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Flying Operations

GENERAL FLIGHT RULES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFPD 11-2, Aircraft Rules and Procedures, by prescribing general flight rules that govern the operation of Air Force aircraft (manned and remotely operated) flown by Air Force pilots, pilots of other services, foreign pilots, and civilian pilots. It 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. Air Force Instruction (AFI) 11-2 Mission Design Series (MDS) Specific, Volume 3 instructions (e.g., AFI 11-2C-5, 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. Submit suggested improvements to this instruction on AF Form 847 through Major Command (MAJCOM) channels. Address questions concerning this instruction to Headquarters Air Force Flight Standards Agency (AFFSA), 1535 Command Drive, Suite D-305, Andrews AFB, MD 20762-7002. See **Attachment 1** for a list of terms and abbreviations. 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.

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(AFMC) AFI 11-202, Volume 3, 6 June 2003, is supplemented as follows:

(AFMC) This document supplements AFI 11-202, Volume 3, *General Flight Rules* and applies to all AFMC flying activities with primary aircrew assigned or attached for flying. This supplement does not apply to the Air National Guard or the US Air Force Reserve units and members except those under AFMC OPCON.

SUMMARY OF REVISIONS

This change incorporates new guidance for Remotely Operated Aircraft (ROA), emerging technologies and numerous General Flight Rules revisions. Changed paragraphs are denoted by a bar "|". Guidance added throughout the AFI on ROA policy. Paragraph **1.2.2.1.1.**: clarification of MAJCOM responsibilities. Paragraph **1.2.3.**: FAA Advisory Circulars. Paragraphs **1.3.2.3.**and 1.3.3.5.: clarify that NGB is classified as a MAJCOM WRT this AFI. Paragraph **1.3.3.2.**: deadlines on waiver submissions. Paragraph **2.1.1.**: clarification/addition of preflight requirements. Paragraph **2.1.3.** and **2.1.3.1.**: restrictions on approach plates. Paragraph **2.1.5.**: provides due regard guidance. Paragraph **2.2.3.**: helicopter fuel requirements. Paragraph **2.2.5.**: Emergency Fuel Guidance. Paragraph **2.3.1.**: transient weather procedures. Paragraph **2.4.2.**: clarifies guidance. Paragraph **2.5.1.1.6.**: includes cameras. Paragraph **2.5.1.4.**: cellular telephone type devices. Paragraph **2.5.1.6.**: updated testing requirements. Paragraph **2.6.1.1.6.**: heading requirement. Paragraph **2.6.1.3.1.**: changed to lead command. Paragraphs **2.6.4.**: clarifies night flight guidance. Paragraph **3.1.6.**: guidance reworded to match FAA source guidance. Paragraph **4.6.**: clarification. **Chapter 5** has been extensively rewritten and must be reviewed in its entirety. Paragraph **6.2.7.1.** and **6.2.7.2.**: clarify pressure suit policy. Paragraph **6.4.1.1.7.**: clarification. Paragraph **6.4.5.4.** and **6.4.5.5.**: adds guidance of loss of cabin pressure. Paragraph **7.1.2.**: clarification. **Chapter 8** and **Chapter 9** have been extensively rewritten and must be reviewed in their entirety. Numerous changes/additions to **Attachment 1** (abbreviations, acronyms and terms).

(AFMC) Paragraphs preceded by a bar (|) have been substantially changed from the last revision. ROA guidance added for the following paragraphs: **4.3.1.2.**, **5.8.2.1. (Added)**, **5.13.1.4.**, **8.3.3.3.**, **8.4.3.2.**, **8.6.** and **8.13.1.4.** Paragraph **2.5.4.** added MESP/MEGP. Paragraph **2.1.3.** now references AFI 11-2FT Vol 3 for in-flight publication guidance. Paragraph **3.1.2.3.** deleted the reference to a DD Form 175 or ICAO Form 1801. Paragraph **4.3.6. (Added)** removed depot pickup and deliveries from the requirement to report OCONUS sorties to AFMC/DOO. Additionally, AFMC/DOO contact information was updated. Paragraph **4.3.7. (Added)** clarified information required for one-time flight waivers. Paragraph **5.1.7. (Added)** changed approval level for ungrounding actions from a Class B accident to the DFO. Paragraph **5.7.2.1.** added guidance for operations faster than 250 knots. Paragraph **5.8.3.5.** authorizes use of GPS as primary means of navigation in remote/oceanic areas. Paragraph **5.9.1.5.** outlined reduced same runway separation policy. Paragraph **5.14.2.** requires documentation of exceptions to practice emergency procedures on the flight authorization. Paragraph **5.17.2.** changed restrictions and approval policy on reduced lighting operations. Paragraph **5.18.** added reference to AFI 11-246. Paragraph **5.30.1.** added guidance on GCAS/TAWS operations. Paragraphs **8.7.2.2.2.** and **8.7.2.2.2.1.** added information on the SDP program. Paragraph **8.13.1.5.** authorizes PRM approaches. Paragraph 9.6.3.4. added FDP guidance. Paragraph **9.8.3.1.** grants a waiver to the restriction after aircraft pressurization checks.

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Chapter 1

GENERAL INFORMATION

1.1. General.

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

1.1.2. This AFI is a common source of flight directives that include:

1.1.2.1. Air Force-specific guidance.

1.1.2.2. Federal Aviation Regulations (FARs).

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

1.1.3. This AFI provides necessarily broad guidance and cannot address every conceivable circumstance. PICs are expected to use their best judgment to ensure the safe conduct of the flight.

1.2. Compliance.

1.2.1. The PIC will ensure compliance with the following:

1.2.1.1. This AFI and MAJCOM guidance.

1.2.1.2. MDS-specific instructions and supplements.

1.2.1.2. (AFMC) AFMC produces a three-volume set of Flight Test (FT) instructions containing attachments for each weapon system flown in AFMC. These instructions are numbered AFI 11-2FT Vol 1, 2, and 3 and will contain the training, evaluation criteria, and operations procedures, respectively, for each weapon system. AFMC uses these instructions in lieu of AFI 11-2 MDS-specific volumes for flying operations. In the absence of published guidance, AFMC units will coordinate with HQ AFMC/DOV for approval of locally developed guidelines. If possible, these guidelines should be consistent with similar guidance specified in the appropriate AFI 11-2 MDS-specific lead MAJCOM Volumes. In addition, aircraft on loan to AFMC undergoing short-term flight test programs will be flown according to the lead MAJCOM guidance if no AFMC guidance exists.

1.2.1.3. The FARs when operating within the United States including the airspace overlying the waters out to 12 miles from the US coast, unless the Federal Aviation Administration (FAA) has excluded military operations.

1.2.1.4. ICAO SARPs in international airspace over the high seas, military mission permitting.

1.2.1.5. The specific rules of each individual nation as published in Flight Information Publications (FLIP) planning documents and the Foreign Clearance Guide (FCG). Theater commanders must ensure the contents of FLIP accurately indicate the rules of each nation within their area of responsibility that differ from this instruction.

1.2.1.6. ICAO SARPS when operating in a nation whose rules are not published.

1.2.1.7. Procedures and special notices in FLIP, Notices to Airmen (NOTAMs), aircraft technical orders, Air Force directives, MAJCOM directives, and Air Traffic Control (ATC) instructions. (See **Attachment 1** for related publications.)

1.2.2. **MAJCOM Supplements.** The following restrictions apply to MAJCOM supplements and MDS Specific, Volume 3 instructions subordinate to this AFI:

1.2.2.1. MAJCOM supplements and MDS Specific, Volume 3 instructions shall not be less restrictive than this instruction.

1.2.2.1.1. Items in this instruction identified with lead command will be addressed by the lead command for the applicable MDS in the appropriate AFI 11-2MDS, Volume 3, in accordance with (IAW) AFPD 11-2, *Aircraft Rules and Procedures*. Items identified with MAJCOM will be supplemented in a MAJCOM supplement or in the appropriate MDS Specific, Volume 3.

1.2.2.2. MAJCOM supplements and MDS Specific, Volume 3 instructions must be coordinated with HQ AFFSA prior to publication. Submit supplements for coordination to HQ AFFSA/XO, 1535 Command Drive, Suite D-305, Andrews AFB MD 20762-7002, email **mailto:affsa.xo@andrews.af.mil**.

1.2.2.3. (Added-AFMC) AFMC flying units may supplement only AFI 11-2FT Vol 3, *AFMC Flight Procedures*, to incorporate additional aircrew procedures. Send unit supplements to HQ AFMC/DOV, 508 W. Choctawhatchee Ave, Suite 4, Eglin AFB FL 32542-5713, for review and approval prior to publication. Include AFMC/DOV and AFMC/DOO on the distribution list for approved supplements to AFI 11-2FT Vol 3.

1.2.3. **FAA Advisory Circulars (ACs) and Technical Standard Orders (TSOs):** IAW AFI 63-1301, Global Air Traffic Management (GATM) and Navigation Safety system performance and software development processes for non-civil type certificated aircraft must either satisfy civil standards or provide an equivalent level of safety and performance. FAA Advisory Circulars (ACs) and Technical Standard Orders (TSOs) provide civil standards for the Certification and Operational Approval of GATM and navigation safety systems.

1.2.3.1. **"Properly Certified" Aircraft.** In many cases this AFI uses the term "properly certified" in lieu of listing all applicable civil equipment and integration standards for GATM and Navigation Safety systems. The term "Properly Certified" indicates that the aircraft systems comply with appropriate FAA ACs and TSOs or provide an equivalent level of safety and performance. A list of required civil standards may be obtained from the AFFSA web site (**https://wwwmil.andrews.af.mil/pages/affsa/affsaxo.htm)** or via aircraft certification matrices maintained by ESC/GA.

1.3. Waivers.

1.3.1. HQ AFFSA will provide written waivers to this instruction only when:

1.3.1.1. Compliance with this instruction creates a hazard.

1.3.1.2. An essential MAJCOM requirement makes a waiver necessary.

1.3.2. **MAJCOM Commander Waiver Authority.**

1.3.2.1. MAJCOM commanders may authorize a waiver to this instruction without prior approval from HQ AFFSA, if doing so is "essential to the defense of the United States" because of a mili-

tary emergency or an urgent military necessity. MAJCOM commanders will notify HQ AFFSA of their intention to do so.

1.3.2.2. Unless otherwise specified in MDS Specific Volume 3 instructions, MAJCOM/DO is waiver authority for operational procedure requirements in the appropriate MDS Specific, Volume 3. Further delegation of waiver authority is at MAJCOM discretion and will be addressed in the relevant instruction.

1.3.2.2. (AFMC) HQ AFMC/DOV is waiver authority for this supplement. Route requests using AFMC Form 73 through chain of command to flying unit commanders prior to submission to HQ AFMC/DOV. Send waiver requests to HQ AFMC/DOV, 508 W. Choctawhatchee Ave, Suite 4, Eglin AFB FL 32542-5713 for review and approval.

1.3.2.3. For the purposes of this regulation the "NGB" is considered a MAJCOM.

1.3.3. **Waiver Process.** AFFSA will provide only written waivers. Units requiring a waiver to this AFI will follow the procedure listed below:

1.3.3.1. Units will forward their request for a waiver to this instruction through their chain of command to their MAJCOM. The unit must include a detailed package supporting the request.

1.3.3.2. MAJCOMs will review the request. If approved, MAJCOMs will endorse the request and forward it to HQ AFFSA/XO at least 30 days prior to the waiver requirement.

1.3.3.3. MAJCOMs shall track the currency of all approved waivers to ensure waiver renewals are requested a minimum of 15 days prior to the expiration date. HQ AFFSA will review and respond in writing to MAJCOM waiver requests.

1.3.3.4. All approvals will include an expiration date.

1.3.4. **FAR Exemptions and Authorizations** . MAJCOMs will obtain FAA exemptions or authorizations only through HQ AFFSA.

1.3.4.1. MAJCOMs will follow the procedures outlined in paragraph **1.3.3.**

1.3.4.2. MAJCOM commanders may, for operations subject to the FARs only, unilaterally authorize deviation from air traffic rules without a waiver from HQ AFFSA or an exemption from the FAA, if it considers the deviation "essential to the defense of the United States" and there is no time to obtain approval from HQ AFFSA and the FAA. The MAJCOM will notify HQ AFFSA and the FAA (through HQ AFFSA) of its military intentions prior to deviating from the flight rules. The notice should be given at the earliest time practicable.

1.3.4.3. Any operations of Remotely Operated Aircraft (ROA) outside of Special Use Airspace (SUA) require an FAA Certificate of Operations (COA).

1.3.5. An ATC clearance is not authority to deviate from this instruction.

1.4. Deviations:

1.4.1. A PIC may deviate from any flight rule only when:

1.4.1.1. An in-flight emergency requires immediate action.

1.4.1.2. Deviation is required to protect lives.

1.4.1.3. When safety of flight dictates.

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

1.4.3. **Post-Flight Actions.** The following post-flight actions shall be taken in the event of a deviation from a flight rule and/or when given traffic priority by ATC in an emergency:

1.4.3.1. The PIC will verbally report the incident to the immediate supervisor and commander within 24 hours of the incident.

1.4.3.2. The PIC shall make a detailed written record.

1.4.3.3. The unit will keep a copy of that record and be prepared to provide that record to the appropriate investigating authority IAW the AFIs listed in paragraph **1.4.4.** The record will be kept for 1 year from the date of the incident.

1.4.4. **Violations** . A violation may result when an Air Force aircraft deviates from flight rules. FAA ATC facility deviation reports involving an Air Force aircraft are processed IAW AFI 13-201, *Air Force Airspace Management*. Air Force air traffic control facility deviation reports involving Air Force aircraft are processed IAW AFI 91-202, *The US Air Force Mishap Prevention Program*. Violations that occur in the airspace of foreign nations are handled IAW the procedures of that nation.

1.4.4.1. The names of the crew will not be released to non-USAF agencies without the permission of the Air Force Representative to the FAA (AFREP) coordinating the investigation.

1.5. Dimensional Units . Visibility distances are in statute miles (SM). All other distances referred to in this instruction are in nautical miles (NM) unless otherwise identified.

1.6. Improvement Recommendations . Use AF Form 847, Recommendation for Change of Publication (Flight Publications), to recommend changes to this instruction IAW AFI 11-215, *Flight Manuals Procedures (FMP)*.

1.6. (AFMC) Improvement Recommendations: Send AF Forms 847 to HQ AFMC/DOV for coordination.

1.7. Disposition of Records. Dispose of records accumulated under this instruction IAW Air Force Manual (AFMAN) 37-139, *Records Disposition Schedule.*

Chapter 2

PREFLIGHT REQUIREMENTS

2.1. Preflight Planning.

2.1.1. The PIC will ensure aircrew members know the appropriate procedures and have applicable information available to them for the intended operation. These shall include, but are not limited to:

2.1.1.1. Appropriate sections of the aircraft technical order (T.O.)

2.1.1.2. NOTAMs (Including Global Positioning Satellite (GPS) NOTAMs if applicable)

2.1.1.3. FLIP including appropriate sectional aeronautical charts or Portable Flight Planning System (PFPS)/Falcon View with FAA/ICAO airspace displayed for flight under Visual Flight Rules (VFR).

2.1.1.4. Airfield Qualification and Familiarization Manual information where available.

2.1.1.4.1. MAJCOMs will provide guidance on the use of additional Airfield Qualification Program materials.

2.1.1.5. Alternatives available if the flight cannot be completed as planned.

2.1.1.6. Departure, en route, destination, and alternate weather observations and forecasts.

2.1.1.7. Fuel requirements.

2.1.1.8. Minimum safe altitudes for the planned route and terminal area.

2.1.1.9. Takeoff and landing limitations.

2.1.1.10. The Airfield Suitability and Restrictions Report (ASRR) IAW paragraph **2.1.2.**

2.1.1.11. AFI 11-2MDS-Specific, Volume 3, *Operations Procedures*.

2.1.1.12. Applicable bird advisories and hazard information, available through Internet sources, Automated Terminal Information System (ATIS), or as disseminated locally.

2.1.2. **Airfield Suitability and Restrictions Report (ASRR).** Each MAJCOM will:

2.1.2.1. Establish specific policy on the applicability by MDS and how aircrews will use the ASRR.

2.1.2.1.1. (Added-AFMC) Flights to DoD and joint-use airfields within the CONUS. For flights originating and terminating at DoD or joint-use installations within the CONUS, an ASRR review is not required.

2.1.2.1.2. (Added-AFMC) Flights to non-DoD/joint use airfields (including all overseas airfields). For flights originating or terminating at civil airfields (other than joint-use), consult both the ASRR and Global Decision Support System (GDSS) databases for additional flight planning information, airfield suitability, obstruction data, and restrictions. General ASRR restrictions (example: day only, VMC only, etc.) are applicable to all AFMC operations. Aircraft-specific restrictions apply to AFMC users of like aircraft. Where advisements are specified, contact HQ AFMC/DOV.

2.1.2.1.3. (Added-AFMC) Waivers to ASRR Restrictions. ASRR waiver authority is AFMC/DOV.

2.1.2.2. Ensure the ASRR is available to aircrews, mission planners, and other personnel as required.

2.1.2.3. Establish procedures to ensure personnel can access and use the ASRR.

2.1.3. **Publications.** The PIC will ensure current copies of the appropriate FLIP en route supplement, en route charts, Flight Information Handbook, and appropriate arrival, approach and departure procedures are on board the aircraft or immediately available in the ROA ground station. If an electronic navigation system database is used, the PIC will ensure it is current.

2.1.3. (AFMC) Refer to AFI 11-2FT Vol 3 for additional publications requirements.

2.1.3.1. Crews shall not be provided with and aircrew shall not use an approach plate from which all information cannot be retrieved due to incompleteness, poor readability, language barrier or unfamiliar procedures.

2.1.4. **Stopover flights.** The PIC will:

2.1.4.1. Ensure the entire flight is planned to its final destination in the greatest detail possible for each leg of the flight.

2.1.4.2. Before departing each intermediate stop, obtain the latest weather and NOTAM information available for the intended route, destination and alternate.

2.1.5. **Due Regard.** Due regard operations may only be conducted in international airspace and over the high seas, IAW FLIP General Planning (GP), paragraph 7-8. In order to operate under due regard the aircraft must:

2.1.5.1. Be operated in Visual Meteorological Conditions (VMC) conditions; or

2.1.5.2. Be operated within radar surveillance and under positive communication control of a surface or airborne radar; or

2.1.5.3. Be equipped with airborne radar that is sufficient to provide separation between themselves, aircraft they may be controlling and other aircraft; or

2.1.5.4. Be operated outside the limits of controlled airspace.

2.2. Fuel Requirements.

2.2.1. **General Information.** The PIC will ensure sufficient fuel is available on board the aircraft to comply with the requirements of this instruction and safely conduct the flight. Before takeoff or immediately after in-flight refueling, the aircraft must have enough usable fuel aboard to complete the flight:

2.2.1.1. To a final landing, either at the destination airport or alternate airport (if one is required), plus the fuel reserves.

