

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

**AIR FORCE INSTRUCTION 11-2B-2,  
VOLUME 3**



**3 MAY 2010**

***Flying Operations***

***B-2--OPERATIONS PROCEDURES***

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This volume establishes effective and safe operations of the B-2 and implements AFPD 11-2, *Aircraft Rules and Procedures*; AFPD 11-4, *Aviation Service*; and AFI 11-202V3, *General Flight Rules*. It establishes the minimum Air Force operations procedures for personnel performing duties in the B-2. This publication applies to the Air National Guard (ANG). MAJCOMs, Direct Reporting Units (DRU) and Field Operating Agencies (FOA) will forward proposed MAJCOM/DRU/FOA-level supplements to this volume to HQ AFFSA/A3OF, through HQ AFGSC/A3TO, for approval prior to publication IAW AFPD 11-2, paragraph 4.2. Copies of approved and published supplements will be provided by the issuing office to HQ AFFSA/A3OF, HQ AFGSC/A3TO, and the user MAJCOM/ DRU/FOA offices of primary responsibility (OPR). Field units below MAJCOM/DRU/FOA level will forward copies of their supplements to this publication to their parent MAJCOM/DRU/FOA OPR for review and approval prior to publication. NOTE: The above applies only to those DRUs/FOAs that report directly to HQ USAF. Keep supplements current by complying with AFI 33-360, *Publications and Forms Management*.

Waiver authority to this publication is set out in paragraph 1.3. See paragraph 1.3. for guidance on submitting comments and suggesting improvements.

This instruction requires the collection or maintenance of information protected by the Privacy Act of 1974. The authority to collect and maintain the records prescribed in this instruction are 37 USC 301a, Incentive Pay; Public Law 92-204 (Appropriations Act for 1973), Section 715; Public Law 93-570 (Appropriations Act for 1974); Public Law 93-294 (Aviation Career Incentive Act of 1974); DOD Instruction 7730.57, Aviation Career Incentive Act of 1974 and Required Annual Report; AFI 11-401, Aviation Management; and E.O. 9397, Numbering System for Federal Accounts Relating to Individual Persons as amended by Executive Order

13478, Amendments to Executive Order 9375 Relating to Federal Agency Use of Social Security Numbers, November 18, 2008. System of records notice F011 AF/XOA, Aviation Resource Management System (ARMS), applies.

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This instruction contains references to the following field (subordinate level) publications and forms which, until converted to departmental level publications and forms may be obtained from the respective MAJCOM publication distribution office.

**SUMMARY OF CHANGES**

This document has been changed to reflect the transfer of the bomber global strike mission from Air Combat Command (ACC) to Air Force Global Strike Command (AFGSC).

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## Chapter 1

### INTRODUCTION

**1.1. Scope and Responsibilities.** This volume, in conjunction with other governing directives in Attachment 1, outlines those procedures applicable to the safe operation of B-2 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. With complementary references, this volume prescribes standard operational procedures for all USAF B-2 crews.

**1.2. References, Abbreviations, Acronyms, and Terms.** See [Attachment 1](#). 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.

#### **1.3. Waivers.**

1.3.1. Forward waiver requests through appropriate channels to MAJCOM/A3 for approval.

1.3.2. Unless specified in the waiver approval message, the waiver remains in effect until the next AFI 11-2B-2V3 version.

1.3.3. Submit changes to this volume on AF Form 847, *Recommendation for Change of Publication* (flight publication) using local procedures.

**1.4. Deviations.** Deviations from these procedures require specific approval of MAJCOM/A3 unless an urgent requirement or an aircraft emergency dictates otherwise. In such a case, the aircraft commander will take the appropriate action to safely recover the aircraft.

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

## Chapter 2

### MISSION PLANNING

**2.1. Responsibilities.** The pilot in command of each aircraft and the designated flight lead are ultimately responsible for mission planning. Crewmembers are personally responsible for maintaining adequate knowledge of system operations, normal, and emergency procedures. The Weapons and Tactics Flight will provide supplemental planning information as required to effectively accomplish the assigned mission.

2.1.1. Accomplish flight planning to insure safe accomplishment of all phases of flight. As a minimum, flight planning includes takeoff/landing data, fuel requirements, target study/weapons delivery procedures/briefing (if applicable), formation procedures (if applicable), and chart preparation. Review bird advisory and bird hazard information IAW AFI 91-102 and AFPAM 91-212. Consider and factor in foreseeable safety risks and risk mitigation factors in accordance with Operational Risk management (ORM).

2.1.2. Standards. Groups may develop OG/CC approved Group/Wing standards. OG/OGV will review all standards to ensure standardization and compliance with AFI 11-series guidance.

2.1.3. Mission planning time. SQ/CCs will provide pilots sufficient time to mission plan. SQ/CCs should schedule no less than four hours for mission planning when pilots have standardized/stereo products available (“show and go” flight profiles). SQ/CCs should schedule a minimum of eight hours of mission planning for actual weapons deliveries, airshow/flyby profiles, or any non-standard mission.

### **2.2. Map/chart preparation.**

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

2.2.2. Enroute Charts. Pilots may use Flight Information Publication (FLIP) enroute charts instead of maps on navigational flights within areas that adequately covered by FLIP. These charts will be of sufficient scale to provide navigation and terrain/obstacle avoidance.

2.2.3. PFPS/Sectional Charts.

2.2.3.1. Pilots flying under VFR, inside the MTRs, in low-altitude MOAs, or performing VFR flybys in the CONUS will supplement existing mission planning materials (e.g. CHUM, FLIP AP/1B, etc.) with one of the following:

2.2.3.1.1. PFPS/Falcon View with the following overlay options selected: airports/heliports, airspace boundaries, airways, MTR, parachute jump and SUAS boundaries.

2.2.3.1.2. Sectional aeronautical charts.

2.2.4. Low Level Charts. Low level charts and route books used during flight will be annotated with location and dimensions of Class A/B/C/D airspace, civil/military airfields and other potential high density traffic areas (e.g., parachute activity areas and ultra

light/hang glider/glider sites, etc.) within 5 NM of any planned VFR route or MTR lateral boundary. Applicable airfield approach control frequencies in the vicinity of Class A/B/C/D airspace will be annotated and briefed on all such flights. In addition, annotate and brief the intersection of other VR/IR routes (if applicable) and any other possible areas of conflict.

2.2.4.1. Low level charts and route books will also be annotated with a minimum safe altitude (MSA) or route abort altitude (RAA) for each leg, updated by the Chart Update Manual (CHUM), and annotated for all man-made obstacles above the planned flight altitude.

2.2.5. Pilots flying outside CONUS will follow gaining MAJCOM, theater or host nation guidance on mission planning. If no gaining MAJCOM, theater or host nation guidance exists, use the best charts or Falcon View overlay options available to comply with this instruction's requirements.

**2.3. CBRNE.** Procedures for operation in a CBRNE-threat environment are contained in Attachment 2.

**2.4. Fuel Conservation.** Manage aviation fuel as a limited commodity and precious resource. Design procedures for optimal fuel use and efficiencies throughout all phases of mission execution, to include ground operations, flight plans, power settings, and climb/descent profiles. Incorporate enroute tasks to make maximum use of airborne learning opportunities.

**2.5. Briefing/Debriefing.**

2.5.1. The aircraft commander (AC) or flight lead (FL) establishes mission goals and objectives.

2.5.2. AC/FL will present a logical briefing to promote the safe and effective mission accomplishment. AC/FL will brief contracts, roles, and responsibilities for all crew/flight members.

2.5.3. All flight members must attend the flight briefing unless previously coordinated with squadron supervision. Anyone not attending the flight brief must receive a briefing on mission events and emergency procedures. If the interval from the initial briefing to takeoff exceeds 72 hours, a complete review and briefing must be re-accomplished. All crews involved in a formation flight must attend a formation briefing.

2.5.4. AC/FLs will brief all items required by Air Force Instructions (AFIs) and the flight crew information file (FCIF). AC/FLs may use locally developed briefing guides that cover all AFI briefing requirements. Those items published in AFIs, Air Force Tactics, Techniques and Procedures (AFTTPs) Manuals, or squadron/wing standards and understood by all flight members may be briefed as "standard."

2.5.5. Alternate mission. AC/FLs will brief an appropriate alternate mission.

2.5.6. Debriefing. AC/FLs will formally debrief every mission for all flight/crew members. As soon as possible after each mission, AC/FLs will review audio/visual mission recording media, if available.

**2.6. Unit Developed Checklists/Local Pilot Aids.**

2.6.1. Except for -25 checklists, unit developed checklists may be used in lieu of flight manual checklists provided they contain all items (verbatim and in order) listed in the applicable checklist.

2.6.2. Units will produce a pilot aid that includes as a minimum:

2.6.2.1. Briefing guides.

2.6.2.2. Local VHF/UHF/HF/VSAT/LINK-16 channelization.

2.6.2.3. Airfield diagram.

2.6.2.4. NORDO procedures.

2.6.2.5. Impoundment procedures.

2.6.2.6. Fuel dump and weapons jettison areas.

2.6.2.7. Divert/alternate base information.

2.6.2.8. Recovery with ferried, retained, or hung weapons on board.

2.6.2.9. On-scene commander procedures for CSAR operations.

2.6.2.10. Other information as deemed necessary by the unit, such as stereo flight plans, ERCC/taxi-back procedures, local training areas/MOAs/ATCAA diagrams, alert procedures, and maintenance brevity codes.

