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*Flying Operations*

**F-117 OPERATIONS PROCEDURES**



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This volume implements AFD 11-2, *Aircraft Rules and Procedures*; AFD 11-4, *Aviation Service*; and AFI 11-202V3, *General Flight Rules*. It applies to all F-117A units. This volume does not apply to Air Force Reserve Command (AFRC) or Air National Guard (ANG) units and members. MAJCOMs/DRUs/FOAs are to forward proposed MAJCOM/DRU/FOA-level supplements to this volume to HQ AFFSA/XOF, through HQ ACC/DOTO, for approval prior to publication IAW AFD 11-2. Copies of MAJCOM/DRU/FOA-level supplements, after approved and published, will be provided by the issuing MAJCOM/DRU/FOA to HQ AFFSA/XOF, HQ ACC/DOTO, and the user MAJCOM/DRU/FOA offices of primary responsibility. Field units below MAJCOM/DRU/FOA level will forward copies of their supplements to this volume to their parent MAJCOM/DRU/FOA office of primary responsibility for post publication review. **NOTE:** The terms Direct Reporting Unit (DRU) and Field Operating Agency (FOA) as used in this paragraph refer only to those DRUs/FOAs that report directly to HQ USAF. When guidance in this volume duplicates, changes, or conflicts with already published information contained in other ACC documents, the material in this volume takes precedence. Keep supplements current by complying with AFI 33-360V1, *Publications Management Program*. See paragraph 1.5. of this volume for guidance on submitting comments and suggesting improvements to this publication. This publication is affected by the Paperwork Reduction Act of 1974 as amended in 1996. Maintain and dispose of records created as a result of processes prescribed in this publication in accordance with AFMAN 37-139, *Records Disposition Schedule*.

This volume, with its complementary unit-specific Local Procedures Supplement, prescribes standard operational and weapons employment procedures to be used by all pilots operating USAF F-117A aircraft. USAFAWC aircraft may deviate from the contents of this volume as outlined in individually approved test plans required for Test and Evaluation purposes. File a copy of all approved waivers with this volume.

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## Chapter 1

### INTRODUCTION

**1.1. General.** This volume outlines those procedures applicable to the operation of the F-117A aircraft. With the complimentary references cited, this volume prescribes standard operational procedures to be used by all ACC F-117A pilots.

**1.2. Pilot's Responsibility.** This volume, in conjunction with other governing directives, prescribes procedures for F-117A aircraft under most circumstances, but is not to be used as a substitute for sound judgment or common sense. Operations or procedures not specifically addressed may be accomplished if they enhance safe, effective mission accomplishment.

**1.3. Deviations.** Deviations from these procedures require specific approval of HQ ACC unless an urgent requirement or an aircraft emergency dictates otherwise, in which case the pilot in command will take the appropriate action to safely recover the aircraft. Det 1, 53 TEG, may deviate from the contents of this volume as outlined in individually approved test plans required for Follow On Test and Evaluation (FOT&E) purposes.

**1.4. References.** This volume, in conjunction with T.O. 1F-117A-1, *Flight Manual*; AFTTP 3-1V18 (S), *Tactical Employment F-117A (U)*; and AFI 11-214, *Aircrew, Weapons Director, and Terminal Attack Controller Procedures for Air Operations*; are the primary references for F-117A operating procedures. Training units may develop phase manuals from the procedures contained in these documents. Phase manuals may be used to augment initial and mission qualification training at operational units. Phase manuals may expand these basic procedures; in no case will they be less restrictive.

#### **1.5. Waivers Requests:**

1.5.1. Will be forwarded through NAF to HQ ACC/DOT for approval.

1.5.2. Will remain in effect until incorporated into this volume unless otherwise stated in the approval correspondence.

1.5.3. Changes to this volume will be submitted on AF Form 847, **Recommendation for Change of Publication (Flight Publications)**, to NAF who will in-turn forward to HQ ACC/DOTV (57 WG will forward directly to ACC).

**1.6. Distribution.** Each pilot is authorized a copy of this volume.

## Chapter 2

### MISSION PLANNING

**2.1. Responsibilities.** The responsibility for mission planning is shared jointly by individual pilots, the mission planning cell (MPC), and the intelligence function of F-117A units.

#### **2.2. Mission Planning:**

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

2.2.2. When operating from airfields equipped with a BAK-12 cable raised by a BAK-14 device, will ensure the departure end cable is raised for all takeoffs and landings unless another arrestment system (cable/barrier) is immediately available.

2.2.3. Will use 8,000 feet as the minimum available runway for takeoffs and landings. A compatible departure end barrier or cable is required for runway lengths up to 11,999 feet. These criteria may be waived by the OG/CC.

2.2.4. Will adhere to the maximum flight duty day is 10 hours for pilots flying at any time between official sunset and sunrise. The duty day begins when a pilot reports to his squadron or office and includes post flight ground operations through engine shutdown. Wing commander is the waiver authority for an extended flight duty day.

2.2.5. Will include designated mission leads to plan and brief missions involving fighter stream operations.

#### **2.3. Map/Chart Preparation will Include:**

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

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

**2.3.3. Navigation Route Maps.** For overland tactical training flights, a current chart of sufficient scale and AF Form 70, **Pilot Flight Plan and Flight Log**, providing navigation and terrain/obstacle avoidance information will be carried. Sufficient navigational information will be included to ensure successful mission accomplishment. A minimum safe altitude (MSA) or route abort altitude (RAA) will be annotated on all maps. Maps will be updated from the Chart Update Manual (CHUM) and all man-made obstacles above the planned flight altitude will be highlighted.

**2.3.4. Minimum Enroute Altitudes.** Minimum Enroute Altitude (MEA) for peacetime mission planning will be IAW AFI 11-202V3, *General Flight Rules*. MSA can be used when planning within restricted airspace, warning areas, and MOAs if the minimum altitude published for the airspace allows. Waiver to these restrictions requires AFFSA/XO approval. Pilots are personally responsible for reviewing assigned routes prior to flight to ensure compliance with these criteria. Momentary deviations from MEA are approved for weather avoidance during day VMC.

## 2.4. Briefing/Debriefing:

- 2.4.1. Responsibilities for flight lead, mission leads, and/or mission planners are to present a logical briefing, which will ensure safe, effective mission accomplishment. Briefing guides will be used to provide a reference list of items, which may apply to particular missions. Items listed may be briefed in any sequence. Specific items not pertinent to the mission need not be covered.
- 2.4.2. Will begin at least 1 ½ hours before scheduled takeoff.
- 2.4.3. Will be structured to accommodate the capabilities of each pilot in the flight.
- 2.4.4. When dissimilar aircraft are flown in formation, proper position (to ensure adequate wingtip clearance), responsibilities, and aircraft-unique requirements will be briefed for each phase of flight.
- 2.4.5. Will include alternate missions.
- 2.4.6. Need cover only those items that pertain to their particular flight if all flight members attend an initial or mass briefing.
- 2.4.7. Guides are in [Attachment 1](#) through [Attachment 9](#) Units may supplement these guides as necessary. Units that fly missions not covered by this volume, or its supplements, will develop and maintain briefing guides for those missions. OT&E weapons delivery and mission profiles are approved by the USAFWTC/CC and are reviewed during the specific test Safety Review Board.

## 2.5. Unit Developed Checklists/Local Pilot Aids:

- 2.5.1. May be used in lieu of flight manual checklists provided they are verbatim and in the order listed in the applicable checklist.
- 2.5.2. Will be developed. As a minimum, the following will be included:
  - 2.5.2.1. Briefing guides.
  - 2.5.2.2. Local UHF channelization, and airfield diagrams.
  - 2.5.2.3. Impoundment procedures, emergency action checklists, and NORDO/divert information.
  - 2.5.2.4. Other information as deemed necessary by individual units. For example, stereo flight plans, quick turnaround procedures, local training areas, bailout and jettison areas, and instrument preflight.

## 2.6. Personal Equipment. Pilots will have the following on all flights:

- 2.6.1. Flashlight (night flights).
- 2.6.2. Life preserver (flights over water beyond gliding distance from land).
- 2.6.3. F-117A-1 CL, -6 CL, and -34 CL (as necessary), Inflight Guide (basic and annex), IFR supplement, appropriate Hi-chart, and applicable approach plates.
- 2.6.4. G-suit.

## Chapter 3

### NORMAL OPERATING PROCEDURES

**3.1. Ground Visual Signals.** Normally, the pilot and ground crew will communicate via the intercom system during all engine-start, pre-taxi checks, and end-of-runway (EOR) checks. The intercom system will also be used to the maximum extent possible anytime maintenance technicians are performing "red-ball maintenance" on the aircraft. When ground intercom is not used, visual signals will be in accordance with AFI 11-218, *Aircraft Operation and Movement on the Ground*, and this volume. The crew chief will repeat the given signal when it is safe to operate the system. The following signals augment AFI 11-218:

**3.1.1. Flight Control Checks.** With clenched fist, make several circular movements as if moving the control stick around the cockpit.

**3.1.2. Refueling Receptacle Open or Closed.** Display hand flat on top of helmet with fingers extended. To open, raise fingers to the vertical position and heel of hand remaining stationary. To close, reverse signal.

**3.1.3. Main Gear and Nose Gear Safety Pins and Tail Hook Pin Removed.** Point four fingers at the crew chief.

**3.1.4. Weapons Bay Open or Close.** Display hands with fingers extended, palms up, and edges of hands touching. Move hands apart several times.

**3.1.5. Trapeze Up or Down.** With the edge of one hand, make a "karate chop" into the open palm of the other hand.

**3.1.6. Antennas.** With a quick movement, extend fingers from a clenched fist several times.

### 3.2. Preflight:

3.2.1. Will include physical inspection of the drag chute cable to ensure the metal pin has been removed from the drag chute. If the pin has been previously removed, it will be documented in the AFTO Form 781, **AFORMS Aircrew/Mission Flight Data Document**. In addition, pilots will ensure removal of ground protection equipment such as blow-in door covers and magnetic retaining devices.