2.2.1.2. To or between Air Refueling Control Points (ARCPs) and then to land at the destination (or a recovery base, if refueling is not successful), plus the fuel reserve.

2.2.2. **Alternate Airport Required.** When an alternate is required, the weather conditions at the original destination govern the preflight fuel computation.

2.2.2.1. Fuel required for an approach and missed approach must be included in the total flight plan fuel, when the visibility-only weather criteria in paragraph **8.3.3.1.2.** is used to determine the suitability of the original destination.

2.2.2.2. Fuel required for an approach and missed approach is not required when the ceiling and visibility criteria in paragraph **8.3.3.1.3.** is used to determine the suitability of the original destination.

2.2.3. **Fuel Reserve.** The PIC must ensure the aircraft is carrying enough usable fuel on each flight to increase the total planned flight time between refueling points by 10 percent (up to a maximum of 45 minutes for fixed wing or 30 minutes for helicopters) or 20 minutes, whichever is greater. To compute fuel reserves:

2.2.3. (AFMC) Refer to AFI 11-2FT Vol 3 for additional fuel requirements.

2.2.3.1. For reciprocating engine-driven aircraft and helicopters, use fuel consumption rates for normal cruising altitudes.

2.2.3.2. For turbine-powered aircraft use fuel consumption rates that provide maximum endurance at 10,000 ft. Mean Sea Level (MSL).

2.2.3.3. If the MAJCOM authorizes holding (instead of an alternate airport) for a remote or island destination, do not consider the prescribed holding time as part of the total planned flight time for computing fuel reserve.

2.2.3.3. (AFMC) Holding (in lieu of an alternate airport) is authorized for a remote or island destination when the requirements of **para 8.4.3.**, as supplemented, are met.

2.2.4. **Flight Logs.** The following are the approved types of flight logs:

2.2.4.1. AF Form 70, Pilot's Flight Plan and Flight Log.

2.2.4.2. MAJCOM approved form.

2.2.4.2. (AFMC) The DFO may permit the use of a unit-developed flight log. Submit unit-developed forms to HQ AFMC/DOV for approval.

2.2.4.3. Navigator's flight log.

2.2.4.4. Approved computer-generated flight log. The lead command will approve flight-planning software to meet MDS training and operational requirements.

2.2.4.4. (AFMC) Refer to AFI 11-2FT Vol 3 and the MDS specific attachments for approved flight-planning software. AFMC crewmembers are responsible for ensuring correct entry of flight planning data.

2.2.4.5. Flight planning computations annotated on a navigation chart.

2.2.5. **Minimum/Emergency Fuel Advisory.** When operating in FAA airspace, pilots will declare minimum/emergency fuel to the controlling agency when in their judgment the aircraft may land at the intended destination with less than the required/emergency fuel reserve.

2.3. Weather.

2.3.1. The PIC will obtain sufficient weather information to safely conduct the flight and comply with this instruction. Transient aircrews should contact the Operational Weather Squadron (OWS) respon-

sible for weather support at that location when the home station has not provided prearranged weather support. Aircrews should refer to the Flight Information Handbook (FIH) for OWS contact information. When necessary, record the appropriate weather information on a DD Form 175-1, **Flight Weather Briefing.** The following weather sources are authorized:

2.3.1.1. US Military Weather Services.

2.3.1.2. Approved weather sources listed in the MAJCOM supplement to this instruction or MDS specific Volume 3.

2.3.1.2. (AFMC) When military weather service is not available or incomplete, aircrews will obtain weather by any means possible, to include foreign military, civilian Automatic Terminal Information Service, Flight Service Station, DUATS, through fixed base operators, etc.

2.3.2. Alternative Method. If there are no possible means of obtaining weather from the above sources, pilots may fly in VMC to a point where contact can be established with an authorized weather source.

2.4. Briefings.

2.4.1. The PIC must ensure each crewmember and passenger is briefed on items affecting safety or mission completion. These briefings will include, but need not be limited to:

2.4.1.1. Emergency procedures.

2.4.1.2. Life support systems and equipment information (see paragraph **6.1.2.**).

2.4.1.3. Precautions and restrictions.

2.4.1.4. Special procedures and instructions for use during training, formation, or operational missions.

2.4.1.5. Prohibitions listed in paragraph **2.5.**

2.4.2. **Printed Information Guides.** Lead commands will supplement verbal briefings with printed information guides for passenger use on all passenger carrying aircraft. Printed guides do not substitute for verbal briefings. MAJCOMs may exempt aircraft from this requirement if the printed guides create a safety hazard.

2.4.2. (AFMC) Passenger briefing guide requirements are listed in AFI 11-2FT Vol 3.

2.5. Prohibitions. The following prohibitions apply to each passenger and crewmember aboard an Air Force aircraft: (Until engineering evaluations are complete the provisions of paragraph **2.5.** will apply to ROA ground segments including the control element and all associated communication facilities).

2.5.1. **Electronic Devices.** This section provides guidance on the use of electronic devices in-flight.

NOTE: Standard aircraft electronic equipment undergoes extensive design and testing to ensure post aircraft installation compatibility. Almost all electronic items produce electromagnetic (EM) energy, thus creating potential interference with sensitive antenna-connected aircraft receivers. Transmitting devices produce much higher EM environments; these can potentially interfere with any onboard electronic equipment. For the purposes of this AFI, “portable” devices are battery-powered devices not electrically interfaced with existing aircraft equipment.

2.5.1. (AFMC) Portable GPS Units (PGU) may be used on AFMC aircraft when the requirements of AFI 11-202v3 paragraph **5.8.3.3.** are met in VMC. PGUs that have passed ASC/ENAE certification testing are approved for operation during any phase of flight. Devices, which have not been tested or fail certification testing, are not authorized for use in AFMC aircraft in IMC.

2.5.1.1. **Portable Non-transmitting Devices Authorized Anytime.**

2.5.1.1.1. Hearing Aids.

2.5.1.1.2. Heart Pacemakers.

2.5.1.1.3. Electronic watches, hand-held nonprinting calculators, portable tape players that do not have a recording capability (such as Walkmans, etc).

2.5.1.1.4. Electric Shavers.

2.5.1.1.5. Equipment certified IAW paragraph **2.5.1.6.** below.

2.5.1.1.6. Still photography cameras (not including digital cameras).

2.5.1.2. **Instrument Meteorological Conditions (IMC).** The following conditions apply to the use of electronic devices other than cellular phones (see paragraph **2.5.1.4.** below) during flight in IMC.

2.5.1.2.1. **Portable Transmitting Devices.** Portable transmitting devices, such as hand-held radios and satellite phones not certified as part of the aircraft equipment, shall not be operated at any time when in IMC.

2.5.1.2.2. **Portable Non-transmitting Devices above 10,000 ft. AGL.** The PIC may authorize the use of the following portable non-transmitting devices when in IMC and above 10,000 ft. AGL:

2.5.1.2.2.1. Audio and video recorders and playback devices.

2.5.1.2.2.2. Computers, peripherals, and electronic entertainment devices.

2.5.1.2.2.3. Radio receivers.

2.5.1.2.3. **Portable Non-transmitting Devices below 10,000 ft. Above Ground Level (AGL).** Portable non-transmitting devices will not be operated below 10,000 ft. AGL when in IMC unless they have been tested IAW **2.5.1.6.** below.

2.5.1.3. VMC. The following conditions apply to the use of electronic devices other than cellular phones (see paragraph **2.5.1.4.** below) when operating in VMC.

2.5.1.3.1. **Portable Transmitting Devices.** MAJCOMs may approve the use of portable transmitting devices such as hand-held radios and satellite phones during flights in VMC with the following restrictions:

2.5.1.3.1. (AFMC) Forward all requests to use portable transmitting devices to HQ AFMC/DOV for approval. The request will contain a justification for use; information-demonstrating compliance with the Mil Standards as specified in **Para. 2.5.1.3.1.2.** this instruction, and the duration of the requirement.

2.5.1.3.1.1. There must be a valid operational need that cannot be met by any other means.

2.5.1.3.1.2. The MAJCOM shall ensure that EM compatibility testing is conducted IAW MIL-STD 464, with particular emphasis on paragraphs **5.1.**, **5.2.**, **5.6.**, **5.6.1.** and **5.6.2.** of that standard.

2.5.1.3.1.3. MAJCOMs will advise HQ AFFSA/XO of any authorizations provided under this paragraph.

NOTE: MAJCOMs should use caution before authorizing the use of transmitting devices in their aircraft. Hand-held transmitters can generate EM fields in excess of the susceptibility levels to which many aircraft electronics are qualified. There is a definite risk of interference and it may be difficult to evaluate all configurations the device might be used in due to portability.

2.5.1.3.2. **Portable Non-transmitting Devices.** In addition to those items already authorized in paragraph **2.5.1.1.** above, the PIC may authorize the use of the following non-transmitting devices at anytime during flight in VMC:

2.5.1.3.2.1. Audio and video recorders and playback devices.

2.5.1.3.2.2. Computers, peripherals, and electronic entertainment devices.

2.5.1.3.2.3. Radio receivers.

2.5.1.4. **Cellular Phones.** The PIC will ensure that cellular phones, pagers, wireless internet capable devices and similar cell phone technology devices are turned off and stowed from the time the aircraft leaves its parking spot for departure until clear of the runway after landing.

2.5.1.5. **PIC Responsibility.** The PIC will prohibit the use of any device suspected of creating interference with any system on the aircraft.

2.5.1.6. **Testing Requirements.** Non-transmitting devices required to be used during any phase of flight not already authorized in paragraph **2.5.1.1.** above must be tested. Technical guidance and data evaluation are available from ASC/ENAE, 2530 Loop Road West, Wright Patterson AFB (WPAFB) OH 45433-7101, DSN 785-8928 or 785-2860.

2.5.1.7. **Medical Equipment.** Devices required during any phase of flight must be approved by AFRL/HEPR. Technical guidance, data evaluation, and a list of pre-approved medical equipment are available from AFRL/HEPR, 2504 Gillingham Drive, Brooks AFB TX 78235-5104, DSN 240-2937.

2.5.2. **Hazardous Cargo.** The PIC is responsible for compliance with AFJI 11-204, *Operational Procedures for Aircraft Carrying Hazardous Materials,* when transporting hazardous cargo on Air Force aircraft.

2.5.3. **Transport of Drugs.** The PIC will not allow the transport of narcotics, marijuana, or other dangerous drugs on the aircraft unless such transport has been approved by a US military, Federal, or State authority.

2.5.4. **Foreign Object Damage (FOD) Hazards.** MAJCOMs will provide guidance on the wearing of wigs, hairpieces, ornaments, barrettes, pins, clips, other hair fasteners, or earrings in the aircraft, ROA ground segment, and on the flight line. Procedures must ensure crewmembers and passengers wearing these items do not create a FOD hazard.

2.5.4. (AFMC) Crewmembers, maintenance engineering support personnel (MESP) and mission essential ground personnel (MEGP) will not wear finger rings, scarves, pins, wigs, hair pieces, orna-

ments, barrettes, clips, earrings, and other hair fasteners made of leather, plastic, or metal while performing crew duties in or around the aircraft. Additionally, these items are prohibited for all occupants of ejection seat-equipped aircraft. Other items will be properly secured to minimize foreign object damage (FOD) risk. PICs will ensure that passengers wearing these items do not create a FOD hazard.

2.6. Equipment Required for Flight.

2.6.1. **Flight Instrumentation.** Primary flight instrumentation must provide full-time display of attitude, altitude, and airspeed information and the capability to recognize, confirm, and recover from unusual attitudes. Information must be positioned and arranged in a manner enabling an effective pilot crosscheck. (For the purposes of this regulation the term "cockpit" includes ROA ground control stations)

2.6.1.1. The following flight instrumentation must always be displayed in USAF cockpits and illuminated during night operations. Standby or emergency instruments do not fulfill this requirement, unless specifically endorsed by the AF/XOO as a Primary Flight Reference (PFR). MAJCOMs will determine any additional ROA instrumentation requirements to those listed below.

2.6.1.1.1. Climb/Dive Angle (or pitch and vertical velocity)

2.6.1.1.2. Bank Angle

2.6.1.1.3. Barometric Altitude

2.6.1.1.4. Indicated or Calibrated Airspeed

2.6.1.1.5. Prominent Horizon Reference

2.6.1.1.6. Heading

2.6.1.1.7. Complete Fault Indications (Off Flags) to include lost communication links for ROAs.

2.6.1.2. **Electronic Flight Displays.** Many modern instrument displays allow the pilot to optimize cockpit instrumentation for a particular mission by decluttering, removing or relocating presentations. In some cases, a pilot can omit elements necessary for basic attitude awareness and aircraft control. Regardless of the type aircraft, mission, or mission phase, attitude awareness and paragraph **2.6.1.** instrumentation are a full-time Air Force mission requirement.

2.6.1.3. **Single Medium Displays.** Some single medium displays, including many HUDs, do not provide sufficient attitude cues to enable a pilot to maintain full-time attitude awareness or recover from some unusual attitudes. In addition to meeting the instrumentation requirements of paragraph **2.6.1.**, single medium displays must also receive HQ USAF/XOO endorsement as a PFR before they are used as the stand-alone reference for instrument flight.

2.6.1.3.1. **Flight Instrumentation Evaluation and Endorsement.** HQ USAF/XOO is the final approval authority for determining which single medium displays meet PFR requirements. The lead command will forward endorsement requests for single medium displays through the Joint Cockpit Office (AFRL/HEM), WPAFB OH, and HQ AFFSA/XOP to HQ USAF/XOO. HQ AFFSA must also evaluate any change to cockpit instrumentation that provides a portion of or all the elements of paragraph **2.6.1.** to ensure proposed designs adequately meet USAF flying requirements for worldwide operations. Cockpit Working Groups will be implemented IAW AFI 63-112, *Cockpit Working Groups*.

2.6.1.3.1. (AFMC) Submit endorsement requests for single medium displays to HQ AFMC/DOV for coordination.

2.6.2. **Instrument Flight Rules (IFR).** For flights that operate under IFR, the aircraft must have a two-way radio communication system and navigation equipment compatible with the facilities used for the airspace where the operations occur.

2.6.3. **Instrument Meteorological Conditions (IMC).** Flights conducted in IMC also require:

2.6.3.1. Operative pitot heat.

2.6.3.2. Operational anti-icing and/or de-icing equipment designed to cope with the type and severity of known or forecast icing conditions. Such equipment is not required for brief exposures when climbing or descending to an operating altitude above or below the icing condition.

2.6.4. **Night Flight.** (Not applicable to ROA operations) In addition to the requirements of paragraphs **2.6.1.**, **2.6.2.**, **5.17.** and **5.28.**, a pilot must not operate an aircraft at night unless it is equipped with operational cockpit lighting that allows crewmembers to view all cockpit instrument panels, controls, and read instrument approach plates.

2.6.4.1. Each crewmember must have an operable flashlight. (see glossary: Night)

Chapter 3

FLIGHT PLANS AND PASSENGER MANIFESTS.

3.1. Flight Plans.

3.1.1. **Flight Plan Requirement.** The PIC will ensure a flight plan is filed for any flight of an Air Force aircraft.

3.1.2. **Authorized Flight Plan Forms.** The following flight plan forms are authorized:

3.1.2.1. Those listed in FLIP GP, Chapter 4 (e.g., DD Form 175, Military Flight Plan, and DD Form 1801, DoD International Flight Plan).

3.1.2.2. Host nation required form.

3.1.2.3. A MAJCOM-approved form for local area flights that end at either the base of departure or at an installation under the operational control of the base of departure.

3.1.2.3. (AFMC) Units may develop a local use flight plan form if desired per AFI 11-202 Vol 3 para **3.1.2.3.** Forward draft forms to AFMC/DOV for review and approval. Flight authorization forms will be per AFI 11-401 *Aviation Management*.

3.1.2.4. A MAJCOM-approved form for flights outside the local area that meets the minimum flight plan information required by the controlling agency.

3.1.3. **Procedures for Units without a Base Operations.** When the written flight plan form is not processed through base operations, the flying unit must have a written agreement with the local chief of airfield management outlining the procedures for handling flight movement messages and identifying the agency responsible for flight following.

3.1.4. **Flight Plan Changes.** A PIC may make changes to a route or destination not shown on the original flight plan without re-filing provided:

3.1.4.1. The change does not penetrate an Air Defense Identification Zone (ADIZ).

3.1.4.2. The controlling ATC agency approves the change for an IFR flight.

3.1.4.3. The PIC ensures the facility providing flight following is notified of the change. Failure to ensure a Flight Service Station (FSS) (or its equivalent in an overseas area) is aware of the change may result in erroneous search and rescue service, or an unannounced arrival at the destination base.

3.1.4.4. The change complies with applicable national rules in an overseas area.

NOTE: The format for making changes can be found on the inside cover of the DoD Flight Supplement.

3.1.5. **Nonmilitary Installation Procedures.**

3.1.5.1. **FSS or ATC Facility Available.** Pilots will file a flight plan with a FSS or ATC facility, if available.

3.1.5.2. **No FSS or ATC Facility Available.**

3.1.5.2.1. When no FSS or ATC facility is available, the pilot will contact the agency responsible for command and control of the mission prior to takeoff and:

3.1.5.2.1.1. Have them file the flight plan for the PIC.

3.1.5.2.1.2. If they are unable to file, provide a detailed description of the intended flight route to ensure flight following.

3.1.5.2.2. Once airborne, pilots will remain clear of ADIZ/Buffer Zones, adhere to VFR, contact a FSS or ATC facility and:

3.1.5.2.2.1. Confirm the flight plan has been filed.

3.1.5.2.2.2. If the command and control agency was unable to file, file a flight plan.

3.1.5.2.2.3. Obtain the appropriate clearance.

3.1.5.3. **Destination Notification.** If unable to contact appropriate Command and Control agency the PIC will contact the nearest FSS or equivalent as soon as practicable after takeoff and request the destination be advised of the departure time to ensure both proper flight following and that aircraft do not arrive unannounced at the destination.

3.1.6. **Closing the Flight Plan.** If operating in the National Airspace System (NAS), on an IFR flight plan, into an airport with a functioning control tower, the flight plan is automatically closed upon landing. In all other cases, the PIC will ensure an activated flight plan is closed through a FSS or ATC facility by any means of communication available. Long distance telephone service may be used (collect if necessary).

3.2. Passenger Manifests. The following procedures apply to passenger manifests.

3.2.1. List passengers on DD Form 2131, *Passenger Manifest*, or MAJCOM approved form authorized in a MAJCOM supplement to this instruction or the MDS Specific Volume 3.

3.2.2. When appropriate file a copy of the crew list with the flight plan. File a copy of the passenger manifest with the flight plan or with the passenger service facility. If neither can be filed as stated above, leave a copy with a responsible person at the departure location. Prior to departure, notify the agency responsible for mission command and control of the name of the person or agency to whom the documentation has been entrusted.

