward Looking Infrared
NAVAIDS—Navigational Aids
NM—Nautical Miles
NORDO—No Radio
NOTAM—Notice to Airman
NWLO—Nose Wheel Lift Off
NVG—Night Vision Goggles
OAP—Offset Aim Point
OG—Operations Group
OGV—Operations Group Stan/Eval
OPR—Office of Primary Responsibility
ORM—Operational Risk Management
OSC—On-Scene Commander
OWS—Overload Warning System
PACS—Programmable Armament Control Set
PBG—Pressure Breathing
PFR—Primary Flight Reference
PIC—Pilot in Command
PPKS—Present Position Keeping Source
PPLI—Precise Participant Location and Identification
PWC—Pilot Weather Category
QUAL—Qualification
RAA—Radar Abort Altitude

RALT—Radar Altimeter
RCO—Range Control Officer
RCP—Rear Cockpit
RCR—Runway Condition Reading
RIA—Recovery Initiation Altitude
RNAV—Area Navigation
RSC—Runway Surface Condition
RTB—Return to Base
RTT—Real Time Targeting
RVS—Right Vertical Stab
RWR—Radar Warning Receiver
SAR—Search and Rescue
SARCAP—Search and Rescue Combat Air Patrol
SCP—Set Clearance Plane
SD—Spatial Disorientation
SEFE—Stan/Eval Flight Examiner
SETOS—Single Engine Takeoff Speed
SID—Standard Instrument Departure
SII—Special Interest Item
SM—Statute Mile
SUA—Special Use Airspace
SUU—Suspended Utility Unit
TACAN—Tactical Air Navigation
TDA—Target Density Altitude
TF—Terrain Following
TFR—Terrain Following Radar
TGT—Target
TIDS SA—Tactical Integrated Digital System Situational Awareness
TO—Technical Order
TOLD—Takeoff and Landing Data
UIP—Upgrade Instructor Pilot
USAFE-AFAFRICA—United States Air Forces in Europe-Air Forces Africa

VFR—Visual Flight Rules

VID—Visual Identification

VMC—Visual Meteorological Conditions

VTR—Video Tape Recorder

WSO—Weapon Systems Officer

Terms

Dash 1—AFTTP 3-1.F-15E, *Tactical Employment—F-15E (Classified)*

Low Altitude (LOWAT)—Applies to maneuvering below 5,000 feet AGL (fixed wing) in accordance with AFI 11-214

Low-level—Flight that occurs below 1,000 feet AGL (or defined by host nation)

Top 3—The Squadron Commander, Squadron Director of Operations, or the qualified officer at the duty desk who oversees the flying operations for that day.

Attachment 2

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

A2.1. General Information. Potential adversary use of CBRNE weapons against a friendly airfield presents a serious threat to flying operations. The most effective way for aircrews to avoid this threat is to be airborne before these weapons are detonated or 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. **(T-3).**

A2.2. Mission Preparation. Be aware of the status of the CBRNE environment at the planned launch and recovery airfields, potential divert bases, and throughout the area in which the sortie may fly. Know the current and forecast surface wind direction and 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 as required. **(T-1).**

A2.3. Exiting a Sheltered Area to Fly.

A2.3.1. Stepping to fly. This may entail donning ACDE or transitioning from GCE to ACDE. Take precautions to protect aircrew from injury and or contamination while in transit from the squadron facility to the aircraft. **(T-3).** If possible, transport aircrew in a vehicle that provides overhead cover (enclosed vehicle). If aircrew travel on foot is unavoidable, choose a route that takes maximum advantage of available overhead cover (sunshades, buildings, etc.) to avoid agents that may be settling from the air. **(T-3).**

A2.3.2. Pre-flight. If extra aircrew members are available for preflight duties, consider assigning them to do so wearing GCE. This will allow the aircrew flying to minimize exposure.

