BY ORDER OF THE SECRETARY OF THE AIR FORCE

AIR FORCE MANUAL 11-2B-2, VOLUME 3

30 OCTOBER 2020

Flying Operations

B-2 OPERATIONS PROCEDURES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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

RELEASABILITY: There are no releasability restrictions on this publication.

OPR: AFGSC/A3TO

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

Supersedes: AFI11-2B-2V3, 3 May 2010

Pages: 40

This volume establishes effective and safe operations of the B-2 and implements Department of the Air Force Policy Directive (DAFPD) 11-2, *Aircrew Operations*; DAFPD 11-4, *Aviation Service*; and Air Force Manual (AFMAN) 11-202V3, *Flight Operations*. It establishes the minimum Air Force operations procedures for personnel performing duties in the B-2. This publication applies to all civilian employees and uniformed members of the Regular Air Force and the Air National Guard operating B-2 aircraft. It does not apply to Air Force Reserve units and members. This publication does not apply to the United States Space Force. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Instruction (AFI) 33-322, *Records Management and Information Governance Program,* and disposed of in accordance with Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS). Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. The authorities to waive wing/unit level requirements in this publication are identified with a Tier ("T-0, T-1, T-2, T-3") number following the compliance statement. See DAFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication OPR for non-tiered compliance items. This AFMAN may be supplemented at any level, but all supplements must be routed to Air Force Global Strike Command, Standardization and Evaluations (AFGSC/A3TV) for coordination prior to certification and approval. When guidance in this manual duplicates, changes or conflicts with already published information contained in other AFGSC manuals or lower designation, the

material in this manual takes precedence. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force. Compliance with the attachments in this publication is mandatory.

SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Primary purpose of revision is to change designation from AFI to AFMAN in accordance with DAFI 33-360. Additionally there were minor adjustments to tier levels, formatting and updating of references.

Chapter 1

INTRODUCTION

1.1. Overview. This manual prescribes procedures for operating B-2A aircraft under most circumstances. It is not a substitute for sound judgment. Procedures not specifically addressed may be accomplished if they enhance safe and effective mission accomplishment.

1.2. Roles and Responsibilities.

1.2.1. Commanders. Commanders at their respective tier levels are responsible for complying with guidance in this manual**. (T-1)**. B-2A flying unit wing commanders, delegated no lower than Operations Group Commander (or equivalent), are responsible for providing local operating guidance to supplement the requirements of this Manual**. (T-1)**.

1.2.2. Pilot in Command Authority. The pilot in command is responsible for, and is the final authority for the operation of the aircraft**. (T-1)**. Pilots will use best judgement to safely conduct flying operations**. (T-1)**.

1.3. Deviations. Deviations from these procedures require specific approval by the Major Command Director of Operations unless an urgent requirement or an aircraft emergency dictates otherwise. In that case, the pilot in command should take the appropriate action to safely recover the aircraft.

1.4. Waivers. Forward T-0, T-1 and T-2 waiver requests to the AFGSC, Director of Operations (AFGSC/A3) or Air National Guard (ANG/A3O) for coordination with HAF or external agencies or for approval. Waivers are valid for one year from the approval date. In accordance with DAFI 33-360, T-3 waiver authority may be delegated to group or squadron commanders. Information copies will be provided to AFGSC/A3T and ANG/A3D.

1.5. Instruction Changes. Guidance on suggesting revisions and recommending corrective action(s) is provided in DAFI 33-360. AFGSC/A3 will forward recommendations for changes to this volume to Headquarters Air Force Flight Standards Agency (HQ AFFSA/XOF) for Headquarters Air Force, Director of Operations (AF/A3) approval**. (T-2)**.

Chapter 2

MISSION PLANNING

2.1. Duties.

2.1.1. The pilot in command of each aircraft and the designated flight lead are ultimately responsible for mission planning. **(T-3)**.

2.1.2. Crewmembers are personally responsible for maintaining adequate knowledge of system operations, normal, and emergency procedures. **(T-3)**.

2.1.3. The Weapons and Tactics Flight will provide supplemental planning information as necessary to effectively accomplish the assigned mission**. (T-3)**.

2.2. General Procedures.

2.2.1. Accomplish flight planning to ensure 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 in accordance with AFI 91-202, *The US Air Force Mishap Prevention Program*, and AFI 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program*. **(T-3)**. Units should check the Avian Hazard Advisory System (AHAS) (**http://www.usahas.com**) and contact their base civil engineering wildlife expert or Air Force Safety Center BASH team for further information on times of increased bird activity. Consider and factor in foreseeable safety risks and risk mitigation factors in accordance with Operational Risk Management (ORM).

2.2.2. Standards. Groups may develop Operations Group Commander (OG/CC) approved group/wing standards. Operations Group Standards and Evaluations (OG/OGV) will review all standards to ensure standardization and compliance with AFI 11-series guidance and forward a copy to AFGSC/A3T**. (T-2)**.

2.2.3. The B-2 Weapons Attack Guide (WAG) is an aid for aircrews in mission planning and during flying operations. It does not relieve aircrew from compliance with Technical Orders (T.O.s) or flight regulations. Aircrew are responsible for ensuring information referenced from the B-2 WAG is current, complete, and accurate.

2.2.4. Mission Planning Time. Squadron commanders (SQ/CCs) will provide pilots sufficient time to mission plan**. (T-3)**. SQ/CCs should schedule no less than four (4) hours for mission planning when pilots have standardized/stereo products available ("show and go" flight profiles). SQ/CCs should schedule a minimum of eight (8) hours of mission planning for actual weapons deliveries, airshow/flyby profiles, or any non-standard mission. Unit operations supervisors (or higher) may make crew substitutions as long as the substitute crewmember is thoroughly briefed and understands all aspects of the mission.

2.3. Map/Chart Preparation.

2.3.1. 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.

2.3.2. Enroute Charts. Pilots may use flight information publication (FLIP) enroute charts instead of maps on navigational flights within areas adequately covered by FLIP. These charts will be of sufficient scale to provide navigation and terrain/obstacle avoidance**. (T-3)**.

2.3.3. Supplemental Charts. Pilots flying under visual flight rules (VFR), inside military operating areas (MOA), or on military training routes (MTR) in the continental United States will supplement existing mission planning materials with either:

2.3.3.1. Mission Planning System (MPS) chart with the following overlay options selected: airports/heliports, airspace boundaries, airways, MTR, parachute jump and Special Use Area (SUA) boundaries**. (T-3)**.

2.3.3.2. Sectional Aeronautical Charts**. (T-3)**. **Note:** Use of sectional aeronautical charts in flight is not required.