**2.7. Personal Equipment.** Pilots will fly with adequate flight gear to ensure safe mission completion. Pilots will wear survival vests on all sorties utilizing combat step procedures from fence-in to fence-out. Pilots will carry survival vests on ocean crossing flights. Crewmembers will wear gloves during engine start, takeoff, and landing.

## Chapter 3

### NORMAL OPERATING PROCEDURES

**3.1. Ground Communications.** Pilots will brief ground crews as required. Use operational headsets to the maximum extent possible during all engine starts, pre-taxi checks, and when technicians perform tasks on the aircraft. Use hand signals as a last resort or if required during alert scrambles or combat operation.

**3.2. Ground Visual Signals.** When ground intercom is not available, use visual signals IAW AFI 11-218. All signals pertaining to operation of aircraft systems will originate with the pilot. The crew chief will repeat the signal when it is safe to operate the system. Pilots will not activate any system that poses a danger to the ground crew prior to receiving proper acknowledgment from ground personnel.

#### **3.3. Preflight.**

3.3.1. Icing. Do not take off with visible icing (snow, frost, or ice) on any part of the aircraft.

3.3.2. Flight control BITs (ABIT). Pilots will complete an ABIT of the FCS after performing any flight control (FC) memory reads. Pilots will not perform FC air event memory reads.

#### **3.4. Taxi.**

3.4.1. Minimum taxi interval is 500 feet.

3.4.2. Do not taxi with a reported RCR of less than 6 anywhere on the taxi route. Taxi routes must be cleared to a minimum of 75 feet wide for taxi RCR purposes.

3.4.3. During normal operating procedures, maximum taxi speed is 15 knots groundspeed and 10 knots during turns or high gain operations. Refer to command guidance for taxi limits greater than 15 knots.

3.4.4. Taxi over cables from BAK-9/BAK-15 as slow as possible not to exceed 10 knots ground speed.

#### **3.5. Takeoff.**

3.5.1. Do not takeoff if any of the following conditions exist:

3.5.1.1. The RCR is less than 9 (can be waived by OG/CC).

3.5.1.2. Standing or pooled water is on the runway.

3.5.1.3. The computed takeoff roll exceeds 80% of the available runway (can be waived by OG/CC).

3.5.1.4. The tailwind exceeds 10 knots (can be waived by OG/CC).

3.5.1.5. Any attitude indicator, heading indicator, or standby instrument is inoperative.

3.5.1.6. One or more engines are inoperative from the start of takeoff roll.

3.5.1.6.1. During emergency evacuations and at the discretion of the wing commander or with higher headquarters approval, aircraft may takeoff with one or more engines inoperative. Under no circumstances should a crew take off with a computed takeoff distance that exceeds 95 percent of runway available.

3.5.2. Intersection takeoffs require OG/CC approval.

3.5.3. Runways must be cleared to 150 feet width (+/-75 feet of centerline).

3.5.4. Do not takeoff over any raised web barrier (MA-1A or 61QS11). Do not start takeoff roll or land prior to approach end cables. Takeoffs accomplished beyond approach end cables must have 10,000 feet runway remaining, plus 1000 feet overrun and still comply with applicable takeoff restrictions.

### **3.6. Formation.**

3.6.1. Responsibilities. FLs are responsible for ensuring contracts, roles and responsibilities of each flight member are established, briefed, executed, and debriefed. If any flight member cannot meet their responsibilities, contracts, or assigned tasks then they will immediately communicate that information to the FL.

3.6.2. Maximum formation size is normally three aircraft, but can be as many as 6 aircraft.

3.6.3. Maintain a minimum of 500 feet vertical altitude separation between aircraft.

3.6.4. Notify ATC when operating as a non-standard formation on flight plans, on initial ATC contact, and when contacting each subsequent controller.

3.6.5. Radio Procedures.

3.6.5.1. Except for wingman acknowledgement, preface all communications with the complete flight call \sign. Transmit only information essential for mission accomplishment or safety of flight.

3.6.5.2. Make a “knock-it-off” (KIO) or “terminate” call IAW AFI 11-214. Any flight member may call KIO or terminate. All participants will acknowledge a KIO by repeating the call.

3.6.5.3. Acknowledge radio checks which do not require the transmission of specific data by individual flight members in turn (i.e. “2, 3”). Acknowledging indicates that the appropriate action is complete, in the process of completion, or the flight member understands.

3.6.5.4. All flight members will acknowledge the initial air traffic control (ATC) clearance. Acknowledge subsequent ATC instructions when directed by lead.

3.6.6. Takeoffs. Formation takeoff spacing is one minute minimum but can be waived to 30 seconds by the OG/CC. Nuclear training multi-ship minimum interval takeoffs (MITOs) require OG/CC approval.

3.6.6.1. Use caution for wake turbulence on departure, and adjust climb routing to avoid areas of potential wake turbulence. Appropriate fan headings will be flown for all MITOs to account for preceding aircraft’s wake turbulence. If wake turbulence is encountered, smoothly adjust flight path laterally to exit turbulence. Do not adjust throttles and use caution for G limitations

### 3.6.7. Join-Up/Rejoin.

3.6.7.1. Lead will ensure a minimum of 1000-foot altitude separation between each aircraft for formation rejoins.

3.6.7.2. IMC. Until all wingmen report either visual or tied, FL will report passing every 5000 feet with current and planned rollout heading (if applicable). Wingmen will echo their respective current altitudes and heading. Wingmen will not climb through preceding aircraft's altitude until visual or tied. Wingmen will delay turns until over the same point as the previous aircraft.

3.6.7.3. VMC. Wingmen may use visual cutoff to expedite rejoins. Avoid flight through wingtip vortices and jet wash. If encountered, immediately decouple the autopilot (if engaged) and unload the aircraft to approximately 1G.

3.6.8. Formation breakup. FL will not break up formation until each wingman has a positive fix to navigate with, and to (visual, INS, GPS, or TACAN).

### 3.6.9. Changing Leads/Position Changes:

3.6.9.1. Accomplish lead changes from a stabilized and wings level attitude.

3.6.9.2. Maintain a minimum of 500 feet vertical separation during lead/position changes.

3.6.9.3. Initiate lead changes with a radio call. Wingmen will acknowledge the radio call.

3.6.9.4. The lead change is effective upon acknowledgment.

3.6.9.5. The former leader then moves to the appropriate wing position.

3.6.9.6. VMC Lead/Position Changes. FL announces intention for a position/lead change. After wingman acknowledgement, the affected wingman moves to a line abreast position with a minimum of 1000 feet wing tip spacing. Lead then directs the position/lead change. After wingman acknowledgment, aircraft then change altitudes appropriate for their new positions. The former lead/'new' two will move aft to the trailing wingman position and assume radar trail.

3.6.9.7. IMC Lead/Position Changes.

#### 3.6.9.7.1. Formation Position Change--Any Aircraft Moves to Lead:

3.6.9.7.1.1. Step 1. Lead determines the aircraft to move forward (maneuvering aircraft). The maneuvering aircraft will echelon (normally right) using 30 degrees of bank and turning 30 degrees off heading. When aircraft is 30 degrees off heading, reverse the turn using 30 degrees of bank and return to formation heading. This provides approximately 2 NM offset.

3.6.9.7.1.2. Step 2. After established in echelon, the maneuvering aircraft will accelerate forward, increasing airspeed 30 KIAS maximum. The maneuvering aircraft should resume formation airspeed and stabilize approximately 1¼ NM forward from the original lead. When the maneuvering aircraft is in the forward echelon and positive visual and/or radar contact is established, conduct the required altitude changes. **Note:** altitude changes may be accomplished in

Stabilized aft echelon position so long as all trailing aircraft maintain visual and/or radar contact with the preceding aircraft.

3.6.9.7.1.3. Step 3. The maneuvering aircraft will then assume lead position and clear the formation members to fall into trail position.

3.6.9.7.1.4. Step 4. The formation lead should be advised by the last aircraft after the formation is reformed.

3.6.9.7.2. Formation Position Change--Any Aircraft to the End of the Formation:

3.6.9.7.2.1. Step 1. Lead determines the aircraft to move aft (maneuvering aircraft). The maneuvering aircraft will echelon (normally right) using 30 degrees of bank and turning 30 degrees from the formation heading. After turning 30 degrees off heading, reverse the turn using 30 degrees of bank and return to formation heading. This will provide approximately 2 NM of offset.

3.6.9.7.2.2. Step 2. After establishing in echelon, the maneuvering aircraft will decelerate toward the end of the formation, decreasing airspeed 30 KIAS maximum. The maneuvering aircraft should resume formation airspeed and stabilize approximately  $\frac{3}{4}$  NM aft of the last aircraft. When the maneuvering aircraft is in the aft echelon position and positive visual and/or radar contact is established, formation lead directs required altitude changes. **Note:** Altitude changes may be accomplished in a stabilized forward echelon position so long as all trailing aircraft maintain visual and/or radar contact with the preceding aircraft.

3.6.9.7.2.3. Step 3. The maneuvering aircraft will then move into trail position using no more than 15 degree heading corrections.

3.6.9.7.2.4. Step 4. The formation lead should be advised by the last aircraft after the formation is reformed.

3.6.10. Formation Deconfliction.

3.6.10.1. General. FL will brief deconfliction contracts and ensure that all wingmen understand their responsibilities. Wingmen have the primary responsibility for safe separation and are responsible for executing the FL contracts.