A2.3.3. 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. **(T-3).** This may require use of the ground crew mask. A hardened aircraft shelter (HAS) provides optimum protection, if available. Use caution if entering a HAS that contains aircraft or equipment. Close doors after entry. **(T-3).** If a HAS or other overhead cover is not immediately available, accept the best rapidly reachable cover. **(T-3).**

A2.4. Engine Start to Takeoff. If a HAS is available, use it to minimize exposure time by accomplishing aircraft arming and EOR procedures inside the HAS (if local procedures permit) and by delaying taxi time as long as possible prior to takeoff. **(T-3).**

A2.4.1. Aircraft launch to survive. Units will develop local procedures to provide this option to the commander. In general, aircraft may launch-to-survive 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 the end of runway (EOR) prior to takeoff or that have just landed.

A2.4.2. Alarm red (or theater equivalent) prior to taxi. If in a HAS, the normal procedure is to shut down. Ensure ground personnel are aware of the alarm warning, as engine noise may

preclude effectiveness of normal alert notification procedures. (T-3). Use hand signals, if necessary, to be sure that ground personnel assume proper MOPP and close HAS doors. (T-3). If not in a HAS, procedures may include launch to survive. (T-3).

A2.4.3. Alarm red (or theater equivalent) after. Units typically establish procedures for this contingency depending on whether additional protection is available along the taxi route. For instance, if empty HAS are available, taxiing aircraft may be directed there to shelter. 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 launch to survive. 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. (T-3).

A2.5. Takeoff to Landing.

A2.5.1. Contamination. If Chemical Warfare agent contamination occurs prior to takeoff, flying the aircraft will dissipate the agent to some degree. The greatest dissipation will occur during flights at lower altitudes and longer airborne times. Because the agent may have entered wheel wells, flaps, etc., consider flying in landing configuration to increase airflow to these areas. However, merely flying the aircraft is unlikely to achieve complete decontamination.

A2.5.2. Preparing to land. Aircrew should remain aware of the status of primary and alternate landing locations. Do not attempt to land during Alarm Red situations unless there is no other option. Follow C2 directions and either hold or divert. If mission needs prevent divert, hold until the Alarm Red (or theater equivalent) has cleared or become an Alarm Black. (T-3). 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 Chemical Warfare airburst attack can extend up to 1 hour. If landing during Alarm Black, expect a contaminated environment and MOPP 4. (T-3).

A2.6. Landing to Engine Shutdown. Take advantage of any protection available, minimizing taxi time and distance. (T-3). Maintain contact with C2 in order to remain aware of unexploded ordnance and/or damage to airfield movement surfaces. If a HAS is available and local procedures permit, accomplish aircraft de-arm and EOR procedures there. (T-3). If Alarm Red (or Theater Equivalent) occurs between landing and engine shutdown, considerations are similar to those in [para A2.4](#)

A2.7. After Engine Shutdown. Don appropriate MOPP. If circumstances permit, accomplish normal post-flight inspection procedures. (T-3). If the aircraft is not contaminated, close the canopy. (T-3). If there is any suspicion of personnel contamination, aircrew will process through an Aircrew Contamination Control Area. (T-3). Accomplish maintenance debriefings under cover to the maximum extent possible. (T-3).

Attachment 3**GENERAL BRIEFING GUIDE****A3.1. Mission Data:**

- A3.1.1. Time Hack
- A3.1.2. Classification
- A3.1.3. EP/Threat of the Day
- A3.1.4. Mission Objective(s)
- A3.1.5. Mission Overview
- A3.1.6. Mission Data Card/Takeoff and Landing Data
- A3.1.7. Weather/Sunrise/Sunset/Moon Illumination
- A3.1.8. Transmissivity/Absolute Humidity/Thermal Crossover
- A3.1.9. NOTAMs/Bird Strike Potential
- A3.1.10. Personal Equipment
- A3.1.11. FCIF/Pubs/Maps

A3.2. Ground Procedures:

- A3.2.1. Pre-Flight:
 - A3.2.1.1. Aircraft.
 - A3.2.1.2. Armament.
- A3.2.2. Check-In.
- A3.2.3. Taxi/Marshaling/Arming.
- A3.2.4. Spare/Red Ball Procedures.

