BY ORDER OF THE SECRETARY OF THE AIR FORCE

AIR FORCE INSTRUCTION 11-202, VOLUME 3

7 NOVEMBER 2014

Flying Operations

GENERAL FLIGHT RULES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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

RELEASABILITY: There are no releasability restrictions on this publication.

OPR: HQ AFFSA/XOF

Certified by: HQ USAF/A3O (Brig Gen Giovanni Tuck)

Pages: 75

Supersedes: AFI11-202V3, 22 October 2010

This instruction implements AFPD 11-2, *Aircrew Operations*, by prescribing general flight rules that govern the operation of USAF aircraft (manned and unmanned) flown by USAF pilots, pilots of other services, foreign pilots, and civilian pilots. This instruction applies to Air Force activities operating aircraft on loan or lease, to the extent stipulated in the loan or lease agreement; Air Force Reserve Command (AFRC) units; and to Air National Guard (ANG) units. Public Aircraft Operations (PAO) under government contract for Air Force operations will comply with stipulations documented in written declaration of public aircraft status, applicable Title 14 Code of Federal Regulations (CFR) and this regulation. Air Force Instruction (AFI) 11-2 Mission Design Series (MDS) Specific, Volume 3 instructions (e.g., AFI 11-2KC-10, Volume 3) may contain specific operational guidance unique to individual aircraft and crew positions. MDS-specific, Volume 3 instructions will not be less restrictive than this instruction. Address questions concerning this instruction to Headquarters Air Force Flight Standards Agency (HQ AFFSA) at HQ AFFSA/XOF, 6500 S. MacArthur Blvd, Bldg 4, Room 240, Oklahoma City, OK 73169, email: **hqaffsa.xof@us.af.mil.** See Attachment 1 for a list of terms and abbreviations. **Improvement Recommendations:** Use AF Form 847, *Recommendation for Change of Publication*, to recommend changes to this instruction in accordance with (IAW) AFI 11-215, *USAF Flight Manuals Program (FMP).*

NOTE: The reports in this directive are exempt from licensing according to AFI 33-324, *The Air Force Information Collections and Reports Management Program.* Ensure that all records created as a result of processes prescribed in this publication are maintained IAW Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of IAW Air Force Records

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SUMMARY OF CHANGES

This document has been updated to reflect current aviation guidance. It has been significantly re-organized in chapter and content layout from the previous version and should be thoroughly reviewed in its entirety. Tier waiver authorities (T-0, T-1, T-2, T-3) have been included to all mandated unit compliance items (Wing level and below) as prescribed by AFI 33-360, *Publications and Forms Management*.

Chapter 1

ROLES AND RESPONSIBILITIES

1.1. General.

1.1.1. **Pilot in Command Authority.** The Pilot in Command (PIC), regardless of rank, is responsible for, and is the final authority for the operation of the aircraft.

1.1.2. This AFI provides broad guidance and cannot address every situation. Aircrew will use best judgment to safely conduct flying operations.

1.1.3. Supplemental information to this AFI may be found in the AFMAN 11-217 series.

1.1.4. This instruction is a common source of flight directives that includes:

1.1.4.1. Air Force guidance;

1.1.4.2. Title 14 Code of Federal Regulations (CFRs) and the Aeronautical Information Manual (AIM); and,

1.1.4.3. International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs).

1.1.5. Unmanned Aircraft System (UAS) or Remotely Piloted Aircraft (RPA) applicability.

1.1.5.1. Categories 4 and 5 RPA operations shall follow this AFI; Categories 1-3 ("Small") UAS shall be governed by AFI 11-502V3, *Small Unmanned Aircraft Systems Operations.* UAS/RPA categories are listed in AFI 11-502V3.

1.2. Waivers. Directive guidance (will, shall, must, etc.) throughout this regulation are tiered IAW AFI 33-360, *Publications and Forms Management*. For examples of tiered waivers, see AFI 33-360. HAF/A3O designates the HQ AFSSA/CC as the Approving Official to concur with renewal of existing waivers. MAJCOM/A3 is waiver authority for MAJCOM supplements to this instruction and in the appropriate MDS-specific Volume 3.

1.2.1. **Waiver Process.** Coordination through HQ AFFSA/XOF (**hqaffsa.xof@us.af.mil**) is required for the initiation of Tier 0 and 1 waivers and is recommended prior to initiation of Tier 2 and 3 waivers. HQ AFFSA/XOF will provide only written waivers; verbal waivers are not authorized.

1.2.1.1. **Tier 0:** Annotated by "(T-0)". Determined by respective non-AF authority (e.g. Congress, White House, Secretary of Defense, Joint Staff, etc.). The waiver authority is external to AF.

1.2.1.1.1. HQ AFFSA/XOF will be contacted to initiate Tier 0 waivers. Following a MAJCOM/CC (delegable no lower than MAJCOM/A3) request, HQ AFFSA/XOF will request AFI Certifying Official approval for a Tier 0 waiver after concurrence from the external agency (i.e. an Exemption to the CFRs granted by the Federal Aviation Administration (FAA) Administrator). Tier 0 waiver renewal requests will only be accepted from MAJCOM Stan/Eval.

1.2.1.1.2. Tier 0 guidance may include FAA guidance from the Codified Federal Regulations (CFRs) or ICAO guidance from the SARPs.

1.2.1.2. **Tier 1:** Annotated by "(T-1)". Non-compliance puts Airmen, commanders or the USAF strongly at risk of mission or program failure, death, injury, legal jeopardy or unacceptable fraud, waste or abuse.

1.2.1.2.1. HQ AFFSA/XOF will initiate Tier 1 waivers. Following a MAJCOM/CC (delegable no lower than MAJCOM/A3) request, HQ AFFSA/XOF will request AFI Certifying Official concurrence. Tier 1 waiver renewal requests will only be accepted from MAJCOM Stan/Eval.