3.2.2. Will include aircraft Equipment Required for Flight. In addition to equipment required by AFI 11-202V3, as supplemented, the following must be operational for local area flying:

3.2.2.1. Both MDIs

3.2.2.2. TACAN

3.2.2.3. Standby Flight Instruments

3.2.2.4. IFF

3.2.2.5. ILS (if landing after civil twilight)

### 3.3. Taxi:

**3.3.1. Interval.** For day operations is 150 feet staggered or 300 feet in trail. Minimum taxi interval for night operations is 300 feet on centerline. Spacing may be reduced when holding short of or entering the runway/quick check area.

**3.3.2. Quick Check and Arming.** Place hands in view of ground personnel while the quick check inspection and arming/dearming is in progress.

**3.3.3. Conditions.** The route that is planned and hanger area will be checked for safe conditions when ice and/or snow are present. The Supervisor of Flying (SOF) is responsible. Aircraft will not be taxied when any portion of the taxiway has a reported RCR less than 10.

**3.4. Runway Line Up.** For two-ship elements, the second aircraft should be placed on the upwind side. Each pilot will lineup in the center of his half of the runway. Three ship flights may line up in echelon with the wingmen upwind. Spacing between aircraft elements will be a minimum of 500 feet. All aircraft will maintain wingtip clearance if runway width permits. If wingtip clearance cannot be maintained, aircraft will not conduct engine run-up until the preceding aircraft has begun the departure roll.

### **3.5. Takeoff:**

3.5.1. Formation takeoffs are prohibited.

3.5.2. Will not be attempted if the RCR is reported less than 12.

3.5.3. The maximum wing fuel imbalance for takeoff is 1000 pounds. Pilots will not attempt to balance wing fuel on the ground with the fuel source selector as this may force fuel overboard.

3.5.4. On training missions, will not be attempted if the computed takeoff roll exceeds 70% of the available runway.

3.5.5. Interval between aircraft will be a minimum of 15 seconds for day and 20 seconds for night. If carrying heavyweights, interval shall be increased to 30 seconds.

3.5.6. At the start of the takeoff roll, steer toward the center of the departure end of the runway.

3.5.7. Day weather criteria for a VFR join-up underneath a ceiling is 1500/3.

3.5.8. For night takeoffs, the first turn should not be initiated until 1000 feet AGL and 250 KCAS. If local departures require earlier turns for airspace restrictions, then the minimum parameters for the first turn will be 400 feet AGL and Single Engine Climb Speed.

### **3.6. Formation:**

3.6.1. At night, will only consist of two or more F-117As in trail or station keeping. Formations will be supervised by a certified flight lead. The maximum number of aircraft in station-keeping or trail formation at night or in forecasted/actual IMC is three. Maximum flight size during day/VMC is four.

3.6.2. Chase is not authorized at night unless an emergency situation exists and the SOF has coordinated for the chase.

3.6.3. Airborne visual signals will be in accordance with AFI 11-205, *Aircraft Cockpit and Formation Flight Signals*.

3.6.4. Turning rejoins will be conducted at 300 KCAS and 30 degrees of bank, straight ahead rejoins will be at 300 KCAS, unless otherwise briefed. Element rejoins will be flown with the wingman in route formation.

3.6.5. Flight leaders will not normally break up formations until each pilot has a positive fix from which to navigate.

3.6.6. Lead changes will meet the following conditions:

3.6.6.1. Will be initiated from a stabilized, wings level attitude.

3.6.6.2. Will be initiated at a minimum altitude of 1,000 AGL (day) and 2,000 AGL (night).

3.6.6.3. During the day, will not be initiated with the wingman further aft than normal fingertip or route position.

3.6.6.4. Should not be initiated until the leader can ensure that the wingman assuming the lead is in a position from which the lead change can be safely initiated and visual contact maintained.

3.6.6.5. The wingmen will acknowledge by head nod or radio.

3.6.6.6. The lead change is effective upon acknowledgment. The former leader (new wingman) then moves to the wing (briefed) position.

3.6.6.7. At night, will be initiated from station keeping or trail formation only and will be acknowledged over the radio.

### 3.7. Close Formation Includes:

**3.7.1. Fingertip.** Wingmen will maintain wingtip clearance. Fingertip is a position that aligns the tip of the lead aircraft's wing with the midpoint of the engine exhaust (fore and aft) and aligns the aft tips of the vertical stabilizers (in and out). The wingman will stack just low enough to see the wingtip position light on the underside of the wing.

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

**3.7.3. Crossunder.** Wingmen will reduce power and drift aft and low of the lead aircraft to ensure nose-tail and vertical separation, cross to the opposite side, and move back to the original position.

**3.8. Route Formation.** Route formation is an extension of fingertip formation with up to approximately 500 feet between aircraft. This position allows the wingman to check cockpit instruments, provide visual lookout, and still be close enough to move into close formation if weather or other circumstances dictate. During turns, the element or aircraft turned into will stack low only as necessary to keep lead in sight and remain below his plane of maneuvering. Crossunders may be directed using a wing dip, as in close formation.

**3.9. Station Keeping/Trail Formation.** Station keeping is normally used during night/VMC conditions. Trail formation is normally used during night/IMC conditions. Both require an ARTCC-assigned altitude block when operation in controlled airspace. The following is the standard for:

**3.9.1. Station Keeping.** For two-ship formations, #2 maintains a position 500 below and 0.2 - 0.5 NM behind lead. For three-ship formations, #3 will maintain 1000' below and 0.7 - 1.0 NM behind lead. Station keeping formations will be maintained using a combination of visual references and the A/A TACAN. IRADS will not be used to achieve or maintain station-keeping formation.

**3.9.2. Trail Formation.** For two-ship formations, #2 maintains a position 1000 below and 1 NM (+ 0.2) behind lead. For three-ship formations, #3 will maintain 2000' below and 2 NM (+ 0.2) behind

lead. Trail formation will be maintained using a combination of the A/A TACAN and the planned route. IRADS will not be used to achieve or maintain station-keeping formation.

**3.9.3. For Night Peacetime Operations.** The lead will have an operational lower rotating anti-collision light to facilitate rejoins or to support trail formations. Exceptions to this guidance include anti-collision light-out training IAW paragraph 3.26. The maximum number of aircraft in station-keeping or trail formation at night or in forecasted/actual IMC is three.

**3.10. Tactical Formation.** See AFTTP 3-1V18.

**3.11. IP/SEFE Chase:**

3.11.1. With a T-38 will only be accomplished by:

3.11.1.1. Instructor pilots (T-38 IP or F-117A IP) and/or SEFEs certified IAW T-38 Companion Trainer Qualification Course.

3.11.1.2. Det-1, 53 TEG FOT&E pilots.

3.11.2. On transition sorties, the T-38 chase aircraft will descend no lower than 50 feet AGL when performing a chase pick-up.

3.11.3. In-flight, the chase aircraft will maneuver as necessary for mission accomplishment, but will normally not stack below the lead aircraft on minimum altitude profiles.

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

3.11.5. Will not include F-117A aircraft chasing another F-117A in the VFR overhead pattern nor accomplish a chase pick-up pattern, unless waived by the unit commander (OG/CC) for unusual circumstances.

3.11.6. If it becomes necessary to assume a close formation (i.e., weather), the lead aircraft will verbally/visually give the signal to assume a fingertip position. If necessary, an IP chase may request fingertip from the lead aircraft. This will be briefed in the pre-flight briefing.

3.11.7. Operations are not authorized at night.

**3.12. Maneuvering Parameters:**

3.12.1. In addition to T.O. F-117A-1 restrictions, which define the limits of the basic airframe (LBA), and weapons release envelopes, include the following limitations during advanced handling sorties:

3.12.1.1. No wing fuel, less than 300-lbs. left/right fuel imbalance.

3.12.1.2. +/- 25 degree of pitch maximum.

3.12.1.3. 9.5 degrees AOA maximum.

3.12.1.4. 5 Gs maximum.

3.12.1.5. Day VFR only.

3.12.1.6. Over-the-top maneuvers are prohibited--to include Loop, split-S, and Immelmann turns.

3.12.2. During peacetime night training is restricted to positive Gs only, 60 degree of bank, and +/- 18 degrees of pitch to reduce the risks of spatial disorientation. Negative-G pushovers are limited to actual unusual attitude recoveries.

3.12.3. For PAARS practice recoveries are limited to day VMC conditions.

3.12.4. For the modified lazy-8 maneuver, chandelle, and aileron roll will be IAW approved phase manuals.

### **3.13. Ops Checks:**

3.13.1. Will be accomplished to ensure safe mission accomplishment. Frequency will be increased during tactical maneuvering at high power settings. Ops checks are required:

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

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

3.13.1.3. At frequent intervals throughout the flight.

3.13.2. As a minimum, will include all items in T.O. 1F-117A-1 "CLIMB/CRUISE CHECKS."

3.13.3. For chased flights or formation flights, the flight leader will initiate by radio call or visual signal. Response is required.

### **3.14. Radio Procedures:**

3.14.1. Will include transmitting only the information essential for accomplishment of the mission or to promote safety of flight. A "Knock-It-Off" radio call will be made to terminate maneuvering for any reason, particularly when a dangerous situation is developing. This transmission applies to all phases of flight and all types of missions. All participants will acknowledge by repeating the call (e.g., "Bandit 2, Knock It Off").

3.14.2. Will include radio checks that do not require the transmission of specific data and will be acknowledged by individual flight members in turn. Acknowledgment by the individual flight member indicates the appropriate check will be initiated or is in the process of being completed.

3.14.3. Will include frequency changes initiated by the flight/mission lead. The flight/mission lead will check flight members in on the new frequency.

3.14.4. Will include in addition to the standard radio procedures outlined in AFI 11-202V3; specific mission guides; and FLIP publications, acknowledging the initial ATC clearance. This verifies the pilot understands the clearance.

### **3.15. Airborne Comm Jamming Procedures:**

3.15.1. Will only be conducted when briefed, on tactical frequencies, and only in tactical training areas.

3.15.2. An alternate method of establishing communications in a jamming environment (i.e., guard frequency) will be available. The alternate frequency will not be jammed.