2.3.4. Pilots flying outside the continental United States will follow gaining MAJCOM, theater or host nation guidance on mission planning. **(T-2)**. If no gaining MAJCOM, theater or host nation guidance exists, use the best charts or overlay options available to comply with this manual's requirements**.**

2.3.5. MOA/Restricted/Warning Area Charts. Aircrew using a single Minimum Safe Altitude (MSA) will clearly annotate it on the chart. **(T-3)**. Aircrew will annotate all Minimum Safe Altitudes and associated constructs are annotated on the chart. **(T-3)**.

2.3.6. Minimum safe altitudes (MSA) and Route Abort Altitudes (RAAs) will be a minimum of 1,000 feet (2,000 feet in mountainous terrain) above the highest obstacle/terrain (rounded up to the next 100 feet) within the lateral limits of the route or operational area, but in no case less than five (5) nautical miles (NM) either side of planned route corridor**. (T-3)**.

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) sets mission goals and objectives.

2.5.2. AC/FL will present a logical briefing to promote safe and effective mission accomplishment**. (T-2)**. AC/FL will brief contracts, roles, and responsibilities for all crew/flight members**. (T-2)**.

2.5.3. All flight members must attend the flight briefing unless previously coordinated with squadron supervision**. (T-3)**. Commanders will ensure that anyone not attending the flight brief receives a briefing on mission events and emergency procedures**. (T-0)**. If the interval from the initial briefing to takeoff exceeds 72 hours, commanders will ensure that a complete review and briefing is re-accomplished**. (T-3)**. All crews involved in a formation flight must attend a formation briefing**. (T-2)**.

2.5.4. AC/FLs will brief all items required by AFMANs and the flight crew information file (FCIF)**. (T-2)**. 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**. (T-2)**.

2.5.6. Debriefing. AC/FLs will formally debrief every mission for all flight/crew members**. (T-2)**. After each mission, AC/FLs will review audio/visual mission recording media, if available**. (T-3)**. At a minimum, the debriefing should include safety of flight items, alibis to debrief items, an evaluation of the mission objectives, desired learning objectives, lessons learned, execution errors, deconfliction contracts, in-flight execution of flight member responsibilities, and mission/tactical employment priorities.

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.**(T-2)**.

2.6.2.2. Local radio and data link (VHF, UHF, HF, VSAT, and LINK-16) channelization**. (T-2)**.

2.6.2.3. Airfield diagram**. (T-2)**.

2.6.2.4. No radio (NORDO) procedures**. (T-2)**.

2.6.2.5. Impoundment procedures**. (T-2)**.

2.6.2.6. Fuel dump and weapons jettison areas**. (T-2)**.

2.6.2.7. Divert/alternate base information**. (T-2)**.

2.6.2.8. Recovery with ferried, retained, or hung weapons on board**. (T-2)**.

2.6.2.9. On-scene commander procedures**. (T-2)**.

2.6.2.10. Other information as deemed necessary by the unit, such as stereo flight plans, engine running crew change (ERCC), taxi-back procedures, local training areas, MOA or air traffic control assigned area (ATCAA) diagrams, alert procedures, and maintenance brevity codes.

2.7. Personal Equipment. Pilots should fly with adequate flight gear to ensure safe mission completion. Pilots will wear survival vests on all sorties utilizing combat step procedures from FENCE (firepower, emitters, navigation, communication, and electronic countermeasures)-IN to FENCE-OUT**. (T-3)**. Pilots will carry survival vests on ocean crossing flights**. (T-2)**. Crewmembers will wear gloves during engine start, takeoff, and landing**. (T-3)**.

Chapter 3

NORMAL OPERATING PROCEDURES

3.1. Ground Communications. Pilots will brief ground crews as required**. (T-2)**. 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 in accordance with **AFMAN 11-218*, Aircraft Operations and Movement on the Ground*.** All signals pertaining to operation of aircraft systems should originate with the pilot. The crew chief will repeat the signal when it is safe to operate the system**. (T-2)**. Pilots will not activate any system that poses a danger to the ground crew prior to receiving proper acknowledgment from ground personnel**. (T-2)**.

3.3. Preflight.

3.3.1. Icing. Do not take off with visible icing (snow, frost, or ice) on any part of the aircraft**. (T-1)**.

3.3.2. Flight Control BITs (ABIT). Pilots will complete an ABIT of the flight control system (FCS) after performing any flight control (FC) memory reads**. (T-3)**. Pilots will not perform FC air event memory reads**. (T-3)**.

3.4. Taxi.

3.4.1. Minimum taxi interval is 500 feet.

3.4.2. Do not taxi with a reported runway condition reading (RCR) of less than 6 anywhere on the taxi route. Commanders will ensure that taxi routes are cleared to a minimum of 75 feet wide for taxi RCR purposes**. (T-2)**.

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 arresting cables slower than 10 knots ground speed**. (T-3)**.

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**. (T-3)**.

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. 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). **(T-2)**.

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. Commanders will ensure that takeoffs accomplished beyond approach end cables have 10,000 feet runway remaining, plus 1,000 feet overrun and still comply with applicable takeoff restrictions**. (T-2)**.

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**. (T-2)**.

3.6.2. Formation size is normally three aircraft or less, but can be as many as six aircraft.

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

3.6.4. Notify air traffic control (ATC) when operating as a non-standard formation on flight plans, on initial ATC contact, and when contacting each subsequent controller. **(T-2)**.

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 in accordance with AFI 11-214, *Air Operations Rules and Procedures*. Any flight member may call KIO or terminate. All participants will acknowledge a KIO by repeating the call. **(T-2)**.

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 ATC clearance**. (T-2)**. Acknowledge subsequent ATC instructions when directed by lead.

3.6.6. Takeoffs.

3.6.6.1. Formation takeoff spacing is 1-minute minimum but can be waived to 30 seconds by the OG/CC. Nuclear training multi-ship minimum interval takeoffs (MITO) require OG/CC approval.

3.6.6.2. Use caution for wake turbulence on departure and adjust climb routing to avoid areas of potential wake turbulence. Appropriate fan headings should be flown for all MITO 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 1,000-foot altitude separation between each aircraft for formation rejoins**. (T-3)**.

3.6.7.2. Instrument Meteorological Conditions (IMC). Until all wingmen report either visual or tied, FL will report passing every 5000 feet with current and planned rollout heading (if applicable)**. (T-2)**. Wingmen will echo their respective current altitudes and heading**. (T-2)**. Wingmen will not climb through preceding aircraft's altitude until visual or tied**. (T-2)**. Wingmen will delay turns until over the same point as the previous aircraft**. (T-2)**.