3.2.3. If there are unscheduled changes in the crew list or passenger manifest, send the changes to the facility that processed the original manifest or flight plan, or leave the changes with a responsible person at the location where the change is made. If the changes aren't made with the original facility, then prior to departure notify the agency responsible for command and control of the mission with the name of the person or agency where the changes to the manifest are being held.

3.3. (Added-AFMC) Parachutist Manifests. All parachutists will be listed on DD Form 2131, **Passenger Manifest**, or AFMC Form 56, **Parachutist Jump Schedule**. Parachutists will provide the aircrew with a copy of the manifest or AFMC Form 56, and the aircrew will file this list with the mission paperwork.

Chapter 4

FLIGHT AUTHORIZATION, APPROVAL, AND CLEARANCE AUTHORITY

4.1. Flight Authorization. Flights in Air Force aircraft will be authorized in accordance with AFI 11-401, *Flight Management.*

4.1.1. **Pilot in Command.** The PIC must be current and qualified in the aircraft to be flown or under the supervision of an instructor pilot. The PIC must have a current instrument rating if any of the flight will be conducted under IFR.

4.2. Approval Authority.

4.2.1. The individual designated in the Flight Authorization as the PIC is the approval authority for the flight with the following exceptions:

4.2.1.1. Flying unit commanders will approve flights from installations under their operational control by student or other pilots who do not have their own approval authority.

4.2.1.2. Flying unit commanders will approve flights by fixed wing aircraft to or from other than established landing surfaces, such as highways, pastures, etc.

4.2.2. **Flight Plan Signature.** The PIC will sign the flight plan. The signature (or act of filing by a means that precludes signing, such as by phone, radio, or computer) is evidence of approval and means:

4.2.2.1. The flight was properly ordered and released.

4.2.2.2. Current NOTAMs, weather, and other pertinent flight data were obtained.

4.2.2.3. The flight will be conducted according to governing directives.

4.2.2.4. The flight plan has been reviewed for completeness and accuracy.

4.2.2.5. Foreign clearance briefings have met the minimum requirements of the FCG.

4.2.2.6. The Formation Lead ensured each member of the formation flight was briefed on all pertinent aspects of the planned flight, and the PIC of each aircraft in the formation possesses an instrument rating (Army and Navy Special and Instrument Ratings, and FAA Instrument/Airline Transport Pilot Ratings meet this requirement) if any portion of the flight is to be conducted under IFR.

4.2.2.7. The PIC is aware of the responsibility for safety of the aircraft or formation and its occupants.

4.2.2.8. The flight complies with the scheduling and coordination procedures specified for Special Use Airspace in FLIP AP/1A or Military Training Routes (MTR) in FLIP AP/1B.

4.2.2.9. The flight complies with ADIZ restrictions published in FLIP and NOTAMs.

4.3. Additional Approval and Requirements.

4.3.1. **(P) Fields.** MAJCOMs may prescribe which Air Force aircraft can file to or land at Continental United States (CONUS) civil (P) airports.

4.3.1.1. In the absence of MAJCOM guidance, pilots must not file to or land fixed-wing Air Force aircraft (other than C-designated aircraft, such as C-130, C-21, etc.) at CONUS civil (P) airports except:

4.3.1.1.1. In an emergency.

4.3.1.1.2. When necessary in the recovery of active air defense interceptor aircraft.

4.3.1.1.3. When this instruction requires an alternate airport and no suitable military airport is available.

4.3.1.1.4. When the wing commander or higher authority approves the flight and the airport manager grants permission in advance.

4.3.1.1.5. When FLIP classifies the airport of intended landing as a joint-use field (e.g., ANG and civil) and airport facilities or ground support equipment can support the aircraft concerned.

4.3.1.2. MAJCOMs shall approve each airfield from which ROAs may operate.

4.3.1.2. (AFMC) The DFO will designate all ROA authorized airfields in the unit supplement to AFI 11-2FT Vol 3. Prior to operating out of a new airfield, a site-survey will be conducted to review airfield layout, obstacles (close & distant) airspace requirements, and any local unique procedures. Notify HQ AFMC/DOV when a site survey has been completed and endorsed by the DFO.

4.3.2. **Volume Training, Civil Fields.** Flying units shall coordinate with the appropriate civil airport authorities (i.e., tower, approach control, etc.) before conducting volume training at civil airports.

4.3.3. **Volume Training, Airways.** Flying units that must conduct volume training along or through airways, shall coordinate with the appropriate ATC agency.

4.3.4. **Off-Station Training Flights.** Commanders will ensure that all off-station training flights meet valid training requirements and will present a positive image of the Air Force.

4.3.5. **VFR Flights.** Commanders will ensure VFR flight operations are only conducted out of necessity, as dictated by mission or training requirements.

4.3.6. (Added-AFMC) For flights originating and terminating away from home base, the DFO will establish local aircrew reporting procedures to ensure monitoring of local and cross-country aircraft, crew status, location, and mission status.

4.3.7. (Added-AFMC) One-time flights of un-airworthy/crash-damaged aircraft to repair facilities require HQ AFMC/DO approval. Proposed flights with any engine inoperative or primary aircraft system affecting safety of flight completely inoperative, unless required under an approved test plan, require HQ AFMC/DO approval (for example, landing gear, engines, IFR capability, hydraulic, electrical, fuel, or flight control). Submit requests, to HQ AFMC/DOV for coordination. The package should include as a minimum aircraft history, engineering analysis/coordination, risk analysis, and flight restrictions.

4.4. Clearance Authority.

4.4.1. **IFR Flight in Controlled Airspace.** The PIC shall ensure an ATC clearance is obtained before departing on an IFR flight in controlled airspace.

4.4.2. **Uncontrolled Airspace** . The PIC is the clearance authority in uncontrolled airspace.

4.5. ATC Clearances and Instructions:

4.5.1. The PIC will ensure compliance with ATC clearances or instructions unless:

4.5.1.1. An amended clearance is obtained.

4.5.1.2. An emergency exists.

4.5.1.3. Deviation is required in response to a Traffic Alert and Collision Avoidance System (TCAS) resolution advisory (RA).

4.5.1.4. Deviation is necessary to ensure safety of flight.

4.5.2. If the aircrew is unsure of the ATC clearance they should immediately clarify it with ATC.

4.6. Complying with International Procedures . The PIC will ensure compliance with the international procedures in FLIP GP, Area Planning (AP), and the FCG. In addition, the PIC will:

4.6.1. Expand preflight and post flight aircraft checks on all flights with a destination other than the country of departure. These checks should include the manifest of all personnel and cargo and likely areas aboard the aircraft where drugs/contraband/stowaways may be concealed.

4.6.2. Immediately report any suspected customs deviations to the proper authorities.

4.7. (Added-AFMC) Aircraft Delivery. AFMC depot aircrews will accomplish aircraft pickup and delivery to and from depot facilities to the maximum extent unit local mission requirements allow.

Chapter 5

GENERAL FLIGHT RULES

5.1. Operational Standards.

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

5.1.2. **Off-Station Training.** The PIC will ensure the execution of all off-station training activities achieves valid training requirements, presents a positive image of the Air Force, and does not present an image of waste and abuse of government resources.

5.1.3. **Unauthorized Flight Demonstrations.** Unauthorized or impromptu flight demonstrations, maneuvers, or "fly-bys" are prohibited. AFI 11-209, *Air Force Participation in Aerial Events,* addresses authorized flight demonstrations.

5.1.4. **Flying While Under the Influence.** A person must not act as a crewmember of an aircraft:

5.1.4.1. While under the influence of alcohol or its after effects. Alcohol and its after effects can adversely affect flight duties that impact safety of flight. Aircrew shall not consume alcoholic beverages within 12 hours of take-off.

5.1.4.2. While under the influence of or using a drug that affects the ability to safely perform assigned duties. Aircrew may not self-medicate except IAW AFI 48-123, *Medical Examinations and Standards*.

5.1.4.3. If physical condition is suspect or known to be detrimental to the safe completion of flight duties.

5.1.5. **Transporting Passengers Under the Influence.** The PIC will ensure personnel suspected to be under the influence of intoxicants or narcotics are not allowed to board an Air Force aircraft except:

5.1.5.1. In an emergency.

5.1.5.2. When in patient status under proper care or when exceptional circumstances exist and no compromise of safety is anticipated.

5.1.6. **Crew at their 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. ROA crewmembers shall not leave their duty station unless another qualified pilot is in the ground control station and the new pilot establishes control of the aircraft.

5.1.6.1. While operating outside SUA each ROA shall have its own dedicated pilot controlling/monitoring its flight.

5.1.7. (Added-AFMC) Any assigned, attached, or temporary duty aircrew member involved in a Class A or B mishap will be administratively grounded by the DFO immediately following the mishap. Any aircrew member involved in a Class A mishap will not perform aircrew duties in AFMC assigned aircraft until re-authorized in writing by AFMC/DO. Forward copies of all grounding actions to AFMC/DOV and coordinate all return to flying status actions for Class A mishaps through AFMC/DOV for AFMC/DO approval. Any aircrew member involved in a Class B mishap will not perform

aircrew duties in AFMC assigned aircraft until re-authorized in writing by the DFO. Copies of all relative actions will be maintained in section four of affected individual's training folder.

5.2. See and Avoid. Pilots operating in VMC, under IFR or VFR, whether or not under radar control, are responsible to see and avoid other traffic, terrain, and obstacles.

NOTE: Within the NAS, ATC only provides separation between IFR and VFR aircraft operating within Class B and C airspace. In Class D and E airspace, ATC provides traffic advisories on VFR aircraft on a time-permitting basis. Standard IFR separation is provided to all aircraft operating under IFR in controlled airspace. Outside the NAS the crew should consult ICAO and country specific guidance outlined in the FCG and FLIP publication.

5.2.1. For ROA operations to comply with see and avoid requirements, they must have the capability to detect/see all traffic in sufficient time to perform an avoidance maneuver in a timely manner.

NOTE: ROA operations that do not comply with paragraph **5.2.** will be conducted under specific arrangements with appropriate aviation authorities (FAA, host nation, or military control). FAA COAs issued IAW FAA Order (FAAO) 7610.4 Chapter 12, Section 9 or arrangements with host-nation aviation authorities do not waive the FARs nor provide relief from ICAO Rules of the Air. FAAO 7610.4, Chapter 12, Section 9, outlines an equivalent level of safety comparable to see and avoid requirements for manned aircraft. ROA operations in compliance with a FAA COA are acceptable because they incorporate an equivalent level of safety agreed to by the FAA. ROA operations in compliance with host-nation aviation authorization are acceptable provided they incorporate an equivalent level of safety addressing as a minimum the measures outlined in FAAO 7610.4, Chapter 12, Section 9. ROA operations in special use airspace are acceptable provided equivalent level of safety measures are in place with controlling agencies and other airspace users.

5.3. Proximity of Aircraft. The PIC must not allow the aircraft to be flown so close to another that it creates a collision hazard. Use 500 ft. of separation (well clear) as an approximate guide except for:

5.3.1. Authorized formation flights.

5.3.2. Emergency situations requiring assistance from another aircraft.

NOTE: If an emergency requires visual checks of an aircraft in distress, the PIC must 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.

5.3.3. MAJCOM-approved maneuvers in which each participant is fully aware of the nature of the maneuver and qualified to conduct it safely (for example, interceptor attack training).

5.4. Formation Flight.

5.4.1. **Non-standard Formation Flight.** Non-standard formation flights may be conducted under the following conditions:

5.4.1.1. When approved by ATC.

5.4.1.2. Operating within an authorized Altitude Reservation (ALTRV).

5.4.1.3. Operating under the provisions of a Letter of Agreement (LOA).

5.4.1.4. Operating in airspace specifically designed for a special activity.

5.4.1.5. Operating under VFR.

5.4.2. **Transponder Operations During Formation Flight.** Unless otherwise specified in Allied Communications Publication 160, US Supplement 1:

5.4.2.1. Only one aircraft (normally the lead) of a standard formation will squawk the assigned code.

5.4.2.1.1. Unless otherwise directed by ATC, all aircraft within a non-standard formation flight will squawk the ATC-assigned Mode 3A/C beacon code until established within the assigned altitude block and closed to the proper en route interval. Unless otherwise directed by ATC, when aircraft interval exceeds 3 NMs, both the formation leader and the last aircraft will squawk the assigned Mode 3A/C beacon code.

5.4.2.1.2. During refueling, when the receiver formation is within 3 NMs of the tanker aircraft, the receiver formation squawks standby unless the T.O. specifies different distances.

5.5. Right-of-Way Rules. Usually, right-of-way is given to the aircraft least able to maneuver, which normally permits that aircraft to maintain course and speed. However, visibility permitting, each pilot must take whatever action is necessary to avoid collision, regardless of who has the right-of-way. When another aircraft has the right-of-way, the yielding aircraft must not pass over, under, abeam, or ahead of the other aircraft until well clear.

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

5.5.2. **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:

5.5.2.1. Balloons.

5.5.2.2. Gliders.

5.5.2.3. Aircraft towing or refueling other aircraft.

5.5.2.4. Airships.

5.5.2.5. Rotary or fixed-wing aircraft.

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

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

5.5.5. **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 if it does not use this advantage to cut in front of or overtake the other.

5.6. Communication in Flight.

5.6.1. **Communication with ATC.** Establish and maintain two-way radio communications with the proper ATC facility or FSS IAW the procedures appropriate for the class of airspace as outlined in FLIP.

5.6.1.1. For ROA operations in controlled airspace two-way radio communications will be the primary means of communications. Whenever Ultra High Frequency (UHF)/Very High Frequency (VHF) communications are not available telephone may be used as a primary means of communication.

5.6.2. **Emergency Frequencies.** Monitor emergency frequencies at all times (unless the radio equipment on board does not have this capability).

5.6.3. **ATC Communications Failure.** Follow the communications failure procedures published in the FIH.

5.6.3.1. For ROA operations there must be an independent means of backup communications available from the ground control element to the ATC agency controlling the aircraft.

5.7. Aircraft Speed.

5.7.1. **Supersonic Flight.** The PIC will not allow the aircraft to operate at or above Mach l except as specified in AFI 13-201. Inadvertent flights above Mach will be handled IAW AFI 13-201.

5.7.2. **In the NAS.** The PIC will:

5.7.2.1. Not allow their aircraft to exceed 250 knots indicated airspeed (KIAS) below 10,000 ft. MSL unless the MAJCOM has approved a higher speed IAW paragraph **5.7.5.**, FAA Speed Authorization.

5.7.2.1. (AFMC) AFMC aircrews are directed to fly required and recommended flight manual tech order minimum/maximum airspeeds for the appropriate phase of flight. When the airspeed is given as a range, fly the slowest practical speed in that range for safe mission execution.

5.7.2.2. Not allow their aircraft to exceed 200 KIAS at or below 2,500 ft. AGL within 4 NMs of the primary airport of a Class C or Class D airspace area unless authorized or required by ATC, or required to maintain the minimum safe maneuvering airspeed specified in the aircraft T.O.

5.7.2.3. Not allow their aircraft to exceed 200 KIAS in the airspace underlying a Class B airspace area designated for an airport or in a VFR corridor designated through Class B airspace area, unless required to maintain the minimum safe maneuvering airspeed specified in the aircraft T.O.

5.7.3. **Outside the NAS.** The PIC will not allow the aircraft to exceed 250 KIAS below 10,000 ft. MSL unless:

5.7.3.1. Mission requirements dictate speeds in excess of 250 KIAS and operations are in international airspace.

5.7.3.2. ICAO or host nation rules permit aircraft speeds over 250 KIAS.

5.7.3.3. Necessary to maintain the minimum safe airspeed as specified in the aircraft T.O.

5.7.3.4. Required by ATC and permitted by host nation rules.

5.7.4. **Holding.** Conduct holding at airspeeds prescribed in FLIP.

5.7.5. **FAA Speed Authorization.** The FAA recognizes that certain military operations and training requirements cannot be met under the terms of the FAR 91.117, *Aircraft Speed*, and has therefore granted a speed authorization. The authorization grants an exception to aircraft having flight characteristics that preclude safe operations at speeds below 250 KIAS by providing that if the minimum safe airspeed for any particular operation is greater than the maximum speed prescribed, the aircraft may be operated at the minimum safe speed.

5.7.5.1. **When the Authorization Applies.** Air Force pilots may operate their aircraft below 10,000 ft. MSL, within US airspace, in excess of 250 KIAS only under the following conditions:

5.7.5.1.1. Within restricted areas.

5.7.5.1.2. Within Military Operating Areas (MOAs).

5.7.5.1.3. When operating within MAJCOM approved large-scale exercises or short-term special missions.

5.7.5.1.4. Within published IFR MTRs.

5.7.5.1.5. Within published VFR MTRs. (Exception. Aircraft will not exceed 250 KIAS on SR routes)

5.7.5.1.6. Within defined areas or routes that have been coordinated and concurred on by the proper MAJCOM and FAA regions, but have not yet been published. This provision is intended to accommodate speed requirements on an interim basis until the area/route can be published.

5.7.5.1.7. When the aircraft T.O. requires or recommends a higher speed in order to maintain safe maneuverability. If the safe maneuvering airspeed in the T.O. is listed as a range, fly the slowest speed practical in that range, based on weight and configuration. This provision is primarily to accommodate climbs/descents and terminal area operations.

NOTE: Airspeeds applicable to this exemption must be published in the aircraft T.O. (Dash-1). A MAJCOM supplement or MDS specific Volume 3 does not constitute the aircraft flight manual as referenced in the FAA exemption.

5.7.5.2. **MAJCOM Responsibilities.** MAJCOMs will conduct large-scale exercises in permanent or temporary special-use airspace established according to FAA Handbooks 7400.2 and 7610.4. 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:

5.7.5.2.1. Affected non-participating military flying units.

5.7.5.2.2. Affected FAA Air Route Traffic Control Center (ARTCCs).

5.7.5.2.3. Affected FAA regions through the Air Force representative.

5.7.5.2.4. Other agencies, as appropriate.

5.8. Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) Systems and Procedures.

5.8.1. **Operational approval of GATM and Navigation Safety Systems.** IAW AFI 63-1301, lead and user MAJCOMs, as applicable, are responsible for providing operational approval of GATM sys-

tems/equipment. Operational approval shall be based on compliance with or equivalence to civil CNS standards and requirements for training, operational procedures, maintenance, and logistics support. The AFFSA web site contains a consolidated list of civilian CNS system requirements and information (**https://wwwmil.andrews.af.mil/pages/affsa/affsaxo.htm**).

5.8.1. (AFMC) NAV systems installed during aircraft production or fleet-wide (TCTO) modification, conforming to the accuracy tolerances of FAA Advisory Circular 90-45A, 20-130A and 20-138, are approved for use in enroute operations. Installation and use of other RNAV systems requires coordination with the responsible Air Logistics Center (ALC) System Program Office (SPO). Engineering and certification authority for testbed aircraft resides with the contractor and/or responsible test organization.