1.2.1.2.2. Tier 1 includes guidance that lends to standardization across all USAF wings and platforms.

1.2.1.3. **Tier 2:** Annotated by "(T-2)". Non-compliance may degrade mission or program effectiveness or efficiency and has potential to create moderate risk of mission or program failure, injury, legal jeopardy or unacceptable fraud, waste, or abuse.

1.2.1.3.1. MAJCOM Stan/Eval will initiate Tier 2 waivers and will request MAJCOM/CC (delegable no lower than MAJCOM/A3) approval for all Tier 2 waivers. Tier 2 waivers only apply within the approving MAJCOM.

1.2.1.3.2. Tier 2 guidance includes instruction that lends to standardization across MAJCOM-specific wings and platforms. Once approved, MAJCOM Stan/Eval will send an informational copy to HQ AFFSA/XOF within 5 duty days.

1.2.1.4. **Tier 3**: Annotated by "(T-3)". Non-compliance may limit mission or program effectiveness or efficiency and has a relatively remote potential to create risk of mission or program failure, injury, legal jeopardy or unacceptable fraud, waste, or abuse.

1.2.1.4.1. Wing commanders, delegable no lower than operations group commanders or equivalent, will initiate and approve Tier 3 waiver requests. Once approved, wings will send an informational copy to MAJCOM Stan/Eval and HQ AFFSA/XOF within 5 duty days.

1.2.1.4.2. Tier 3 guidance includes instruction that is limited to wing- and location-specified rules that do not affect AF-level standardization.

1.2.2. For the purposes of this instruction, flying MAJCOMS are: ACC, AETC, AFDW, AFGSC, AFMC, AFRC, AFSOC, AMC, DIA, NGB, PACAF, and USAFE. Commander Air Force forces (COMAFFORs) in the grade of O-8 or higher in Combatant Commands (CCMDs) are considered MAJCOM commanders only for forces under their operational control.

1.3. Compliance. The PIC will ensure compliance with this AFI and the following (see Attachment 1 for related publications):

1.3.1. Air Force, Major Command (MAJCOM), and Mission Design Series (MDS)-specific instructions;

1.3.2. Flight Information Publications (FLIP) and Foreign Clearance Guide (FCG);

1.3.3. Air Traffic Control (ATC) clearances;

1.3.4. Notices to Airmen (NOTAMs), aircraft technical orders; and,

1.3.5. Combatant Commander's instructions and other associated directives IAW the Air Component Commander's objectives.

1.4. Operational Prerogative of Military Aircraft. When operationally necessary, PICs are authorized to conduct military flight operations with due regard for the safety of navigation of civil traffic in international airspace IAW FLIP *General Planning* (GP). Except for pre-planned missions, PICs shall consider such operations in peacetime as a flight rule deviation and will comply with the reporting requirements in **paragraph 1.6**. (T-0). MAJCOMs may authorize tactical operations for training and compliance with **paragraph 1.2.5**.

1.5. MAJCOM Supplements. MAJCOM supplements shall not be less restrictive than this instruction and be IAW AFI 33-360. Submit supplements to HQ AFFSA/XOF (**hqaffsa.xof@us.af.mil**) for coordination prior to publishing.

1.5.1. Tier 0 and 1 waivers shall not be published in MAJCOM supplemental guidance.

1.6. Deviations. An ATC clearance is not authority to deviate from this instruction. A PIC may only deviate from this instruction, flight rule, or ATC clearance to protect life, for safety of flight, or when an in-flight emergency requires immediate action.

1.6.1. **Notification.** When deviating from an ATC clearance, notify ATC of the action taken as soon as possible.

1.6.2. **Post-Flight Actions.** In the event of a deviation from a flight rule and/or when given traffic priority by ATC in an emergency, the PIC will verbally report the incident to a supervisor and commander within 24 hours of the incident and shall make a detailed written record (T-0). The unit will keep a copy of the record for a minimum of 1 year from the date of the incident and be prepared to provide the record to the appropriate investigating authority if required (T-0).

1.7. Violations. A violation may result when a USAF aircraft deviates from flight rules. FAA ATC deviation reports involving a USAF aircraft are processed by the Air Force Representative to the FAA (AFREP) IAW AFI 13-201, *Airspace Management*. Air Force ATC deviation reports involving USAF aircraft are processed IAW AFI 91-202, *The US Air Force Mishap Prevention Program*. Violations that occur in the airspace of foreign nations are processed IAW the procedures of that nation.

1.7.1. For any alleged violation, utilize aircraft call-sign for any contact with ATC. Do not release names of crewmembers to non-USAF agencies without the permission of the AFREP in coordination with the MAJCOM/A3 or HQ USAF/A3O.

1.7.2. If notified by an AFREP of a possible violation, MAJCOMs will preserve any available evidence for a minimum of 180 days and will contact the AFREP prior to disposal.

1.8. Aviation Safety Reporting. Potential hazards to aviation safety should be reported via the military Aviation Safety Action Program (ASAP) (**www.safety-masap.com**). Incidents involving damage to aircraft, personal injury, or intentional disregard of orders or instructions, whether reported to ASAP or not, shall be reported to a Flight Safety Officer (FSO) as soon as possible (T-0). Report hazardous air traffic events IAW AFMAN 91-223, *Aviation Safety Investigations and Reports.*

1.9. Airworthiness. For all issues concerning aircraft airworthiness certification, refer to AFI 62-601, *USAF Airworthiness*.

1.10. Communication, Navigation, Surveillance (CNS) Certification and Approval. USAF aircraft and aircrews must comply with the performance requirements and specifications appropriate for the route, procedure, and airspace unless exemptions or special procedures for non-equipped aircraft are granted (T-0).

1.10.1. Remotely Piloted Aircraft. See **paragraph 4.10**.

1.10.2. Operational Approvals. MAJCOM CNS procedures and training should provide a level of performance and safety that is consistent with civil airspace standards. HQ AFFSA will assist MAJCOMs with Operational Approvals. Contact AFFSA/XON (**hqaffsa.xon@us.af.mil**) for capabilities that require specific operational approval.