3.6.7.3. Visual Meteorological Conditions (VMC). Wingmen may use visual cutoff to expedite rejoins. Avoid flight through wingtip vortices and jet wash**. (T-1)**. 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 with which to navigate (visual, INS, GPS, or TACAN), and a separate ATC clearance (if applicable)**. (T-2)**.

3.6.9. Changing Leads/Position Changes. See **AFTTP 3-3.B-2, *Combat Aircraft Fundamentals B-2***.

3.6.10. Formation Deconfliction.

3.6.10.1. General. FL will brief deconfliction contracts and ensure that all wingmen understand their responsibilities**. (T-3)**. 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**. (T-2)**.

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 1,000 feet until all formation members are tied or visual**. (T-2)**.

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**. (T-2)**.

3.6.10.3. Broke Lock and Lost Communication. 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**. (T-2)**. Simultaneously, the wingman should 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 1,000 feet altitude separation before rejoining any formation**. (T-1)**. 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)**. (T-2)**. If VMC and pre-briefed by FL, wingman may automatically assume echelon position with the tanker(s) in sight.

3.6.11.2. Visual Observation Position. Wingmen may move into visual observation position (VOP) in accordance with AFTTP 3-3.B-2 with the following restrictions:

3.6.11.2.1. Visibility is 2 NM or greater.

3.6.11.2.2. Tanker has cleared wingman to VOP.

3.6.11.2.3. FL has moved into the pre-contact position.

3.6.11.2.4. Aircraft will stabilize at 1,000 feet separation prior to proceeding no closer than 500 feet wingtip clearance. **(T-2)**.

3.6.11.3. Post Refueling Rejoins. After completing air refueling, lead moves to a two mile left 60 degree echelon position stacked down 2,000 feet from the air refueling base altitude of the lead tanker. **(T-2)**. After refueling, the number two aircraft stacks down 1,500 feet and assumes a trail position behind lead. **(T-2)**. Post refueling, number three stacks down 1,000 feet and moves to a trail position behind two. **(T-2)**. Lead will coordinate with the tanker lead for a larger altitude block, if required.

3.6.11.4. Comply with further formation air refueling procedures in accordance with Allied Tactical Publication (ATP)-3.3.4.2, *Air-to-Air Refueling*.

3.7. Air Refueling.

3.7.1. Air refueling operations are authorized along published routes/tracks. Random air refueling is authorized with air traffic control 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**. (T-2)**.

3.7.2.2. Do not conduct air refueling with an FCS CAUTION, except when necessary for safe recovery of the aircraft**. (T-2)**.

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**. (T-2)**.

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 Instructor Pilot (IP) supervision. Pilots will place no more than one throttle to idle to simulate the loss of one engine**. (T-2)**.

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**. (T-2)**.

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**. (T-2)**.

3.7.2.7. Do not conduct air refueling when tanker is unable to retract landing gear**. (T-2)**.

3.7.2.8. Discontinue air refueling after loss of all tanker disconnect capability, except during the following conditions: **(T-2)**.

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, operational readiness inspections (ORI), emergency evacuations or deployments/re-deployments (limit contact time to that required to obtain fuel).

3.7.2.9. Boom wet downs with jet propellant four (JP-4, emergency/alternate fuel) are acceptable as long as the total quantity passed does not exceed one percent of total fuel in tanks**. (T-2)**.

3.7.3. Breakaway Training.

3.7.3.1. The tanker pilot, boom operator, and receiver pilot will brief breakaway training prior to initiation**. (T-2)**. Commanders will ensure that the briefing includes when the maneuver occurs and who gives the execution command**. (T-2)**.

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**. (T-2)**.

3.7.4.3. The receiver pilot will inform the boom operator when starting the demonstration, the limit demonstrated, and when terminating the demonstration**. (T-2)**.

3.7.5. Override Boom Latching Procedures Training. Override boom latching procedures require an instructor pilot. Pilots and boom operators will pre-brief procedures**. (T-2)**. Ensure that both tanker and receiver systems are fully operational**. (T-2)**.

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 to 2,500 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 should be accomplished with at least 10,000 feet runway remaining plus 1,000 feet of overrun. When 1,000 feet of overrun are not available, reserve 1,000 feet of the runway to meet the minimum overrun requirements.

Table 3.1. Traffic Pattern and Landing Limitations and Restrictions.

Approach Type	**Notes**	**Maximum gross weight**	**Maximum crosswind**	**Minimum Weather (ceiling/visibility)**	**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 (with IP)	500-1 1/2 (or non-precision minima whichever is higher) 300-1 (with IP)	No	Yes	9
Normal Master mode touch and go	2, 3	270,000	25	300-1	Yes	Yes	9
Simulated Engine Out Low Approach	4, 5	270,000	N/A	Note 6	No	Yes	N/A
Simulated Engine Out Touch and Go/Landing	5	270,000	25	Note 6	Yes	Yes	13

Approach Type	Notes	Maximum gross weight	Maximum crosswind	Minimum Weather (ceiling/visibility)	IP Required	Night	Minimum RCR
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: a. Any landing gear malfunction (gear door and nosewheel steering malfunctions) b. Any brake or anti-skid failure indications, any flight control caution or warning c. Center of gravity outside landing limits d. Runway length insufficient to abort a touch-and-go and stop in the remaining runway e. 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 (see also AFI 11-209_AFGSC Supplement, *Participation in Aerial Events*):

3.9.1. Profile 1. Normal Pass--Straight Thru Pass. Profile consists of a 1,000 foot above ground level (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 1,000 feet above the highest obstacle within 2,000 feet. Following the straight thru pass, the pilot will ensure that the aircraft climbout is in accordance with ATC instructions**. (T-1)**. If a high angle climbout is desired, this profile may be combined with the climbout portion of Profile 4.

3.9.2. Profile 4-Tear Drop Maneuver 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 1,000 feet AGL. If the show line is a non-runway environment then use 1,000 feet above the highest obstacle within 2,000 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 should be planned for 40 degrees (not to exceed 45 degrees)**. (T-2)**. Execute turns so as to fly no closer than 1,000 feet from the crowd line. If departing after this profile, at show center, execute a climbing turn at maximum continuous thrust at 40 degrees of bank away from the crowd line**. (T-2)**. Comply with climbout in accordance with ATC instructions.

3.9.3. Profile 5--360 Degree (Box Pattern). Profile consists of a 1,000 foot AGL (minimum altitude) **(T-2)**. 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 1,000 feet

above the highest obstacle within 2,000 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 1,000 feet AGL (roll out momentarily at perpendicular headings to the show line for clearing). All bank angles should be planned for 40 (not to exceed 45) degrees**. (T-2)**. At this time, the aircraft should execute a level pass and depart the area.