5.8.1.1. **Area Navigation (RNAV).** Lead and user MAJCOMs will approve RNAV systems for IFR operations (en route and/or terminal). These RNAV systems must meet requirements and specifications found in AC 20-130A, AC 20-138, and AC 90-45A as appropriate or an equivalent level of performance and safety.

5.8.2. **Self-Contained Approaches.** MAJCOMs will publish their policy and restrictions on the use of self-contained approaches such as Airborne Radar Approaches, Self Contained Navigation Systems (SCNS), or Mission Computer Approaches, in their supplement to this instruction. These approaches will be considered published if they meet the requirements of paragraph **8.3.1.1.**

5.8.2. (AFMC) Unit DFOs may authorize the accomplishment of self-contained approaches as part of an approved test plan or FCF profile. Flight conditions will be day VMC unless the approach is TERPS-certified according to **para 8.3.1.1.4.**, this supplement.

5.8.2.1. (Added-AFMC) ROA platforms should fly the three-dimensional track of a published approach if an appropriate one is available. If no published approach is available, or if a valid operational requirement exists, self-contained approaches (SCA) for ROA platforms will be constructed in accordance with the procedures outlined in AFI 11-2FT Vol 3. SCAs for use in IMC require DFO approval prior to executing the approach. Weather minima for these approaches are published in AFI 11-2FT Vol 3.

5.8.3. **Global Positioning System (GPS).** The PIC will ensure compliance with the guidance presented in this section appropriate to the GPS installation in their aircraft. Air Force GPS systems are divided into three basic categories: mission enhancement systems, systems meeting FAA requirements for IFR use, and portable GPS units (PGUs).

5.8.3.1. **Mission Enhancement Systems.** Mission enhancement systems will not be used for instrument navigation. These systems include receiver 3As, Miniaturized Airborne GPS Receivers (MAGRs), or any GPS or embedded GPS/Inertial Navigation Systems (INS) (EGI) system which does not comply with the minimum standards of Technical Standards Order (TSO) C-129/C-129a (see paragraph **5.8.3.2.1.**). These systems are intended to enhance mission capability when conducting tactical operations such as weapons delivery and airdrop.

5.8.3.1.1. **Exception.** MAJCOMs may approve a mission enhancement system for en route instrument navigation if the mission GPS is used to update a self-contained navigation system, such as INS or mission computer, and is checked against other MAJCOM approved source(s) (e.g., TACAN, VOR/DME, navigator/Weapon Systems Officer (WSO), independent monitoring system).

5.8.3.1.1. (AFMC) Mission enhancement systems, when verified against other NAVAIDs, may be used to update the INS position for enroute instrument navigation.

5.8.3.1.2. **Instrument Approaches.** Mission enhancement systems will not be used for instrument approaches unless they are part of a navigation system capable of self-contained instrument approaches as outlined in paragraph **5.8.2.** above.

5.8.3.2. **IFR Approved GPS.** Lead and user MAJCOMs will provide operational approval for the IFR use of GPS systems. These systems must as a minimum meet the requirements and specifications of FAA TSO C-129/C-129a (see paragraph **5.8.3.2.1.**) for un-augmented systems, or TSO C-145/C-146 for augmented systems or an equivalent level of performance and safety. Additionally, system integration must be "properly certified" (paragraph **1.2.3.1.**).

5.8.3.2. (AFMC) GPS systems installed during aircraft production or fleet-wide (TCTO) modification, conforming to the requirements and specifications of FAA TSO C-129A, C-115, C-145 and C-146, are approved for IFR use. Installation and use of other GPS systems requires coordination with the responsible ALC. Engineering and certification authority for testbed aircraft resides with the contractor and/or responsible test organization.

5.8.3.2.1. **TSO C-129 vs. TSO C-129a** GPS equipment certified to TSO C-129 may be used for IFR navigation as long as it also includes a psuedorange step error detection feature as specified in TSO C-129a (paragraph (a) (3) (xv) 5), or equivalent, and satellite selection features (healthword checking) as specified in TSO C-129a (paragraph (a) (6)) or equivalent.

5.8.3.2.2. **GPS and RNAV (GPS) Instrument Approaches.** Systems that meet the specifications and are properly integrated IAW paragraph **5.8.3.2.** may be used for both IFR navigation and/or GPS instrument approaches. MAJCOMS must provide approval for RNAV (GPS) operations and ensure that crews are aware of the RNAV (GPS) minimums compatible with aircraft equipage.

5.8.3.2.2.1. Approaches flown using GPS must be retrieved from a validated navigation database and shall not be manually entered.

5.8.3.2.2.2. GPS approaches will not be flown with an expired database.

5.8.3.2.2.3. When flying to a destination where a procedure using GPS is the intended Departure Procedure (DP) or IAP, aircrew shall ensure Receiver Autonomous Integrity Monitoring (RAIM) availability prior to commencing the GPS procedure.

5.8.3.2.2.4. GPS NOTAMS must be checked if intending to fly a GPS DP or IAP. Satellites that will become unavailable during the flight should be manually deselected to ensure an accurate predictive RAIM check can be accomplished.

5.8.3.2.2.5. If approach RAIM is not available, then a GPS IAP shall not be flown.

5.8.3.2.2.6. If a RAIM failure occurs, or the receiver does not sequence from "Armed" to "Activate" (or equivalent), prior to the final approach waypoint (FAWP), contact ATC for an alternate clearance. If an alternate clearance cannot be obtained, do not descend to the Minimum Descent Altitude (MDA), but proceed to the missed approach waypoint (MAWP) via the FAWP and execute a missed approach.

5.8.3.2.2.7. If a RAIM flag with status annunciation appears after the FAWP, immediately climb to the missed approach altitude, proceed to the MAWP and execute a missed approach.

5.8.3.3. **Portable GPS Units (PGUs).** PGUs include commercial hand-held GPS receivers, military Precision Lightweight GPS Receivers (PLGRs), and PLGRs coupled with a laptop computer that incorporates moving map displays. They are intended to be used in aircraft as situational awareness tools only. PGUs are authorized for use with the following restrictions:

5.8.3.3.1. PGUs shall not be used for IFR navigation, instrument approaches, or as a PFR.

5.8.3.3.2. PGUs are considered portable electronic devices and therefore are subject to the requirements of paragraph **2.5.1.**, Electronic Devices.

5.8.3.3.3. MAJCOMs will specifically authorize the use of PGUs in a supplement to paragraph **2.5.1.** of this AFI.

5.8.3.3.4. MAJCOMs will approve software used in PGUs that have a moving map display.

5.8.3.3.4. (AFMC) Software developed for use with PGUs containing moving map displays requires HQ AFMC/DOV approval. Submit supporting documentation with the approval request.

5.8.3.3.5. PGUs will not be used as a substitute for any required flight equipment listed in paragraph **2.6.**, Equipment Required for Flight.

5.8.3.3.6. PGUs must be adequately secured to avoid becoming a projectile hazard.

5.8.3.3.7. MAJCOMs will develop programs to ensure aircrews have received proper training on these systems before permitting their use.

5.8.3.4. **GPS "Overlay" Approaches.** Predictive RAIM check must be accomplished prior to initiating the approach. If approach RAIM is not available, a GPS overlay approach cannot be flown. MAJCOMs may approve the use of overlay approaches with the following provisions:

5.8.3.4.1. Only those approaches contained in DoD/National Aeronautical Charting Organization (NACO) FLIP with "or GPS" in the title are authorized to be flown in IMC as overlay approaches in the United States.

5.8.3.4.2. Approaches contained in FLIP without "or GPS" in the title may only be flown in day VMC conditions.

5.8.3.4.3. Overlay approaches flown using GPS must be retrieved from a valid navigation database and shall not be manually entered.

5.8.3.4.3.1. The retrieved procedure must clearly depict the FAWP, all step-down fixes, the MAWP and the missed approach holding point (MAHP). The system must automatically sequence to the next waypoint.

5.8.3.4.4. The traditional navigation aids (NAVAIDS) serving the underlying approach must be serviceable, tuned, identified and displayed to the pilot while flying the overlay approach, even if using GPS guidance. This may be accomplished by the pilot not flying in two-pilot aircraft.

5.8.3.4.5. If the pilot/crew detect any deviation from the published underlying procedure that exceeds normal tolerances, the crew will disregard GPS guidance and transition to the conventional underlying approach.

5.8.3.4.6. Procedures applicable to RNAV (GPS) approaches pertaining to flags, warnings, cautions, messages, or annunciations also apply overlay approaches.

5.8.3.4.7. Single pilot aircraft may only conduct overlay approaches in day, VMC conditions.

5.8.3.5. **GPS as Primary Means of Navigation in Remote/Oceanic Areas.** Lead and user MAJCOMs may provide operational approval for GPS navigation equipment as a primary means of navigation in remote/oceanic areas only if the system meets the requirements and specifications of FAA Notice 8110.60, meets an equivalent level of performance and safety or if host nation provides exemptions to the dual navigation system requirement (e.g., "Blue Spruce" routes in the North Atlantic, FAA single long route navigation system exemption for the Caribbean).

5.8.3.5. (AFMC) GPS may be used as a primary means of navigation in remote/oceanic areas provided the requirements of the basic regulation are met.

5.8.3.6. **Instrument DPs using GPS or RNAV.**

5.8.3.6.1. The navigation system/receiver must be set to terminal (± 1 NM) CDI sensitivity and the navigation routes must be contained in the data base in order to fly published IFR charted departures and DPs. DPs may not be entered manually.

5.8.3.6.2. If available, the traditional NAVAIDS serving the underlying DP must be tuned, identified and displayed, even if using GPS/RNAV guidance.

5.8.3.6.3. If the pilot/crew detect any deviation from the published underlying procedure that exceeds normal tolerances, the crew will disregard GPS/RNAV guidance and transition to the conventional underlying NAVAIDS.

5.8.3.6.4. If terminal RAIM is not available, GPS may not be used to fly a DP.

5.8.3.7. (Added-AFMC) Units will develop a training program tailored to the specific PGU that will be used. Document training in the individual's aircrew training folder.

5.8.4. **Navigation System Databases.**

5.8.4.1. Expired Database. If the database has expired, the PIC:

5.8.4.1.1. May continue a mission with an expired database, if the database information required for the flight can be verified with current FLIP.

5.8.4.1.2. Shall get the database updated at the first opportunity.

5.8.4.1.3. Will not fly GPS approaches.

5.8.5. **IFR or VFR Approved Vertical Navigation (VNAV) Systems.**

5.8.5.1. Lead and user MAJCOMs will provide operational approval of VNAV systems for VFR or IFR use. These systems must be "properly certified" (paragraph **1.2.3.1.**).

5.8.5.2. **Barometric Vertical Navigation (Baro-VNAV).** MAJCOMs will approve the use of barometric VNAV (BARO-VNAV) systems for instrument approach operations. These systems must be "properly certified" (paragraph **1.2.3.1.**).

5.8.5.2.1. Use of barometric VNAV decision altitude (DA) is not authorized with a remote altimeter setting. A current local altimeter setting for the landing airfield is required. Where remote altimeter minima are shown, the baro-VNAV function may be used, but only to the published Lateral Navigation (LNAV) MDA.

5.8.5.2.2. In order to use LNAV/VNAV minima the temperature at the landing airfield must be at or above the temperature restriction noted on the IAP. If the temperature is below the specified limit, the baro-VNAV function may be used, but only to the published LNAV MDA.

5.8.5.2.3. Barometric VNAV guidance will not be used below the published LNAV MDA or LNAV/VNAV DA.

5.9. Airport Operations.

5.9.1. **Takeoff and Landing.**

5.9.1.1. **Clearances.** Obtain a clearance from ATC before taxiing, taxiing onto a runway, takeoff, or landing, at an airport with an operating control tower.

5.9.1.2. **Taxi Clearance.** An ATC taxi clearance to or from the assigned runway that does not include hold instructions authorizes the aircraft to taxi across all other runways and taxiways en route to or from the assigned runway.

5.9.1.2.1. Do not taxi across or onto the assigned runway without further clearance from ATC.

5.9.1.3. **Uncontrolled Field Procedures.** At uncontrolled fields:

5.9.1.3.1. Use the runway favored by the winds if no other factors make that runway unacceptable.

5.9.1.3.2. Announce your activities on the appropriate frequency. (Refer to the Aeronautical Information Manual (AIM) and AFMAN 11-217, Volume 2, *Instrument Flight Procedures*, for more detail.)

5.9.1.4. **Land and Hold Short Operations (LAHSO).** USAF fixed wing pilots are prohibited from accepting LAHSO clearances.

5.9.1.4.1. Air Force pilots may passively participate in LAHSO (land or take-off when another aircraft has been given a LAHSO clearance). PIC is the final authority whether to take-off, land or continue a touch-and-go when a merging aircraft has received a LAHSO clearance.

5.9.1.4.2. MAJCOMs that require certain units or aircraft to have LAHSO authorization for mission accomplishment, must contact AFFSA to ensure MDS specific data is incorporated into FAA Order (7110.199) appendix 3.

5.9.1.5. **Reduced Same Runway Separation (RSRS).** MAJCOMs may approve RSRS operations in a supplement to this AFI. Approval shall include RSRS criteria for each applicable MDS governing similar and dissimilar landing/touch-and-go operations.

5.9.1.5. (AFMC) Reduced Same Runway Separation (RSRS) is authorized for AFMC aircrews per AFI 13-203 AFMC Sup 1.

5.9.1.5.1. RSRS is applicable to all non-formation aircraft.

5.9.2. **Turns after Takeoff, Low Approaches, or Closed Patterns.**

5.9.2.1. Do not turn after a takeoff, touch and go, or low approach until at least 400 ft. above the departure end of the runway (DER) elevation, at a safe airspeed, and past the end of the runway (if visible) unless:

5.9.2.1.1. Specifically cleared by the controlling agency.

5.9.2.1.2. Safety dictates otherwise.

5.9.2.1.3. Required by local procedures.

5.9.2.1.4. Required by the published DP.

5.9.2.2. The 400 ft. restriction does not apply when executing a closed pattern.

5.9.3. **Traffic Pattern Procedures.**

5.9.3.1. At Air Force installations fly the traffic pattern published in the local flying procedures publication or FLIP, unless otherwise directed.

5.9.3.2. At other than Air Force installations, fly traffic patterns as directed by the control tower or published in FLIP, FAR Part 91 Subpart B, or the AIM.

5.9.3.3. At airports with no control tower, follow the standard light signals or visual indicators that prescribe the direction of traffic and landing runway. Departures must comply with the appropriate route for the airport. (Refer to AIM for detailed information.)

5.9.3.4. Helicopters should avoid the flow of fixed-wing aircraft. Helicopters that can maintain an airspeed compatible with fixed wing traffic may fly in the rectangular pattern.

5.9.4. **Helicopter Landing Areas.** Helicopters may operate from/to other than established landing areas (i.e., fields, highways, parks, etc.) if:

5.9.4.1. A military requirement exists and the user receives permission to use the area for landing, safeguards exist to permit operations without hazard to persons or property, and no legal objections are apparent.

5.9.4.2. Conducting an operational mission.

5.9.5. **Night Operations.** The PIC will adhere to the following guidance during night operations:

5.9.5.1. Fixed wing aircraft must not be operated from a runway unless it is outlined with operating lights and clearly discernible. Covert Infrared (IR) runway lighting being used by qualified crews equipped with Night Vision Goggles (NVGs) meets this requirement.

5.9.5.2. 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. Use the latest version of the Air Almanac or computer program "LIGHT PC" to determine or calculate light and moon data.

5.9.5.3. (Added-AFMC) Helicopter Night Operations. The DFO may authorize helicopters on high priority operational or test missions to operate into and from unlighted areas as long as all available terrain and obstacle information is studied and all available lighting is used. Consideration must be given for the use of parachute flares or prepositioning other forms of lighting. Running takeoffs and landings will only be made to a runway or taxiway that is clearly discernible by

lights. On all other missions (training, routine operational, or test missions, etc.), landings into remote and operational sites between official sunset and official sunrise are permitted if the mission is authorized and accomplished according to an approved night vision goggle (NVG) program or under the following conditions: the area is outlined by discernible lights or parachute flares, the pilot is familiar with the landing area through review of the site folder, and a daytime landing or overflight is accomplished, if feasible.

5.9.6. **Landing Gear Reporting Procedures.** Pilots operating retractable gear aircraft must report "gear down" to the ATC agency or runway supervisory unit after extending the landing gear. This report shall be made during any approach to an airport prior to crossing the runway threshold.

5.10. Altitude Requirements. Except for takeoff or landing, do not operate aircraft:

5.10.1. **Emergency Landing.** Below an altitude that, should an emergency landing become necessary, creates undue hazard to persons or property.

5.10.2. **VFR.** Under VFR above 3,000 ft. AGL at altitudes or flight levels other than those specified in FLIP. In airspace under FAA jurisdiction, these altitudes do not apply when turning or holding in a holding pattern of 2 minutes or less.

5.10.3. **Congested Areas.** Over congested areas (i.e., cities, towns, settlements) or groups of people if the altitude does not ensure at least 1,000 ft. above the highest obstacle within a 2,000-ft. radius of the aircraft. Pilots flying helicopters in FAA airspace or operating IAW host nation agreements may operate at lower altitudes and in closer proximity if they do not create a hazard to persons or property on the surface.

5.10.4. **Non-congested Areas.** Over non-congested areas at an altitude of less than 500 ft. AGL except over open water, in special use airspace, or in sparsely populated areas. Under such exceptions, pilots must not operate aircraft closer than 500 ft. to any person, vessel, vehicle, or structure. Pilots flying helicopters in FAA airspace may operate at lower altitudes and in closer proximity if they do not create a hazard to persons or property on the surface.

5.10.5. **Flight over National Recreation Areas and Wildlife Refugees.** Mission permitting, not less than 2,000 ft. AGL over the following areas: national parks, monuments, seashores, lake shores, recreation areas, and scenic river ways administered by the National Park Service; national wildlife refuges, big game refuges, game ranges, and wildlife refuges administered by the US Fish and Wildlife Service; and wilderness and primitive areas administered by the US Forest Service. This paragraph is not applicable to special use airspace, low-altitude tactical navigation areas, and MTRs. Higher altitudes may exist for specific areas. (See AP/1B and sectional aeronautical charts.)

5.11. Disaster Areas. Pilots shall not operate their aircraft within a designated disaster area. NOTAMs list disaster areas. Exceptions are permitted when an aircraft is:

5.11.1. Aiding in airborne relief for the area.

5.11.2. Going to or from an airport in the area, but does not hamper or endanger relief activities.

5.11.3. On a flight that has been specifically cleared by ATC.

5.12. Altimeter Settings. Set altimeters according to FLIP GP and AP documents.

5.13. Simulated Instrument Flight.

5.13.1. **Restrictions.** The following restrictions apply to simulated instrument flight:

5.13.1.1. The aircraft must be equipped with a functional two-way radio.

5.13.1.2. A safety observer, either a current and qualified pilot or fighter Weapons Systems Operator (WSO), able to see outside at all times, should accompany the flight whenever possible, either as a crewmember or in a chase aircraft.