3.15.3. "SAFETY, SAFETY, SAFETY" will be used to halt jamming until all safety related information has been passed.

3.15.4. Refer to AFI 11-214 for further procedures and requirements.

### 3.16. Tactical Navigation Procedures:

3.16.1. Will be flown using AFTTP 3-1 as a reference.

3.16.2. During briefings, emphasis will be placed on tactical navigation flight maneuvering and observation of terrain feature/obstacles along the route of flight. For air-to-surface tactics over water, include specific considerations for over water operations with emphasis on minimum altitudes.

3.16.3. Includes pilots primarily referencing the INS/GPS. If the INS and GPS are degraded, the flight may continue using a combination of dead reckoning (DR) and TACAN information as long as flight safety is not compromised. If on-board avionics are degraded to such a degree that accurate navigation becomes questionable, the route will be aborted and the pilot will proceed to base/instrument pattern.

3.16.4. Will use a minimum altitude for low level flight of 1,000 AGL or as approved in FOT&E test plans for 53 TEG pilots. The unit commander will certify a pilot's minimum altitude for tactical navigation. Minimum altitude in peacetime is IAW para 2.3.4.

3.16.5. Will use the minimum safe speed for tactical navigation/maneuvering of 300 KCAS/360 KGS, whichever is higher.

3.16.6. Will use an in-flight weather minimums for visual low level training on MTRs or in restricted/warning areas IAW FLIP, or 3000 feet and 5 miles, whichever is higher.

### 3.17. Air Refueling:

3.17.1. Initial or recurrency training in air refueling will not refuel with a student boom operator.

3.17.2. At night should be conducted in a non-turbulent air mass whenever possible.

3.17.3. Minimum in-flight visibility for tanker rejoins is 1 NM.

### 3.18. Fuel Requirements. The following are definitions and required quantities for F-117A operations:

3.18.1. Joker fuel is the fuel state above Bingo at which separation/bugout/event termination should begin.

3.18.2. Bingo is the fuel required for recovery from a training area/route to the base of intended landing. Bingo fuel is based on pre-briefed flight parameters, takes into account normal recovery procedures, and allows the aircraft to arrive on initial or the IAF with the appropriate recovery fuel. Bingo fuels should be planned at higher airspeeds and fuel flows in hostile airspace and maximum range in friendly airspace. Bingo fuel is a mandatory briefing item for all missions other than SAT sorties.

**3.18.3. Continuation Fuel.** A predetermined fuel state that will allow completion of the planned route and arrive on initial or at the IAF with the appropriate recovery fuel. Continuation fuel is a mandatory briefing item for all SAT sorties.

**3.18.4. Critical Fuel.** A predetermined fuel that is required to return to base by the most direct routing at maximum range airspeeds and altitudes. It will be determined from the point furthest from the base of intended landing. This fuel allows for landing with recovery fuels listed below. Critical fuel is a mandatory briefing item for all SAT mission.

**3.18.5. Normal VFR Recovery Fuel.** Normal VFR Recovery Fuel includes the following (see Chapter 8 for local restrictions):

3.18.5.1. During single-runway operations, pilots will arrive at initial or at the IAF for a full stop at the base of intended landing with enough fuel to recover at a suitable alternate with 2000 pounds.

3.18.5.2. During multiple-runway operations, pilots will arrive at initial or at the IAF for a full stop landing with a minimum of 2500 pounds.

**3.18.6. Minimum Fuel.** Declared whenever it becomes apparent that an aircraft will enter initial or start an instrument final approach at the base of intended landing (or alternate, if required), with 2000 pounds or less or one FUEL LOW light illuminated.

**3.18.7. Emergency Fuel.** Declared whenever it becomes apparent that an aircraft will enter initial or begin an instrument final approach at the base of intended landing or alternate, if required, with 1500 pounds or less or both FUEL LOW lights illuminated.

### **3.19. Approaches and Landings:**

3.19.1. Should be at an alternate if possible, when the RCR at the base of intended landing is less than 12.

3.19.2. For daytime dry runway operations will use 6,000 feet minimum spacing between landing aircraft, or as directed locally. An F-117A intentional no-chute landing requires 8000 feet separation behind an F-117A chute-assisted landing.

3.19.3. Will be to the desired touchdown point for a VFR approach of 500 feet from the threshold, or the glidepath interception point for a precision approach. When local procedures or unique runway surface conditions require landing beyond a given point on the runway, the desired touchdown point will be adjusted accordingly.

3.19.4. Will conclude with all aircraft clearing to the "cold" side of the runway when speed/conditions permit.

3.19.5. Over a raised WEB barrier (BAK 15) is prohibited.

### **3.20. Intentional No-Chute (INC) Landings:**

3.20.1. Are authorized at all locations. All F-117A pilots must accomplish the local checkout program prior to accomplishing INC landings. The following procedures and restrictions will be adhered to:

3.20.1.1. INC minimum runway length is 10,000 feet with a compatible departure-end arrestment system (calculated stopping distance must be less than the distance to the last compatible barrier).

3.20.1.2. Maximum internal stores and fuel weight will not exceed 8,000 pounds or as restricted locally.

3.20.1.3. Dry runway.

3.20.1.4. 8000 feet minimum spacing behind a chuted F-117A.

3.20.1.5. No trapped fuel (aft CG).

3.20.2. Will be terminated and the drag chute will be used if any doubt exists as to the conditions under which an INC landing may be accomplished.

3.20.3. Will be terminated if the aircraft is not slowing. Immediately pull the chute and continue braking.

3.20.4. Are authorized at night once a pilot is certified.

### **3.21. Drag Chute Jettison:**

3.21.1. Should be accomplished by cocking the aircraft into the prevailing wind prior to releasing the chute to avoid possible aircraft damage due to drag chute attachment clevis impact during crosswinds.

3.21.2. Will be accomplished at a minimum ground speed of 10 knots.

3.21.3. Will be accomplished by placing the power between idle and 70% on both engines.

3.21.4. Will be accomplished by allowing two seconds for the rudders to center before releasing chute.

3.21.5. Will be accomplished straight ahead, on the downwind side of the runway, with a minimum of 20 knots if unsure of the prevailing wind conditions due to gusts.

### **3.22. Overhead Traffic Patterns:**

3.22.1. Will be accomplished with the minimum safe airspeed of 300 KCAS and pattern altitude will be as published (minimum of 1,500 feet AGL).

3.22.2. Will include initiating the break at the approach end unless directed otherwise by local procedures or tower.

3.22.3. Will include the aircraft being wings level on final prior to 300 feet AGL and 1 mile from the touchdown point.

### **3.23. Low Approaches:**

3.23.1. And go-arounds should not track directly over aircraft on the runway at low altitude, clear to the outside. Remain 500' below traffic pattern altitude until crossing the departure end of the runway unless missed approach/climbout procedures, local procedures, or controller instructions dictate otherwise.

3.23.2. Will observe the following minimum altitudes:

3.23.2.1. Normal low approaches (day or night): So that touchdown does not occur.

3.23.2.2. Formation low approaches will use the following limitations:

**3.23.2.2.1. Day.** 100 ft AGL.

**3.23.2.2.2. Night.** Night formation approaches are not authorized.

3.23.2.3. Chase aircraft during an emergency: 300 ft AGL.

3.23.2.4. T-38 IP/SEFE chase aircraft: 50 ft AGL.

3.23.2.5. F-117A IP or SEFE chase aircraft: 100 ft AGL.

3.23.2.6. See paragraph 7.13 for single engine minimums.

**3.24. Closed Traffic Patterns.** Minimum airspeed for initiating a closed pattern is 250 KCAS. Initiate the close at the departure end of the runway unless directed otherwise by local procedures or the controlling agency. Fly the pattern to arrive on downwind at 220-250 KCAS.

**3.25. Formation Approaches:**

3.25.1. Will normally be accomplished from a precision approach. If not, the approach will be accomplished utilizing a published instrument approach or a VFR straight-in approach using the VASI/PAPI, if available. In all cases the rate of descent should be similar to a normal precision approach.

3.25.2. Will be led by a qualified flight lead unless an IP or a flight lead qualified squadron supervisor is in the element. The flight lead is responsible for pre-briefing formation approaches.

3.25.3. Will have the wingman positioned on the upwind side if the crosswind exceeds 5 knots.

3.25.4. Will have the wingman maintaining a minimum of 10 feet lateral wingtip spacing.

3.25.5. Will not be accomplished when the weather is below the weather category of the most restrictive pilot in the element.

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

3.25.7. Will only terminate in a low approach. Formation landings are prohibited.

**3.26. Anti-Collision Light Out Training:**

3.26.1. Will only be in restricted/warning areas or specifically designated ATCAAs.

3.26.2. Will only be accomplished by CMR/BMC pilots.

3.26.3. Must be thoroughly briefed between participating flight members and will only be accomplished with two aircraft.

3.26.4. Must be accomplished with an operable air-to-air TACAN. Only the flight lead's anti-collision light will be turned off and the nav/fuselage lights remaining on bright. The wingman will keep the anti-collision light on and nav/fuselage lights bright.

3.26.5. Will be accomplished with a minimum vertical separation of a 2000 feet between elements practicing anti-collision light-out training in the same airspace.

**3.27. Tanker Flyby Pickup Rendezvous:**

3.27.1. Is designed to rendezvous a fighter force with tankers as expeditiously as possible after take-off. This procedure may be accomplished using EMCON 1 or 2. The plan will be thoroughly coordinated between all parties as well as steps taken to ensure on-time takeoffs. Figure 3.1 depicts a generalized plan for a flyby pickup.

3.27.2. Should be accomplished with assigned A/A TACAN frequencies for the tanker and fighter. Both will tune to their frequency five minutes prior to scheduled takeoff. If no DME is received, the tanker will call for brake release by referencing a TACAN station or pre-planned ground point.

3.27.3. Should be accomplished with the tanker flying a ground track parallel to the departure runway at minimum safe airspeed of 300 KIAS and 1000 ft AGL, offset opposite the direction of turn out of traffic. Fighters will run up engines at 5 DME from tanker and release brakes at 2 DME. This should place the tanker 3000-ft in front at takeoff.