3.6.10.2. Loss of visual/radar lock. Use the following procedures if any flight member loses visual/radar contact within the formation:

3.6.10.2.1. Wingmen will call "blind/broke lock" when unable to monitor preceding aircraft's position.

3.6.10.2.2. After a blind/broke lock call from any formation member, lead immediately will communicate current heading and altitude and then repeat heading and altitude parameters every 1000 feet until all formation members are tied or visual.

3.6.10.2.3. If there is not a timely acknowledgement of the original "blind/broke lock" call, then the flight member initiating the call will maneuver away from the last known position of the other flight members and obtain a separate clearance.

3.6.10.3. Broke Lock and Lost Comm. If a wingman becomes "broke lock" and is unable to contact the lead aircraft, the wingman will utilize all available communications

devices on board the B-2 to establish contact with lead. Simultaneously, the wingman must take positive steps to ensure separation. If in straight and level flight, maintain established altitude separation and previously cleared flight path. If straight ahead and in a climb or descent, turn fifteen degrees away from lead's last known heading. If in a turn and in a climb or descent, roll out to obtain separation and ensure flight path clearance. If all attempts to regain contact with lead aircraft fail, attempt to contact ATC to obtain a separate clearance.

3.6.10.4. Mid-mission/late rejoins. Rejoining aircraft require radio contact, visual or radar contact, and 1000 feet altitude separation before rejoining any formation. If applicable, accept "military assumes responsibility for separation of aircraft" (MARSA) with ATC only after ensuring altitude separation.

### 3.6.11. Formation air refueling.

3.6.11.1. Initial Rejoin. Cross the rendezvous point in trail formation. If IMC, lead directs wingmen to move to echelon after the formation is rolled out behind the tanker(s). If VMC and pre-briefed by FL, wingman may automatically assume echelon position with the tanker(s) in sight.

3.6.11.2. Post refueling rejoins. After completing air refueling, lead moves to a two mile left 60 degree echelon position stacked down 2000 feet from the air refueling base altitude of the lead tanker. After completing refueling, the number two aircraft stacks down 1500 feet, and assumes a trail position behind lead. Post refueling, number three stacks down 1000 feet and moves to a trail position behind two. Lead will coordinate with the tanker lead for a larger altitude block, if required.

3.6.11.3. Comply with further formation air refueling procedures IAW ATTP-56(B).

## 3.7. Air Refueling.

3.7.1. Air refueling operations are authorized along published routes/tracks. Random air refueling is authorized with ARTCC approval. After completing the rendezvous, maintain formation with the tanker. The tanker is responsible for navigation.

### 3.7.2. Air Refueling Restrictions.

3.7.2.1. Do not conduct air refueling with control stick steering engaged.

3.7.2.2. Do not conduct air refueling with an FCS CAUTION, except when necessary for safe recovery of the aircraft.

3.7.2.3. Do not conduct air refueling when encountering turbulence which, in the opinion of the pilot-in-command or boom operator, denies a safe margin of control of either aircraft or boom.

3.7.2.4. Do not conduct air refueling with less than four engines operating, except when necessary for safe recovery of the aircraft. Simulated engine out air refueling is permitted under IP supervision. Pilots will place no more than one throttle to idle to simulate the loss of one engine.

3.7.2.5. Do not conduct air refueling when the tanker has less than all engines operating, unless required for safe recovery of the aircraft.

3.7.2.6. Do not conduct air refueling when any flight control problems are suspected or encountered in flight which, in the opinion of the receiver aircraft commander, would deny a safe margin of control.

3.7.2.7. Do not conduct air refueling when tanker aircraft is unable to retract landing gear.

3.7.2.8. Discontinue air refueling after loss of all tanker disconnect capability, except during the following conditions:

3.7.2.8.1. During an emergency fuel situation (limit contact time to that required to obtain fuel).

3.7.2.8.2. Operational missions, ORI, emergency evacuations or deployments/re-deployments (limit contact time to that required to obtain fuel).

3.7.2.9. Boom wet downs from the contact position with JP-4 (Emergency/Alternate fuel) are acceptable as long as the total quantity passed does not exceed one percent of total fuel in tanks.

### 3.7.3. Breakaway Training.

3.7.3.1. The tanker pilot, boom operator, and receiver pilot will brief breakaway training prior to initiation. The briefing must include when the maneuver will occur and who gives the execution command.

3.7.3.2. Do not accomplish breakaway training while in contact.

### 3.7.4. Boom Limits Demonstration.

3.7.4.1. Boom envelope demonstrations require IP supervision.

3.7.4.2. The boom operator and the receiver pilot will confirm normal disconnect capability prior to the start of the demonstration.

3.7.4.3. The receiver pilot will inform the boom operator when starting the demonstration, the limit demonstrated, and when terminating the demonstration.

3.7.5. Override Boom Latching Procedures. Override boom latching procedures training require an instructor pilot. Pilots and boom operators will pre-brief procedures. Both tanker and receiver systems must be fully operational.

## 3.8. Approaches and Landings.

3.8.1. Maximum bank angle in the traffic pattern is 45 degrees.

3.8.2. Landing touchdown zone. The normal touchdown zone for full stop and touch and go landings is 750 -2500 feet beyond the threshold on runway centerline. Pilots should consider a go-around for landings outside the normal touchdown zone.

3.8.3. Autopilot. When flying coupled instrument approaches, disengage the autopilot no lower than decision height or minimum descent altitude.

3.8.4. Landings beyond approach end cables will be accomplished with at least 10,000 feet runway remaining plus 1000 feet of overrun. When 1000 feet of overrun are not available, reserve 1000 feet of the runway to satisfy the minimum overrun requirements.

3.8.5. Table 3.1. provides traffic pattern and landing limitations and restrictions.

**Table 3.1. Traffic Pattern and Landing Limitations and Restrictions.**

Approach Type	Notes	Maximum gross weight	Maximum crosswind	Minimum weather	IP required	Night	Minimum RCR
Full stop landing	1	311,500	30	Approach mins	No	Yes	9
Normal low approach		300,000	N/A	Approach mins	No	Yes	N/A
Touch and go	2	270,000	20 25 (w/IP)	300-1 (w/IP) 500-1 1/2 (or nonprec mins whichever is	No	Yes	9
Normal master mode touch and	2, 3	270,000	25	300-1	Yes	Yes	9
Sim Eng Out Low Apprch	4, 5	270,000	N/A	Note 6	No	Yes	N/A
Sim Eng Out Touch and Go/Full Stop	5	270,000	25	Note 6.	Yes	Yes	13

Notes:

1. OG/CC approval required for full stop landings at gross weights exceeding 285,000.
2. Do not accomplish touch and go landings with any of the following:
  1. Any landing gear malfunction (including gear door malfunctions and nosewheel steering malfunctions)
  2. Any brake or anti-skid failure indications, any flight control caution or warning
  3. Center of gravity outside landing limits
  4. Runway length insufficient to abort a touch-and-go and stop in the remaining runway
  5. Any live or inert weapons on board
3. Accomplish normal master mode approaches without approach mode and without speed brakes extended.
4. Initiate low approach/go-around no lower than 200 height above touchdown.
5. Use four engines for non-briefed/unplanned go-arounds.
6. Weather required is 1,000 feet/2 miles visibility or circling minimums, whichever is higher.

**3.9. Airshow/Flyby Profiles.** The following are approved airshow/flyby profiles:

3.9.1. Profile 1--Straight Thru Pass. Profile consists of a 1000 foot AGL (minimum altitude), clean configuration pass over the runway at 200 to 250 knots based on aircraft gross weight. If the show line is a non-runway environment then use 1000 feet above the highest obstacle within 2000 feet. Following the straight thru pass, aircraft will climbout IAW ATC instructions. If a high angle climbout is desired, this profile may be combined with the climbout portion of Profile 2.

3.9.2. Profile 2--Tear Drop Pass. Profile begins via a straight run-in down the show line of the viewing audience at 200 to 250 knots, based on aircraft gross weight. Minimum altitude for this maneuver is 1000 feet AGL. If the show line is a non-runway environment then use 1000 feet above the highest obstacle within 2000 feet. Upon completion of the straight run-in pass, track outbound approximately 1 nautical mile then execute a 240 degree turn away from the show line (rolling out momentarily at 90 degrees to the show line for clearing) so as to roll out directed towards show center tracking 30 degrees off runway or show centerline. At show center accomplish a turn away from show center and track outbound 30 degrees off runway or show centerline. All bank angles will be planned for 40 degrees (not to exceed 45 degrees). Execute turns so as to fly no closer than 1000 feet from the crowd line. If departing after this profile, at show center, execute a climbing turn (at MCT) at 40 degrees of bank away from the crowd line. Comply with climbout in accordance with ATC instructions.

3.9.3. Profile 3--360 degree (box pattern). Profile consists of a 1000 foot AGL (minimum altitude), clean configuration pass over the runway at 200 to 250 knots based on aircraft gross weight. If the show line is a non-runway environment then use 1000 feet above the highest obstacle within 2000 feet. Following the straight thru pass, execute a turn away from the crowd line and fly a rectangular box pattern to a second pass at 1000 feet AGL (roll out momentarily at perpendicular headings to the show line for clearing). All bank angles will be planned for 40 (not to exceed 45) degrees. At this time the aircraft will execute a level pass and depart the area.