5.13.1.3. If a chase aircraft is used, maintain continuous visual contact and two-way communications between aircraft.

5.13.1.4. MAJCOMs may authorize ROAs to conduct simulated instrument flight provided the aircraft has see and avoid capabilities as outlined in paragraph **5.2.1.**

5.13.1.4. (AFMC) ROA simulated instrument flight will be conducted in accordance with the applicable certificate of authorization (COA).

5.13.2. **Practice Instrument Approaches.** Approaches conducted in other than actual IMC. Although controlling the aircraft primarily by reference to the flight instruments, the PIC must be able to see the ground, surrounding terrain, and when established on the final segment of the approach, the airport environment.

NOTE: These approaches meet the requirement for primary simulated instrument time because the PIC has chosen to fly the approach using flight instruments as the primary reference for maintaining aircraft attitude.

5.13.2.1. Practice instrument approaches, including approaches flown under VFR (see paragraph **8.1.2.2.**) will be conducted IAW **Chapter 8** of this instruction.

5.13.2.2. Safety Observers. Practice approaches may be conducted without a safety observer (as defined in paragraph **5.13.1.2.**) if the PIC is instrument qualified and current in the type of approach being flown. When flying a practice approach without a safety observer, the PIC must maintain a composite crosscheck sufficient to establish situational awareness as to terrain and other traffic. The PIC is not relieved of the responsibility to see and avoid other traffic.

5.13.3. **Vision Restricting Devices.** MAJCOMs must approve the use of vision restricting devices (e.g., hoods, Foggles, etc) in their supplement to this instruction. Vision restricting devices will not be used without a safety observer (as defined in paragraph **5.13.1.2.**).

5.13.3.1. MAJCOMs must provide specific approval for use of these devices for takeoffs and landings.

5.13.3.1. (AFMC) Use of vision restricting devices during takeoffs and landings is approved when required by a test plan. Observers will be pilot qualified in the aircraft flown, have direct access to the flight controls, have full view of the flight instruments, and be able to see outside.

5.13.3.2. At least 2,000 ft of obstruction clearance is required when using vision restricting devices if the safety observer:

5.13.3.2.1. Is not qualified as first pilot or copilot in the aircraft.

5.13.3.2.2. Does not have full view of the flight instruments.

5.13.3.2.3. Does not have access to the flight controls.

5.13.3.2.4. Is in a chase aircraft.

5.14. Simulated Emergency Flight Procedures:

5.14.1. **Restrictions.**

5.14.1.1. The following restrictions apply to simulated emergencies:

5.14.1.1.1. Do not practice emergency procedures with passengers on board.

5.14.1.1.2. Single pilot aircraft require day VMC.

5.14.1.1.3. Multi-pilot aircraft in day IMC require weather conditions at or above published circling minimums for the approach to be flown.

5.14.1.1.4. Multi-pilot aircraft at night require weather conditions at or above 1,000 ft. ceiling and 2 SMs visibility or circling minimums, whichever is higher.

5.14.1.2. MAJCOMs may authorize simulated emergencies during the period of civil twilight, in Alaska and other areas exceeding 60° latitude (see glossary for definition: civil twilight).

5.14.2. **Required MAJCOM Guidance** . MAJCOMs must publish guidance for practicing simulated emergency takeoffs, approaches, and landings. This guidance must include, as a minimum:

5.14.2. (AFMC) Guidance for practicing emergency procedures is contained in AFI 11-2FT Vol 3 and the MDS specific attachments. The DFO may approve exceptions only when required as part of an approved test plan. Document approval on the flight authorization.

5.14.2.1. Procedures when an instructor pilot or flight examiner does not have immediate access to the aircraft controls.

5.14.2.2. Instructions to minimize actual engine shutdown when a reduction of power suffices.

5.14.2.3. MAJCOMs must publish restrictions on the practice of fixed-wing Simulated Flameout (SFO) or forced landing approaches under the following conditions:

5.14.2.3.1. If the aircraft T.O.s do not furnish specific guidance for performing SFO or forced landing approaches.

5.14.2.3.2. SFO approaches do not conform to T.O. patterns.

5.14.2.3.3. Preflight briefing does not contains SFO procedures.

5.14.2.3.4. Approaches are not flown at military airfields or at P designated fields (where letters of agreement are in effect) that have established SFO patterns.

5.14.2.3.5. The airport does not have an active tower or Runway Supervisory Unit, enough runway for that aircraft, and proper crash and rescue equipment.

5.14.2.3.6. The practice approaches have not been coordinated with the ATC agencies responsible for the airspace that the SFO or forced landing pattern transits.

5.14.3. (Added-AFMC) The DFO may allow a Federal Aviation Administration (FAA) flight examiner (FE) to observe pilot or flight engineer performance for an airline transport pilot or flight engineer qualification evaluation given as part of an Air Force checkride. The FAA FE will occupy an observer position only. All restrictions of this supplement apply. Field units will retain a copy of the written approval for 2 years.

5.15. Touch-and-Go Landings.

5.15.1. Touch-and-go landings are authorized if required by courses listed in the Air Force Education Training Course Announcement (ETCA) database (**https://etca.keesler.af.mil**).

5.15.2. MAJCOMs may authorize touch-and-go landings in any command-operated aircraft.

5.15.2. (AFMC) Touch-and-go landings are authorized in any command operated aircraft provided all requirements of AFI 11-2FT Vol 3 and AFI 11-2FT Vol 1 are met.

5.15.3. MAJCOMs must provide explicit guidance in its command supplement about operating conditions and pilot qualifications.

5.16. Dropping Parachutists or Objects.

5.16.1. **Restrictions.** The PIC will not allow the dropping of parachutists or objects from the aircraft except:

5.16.1. (AFMC) Parachutist airdrops will be conducted according to AFI 11-410, *Personnel Parachute Operations*. Other airdrops will be conducted under approved test plans or locally developed procedures.

5.16.1.1. In an emergency.

5.16.1.2. When mission requirements dictate.

5.16.2. **MAJCOM Responsibilities.** MAJCOMs will establish procedures to ensure airdrops comply with applicable directives.

5.16.3. **PIC Responsibilities.** The PIC will:

5.16.3.1. When jettisoning fuel and circumstances permit, notify the appropriate ATC or flight service facility of intentions, altitude, location, and when the operation is complete.

5.16.3.2. Drop chaff containing rope elements according to AFI 13-201, and FAA Handbook 7610.4, *Special Military Operations.*

5.16.3.3. Report any accidental loss of equipment or aircraft parts or jettisoning of cargo according to AFMAN 10-206, Operational Reporting, and AFI 91-204, *Safety Investigations and Reports*.

5.17. Aircraft Lighting.

5.17.1. **Reduced Lighting.** MAJCOMs may authorize reduced or light-out operations in restricted areas, warning areas or host nation approved areas in a MAJCOM supplement to this instruction. Host nation approved areas may be documented in a LOA or host nation regulatory documentation.

5.17.1. (AFMC) Reduced or light-out operations within restricted and warning areas are approved for AFMC aircraft when operational or test requirements dictate. DFOs will establish policies for such lighting in the unit supplement to AFI 11-2FT Vol 3.

5.17.2. **Aircraft Lighting During Formation Operations.** MAJCOMs may authorize formation flights to vary their lighting configuration according to the aircraft type and mission requirement. The MAJCOM must ensure guidance on this type of operation is provided and that it ensures an equivalent level of visual identification as a single aircraft.

5.17.2. (AFMC) When operating outside restricted or warning areas and in standard formation, one aircraft in the formation will display appropriate lighting. Others may operate with reduced lighting as safety, operational and test conditions permit. If a requirement exists to operate outside of restricted or warning areas with reduced lighting and not in standard formation, units must coordinate requests for a waiver through AFMC/DOV to HQ AFFSA/XOF.

5.17.3. **Position Lights** . Display position lights between the hours of official sunset and sunrise:

5.17.3.1. Immediately before engine start and when an engine is running. Aircraft that do not have power available before start shall turn them on as soon as power is available.

5.17.3.2. When parked in an area likely to create a hazard or while being towed, unless clearly illuminated by an outside source.

5.17.4. **Anticollision and Strobe Lights.** Anticollision lights and strobe lights are not the same. For the purposes of this section, anti-collision lights are the primary flashing light system on the aircraft intended to attract the attention of others to enhance see and avoid operations, while strobe lights are systems such as wingtip strobes or other similar strobe light installations.

5.17.4.1. **Ground Operations.** Aircraft equipped with anticollision lights will display these lights IAW AFI 11-218, *Aircraft Operations and Movement on the Ground*.

5.17.4.2. **Airborne Operations.** Aircraft equipped with anticollision and strobe lights will operate these lights as follows:

5.17.4.2.1. Anticollision lights must be on from takeoff to landing.

5.17.4.2.2. Strobe lights shall be operated IAW MAJCOM or aircraft T.O. guidance.

5.17.4.3. The PIC may turn off anticollision lights when it is in the best interest of safety to do so.

5.17.4.4. The PIC may continue the mission with the failure of any light of the anticollision light system to the first stop where repairs can be made.

5.17.5. **Landing Lights.**

5.17.5.1. Aircraft must have at least one operable landing light.

5.17.5.1.1. Helicopters equipped with a searchlight that provides sufficient light for landing may substitute that for an operable landing light.

5.17.5.2. Landing lights will be illuminated below 10,000 ft. MSL, day or night, within operational constraints.

5.17.5.3. When mission requirements dictate, use of landing lights is optional during take-off/landing, if the aircraft is equipped with an operational sensor that provides a visual representation of the runway environment. Operations must comply with paragraph **5.9.5.1.**

5.17.5.4. If ROAs are equipped with operational sensors that enable the pilot to identify the runway environment without a landing light, use of landing lights is not required.

5.17.5.5. When other aircraft are operating in the pattern, landing light off operations should be limited to specific training and operational requirements.

5.18. 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), MTRs or host nation approved airspace according to the guidelines in AFI 11-214, *Aircrew, Weapons Director, and Terminal Attack Controller Procedures for Air Operations*. Aircraft deployed or based at overseas locations will operate IAW applicable host nation agreements or ICAO SARPs. 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.

5.18. (AFMC) Aerobatics and Air Combat Tactics. Air Combat Tactics will adhere to guidelines of AFI 11-2FT Vol 3. Aerobatic maneuvers will not be performed below 5,000 feet AGL. Exception: Flight maneuvers approved according to AFI 11-209, Air Force Participation in Aerial Events, and applicable volumes of AFI 11-246, Air Force Aircraft Demonstrations, as part of an authorized air show.

5.19. Participating in Aerial Events.

5.19.1. The PIC will ensure compliance with AFI 11-209, when participating in aerial events, demonstrations, and static displays.

5.19.2. When a NOTAM imposes a temporary flight restriction (TFR) during an airshow, major sporting event, natural disaster, etc, no aircraft may operate in the designated airspace except IAW the authorization, terms and conditions of the TFR.

5.20. Tobacco Use on Air Force Aircraft. Tobacco use is prohibited on Air Force or contract aircraft. For exceptions see AFI 40-102, *Tobacco Use in the Air Force.*

5.21. Landing with Hot Armament. MAJCOMs will ensure local units develop procedures for handling aircraft that land with live armament to ensure the safe conduct of such operations.

5.21. (AFMC) Landing with Hot Armament. Units that conduct operations with live armament will publish procedures for live/hung ordnance in the unit supplement to AFI 11-2FV Vol 3, local airfield operations instructions, and/or in-flight guide.

5.21.1. Before landing with hot armament or practice munitions at a non-Air Force installation or an airfield where local procedures are not known, the PIC must:

5.21.1.1. Advise the tower of the circumstances.

5.21.1.2. Advise transient alert and other appropriate agencies.

5.21.1.3. Request taxi instructions to the designated de-arming area.

5.21.2. After landing with hot armament at a non-Air Force installation or an airfield where the local procedures are not known, the PIC must:

5.21.2.1. Avoid taxiing into an area or position that could threaten personnel or equipment.

5.21.2.2. Before leaving the aircraft, ensure the ground crew is aware of the armament on board.

5.21.2.3. If necessary, request assistance from the nearest Air Force facility by the most expeditious means.

5.21.3. (Added-AFMC) Aircraft will not be delivered to a contractor facility with hot armament on board unless delivery is specifically required by the contract and approved by the cognizant contract administration office.

5.22. Pilot Weather Reports (PIREPs) and Air Reports (AIREPs).

5.22.1. **PIREPs.** Pilots will immediately report hazardous weather conditions and volcanic activity to the ARTCC, terminal ATC, or FSS. Additionally, pilots are urged to report any significant flight condition information. Pilots operating in warning areas should forward significant weather reports to the appropriate controlling agency (e.g., ARTCC, military radar unit, Airborne Warning and Control System, etc). In all cases, follow with a report to a Pilot-to-Metro Service (PMSV) to ensure rapid dissemination to other using agencies. See PIREP procedures in the FIH.

5.22.2. **AIREPs.** AIREPs are usually made over areas where weather information is limited or nonexistent (for example, over an ocean). AIREPs also contain supplemental aircraft position information. MAJCOMs provide aircrew guidance on when to file an AIREP. When required, use AF Form 72*, Air Report* (AIREP), for reporting. The pilot must brief the forecaster at the destination airfield on the weather conditions that prompted AIREPs and pass on any other significant weather information.

5.22.2. (AFMC) When mission requirements and crew workload permit, aircrews will file air reports for extended over water flights when actual weather encountered is significantly different from forecast.

5.23. Operating in the Vicinity of Thunderstorms.

5.23.1. **Operations into Thunderstorms.** The PIC shall not intentionally operate into a thunderstorm except when operating on a MAJCOM-approved mission specifically requiring thunderstorm penetration.

5.23.1. (AFMC) Missions requiring planned penetration of a thunderstorm require HQ AFMC/DO approval.

5.23.2. **Takeoff, Approach, and Landing.** Pilots will not takeoff, land, or fly an approach at an airport where thunderstorms are producing hail, strong winds, gust fronts, heavy rain, lightning, windshear, and (or) microbursts.

5.23.3. **Flight Planned Route.** When observed or reported thunderstorm activity adversely affects the flight plan route, pilots will delay the scheduled mission, alter the route of flight to avoid the thunderstorm activity, or proceed to a suitable alternate. Pilots shall use all available information including radar, PMSV, and PIREPs to avoid thunderstorm activity.

NOTE: Induced lightning strikes and electrostatic discharges can occur in what may look like benign conditions; a thunderstorm does not have to be present for these discharges. See AFH 11-203, Volume 1, *Weather for Aircrews,* for detailed information on thunderstorms, lightning, and electrostatic discharge.

5.23.3. (AFMC) Thunderstorm avoidance procedures are listed in AFI 11-2FT Vol 3.

5.24. Wake Turbulence and Windshear. Pilots will:

5.24.1. **Report Wake Turbulence.** Notify ATC when encountering wake turbulence on any approach.

5.24.2. **Report Windshear.** Immediately report a windshear or microburst encounter on takeoff, approach, or landing to the most appropriate agency (e.g., control tower, approach control, PMSV) and, if possible, include:

5.24.2.1. Altitude of the encounter.

5.24.2.2. Loss or gain in airspeed or altitude.

5.24.2.3. Type of aircraft.

5.24.2.4. Location of occurrence (see AFH 11-203, Volume 1).

5.25. Volcanic Activity. Air Force aircraft will not be flown in an area of known or reported volcanic activity unless engaging in operations (such as rescue) specifically relating to the incident. Any encounters with pyroclastic clouds (volcanic ash) should be reported as soon as possible to the appropriate controlling agency (ARTCC, military radar unit, AWACS, etc.). In all cases, follow with a report to a PMSV, or other applicable weather agency, to ensure rapid dissemination to other using agencies. See PIREP procedures in the FIH.

5.26. Night Vision Goggles (NVG) Operations. Aircrew will preflight NVGs prior to each use to ensure proper operation and optimum night visual enhancement. MAJCOMs will prescribe the use of NVGs during aircraft operations.

5.26. (AFMC) Night Vision Goggles (NVG) Operations. Operations and training requirements for NVG operations are specified in AFI 11-2FT, Vol 1 and 3.

5.27. Takeoff with Ice or Frost. The PIC will not takeoff with ice, snow, or frost adhering to the wings, control surfaces, propellers, engine inlets, or other critical surfaces of the aircraft, unless authorized by the aircraft single manager or flight manual.

5.27.1. If approved by the system program office or flight manual:

5.27.1.1. A thin coating of frost is permitted on the fuselage, provided the letter and paint lines are visible.

5.27.1.2. Light frost (up to 1/8 inch thick) caused by supercooled fuel is permitted on the lower wing surface (i.e., below the fuel tank area) if the fuselage and all other control surfaces are free of all icing. If deicing is required on any other aircraft surface, the underwing frost shall also be removed.

5.27.2. Information on the removal and prevention of frozen precipitation is contained in T.O. 42C-1-2, *Anti-Icing, De-Icing and Defrosting of Parked Aircraft.*

5.28. Night Approaches. MAJCOMs shall determine procedures governing the use of instrument approaches while operating in night VMC conditions.

5.28. (AFMC) Night Approaches. When operating in night VMC, except when mission or training requirements dictate otherwise, aircrew will land using precision glidepath guidance. This glidepath guidance can either be from a precision instrument approach or from an approach lighting system. Acceptable types of glidepath guidance are contained in AFMAN 11-217, Volume 1. Aircrew should complete a thorough review of the point of intended landing and the surrounding terrain and obstacles prior to arrival.

5.29. Traffic Alerting and Collision Avoidance System (TCAS). Aircraft equipped with TCAS shall operate in Traffic Alert (TA)/RA Mode unless provisions of paragraph **5.29.2.** apply or unless mission requirements or host nation agreements dictate otherwise.

5.29.1. **Response to TCAS Alerts.**

5.29.1.1. Pilots shall respond to all RAs as directed by the TCAS system, unless doing so would jeopardize the safe operation of the aircraft (e.g., descent into obstacles).

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

5.29.1.3. In the event of an RA to alter the flight path, the alteration of the flight path will be kept to the minimum extent necessary to comply with the RA.

5.29.1.4. Pilots who deviate from an ATC clearance in response to an RA shall 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.

5.29.1.5. If a TCAS RA requires maneuvering contrary to ATC instructions, right-of-way rules, cloud clearance requirements, or other VFR/IFR flight rules, pilots are expected to follow the TCAS RA.

5.29.2. **Formation TCAS Operations.**

5.29.2.1. As a minimum, formation leads shall operate in TA mode.

5.29.2.2. Unless otherwise required by ATC, host nation agreement or specified in the MDS specific guidance, when total length of the formation exceeds 3.0 NMs, both the formation leader and the last aircraft will operate in TA/RA Mode.