A3.3. Takeoff:

- A3.3.1. Runway Lineup.
- A3.3.2. Formation Takeoff/Takeoff Interval
- A3.3.3. Abort.
- A3.3.4. Jettison Procedures.
- A3.3.5. Low Altitude Ejection.
- A3.3.6. Landing Immediately After Takeoff.

A3.4. Departure/Enroute:

- A3.4.1. Routing.
- A3.4.2. Trail Departure.
- A3.4.3. Join-Up/Formation.

A3.4.4. NVG Donning (Night).

A3.4.5. Systems/Ops Checks.

A3.4.6. TFR Checks (Night).

A3.5. Recovery:

A3.5.1. Rejoin.

A3.5.2. BD Check.

A3.5.3. Type Recovery.

A3.5.4. Flight Break-Up (if applicable).

A3.5.5. Pattern and Landing.

A3.5.6. After Landing/De-Arm.

A3.5.7. Emergency/Alternate Airfields.

A3.6. Special Subjects.

Attachment 4**SPECIAL SUBJECT BRIEFING GUIDE (AS APPLICABLE)****A4.1. ROE, Special Instructions.****A4.2. Instructor Responsibilities Operating.****A4.3. Chase Procedures.****A4.4. IFF/Mode S Procedures.****A4.5. Lateral Asymmetry.**

A4.5.1. Takeoff Configuration.

A4.5.2. Tactical portions based on planned weapons expenditure.

A4.5.3. Lateral asymmetry highlight areas (e.g., external tank fuel imbalance combined with high-g/high AOA maneuvering).

A4.6. Midair Collision Avoidance.

A4.6.1. Radar/Visual Search Responsibilities.

A4.6.2. Departure/Enroute/Recovery High Density Traffic Areas.

A4.6.3. Deconfliction plan.

A4.6.3.1. From Other Military Aircraft.

A4.6.3.2. From Civilian Aircraft.

A4.7. Flight Member Roles and Responsibilities.

A4.7.1. Formation and Deconfliction Contracts.

A4.7.2. Sensor Management/Prioritization.

A4.7.3. Tactical Employment Priorities.

A4.8. Dissimilar Formations.**A4.9. Terrain Avoidance.**

A4.9.1. Departure/Enroute/Recovery.

A4.9.2. Use of RALT/MSL Floor Settings.

A4.10. Bird Strike Procedures, Use of Visor(s).**A4.11. Hazards Associated with Human Factors (e.g., Channelized Attention, Task Saturation/Prioritization, and Complacency).****A4.12. g-Awareness:**

A4.12.1. g-Suit connection/g-tolerance/g-Awareness Turn.

A4.12.2. Use of Anti-g Straining Maneuver (AGSM).

A4.13. Visual Illusions, Perceptions.

A4.14. Spatial Disorientation, Unusual Attitudes.

A4.15. Lost Wingman.

A4.16. Radio Inoperative (NORDO).

A4.17. SARCAP and On-Scene Commander Procedures.

A4.18. Recall Procedures.

A4.19. SIIs.

A4.20. Training Rules.

A4.21. Lateral Asymmetry Severity.

A4.22. ORM.

A4.22.1. ORM assessment, hazards to this flight.

A4.22.2. Factors mitigating risk.

A4.22.3. When to reassess.

Attachment 5**ADVANCED HANDLING BRIEFING GUIDE****A5.1. Airwork.**

A5.1.1. Airspace Restrictions.

A5.1.2. Area Orientation.

A5.1.3. Planned Maneuvers.

A5.1.4. Maneuvering Limitations.

A5.1.4.1. Airspeed and g .

A5.1.4.2. Recognition/Prevention/Recovery From Out of Control.

A5.1.4.3. Maneuvering at Heavyweight/High AOA/Asymmetrical Configuration.

A5.1.4.4. Effects of Center of Gravity (CG) Throughout the Flight.