3.10. Chase Formation.

3.10.1. The OG/CC will approve preplanned B-2 chase flights.

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**. (T-2)**.

3.10.4. All aircraft in the chase formation use a common UHF frequency**. (T-2)**.

3.11. Reduced Lighting Training. Conduct reduced lighting training 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**. (T-3).**

3.12.2. Fuel Distribution and Center of Gravity (CG). To allow auxiliary power unit refueling, manually adjust fuel so that each main tank fuel quantity is below 18,000 lbs, each inboard tank fuel quantity is below 19,400 pounds, and each outboard tank fuel quantity is below 14,300 pounds. 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 pounds prior to engine shutdown following any preflight or alert cocking**. (T-3)**.

3.12.3. Unless maintenance requests otherwise, close auxiliary air doors and open the air refueling receptacle prior to engine shutdown**. (T-3)**.

3.12.4. Pilots will complete a post-flight walk-around inspection of the aircraft and weapons bays**. (T-3)**.

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**. (T-3)**. 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**. (T-3)**.

3.13.4. Do not conduct HPR if brake temperatures exceed 700 degrees Fahrenheit**. (T-2)**. 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 flight management system does not monitor CG**. (T-2)**. The fuel panel fuel management switch position (automatic or manual) does 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**. (T-2)**.

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**. (T-2)**.

3.13.8. Do not HPR if fuel was dumped during flight or if fuel is in the surge tank**. (T-2)**.

3.14. Fuel Minimums.

3.14.1. Normal fuel for recovery is 18,000 lbs. This is a general planning factor, and may be increased based on alternate requirements, follow-on missions, or other factors. If an alternate is required, fuel may be planned based on diverting to then landing at the alternate with minimum fuel – normal recovery fuel need not be applied.

3.14.2. Minimum fuel is 15,000 lbs. Crews will land at or above minimum fuel**. (T-2)**.

3.14.3. Emergency fuel is 10,000 lbs. If at any point in flight the AC/FL expects to land below emergency fuel, adjust the profile, divert and/or declare an emergency**. (T-3)**.

3.14.4. Remote or island destination (In accordance with AFI 11-202v3 AFGSC Supplement, *General Flight Rules*) fuel reserve is 30,000 lbs. If the remote or island destination requires an alternate due to weather, Commanders will ensure that the fuel reserve includes enough fuel for two (2) hours of holding**. (T-1)**.

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 at a minimum. **(T-1)**.

4.2. Simulated Instrument Flight Procedures. Synthetic ILS and Synthetic TACAN approaches require VMC**. (T-1)**. Visual glide path guidance required at night**. (T-1)**.

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 knots calibrated air speed 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 +/- 5,000 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**. (T-2)**.

4.3.7. Do not cruise in any forecast or actual icing conditions**. (T-2)**.

4.3.8. Maintain Mach .65 or greater in icing conditions to minimize ice accumulation.

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

4.4. Area Navigation (RNAV)/ Reduced Vertical Separation Minimum (RVSM) Flight.

4.4.1. RNAV and global positioning system (GPS) approaches are not authorized.

4.4.2. RVSM Airspace. Airspace where RVSM is applied is considered special qualification airspace. Commanders will ensure that both the aircrew and the specific aircraft are approved for operations in these areas**. (T-2)**. All B-2As are approved for restricted operation within RVSM airspace as documented in **Figure 4.1** B-2A RVSM Envelope Limitations. Refer to the flight information general planning on the National Geospatial Intelligence Agency website (**https://www.nga.mil/ProductsServices/Pages/Aeronautical-Charts-and-Publications.aspx**) and the following guidance for additional RVSM requirements:

4.4.3. Required RVSM Equipment. Commanders will ensure that both altimeters (multipurpose display units, one display before each pilot, and the standby altimeter), the autopilot altitude hold function, the identify friend of foe (IFF) transponder altitude reporting (Mode C), and the flight control system (to include the air data ports and their heaters) are fully operational (defined as not more than single channel failed) before entry into RVSM airspace**. (T-2)**. 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 should 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.

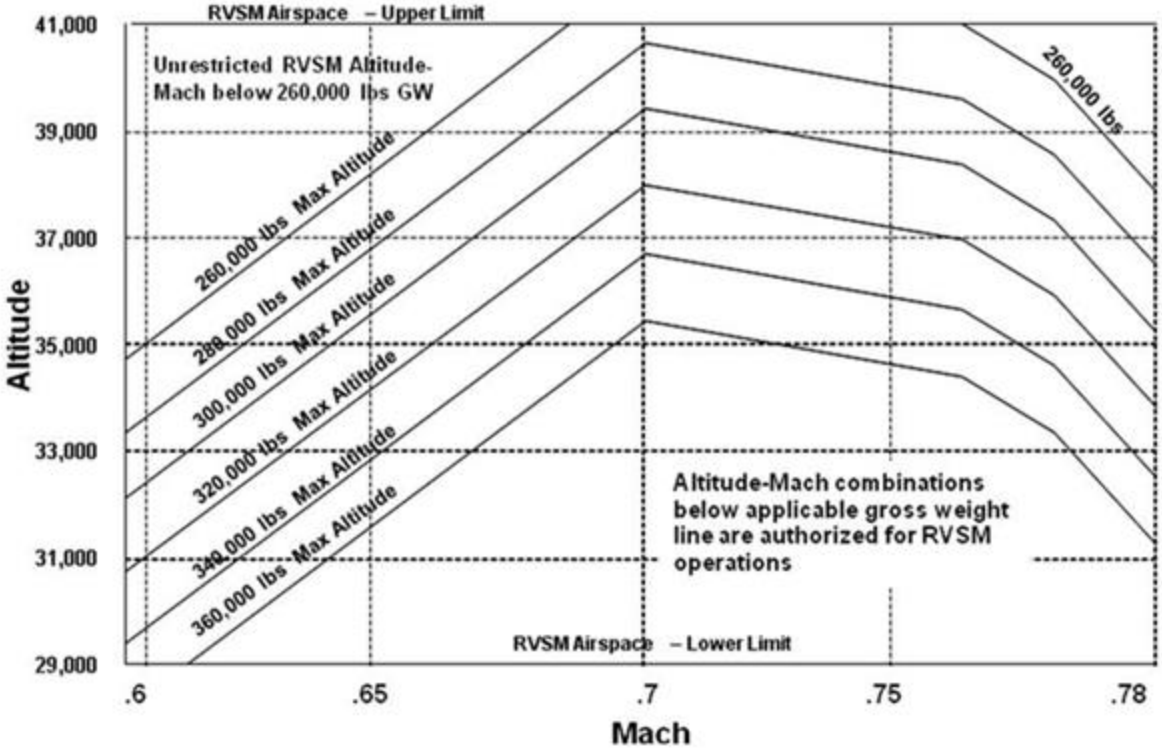
4.4.3.2. Altimeters. Crosscheck primary altitude displays with standby altimeter, before or immediately upon entry to RVSM airspace. After final level off in RVSM airspace the PIC will ensure that the readings of all altimeters are recorded (digital video recorder of both vertical situation displays) and retained for use in case of deviation**. (T-2)**.