5.29.2.3. During refueling operations the tanker aircraft will operate in TA mode. The receiving aircraft may squawk standby unless the aircraft T.O. specifies otherwise.

5.29.3. **ROA TCAS Operations.**

5.29.3.1. ROAs equipped with TCAS shall only operate in TA Mode.

5.30. Terrain Awareness and Warning Systems (TAWS). Pilots will comply with appropriate flight manual procedures upon receipt of a Ground Proximity Warning System (GPWS)/Enhanced GPWS (EGPWS)/TAWS/Ground Collision Avoidance System (GCAS) warning. Terrain warnings need not be followed if the pilot can verify the warning is false by positive visual contact with the terrain/obstacle.

5.30.1. MAJCOMs will establish guidance on GCAS use during tactical operations.

5.30.1. (AFMC) For operational, training and proficiency sorties, AFMC aircrew will follow MDS specific guidance in AFI 11-2FT Vol 3. Test sorties will follow specified guidance in an approved test plan, if different from AFI 11-2FT Vol 3. In the event no guidance is published in AFI 11-2FT Vol 3, refer to lead MAJCOM guidance if appropriate.

Chapter 6

LIFE SUPPORT SYSTEMS

6.1. General Information.

6.1.1. **Indoctrination Course for Frequent Nonrated Flyers.** Commanders of flying units must ensure that nonrated personnel and civilians who make regular and frequent flights receive an indoctrination course on emergency procedures and the proper use of emergency equipment.

6.1.1.1. These courses must address mission and aircraft-specific equipment and procedures.

6.1.1.2. A PIC's preflight briefing does not qualify as an indoctrination course.

6.1.2. **Passenger Briefing** . The PIC will ensure that each passenger is briefed before flight. The briefing must include:

6.1.2.1. Location and use of emergency exits.

6.1.2.2. Location and use of parachutes, and associated survival equipment (when appropriate).

6.1.2.3. Operation of emergency signals and passenger evacuation.

6.1.2.4. Use of the oxygen system and emergency oxygen equipment.

6.2. Personal and Survival Equipment. MAJCOMs shall prescribe wear and use of the following equipment in conjunction with minimum standards established in relevant aircraft T.O.s:

6.2. (AFMC) Personal and Survival Equipment. AFI 11-301AFMC Sup1, *Aircrew Life Support Program*, prescribes wear and use of personal and survival equipment.

6.2.1. Parachutes.

6.2.2. Seat belts, harnesses, or safety belts.

6.2.2. (AFMC) Seat and Safety Belt Requirements. Refer to AFI 11-2FT Vol 3.

6.2.3. Personal equipment including helmets, oxygen masks, anti-G equipment, flight clothing, and flight gloves.

6.2.4. Aircraft survival kits and optional components.

6.2.5. Individual survival equipment, including survival vests and anti-exposure suits.

6.2.6. Flotation equipment, including life rafts and life preservers.

6.2.7. Pressure suits above FL 500 MAJCOMs shall establish specific:

6.2.7. (AFMC) Pressure Suit Flight Requirements. Refer to AFI 11-2FT Vol 3.

6.2.7.1. Limits on the altitude and duration when wearing pressure suits.

6.2.7.2. Recovery procedures.

6.3. Spectacles, Contact Lenses, and NVGs. (Not applicable to ROA operators)

6.3.1. **Spectacles.** While performing aircrew duties, crewmembers must use only Air Force provided spectacles and sunglasses. The Improved Aircrew Spectacle (IAS), including sunglasses, is ordered as the Air Force Flight Frame. The HGU-4/P is authorized only if the IAS is unavailable.

6.3.2. **Contact Lenses.** Crewmembers who want to wear contact lenses must consult with their unit flight surgeon and meet criteria and follow guidelines outlined in AFI 48-123, attachment 17.

6.3.3. **Spare Sets.** Crewmembers who wear corrective spectacles or contact lenses must carry a spare set of clear prescription spectacles on their person while performing aircrew duties.

6.3.4. **NVGs.** Crewmembers must undergo an initial certification course, emphasizing preflight procedures and goggle optimization or limitations, prior to their initial flight with NVGs. An appropriately trained instructor, assisted by a flight surgeon or a designated representative, will conduct this course (see AFI 48-123).

6.4. Oxygen Requirements. (Not applicable to ROA)

6.4.1. **Crew.** Each crewmember shall use supplemental oxygen anytime the cabin altitude exceeds 10,000 ft.

6.4.1.1. **Helicopter Exception.** Air Force helicopters may be operated above 10,000 ft. MSL without supplemental oxygen with the following restrictions:

6.4.1.1.1. Operations must be mission essential.

6.4.1.1.2. Maximum of 1 hour between 10,000 and 12,500 ft. MSL.

6.4.1.1.3. Maximum of 30 minutes between 12,500 and 14,000 ft. MSL.

6.4.1.1.4. Total flight time above 10,000 ft. MSL shall not exceed 1 hour.

6.4.1.1.5. Supplemental oxygen must be used above 14,000 ft. MSL.

6.4.1.1.6. Should any person on the aircraft experience hypoxia symptoms, the PIC will immediately descend below 10,000 ft. MSL, land at a suitable location, and obtain medical assistance from a flight surgeon or civilian designated aviation medical examiner. The affected person shall not continue the flight unless authorized by either medical authority.

6.4.1.1.7. Aircrews required to conduct these operations must receive altitude chamber training IAW AFI 11-403, *Aerospace Physiological Training Program*.

6.4.2. **Unpressurized Aircraft.** The following restrictions apply to aircraft that are being operated unpressurized.

6.4.2.1. Oxygen must be provided for occupants when a flight exceeds 3 hours duration between 10,000 and 13,000 ft MSL.

6.4.2.2. 13,000 ft MSL shall not be exceeded with occupants on board who do not have oxygen.

6.4.2.3. FL 250 shall not be exceeded even if occupants on board have oxygen.

6.4.3. **Pressurized Aircraft.** Pilots flying pressurized aircraft maintaining a cabin altitude of 10,000 ft. or less, will:

6.4.3.1. Have an oxygen mask on if flying a single pilot aircraft above FL 350.

6.4.3.2. If flying a multi-pilot aircraft use the oxygen equipment prescribed in **Table 6.1.**

6.4.4. **Oxygen Supply.** The PIC shall ensure that sufficient oxygen is aboard the aircraft before take-off to fly the planned mission.

6.4.5. **Procedures for Loss of Cabin Pressure:**

6.4.5.1. If the aircraft loses cabin pressure, the pilot must initiate an immediate descent to the lowest practical altitude, preferably below 18,000 ft. MSL, but in no case allow cabin altitude to remain above 25,000 ft. MSL, unless occupants are wearing functional pressure suits.

6.4.5.2. If the aircraft loses pressure and any occupant lacks functioning oxygen equipment, the pilot must descend to maintain an altitude of 13,000 ft MSL or less (terrain permitting) and comply with paragraph **6.4.** above.

6.4.5.2. (AFMC) When any occupant of the aircraft lacks functional oxygen equipment, mission planning should consider recovery at a suitable airfield in the event of a loss of cabin pressurization.

6.4.5.3. Report a loss of cabin pressurization IAW AFI 91-204.

6.4.5.4. If an individual appears to be suffering decompression sickness, a crewmember should administer 100 percent oxygen to that individual using a tight fitting aviator's oxygen mask.

6.4.5.4.1. If an aviator's mask is not available, an alternate source that can provide the greatest percentage of oxygen delivery should be used.

6.4.5.4.1.1. Individuals suspected of decompression sickness should remain on 100 percent oxygen until evaluated by a flight surgeon or competent medical authority.

6.4.5.4.2. The pilot must descend as soon as practical and land at the nearest suitable installation where medical assistance can be obtained. Decompression sickness may occur up to 12 hours after mission completion. The affected person shall not continue the flight unless authorized by a flight surgeon or civilian designated aviation medical examiner.

6.4.5.5. After a cabin decompression, the risk of decompression sickness increases with prolonged exposure to altitudes at or above FL 210 (unpressurized).

Table 6.1. Oxygen Requirements for Pressurized Aircraft.

	Pilot(s)	Flight Engineer	Other Flight Deck Crew	Cabin/ Cargo Area Crew	Pax
10,000 ft through FL250	R	R	R	A	NA
Above FL250 through FL350	One I/ One R	i	R	A	A
Above FL350 through FL410 (both pilots in seat)	I	i	R	A	A
Above FL350 through FL410 (only one pilot in seat)	One O/ One A	i	R	A	A
Above FL410 through FL450	One O/ One I	I	R	A	A
Above FL450 through FL500	One O/ One I	I	I	A	A

	Pilot(s)	Flight Engineer	Other Flight Deck Crew	Cabin/ Cargo Area Crew	Pax
Above FL500 through FL 600 (pressure breathing for altitude system/get-me-down scenario)	G	G	G	G	G
Above FL500 (Sustained)	S	S	S	S	S

6.4.6. **LEGEND:**

6.4.6.1. **A - Have oxygen available.** Individuals required to have oxygen available must carry portable oxygen (such as walk-around bottles) on their person anytime they are moving about the cabin/cargo area. The requirement to have oxygen available can also be satisfied by placing sufficient portable oxygen units or extra oxygen outlets with masks throughout the cabin/cargo area so that any crewmember or passenger has quick access to oxygen regardless of where they are in the cabin/cargo area should a loss of pressurization occur.

6.4.6.2. **R - Have oxygen readily available.** Individuals required to have oxygen readily available must have a functioning system and mask located within arms reach, and the regulator must be set to 100 percent and ON (if the system contains an operator adjustable regulator).

6.4.6.3. **I - Have oxygen immediately available.** Crewmembers who are required to have oxygen immediately available must wear helmets with an oxygen mask attached to one side, or have available an approved quick-donning/sweep-on mask properly adjusted and positioned. Regulators shall be set to 100 percent and ON.

6.4.6.4. **O - Oxygen mask ON.** Regulator ON and normal.

6.4.6.5. **G - Wear a partial pressure suit.** Suit must provide 70mm Hg of assisted positive pressure breathing for altitude.

6.4.6.6. **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 and pressurization to prevent edema and embolism.

Chapter 7

VISUAL FLIGHT RULES (VFR)

7.1. General Information.

7.1.1. Air Force fixed-wing aircraft will fly under VFR when required for mission accomplishment.

7.1.1.1. The PIC will request and utilize VFR Radar Advisory Services (Flight Following) to the maximum extent practical.

7.1.2. The PIC will review the planning documents IAW paragraph **2.1.**, as appropriate to the area of operations to:

7.1.2.1. Ensure that VFR operations are authorized.

7.1.2.2. Check for any applicable restrictions.

7.1.3. If the weather prevents continued flight under VFR on the planned route, the PIC will alter the route of flight, as necessary, so as to continue operations under VFR:

7.1.3.1. To the destination.

7.1.3.2. Until obtaining an IFR clearance.

7.1.3.3. To land at a suitable location.

7.1.4. ROAs must comply with provisions of FAAO 7610.4 when operating under VFR.

7.2. Weather Requirements for Filing VFR.

7.2.1. **Fixed-Wing Aircraft.** The following requirements apply to filing VFR in fixed-wing aircraft:

7.2.1.1. The forecast weather for the planned route of flight conducted under VFR must be equal to, or greater than l,500 ft. ceiling and 3 SMs visibility.

7.2.1.2. The forecast at the destination or point of changeover on a composite flight plan (a flight conducted according to both VFR and IFR) must be valid for ±1 hour of the estimated time of arrival (ETA).

7.2.2. **Helicopters.** The forecast weather for the planned route of flight to be conducted under VFR must ensure compliance with the requirements listed in **Table 7.1.** or **Table 7.2.** as appropriate.

7.3. Flight Operations under VFR.

7.3.1. **FAA Airspace.** PICs operating under VFR in FAA airspace shall adhere to the weather minimums listed in **Table 7.1.**

7.3.2. **Non-FAA Airspace.** PICs operating under VFR in other than FAA airspace will:

7.3.2.1. Adhere to the ICAO VFR weather minimums listed in **Table 7.2.**; or

7.3.2.2. Comply with restrictions published in FLIP or FCG.

7.3.3. **Special VFR (SVFR).**

7.3.3.1. **Fixed-Wing Aircraft.** Air Force fixed-wing aircraft shall not fly under SVFR.

7.3.3.2. **Helicopters.** Helicopters may fly under SVFR with the following provisions:

7.3.3.2.1. Obtain an ATC clearance.

7.3.3.2.2. Remain clear of clouds.

7.3.3.2.3. If operating under the clear of clouds weather criterion, fly at a speed that will allow the opportunity to see any traffic or obstruction in time to avoid a collision.

Table 7.1. USAF VFR Cloud Clearance and Visibility Minimums.

ITEM	A FAA Airspace Class	B Prevailing or Flight Visibility	C Distance from Cloud
1	Class A	Not Applicable	Not Applicable
2	Class B	3 SMs	Clear of Clouds
3	Class C and Class D	3 SMs	500 ft. below, 1,000 ft. above, and 2,000 ft. horizontal
4	Class E and G Below 10,000 ft. MSL (Fixed-wing)	3 SMs	500 ft. below, 1,000 ft. above, and 2,000 ft. horizontal
5	Class E and G At or above 10,000 ft. MSL (Fixed-wing)	5 SMs	1,000 ft. below, 1,000 ft. above, and 1 SM horizontal
6	Class E Below 10,000 ft. MSL (Helicopter)	3 SMs	500 ft. below, 1,000 ft. above, and 2,000 ft. horizontal
7	Class E At or above 10,000 ft. MSL (Helicopter)	5 SMs	1,000 ft. below, 1,000 ft. above, and 1 SM horizontal
8	Class G Below 1,200 ft. AGL (Helicopter)	Day: 1/2 SM Night: 1 SM	Clear of clouds if operated at a speed that allows the pilot adequate opportunity to see any air traffic or obstructions in time to avoid a collision.
9	Class G Above 1,200 ft. AGL and Below 10,000 ft. MSL (Helicopter)	Day: 1 SM Night: 3 SMs	500 ft. below, 1,000 ft. above, and 2,000 ft. horizontal
10	Class G Above 10,000 ft. MSL (Helicopter)	5 SMs	1,000 ft. below, 1,000 ft. above, and 1 SM horizontal

Table 7.2. ICAO VFR Cloud Clearance and Visibility Minimums.

ITEM	A ICAO Airspace Class	B Flight Visibility	C Distance from Cloud
1	Class A	Not Applicable	Not Applicable
2	Class B	8 KMs above 10,000 ft. MSL. 5 KMs below 10,000 ft. MSL	Clear of clouds
3	Class C, D, and E	Same as Class B.	1,500 m. horizontal 300 m (1,000 ft.) vertical
4	Class F and G Above 900 (3,000 ft.) MSL or above 300m (1,000 ft.) above terrain, whichever is higher. (Fixed-wing)	Same as Class B.	Same as Class C, D, and E.
5	Class F and G At and below 900 m (3,000 ft.) or 300 m (1,000 ft.) above terrain whichever is higher. (Fixed-wing)	5 KMs	Same as Class C, D, and E.
6	Class F Above 900 m (3,000 ft.) or 300 m (1,000 ft.) above terrain whichever is higher. (Helicopter)	8 KMs above 10,000 ft. MSL. 5 KMs below 10,000 ft. MSL	1,500 m. horizontal 300 m (1,000 ft.) vertical.
7	Class F and G At and below 900 m (3,000 ft.) or 300 m (1,000 ft.) above terrain whichever is higher. (Helicopter)	5 KMs (See NOTE).	Clear of cloud and in sight of the surface.
8	Class G Above 900 m (3,000 ft.) or 300 m (1,000 ft.) above terrain whichever is higher. (Helicopter)	8 KMs above 10,000 ft. MSL. 5 KMs below 10,000 ft. MSL	1,500 m. horizontal 300 m (1,000 ft.) vertical

NOTE: Helicopters may be permitted by ATC to operate in lower visibility conditions if maneuvered at a speed that will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision.

Chapter 8

INSTRUMENT FLIGHT RULES (IFR)

8.1. IFR Requirements. Air Force fixed-wing aircraft will fly under Instrument Flight Rules (IFR) to the maximum extent possible without unacceptable mission degradation.

8.1. (AFMC) IFR Requirements. Accomplish depot and flight test flights during day VMC to the greatest extent possible. Refer to AFI 11-2FT Vol 3 for more specific weather requirements.

8.1.1. **Category II/III.** Pilots shall not fly Category II or III approaches unless the appropriate crewmembers and the aircraft are properly certified.

8.1.1.1. MAJCOMs will certify their aircrews and aircraft IAW appropriate civil standards.

8.1.1.1. (AFMC) Cat II and Cat III operations in IMC below Cat I minimums are restricted to approved test plans only. Certification will be handled on a case-by-case basis. Submit requests to HQ AFMC/DOV.

8.1.2. **IFR Required.**

8.1.2.1. **Pilots must fly under IFR if:**

8.1.2.1.1. Weather conditions do not permit flight according to VFR.

8.1.2.1.2. Operating in Class A airspace.

8.1.2.1.3. Operating a fixed-wing aircraft within federal airways. Do not consider crossing airways as "within" airways.

8.1.2.1.4. Operating a fixed-wing aircraft at night, unless the mission cannot be conducted under IFR.

8.1.2.2. **Practice Instrument Approaches Under VFR.** MAJCOM approval is required to practice instrument approaches under VFR. In addition to MAJCOM approval, the following restrictions apply:

8.1.2.2. (AFMC) AFMC crews are authorized to conduct practice instrument approaches under VFR.

8.1.2.2.1. VFR cloud clearances and visibilities (see **Chapter 7**) must be maintained.

8.1.2.2.2. Terminal radar service must be available and used.

8.1.2.2.3. Pilots must request authorization from ATC to fly the published missed approach.

8.1.3. (Added-AFMC) Military Authority Assumes Responsibility for Separation of Aircraft (MARSA). The unit DFO is authorized to develop agreements for special IFR operations according to the MARSA concept. See FAA Handbook 7610.4, Special Military Operations, and FLIP for further guidance.

8.2. ATC Clearance. Pilots must obtain an ATC clearance before commencing any IFR flight that originates in or penetrates controlled airspace.

8.3. Destination Requirements for Filing Purposes.

8.3.1. **Destination with a Published Approach.** Pilots may file IFR to a destination with a published instrument approach capable of being flown with navigational equipment aboard the aircraft.

8.3.1.1. **Published Approach Definition.** A published approach is defined as:

8.3.1.1.1. Any DoD/National Imagery and Mapping Agency (NIMA) or NACO FLIP procedure.

8.3.1.1.2. A local use procedure developed according to AFI 11-230, *Instrument Procedures,* and approved by the host MAJCOM.