Attachment 6**AIR REFUELING BRIEFING GUIDE****A6.1. General.**

- A6.1.1. Tanker Call Sign(s)/Receiver assignments.
- A6.1.2. AR Track(s).
 - A6.1.2.1. Altitude.
 - A6.1.2.2. Airspeed.
 - A6.1.2.3. Airspace Restrictions.
- A6.1.3. ARIPs, ARCPs, ARCTs.
- A6.1.4. Radio Frequencies, A/A TACAN, IFF codes.

A6.2. Buddy Procedures.

- A6.2.1. Departure.
- A6.2.2. Join-Up.

A6.3. Enroute.

- A6.3.1. Route of Flight.
- A6.3.2. Formation.
- A6.3.3. Ops Checks.

A6.4. Rendezvous.

- A6.4.1. Type Rendezvous.
- A6.4.2. Holding Procedures, Formation.
- A6.4.3. Tanker Identification—TACAN/Radar/AAI/Visual.
- A6.4.4. Radar Procedures, Techniques.
- A6.4.5. Wingman, Deputy Lead Responsibilities.
- A6.4.6. Receiver Formation, Join-Up Procedures.
- A6.4.7. Rendezvous Overrun.

A6.5. Refueling.

- A6.5.1. Checklist Procedures.
- A6.5.2. Radio Calls.
- A6.5.3. Refueling Order.
- A6.5.4. Radio Silent Procedures.
 - A6.5.4.1. EMCON.
 - A6.5.4.2. Visual Signals.

A6.5.5. Fuel Off-Load.

A6.5.6. Bingo Fuel (Abort Points, Abort Bases).

A6.5.7. Drop-Off Procedures.

A6.5.8. Wake Turbulence.

A6.6. Reform and Exit.

A6.6.1. Formation.

A6.6.2. Clearance.

A6.7. Emergency Procedures.

A6.7.1. Breakaway Procedures.

A6.7.2. Systems Malfunctions.

A6.7.3. Damaged Receptacle.

A6.8. IMC/Night Considerations.

A6.8.1. Lost Wingman Procedures.

A6.8.2. Aircraft Lighting.

A6.8.3. NVG use.

Attachment 7**AIR COMBAT TRAINING (ACBT) AND INTERCEPT BRIEFING GUIDE****A7.1. General/Adversary Coordination/GCI Coordination.**

- A7.1.1. Call Signs.
- A7.1.2. Number and Type Aircraft.
- A7.1.3. Scenario.
 - A7.1.3.1. Objective(s).
 - A7.1.3.2. Type Threat Simulated, Cuffs (if any).
 - A7.1.3.3. CAP Points/Target Locations.
 - A7.1.3.4. Safe Areas, FEBA, Ground Threats.
 - A7.1.3.5. VID/EID/BVR Criteria.
- A7.1.4. Mission Contingencies.
 - A7.1.4.1. Single Radar Scope, No GCI.
 - A7.1.4.2. Single Frequency.
 - A7.1.4.3. Area Weather, Alternate Mission.
 - A7.1.4.4. Minimum Participants (primary, alternate missions).
- A7.1.5. Area Information.
 - A7.1.5.1. Controlling Agency (GCI/AWACS/ACMI).
 - A7.1.5.1.1. GCI/Flight.
 - A7.1.5.1.2. Comm Requirements.
 - A7.1.5.1.3. Type, Level of Control.
 - A7.1.5.1.4. Datalink Setup, Procedures.
 - A7.1.5.2. Airspace Restrictions.
 - A7.1.5.3. CAP Points/Target locations.
 - A7.1.5.4. Frequencies.
 - A7.1.5.5. Squawks.
 - A7.1.5.6. Block Altitudes, Min Altitudes, Flight Parameters.
 - A7.1.5.7. Transmissions.
 - A7.1.5.7.1. KIO.
 - A7.1.5.7.2. Shots/Kills.
 - A7.1.5.7.3. Fuel/Altitude Awareness.
- A7.1.6. Rendezvous/Recovery Procedures/Dissimilar Formation.

A7.1.7. Weapons Employment.

A7.1.7.1. Simulated Ordnance. (type, quantity).

A7.1.7.2. Shot/Kill Criteria.

A7.1.7.3. Kill Removal.