4.4.4. RVSM Operations. Monitor systems and crosscheck altimeters on primary displays to ensure they agree +/- 10 ft. Aircrews should limit climb and descent rates to 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 Form 781A, *Maintenance Discrepancy and Work Document*, malfunctions or failures of RVSM required equipment, including failure of this equipment to meet RVSM tolerances.

4.5. B-2 Basic Area Navigation (BRNAV), Required Navigation Performance (RNP), North Atlantic (NAT) High Level Airspace (HLA). The B-2 aircraft is cleared for operations in basic area navigation (BRNAV), required navigation performance-10 (RNP-10), and NAT HLA.

Figure 4.1. B-2A RVSM Envelope Limitations.



NOTE: B-2 RVSM Restricted Operating Envelope.

Chapter 5

PILOT OPERATIONAL LIMITATIONS AND RESTRICTIONS

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

5.2. Crew Requirements. The minimum crew for flight is specified in T.O. 1B-2A-1, *Flight Manual*. Waiver information for special situations is in **AFI 11-2B-2V1, *B-2 Aircrew Training*.**

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**. (T-2)**.

5.3.2. Authorized Fuel Loads. Commanders will ensure that aircraft are loaded with standard fuel loads in accordance with T.O. 1B-2A-5-2, *Flight Manual Loading Data*. **(T-1)**.

5.4. Pilot and Aircraft Limitations.

5.4.1. Brief practice AFTTP 3-3.B-2 maneuvers or emergency procedures before the maneuver/procedure.

5.4.2. Do not practice compound simulated emergencies during critical phases of flight except those specifically authorized for Instructor Pilot Upgrade/Flight Instructor Course 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 loaded with nuclear weapons**. (T-1)**.

Chapter 6

AIR-TO-SURFACE WEAPONS EMPLOYMENT

6.1. References, Authorities and Definitions. AFI 11-214 contains air-to-surface procedures applicable to all aircraft. Also, reference other applicable instructions, range guides, exercise or theater directives and Special Instructions (SPINS). This chapter specifies procedures applicable to B-2 operations.

6.1.1. Ensure all employment of actual weapons is properly authorized and cleared**. (T-0)**.

6.1.1.1. Authorization to employ weapons for training is given by the wing commander, typically by the 21-165 process. In combat, contingency operations and certain higher headquarters directed exercises, authorization is given via the Air Tasking Order (ATO), Execution Order (EXORD) or similar orders.

6.1.1.2. Aircrew must coordinate final target designation (if not previously received) and clearance to release with ATC, range agencies, and operational and/or tactical controllers (e.g., air operations center, joint terminal attack controller, tactical air control party, forward air controller) as applicable**. (T-0)**.

6.1.2. Units will ensure crewmembers are qualified and proficient, or properly supervised, prior to employing actual weapons**. (T-1)**.

6.1.3. Each training mission involving actual weapons will reference current range guidance and will coordinate number and type of weapons and assigned targets**. (T-3)**. Any exceptional arrangement or waiver for an actual weapons release will be documented in writing**. (T-3)**.

6.1.4. On test sorties, specific portions of this chapter may be waived by instructions contained in the operations order, test plan, or implementation message which directs the test.

6.1.5. Actual Weapon. Any high explosive, inert, or training munition. This includes any releasable store.

6.1.6. High Explosive Weapon. An actual weapon configured with live functioning fuses (i.e., having a live primer mated with electrical power) or high explosives. Planners and crews should be alert for differing usage of "live," as in some instances it may be used by other agencies to denote an actual weapon (e.g., "live" vs. "virtual" or "simulated"). When appropriate, further clarify by describing the weapon as high-explosive.

6.1.7. Inert weapon. An actual weapon that does not have a functioning fuse or high-explosive. This includes weapons with functioning guidance systems, avionics, or propulsion. If a weapon is used with inert submunitions that will separate, it is still considered inert but care should be taken to ensure involved agencies know the submunitions will disperse and to describe any charges used in the weapon's function.

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)**. (T-2)**.

6.2.2. Do not conduct simulated bomb runs, unusual maneuvers, or touch and go landings while carrying actual weapons**. (T-2)**.

6.2.3. Do not complete weapon unlock/release enable/release consent for weapons until the aircraft is on the range, cleared ***hot*** by the controlling authority, and weapons impact would be in the range danger area. When practicable in contingency operations, delay unlock, etc. until cleared and over water, empty or enemy territory**. (T-2)**.

6.2.4. Do not release weapons for training during an inflight emergency or with an engine shutdown**. (T-2)**.

6.2.5. Do not release weapons if the release exceeds or may result in exceeding technical order limits, CG limits, briefed track/timing tolerances, safe escape requirements, wingman deconfliction or fragmentation deconfliction**. (T-2)**.

6.2.6. Do not open weapon bay doors during flight with actual weapons on board other than for intentional release, jettison, or telemetry checks (if applicable)**. (T-2)**.

6.2.7. A range control officer, chase aircraft, or the B-2 flight mission management system may confirm releases. Pilots may conduct simulated bombing training after they release all actual 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 air traffic control agency by all means possible**. (T-1)**. If communications cannot be established, then proceed in accordance with range procedures. During contingency operations, proceed in accordance with SPINS.

6.2.9. Do not operate in SIM mode when actual weapons are aboard the aircraft**. (T-2)**.

6.2.10. Do not practice simulated emergency procedures when actual weapons are loaded on the aircraft**. (T-2)**.

6.2.11. When conducting smart bomb rack assembly (SBRA) operations, do not delete targets or edit the release sequence (REL SEQ) with weapon interface units (WIU) on**. (T-2)**.

6.2.12. Aircrew must have a current copy of the B-2 Weapons OFP Compatibility Matrix (WOCM) when performing a guided weapon preflight. Refer to the OSK SharePoint™ site for the most current WOCM**. (T-3)**.