3.27.4. Should be accomplished with the tanker beginning a 1000-FPM climb while maintaining minimum safe airspeed of 300 KIAS, at the departure end of the runway. A 90-degree turn out of traffic will expedite the rejoin. At night or in IMC, fighters will not begin their turn until 1000 ft AGL and 250 KCAS.

3.27.5. Should be accomplished with subsequent tankers in a cell flying over in 5-minute intervals to allow succeeding fighter elements to perform takeoff requirements.

## Chapter 4

### INSTRUMENT PROCEDURES

**4.1. Approach Category.** The F-117A is designated as an approach category E aircraft. Missed approach airspeed is 200-250 KCAS.

**4.2. Practice Instrument Approaches.** Pilots may fly instrument approaches other than home base under the following conditions:

4.2.1. Facility/base operations, at the airfield where instrument practice is planned, should be contacted in advance to preclude conflicts with other local traffic.

4.2.2. Pilots must plan the mission so as to have adequate fuel to climb to cruising altitude from the last missed approach, cruise to the IAF at home base, divert to a designated alternate, and land with at least 2,000 pounds of fuel remaining.

4.2.3. Minimum altitude restrictions listed in para 3.23. apply.

**4.3. Takeoff and Joinup Procedures:**

4.3.1. For formation operations, the flight lead will notify the appropriate ATC agency when a VMC joinup cannot be accomplished due to weather conditions or operational requirements and coordinate for an altitude block. Formation trail departures will comply with instructions for a non-standard flight as defined in FLIP. Flight lead should request IFF squawks for in-trail wingmen.

4.3.2. If the weather is below 1500/3, or at night, the first turn should not be initiated until 1000 feet AGL and 250 KCAS. If local departures require earlier turns for airspace restrictions, then the minimum parameters for the first turn will be 400 feet AGL and Single Engine Climb Speed.

**4.4. Trail Departures.** For trail departures, basic instrument flying is the first priority and will not be sacrificed when performing secondary tasks, to include formation positioning. Strictly adhere to the briefed climb speeds, power settings, altitudes, headings and turn points. If task saturation occurs, cease attempts to maintain trail, immediately concentrate on flying the instrument departure and notify the flight lead. Depending on the severity of the saturation/disorientation pilots should consider the use of the Pilot Activated Automatic Recovery System (PAARS) to regain orientation. The following procedures will be adhered to:

4.4.1. Takeoff spacing will be 20 seconds minimum.

4.4.2. Maximum flight size during the daylight hours is four.

4.4.3. Maximum flight size at night is three.

4.4.4. Regardless of actual weather conditions, the flight lead will execute all climbs in MIL power and pitch as required to maintain minimum safe airspeed of 300 KCAS unless otherwise briefed. Bank angle will be 30 degrees unless otherwise briefed.

4.4.5. Until the wingman calls visual, emission option permitting, the lead will call altitude at each 5000 feet and starting and stopping turns with new rollout heading, until level off or rejoined.

4.4.6. When all flight members reach cruise altitude and cleared to maintain a block altitude by ATC, the lead will accelerate to the briefed airspeed.

**4.5. Formation Breakup.** Formation breakup should not be accomplished in IMC. However, if unavoidable, breakup will be accomplished in straight and level flight. Prior to a weather breakup, the flight lead will confirm that the wingman has good nav aids and transmit attitude, airspeed, altitude, and altimeter setting. The altimeter setting will be acknowledged by the wingman.

**4.6. Use of the Head Up Display (HUD).** The HUD may be used as an additional instrument reference in night/IMC conditions. It will not be used as the sole instrument in these conditions. The HUD will not be used to recover from an unusual attitude or when executing lost wingman procedures except when no other reference is available.

**4.7. Pilot Activated Automatic Recovery System (PAARS).** PAARS must be considered as an available tool if the pilot encounters a spatially disorienting situation. The use of PAARS can greatly aid a pilot in the recovery of an aircraft under these conditions. The PAARS is not a spin recovery or a ground avoidance system.

**4.8. Simulated Instrument Flight Procedures:**

4.8.1. Require a qualified safety observer in a chase aircraft.

4.8.2. Require a chase aircraft in order to log simulated instrument flight in the F-117A. This does not preclude flying multiple instrument approaches in VMC without a chase; however, in this case the primary emphasis will be on the "see and avoid" concept.

**4.9. Flight in Precipitation/Icing Procedures:**

4.9.1. Primarily involve pilots avoiding penetration of weather or precipitation, particularly within 2,000 ft of the freezing level, to the maximum extent possible. If precipitation cannot be avoided, pilots should reduce airspeed to at or below 300 KCAS (at 250 KCAS below 10,000 ft MSL if minimum safe airspeed allows), and select FLIR to the standby (stowed) position.

4.9.2. Include pilots turning the engine anti-ice on and following appropriate checklist for icing lights (MDI and/or annunciator), if there are suspected icing conditions during flight. After landing, pilots will make an info write-up for an ice-FOD inspection.

## Chapter 5

### AIR TO SURFACE WEAPONS EMPLOYMENT

**5.1. General.** AFI 11-214 contains air-to-surface procedures applicable to all aircraft. This chapter specifies procedures or restrictions applicable to F-1117A operations. Qualification and scoring criteria are contained in AFI 11-2F-117V1.

#### **5.2. Weather Minimums:**

5.2.1. Are in accordance with AFI 11-214.

5.2.2. For ceiling will be at least 500 feet above the highest portion of the pattern flown. In no case will the ceiling/vis be lower than 2,000 feet AGL/3 NM for day and no lower than 3,000 feet AGL/5 NM for night.

#### **5.3. Training Rules (TR):**

5.3.1. Are in accordance with AFI 11-214. Additionally, the following general guidelines will apply to all F-117A operations:

5.3.1.1. When planned navigation routes conflict (i.e., during a simultaneous attack), a 1,000 feet minimum altitude differential is required between converging aircraft.

5.3.1.2. When departing the IP during an on-range simultaneous attack, pilots will transmit their altitude and altimeter setting.

5.3.1.3. Minimum spacing required between aircraft attacking the same target is limited to applicable fusing and frag envelopes.

5.3.1.4. If the aircraft is required to climb/descend during an IP-target run, the attack will be terminated until the aircraft levels at the desired altitude.

5.3.1.5. Minimum altitude for night operations conducted on an MTR or restricted area is the MSA.

5.3.1.6. All attacks will be accomplished "trap up."

5.3.1.7. The Laser will remain in the OFF position, the IRADS will not be placed in IR/LSR (FLIR or DLIR), and the Master Arm will remain SAFE until on the assigned range and ready/cleared to release.

5.3.1.8. A functional DLIR Laser is required to release an LGB. An LGB will not be released unless laser ranging (LR) or track ranging (TR) is indicated on the SD. If pilots have a normal DLIR Laser indication (no DLIR alerts) of CF or AF on the SD, release may be consented.

5.3.1.9. Flight/mission leads/single-ship pilots will ensure the target is certified for lasing and there is no possibility another aircraft might underfly the lasing aircraft.

5.3.1.10. When the pilot is notified by ARTCC or range control of traffic, the pilot will terminate the attack until the traffic is determined to be no factor.

**5.4. Live Ordnance.** Live Ordnance Procedures are in accordance with AFI 11-214. Additionally, the following TRs will apply to all F-117A operations:

- 5.4.1. The Laser will remain OFF and weapons stations with actual ordnance will not be activated/selected when attacking targets occupied by personnel (i.e., cultural).
- 5.4.2. Minimum altitude for all range operations will be determined by fusing and fragmentation envelopes or the MEA, whichever is higher.
- 5.4.3. Live ordnance stations will not be selected until on the range and ready for delivery. The MASTER ARM switch will not be placed in ARM unless there is intent to expend that ordnance IAW range procedures.
- 5.4.4. Aircraft will avoid populated areas when carrying live heavyweight ordnance. Conducting cultural target attacks are prohibited with live heavyweight ordnance on board.
- 5.4.5. Drop only on authorized live, laseable targets IAW appropriate range supplements.

**5.5. Off-Range Simulated Weapons Employment.** Prior to performing a simulated attack on a cultural/off-range target, pilots will ensure the following:

- 5.5.1. The aircraft is under IFR control.
- 5.5.2. Master Arm--SAFE\*.
- 5.5.3. Laser Mode Select Switch--OFF.
- 5.5.4. IRADS Mode Select Switches--IR (FLIR--standby, if DLIR only).
- 5.5.5. Fuse Arming Option--not selected\*.
- 5.5.6. The pickle button is not activated\*.
- 5.5.7. \* Full cockpit switchology is approved for off-range camera attacks provided: (1) the aircraft is configured with either a Bomb Rack Simulator (BRS) (20R898) or Bomb Rack Sensing Switch Cover (Sim Plug) in both weapons bays (empty SUU-20s not authorized), (2) the Laser remains in the OFF position, and (3) the IRADS panel is set to IR/IR.
- 5.5.8. Off-range simulated weapons employment will not be conducted with suspected or confirmed hung ordnance aboard the aircraft.

**5.6. Exercise Participation/Stealth Restrictions.** The following are restrictions placed on F-117A participation in exercises and stealth procedures:

- 5.6.1. The F-117A may only be "stealthed" up during peacetime training missions that comply with current security directives.
- 5.6.2. The F-117A will employ/enter the threat area only during the hours of darkness.
- 5.6.3. The F-117A will be considered a non-player for all air-to-ground and air-to-air threats and associated radars.
- 5.6.4. F-117A pilots will not make any threat reaction maneuvers.
- 5.6.5. F-117A pilots will comply with all other training rules/spins to include external lighting, IFF squawks and altitudes.

5.6.6. Waiver authority to these restrictions rests with the OG/CC but must be ICW the appropriate classification guide.

## Chapter 6

### ABNORMAL OPERATING PROCEDURES

**6.1. General.** This chapter contains procedures to follow when other than normal operations occur. This does not, however, replace or supersede procedures contained in the flight manual or the use of sound judgment and the following applies:

6.1.1. No aircraft will be accepted for flight with a malfunction that is addressed in the emergency/abnormal procedures section of the flight manual until appropriate corrective actions have been accomplished.