A7.1.7.4. Shot/Kill Passage.

A7.1.8. Training Rules.

A7.1.9. Emergency Procedures.

A7.1.9.1. Recovery.

A7.1.9.2. Escort Procedures.

A7.1.10. Debriefing. (time, place).

A7.2. Flight, Element Tactics.

A7.2.1. Avionics Set-up.

A7.2.1.1. Radar.

A7.2.1.2. INS.

A7.2.1.3. IFF.

A7.2.1.4. Air-to-Air TACAN.

A7.2.2. CAP Phase.

A7.2.2.1. Type Holding.

A7.2.2.2. Formation, Altitude, Airspeed.

A7.2.2.3. Search Responsibilities.

A7.2.2.4. Commit.

A7.2.2.4.1. Criteria/Range.

A7.2.2.4.2. Procedures.

A7.2.3. Ingress/Intercept Phase.

A7.2.3.1. Formation, Altitude, Airspeed.

A7.2.3.2. Detection.

A7.2.3.2.1. Search Responsibilities (radar, visual).

A7.2.3.2.2. Radar Sorting.

A7.2.3.3. Targeting Plan.

A7.2.3.4. Intercept Type, Planned Tactics.

A7.2.3.4.1. Plan.

A7.2.3.4.2. Mutual Support Requirements.

- A7.2.3.4.3. ID Requirements, Procedures.
- A7.2.3.4.4. Minimum Altitudes, Airspeeds.
- A7.2.3.4.5. Vertical/Horizontal Conversions, Turning Room.
- A7.2.3.5. Night/IMC Intercepts.
 - A7.2.3.5.1. Electronic Counter Measures (ECM), Chaff, Evasion Restrictions.
 - A7.2.3.5.2. Radar Requirements.
 - A7.2.3.5.3. Altitude Separation Requirements.
- A7.2.4. Engagement Phase.
 - A7.2.4.1. Plan.
 - A7.2.4.2. Clearance for Wingman to Engage.
 - A7.2.4.2.1. Offensive.
 - A7.2.4.2.2. Defensive
 - A7.2.4.3. Alternate Plan (Degraded Situation).
- A7.2.5. Egress, Separation Phase.
 - A7.2.5.1. Disengagement Plan (why/when/how).
 - A7.2.5.1.1. Loss of Mutual Support.
 - A7.2.5.1.2. Fuel.
 - A7.2.5.1.3. Ordnance.
 - A7.2.5.2. Egress Formation/Responsibilities.
- A7.2.6. Contingencies.
 - A7.2.6.1. Single Contact.
 - A7.2.6.2. Short Range Commit.
 - A7.2.6.3. Single Ship (Loss of Mutual Support).
 - A7.2.6.4. Safe Escape/Rendezvous Point.
- A7.2.7. Live Missile, Hot Gun Safety Procedures.
- A7.2.8. Additional Considerations.
 - A7.2.8.1. Threat Reaction.
 - A7.2.8.2. Degraded Systems.
 - A7.2.8.3. Tactical Lead Changes.
 - A7.2.8.4. Bandit Options.
 - A7.2.8.5. VTR/DVRS procedures.
 - A7.2.8.6. Codewords.

A7.2.8.7. Environmental Considerations.

A7.2.9. Alternate Mission.

A7.2.9.1. Type Mission (refer to appropriate mission briefing guide).

A7.2.9.2. Mission Objectives.

Attachment 8**AERIAL GUNNERY BRIEFING GUIDE****A8.1. General.**

A8.1.1. Formation.

A8.1.1.1. Area Information.

A8.1.1.2. Controlling Agency.

A8.1.1.3. Airspace Restrictions.

A8.1.2. Frequencies.

A8.1.3. Switch Positions.

A8.1.4. Arming Procedures.

A8.1.5. Intercept, Set-Up.

A8.1.6. Shooter Sequence.

A8.1.7. Position Changes.

A8.1.8. Chase Procedures.

A8.1.9. Timing.

A8.2. Employment.

A8.2.1. Firing Parameters.

A8.2.1.1. Minimum Range.