6.3. Off-Range Simulated Weapons Employment.

6.3.1. Pilots will minimize use of weapons doors in-flight during simulated weapons employment**. (T-2)**. Open weapons bay doors only for specific initial qualification or continuation training.

6.3.2. Do not "manually" rotate rotor launcher assemblies (RLA) in partial SIM without RLA installed**. (T-2)**.

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 and Navigation System Accuracy for Training Weapon Delivery. Unless range procedures are more restrictive, apply the following guidance.

6.4.1. Weather Guidance/Restrictions.

6.4.1.1. The B-2 is an instrument bomber and does ***not*** perform visual bombing.

6.4.1.2. VMC bombing procedures can be utilized to accomplish actual weapon releases if allowed by the applicable range regulation or SPINS.

6.4.1.3. Actual weapon releases in IMC and/or through an undercast are authorized if allowed by the applicable range regulation or SPINS.

6.4.2. Navigation System Accuracy Guidance/Restrictions. In accordance with AFI 11-214, Chapter 5, aircrew will confirm the accuracy of the aircraft navigation and weapon delivery systems.

6.4.2.1. Unguided Weapons.

6.4.2.1.1. GPS Moded-Out or Inoperative. Aircrew will utilize radar aiming, updates, and altitude calibrations to assess and manage navigation and weapon delivery system health and drift rate in accordance with checklist guidance. Additionally, aircrew must ensure that the navigation system drift rate is equal-to or less than tech-order specification (≤.25 nautical miles per hour or 25 feet per minute) and radar aim within 10 minutes of weapon release on a 0.8 nautical mile coherent map (CM)**. (T-2)**.

6.4.2.1.2. GPS Moded-In (GPS Figure of Merit (FOM) ≤ 3). If GPS FOM is ≤ 3, release is authorized if the aircrew utilizes a 0.8 NM CM map for radar aiming (offset aim point or target direct) while on the range to confirm the accuracy of the aircraft navigation and weapon delivery system. If radar aiming requires introducing buffers into the navigation solution, aircrew will mode-out the GPS and utilize "GPS moded-out or inoperative" guidance. Aircrew will ***not*** release unguided weapons with ***both*** buffers and GPS moded-in the navigation system**. (T-2)**.

6.4.2.1.3. GPS Moded-In (GPS FOM ≥ 4). If GPS FOM is ≥ 4, aircrew will mode-out the GPS and utilize "GPS moded-out or inoperative" guidance. Aircrew will ***not*** release unguided weapons with ***both*** buffers and GPS moded-in the navigation solution**. (T-2)**.

6.4.2.2. Guided Weapons.

6.4.2.2.1. GPS Moded-Out or Inoperative. Do ***not*** release**. (T-2)**.

6.4.2.2.2. GPS Moded-In. If GPS FOM is ≤ 3, release is authorized. If GPS FOM is ≥ 4, withhold**. (T-2)**.

6.4.2.2.3. INS-only weapons may be released if allowed by the applicable range guide. Set the failed weapon mode for SBRA training weapons to "withhold."

6.5. Hung Weapons Procedures.

6.5.1. General. A hung store should be accompanied by a WEAPON caution on the STAT page and a HUNG STORE message on the weapons bay display. Record the Weapons display and note the offending weapons station. If required to swap stores management processors (SMP) for any reason (e.g., to exit bomb (BMB) mode), expect the HUNG STORE message to rescind, even though the hung store condition still exists. If the crew does not suspect that a store is resting on the weapons bay doors, safe weapons and return to base following range and in-flight guide procedures**. (T-2)**.

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 only if necessary for aircraft recovery.

6.6. Jettison Procedures. Pilots will jettison weapons only if, in the opinion of the pilot in command, retention of stores would adversely affect the safe recovery of the aircraft**. (T-2)**.

6.6.1. Mission Planning. Use conventional weapon delivery software (CWDS) and a 235 millisecond (ms) release interval to calculate jettison stick lengths and ensure they are within limits set by range guidance. Calculate data and plan to jettison at the lowest practical altitude.

6.6.2. If a store is suspected to be resting on weapons bay doors:

6.6.2.1. Ensure no IPs will be sequenced to preclude entering BMB mode.

6.6.2.2. Place STACAN on the intended impact point and set course to intended release heading.

6.6.2.3. Intercept the course inbound to the STACAN.

6.6.2.4. Ensure SMPs are ***not*** in BMB mode, decouple roll, and open weapons bay doors manually at "Weapon Range at First Release", calculated using CWDS.

6.6.3. Jettisoning all stores in a bay. If deemed necessary for the safe recovery of the aircraft, accomplish the steps below first. Then, jettison all remaining stores from a selected bay by accomplishing the WEAPONS JETTISON - SELECTIVE checklist in T.O. 1B-2A-34-2-1, *B-2 Non-nuclear Weapons Delivery Manual*. Designating either rack on a side will designate both racks on that side.

6.6.3.1. Ensure no IPs will be sequenced to preclude entering BMB mode.

6.6.3.2. Place STACAN on the intended impact point and set course to intended release heading.

6.6.3.3. Intercept the course inbound to the STACAN.

6.6.3.4. Ensure SMPs are ***not*** in BMB mode, decouple roll, and press jettison button at "Weapon Range at First Release" plus 0.5 NM.

6.6.4. 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. **(T-1)**.

6.7.3. The OG/CC may waive these restrictions in accordance with 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 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 justified by mission priority or required for recovery. Do not conduct ground or in-flight troubleshooting after completing flight manual emergency procedures**. (T-3)**.

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 781A. 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 (NWS) Malfunctions. Do not taxi the aircraft with a brake system malfunction**. (T-2)**. 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**. (T-3)**. After clearing the runway, the pilots will stop until the malfunction can be cleared**. (T-3)**. 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.

7.1.5. Release Faults. When conducting actual weapons releases for training, if an aircrew receives a REL CON: FLT in flight and cannot clear this fault, do not attempt to release weapons**. (T-2)**. Terminate all bombing activity, and write the fault up for maintenance actions upon landing. The crew should attempt to clear the fault by cycling the REL ENBL switches or swapping and/or performing a SMP CDE.

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**. (T-3)**.

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. Reference the B-2 Brake Energy Limit Chart in T.O. 1B-2A-1 and comply with local guidance**. (T-1)**.

7.3.2. Pilots will recalculate takeoff data and brake energy data prior to follow-on takeoffs after an abort**. (T-2)**.

7.4. Air Aborts. Local guidance such as the Go/No Go guidance published in the B-2A In Flight Guide may further dictate specific causes for mission abort.