6.1.2. Aircraft will not be taxied with malfunctions that affect the nose wheel steering, brake systems or with generator malfunctions/failures.

6.1.3. Once a malfunctioning system is isolated, that system will not be used again unless its use in a degraded mode is essential for recovery. If the fault is corrected/reset, and current in-flight procedures allow, the flight may be continued. Do not conduct in-flight troubleshooting after flight manual emergency procedures are completed.

6.1.4. Pilots experiencing in-flight emergencies will be switched over to a single frequency approach channel as soon as practical.

#### 6.2. Ground Aborts:

6.2.1. Prior to takeoff, the flight leader will realign the flight positions to maintain a numerical call-sign sequence. Flight leaders will advise the appropriate command agencies of such changes.

6.2.2. For wingmen in a flight of two or more aircraft with only one designated flight lead in the formation must sympathetically abort or proceed to the pre-briefed single ship mission should the flight lead abort. FTU students who have not completed their initial qualification check must always be accompanied by a chase aircraft occupied by an F-117A IP.

6.2.3. Which cause pilots who do not take off with the flight may join the flight at a briefed rendezvous point prior to a tactical event, or may fly a briefed single ship alternate mission. If a joinup is to be accomplished in a restricted area or MOA, all events will be terminated until the joining aircraft has achieved the desired position.

#### 6.3. Takeoff Aborts:

6.3.1. Procedures will be planned for by reviewing and understanding the takeoff data prior to takeoff. Particular emphasis should be placed on takeoff and abort factors during abnormal situations such as short/wet runways and heavy gross weights.

6.3.2. During takeoff roll, clear to the appropriate side of the runway as expeditiously as possible. If this is not feasible because of possible cable engagement, clear straight ahead. As soon as possible, give call sign and state intentions. The phrase "Cable, Cable, Cable" will be used to indicate a departure-end cable arrestment. The phrase "Barrier, Barrier, Barrier" will be used to indicate a web-type barrier engagement or to direct tower to raise the web barrier.

6.3.3. May cause hot brakes. Anytime hot brakes are suspected, a ground emergency will be declared, the aircraft taxied to the designated hot brake area, and hot brake procedures performed.

6.3.4. Will include lowering the tailhook if there is any doubt about the ability to stop on the remaining runway. This decision will be based on the cable/barrier compatibility, runway length, aircraft speed, weather conditions, braking conditions, and aircraft gross weight.

6.3.5. Above 100 knots will be checked for hot brakes.

6.3.6. May require full operation of brakes. Pilots will ensure the integrity of their brake system prior to passing the last compatible barrier.

#### **6.4. Takeoff Continued with Loss Of Engine:**

6.4.1. If takeoff is continued, the pilot's primary concern should be attaining single engine climb (SEC) speed, and maintaining AOA less than 10 degrees. Altitude permitting, this can best be accomplished by jettisoning any ordnance and commencing fuel dump when ability to maintain aircraft control permits.

6.4.2. The decision to jettison live or inert ordnance should be made based on the pilot's assessment of the relative risk of possible weapons frag damage to the aircraft and danger to personnel and equipment on the ground versus the potential gain of reduced gross weight. If terrain impact appears imminent, the pilot should consider immediate ejection rather than a last ditch attempt to save the aircraft through ordnance jettison.

#### **6.5. Air Aborts:**

6.5.1. Aircraft will maintain their original numerical callsign after takeoff.

6.5.2. The pilot of the aborting aircraft will advise the flight leader or controlling agency (if single ship) of the conditions necessitating the abort, intentions, and assistance required.

6.5.3. Will cause the mission to be aborted, regardless of apparent damage or subsequent normal operation, for any of the following:

6.5.3.1. Birdstrike.

6.5.3.2. Over-G.

6.5.3.3. Flight Control System Anomalies (this does not include a single FCS light that resets IAW flight manual procedures providing the light does not repeat for similar maneuvers).

6.5.3.4. Engine flameout/stagnation.

6.5.3.5. All anomalies will be reported during maintenance debriefing.

6.5.4. If possible, pilots will dump fuel above 5,000 ft AGL. Pilots will annotate in the forms and advise maintenance whenever fuel is dumped.

#### **6.6. Radio Failure:**

6.6.1. Pilots will comply with procedures outlined in FLIP and local directives. A pilot who experiences total radio failure while in close or route formation will maneuver within close/route parameters to attract the attention of another flight member and give the appropriate visual signals. The mission should be terminated as soon as practical and the NORDO aircraft led to the base of intended landing or a divert base. A formation approach to a drop-off on final should be performed unless safety considerations dictate otherwise.

6.6.2. If the NORDO aircraft intends to make an arresting gear engagement, the pilot will fly a straight-in approach flashing the landing light on final to signal the tower.

**6.7. Severe Weather Penetration.** Flight through severe weather should not be attempted. However, if unavoidable, prior to penetration, flights will break up into single ships and recover with separate clearances. Airspeed should be reduced to 300 KCAS or less (250 KCAS below 10,000 ft MSL if minimum safe airspeed allows.) Refer to T.O. F-117A-1 for specific procedures for flying in severe weather or icing.

#### **6.8. Lost Wingman Procedures:**

6.8.1. Immediate separation of aircraft is essential. Upon losing sight of the leader, or if unable to maintain formation due to spatial disorientation, the wingman will simultaneously execute the applicable lost wingman procedures while transitioning to instruments. Refer to paragraph 6.9. for specific spatial disorientation considerations. Smooth application of control inputs is imperative to minimize disorienting effects. Once lost wingman procedures have been executed, permission to rejoin the flight must be obtained from the flight lead. These procedures also apply to chase aircraft.

**6.8.1.1. Two or Three-Ship Wings Level Flight.** For two- or three-ship flights, in wings level flight (climb, descent, or straight and level) simultaneously inform the leader and turn away using 15 degrees of bank for 15 seconds, then resume heading and obtain a separate clearance. The following procedures should also be used for two and three-ship flights:

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

**6.8.1.1.2. Outside of the Turn.** Reverse the direction of the turn using 15 degrees of bank for 15 seconds and inform the leader. Continue straight ahead to ensure separation prior to resuming the turn. Obtain a separate clearance.

**6.8.1.1.3. Precision/Non-Precision Final.** The wingman will momentarily turn away to ensure clearance, inform lead, and commence the published missed approach procedure while obtaining a separate clearance from approach control.

**6.8.1.1.4. Missed Approach.** The wingman will momentarily turn away to ensure clearance, inform lead, and continue the published or assigned missed approach procedure while climbing to 500 feet above missed approach altitude. Obtain a separate clearance from approach control.

**6.8.1.2. Four-Ship Flights.** For four-ship flights, if only one aircraft in the flight becomes separated, the previous procedures will provide safe separation. However, because it is impossible for number 4 to immediately ascertain that number 3 is still has visual contact with the lead, it is imperative that number 4's initial action be based on the assumption that number 3 has also become separated. Number 2 and 3 will follow the procedures outlined above. Number 4 will follow the appropriate procedure as follows:

**6.8.1.2.1. Wings Level Flight (Climb, Descent, Straight, and Level).** Simultaneously inform the leader and turn away using 30 degrees of bank for 30 seconds, then resume heading and obtain a separate clearance.

**6.8.1.2.2. Inside of the Turn for #4.** Momentarily reduce power to ensure nose/tail separation, increase bank 15 degrees, and inform the flight leader to roll out of the turn. Maintain angle of bank to ensure lateral separation and obtain a separate clearance. The leader may resume turn only when separation is ensured.

**6.8.1.2.3. Outside of the Turn for #4.** Reverse the direction of the turn using 30 degrees of bank for 30 seconds and inform the leader. Continue straight ahead to ensure separation prior to resuming the turn. Obtain a separate clearance.

6.8.2. The flight leader should acknowledge the lost wingman's radio call and transmit flight parameters, actions, and/or intentions as appropriate. Care must be taken to observe published terrain clearance limits.

6.8.3. If a wingman becomes separated and any aircraft experiences radio failure, the aircraft with the operational radio will obtain a separate clearance. The NORDO aircraft will set IFF/SIF IAW FLIP radio out procedures, or local directives.

6.8.4. For tanker in formation is IAW appropriate refueling directives/manuals.

## **6.9. Spatial Disorientation (SD):**

6.9.1. Conditions that prevent a clear visual horizon or increase pilot tasking are conducive to SD. When SD symptoms are detected, the following steps will be taken until symptoms abate:

6.9.1.1. Execute lost wingman procedures, if appropriate.

6.9.1.2. Concentrate on flying basic instruments with frequent reference to the attitude indicator. Use heads down instruments. Defer nonessential cockpit tasks.

6.9.1.3. If symptoms persist, bring aircraft to straight and level flight with reference to the attitude indicator, conditions permitting. Maintain straight and level flight, terrain permitting, until symptoms abate. Maximize the use of autopilot to include Pilot Activated Automatic Recovery System (PAARS), if applicable.

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

6.9.2. It is possible for spatial disorientation to deteriorate to the point where the pilot is unable to see, interpret, or process information from the flight instruments. Aircraft control in such a situation is impossible. A pilot must recognize when physiological or psychological limits have been exceeded and abandon the aircraft.

## **6.10. Armament System Malfunctions:**

6.10.1. If an inadvertent release occurs:

6.10.1.1. Record switch positions at the time of release and provide to armament and safety personnel.

6.10.1.2. Record the impact point, if possible.

6.10.1.3. Check armament switches safe and do not attempt further release in any mode. Treat remaining stores as hung ordnance.

6.10.1.4. If remaining stores present a carriage/landing hazard, attempt jettison in a suitable area.

6.10.2. If failure to release occurs:

6.10.2.1. Recheck switch positions and make an additional attempt to expend, time permitting, or have another aircraft perform a bomb check. If no release occurs a second time, do not make another attempt to expend.