1.10.2.1. **Lead MAJCOM responsibilities:**

1.10.2.1.1. Provide training, instructions, procedures, and minimum equipment lists for CNS capabilities to operators and maintenance personnel.

1.10.2.1.2. Receive HQ USAF/A3O endorsement for operational approvals. Initiate endorsement through AFFSA/XON.

1.10.2.1.3. Provide detailed MDS-specific guidance authorizing aircrew to exercise CNS capabilities including approvals, qualifications, and any restrictions or prohibitions.

1.10.2.1.4. Ensure CNS capabilities are properly certified and operationally approved IAW AFI 63-137, *Assurance of Communications, Surveillance/Air Traffic Management (CNS/ATM), Navigation Safety, and Next Generation Air Transportation System (NextGen) Performance*. Also reference AFI 63-112, *Cockpit Working Groups.*

1.10.2.2. **AFFSA responsibilities:**

1.10.2.2.1. Assist MAJCOMs with identifying and defining CNS requirements and accomplishing operational approvals.

1.10.2.2.2. Review MAJCOM approvals for consistency with civil standards and for completeness of operational procedures, flight manuals, and directives prior to staffing for endorsement.

1.11. Primary Flight Reference (PFR). Any PFR used for instrument flight shall be considered for endorsement by HQ USAF/A3O (T-1). Contact HQ AFFSA/XON (**hqaffsa.xon@us.af.mil**) for PFR endorsement process.

1.11.1. USAF aircraft cockpits and UAS control stations must always provide full-time attitude, altitude, airspeed information, and the capability to recognize, confirm, and recover from unusual attitudes in all pilot positions (T-1).

1.11.1.1. UAS control stations must also display at all times: link status, link availability, lost link indications, and logic information (autopilot control mode, primary route, and contingency route) (T-1). *Exception:* Contingency route may be immediately available if not displayed at all times.

1.11.1.2. Lead Commands will define display requirements for aircraft not certified or authorized for instrument flight (T-1).

1.11.2. MAJCOMs will issue guidance for configuration of pilot-selectable flight displays. In actual instrument meteorological conditions (IMC) or when there is no discernible visual horizon, an HQ USAF/A3O-endorsed PFR shall be displayed in the pilot flying position.

Chapter 3

GENERAL FLIGHT RULES

3.1. Professional Flying Standards.

3.1.1. **Reckless Flying.** The PIC is responsible for ensuring the aircraft is not operated in a careless, reckless, or irresponsible manner that could endanger life or property.

3.1.2. **Unauthorized Flight Demonstrations.** Unauthorized or impromptu flight demonstrations, maneuvers, events, or "fly-bys" are prohibited. AFI 11-209, *Aerial Event Policy And Procedures*, addresses authorized flight demonstrations.

3.2. Nonrated Flyers. Flying unit commanders must ensure nonrated personnel and civilians who perform in-flight duties receive an indoctrination course on MDS-specific missions, egress, emergency procedures, and use of flight and emergency equipment (T-0). A preflight briefing does not qualify as an indoctrination course.

3.3. Transporting Passengers Under the Influence. Ensure personnel suspected to be under the influence of intoxicants or narcotics are not allowed to board a USAF aircraft except in an emergency or when authorized by command and control authority.

3.4. Tobacco Use. Tobacco use in all forms, including electronic nicotine delivery systems, is prohibited on all aircraft (T-0).

3.5. Transport of Drugs. Do not allow the transport of narcotics, controlled substances, or other dangerous drugs unless such transport has been approved by a US Military, Federal, or State authority (T-0).

3.6. Hazardous Cargo. Ensure compliance with AFJI 11-204, *Operational Procedures For Aircraft Carrying Hazardous Material*.

3.7. Flight Displays. Comply with MAJCOM or MDS-specific guidance for configuration of pilot-selectable flight displays.

3.8. Authorized Resources for Flight and Mission Related Duties. Conduct flight and mission-related duties with MAJCOM-approved devices and resources. MAJCOMs will establish policy on the use of personal, public, or non-DoD resources for flight and mission duties (e.g. personally-owned devices, non-DoD networks, commercial websites).

3.9. Portable Electronic Devices (PEDs). The PIC will prohibit the use of any PED suspected of creating interference with systems on the aircraft (T-0).

3.9.1. **Non-Transmitting PEDs.** The following may be used at any time or altitude: portable voice recorders, hearing aids, heart pacemakers, electric shavers, calculators, watches, or any other portable electronic device authorized by the MAJCOM.

3.9.2. **Transmitting PEDs**. MAJCOM/A3 may authorize use of PEDs at any altitude with transmitters ON or OFF. In the absence of MAJCOM guidance, the PIC may authorize use of PEDs at or above 10,000 ft. MSL. with transmitter OFF (e.g. Airplane Mode).

3.9.3. **PED Connection to Aircraft.** MAJCOMs may authorize electrical connection of PEDs to aircraft power, data, or antennae with aircraft Program Manager approval. MAJCOMs will provide any applicable restrictions.

3.9.4. **PEDs used for Flight or Mission Duties.**

3.9.4.1. Information displayed on PEDs used to facilitate operation of the aircraft (e.g. Tech Orders, takeoff and landing data (TOLD)) will only be used as approved IAW AFI 11-215, *USAF Flight Manuals Program (FMP)*.

3.9.4.2. PEDs used to facilitate execution of the mission (e.g. portable electronic flight bags, portable Global Positioning System (GPS) units) will only be used as authorized by the MAJCOM (T-1). MAJCOMs will evaluate PEDs to minimize risks associated with mission completion, safety, and security.

3.9.4.3. MAJCOMs will publish guidance on use of personally-owned hardware or software.

3.9.5. **Photo and Video Recording Devices.** Pilot use of handheld photo or video recording devices is prohibited when that pilot is the only one with immediate access to the flight controls (T-2).

3.9.6. **Medical Equipment.** Normally, only medical equipment referenced in the aircraft flight manual, MDS-specific instruction, or listed in the Air Force Medical Logistics website is permitted. See: **https://medlog.detrick.af.mil/index.cfm?event=memo.eqcat**.