7.4.1. Pilot shall abort missions for any of the following:

7.4.1.1. Bird strike/FOD. **(T-3)**.

7.4.1.2. Over-G. **(T-3)**.

7.4.1.3. Flight control system anomalies (see local guidance). **(T-3)**.

7.4.1.4. Engine flameout/stagnation. **(T-3)**.

7.4.1.5. Boom strike. **(T-3)**.

7.4.1.6. Confirmed or suspected fuel leaks. **(T-3)**.

7.4.2. Do not conduct training events such as air refueling (except when required for safe recovery of the aircraft), actual weapons releases, dissimilar air training activity, or practice patterns/landings after an air abort**. (T-3)**.

7.5. Radio/Identify Friend or Foe (IFF)-Selective Identification Feature (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**. (T-3)**.

7.6. Lost Wingman Procedures. During climbs and descents, if visual and/or radar contact is lost, flight leads should 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**. (T-2)**. After a blind/broke lock call, lead will broadcast heading and altitude every 1,000 feet until all formation member are either tied or visual**. (T-2)**.

7.7. Spatial Disorientation/Unusual Attitudes.

7.7.1. Practice unusual attitude recoveries are prohibited in flight**. (T-2)**.

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 necessary, 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**. (T-3)**.

7.8.2. For training missions, do not rotate a hung weapon from the release position. **(T-2)**.

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.

7.9.2. Do not practice aborted takeoffs except in a simulator**. (T-2)**.

7.9.3. Do not shut down an engine in flight to simulate an emergency**. (T-2)**.

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

7.9.5. Practice stalls and approach to stalls are prohibited inflight**. (T-2)**.

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 pre-briefed mission.

7.10.2. Establish a SARCAP commander.

7.10.3. Notify controlling agencies of the situation, and change squawk as necessary.

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 after the arrival of designated rescue forces.

Chapter 8

LOCAL OPERATING PROCEDURES

8.1. General. This chapter is reserved for unit local operating procedures. In accordance with DAFI 33-360, the paragraph method is the only authorized way to supplement an AFMAN and added material should 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 AFMAN. Added or stand-alone procedures should 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:

8.2. Section A. Introduction/Purpose.

8.3. Section B. Applicability.

8.4. Section C. Ground Operation.

8.5. Section D. Flying Operations.

8.6. Section E. Weapons Employment.

8.7. Section F. Abnormal Procedures.

8.8. Section G. Command and Control.

8.9. Section H. Fuel Requirements.

8.10. Section I. Divert Instructions.

8.11. Section J. Jettison Areas (instrument/visual flight rules).

8.12. Section K. Controlled Bailout Areas.

8.13. Section L. Local Weather Procedures.

8.14. Section M. Approved Alternate/Other Missions.

8.15. Section N. Unit Standards.

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

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

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

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

AFI 11-209 AFGSC Supplement *Participation in Aerial Events*, 8 February 2019

AFI 11-214, *Air Operations Rules and Procedures*, 8 July 2020

AFI 11-215, *Flight Manuals Program,* 25 March 2019

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

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

AFI 11-202V3 AFGSC Supplement, *General Flight Rules*, 9 July 2019

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

AFMAN 11-2B-2V1, *B-2 Aircrew Training,* 20 August 2020

AFMAN 11-202V3, *Flight Operations,* 10 June 2020

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

AFTTP 3-3.B-2, *Combat Aircraft Fundamentals - B-2*, 31 July 2015

ATP-3.3.4.2, *Air-to-Air Refueling*, 26 April 2019

B-2A *Inflight Guide,* 1 Dec 2017

B-2A *Weapons Attack Guide*, 1 October 2015

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

T.O. 1B-2A-1, *Flight Manual*, 10 March 2014

T.O. 1B-2A-34-2-1, *B-2 Non-nuclear Weapons Delivery Manual*, 31 January 2007

T.O. 1B-2A-5-2, *Flight Manual Loading Data,* 8 January 2008

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*

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

Abbreviations and Acronyms

AC—aircraft commander

AFGSC—Air Force Global Strike Command

AFI—Air Force instruction

AFMAN—Air Force manual

AFPD—Air Force policy directive

AFTTP—Air Force tactics, techniques, and procedures

AGL—above ground level

AHAS—avian hazard advisory system

ATCAA—air traffic control assigned airspace

ATO—air tasking order

BASH—bird/wildlife aircraft strike hazard

BINGO—pre-briefed fuel state for recovery

BIT—built-in test

BMB—bomb mode

BRNAV—basic area navigation

CBRN—chemical, biological, radiological and nuclear

CC—commander

CG—center of gravity

CHUM—chart update manual

CM—coherent map mode of B-2 radar

CT—continuation training

CWDS—conventional weapon delivery software

deconfliction—removal or mitigation of collision risk

DVR—digital video recorder

DRU—direct reporting unit

EOR—end of runway

ERCC—engine running crew change

EXORD—execution order

FAF—final approach fix

FC—Flight Controls

FCIF—flight crew information file

FCS—flight control system

FENCE—firepower, emissions, navigation, communications, expendables

FIC—flight instructor course

FL—flight lead

FLIP—flight information publication

FOA—field operating agency

FOM—figure of merit

G limitations—limits on the demands placed on aircraft load factor

GPS—global positioning system

HAS—hardened aircraft structure

HE—high explosive

HF—high frequency

HLA—high level airspace

HPR—hot pit refueling

IAF—initial approach fix

IFF—identification friend or foe

IFR—instrument flight rules

IMC—instrument meteorological conditions

IP—instructor pilot

IPUG—instructor pilot upgrade

IQT—Initial Qualification Training

JDAM—joint direct attack munition

JP-4—Emergency/Alternative jet fuel normally used by US Navy and Marine Corps

KIO—knock-it-off

LINK-16—data link system

MARSA—Military Assumes Responsibility for Separation of Aircraft

MITO—Minimum Interval Takeoff

MOA—military Operating Area

MOPP—mission oriented protective posture

MNPS—minimum navigation performance specifications

MPS—mission planning system

ms—millisecond

MSA—minimum safe/sector altitude

MTR—military training route

NAT—North Atlantic

NM—nautical mile

NORDO—no radio

NWS—nose wheel steering

OFP—Operational Flight Program

OG—operations group

OPR—office of primary responsibility

ORM—operational risk management

ORI—operational readiness inspection

RAA—Route Abort Altitude

RCR—runway condition reading

REL SEQ—release sequence

RLA—rotary launcher assembly

RNAV—area navigation

RNP—Required Navigation Performance

RTB—Return to Base

RVSM—reduced vertical separation minima

SARCAP—search and rescue combat air patrol

SBRA—smart bomb rack assemblies

SIF—selective identification feature

SILS—synthetic instrument landing system

SMP—stores management processors

SPINS—special instructions

STACAN—synthetic TACAN

SUA—special use airspace

SQ—squadron

TACAN—tactical air navigation

TCAS—traffic alert and collision avoidance system

T.O.—technical order

UHF—ultra high frequency

VFR—visual flight rules

VHF—very high frequency

VMC—visual meteorological conditions

VOP—visual observation position

VSAT—voice satellite/very small aperture terminal

WAG—weapons attack guide

WIU—weapons interface unit

WOCM—Weapons Operation Flight Program Operational Flight Capability Matrix

Terms

Actual Weapon—Any high explosive, inert, or training munition. This includes any releasable store.