**3.10. Chase Formation.**

3.10.1. The OG/CC determines when a B-2 flight requires a chase flight.

3.10.2. Minimum chase spacing from a B-2 is 150 feet.

3.10.3. Chase aircraft will not fly directly over or under B-2 aircraft.

3.10.4. All aircraft in the chase formation will use a common UHF frequency.

**3.11. Reduced Lighting Training.** Conduct reduced lighting training only in approved airspace.**3.12. After Landing Procedures.**

3.12.1. Weapons bay doors. Do not open the weapons bay doors until the aircraft reaches its final parking location and a ground observer is available.

3.12.2. Fuel distribution and center of gravity. To allow APU refueling, manually adjust fuel so that each main tank fuel quantity is below 18,000#s, each inboard tank fuel quantity is below 19,400#s, and each outboard tank fuel quantity is below 14,300#s. Accomplish fuel adjustments after exiting the runway and prior to engine shutdown. Maintain CG within the

flight CG envelope during taxi. To avoid fuel venting overboard, ensure the outboard tanks are below 14,300#s prior to engine shutdown following any preflight or alert cocking.

3.12.3. Unless maintenance requests otherwise, close aux air doors and open the ARSSI prior to engine shutdown.

3.12.4. Pilots will complete a post-flight walk-around inspection of the aircraft and weapons bays.

### **3.13. Hot Pit Refueling (HPR).**

3.13.1. HPR certified pilots and ground crews may conduct HPR day or night.

3.13.2. HPR with a pentagraph requires a separate brake check area away from the refueling pits. HPR with R-11 or R-12A trucks does not require a separate brake check area.

3.13.3. Outgoing ERCC crews normally perform HPR. Do not ERCC adjacent to aircraft conducting HPR operations.

3.13.4. Do not conduct HPR if brake temperatures exceed 700 degrees Fahrenheit. After brakes cool to below 700 degrees, HPR is permitted.

3.13.5. Pilots will monitor aircraft CG during HPR because with the ground refuel panel powered, the FMMS does not monitor CG. The fuel panel fuel management switch position (AUTO or MAN) will not prevent exceeding CG limits.

3.13.6. Pilots will verbally confirm to the maintenance crew that hands, feet and knees are clear of all flight controls prior to commencing HPR.

3.13.7. Do not perform any avionics operations or maintenance operations during HPR. Only transmit UHF/VHF if required for an emergency. Pilots will notify ground refueling crews prior to any radio transmissions.

3.13.8. Do not HPR with weapons, live or inert, aboard the aircraft.

3.13.9. Do not HPR if fuel was dumped during flight or if fuel is in the surge tank.

### **3.14. Fuel minimums.**

3.14.1. Normal fuel for recovery is 18,000 lbs.

3.14.2. Minimum fuel is 15,000 lbs.

3.14.3. Emergency fuel is 10,000 lbs.

3.14.4. Remote or island destination (IAW AFI 11-202v3 AFGSC Sup) fuel reserve is 30,000 lbs. If the remote or island destination requires an alternate due to weather, then the fuel reserve must include enough fuel for two hours of holding.

## Chapter 4

### INSTRUMENT PROCEDURES

**4.1. Approach Category.** The B-2A is designated as an approach category D aircraft. If the airspeed for a circling approach exceeds 166 knots, use category E minima.

**4.2. Simulated Instrument Flight Procedures.**

4.2.1. Synthetic ILS (SILS) and Synthetic TACAN (STACAN) approaches require VMC. Visual glide path guidance is required at night.

**4.3. Flight in Precipitation/Icing Procedures.**

4.3.1. Lightning Strike/Static Discharge. In the event of a known or suspected lightning strike or static discharge, terminate the mission and maintain below 250 KCAS when practical.

4.3.2. Avoid thunderstorms laterally by 20 NM when below FL 200.

4.3.3. Avoid thunderstorms laterally by 40 NM when at or above FL 200.

4.3.4. When at or above FL 200, stay VMC when within 40 NM of any convective activity, not just thunderstorms, which have built above FL 200.

4.3.5. Avoid cruising at altitudes in IMC, or in areas of precipitation, that are within +/-5000 feet or +/- 10 degrees Celsius of the forecast freezing level. Climb or descend through these areas as rapidly as is safely possible.

4.3.6. Do not climb or descend through forecast or reported icing conditions greater than light.

4.3.7. Do not cruise in any forecast or actual icing conditions.

4.3.8. Maintain Mach .65 or greater to minimize amount of ice accumulated (in icing conditions).

4.3.9. Minimize throttle movements with anti-ice/rain removal operating

**4.4. INS/GPS/RVSM Flight.**

4.4.1. RNAV and GPS approaches are not authorized.

4.4.2. Reduced Vertical Separation Minimum (RVSM) Airspace. Airspace where RVSM is applied is considered special qualification airspace. Both the aircrew and the specific aircraft must be approved for operations in these areas. All B-2As are approved for restricted operation within RVSM airspace as documented in Figure 4.1 B-2A RVSM Envelope Limitations. Refer to FLIP GP and the following guidance for additional RVSM requirements:

4.4.3. Required RVSM Equipment. Both altimeters (MDUs, one display before each pilot, and the standby altimeter), the autopilot altitude hold function, the IFF transponder altitude reporting (Mode C), and the flight control system (to include the air data ports and their heaters) must be fully operational (defined as not more than single channel failed) before entry into RVSM airspace. Should any failures of this equipment beyond the allowable single

channel failure occur, immediately notify ATC and coordinate further clearance. If failure occurs before entering RVSM airspace, request a new clearance so as to avoid this airspace, or request ATC special handling as a non-equipped aircraft.

4.4.3.1. Autopilot. The altitude hold function of the autopilot shall be engaged throughout level cruise periods in RVSM airspace, except when special circumstances dictate, such as when turbulence procedures require disengagement. Report any aircraft deviations greater than 130 ft from the commanded altitude to maintenance.

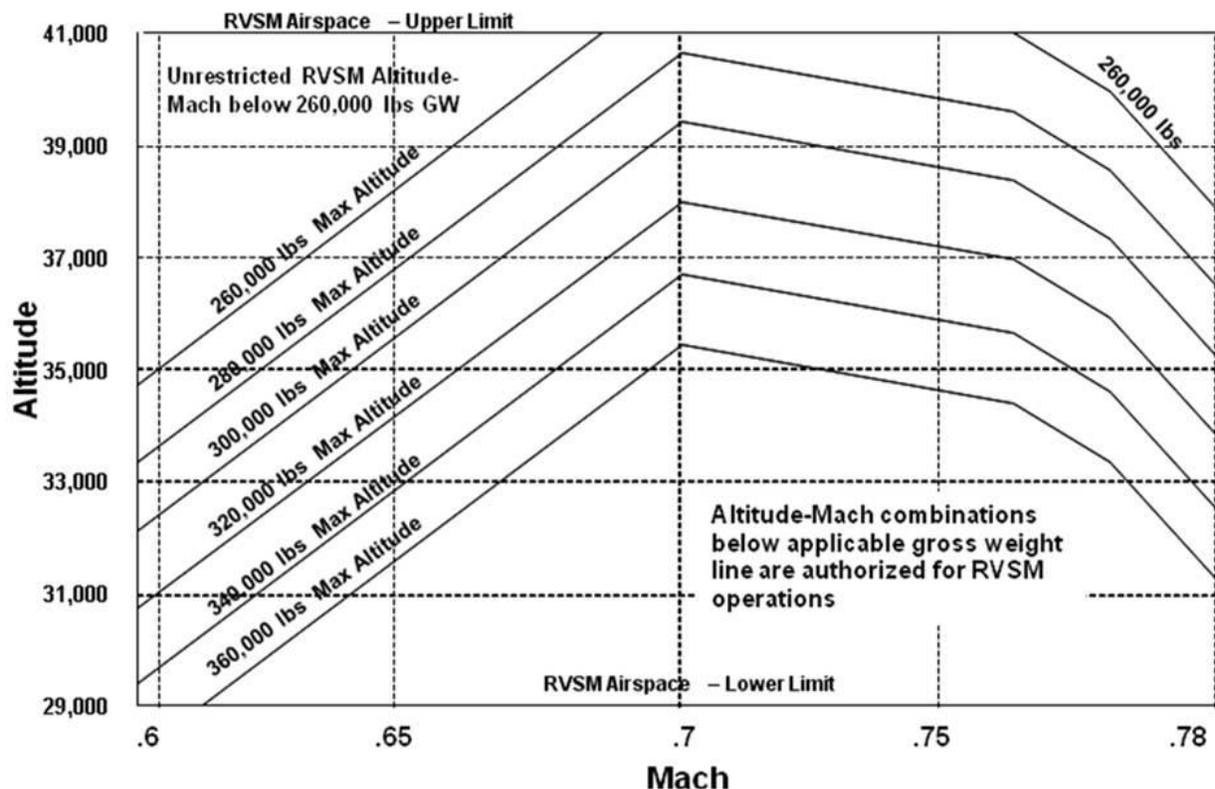
4.4.3.2. Altimeters. Crosscheck primary altitude displays with standby altimeter, before or immediately upon entry to RVSM airspace. After final level off in RVSM airspace the PIC will ensure that the readings of all altimeters are recorded (AVTR of both VSD's) and retained for use in case of deviation.