3.10. Aircraft Movement on the Ground. Comply with AFI 11-218, *Aircraft Operations and Movement on the Ground*, and locally published procedures.

3.10.1. **Clearances.** Obtain clearance from ATC before taxiing, taking a runway, takeoff or landing at an airport with an operating control tower (T-0). Precisely read back all taxi and hold short instructions (T-0). If a taxi route requires crossing any runway, hold short until obtaining specific clearance to cross each runway (T-0). Do not taxi across or onto the assigned runway without clearance from ATC (T-0).

3.10.2. **Surface Movement Guidance and Control System (SMGCS).** Obtain MAJCOM-directed training and certification before participating in SMGCS taxi operations (T-0). MAJCOMs shall publish MDS-specific guidance for aircrew required to operate at SMGCS locations in low visibility. See AFI 11-218 for further guidance.

3.11. Crew at Stations. Crewmembers must occupy their assigned duty stations from takeoff to landing unless absence is normal in the performance of crew duties or in connection with physiological needs (T-0). Pilots shall not leave their duty station unless another qualified pilot establishes control of the aircraft (T-0).

3.12. Sterile Cockpit. In the absence of MAJCOM guidance, aircrew of fixed-wing aircraft shall minimize non-essential cockpit conversations and other extraneous activities which could interfere with flight duties when below 10,000 ft. MSL, during critical phases of flight, and during all taxi operations.

3.13. Inflight Reporting. See also AFI 10-206, *Operational Reporting*.

3.13.1. **Flight Safety Conditions.** Immediately report hazardous weather conditions, wake turbulence, volcanic activity, or large concentrations of birds or wildlife on or near the airfield to the appropriate controlling agency. Pilots shall report any other significant flight condition that may affect aviation safety. See pilot report (PIREP) procedures in the *Flight Information Handbook* (FIH).

3.13.2. **Minimum or Emergency Fuel Advisory.** Declare "minimum fuel" or "emergency fuel" to the appropriate controlling agency when the aircraft may land at the intended destination with less than the MDS-specific minimum or emergency fuel reserves.

3.13.3. **Position Reports.** Report position as requested by ATC, host-nation procedures, or ICAO procedures (T-0). See IFR Supplement for position report format.

3.13.4. **Hazardous Laser Activity.** Report any hazardous laser activity. Reference AFI 11-301V4 for specific actions.

3.13.5. **Electromagnetic Interference.** Report any electromagnetic interference IAW Joint Spectrum Interference Resolution (JSIR) procedures in the FIH and AFI 10-707, *Spectrum Interference Resolution Program*.

3.14. Oxygen and Pressurization Requirements (N/A for UAS).

3.14.1. **Oxygen.** Ensure sufficient oxygen for the planned mission is available to all occupants before takeoff (T-0). Normally, aircrew will use supplemental oxygen any time the cabin altitude exceeds 10,000 ft. MSL.

3.14.2. **Unpressurized Operations.** When mission essential, aircrew trained IAW AFI 11-403, *Aerospace Physiological Training Program*, may operate aircraft unpressurized up to Flight Level (FL) 250 IAW MAJCOM guidance and the following restrictions (T-1):

3.14.2.1. Without supplemental oxygen:

3.14.2.1.1. Altitude is limited to 14,000 ft. MSL.

3.14.2.1.2. Flight time between 10,000 and 12,500 ft. MSL is unrestricted, but shall not exceed 1 hour if any portion of the flight is conducted in IMC, at night (with or without NVDs), while employing weapons, conducting airdrop, air-refueling, or if performing high-g maneuvers.

3.14.2.1.3. Flight time between 12,500 and 14,000 ft. MSL shall not exceed 30 minutes.

3.14.2.1.4. If any occupant is not trained IAW AFI 11-403, altitude and flight time are limited to 13,000 ft. MSL and 3 hours, but shall not exceed the limits in paragraphs 3.14.2.1.2 and 3.14.2.1.3.

3.14.2.2. Supplemental oxygen must be used by all occupants between 14,000 ft. MSL and FL250. Do not exceed FL250 unless occupants are wearing functional pressure suits (see paragraph 3.14.7).

3.14.3. **Pressurized Operations.** Pilots flying pressurized operations will normally maintain a cabin altitude below 10,000 ft. and comply with the supplemental oxygen requirements in **Table 3.1**. (T-1). If cabin altitude is between 10,000 ft. MSL and FL250, comply with **paragraph 3.14.2**.

Table 3.1. Oxygen Requirements for Pressurized Aircraft.

	Pilot(s)[1]	Cockpit	Other Flight Deck Crew	Cabin/Cargo Area Crew	Pax

		Crew[2]			
10,000 ft. through FL 250	R	R	R	A	NA
Above FL 250 to FL 350	One I/One R	R	R	A	A
Above FL 350 to FL 410 (two pilots at controls)	I	R	R	A	A
Above FL 350 to FL 410 (one pilot at controls)	One O/One A	I	R	A	A
Above FL 410 to FL 450	One O/ One I	I	R	A	A
Above FL 450 to FL 500	One O/ One I	I	I	A	A
Above FL 500 to FL 600	G	G	G	G	G
Above FL 500 (Sustained)	S	S	S	S	S

NOTE 1: *Single-pilot aircraft must follow the most restrictive guidance in this table.*

NOTE 2: *Cockpit crew is defined as those crew positions with access to flight controls or responsibility for flight engineer panel, communication, or navigation systems.*

LEGEND:

A - Oxygen available. Carry or place portable oxygen units or extra oxygen outlets with masks throughout the cabin/cargo area so that any person has quick access to oxygen should a loss of pressurization occur.

R - Oxygen readily available. A functioning system and mask shall be located within arm's reach, and the regulator must be set to 100 percent and ON (when regulator is adjustable).

I - Oxygen immediately available. Must wear helmets with an oxygen mask attached to one side, or have available an approved quick-don style mask properly adjusted and positioned. Regulators shall be set to 100 percent and ON.