Alarm Black—Attack is over and contamination or unexploded ordinance is known or suspected.

Alarm Red—Immanent attack by air, missile, or ground forces.

Inert weapon—An actual weapon that does not have a functioning fuse or high-explosive. This includes weapons with functioning guidance systems (e.g., LGB seekers/tail kits), avionics and/or propulsion. If a weapon is used with inert submunitions that will separate, it is still considered inert but care should be taken to ensure involved agencies know the submunitions will disperse and to describe any charges used in the weapon's function.

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.

High Explosive Weapon—An actual weapon configured with live functioning fuses (i.e., having a live primer mated with electrical power) or high explosives. Planners and crews should be alert for differing usage of "live," as in some instances it may be used by other agencies to denote an actual weapon (e.g., "live" vs. "virtual" or "simulated"). When appropriate, further clarify by describing the weapon as high-explosive.

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

Inert Weapon—An actual weapon that does not have a functioning fuse or high-explosive. This includes weapons with functioning guidance systems (e.g., LGB seekers/tail kits), avionics and/or propulsion. If a weapon is used with inert submunitions that will separate, it is still considered inert but care should be taken to ensure involved agencies know the submunitions will disperse and to describe any charges used in the weapon's function.

Live Weapon—Actual munitions containing a primary explosive charge (JDAM, Mk 84, etc.).

Tied—Positive radar contact with element or aircraft.

Weapon—Any live, inert, or training munitions.

Attachment 2

AIRCREW OPERATIONS IN CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR (CBRN) 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.

A2.2. CBRN Environments. Counter-CBRN actions can be grouped into environments. Chemical and Nuclear environments result from clouds or rain of minute droplets of agents dispersed from a munition or sprayed as an aerosol. 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.

A2.3. Mission Preparation. Determine the CBRN status at planned launch, recovery and divert bases. Know the current Mission Oriented Protective Posture (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 End of Runway (EOR) procedures may be conducted in the hardened aircraft shelter (HAS) or other non-standard location.

A2.4. 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.

A2.5. Ground Operations during Alarm Red (or Theater Equivalent).

A2.5.1. 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 Hardened Aircraft Structure (HAS) provides optimum protection. Ensure the safety of supporting ground crew; use hand signals if necessary.

A2.5.2. Ground Operations Outside the Parking Spot. Maintain contact with supervisor of flying, air traffic control, command post, 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. The first option is to taxi into a hardened structure. If a hardened structure is not available, a hangar or flow through should reduce exposure to settling airborne agents. 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 extremes, especially if there is no protective mask available, select 100 percent oxygen and consider turning off the environmental control systems and/or shutting down to avoid bringing agent/dust into the aircraft. Leave the aircraft buttoned up and await assistance.

A2.6. Airborne.

A2.6.1. 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 two (2) to four (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.

A2.6.2. During the Mission and Return to Base (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 command directions and hold or divert. If holding, try to wait until Alarm Red is terminated. When able, obtain updates on airfield status, ground hazards, de-arm and taxi routing. If landing in Alarm Black, expect a contaminated environment and MOPP 4. Droplet settling following a chemical or biological airburst attack can take up to one (1) hour. If you believe the aircraft was contaminated before takeoff or while airborne, notify command and control.

Attachment 3

STRANGE FIELD PROCEDURES

A3.1. Mission Planning. During mission planning, crews should review the following information for each base of intended landing:

A3.1.1. **FLIP Enroute Supplement:**

A3.1.1.1. Traffic pattern altitudes/airfield specific differences

A3.1.1.2. Navaids scheduled maintenance period(s)

A3.1.1.3. Facilities/services/fuels available

A3.1.1.4. Load bearing capacity

A3.1.2. **FLIP Planning Documents:**

A3.1.2.1. Special notices

A3.1.2.2. Preferred routings

A3.1.2.3. Terminal Control Areas

A3.1.2.4. International Civil Aviation Organization information

A3.1.3. **Instrument Approach Plates:**

A3.1.3.1. Airfield layout/obstacles/runway length and width

A3.1.3.2. Final approach runway alignment

A3.1.3.3. Airfield lighting

A3.1.3.4. Navigation chart (review for local terrain features)

A3.1.4. **Security Requirements:**

A3.1.4.1. Aircraft security requirements

A3.1.4.2. Storage of classified materials

A3.2. 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:

A3.2.1. **Departure:**

A3.2.1.1. Obstacles

A3.2.1.2. Rate of climb required

A3.2.1.3. Emergency/minimum safe altitudes

A3.2.1.4. SID/routing/navaids/altitude requirements

A3.2.2. **Enroute Descent:**

A3.2.2.1. Start descent point

A3.2.2.2. Rate of descent require

A3.2.2.3. Transition altitude

A3.2.2.4. Terminal fix (initial approach fix (IAF), final approach fix (FAF), precision approach radar, air surveillance radar approach, etc.)

A3.2.2.5. Lost communication procedures

A3.2.2.6. Emergency/minimum safe/sector altitudes

A3.2.3. **Published Penetration:**

A3.2.3.1. IAF/holding fix

A3.2.3.2. Initial rate of descent required

A3.2.3.3. Transition altitude

A3.2.3.4. Altitude restrictions

A3.2.3.5. Emergency/minimum safe/sector altitudes

A3.2.3.6. Final approach fix

A3.2.3.7. Lost communication procedures

A3.2.4. Final Approach--Published or Radar:

A3.2.4.1. Rate of descent

A3.2.4.2. Timing

A3.2.4.3. Weather minimums/minimum descent altitude/decision height - Aircraft/aircrew restrictions

A3.2.4.4. Missed approach procedures

A3.2.4.5. Lost communication procedures

A3.2.4.6. Transition to visual/runway environment/landing