6.10.2.2. If suspected or actual hung ordnance exists, follow the appropriate local hung ordnance procedure.

6.10.2.3. Stores jettison will be accomplished IAW T.O. 1F-117A-34-CL-1.

6.10.3. If hung ordnance is confirmed or suspected:

6.10.3.1. Declare an emergency (except for BDU 33).

6.10.3.2. Fly a hung ordnance pattern.

6.10.3.3. When practical, advise tower of condition, intentions, and request dearming crews. Upon landing, proceed to dearm and inform the dearming crew so the condition or the ordnance can be checked/secured.

6.10.3.4. Overhead patterns and practice low approaches will not flown with hung ordnance. Overhead patterns and practice low approaches may be flown with unexpended ordnance if normal post-release indications are present.

6.10.4. A no-spot BDU-33 release attempt does not require a hung ordnance pattern if the bay doors are closed and normal release and post release indications are present.

## **6.11. Unintentional No-Chute Landings:**

6.11.1. If the drag chute fails to deploy on a dry runway, pilots will check the airspeed approaching the 5,000 ft remaining point. Use the following guidelines:

6.11.1.1. If greater than 155 KIAS, lower the hook and call "Barrier, Barrier, Barrier/Cable, Cable Cable", and continue max braking. Release brakes approaching the barrier to effect a successful engagement. If the cable is missed, reapply max braking and continue to steer to middle of the runway. Expect a brake fire. Barrier engagement may hinder the possibility of ground egress.

6.11.1.2. If less than 135 KCAS, max braking should stop the aircraft prior to the end of the runway

6.11.2. After any unintentional no-chute landing, suspect hot brakes.

6.11.3. Max braking should be used on a wet runway. If a cable engagement appears imminent, call for the cable and/or barrier and lower the hook. Approaching the cable, release brakes to effect a successful engagement. If cable is missed, reapply max braking and anticipate a barrier engagement, if available.

6.11.4. Anytime hot brakes are suspected, declare a ground emergency and taxi to the designated hot brake area.

6.11.5. If a pilot is notified that the aircraft has hot brakes while in a hangar or hangar area, immediately taxi to the appropriate hot brake area, turn into the wind, and wait for fire response personnel for further direction.

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

- 6.12.1. Do not shutdown the engine unless fire or other conditions dictate, or directed to do so by the arresting crew and/or emergency response personnel.
- 6.12.2. Do not taxi until directed to do so by the arresting gear crew and/or emergency response personnel.
- 6.12.3. Use an increase of power to control aircraft rollback after the cable has been stretched. DO NOT use wheel brakes.

**6.13. In-flight Practice of Emergency Procedures:**

- 6.13.1. Includes any procedure that produces an effect that closely parallels the actual emergency.
- 6.13.2. All practice and/or training related to aborted takeoffs will be accomplished in the flight simulator, or (if simulator is unavailable) a static aircraft.
- 6.13.3. Will be performed IAW AFI 11-202V3; AFI 11-F-117V1, *F-117--Aircrew Training*; T.O.s; phase manuals; and this volume, as supplemented.
- 6.13.4. Simulated in-flight loss of both engines is prohibited. In-flight practice airstarts or engine shutdowns are also prohibited, except as required for functional check flights.
- 6.13.5. Simulated single engine procedures include the following:
  - 6.13.5.1. Simulated single engine approach and landing operations will adhere to flight manual prescribed airspeed and AOA parameters.
  - 6.13.5.2. The EPU will not be activated during simulated single engine operations.
  - 6.13.5.3. During night operations, go-arounds will be initiated at or above 300 ft AGL using both engines.
  - 6.13.5.4. Simulated single engine landings are prohibited at night.
  - 6.13.5.5. For day operations planned go-around will be initiated no lower than 100 ft AGL (two engine) or 300 ft AGL (single engine).

**6.14. Search and Rescue (SARCAP) Procedures.** In the event an aircraft is lost in flight, actions must begin to locate possible survivors and initiate rescue efforts. It is imperative that all flight members aggressively pursue location and rescue downed personnel even though they seem uninjured. Many downed aircrews initially suffer shock or have delayed reactions to ejection injuries. The following are procedures that are by no means complete and should be adjusted to meet each unique search and rescue situation:

- 6.14.1. Squawk.** Immediately terminate maneuvering using appropriate Knock-It-Off procedures. Establish a SARCAP commander. IFF should be placed to EMER to alert ATC/GCI of the emergency situation.
- 6.14.2. Talk.** Communicate the emergency situation and aircraft/flight intentions immediately to applicable control agencies. Use GUARD frequency if necessary.

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

**6.14.4. Separate.** Remain above the last observed parachute altitudes until position of all possible survivors is determined. Deconflict other aircraft assisting in the search and rescue.

**6.14.5. SARCAP.** Establish a SARCAP by altitude to preclude midair collision. The high/low CAPs should be established as necessary to facilitate communication with other agencies.

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

**6.15. Recoveries Without a Transponder (IFF):**

6.15.1. Due to the F-117A's low air traffic control radar observability without IFF, pilots will immediately notify controlling agencies if the IFF is inoperative, and provide accurate position reports to controlling agencies for separation from other traffic.

6.15.2. If radar vectors are required for an approach, pilots will slow to 250 KCAS when within approximately 25 DME of the field and lower the landing gear to enhance the radar return for RAP-CON.

**6.16. Critical Action Procedures.** Specific Critical Action Procedures are contained in T.O. 1F-117A-1.

## Chapter 7

### LOCAL OPERATING PROCEDURES

**7.1. General.** This chapter is reserved for unit local operating procedures. Procedures herein will not be less restrictive than those contained elsewhere in this volume, nor is this chapter intended to be a single source document for procedures contained in other directives or regulations. Unnecessary repetition of guidance provided in other established directives should be avoided; however, reference to those directives is acceptable when it serves to facilitate location of information necessary for local operating procedures.

**7.2. Review.** A copy of this chapter will be forwarded to HQ ACC/DOTO and 12 AF/OV for review. Returned comments and required changes will be provided to units as appropriate. This procedure need not delay distribution.

**7.3. Format.** The local chapter will be organized in the following format and will include, but is not limited to, the following:

- 7.3.1. Section A. Introduction.
- 7.3.2. Section B. General Policy.
- 7.3.3. Section C. Ground Operations.
- 7.3.4. Section D. Flying Operations.
- 7.3.5. Section E. Weapons Employment.
- 7.3.6. Section F. Abnormal Procedures.
- 7.3.7. Attachments (Illustrations).

**7.4. Content.** This chapter will include procedures for the following, if applicable:

- 7.4.1. Command and Control.
- 7.4.2. Fuel Requirements and Bingo Fuels.
- 7.4.3. Divert Instructions.
- 7.4.4. Jettison Areas (IFR/VFR).
- 7.4.5. Controlled Bailout Areas.
- 7.4.6. Local Weather Procedures.

7.4.7. Low Level Route Abort Procedures.

7.4.8. Approved Alternate Missions.

7.4.9. Unit Standards (Optional).

ROBERT H. FOGLESONG, Lt General, USAF  
DCS/Air & Space Operations

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

AFPD 11-2, *Aircraft Rules and Procedures*

AFPD 11-4, *Aviation Service*

AFTTP 3-1V18, *F-117A Tactical Employment*

AFI 11-2F-117V1, *F-117--Aircrew Training*

AFI 11-202V3, *General Flight Rules*

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

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

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

AFI 33-360V1, *Publications Management Program*

T.O. 1F-117A-1, *Flight Manual*

***Abbreviations and Acronyms***

**A/A**—Air-to-Air

**AF**—Air Force

**ACC**—Air Combat Command

**ACCR**—ACC Regulation

**ACCI**—ACC Instruction

**AFMAN**—Air Force Manual

**AFORMS**—Air Force Operational Resource Management System

**AFRC**—Air Force Reserve Command

**AFR**—Air Force Regulation

**AFTTP**—Air Force Tactics, Techniques, and Procedures

**AGL**—Above Ground Level

**AHC**—Aircraft Handling Characteristics

**ANG**—Air National Guard

**ARCP**—Air Refueling Contact Point

**ARIP**—Air Refueling Initial Point

**ARTC**—Air Refueling Training Corridor

**ATC**—Air Traffic Control

**ATCAA**—Air Traffic Control Assigned Airspace  
**CAP**—Combat Air Patrol  
**CC**—Commander  
**CHUM**—Chart Update Manual  
**CMR**—Combat Mission Ready  
**COMM**—Communication  
**CT**—Continuation Training  
**DLIR**—Downward Looking Infrared  
**DNIF**—Duties Not Including Flying  
**DO**—Director of Operations  
**DR**—Dead Reckoning  
**DRU**—Direct Reporting Unit  
**E&E**—Escape and Evasion  
**EMCON**—Emission Control  
**EOR**—End of Runway  
**EP**—Emergency Procedure  
**FAAH**—Federal Aviation Administration Handbook  
**FAC**—Forward Air Controller  
**FENCE**—Fuel, Emissions, Navigation, Communications, Expendables  
**FCS**—Flight Control System  
**FLIR**—Forward Looking Infrared  
**FLOT**—Forward Line of Own Troops  
**FRAG**—Fragmentation  
**FSCL**—Fire Support Control Line  
**FTU**—Formal Training Unit  
**FW**—Fighter Wing  
**G**—Gravitational Load Factor  
**GBU**—Guided Bomb Unit  
**GCI**—Ground Control Intercept  
**HQ**—Headquarters  
**HUD**—Head Up Display  
**IAW**—In Accordance With