A8.2.1.2. Closure.

A8.2.1.3. Angle-Off.

A8.2.1.4. Error Analysis.

A8.2.2. Contingencies.

A8.2.2.1. Avionics Malfunctions.

A8.2.2.2. Gun Malfunctions.

A8.2.2.3. Range Estimation Without Radar.

A8.2.3. Safety Considerations.

A8.2.3.1. Target Fixation.

A8.2.3.2. Debris Avoidance.

A8.2.3.3. Fouls.

Attachment 9**LOW-LEVEL NAVIGATION BRIEFING GUIDE****A9.1. General.**

A9.1.1. Route, Clearance, Restrictions.

A9.1.2. Flight Responsibilities.

A9.1.2.1. Navigation.

A9.1.2.2. Radar/Visual Search.

A9.1.3. Entry, Spacing, Holding, Initial Altitude (MSA).

A9.2. Route Procedures.

A9.2.1. FENCE Checks.

A9.2.2. Tactical Formation/Turns.

A9.2.3. Low-Level Navigation.

A9.2.3.1. Use of INS/EGI/DMS.

A9.2.3.2. Radar Procedures, Techniques, Predictions.

A9.2.3.3. Visual Procedures, Techniques, IR Predictions.

A9.2.3.4. System Updates, Calibrations.

A9.2.3.5. Time Control, Fuel Control.

A9.2.3.6. Terrain Following/Avoidance, Wingman Considerations.

A9.2.3.7. Leg Altitudes, Set Clearance Plane (TF), Obstacles (MSL/AGL).

A9.2.4. Threat Reactions.

A9.2.4.1. RWR, ECM, Chaff, Flares.

A9.2.4.2. Engagement Criteria.

A9.2.4.3. Flight Path Deconfliction.

A9.2.4.4. Termination.

A9.3. Emergencies.

A9.3.1. Aircraft Malfunctions.

A9.3.2. Route Abort Procedures (ERAA/MSA), ATC Frequencies, Airspace Considerations.

Attachment 10**AIR-TO-SURFACE WEAPONS EMPLOYMENT BRIEFING GUIDE (RANGE MISSION)****A10.1. Range Information.**

A10.1.1. Target and Range Description.

A10.1.2. Restrictions.

A10.1.3. Range Entry, Holding.

A10.1.4. Radio Procedures.

A10.1.5. Formation.

A10.1.6. Sequence of Events.

A10.1.7. Pattern Procedures.

A10.1.8. Aircraft fallout plan.

A10.1.9. Rejoin on range for late takeoffs.

A10.2. Employment Procedures, Techniques.

A10.2.1. Avionics Setup, Switch Positions.

A10.2.1.1. Weapons Switchology, Delivery Mode.

A10.2.1.2. Radar Switchology.

A10.2.1.3. Special Weapons Switchology.

A10.2.2. System Deliveries.

A10.2.2.1. Ground track, Altitude, Airspeed.

A10.2.2.2. Delivery Spacing.

A10.2.2.3. Radar, Optical Depiction (OAP/TGT).

A10.2.2.4. Radar, Optical Tuning and Search Techniques.

A10.2.2.5. Pickle, Release Point.

A10.2.2.6. Safe Escape, Safe Separation Procedure.

A10.2.2.7. Backup Deliveries.

A10.2.3. Pop-Up to Dive Delivery.

A10.2.3.1. Entry Airspeed, Altitude.

A10.2.3.2. Pop Point, Pull-Up Angle, Power Setting.

A10.2.3.3. Target Acquisition.

A10.2.3.4. Pull Down, Apex Altitudes.

A10.2.4. Pattern Spacing and Corrections.

A10.2.5. Dive Delivery.

- A10.2.5.1. Roll-In Position.
- A10.2.5.2. Techniques (Pitch/Bank/Power).
- A10.2.5.3. Roll-Out, Wind Effect.

A10.2.6. Dive Final.