4.4.4. RVSM Operations. Monitor systems and crosscheck altimeters on primary displays to ensure they agree +/- 10 ft.

4.4.4.1. Aircrews should limit climb and descent rates to a maximum of 1,000 feet per minute when operating in RVSM airspace to reduce potential effects on other aircraft's Traffic Alert and Collision Avoidance System (TCAS) operations, and to minimize risk of overshooting desired altitude during level-off.

4.4.5. Post Flight. Document (in the AFTO Forms 781) malfunctions or failures of RVSM required equipment, including the failure of this equipment to meet RVSM tolerances.

**Figure 4.1. B-2A RVSM Envelope Limitations.**



**NOTE: B-2 RVSM Restricted Operating Envelope.**

**4.5. B-2 BRNAV, RNP-10, MNPS RNP-12. 6.** The B-2 aircraft is cleared for operations in Basic Area Navigation (BRNAV), Required Navigation Performance-10 (RNP-10), and North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS) airspace.

## Chapter 5

### PILOT OPERATIONAL LIMITATIONS AND RESTRICTIONS

**5.1. Scope.** This chapter adds B-2 aircraft limitations and restrictions to those already specified in flight manuals and other portions of this instruction and apply to all AFGSC aircrews.

**5.2. Crew Requirements.** The minimum crew is specified in T.O. 1B-2A-1. Waiver information for special situations is in AFI 11-2B-2V 1.

#### **5.3. General Limitations.**

5.3.1. New/Modified Aircraft and Equipment. Pilots not qualified in the operation of new or modified aircraft equipment will not operate that equipment unless under the supervision of an instructor pilot qualified in that equipment.

5.3.2. Authorized Fuel Loads. Aircraft will be loaded with standard fuel loads IAW T.O. 1B-2A-5-2.

#### **5.4. Pilot and Aircraft Limitations.**

5.4.1. Brief all practice AFTTP 3-1 maneuvers or emergency procedures before the maneuver.

5.4.2. Do not practice compound simulated emergencies during critical phases of flight except those specifically authorized for Flight Instructor Course (FIC) training.

5.4.3. After taking the appropriate action to rectify a malfunction, resume training only if the designated pilot in command determines no hazard to safe aircraft operations exists. In an actual emergency, terminate all training and emergency procedures practice.

5.4.4. Pilots must be Combat Mission Ready to operate an aircraft armed with nuclear weapons.

## Chapter 6

### AIR-TO-SURFACE WEAPONS EMPLOYMENT

**6.1. References.** AFI 11-214 contains air-to-surface procedures applicable to all aircraft. This chapter specifies procedures applicable to B-2 operations.

**6.2. General.**

6.2.1. Do not release weapons if a release system, indicator, or weapon bay door malfunction exists, unless the malfunction is only a loss of redundancy which does not affect weapons accuracy or normal weapons release (e.g., single power drive unit controller failure).

6.2.2. Do not conduct simulated bomb runs, unusual maneuvers, or touch and go landings while carrying weapons.

6.2.3. Do not complete weapon unlock/release enable/release consent for live or inert weapons until the aircraft is on the range, cleared HOT by the controlling authority, and weapons impact would be in the range danger area.

6.2.4. Do not release weapons during an inflight emergency or with an engine shutdown (excluding combat).

6.2.5. Do not release weapons if the release exceeds or will result in exceeding technical order limits, CG limits, briefed track/timing tolerances, safe escape requirements, wingman deconfliction, or fragmentation deconfliction.

6.2.6. Do not open weapon bay doors during flight with weapons on board other than for intentional release, jettison, or telemetry checks (if applicable).

6.2.7. A range control officer (RCO), chase aircraft, or the B-2 Mission Management System (MMS) may confirm releases. Pilots may conduct simulated bombing training after they release all live/inert weapons.

6.2.8. If communications are lost while on-range, immediately place release switches to the safe/off position. Do not accomplish further releases until establishing communications and receiving clearance to release. If communications cannot be established, the pilots will remain in range airspace and attempt to contact the appropriate ARTCC by all means possible. If communications cannot be established, then proceed IAW range procedures.

6.2.9. Do not operate in SIM mode when live or inert weapons are aboard the aircraft.

6.2.10. Do not practice simulated emergency procedures when weapons are loaded on the aircraft.

**6.3. Off-Range Simulated Weapons Employment.**

6.3.1. Pilots will minimize use of weapons doors in-flight during simulated weapons employment. Open weapons bay doors only for specific IQT/CT training.

6.3.2. Do not “manually” rotate RLAs in partial SIM without RLAs installed.

6.3.3. When conducting nuclear training missions using the simulation mode, pilots may power off the simulated weapons and deselect the weapons display for departure. After completing all simulated weapons deliveries, pilots should safe any retained simulated

weapons using the appropriate weapons checklist. Following completion of this procedure, pilots may power off any remaining simulated weapons and deselect the weapons display.

**6.4. Weather Minimums/IMC Weapons Deliveries.** If range procedures permit, B-2 pilots may release live or inert weapons in IMC.

6.4.1. Unless further restricted by range guidance, B-2 aircrews will adhere to the following when conducting IMC operations or dropping through an undercast: With GPS FOM greater than or equal to 4 requires one OAP or target direct aiming on a 0.8 NM CM map. Without GPS and system buffers greater than 250' requires one OAP within 5 minutes of release (or target direct aiming) on a 0.8 NM CM map. For Coordinate only releases: Do not release if GPS FOM greater than or equal to 4. For non-GPS integrated releases do not release if navigation system buffers are greater than or equal to 250. Buffer value must be verified via radar within 10 minutes of release.

**6.5. Hung weapons procedures.**

6.5.1. General. If pilots receive hung munitions indications, they will terminate all subsequent bombing activity scheduled for the sortie, accomplish post release checklist actions to safe the weapons, and return to base.

6.5.2. Recovery. If recovering with hung weapons, accomplish the abort/post-release checklist and return directly to base or other suitable landing base, avoiding over-flight of populated areas. Accomplish air refueling if necessary for aircraft recovery.

**6.6. Jettison procedures.** Pilots will jettison weapons only if in the opinion of the pilot in command, the retention of stores would adversely affect the safe recovery of the aircraft. After a successful jettison with suspected or known hung munitions, do not accomplish any further weapons delivery activity (peacetime).

**6.7. Exercise participation.**

6.7.1. B-2 crews may fly in penetration master mode during peacetime training missions that comply with current security directives.

6.7.2. B-2 pilots will comply with all other training rules/SPINS including external lighting, IFF, squawks, and altitudes.

6.7.3. The OG/CC may waive these restrictions IAW the appropriate classification guide.

## Chapter 7

### ABNORMAL OPERATING PROCEDURES

**7.1. General.** This chapter contains procedures to be followed when other-than-normal situations occur. They do not, however, replace or supersede procedures contained in the flight manual.

7.1.1. Accept no aircraft for flight with a malfunction which denies the crew the ability to safely operate in all phases of flight or any malfunction that, if airborne, would require mission termination.

7.1.2. Once a malfunctioning system is isolated and/or the fault corrected, do not use that system again unless use in a degraded mode is essential for recovery. Do not conduct ground or in-flight troubleshooting after completing flight manual emergency procedures.

7.1.3. Fuel dumping. Only conduct fuel dumping in order to reduce aircraft gross weight for safety of flight. When circumstances permit, dump over unpopulated areas above 8,000 feet AGL. Annotate fuel dumping in the AFTO Forms 781. If conditions permit, advise the appropriate air traffic control agency of altitude and location and when the operation has been completed.

7.1.4. Brake and nosewheel steering malfunctions. Do not taxi the aircraft with a brake system malfunction. Do not taxi with a nose wheel steering malfunction with the exception of using nose wheel steering override, or differential braking to clear the active runway. After clearing the runway, the pilots will stop until the malfunction can be cleared. If nosewheel failure occurs in-flight and cannot be cleared or reset, aircrews may taxi the aircraft clear of the runway using NWS Override or differential braking and stop until the malfunction can be cleared.

**7.2. Ground Aborts.** Delayed aircraft may join a flight at a briefed rendezvous point or fly a briefed alternate mission. Flight leads will advise the appropriate agencies of applicable changes after a ground abort.

**7.3. Takeoff Aborts.**

7.3.1. When a takeoff is aborted and hot brakes are suspected or computed, taxi to the hot brake area, declare an emergency, and follow technical order procedures. Crews will reference the B-2 Brake Energy Limit Chart in TO 1B-2A-1 and comply with local guidance.

7.3.2. Pilots will recalculate takeoff data and brake energy data prior to follow-on takeoffs after an abort.

**7.4. Air Aborts.** Local guidance such as the B-2 Go/No Go Guide dictates specific causes for mission abort.

7.4.1. Abort missions for any of the following:

7.4.1.1. Bird strike/FOD.

7.4.1.2. Over-G.

7.4.1.3. Flight control system anomalies (see local guidance).

7.4.1.4. Engine flameout/stagnation.

7.4.1.5. Boom strike.

7.4.1.6. Confirmed or suspected fuel leaks.

7.4.2. Do not conduct training events such as air refueling (except when required for safe recovery of the aircraft), live/inert bombing, dissimilar air training activity, or practice patterns/landings, after an air abort.

**7.5. Radio/IFF-SIF Failure.** Comply with local procedures for radio failure. Immediately notify controlling agencies if the IFF is inoperative, and provide accurate position reports for separation from other traffic.