**ID**—Identify/Identification

**IFE**—In Flight Emergency

**IFR**—Instrument Flight Rules

**ILS**—Instrument Landing System

**IMC**—Instrument Meteorological Conditions

**IP**—Instructor Pilot or Initial Point

**KCAS**—Knots Calibrated Airspeed

**KIAS**—Knots Indicated Airspeed

**KTAS**—Knots True Airspeed

**MAJCOM**—Major Command

**MARSA**—Military Assumes Responsibility for Separation of Aircraft

**MCR**—Multi-Command Regulation

**MDI**—Module Display Indicator

**MEA**—Minimum Enroute Altitude

**MOA**—Military Operating Area

**MQT**—Mission Qualification Training

**MSA**—Minimum Safe Altitude

**MTR**—Medium Training Route

**NAF**—Numbered Air Force

**NAV**—Navigation

**NCO**—Noncommissioned Officer

**NLT**—No Later Than

**NMR**—Non Mission Ready

**NOTAM**—Notice to Airmen

**NORDO**—No Radio

**NT**—Night

**OG**—Operations Group

**OPR**—Office of Primary Responsibility

**OPS**—Operations

**OT&E**—Operational Test and Evaluation

**PAARS**—Piloted Activated Automatic Recovery System

**PAR**—Precision Approach Radar

**PARA**—Paragraph  
**RAP**—Ready Aircrew Program  
**RCR**—Runway Condition Reading  
**RCS**—Radar Cross Section  
**ROE**—Rules of Engagement  
**RTB**—Return To Base  
**SA**—Situational Awareness, Strategic Attack  
**SAFE**—Selected Area For Evasion  
**SAR**—Search and Rescue  
**SARCAP**—Search and Rescue Combat Air Patrol  
**SAT**—Surface Attack Tactics  
**SEFE**—Stan/Eval Flight Examiner  
**SII**—Special Interest Item  
**SIM**—Simulation  
**SOF**—Supervisor of Flying  
**SQ**—Squadron  
**SQ/CC**—Squadron Commander  
**SSE**—Simulated Single Engine  
**TA**—Terrain Avoidance  
**TACAN**—Tactical Air Navigation  
**TBD**—To Be Determined/Developed  
**TDY**—Temporary Duty  
**T.O.**—Technical Order  
**TOT**—Time Over Target  
**TM**—Target Mode  
**TR**—Training Rules, Transit Route  
**UHF**—Ultra High Frequency  
**USAF**—United States Air Force  
**USAFAWC**—USAF Air Warfare Center  
**USAFWTC**—USAF Weapons and Tactics Center  
**VFR**—Visual Flight Rules  
**VIS**—Visibility

**VMC**—Visual Meteorological Conditions

**VOL**—Volume

**WX**—Weather

*Terms*

**Attempted Release**—The stores management processor (SMP) issues a release pulse in either automatic or manual mode with all switches correctly positioned.

**Hung Weapon**—A live or inert weapon that does not separate from the aircraft following an attempted release.

**Live Weapon**—Actual munitions containing a primary explosive charge (GBU-27, Mk 84, CBU-87, etc.).

**Practice Weapon**—A weapon intended for training or practice and containing no primary explosive charge.

**Retained Weapon**—A weapon still on board the aircraft with no release attempted or after successfully releasing the intended number of weapons in a partial load. Weapons not released due to procedural errors are retained.

**Weapon**—Any live, inert, or training munitions.

*Addresses*

HQ AFSSA/XO and XOF  
1535 Command Dr, Suite D-309  
Andrews AFB MD 20762-7002

HQ ACC/DO, DOT, and DOTO  
205 Dodd Blvd, Suite 101  
Langley AFB VA 23665-2789

**Attachment 2****GENERAL BRIEFING GUIDE****A2.1. Mission Preparation:**

- A2.1.1. Time hack
- A2.1.2. EP/threat of the day
- A2.1.3. Mission objective(s)
- A2.1.4. Mission overview
- A2.1.5. Mission data card
- A2.1.6. G-Awareness
- A2.1.7. Fuels required
- A2.1.8. Joker
- A2.1.9. Bingo
- A2.1.10. Critical fuel
- A2.1.11. Continuation fuel
- A2.1.12. Environmental conditions
  - A2.1.12.1. Weather
  - A2.1.12.2. Sunrise/sunset (if applicable)
  - A2.1.12.3. Moon illumination (if applicable)
  - A2.1.12.4. Contrail levels
- A2.1.13. NOTAMs
- A2.1.14. Personal equipment
- A2.1.15. FCIF/pubs/maps
- A2.1.16. SIIs ACC, NAF, 49 FW

**A2.2. Ground Procedures:**

- A2.2.1. Pre-flight of aircraft/weapons
- A2.2.2. Ground crew briefing (when applicable)
- A2.2.3. Act only on pilot's instructions
- A2.2.4. Ground emergency procedures
- A2.2.5. Hand signals
- A2.2.6. Aircraft danger areas
- A2.2.7. Check-in

A2.2.8. Taxi/marshalling/arming

A2.2.9. Spare procedures

**A2.3. Takeoff:**

A2.3.1. Runway lineup

A2.3.2. Takeoff interval

A2.3.3. Trail departure

A2.3.4. Abort

A2.3.5. Landing immediately after takeoff

**A2.4. Departure:**

A2.4.1. Join-up

A2.4.2. Formation

A2.4.3. Ops checks

**NOTE:** Ensure the majority of time is used for discussion of tactics, complicated mission segments/special activities, and other new or important items. If regular briefing items have already been discussed during mission planning or are standard, specialty checklist items, they may be reviewed briefly or omitted as appropriate.

**Attachment 3****INSTRUMENT/NAVIGATION/TRANSITION GUIDE****A3.1. Climb:**

A3.1.1. Instrument departure

A3.1.1.1. Power setting/airspeed

A3.1.1.2. Routing (SID, radar vectors, etc.)

A3.1.2. Level off

A3.1.3. Formation

**A3.2. Cruise:**

A3.2.1. Enroute

A3.2.2. Cruise data

A3.2.3. Nav aids

A3.2.4. Fuel awareness/ops checks

**A3.3. Area:**

A3.3.1. Airspace restrictions/area orientation

A3.3.2. Instructor responsibilities (if applicable)

A3.3.3. Maneuvers/G-awareness/ops checks/fuel awareness

A3.3.4. Airwork

A3.3.5. Departure

A3.3.5.1. Routing

A3.3.5.2. Joker

A3.3.5.3. Bingo

**A3.4. Approaches:**

A3.4.1. Holding/penetration

A3.4.2. Missed approach/climb out

**A3.5. Special Subjects:**

A3.5.1. Alternate mission

A3.5.2. Emergency/alternate airfields

A3.5.3. Spatial disorientation/unusual attitudes

A3.5.4. Hazards associated with human factors (i.e., Channelized attention, complacency, task saturation/prioritization)

A3.5.5. Low altitude ejection

A3.5.6. Lost wingman

A3.5.7. Aircraft lighting considerations

**Attachment 4****AIR REFUELING GUIDE****A4.1. General:**

- A4.1.1. Tanker call sign(s),
- A4.1.2. Receiver assignments
- A4.1.3. Refueling tracks(s)
- A4.1.4. Altitude
- A4.1.5. Airspeed
- A4.1.6. Radio frequencies
- A4.1.7. ARIPs, ARCPs, ARTCs

**A4.2. Buddy Procedures:**

- A4.2.1. Departure
- A4.2.2. Join-up

**A4.3. En Route:**

- A4.3.1. Route of flight
- A4.3.2. Formation
- A4.3.3. Ops checks

**A4.4. Rendezvous:**

- A4.4.1. Type rendezvous
- A4.4.2. Holding procedures/formation
- A4.4.3. Ground radar assistance
- A4.4.4. Tanker identification - A/A TACAN/ground radar/visual
- A4.4.5. Wingman/deputy lead responsibilities
- A4.4.6. Receiver formation/join-up procedures
- A4.4.7. Rendezvous overrun

**A4.5. Refueling:**

- A4.5.1. Checklist procedures
- A4.5.2. Radio calls
- A4.5.3. Refueling order
- A4.5.4. Techniques

A4.5.5. Radio silent procedures (visual signals)

A4.5.5.1. Visual signals

A4.5.5.2. EMCON

A4.5.6. Fuel off-load

A4.5.7. Abort points/abort bases

A4.5.8. Drop-off procedures

A4.5.9. Wake turbulence

**A4.6. Rejoin and Exit:**

A4.6.1. Formation

A4.6.2. Clearance

**A4.7. Emergency Procedures:**

A4.7.1. Breakaway procedures

A4.7.2. Systems malfunctions

A4.7.3. Damaged receptacle

**A4.8. IMC/Night Considerations (if applicable):**

A4.8.1. Lost wingman procedures

A4.8.2. En route

A4.8.3. On the tanker

A4.8.4. Aircraft lighting

**A4.9. Special Subjects:**

A4.9.1. Alternate mission

A4.9.2. Spatial disorientation

A4.9.3. Hazards associated with human factors (i.e., Channelized attention, complacency, and task saturation/prioritization).

**Attachment 5****COMBAT BRIEFING GUIDE****A5.1. Time Hack****A5.2. Objectives****A5.3. Overview**

- A5.3.1. Ground operations
- A5.3.2. Takeoff/departure/route
- A5.3.3. Update points
- A5.3.4. Ingress
- A5.3.5. RTB
- A5.3.6. Approaches/diverts

**A5.4. Scenario/Intel:**

- A5.4.1. Theater of operations
- A5.4.2. Political borders checks
- A5.4.3. FLOT/FSCL
- A5.4.4. Safe areas/contact procedures
- A5.4.5. Stealth lines/fence checks
- A5.4.6. Roe collateral/no collateral
- A5.4.7. Support assets/locations

**A5.5. Weather/NOTAMS:**

- A5.5.1. Homeplate/alternate
- A5.5.2. Enroute
- A5.5.3. Target area
  - A5.5.3.1. Altimeter/cloud bases
  - A5.5.3.2. D-value/winds
  - A5.5.3.3. Moon rise/illumination
  - A5.5.3.4. Absolute humidity
- A5.5.4. NOTAMS

**A5.6. Mission Data Card:**

- A5.6.1. Callsign/times/TOLD

- A5.6.2. Mission number
- A5.6.3. Tanker info
- A5.6.4. Joker
- A5.6.5. Bingo/Critical
- A5.6.6. Continuation fuel
- A5.6.7. Asset information