O - Oxygen mask ON. Regulator ON and normal.

G - Wear a partial pressure suit. Suit must provide 70mm Hg of assisted positive pressure breathing for altitude (pressure breathing for altitude system/get-me-down scenario).

S - Wear a pressure suit. Suit must provide a total pressure (atmospheric plus suit differential) of at least 141mm Hg to the head and neck with adequate body coverage to prevent edema and embolism.

3.14.4. **Procedures for Loss of Cabin Pressure.** Initiate an immediate descent to the lowest practical altitude, preferably below 18,000 ft. MSL. Do not allow cabin altitude to remain above FL250 unless occupants are wearing functional pressure suits (T-1). If any occupant lacks functioning oxygen equipment, descend to an altitude of 13,000 ft. MSL or less (terrain or fuel requirements permitting) and comply with paragraph 3.14.2. (T-1).

3.14.4.1. If cabin altitude exceeds 18,000 ft. MSL following the unintended loss of cabin pressure, aircrew and passengers must be evaluated by a flight surgeon or other aviation medical authority prior to further flight (T-1). If cabin altitude cannot be determined, use the aircraft altitude at the time of the event. Report a loss of cabin pressurization IAW AFMAN 91-223.

3.14.5. **Decompression Sickness (DCS).** If any occupant exhibits DCS symptoms, descend as soon as practical and land at the nearest suitable installation where medical assistance can be obtained (T-1). Individuals suspected of DCS shall be administered and remain on 100% oxygen (using tight-fitting mask or equivalent) until evaluated by an aviation medical authority (T-1). Decompression sickness may occur up to 12 hours after landing. Aircrew will not fly after a DCS event without specific authorization from a flight surgeon (T-1).

3.14.6. **Hypoxia.** If anyone on the aircraft experiences hypoxia symptoms, descend immediately to the lowest practical altitude and land at a suitable location to obtain medical assistance (T-1). Aircrew will not fly after a hypoxia event without specific authorization from a flight surgeon (T-1). For hypoxia symptoms caused by an On-Board Oxygen Generation System (OBOGS), follow MDS-specific guidance.

3.14.7. **High Altitude Operations.** Without functional pressure suits, maintain a cabin altitude below FL250 and adhere to the time limits in Table 3.2. (T-1). For high-altitude airdrop missions, use the oxygen requirements in AFI 11-409, *High Altitude Airdrop Mission Support Procedures*. If the aircraft lands between missions and the time on the ground equals or exceeds the time spent at or above a cabin altitude of FL210, the time of allowable duration can be reset to the maximum (T-1).

Table 3.2. Cabin Altitude Time Limits (DCS Prevention) (N/A for U-2 Operations).

Time (minutes)	Cabin Altitude (ft. MSL)
0	At or Above FL 250
45	24,000 – 24,999
70	23,000 – 23,999
120	22,000 – 22,999
200	21,000 – 21,999

3.15. Aircraft Lighting. Operate aircraft lighting according to the following guidance or IAW host-nation rules and theater SPINS (T-0):

3.15.1. **Position Lights.** Illuminate position lights (one per side minimum) between official sunset and sunrise (T-0); and,

3.15.1.1. When an engine is starting or running. Aircraft that do not have power available before start shall turn them on as soon as power is available (T-0); or,

3.15.1.2. While being towed, or when parked in an area likely to create a hazard, unless clearly illuminated by an outside source (T-0).

3.15.2. **Anti-collision or Strobe Lights.** If equipped, turn anti-collision or strobe lights on from just prior to engine start until engine shutdown (T-0).

3.15.2.1. Aircraft that do not have power available before engine start shall turn anti-collision or strobe lights on as soon as power is available (T-0).

3.15.2.2. Flashing lights may be switched off or reduced in intensity if they adversely affect the performance of duties, or subject an outside observer to harmful glare (T-0).

3.15.3. **Landing Lights.** If equipped, landing lights should be turned on when takeoff clearance is received, when commencing takeoff roll at an airport without an operating control tower, or when operating below 10,000 ft. MSL within normal MDS-specific operating procedures.

3.15.4. **Reduced Aircraft Lighting.** MAJCOMs may authorize reduced or lights-out operations in restricted areas, warning areas, host-nation approved areas, or designated airfields. Designated airfields shall be documented in a Letter of Agreement (LOA) (T-0).

3.16. Airfield Lighting.

3.16.1. Fixed-wing operations at night:

3.16.1.1. Will not be conducted from a runway unless it is outlined with operable lighting or high-intensity runway reflective markers and is clearly discernible (T-2).

3.16.1.2. Are restricted to military airfields or civilian airports with an appropriate LOA during non-contingency operations from unlighted runways or landing zones (or those using high-intensity runway reflective markers) (T-0).

3.16.1.3. Must comply with MDS-specific operating instructions, including comprehensive risk mitigation measures (such as infrared (IR) lighting requirements, NVD usage, non-participating aircraft procedures, NOTAM issuance, weather and lunar illumination requirements and RM assessments) (T-2).

3.16.2. Covert IR runway lighting used by qualified crews equipped with NVDs meets the intent of lighted landing surface.

3.16.3. Extreme Latitudes. In Alaska, areas located north of 60° North latitude, Antarctica, and areas located south of 60° South latitude, aircraft may be operated to unlighted airports during the period of civil twilight (T-0).

3.17. Right-of-Way. Each pilot must take whatever action is necessary to avoid collision, regardless of who has the right-of-way. The yielding aircraft must not pass over, under, abeam, or ahead of the other aircraft until well clear.

3.17.1. **Distress.** Aircraft in distress have the right-of-way over all other air traffic.

3.17.2. **Converging.** When converging at approximately the same altitude (except head-on or approximately so), the aircraft to the other's right has the right-of-way. Aircraft of different categories have the right-of-way in the following order of priority: balloons, gliders, aircraft towing or refueling other aircraft, airships, rotary- or fixed-wing aircraft.