- A10.2.6.1. Aim-Off Distance.
- A10.2.6.2. Dive Angle.
- A10.2.6.3. Airspeed.
- A10.2.6.4. HUD Depiction.
- A10.2.6.5. Sight Picture, Corrections, Aim-Point.
- A10.2.6.6. Release Parameters.
- A10.2.6.7. Release Indications.
- A10.2.6.8. Safe Escape, Safe Separation Procedure.

A10.3. Special Procedures.

- A10.3.1. Live Ordnance Considerations.
- A10.3.2. Fuse Arming, Safe Escape, Safe Separation.
- A10.3.3. Frag Avoidance.
- A10.3.4. Laser Operations.

A10.4. Night Procedures.

- A10.4.1. Aircraft Lighting.
- A10.4.2. Radio Calls.
- A10.4.3. Target ID, Range Lighting.
- A10.4.4. Night Spacing Techniques.
- A10.4.5. Instrument Crosscheck, Disorientation.

A10.5. Over Water Range Operations.

- A10.5.1. Employment Techniques.
 - A10.5.1.1. Depth Perception, Reduced Visual Cues.
 - A10.5.1.2. Distance/Altitude Estimation.
 - A10.5.1.3. Pop-Up Positioning.
 - A10.5.1.3.1. Timing.
 - A10.5.1.3.2. Visual and System References to Establish Pull-Up Point.
- A10.5.2. Special Considerations.

A10.5.2.1. Adjusted Minimum Altitudes.

A10.5.2.2. Training Rules, Special Operating Procedures.

A10.6. Range Departure Procedures.

A10.6.1. Armament Safety Checks.

A10.6.2. Rejoin.

A10.6.3. Battle Damage/Bomb Check.

A10.6.4. Jettison Procedures, Parameters.

A10.6.5. Hung/Unexpended Ordnance.

A10.6.6. Inadvertent Release.

A10.6.7. Gun Unsafe/Jam.

Attachment 11**AIR-TO-SURFACE WEAPONS EMPLOYMENT BRIEFING GUIDE (SURFACE
ATTACK TACTICS)****A11.1. General Mission Data.**

A11.1.1. Intelligence, Threat Scenario.

A11.1.2. Operating Area Entry, Description, Boundaries.

A11.1.3. FENCE Checks.

A11.1.4. Low-Level Briefing (as applicable).

A11.1.5. Target Area.

A11.1.5.1. Location, Description, Elevation, Visual Cues in the Target Area.

A11.1.5.2. TOT.

A11.1.5.3. Target Area Weather.

A11.1.5.3.1. Ceiling, Visibility.

A11.1.5.3.2. Winds, Altimeter.

A11.1.5.3.3. Sun Angle, Shadows.

A11.1.5.3.4. IR Considerations.

A11.1.6. Threat Array.

A11.1.6.1. Type, Capabilities.

A11.1.6.2. Locations.

A11.1.6.3. Countermeasures.

A11.1.6.3.1. ICS, Chaff, Flare.

A11.1.6.3.2. Terrain masking.

A11.1.6.3.3. Radio Silent Procedures.

A11.1.6.3.4. Authentication, Comm-Jamming, Chattermark Procedures.

A11.1.6.4. Threat Reactions.

A11.1.6.4.1. LOWAT.

A11.1.6.4.2. IP to Action Point.

A11.1.6.4.3. During Delivery.

A11.1.7. Ordnance, Weapons Data.

A11.1.7.1. Type, Fusing.

A11.1.7.2. Weapons Settings.

A11.1.7.3. Desired Effects.

A11.1.7.4. Specific Aim Points.

A11.1.7.5. Minimum Altitudes.

A11.1.7.5.1. Fuse Arming, Safe Escape, Safe Separation.

A11.1.7.5.2. Frag Avoidance.

A11.1.8. Laser Operations.

A11.2. Employment Procedures.

A11.2.1. Tactics.

A11.2.1.1. Overview.

A11.2.1.2. Ingress.

A11.2.1.2.1. Formation.

A11.2.1.2.2. Speed, Altitude.

A11.2.1.3. Weapons Delivery.

A11.2.1.3.1. Type Delivery.

A11.2.1.3.2. Switchology.

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