## **A5.7. Ground Operations:**

- A5.7.1. Pre-step
  - A5.7.1.1. Sanitize
  - A5.7.1.2. Vest/gun/glnt tape
  - A5.7.1.3. E&E maps/firefly
  - A5.7.1.4. AF Form 70/photos
  - A5.7.1.5. EDTM
  - A5.7.1.6. Flashlights
- A5.7.2. Preflight cockpit
  - A5.7.2.1. IRADS cooling
  - A5.7.2.2. EDTM loading/faults
  - A5.7.2.3. INS coords
  - A5.7.2.4. SMD (weapons/laser codes/bit checks)
- A5.7.3. Preflight aircraft
  - A5.7.3.1. RAM/butter/bubbles
  - A5.7.3.2. Forms
  - A5.7.3.3. Platy bricks
  - A5.7.3.4. Inert bottle
  - A5.7.3.5. KY-58 fill
- A5.7.4. Preflight weapons
  - A5.7.4.1. WLP (laser codes, bomb code)
  - A5.7.4.2. Bombs (guidance pkg., laser)
- A5.7.5. Taxi
  - A5.7.5.1. Time/comm procedures
  - A5.7.5.2. Route
  - A5.7.5.3. EOR check IRADS/INS/SMD

A5.7.6. Takeoff/departure

- A5.7.6.1. Heavyweight jettison
- A5.7.6.2. Aborts/engine failure plan
- A5.7.6.3. Departure procedures
- A5.7.6.4. NLT time/ make-up time/plan

**A5.8. Ingress Routing:**

- A5.8.1. Continuation/bingo fuels
- A5.8.2. Altitudes/MEAs
- A5.8.3. Sensor update points
- A5.8.4. Turns (hand fly vs. Autopilot)
- A5.8.5. Stealth line, GO/NO-GO
- A5.8.6. Lights/inert point
- A5.8.7. Threats
- A5.8.8. Route changes IRD
- A5.8.9. Timing/make up

**A5.9. Target Area:**

- A5.9.1. Attack plan
- A5.9.2. Pacing/switchology
- A5.9.3. Polarity changes
- A5.9.4. IRADS crosscheck
  - A5.9.4.1. ALG
  - A5.9.4.2. Grey scales
- A5.9.5. Threat locations/times

**A5.10. Targets:**

- A5.10.1. Acquisition plan/imagery
- A5.10.2. TGT descriptions
- A5.10.3. Offsets
- A5.10.4. Weapons
  - A5.10.4.1. Effects
  - A5.10.4.2. Delivery parameters
  - A5.10.4.3. TOF/LDT/ALDT

A5.10.4.4. DLIR look time

A5.10.4.5. Simultaneous effects

A5.10.4.6. Release ROE

A5.10.5. No sight plan

A5.10.6. WX backup plan

A5.10.7. Threat reaction

**A5.11. Egress:**

A5.11.1. Routing

A5.11.2. Contingencies

A5.11.3. Armament safety check

A5.11.4. Destealth/fence-out

A5.11.5. IFF line

A5.11.6. Antennas (radios/IFF)

A5.11.7. Inflight report

A5.11.8. AWACS/JSTARS/ABCCC

A5.11.9. Divert/wounded bird

A5.11.10. Jettison

**A5.12. RTB:**

A5.12.1. Safe passage procedures

A5.12.2. Inst approach

A5.12.3. Hung bomb procedures

**A5.13. Contingencies:**

A5.13.1. Wx avoidance

A5.13.1.1. TM wide

A5.13.1.2. Anti-ice

A5.13.2. Systems malfunction

A5.13.3. Early/late tot

A5.13.4. Emergency divert

A5.13.5. Dump targets

**A5.14. Mission Recap**

**A5.15. Peacetime Addendum:**

A5.15.1. Actual route/weapons

A5.15.2. Range/times

A5.15.3. Training rules

A5.15.4. Instructional briefing

A5.15.5. Flight briefing

**Attachment 6****AIR TO SURFACE WEAPONS EMPLOYMENT GUIDE****A6.1. Range Formation:**

- A6.1.1. Target/range description
- A6.1.2. Restrictions
- A6.1.3. Range entry/holding
- A6.1.4. Radio procedures
- A6.1.5. Formation
- A6.1.6. Sequence of events
- A6.1.7. Pattern procedures

**A6.2. Employment Procedures/Techniques:**

- A6.2.1. Switch positions
  - A6.2.1.1. Arming
  - A6.2.1.2. Displays
- A6.2.2. Final
  - A6.2.2.1. Airspeed
  - A6.2.2.2. Sight picture/corrections/aim-point
  - A6.2.2.3. Release parameters
  - A6.2.2.4. Release indications
  - A6.2.2.5. Recovery procedures

**A6.3. Special Subjects:**

- A6.3.1. Error analysis
- A6.3.2. Training rules/special operating instructions/procedures
- A6.3.3. Fouls
- A6.3.4. Minimum altitudes
- A6.3.5. Maneuvering limitations
  - A6.3.5.1. Aircraft
  - A6.3.5.2. Stores (carriage/release)
- A6.3.6. Target fixation
- A6.3.7. Time to ground impact
  - A6.3.7.1. Wings level

A6.3.7.2. Over bank with G loading

A6.3.8. Hazards associated with human factors (i.e., Channelized attention, complacency, and task saturation/prioritization).

**A6.4. Night Procedures (if applicable):**

A6.4.1. Aircraft lighting

A6.4.2. Radio calls

A6.4.3. Target id/range lighting

A6.4.4. Night spacing techniques

A6.4.5. Instrument crosscheck/disorientation

**A6.5. Over Water Range Operations:**

A6.5.1. Employment techniques

A6.5.1.1. Depth perception/reduced visual cues

A6.5.1.2. Distance/altitude estimation

A6.5.2. Special considerations

A6.5.2.1. Adjusted minimum altitudes

A6.5.2.2. Training rules/special operating procedures

**A6.6. Range Departure/Recovery:**

A6.6.1. Armament safety checks

A6.6.2. Rejoin

A6.6.3. Battle damage/bomb check

A6.6.4. Hung ordnance

A6.6.5. Inadvertent release

**Attachment 7****AIR COMBAT TRAINING/EXERCISE GUIDE****A7.1. Security:**

- A7.1.1. Normal mission procedures
- A7.1.2. Emergency recoveries
- A7.1.3. Divert
- A7.1.4. Bailout

**A7.2. Recovery/Landing:**

- A7.2.1. Rejoin
- A7.2.2. Battle damage/bomb check (if applicable)
- A7.2.3. Flight break-up (if applicable)
- A7.2.4. Contingency routing
  - A7.2.4.1. Hung/unexpended ordnance (if applicable)
  - A7.2.4.2. Weapons/aircraft malfunction (if applicable)
- A7.2.5. Pattern and landing
- A7.2.6. After landing/de-arm

**A7.3. Special Subjects:**

- A7.3.1. Instructor responsibilities
- A7.3.2. Chase procedures
- A7.3.3. IFF procedures
- A7.3.4. Radar/visual search responsibilities/midair collision avoidance
- A7.3.5. Dissimilar formations
- A7.3.6. Terrain avoidance
  - A7.3.6.1. Departure/enroute/recovery
  - A7.3.6.2. Use of radar altimeters
- A7.3.7. Bird strike procedures/use of visor(s)
- A7.3.8. Hazards associated with human factors (i.e., Channelized attention, complacency task saturation/prioritization).
- A7.3.9. Visual illusions/perceptions
- A7.3.10. Spatial disorientation/unusual attitudes
- A7.3.11. Lost wingman

A7.3.12. Radio inoperative

A7.3.13. SARCAP

A7.3.14. Recall procedures

A7.3.15. SIIs

A7.3.16. G-Awareness

**Attachment 8****LOW LEVEL NAVIGATION GUIDE****A8.1. General:**

- A8.1.1. Route/Clearance/Restrictions
- A8.1.2. Flight Responsibilities
  - A8.1.2.1. Navigation
  - A8.1.2.2. Visual Search
- A8.1.3. Entry/Spacing/Holding/Initial Altitude (MSA)

**A8.2. Route Procedures:**

- A8.2.1. Stealth Check/Fence Check
- A8.2.2. Formation/Turns
- A8.2.3. Low-Level Navigation
  - A8.2.3.1. Dead Reckoning
  - A8.2.3.2. Use of Nav Aids
  - A8.2.3.3. Use of INS
  - A8.2.3.4. Visual Procedures
  - A8.2.3.5. Updates
  - A8.2.3.6. Timing
  - A8.2.3.7. Fuel Awareness
  - A8.2.3.8. Terrain Avoidance/Following
  - A8.2.3.9. Leg Altitudes
    - A8.2.3.9.1. Obstacles
- A8.2.4. Threat Reactions/Avoidance

**A8.3. Emergencies:**

- A8.3.1. Aircraft Malfunctions
- A8.3.2. Route Abort Procedures/ATC Frequencies

**A8.4. TRs/Special Operation Instructions****A8.5. Alternate Mission:**

- A8.5.1. Type Mission
- A8.5.2. Mission Objectives

**A8.6. Special Subjects:**

A8.6.1. Airspace Restrictions

A8.6.2. Ops Checks

A8.6.3. Fuel Awareness/Consumption Rates

A8.6.4. Maneuvering Limits

A8.6.4.1. Airspeed

A8.6.4.2. Gs

A8.6.4.3. Recognition/Prevention/Recovery from Out of Control

A8.6.5. Time to Ground Impact

A8.6.5.1. Wings Level

A8.6.5.2. Over Bank/G-Loading

A8.6.6. Night Considerations

A8.6.7. Hazards Associated W/Human Factors (Channelized Attention, Task Saturation, Prioritization, and Complacency).

**Attachment 9****MISSION DEBRIEFING GUIDE****A9.1. Ground Procedures****A9.2. Takeoff, Join-Up, Departure****A9.3. En Route Procedures****A9.4. Recovery/Landing/After Landing****A9.5. General:**

A9.5.1. Radio procedures

A9.5.2. Flight discipline/effectiveness

A9.5.3. General areas for improvement

**A9.6. Specific Mission Accomplishment/Analysis:**

A9.6.1. Mission reconstruction

A9.6.2. Mission support (FAC, GCI, helicopters, etc.)

A9.6.3. VTR/film assessment (if applicable)

A9.6.4. Learning objectives achieved

A9.6.5. Lesson(s) learned

A9.6.6. Recommendations for improvement

**A9.7. Comments/Questions**