**7.6. Lost Wingman Procedures.** During climbs and descents, if visual and/or radar contact is lost, flight leads will use all means to ensure proper formation spacing (lateral and vertical). Wingmen immediately will call blind/broke lock when unable to monitor preceding aircraft's position. After a blind/broke lock call, lead will broadcast heading and altitude every 1000 ft until all formation member are either tied or visual.

**7.7. Spatial Disorientation (SD)/Unusual Attitudes.**

7.7.1. Practice unusual attitude recoveries are prohibited in flight.

7.7.2. Nose High Recovery Procedure. To recover from a nose high attitude, add power as required, establish a bank angle of no more than 60 degrees, lower the nose to a minimum minus three degree pitch attitude, then return the aircraft to level flight in both pitch and bank.

7.7.3. Nose Low Recovery Procedure. Recover from a nose low attitude by reducing power and extending speedbrakes as required, rolling wings level, then increasing stick back pressure to return the aircraft to level flight.

**7.8. Armament System Malfunctions.**

7.8.1. After complying with technical order procedures and guidance, pilots will comply with local guidance.

7.8.2. For peacetime missions, do not rotate a hung weapon from the release position.

7.8.3. If an inadvertent release occurs, accomplish post release checklist actions to ensure switches are in the safe/off position. Do not accomplish any further weapons deliveries (actual or SIM). If no weapons remain on the aircraft, any non-weapons related training may be accomplished.

**7.9. In-flight Practice of Emergency Procedures.**

7.9.1. A simulated emergency procedure is any procedure that produces an effect which closely parallels an actual emergency. Retarding a throttle to simulate the drag of a flamed out engine would be an example of such a practice.

7.9.1.1. Do not practice aborted takeoffs except in a simulator.

7.9.1.2. Do not shut down an engine in flight to simulate an emergency.

7.9.1.3. Simulated engine out refueling with an engine in idle is permitted as part of syllabus training with an IP.

7.9.1.4. Practice stalls and approach to stalls are prohibited inflight.

**7.10. Search and Rescue Combat Air Patrol (SARCAP) Procedures.** During an aircraft mishap, immediately attempt to locate survivors and initiate rescue efforts.

- 7.10.1. Knock off maneuvering and the prebriefed mission.
- 7.10.2. Establish a SARCAP commander.
- 7.10.3. Notify controlling agencies of the situation, and change squawk as required.
- 7.10.4. Mark the last known position of survivors using any navigation means available.
- 7.10.5. Remain above the highest ejection altitude.
- 7.10.6. Deconflict with other aircraft to prevent mid-air collision.
- 7.10.7. Revise BINGO fuels or recovery bases to maintain maximum SARCAP coverage.
- 7.10.8. Relinquish SARCAP operations to designated rescue forces upon their arrival.
- 7.10.9. Follow briefed or local procedures following the arrival of designated rescue forces.

## Chapter 8

### LOCAL OPERATING PROCEDURES

**8.1. General.** This chapter is reserved for unit local operating procedures. IAW AFI 33-360, the paragraph method is the only authorized way to supplement an AFI and added material must be arranged according to the basic publication. Units composed of dissimilar aircraft may publish guidance in a single, stand-alone local operating instruction instead of supplementing this AFI. Added or stand-alone procedures will not be less restrictive than those contained elsewhere in this volume. This chapter is not intended to be a single source document for procedures contained in other directives or regulations. Avoid unnecessary repetition of guidance provided in other established directives; however, reference to those directives is acceptable when it serves to facilitate location of information necessary for local operating procedures. This chapter is authorized to be issued to each B-2 pilot. Units may supplement the following paragraphs for local operating guidance:

- 8.1.1. Section A. Introduction/Purpose.
- 8.1.2. Section B. Applicability.
- 8.1.3. Section C. Ground Operation.
- 8.1.4. Section D. Flying Operations.
- 8.1.5. Section E. Weapons Employment.
- 8.1.6. Section F. Abnormal Procedures.
- 8.1.7. Section G. Command and Control.
- 8.1.8. Section H. Fuel Requirements.
- 8.1.9. Section I. Divert Instructions.
- 8.1.10. Section J. Jettison Areas (IFR/VFR).
- 8.1.11. Section K. Controlled Bailout Areas.
- 8.1.12. Section L. Local Weather Procedures.
- 8.1.13. Section M. Approved Alternate/Other Missions.
- 8.1.14. Section N. Unit Standards

**8.2. Forms Adopted.** 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*.

PHILIP M. BREEDLOVE, Lt Gen, USAF  
DCS, Operations, Plans and Requirements

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

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***Abbreviations and Acronyms***

**AFGSC**—Air Force Global Strike Command

**AFGSCR**—Air Force Global Strike Command Regulation

**AFGSCI**—Air Force Global Strike Command Instruction

**AFMAN**—Air Force Manual

**AFR**—Air Force Regulation

**AFSATCOM**—Air Force Satellite Communication

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

**AGL**—Above Ground Level  
**AHC**—Aircraft Handling Characteristics  
**ALTRV**—Altitude Reservation  
**API**—Aircrew Position Indicator  
**ARIP**—Air Refueling Initiation Point  
**ARMS**—Aviation Resource Management System  
**ATD**—Aircrew Training Device  
**AVTR**—Aircraft Video Tape Recorder  
**BQT**—Basic Qualification Training  
**BRA**—Bomb Rack Assembly  
**BS**—Bomb Squadron  
**BW**—Bomb Wing  
**BQ**—Basic Qualified  
**CBI**—Computer Based Instruction  
**CC**—Commander  
**CDE**—Chemical Defense Equipment  
**CFTR**—Combined Force Training  
**CHUM**—Chart Update Manual  
**CM**—Coherent Map Mode of B-2 Radar  
**CMR**—Combat Mission Ready  
**COMSEC**—Communications Security  
**CPT**—Cockpit Procedures Trainer  
**CSS**—Control Stick Steering  
**CT**—Continuation Training  
**CTP**—Companion Trainer Program  
**CW**—Chemical Warfare  
**DMPI**—Designated Mean Point of Impact  
**DNIF**—Duty Not Involving Flying  
**DO**—Director of Operations  
**DTED**—Digital Terrain Elevation Data  
**EC**—Electronic Combat  
**E&E**—Escape and Evasion

**EEFI**—Essential Elements of Friendly Information  
**EMCON**—Emission Control  
**EOR**—End of Runway  
**ERCC**—Engine Running Crew Change  
**FAA**—Federal Aviation Administration  
**FAAH**—Federal Aviation Administration Handbook  
**FENCE**—Fuel, Emissions, Navigation, Communications, Expendables  
**FCD**—Flight Characteristic Demonstration  
**FCS**—Flight Control System  
**FEB**—Flight Evaluation Board  
**FIC**—Flight Instructor Course  
**FLIP**—Flight Information Publication  
**FLOT**—Forward Line of Own Troops  
**FTU**—Formal Training Unit  
**GCC**—Graduated Combat Capability  
**HAT**—Height Above Touchdown  
**HF**—High Frequency  
**HHD**—Higher Headquarters Directed  
**HHQ**—Higher Headquarters  
**JDAM**—Joint Direct Attack Munition  
**IAW**—In Accordance With  
**ICWT**—Initial Chemical Warfare Training  
**IFF**—Identification Friend or Foe  
**IFR**—Instrument Flight Rules  
**IMC**—Instrument Meteorological Conditions  
**IOS**—Instructor Operator Station  
**IP**—Instructor Pilot  
**IQC**—Initial Qualification Course  
**IQT**—Initial Qualification Training  
**KIAS**—Knots Indicated Airspeed  
**LC**—Lost Communications  
**MAJCOM**—Major Command

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

**MC**—Mission Capable/Mission Commander

**MCM**—Multi-Command Manual

**MCR**—Multi-Command Regulation

**MITO**—Minimum Interval Takeoff

**MOA**—Military Operating Area

**MQT**—Mission Qualification Training

**MRR**—Minimum Runway Required

**MS**—Mission Support

**MT**—Mission Trainer

**MTRS**—Military Training Route Structure

**NAF**—Numbered Air Force

**NMR**—Non Mission Ready

**NORDO**—No Radio

**NSS**—Navigation System

**OG**—Operations Group

**OMR**—Optical Mark Reader

**OPSEC**—Operations Security

**ORI**—Operational Readiness Inspection

**OSS**—Operations Support Squadron

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

**PFPS**—Portable Flight Planning System

**RCO**—Range Control Officer

**RCR**—Runway Condition Reading

**RCS**—Radar Cross Section

**RLA**—Rotary Launcher Assembly

**RQC**—Requalification Course

**RWS/AAT**—Range-While-Search/Air-to-Air Track Modes of B-2 Radar

**RZ**—Rendezvous

**SA**—Situational Awareness

**SAFE**—Selected Area For Evasion

**SEFE**—Stan/Eval Flight Examiner

**SELO**—Stan/Eval Liaison Officer  
**SILS**—Synthetic Instrument Landing System  
**SOF**—Supervisor of Flying  
**SQ**—Squadron  
**SUAS**—Special Use Air Space  
**TA**—Terrain Avoidance  
**TACAN**—Tactical Air Navigation  
**TBD**—To Be Determined  
**TDY**—Temporary Duty  
**TDZ**—Touch Down Zone  
**TF**—Terrain Following  
**TR**—Transit Route  
**TRT**—Takeoff Rated Thrust  
**TRP**—Training Review Panel  
**TSO**—Target Study Officer  
**TTR**—Tactics Training Range  
**UHF**—Ultra High Frequency  
**UMD**—Unit Manning Document  
**VFR**—Visual Flight Rules  
**VHF**—Very High Frequency  
**VMC**—Visual Meteorological Conditions  
**WST**—Weapons Systems Trainer  
**WX**—Weather Mode of B-2 Radar

### *Terms*

**Alternate Entry Control Point (Alternate Entry Fix)**—The route point(s) upon which a control time for an alternate entry into the route is based.