3.17.3. **Approaching Head-On.** If aircraft are approaching each other head-on or approximately so, each shall alter course to the right.

3.17.4. **Overtaking Aircraft.** An overtaken aircraft has the right-of-way. The overtaking aircraft must alter course to the right.

3.17.5. **Landing.** An aircraft established on final approach has the right-of-way over other aircraft on the ground or in the air, except when two or more aircraft are approaching to land. In this case, the aircraft at the lower altitude has the right-of-way but it shall not use this advantage to cut in front of or overtake the other.

3.18. Sense and Avoid. Pilots under instrument flight rules (IFR) or visual flight rules (VFR), whether or not under radar control, are responsible for avoiding traffic, terrain/obstacles, and environmental hazards.

3.18.1. Standard IFR separation is provided between aircraft operating under IFR in controlled airspace. Within the National Airspace System (NAS), ATC provides traffic advisories on VFR aircraft on a time-permitting basis. Outside the NAS, consult ICAO and country-specific guidance outlined in the FCG and FLIP.

3.18.2. UAS without approved sense and avoid capabilities will be operated under specific arrangements with appropriate aviation authorities (e.g., FAA, host nation, or military control).

3.19. Proximity of Aircraft. Do not allow the aircraft to be flown so close to another that it creates a collision hazard. Use 500 ft. of separation as an approximate guide except for:

3.19.1. Authorized formation flights.

3.19.2. Emergency situations requiring assistance from another aircraft. If an emergency requires visual checks of an aircraft in distress, exercise extreme care to ensure this action does not increase the overall hazard. The capabilities of the distressed aircraft and the intentions of the crews involved must be considered before operating near another aircraft in flight.

3.19.3. MAJCOM-approved maneuvers in which participants are aware of the nature of the maneuver and qualified to conduct it safely (e.g. interceptor visual identification training).

3.20. Dropping Parachutists, Stores, or Other Objects. Do not allow objects to be dropped except in an emergency or when required for mission accomplishment. Report any accidental loss of equipment, aircraft parts, or cargo IAW AFI 10-206, *Operational Reporting*, and AFMAN 91-223.

3.21. Fuel Jettison. Do not jettison fuel except in an emergency or when required for mission accomplishment. When jettisoning fuel and circumstances permit, provide the appropriate ATC or flight service facility with intentions, altitude, location, and completion time. Report any jettisoning of fuel IAW AFI 10-206.

3.22. Radio, Laser, and Other Electromagnetic Emitter Restrictions. Equipment which transmits radio, laser, or other energy will only be operated for the intended purpose and in the authorized manner to prevent unintentional interference, damage, or injury (T-0).

3.23. Communication, Navigation, and Surveillance Equipment. Operate equipment as authorized by the MAJCOM. MAJCOMs will establish tactical operations guidance. When operating in controlled airspace under IFR, immediately report to ATC the loss or impairment of navigational, air-to-ground communications, or surveillance capability IAW the FIH.

3.23.1. **Transponders.** Operate the transponder IAW ATC instructions, host nation, MAJCOM directives, and theater SPINS (T-0). In the NAS, transponders will be operated in controlled airspace, including Mode C if installed, on the appropriate code or as assigned by ATC (T-0). Additionally, unless local procedures dictate otherwise, transponders should be turned to the "ON" or normal altitude reporting position prior to aircraft movement (T-0).

3.23.1.1. Mode S Flight ID. Prior to each flight, ensure the Mode S Flight ID matches the call sign entered exactly on the flight plan with no embedded spaces, dashes, extra characters, or added zeros (T-0). When the flight plan call sign is less than seven characters, place blank spaces only at the end.

3.23.1.2. Mode S Address. Prior to each flight, ensure the Mode S address is entered correctly. MAJCOMs will manage assigned dynamic addresses to ensure no two aircraft are airborne with the same address.

3.23.1.3. Mode 4/5. If required, Mode 4/5 operations are outlined in the Flight Information Handbook (See MODE 4/5 in glossary).

3.23.2. **Traffic Collision Avoidance System (TCAS).** Aircraft equipped with TCAS shall operate in the TCAS mode that provides both Traffic Alerts (TAs) and Resolution Advisories (RAs) unless otherwise dictated by the aircraft manual, formation flight requirements, MAJCOM guidance, mission requirements, or host-nation agreements.

3.23.2.1. TCAS on the Ground. While on the ground, operate in standby or TA Only (T-0). TA/RA will be selected during takeoff and landing (T-0).

3.23.2.2. Response to TCAS Alerts. Respond to all RAs regardless of ATC instructions, right-of-way rules, cloud clearance requirements, or other VFR/IFR flight rules, as directed by TCAS unless doing so would jeopardize the safe operation of the aircraft (e.g., descent into obstacles).

3.23.2.2.1. Do not deviate from an assigned ATC clearance based solely on TA information. Attempt to attain visual contact and maintain safe separation.

3.23.2.2.2. In the event of an RA, alter the flight path only to the extent necessary to comply with the RA.

3.23.2.2.3. After deviating from an ATC clearance in response to an RA, notify ATC of the deviation as soon as practical and promptly return to the current ATC clearance when the traffic conflict is resolved or obtain a new clearance.

3.23.3. **Terrain Awareness and Warning Systems (TAWS).** Comply with appropriate flight manual procedures and MAJCOM guidance upon receipt of a Ground Proximity Warning System (GPWS)/TAWS/Enhanced GPWS (EGPWS)/Ground Collision Avoidance

System (GCAS) warning. During VMC flight, terrain warnings do not need to be followed if the pilot can verify the warning is false by visual contact with terrain or obstacles.

3.23.4. **Global Navigation Satellite System (GNSS) Equipment.**

3.23.4.1. GPS Equipment. MAJCOMs will determine if GPS is approved as the primary means of navigation and provide guidance for its use. If GPS is not approved as primary, ensure the approved primary means of navigation (e.g., VOR, TAC, etc.) is operational and monitored (T-0).