8.3.1.1.3. A published radar approach. For pilots to fly a published radar approach or instrument approach procedure that requires radar to define a fix essential for flying the approach, a non-radar facility must provide a positive aircraft position within 25 NMs of the airfield. Pilots operating in Class A airspace may file to the nearest nonradar facility or fix (regardless of distance from the terminal) and request radar vector service to the terminal.

8.3.1.1.4. Any product not published by DoD/NIMA or the FAA (NACO), but approved by the MAJCOM, for which an operational requirement exists. Before the MAJCOM grants approval, the appropriate MAJCOM TERPs office must review the product IAW AFI 11-230. A TERPS review is not required when the instrument procedure falls within the criteria of Special Accredited Host Nation/Airport and when the aircrew is using the host government sanctioned FLIP product. Commercially produced products (e.g., Jeppesen, etc.), regardless of host country accreditation status, shall undergo a comparison review by the appropriate MAJCOM TERPS office. When required, the review may be waived using the process described in paragraph **8.3.1.2.** of this instruction. The reviewing MAJCOM TERPS office shall inform crews when a procedure does not meet recognized obstruction clearance and/or if any flight inspection anomalies exist.

8.3.1.1.4. (AFMC) Approval of Non-DoD/NOAA and Local Use Procedures. Instrument procedures not published in either DoD or NOAA FLIP require a formal TERPS review, followed by AFMC/DO approval. The single point of contact for all requests is the AFMC TERPS office (HQ AFMC/DOO, DSN 986-0060 commercial (937) 656-0060, fax 986-1246 commercial (937) 656-1246). Submit requirements directly to the TERPS office (HQ AFMC/DOO) immediately upon mission notification. Minimum 15 days advance notice is desired. Instrument procedures are approved for specific missions, not blanket use. PICs will comply with restrictions and recommendations contained in the TERPS evaluation. Approval request must include airfield name/ICAO, desired procedure(s), copy of approach plate (or Jeppesen page number), mission date, POC and phone number.

8.3.1.1.4.1. Aircrew shall follow MAJCOM guidance to ensure that such a review has been conducted by their MAJCOM and is current.

8.3.1.1.4.2. MAJCOMs must ensure crews receive adequate training prior to the initial use of Non-DoD/NIMA or NACO approach procedures.

8.3.1.2. **Waiver of TERPS Review.** The TERPS review required under paragraph **8.3.1.1.** may be waived under the following provisions:

8.3.1.2.1. This waiver applies to non-standard operations, defined as: an urgent requirement to fly short notice, humanitarian, contingency, medical evacuation, "Special" Access and urgent State Department missions.

8.3.1.2.2. The applicable MAJCOM/DO, if an 0-8 or above, may waive the TERPS review. If the DOs grade is below 0-8, then waiver authority will lie with the first O-8 in the MAJCOM operational chain of command. This waiver authority will not be further delegated.

8.3.1.2.3. If the waiver authority is exercised, MAJCOMs will ensure the aircrew and the applicable TERPS office are aware the provisions of paragraph **8.3.1.1.** have been waived.

8.3.1.3. Special Accredited Nations/Airports are those locations where the USAF has placed a very high degree of confidence in host nation instrument procedure development/publication practices. These development and publication practices are equal to those of the FAA/DoD as determined through a thorough review of approach design criteria. Final approval of host nations/airports status rests with HQ AFFSA/CC.

8.3.1.3.1. Any commercial product based on a special accredited host nation/airport procedure is subject to a TERPs review IAW AFI 11-230.

8.3.2. **Destination Without a Published Instrument Approach.** If there is no published approach at the destination capable of being flown with the navigational equipment aboard the aircraft, pilots may file IFR to a point en route (where forecast weather is VMC at the time of arrival) or to a point served by a published approach procedure (where the pilot can make a descent to VMC conditions) and then continue under VFR to the destination.

8.3.3. **Weather.** The following are the weather requirements for filing to a destination:

8.3.3.1. **Fixed-Wing Aircraft.** Weather for the ETA (±1 hour) at destination or recovery base must be at or above the lowest minimum published for an approach suitable for the aircraft concerned.

8.3.3.1.1. MAJCOMs may waive this requirement when operational necessity dictates the use of a destination forecast to be below minimums, but MAJCOMs must establish alternate recovery procedures, such as the use of two or more alternate airports, additional holding fuel, etc.

8.3.3.1.2. For a straight-in or sidestep approach, the forecast weather must meet only the published visibility requirements for that approach.

8.3.3.1.3. For a circling approach, the forecast weather must meet both the ceiling and prevailing visibility requirements.

8.3.3.2. **Helicopters.** Helicopter pilots shall adhere to the same weather requirements as fixed-wing aircraft with the following exceptions:

8.3.3.2.1. Helicopter pilots planning a fixed-wing approach procedure may use the Category A MDA or DH, regardless of airspeed flown. The required visibility minimum may be reduced to one-half of the published visibility minimums for Category A aircraft, but in no case may the minimums be reduced to less than 1/4 SM or 1200 ft. Runway Visual Range (RVR).

8.3.3.2.2. Helicopter pilots must use the published visibility minimums for "Copter Only" approaches as published.

8.3.3.3. **ROA Weather Requirements.** MAJCOMs will determine ROA weather limit requirements based on aircraft equipage, level of autonomy and crew capabilities.

8.3.3.3. (AFMC) Refer to AFI 11-2FT Vol 3 for specific ROA weather requirements.

8.3.3.4. **Temporary (TEMPO) Conditions.** Pilots may file to a destination whose forecast includes temporary (TEMPO) changes in ceiling and/or visibility that are lower than prescribed in **8.3.3.1.** and **8.3.3.2.**, but an alternate may be required (see paragraphs **8.4.** and **8.5.**).

8.4. When an Alternate is Required. This section prescribes when an alternate must be filed.

8.4.1. **Weather.** An alternate is required when the worst weather (Tempo or prevailing) at the ETA (±1 hour) for the first point of intended landing (or each point of intended landing on a stopover flight plan), is less than:

8.4.1.1. **Fixed-Wing Aircraft.**

8.4.1.1.1. A ceiling of 3,000 ft. or

8.4.1.1.2. A visibility of 3 SMs or 2 SMs above the lowest compatible published landing minimum visibility, whichever is greater (see **Figure 8.1.**).

8.4.1.2. **Helicopters.** Designate an alternate if, for the ETA (±1 hour) for the first point of intended landing (or each point of intended landing on a stopover flight plan), the worst weather (TEMPO or prevailing) is forecast to be less than:

8.4.1.2.1. A ceiling of 700 ft, or

8.4.1.2.2. A visibility of 1 SM (see **Figure 8.2.**).

8.4.2. **Additional Items Requiring an Alternate.**

8.4.2.1. Regardless of weather, pilots must designate an alternate airport on all IFR flight plans when filing to a destination where:

8.4.2.1.1. All compatible approaches require radar.

8.4.2.1.2. GPS is the only available NAVAID.

8.4.2.1.3. Required NAVAIDs are unmonitored.

8.4.2.1.4. When the destination has no weather reporting capability.

8.4.3. **Exception for Remote or Island Destinations.** MAJCOMs may authorize holding for a specified time in lieu of an alternate for those remote or island destinations for which designating an alternate is not possible.

8.4.3. (AFMC) A remote or island destination is defined as any aerodrome, which, due to its unique geographic location, offers no suitable alternate (civil or military) within 2 hours flying time.

8.4.3.1. MAJCOMs that authorize holding at a remote or island destination will prescribe weather criteria and recovery procedures.

8.4.3.1. (AFMC) Aircraft may hold at a remote or island destination, instead of designating an alternate airport, if all of the following conditions are met. There must be enough fuel on board, in addition to required reserves, to hold for at least 1 hour after arriving at the initial approach fix. From 1 hour before until 2 hours after estimated time of arrival, the worst weather is forecast to be at or above that required for an airport to qualify as an alternate. The forecast crosswind component corrected for runway condition reading (RCR) is within the recommended zone of the aircraft's landing crosswind chart.

8.4.3.2. For ROA operations MAJCOMs may authorize remote or island destination criteria or holding for a specified time in lieu of designating an alternate.

8.4.3.2. (AFMC) Holding (instead of an alternate airport) is authorized for ROA operations. Fuel and weather requirements are the same as **paragraph 8.4.3.1.**

Figure 8.1. USAF Fixed-Wing Weather (WX) Requirements.

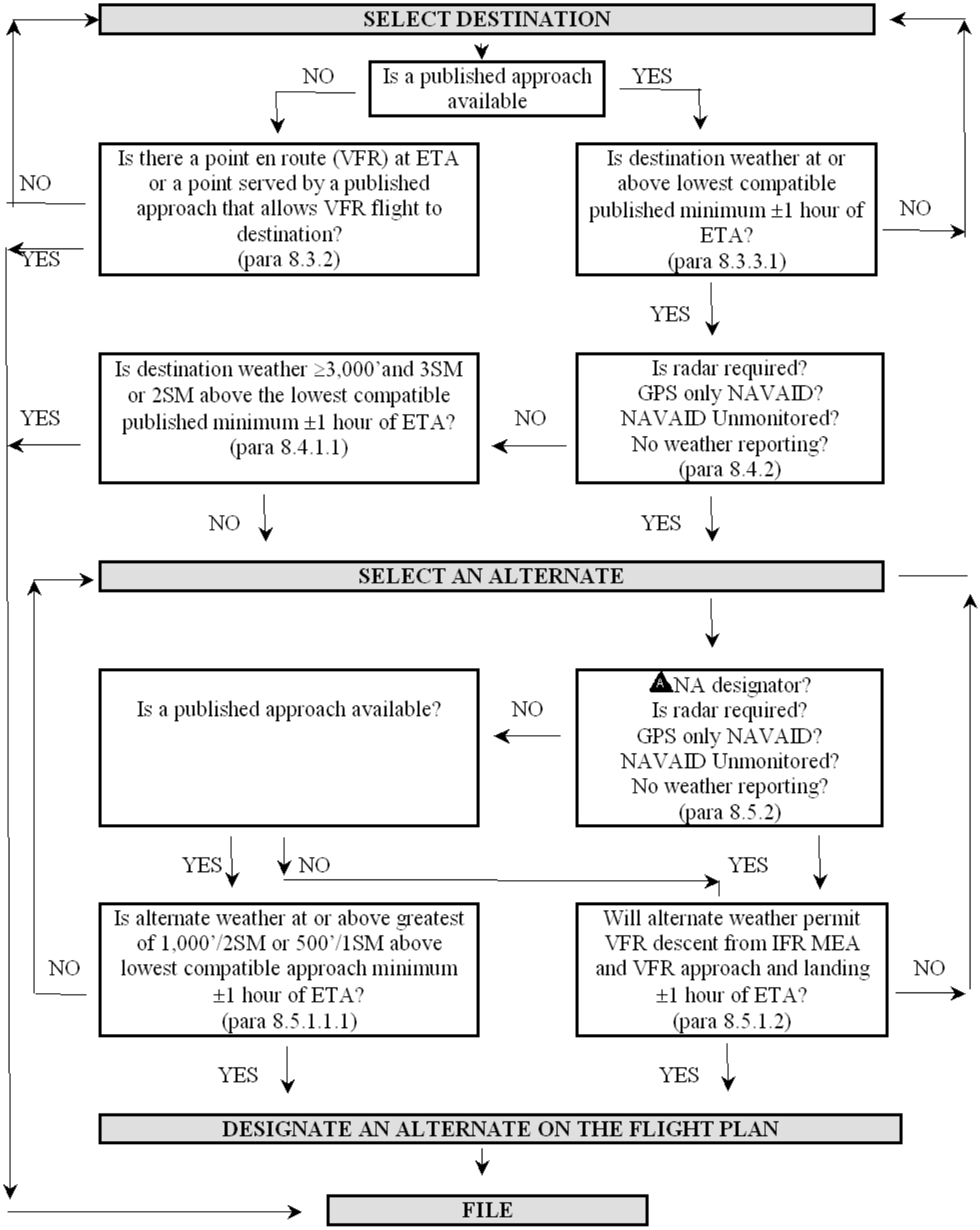
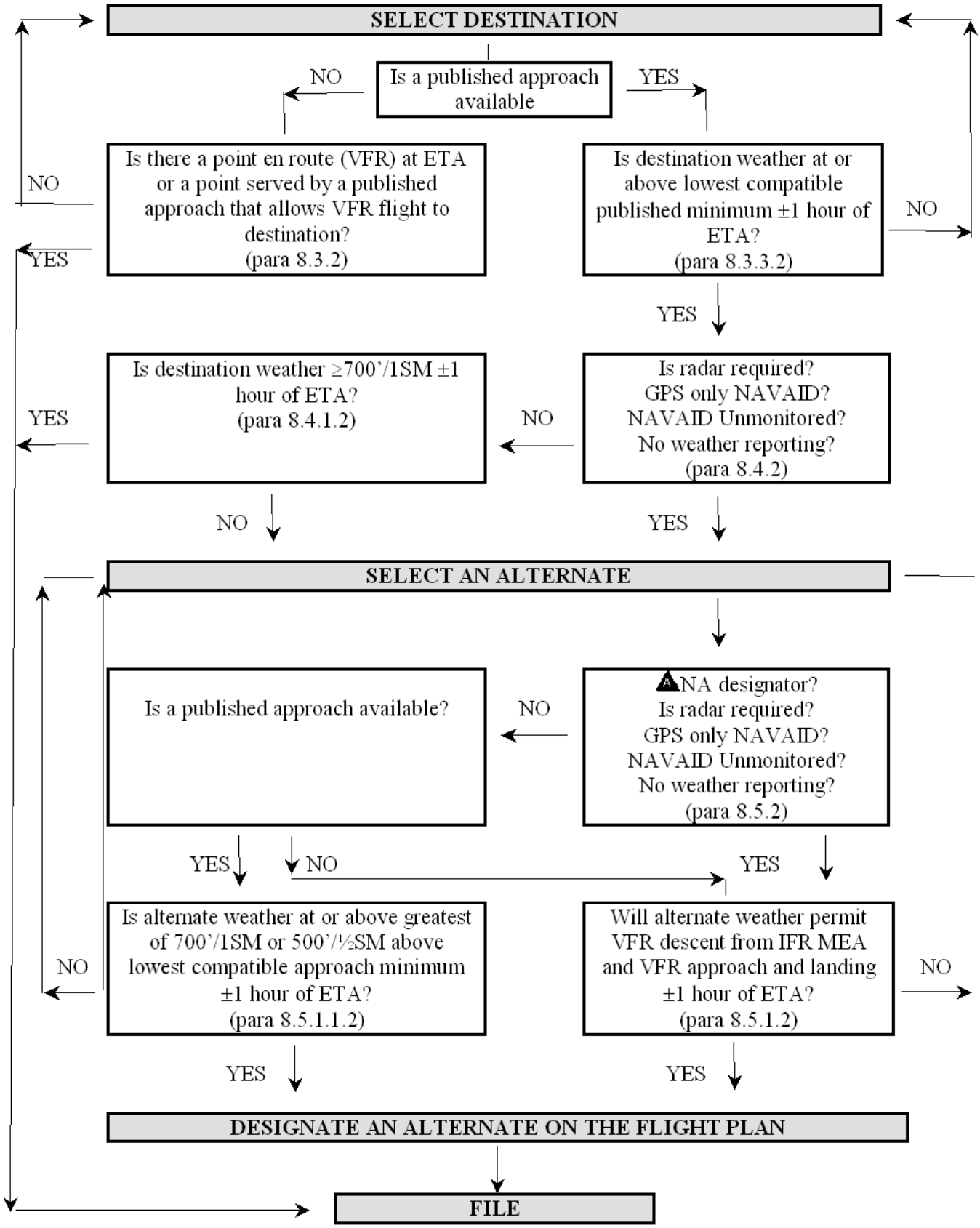


Figure 8.2. USAF Helicopter Weather (WX) Requirements.



8.5. Selecting an Alternate.

8.5.1. **Weather.** For an airport to qualify as an alternate, the worst weather (TEMPO or prevailing) for the ETA (±1 hour) at the alternate airport must be forecast to be at or above the following:

8.5.1.1. **With a Published Instrument Approach Procedure:**

8.5.1.1.1. **Fixed-Wing Aircraft.** A ceiling of at least 1,000 ft. or 500 ft. above the lowest compatible published landing minimum, whichever is higher, and a visibility of 2 SMs or 1 SM above the lowest compatible published landing minimum, whichever is higher (see **Figure 8.1.**).

8.5.1.1.2. **Helicopters.** A ceiling of at least 700 ft. or 500 ft. above the lowest compatible published landing minimum, whichever is higher, and a visibility of 1 SM or 1/2 SM above the lowest compatible published landing minimum, whichever is higher (see **Figure 8.2.**).

8.5.1.2. **Without a Published Instrument Approach Procedure.** Forecast weather for the ETA (±1 hour) must permit a VFR descent from the IFR en route altitude to a VFR approach and landing.

8.5.1.3. **Exception for Temporary Conditions.** Pilots may select an airport as an alternate that includes a temporary condition in the forecast below that required in paragraphs **8.5.1.1.** and **8.5.1.2.** if the temporary condition is due to a thunderstorm or rain/snow shower. In all cases, the forecast for the prevailing weather conditions must meet or exceed the requirements of paragraphs **8.5.1.1.** and **8.5.1.2.**

8.5.2. **Airports that do not Qualify as Alternates.** Except IAW paragraph **8.5.1.2.** above airports do not qualify as alternates if:

8.5.2.1. All compatible approaches require radar.

8.5.2.2. GPS is the only available NAVAID.

8.5.2.3. Required NAVAIDs are unmonitored.

8.5.2.4. There is no weather reporting capability.

8.5.2.5. ▲ NA is displayed on the approach plate. The ▲ NA designation means either NAVAIDS are unmonitored or there is no weather reporting capability.

NOTE: The FLIP ▲ designation (without **NA**) signifies that non-standard alternate minimums are published for that runway. Non-standards alternate minimums do not apply to USAF aircraft

8.6. Takeoff Minimums. Pilots shall not takeoff when the existing weather is below the landing minimums for the specific aircraft unless specifically authorized by the applicable MAJCOM. RVR reports (feet or equivalent meter value), when given for a particular runway, apply to all takeoffs and landings on, and approaches to, the runway.

8.6. (AFMC) Takeoff Minimums. Command takeoff alternate requirements for tanker/transport/bomber aircraft are listed in **Table 8.1. (Added)** For fighter/trainer/ROA aircraft, the DFO may authorize takeoff for operational requirements when existing weather is below landing minimums if the visibility is at least 1,600 feet runway visual range (RVR) or 1/4-mile and a suitable alternate is located within 30 minutes flying time. The reported and forecast weather at the alternate must meet that required for an air-

port to qualify as an alternate, and the forecast crosswind component corrected for RCR must be within the recommended zone of the aircraft's landing crosswind chart.

Table 8.1. (Added-AFMC) Departure Minimums and Alternate Requirements for Tanker/ Transport/Bomber Aircraft.