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

**Blind**—No visual contact with the friendly aircraft/ground position; opposite of visual.

**Broke Lock**—Loss of radar contact with element or aircraft; opposite of tied.

**End Maneuver Area**—A control point terminating the weapon run area.

**Entry Control Time**—The scheduled time over the Primary/Alternate Entry Control Point.

**High Altitude Activity**—Same as AFI 11-2B-2V1.

**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 (JDAM, Mk 84, CBU-87, etc.).

**Low Altitude Activity**—Same as AFI 11-2B-2V1.

**Maneuver Area**—The portion of an IR between the SMA and End Maneuver Area (EMA).

**MASMS (Military Airspace Management System)**—The term MASMS in this instruction refers to the automated scheduling system operated by Detachment 1, HQ ACC/DOR, the Military Airspace Management System Office at Offutt AFB, NE.

**Medium Altitude Activity**—Same as AFI 11-2B-2V1.

**Mountainous Terrain**—Terrain that varies more than 1000 feet in elevation in 10 NM along published track.

**Operating Altitudes**—Altitudes for all routes will be published in FLIP AP/1B or AP/3. TF altitudes will be based on a minimum altitude published for the route, the clearance plane settings developed by local airspace managers at the originating activity, Tech Order minimums, or training restrictions, whichever is higher.

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

**Primary/Alternate Exit Point**—The final waypoint published in FLIP for the primary or alternate exit of a route.

**Primary/Alternate TF Initiation Point (Start TF)**—The FLIP waypoint at which air crew are authorized to begin TF operations.

**Primary/Alternate TF Termination Point (End TF)**—The point which denotes the end of TF operations.

**Primary Entry Point (PEP)**—Referred to as the Entry Fix. The route point upon which a control time for route entry is based

**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

**Saddled**—Informative call from wingman indicating the return to briefed formation position.

**Start Maneuver Area**—The point that defines the start of the weapon run area.

**Tied**—Positive radar contact with element or aircraft.

**Visual Contour Flight**—Operation at a predetermined altitude above the ground, following contours visually with radar altimeter crosscheck.

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

## ATTACHMENT 2

### AIRCREW OPERATIONS IN CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR THREAT ENVIRONMENT

**A2.1. General Information.** Potential use of CBRN weapons against friendly airfields presents a serious threat to flying operations. Although the most effective way for aircrews to avoid this threat is to be airborne before those 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 CBRN attack. Each air base should publish detailed CBRN procedures. The following information is for use when base-specific procedures are unknown or incomplete.

**A2.1.1. Counter-CBRN actions can be grouped into environments.** First is where chemical or biological agents are dispersed from a munition or sprayed as an aerosol resulting in a cloud or rain of minute droplets. The nuclear environment is within range of any direct effect from a nuclear detonation. The radiological environment's hazard is radioactive dust that can originate as fallout from a detonation or from dispersal of radioactive material without a nuclear detonation--a dirty bomb. Procedures in all environments except nuclear are similar--use procedures and protective gear to avoid skin contact with or inhalation/ingestion of agents or particles.

**A2.2. Mission Preparation.** Determine the CBRN status at planned launch, recovery and divert bases. Know the current MOPP level for relevant sectors of the launch airfield. Plan ground ops to minimize the time between leaving shelter and takeoff. If available, use other aircrew members to perform preflight duties to minimize flight crew exposure. Arming and EOR procedures may be conducted in the hardened aircraft shelter (HAS) or other non-standard location.

**A2.3. Travel To/From the Aircraft and Aircraft Preflight.** Step in the appropriate protective ensemble and carry other protective gear as required. If possible, travel to and from the aircraft in an enclosed vehicle to prevent contamination from agents or dust settling from the air. If travel on foot is unavoidable, choose a route that takes maximum advantage of available overhead cover (sun shades, buildings, etc.). If the aircraft is contaminated, ensure maintenance has accomplished spot decontamination and avoid contaminating your person during preflight. Take steps to avoid bringing contamination into the aircraft on helmet bags, map bags, etc. In a potential CBRN environment, keep aircraft buttoned up as much as possible when outside protective shelter. Post-mission, if there is any suspicion of aircrew contamination process through an aircrew contamination control area (ACCA).

#### **A2.4. Ground Operations during Alarm Red (or Theater Equivalent).**

**A2.4.1. Before Taxi Out and After Taxi Back.** If Alarm Red occurs while the crew is outside the aircraft or in the chocks, shut down and exit the aircraft (if appropriate), take cover and don appropriate MOPP. This may require use of the ground crew mask. A hardened facility such as a HAS provides optimum protection. Ensure the safety of supporting ground crew; use hand signals if necessary.

**A2.4.2. Ground Operations Outside the Parking Spot.** Maintain contact with SOF, ATC, CP, etc. to remain aware of ground hazards and command direction. If Alarm Red occurs while on the ground outside the chocks, there are two primary options. First is to taxi into

structure, preferably a hardened one, although a hangar or flow through will reduce exposure to settling airborne agent. Use caution to not damage the aircraft or nearby people and things. Shut down and close structure doors when able. The second option is to launch for survival contingent on fuel state, arming status, proximity to runway, nature of attack, etc. If shelter or takeoff is not possible, try to get out of the taxi flow. In extremis, especially if you don't have a protective mask available, select 100 percent oxygen and consider turning off the ECS and/or shutting down to avoid bringing agent/dust into the aircraft. Leave the aircraft buttoned up and await assistance.

## **A2.5. Airborne.**

A2.5.1. Contamination. Becoming contaminated by chemical or biological agents, while airborne, is very unlikely. If chemical agent contamination occurred prior to takeoff, flight will dissipate the agent to some degree, but will not achieve complete decontamination. Flights of at least 2 to 4 hours are recommended, and lower altitudes are more effective than higher altitudes. Fly with the aircraft configured (gear and speedbrakes extended) as long as possible to maximize the airflow in and around as many places as possible. There is no simple guidance for biological contaminants. If suspected, maintain maximum protective posture. If radioactive dust contamination is suspected, take measures to avoid getting the dust on bare skin, breathing it in (protective masks work for this) or getting it into your mouth. Seek decontamination assistance after landing.

A2.5.2. During the Mission and RTB. Use command and control agencies to maintain awareness of command intent and 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 hold or divert. If holding, try to wait until Alarm Red is terminated. When able, obtain updates on airfield status, ground hazards, dearm and taxi routing. If landing in Alarm Black, expect a contaminated environment and MOPP 4. Droplet settling following a chem or bio airburst attack can take up to one hour. If you believe the aircraft was contaminated before takeoff or while airborne, notify C2.

**ATTACHMENT 3**  
**FLIGHT BRIEFING GUIDES**

**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.

**A3.1. Roll Call (Crew Number), Security Classification.**

**A3.2. Review of Weather Planning Factors:**

A3.2.1. **Takeoff.**

A3.2.2. **Low level (primary and backup).**

A3.2.3. **Air refueling.**

A3.2.4. **Recovery.**

**A3.3. Mission Profile:**

A3.3.1. Priority of training events.

A3.3.2. Currency items/problems.

**A3.4. Mission Data:**

A3.4.1. Call Sign.

A3.4.2. Mission Date.

A3.4.3. Crew Rest/Show/Step.

A3.4.4. Arrive at aircraft.

A3.4.5. Crew/transition duty day.

A3.4.6. Taxi/takeoff/land time/duration.

**A3.5. Aircraft Number/Maintenance/TCTO Status.**

**A3.6. Ground Operations/Emergencies:**

A3.6.1. **Emergency egress/emergency engine shutdown.**

A3.6.1.1. **With/without interphone.**

A3.6.1.2. **After taxi.**

**A3.7. Takeoff Performance Review:**

A3.7.1. Fuel load/gross weight/weapons load.

**A3.8. Takeoff/Departure:**

A3.8.1. **Procedures/crew coordination.**

A3.8.2. **Aborts.**

A3.8.3. **Emergencies after decision speed.**

A3.8.4. **Departure routing.**

A3.8.5. **Obstructions.**

A3.8.6. **Planned level off altitude and airspeed.**

**A3.9. Enroute:**

A3.9.1. **Overview.**

A3.9.2. Action/crunch points.

A3.9.3. Restricted airspace.

A3.9.4. **High terrain.**

A3.9.5. **Emergency airfields.**

A3.9.6. Late takeoff considerations or alternate mission.

**A3.10. Air Refueling:**

A3.10.1. **Track/area.**

A3.10.2. Tanker call sign/aircraft type.

A3.10.3. RZ type and altitude/block.

A3.10.4. C/R plan/EMCON procedures.

A3.10.5. **Onload.**

A3.10.6. **End A/R request.**

A3.10.7. Missed A/R considerations.

**A3.11. Low Level:**

A3.11.1. **Pilot/mission commander specific considerations/brief.**

A3.11.2. **Letdown type.**

A3.11.3. **Level off altitude and considerations.**

A3.11.3.1. **Terrain elevation.**

A3.11.3.2. Radar altimeter lock-on altitude.