3.23.4.2. GPS Standard Position Service (SPS) and Precise Position Service (PPS). Follow MAJCOM or SPINS guidance on use of SPS/PPS.

3.23.4.3. Receiver Autonomous Integrity Monitoring (RAIM) is required unless integrity is ensured by other means approved by the MAJCOM (T-0).

3.23.4.3.1. Active RAIM. If RAIM is not available, actively monitor an alternate means of navigation and inform ATC of any degraded capability (T-0).

3.23.4.3.2. Predictive RAIM (P-RAIM). Check P-RAIM prior to departure when possible (T-0). If RAIM is predicted to be unavailable for more than five minutes along the route of flight, the flight must rely on other approved equipment, be rerouted, or delayed (T-0). Not required if Wide-Area Augmentation System (WAAS) enabled and flight is in WAAS coverage area (T-0).

3.23.5. **RNAV Equipment other than GNSS.** (eLORAN, Inertial, Stellar, Doppler, Blended, Hybrid, Tightly-Coupled, EGI, DME/DME, GNSS other than GPS, etc.). MAJCOMs will determine if RNAV equipment other than GNSS is approved as the primary means of navigation and provide guidance for its use. If not approved as primary, ensure the approved primary means of navigation (e.g., GPS, VOR, TAC, etc.) is operational and monitored (T-0).

3.23.6. **Carry-On Equipment.** Use carry-on communication, navigation, and surveillance equipment as authorized by the MAJCOM **(**MAJCOMs are encouraged to coordinate the use of CNS equipment with the respective aircraft Program Office) (T-1). MAJCOMs will publish guidance and provide training on acceptable use, limitations, and hazards of carry-on equipment. See also **paragraph 3.9**.

3.24. Formation Flights (Including Air Refueling). Accomplish formation flights only as authorized by the MAJCOM.

3.24.1. Formation Briefing. Formation flight leads will brief formation flight operations to all participants in accordance with MAJCOM-approved guidance (T-0).

3.24.2. Formation in Reduced Vertical Separation Minimum (RVSM) Airspace within the NAS. Formation flights may operate in RVSM airspace if all participating aircraft are RVSM compliant or approved by ATC (T-0).

3.24.3. Aircraft Lighting. MAJCOMs may authorize formation flights to vary lighting configuration according to the aircraft type and mission requirement. The MAJCOM must provide guidance on this type of operation and ensure the guidance provides an equivalent level of visual identification as a single aircraft.

3.24.4. Transponder Operations.

3.24.4.1. Only one aircraft (normally the lead) of a standard formation should squawk (T-0).

3.24.4.2. Unless otherwise directed, receivers will not squawk when less than 3 nautical miles (NM) from the tanker (T-0).

3.24.4.3. Unless otherwise directed by ATC, all aircraft within a non-standard formation flight will squawk until established within the assigned altitude block and closed to the proper en route interval (T-0). When aircraft interval exceeds 3 NM, both the formation leader and the last aircraft will squawk (T-0).

3.24.5. Traffic Collision Avoidance System **(**TCAS) Operations.

3.24.5.1. Formation leads (and last aircraft, when formation length exceeds 3 NM) shall operate in TA mode unless otherwise required by ATC, host-nation agreement or specified in the MDS-specific guidance (T-0).

3.24.5.2. During refueling operations, the tanker aircraft will operate in TA mode (T-0).

3.24.6. Non-standard Formations. Non-standard formation flights may be conducted:

3.24.6.1. When approved by ATC;

3.24.6.2. Operating under VFR in visual meteorological conditions (VMC);

3.24.6.3. Operating within an authorized Altitude Reservation (ALTRV);

3.24.6.4. Operating under the provisions of a Letter of Agreement (LOA); or,

3.24.6.5. Operating in airspace specifically designated for a special activity.

3.25. Large Scale Exercises. MAJCOMs will conduct large-scale exercises in permanent or temporary special-use airspace (SUA) established according to FAA Joint Order (JO) 7400.2, *Procedures for Handling Airspace Matters*, and FAA JO 7610.4, *Special Operation*. When MAJCOMs approve large-scale exercises or short-term special missions they will ensure information on approved activities is available to the non-participating flying public and coordinate these operations with:

3.25.1. Affected non-participating military flying units;

3.25.2. Affected FAA Air Route Traffic Control Center (ARTCC);

3.25.3. Affected FAA regions through the Air Force representative (AFREP); and,

3.25.4. Other agencies, as appropriate.

3.26. Aerobatics and Air Combat Tactics. Aerobatics, air combat tactics and air-to-ground tactics which involve aerobatic type maneuvering must be performed in SUA, ATC-Assigned Airspace (ATCAA), military training routes (MTRs) or host-nation approved airspace IAW the guidelines in AFI 11-214, *Air Operations Rules and Procedures* (T-0). Aircraft deployed or based at overseas locations will operate IAW applicable host-nation agreements or ICAO SARPs (T-0). If the aircraft operating requirements (altitude requirements, maximum airspeeds, dropping of objects, etc.) dictated in the host-nation agreement are less restrictive than USAF/MAJCOM guidance, the most restrictive guidance shall be used (T-1).

3.27. Temporary Flight Restriction (TFR) Airspace. Aircraft will not operate in TFR airspace unless authorized (T-0).

3.28. Uncontrolled Field Procedures. Use runway favored by the winds if no other factors make that runway unacceptable (T-0). Announce your activities on the appropriate frequencies (T-0). UAS operations are prohibited at uncontrolled fields when other traffic is present (T-2).

3.29. Obstacle Clearance Responsibility. Pilots are never relieved of the responsibility for terrain and obstacle avoidance. The radio call "Radar Contact" only means the aircraft has been identified on radar. Responsibility is shared between pilot and controller only after navigational guidance is issued.

3.30. Participating in Aerial Events. Ensure compliance with AFI 11-209 when participating in aerial events, demonstrations, and static displays.