A3.11.3.3. Roundout/level off altitudes.

A3.11.3.4. **IFR altitude.**

A3.11.3.5. **Range-specific procedures.**

A3.11.3.6. Withhold/Hung weapons procedures.

**A3.12. Communications:**

A3.12.1. **Command Post (authentication/ launch/recovery).**

A3.12.2. **VHF/UHF/HF/AFSATCOM/MILSTAR/HAVE QUICK.**

A3.12.3. **Secure voice procedures.**

A3.12.4. Recall procedures.

**A3.13. Recovery:**

A3.13.1. **Hung/withheld weapon procedures.**

A3.13.2. Fuel reserve.

A3.13.3. Divert options.

**A3.13.4. Approach review.**

A3.13.4.1. Crew coordination.

A3.13.4.2. Low vis landing procedures.

A3.13.4.3. Transition to landing.

A3.13.4.4. **Safety check.**

A3.13.5. Simulated Emergency Procedures.

A3.13.6. ERCC/Taxiback procedures.

A3.13.7. Warm seat swap procedures.

**A3.14. In-Flight Emergencies:**

A3.14.1. **Crew coordination.**

A3.14.1.1. **Fly and navigate.**

A3.14.2. **Airmanship.**

A3.14.2.1. **Who flies vs.** who accomplishes checklist.

A3.14.2.2. Loss of interphone/cockpit communications.

A3.14.2.3. Ejection procedures.

**A3.15. Crew Coordination (General):**

A3.15.1. Transfer of aircraft control and AFCS modes.

A3.15.2. Leaving/returning to seat/going on or off oxygen.

A3.15.3. Altitude calls.

**A3.16. Specialized Briefings/Special Subjects:**

A3.16.1. **Target Study.**

A3.16.2. **Chase/Formation briefing.**

A3.16.3. **Unusual/special events--flyby, FCF.**

A3.16.4. **Range Considerations.**

A3.16.5. **Radar/Visual Search Responsibilities.**

A3.16.5.1. **Departure/Enroute/Recovery.**

A3.16.5.2. **High Density Traffic Areas.**

A3.16.6. **Mid-Air Collision Avoidance.**

A3.16.6.1. **From Other Military Aircraft.**

A3.16.6.2. From Civilian Aircraft.

**A3.17. Reminders:**

A3.17.1. **ACC Special Interest Items.**

A3.17.2. **Flight manual changes.**

A3.17.3. **Flight clothing and equipment.**

**ATTACHMENT 4**  
**FORMATION BRIEFING GUIDE**

**NOTE:** This minimum briefing guide is provided as an example to stress mission events and objectives rather than reinforce technical order procedures. A standardized briefing format is especially important when flying with other units. Brief only actions required to meet mission and EMCON objectives.

**A4.1. ROLL CALL:**

- A4.1.1. Time Hack
- A4.1.2. Mission Changes
- A4.1.3. Call Signs/pilots
- A4.1.4. Tail Numbers
- A4.1.5. Parking Locations
- A4.1.6. Mx Status
- A4.1.7. Weapons configurations
- A4.1.8. Fuel loads

**A4.2. WEATHER:**

- A4.2.1. Takeoff
- A4.2.2. En route
- A4.2.3. Air refueling
- A4.2.4. Low level
- A4.2.5. Destination
- A4.2.6. Alternates

**A4.3. MISSION OVERVIEW:**

- A4.3.1. Mission Objectives
- A4.3.2. TGTs/Times
- A4.3.3. Intelligence
- A4.3.4. EW/GCI lines
- A4.3.5. FLOT
- A4.3.6. Route/Tgt Area Defenses
- A4.3.7. Passive Detection
- A4.3.8. SAR
- A4.3.9. Tactical Considerations

**A4.4. COMM PLAN:**

- A4.4.1. EMCON level
- A4.4.2. Frequencies
- A4.4.3. Change over times/points/procedures
- A4.4.4. **IFF/SIF**
- A4.4.5. Code words
- A4.4.6. Bullseye points

**A4.5. GROUND OPERATIONS:**

- A4.5.1. Taxi Route/Delays
- A4.5.2. Takeoff Data Review

**A4.6. TAKEOFF:**

- A4.6.1. Spacing
- A4.6.2. Aborts
- A4.6.3. Departure Route
- A4.6.4. Joinup/Airspeed/Intermediate Level offs
- A4.6.5. Late Takeoff
- A4.6.6. Delayed aircraft rejoin procedures

**A4.7. LEVEL OFF:**

- A4.7.1. Altitude Block/Planned Speeds
- A4.7.2. Level Off/TF Checks
- A4.7.3. Trail/Visual formation procedures
- A4.7.4. Position Changes
- A4.7.5. High Bomb Runs
- A4.7.6. TGTs/TOTs/Alt stacks

**A4.8. AIR REFUELING:**

- A4.8.1. Call Signs/CR Plan/Times/Onloads/Altitudes
- A4.8.2. Receiver Assignments/Wingman Responsibilities/Positions
- A4.8.3. Overruns & Breakaway
- A4.8.4. Night/IMC procedures
- A4.8.5. End AR plan
- A4.8.6. Lost AR plan

**A4.9. FORMATION LOW LEVEL:** Formation low level is currently not authorized. However, this does not preclude the use of formation procedures at ranges such as Smokey Hill, when required for safe operations.

- A4.9.1. A/A TACAN/R adios
- A4.9.2. Penetration/Spacing/Split-up
- A4.9.3. Threat Reactions
- A4.9.4. Target area tactics
- A4.9.5. Weapon fusing
- A4.9.6. Release parameters
- A4.9.7. With hold criteria
- A4.9.8. Safe escape considerations
- A4.9.9. Safe separation
- A4.9.10. Route aborts/emergency airfields
- A4.9.11. Route abort Altitude
- A4.9.12. Rejoin

**A4.10. RECOVERY/REJOIN:**

- A4.10.1. Location
- A4.10.2. Altitudes/Airspeeds
- A4.10.3. A/A TACAN/R adios
- A4.10.4. Rejoin Point
- A4.10.5. Routing/Penetration/Breakup

**A4.11. SPECIAL SUBJECTS:**

- A4.11.1. Emergencies
- A4.11.2. Broke Lock Procedures
- A4.11.3. EMCON/Chattermark
- A4.11.4. **Fallout Plan ( Lead breaks etc. for multi-ship deputy flt lead)**
- A4.11.5. Lead Changes
- A4.11.6. Mid Mission Rejoins
- A4.11.7. Freqs/Air-to-Air/Speeds
- A4.11.8. Bingo Fuels
- A4.11.9. Hung Stores
- A4.11.10. Alternate Mission/No later than times
- A4.11.11. Debriefing

**A4.12. Questions**

**ATTACHMENT 5**  
**STRANGE FIELD PROCEDURES**

**A5.1. Mission Planning.** During mission planning, crews should review the following information for each base of intended landing:

**A5.1.1. FLIP Enroute Supplement:**

- A5.1.1.1. Traffic pattern altitudes/airfield specific differences
- A5.1.1.2. Navaids scheduled maintenance period(s)
- A5.1.1.3. Facilities/services/fuels available
- A5.1.1.4. Load bearing capacity

**A5.1.2. FLIP Planning Documents:**

- A5.1.2.1. Special notices
- A5.1.2.2. Preferred routings
- A5.1.2.3. Terminal Control Areas
- A5.1.2.4. ICAO information

**A5.1.3. Instrument Approach Plates:**

- A5.1.3.1. Airfield layout/obstacles/runway length and width
- A5.1.3.2. Final approach runway alignment
- A5.1.3.3. Airfield lighting
- A5.1.3.4. Navigation chart (review for local terrain features)

**A5.1.4. Security Requirements:**

- A5.1.4.1. Aircraft security requirements
- A5.1.4.2. Storage of classified materials

**A5.2. Review of Arrival/Approach Procedures.** Before departure from each base crews may use the following guide as a means of reviewing the arrival/approach procedures for the next intended landing base:

**A5.2.1. Departure:**

- A5.2.1.1. Obstacles
- A5.2.1.2. Rate of climb required
- A5.2.1.3. Emergency/minimum safe altitudes
- A5.2.1.4. SID/routing/navaids/altitude requirements

**A5.2.2. Enroute Descent:**

- A5.2.2.1. Start descent point
- A5.2.2.2. Rate of descent require

- A5.2.2.3. Transition altitude
- A5.2.2.4. **Terminal fix (IAF, FAF, PAR/ASR, etc. )**
- A5.2.2.5. Lost communication procedures
- A5.2.2.6. Emergency/minimum safe/sector altitudes

**A5.2.3. Published Penetration:**

- A5.2.3.1. IAF/holding fix
- A5.2.3.2. Initial rate of descent required
- A5.2.3.3. Transition altitude
- A5.2.3.4. Altitude restrictions
- A5.2.3.5. Emergency/minimum safe/sector altitudes
- A5.2.3.6. Final approach fix
- A5.2.3.7. Lost communication procedures

**A5.2.4. Final Approach--Published or Radar:**

- A5.2.4.1. Rate of descent
- A5.2.4.2. Timing
- A5.2.4.3. Weather minimums/MDA/DH
  - A5.2.4.3.1. Aircraft/aircrew restrictions
- A5.2.4.4. Missed approach procedures
- A5.2.4.5. Lost communication procedures
- A5.2.4.6. Transition to visual/runway environment/landing