3.31. Simulated Instrument Flight.

3.31.1. For non-qualified instrument pilots, a safety observer who is able to clear outside at all times, should accompany the flight either as a crewmember or in a chase aircraft (T-0). If a chase aircraft is used, maintain continuous visual contact and two-way communications between aircraft (T-1). A safety observer is defined as a current and qualified instrument pilot or a fighter weapons systems operator (or other MAJCOM-designated aircrew member) with access to a set of flight controls (T-1).

3.31.2. Vision Restricting Devices. MAJCOMs must approve the use of vision restricting devices and provide specific approval for use during takeoffs and landings. Vision restricting devices will not be used without a safety observer (T-0).

3.31.2.1. Maintain at least 2,000 ft. of obstruction clearance when using vision restricting devices if the safety observer is in a chase aircraft, or not qualified as a pilot, or does not have full view of the flight instruments and access to the flight controls (T-1).

3.31.1. When not on an IFR flight plan, the aircraft must be equipped with a functional two-way radio and have the airport environment in sight when established on the final segment of an approach (T-0).

3.32. Simulated Emergency Flight Procedures.

3.32.1. Terminate simulated emergency training if an actual emergency occurs.

3.32.2. MAJCOMs must provide guidance when an instructor pilot or flight examiner does not have immediate access to the aircraft controls.

3.32.3. Passengers will not be onboard (T-1). *Exception*: simulated emergencies may be performed with passengers onboard if there is no flight deck crew participation; flight deck crew may participate with MAJCOM approval. (N/A for UAS).

3.32.4. Single-pilot aircraft require day (including civil twilight) VMC (N/A for UAS) (T-1).

3.32.5. Multi-pilot aircraft in day IMC require weather conditions at or above published circling minimums for the approach to be flown (N/A for UAS) (T-1).

3.32.6. Multi-pilot aircraft at night require weather conditions at or above 1,000 ft. ceiling and 2 SM visibility or circling minimums, whichever is higher (N/A for UAS) (T-1).

3.32.7. Simulated Flameout, Forced Landing, or Emergency Landing Patterns (SFO/ELP). At controlled fields where SFO/ELP maneuvers are conducted, the facility air traffic

manager shall issue an LOA with the appropriate military authority and adjacent facilities as required. The LOA shall conform to FAA Joint Order (FAA JO) 7610.4. (T-0).

3.32.7.1. MAJCOMs must provide guidance for SFO/ELP approaches when the T.O.s do not provide specific guidance; the approaches do not conform to the T.O. guidance; the approaches have not been coordinated with the ATC responsible for the airspace; or the airport/landing area does not have a prepared runway surface, an active tower/Runway Supervisory Unit (RSU), enough runway, or proper crash/rescue equipment (T-0).

3.33. Vertical-Lift Operations. For this instruction, tilt-rotor aircraft in vertical-flight mode will follow helicopter guidance (T-1). MAJCOMs will provide guidance on determining phase-of-flight for aircraft capable of transition to/from vertical flight.

navigation systems (LRNS) and dual long-range communication systems are required. RVSM is mandatory in MNPS airspace. Aircraft that cannot meet dual LRNS requirements may be accommodated on special routings ("Blue Spruce" routes). Aircraft that cannot meet RVSM requirements are excluded from MNPS airspace unless operating on an ALTRV.

Mode 4—Transponder mode established to enable IFF (Identification Friend or Foe) functions between military aircraft or military aircraft and military ground stations. Uses classified codes, but operates on 1030 MHz and 1090 MHz; the same frequency pair used by the Air Traffic Control Radar Beacon System that civil air traffic uses for Mode 3A/C, Mode S, and TCAS. Mode 4 interrogation signals can suppress civil airborne transponders; therefore all Mode 4 operations in the NAS require prior authorization through the Air Force Frequency Management Agency (AFFMA): **affma.cc@pentagon.af.mil.**

Mode 5—Performance upgrade to the current Mark XII IFF transponder system. Mode 5 provides new waveforms, new cryptography, more data, and improved radio frequency (RF) link margin to resolve many of the deficiencies identified with Mark XII. It will eventually replace the analog Mode 4 IFF system with digital IFF message formats which embed unprecedented combat relevant data.

Mode S—The primary role of the Mode S transponder is to "selectively" respond to interrogations, as opposed to responding to all interrogations, from a ground sensor or TCAS to provide airborne data information including identification, equipage, and altitude.

Mountainous Terrain—In the absence of other MAJCOM guidance, USAF aircrews shall consider as mountainous those areas defined in 14 CFR §95.11 for CONUS, Alaska, Hawaii and Puerto Rico. In other areas, use 500 ft. surface elevation change over a ½ NM.

National Airspace System (NAS)—The NAS is the common network of *United States* (U.S.) airspace: air navigation facilities, equipment, services, airports or landing areas, aeronautical charts, information/services, rules, regulations, procedures, technical information, manpower, and material. Included are system components shared jointly with the military. *United States*, in a geographical sense, means (1) the States, the District of Columbia, Puerto Rico, and the possessions, including the territorial waters (within 12 nautical miles) and (2) the airspace of those areas. **Note**: IAW ICAO Article 12 and Annex 2 and 11, the United States has accepted responsibility for providing air traffic services within airspace overlying the high seas beyond 12 miles from the coast (also known as international airspace). These flight information regions of international airspace include: Oakland Oceanic, Anchorage Oceanic, Anchorage Continental, Anchorage Arctic, Miami Oceanic, Houston Oceanic and New York Oceanic. Aircrews should be aware that although they are being provided air traffic services by the FAA, they are operating in international airspace and ICAO SARPS, FLIP, and AFIs are applicable.

Navigation Specification—A set of aircraft and aircrew requirements needed to support performance-based navigation operations within a defined airspace. Comprised of RNAV and RNP specifications.

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

Non-Standard Formation—Operations under any of the following conditions: 1. When the flight leader has requested and ATC has approved other than standard formation dimensions (≤1 NM lateral separation or ≤ 100 ft. vertical separation), 2. When operating within an authorized