If departure weather is:	A departure alternate is:
At or above authorized ceiling and visibility landing minimums.	Not required.
Below either authorized ceiling or visibility minimums but RVR is 1600 or greater (visibility ¼ mile or greater) **-OR-** Below either authorized ceiling or visibility minimums but RVR is 1200 or greater at the approach end and 1000 or greater at the departure end and runway centerline lights operational. (See Note 3)	Required. (See Notes 1 and 2)

NOTES:

1. Alternate must be located within 30 minutes flight time with weather reported and forecast at or above approach minimums or 200- ½ (RVR 2400), whichever is higher, for 1 hour after takeoff.
   -OR-
   Alternate must be located within 2 hours flight time with weather forecast to be at least 500-1 above approach minimums but no lower than 700-2 for a precision approach or 800-2 for a non-precision approach for ETA at the alternate +/– one hour.
2. Aircraft must be able to maintain minimum enroute altitude to the alternate if an engine fails.
3. Must have centerline lighting and dual RVR display slave readouts for both approach and departure ends of the runway. For runways with triple RVR readouts, the pilot may use any two consecutive readouts to determine if the runway is usable for departure (aircraft performance permitting). For example, approach end RVR=800, midfield RVR=1700, departure end RVR=1000. If aircraft performance and runway length will permit taking off at midfield, this runway is usable for takeoff.

8.6.1. **RVR Requirements.** For weather requirements of 1600 RVR or greater, touchdown RVR will be used to determine visibility requirements. For weather requirements of below 1600 RVR to 1000 RVR, touchdown RVR must be at least 1200 and rollout RVR must be at least 1000. For weather requirements of below 1000 RVR to 600 RVR touchdown RVR must be at least 700, mid RVR (if installed) must be at least 700 and rollout RVR must be at least 600.

8.6.1.1. (N/A for Helicopter) Minima below 1600 RVR are not authorized unless the runways are equipped with centerline lights and two operative transmissometers.

NOTE: Where only two transmissometers are installed, the touchdown and rollout RVR minimums must be met. If three transmissometers are installed, the failure of any one transmissometer will not affect operations provided the remaining two RVR values are at or above appropriate minima stated above.

8.6.2. MAJCOMs that permit takeoffs when the weather is lower than the published landing minimums shall prescribe alternative take off minima and substitute recovery procedures.

8.6.3. Civil contract carriers can operate from airports under Air Force jurisdiction using the takeoff minimums approved by the FAA and published in the air carrier's operations specifications.

8.7. IFR Departures. Aircrew must adhere to IFR departure procedures guidance published in Chapter 9 of AFMAN 11-217, Volume 1, *Instrument Flight Procedures***.**

8.7.1. **Authorized IFR Departure Methods.**

8.7.1.1. There are five authorized methods of departing IFR:

8.7.1.1.1. IFR DPs

8.7.1.1.2. Standard Instrument Departure (SIDs) Procedures

8.7.1.1.3. Specific ATC Departure Instructions (includes radar vectors)

8.7.1.1.4. Diverse Departures

8.7.1.1.5. Special Departure Procedures (SDPs) (for emergency use only)

NOTE: This does not restrict aircraft already airborne from departing IFR via the published missed approach procedure for the instrument approach being flown. (See paragraph **8.13.5.**)

8.7.1.2. **No Authorized IFR Departure Method.** If the airport does not have one of the authorized IFR departure methods described in paragraph **8.7.1.1.1.** through **8.7.1.1.4.**, then an IMC departure under IFR is not authorized. In this situation, to depart the airfield under IFR the weather at takeoff must permit a VMC departure to a minimum safe IFR altitude as described in paragraph **8.8.** The requirements of paragraph **5.10.** and **Table 7.1.**/**Table 7.2.** also apply.

8.7.1.3. **Approved Instrument Departure Procedures.** An approved instrument departure procedure is defined as:

8.7.1.3.1. Any DoD/NIMA or FAA (NACO) FLIP procedure.

8.7.1.3.2. Any product not published by DoD/NIMA or the FAA (NACO), but approved by the MAJCOM, for which an operational requirement exists. Before the MAJCOM grants approval, the appropriate MAJCOM TERPs office must review the product IAW AFI 11-230. A TERPS review is not required when the instrument procedure falls within the criteria of Special Accredited Host Nation/Airport and when the aircrew is using the host government sanctioned FLIP product. Commercially produced products (e.g., Jeppesen, etc.), regardless of host country accreditation status, shall undergo a comparison review by the appropriate MAJCOM TERPS office. When required, the review may be waived using the process described in paragraph **8.3.1.2.** of this instruction. The reviewing MAJCOM TERPS office shall inform crews when a procedure does not meet recognized obstruction clearance and/or if any flight inspection anomalies exist.

8.7.1.4. **Non-Standard Takeoff Minimums.** Pilots may not depart an airfield using non-standard takeoff minimums in lieu of meeting the required climb gradient. When non-standard takeoff minima are published, with or without a climb gradient, the PIC may not take-off under the provisions of IFR established in paragraph **8.6.** unless:

8.7.1.4.1. The departure procedure authorizes "**standard**" takeoff minimums with a climb gradient in lieu of the non-standard criteria and the requirements of paragraph **8.7.2.** below are met, or

8.7.1.4.2. With one engine inoperative (OEI) the aircraft must be capable of being at or above the published non-standard takeoff minima ceiling requirement prior to crossing the departure end of the runway and continue a climb profile that will vertically clear all obstacles. All engine operating climb gradient must still be calculated to ensure compliance with paragraph **8.7.2.1.**

8.7.2. **Required Climb Gradient.**

8.7.2.1. **Single Engine or Multi-Engine Aircraft with All Engines Operating.** The PIC will ensure the aircraft meets or exceeds the published climb gradient for the departure method being used all engines operating (AEO). When no climb gradient is published, the aircraft must be able to climb at 200 feet per nautical mile (3.3%) or greater.

8.7.2.2. **Multi-Engine Aircraft with One Engine Inoperative.**

8.7.2.2.1. PICs of multi-engine aircraft must ensure the aircraft can vertically clear all obstacles along the planned departure route during all segments of the climb profile with one engine inoperative. MAJCOMs must ensure aircrew and supervisors consider the following before using this procedure:

8.7.2.2.1.1. Mission type and priority.

8.7.2.2.1.2. Performance degradation and aircraft maneuverability during turning departures.

8.7.2.2.1.3. Type and amount of obstacles and terrain, accuracy and availability of obstacle/terrain data, and the crew's familiarity with the departure airfield.

8.7.2.2.1.4. Requirement and capability to immediately reduce aircraft weight (i.e., jettison of external stores).

8.7.2.2.2. **Special Departure Procedures.** Where available, SDPs should be used for OEI departure planning.

8.7.2.2.2. (AFMC) Units wishing to develop SDPs must coordinate through AFMC/DOV via an AFMC Form 73 for AFFSA approval.

8.7.2.2.2.1. MAJCOMs will ensure that aircrews are qualified prior to using SDPs for applicable MDS aircraft.

8.7.2.2.2.1. (AFMC) Refer to AFI 11-2FT Vol 1 for guidance on SDP training and documentation.

8.7.2.2.2.2. All engine climb gradient must still be calculated to ensure compliance IAW paragraph **8.7.2.1.**

8.7.2.2.2.3. SDP routings that differ from SID/DP routings shall only be flown in emergency situations.

8.7.3. **MAJCOM Responsibility.** MAJCOMs or COMAFFOR will ensure aircraft are tasked to takeoff at a weight that allows the aircraft to meet or exceed the appropriate climb gradient or comply with paragraph **8.7.2.2.**

8.7.4. **PIC Responsibility.** The PIC will ensure the planned departure method and route is briefed to the crew prior to takeoff, including procedures in the event of an emergency. If an SDP is available

and used, the PIC will ensure the aircrew possesses the most current procedure and briefs the procedure prior to take off.

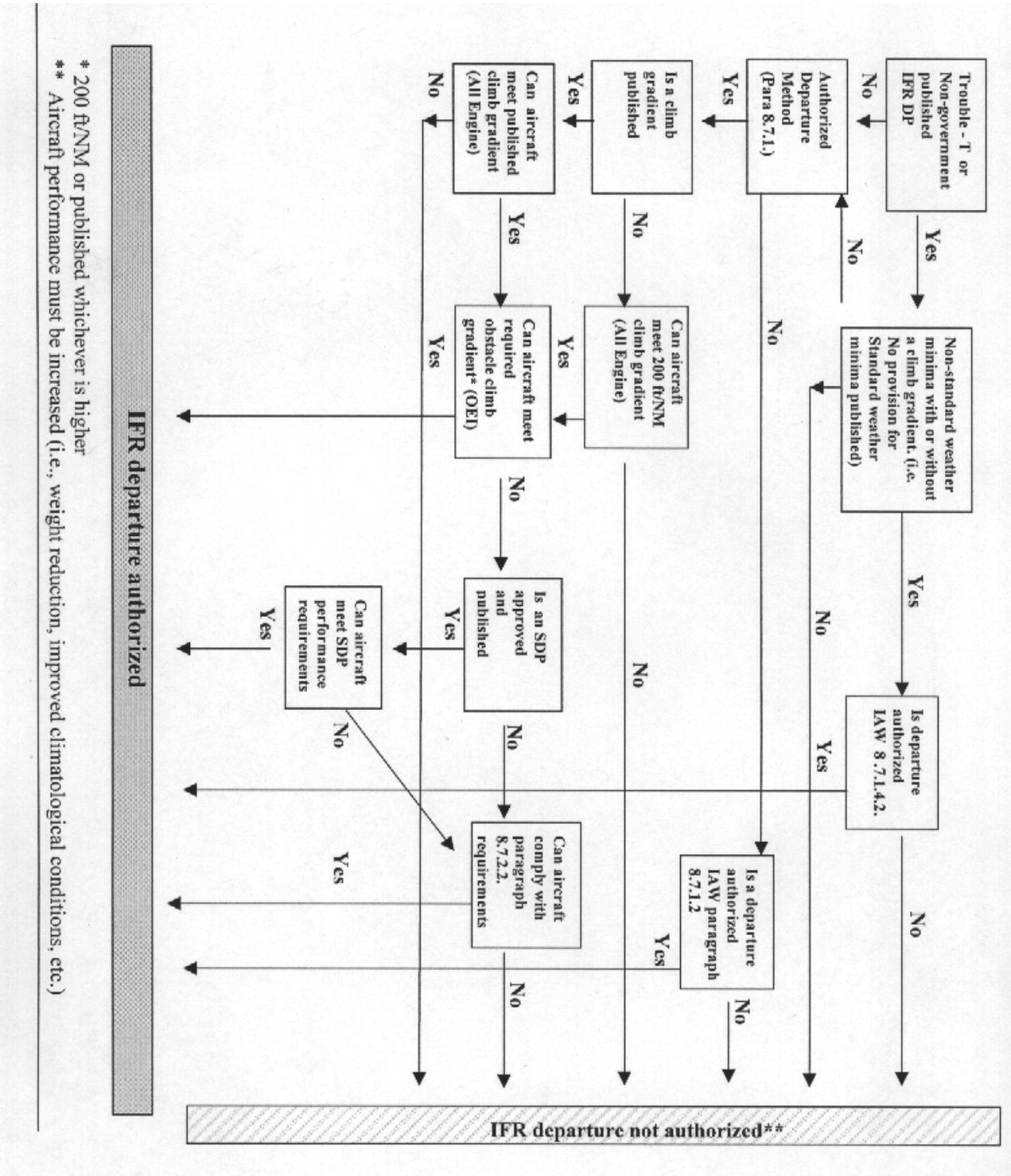
8.7.5. **Published Instrument Departure Procedures.** Unless otherwise cleared by ATC, pilots will fly the published instrument departure procedure for the runway used.

8.7.6. **Radar Vectors.** Pilots are responsible for terrain and obstacle clearance until a radar vector is issued by ATC. When directed to climb, by ATC, the pilot is expected to maintain a minimum climb gradient of 200 ft/NM unless a higher gradient is published or directed by ATC. Immediately inform ATC if unable to meet an ATC climb gradient.

NOTE: Pilots are never relieved of the responsibility for terrain clearance. The use of the term "Radar Contact" by a controller means the aircraft has been identified on radar, but does not mean that terrain and obstruction clearance responsibility has transferred to the controller. When a vector is issued, responsibility for terrain and obstruction clearance is shared between pilot and controller.

NOTE: Many countries/facilities are not capable of adequately providing radar vectors and safe minimum vectoring altitudes. Caution should be exercised when flying radar vectors outside US domestic airspace.

Figure 8.3. IFR Departure Planning Chart.



8.8. Minimum Altitudes. This section is not applicable to climbs and descents required for takeoff and landing, or practice approaches.

8.8.1. **On Airways.** Pilots shall not fly lower than the MEA or Minimum Obstacle Clearance Altitude (MOCA) published for the airway.

8.8.1.1. Pilots using the MOCA shall ensure that the altitude selected will provide suitable navigation facility and ATC radio communication reception.

8.8.2. **Off Airways.**

8.8.2.1. Pilots shall fly no lower than:

8.8.2.1.1. The Off Route Obstacle Clearance Altitude (OROCA).

8.8.2.1.2. The Off Route Terrain Clearance Altitude (ORTCA).

8.8.2.1.3. An altitude that provides at least 1,000 ft. of clearance above all obstacles within 5 nautical miles of the course to be flown in non-mountainous terrain or 2,000 ft. in mountainous terrain. Mountainous terrain is designated by FAR 95.11.

8.8.2.1.3.1. When operating outside US domestic airspace any terrain above 3,000 ft. will be considered mountainous terrain.

8.8.2.1.4. Descent below applicable IFR minimum altitudes, listed above, is only authorized under the following conditions:

8.8.2.1.4.1. An ATC provided minimum radar vectoring altitude is available from a suitably equipped and capable radar facility. For areas of responsibility outside US domestic airspace, MAJCOMs will determine which radar facilities are suitably equipped and capable.

NOTE: Many countries/facilities are not capable of adequately providing radar vectors and safe minimum vectoring altitudes. Caution should be exercised when flying radar vectors outside US domestic airspace.

8.8.2.1.4.2. In no case will the minimum altitude be below 1000 ft. AGL.

8.8.2.1.4.3. If there is any doubt as to whether the ATC provided minimum vectoring altitude is providing adequate obstacle clearance (radar outages, communication difficulties, etc) pilots should not descend below the non-radar minimum altitudes listed above.

8.8.2.2. Pilots using the OROCA or ORTCA shall ensure that the altitude selected will provide suitable navigation facility and ATC radio communication reception.

8.8.3. Descent below the minimum altitudes in paragraph **8.8.2.**, is only permitted when:

8.8.3.1. Operating in the NAS, and given an ATC clearance to the minimum vectoring altitude, or

8.8.3.2. Cloud clearance and visibility, IAW **Table 7.1./Table 7.2.** or MAJCOM direction, allow the PIC to maintain safe clearance from surrounding terrain and obstacles, or

8.8.3.3. When an approved and operational terrain following radar is used to enter an MTR.

8.8.4. **MTRs.** Pilots operating on MTRs shall adhere to the minimum altitudes published in FLIP AP.

8.9. IFR Cruising Altitudes.

8.9.1. Pilots should file requested altitudes for IFR flights in controlled airspace according to the cruising altitude diagram depicted on the appropriate en route chart.

8.9.2. Pilots operating in uncontrolled airspace shall maintain altitude IAW the diagrams published on the appropriate en route chart.

8.10. IFR En route Navigation. Pilots shall fly along the centerline of the direct course between NAVAIDS or fixes defining a published or unpublished route when, operating in controlled airspace under IFR unless:

8.10.1. Authorized by the controlling agency.

8.10.2. Operating in SUA or on MTRs.

8.11. In-Flight Communications.

8.11.1. **Position Reports.** A pilot operating under IFR will continuously monitor appropriate ATC frequencies and follow FIH instructions for position reports, lost communications, and radio procedures.

8.11.2. **Navigation and Communication Equipment Malfunctions.** When operating in controlled airspace under IFR, the PIC will immediately report to ATC the loss or impairment of navigational or air-to-ground communications capability according to instructions in the FIH.

8.12. Cancellation of IFR Clearance.

8.12.1. **Cancellation.** Pilots shall ensure compliance with **Chapter 7** and paragraph **8.1.** of this instruction before canceling IFR.

8.12.1.1. Pilots who cancel IFR shall ensure that a VFR flight plan is in effect for the remainder of the flight to ensure flight following. If operating at overseas locations where a VFR flight plan cannot be filed the PIC will ensure that flight following is available via alternate means.

8.12.1.2. Paragraph **8.12.1.1.** does not apply if in radio contact with the destination tower.

8.13. Approach and Landing.

8.13.1. **Prior to Descent or Approach.** Pilots shall not begin an en route descent or published approach if the weather required for the approach is below the required minimums.

8.13.1.1. **Straight-In or Sidestep Approach.** Weather must only be at or above the published visibility minimums.

8.13.1.2. **Circling Approach.** Weather must be at or above both the published ceiling and visibility minimums.

8.13.1.3. **Helicopter Minima.** Helicopter pilots using a fixed-wing approach procedure may use the Category A minima regardless of airspeed flown. The required visibility minimum may be reduced to one-half of the published visibility minimums for Category A aircraft, but in no case may the minimums be reduced to less than 1/4 SM or 1,200 ft. RVR. Helicopter pilots must use the visibility minimums for "Copter Only" approaches as published.

8.13.1.4. **ROA Minima.** MAJCOMs shall determine suitable weather minima based on aircraft equipage, level of autonomy, and crew abilities.

8.13.1.4. (AFMC) Refer to AFI 11-2FT Vol 3 for specific ROA weather requirements

8.13.1.5. **Precision Runway Monitoring (PRM) Approach.** Prior to authorizing PRM approaches, MAJCOMs must ensure that crews are qualified and aircraft are appropriately equipped.

8.13.1.5. (AFMC) PRM approaches are authorized for AFMC aircraft provided the aircraft is equipped with appropriate IFR equipment to include dual VHF radios, and aircrew training is accomplished and documented IAW AFI 11-2FT Vol 1.

8.13.1.5.1. TCAS II equipped aircraft will fly the Instrument Landing System (ILS) PRM approach with TCAS set to the TA/RA mode.

8.13.1.5.2. If an ATC breakout and a TCAS RA are received simultaneously, or shortly after one another, the pilot will respond to both the turns required in the breakout instructions and the vertical correction required by the TCAS system.

8.13.1.6. **Temperature Correction.** For all flight operations, temperature corrections to the published altitudes shall be applied IAW the chart provided in the FIH to ensure adequate obstacle clearance. The values derived from the FIH temperature correction chart shall be:

8.13.1.6.1. Added to the published DH or MDA and step down fix altitudes in the final approach segment whenever the outside air temperature is 32°F/0°C or below.

8.13.1.6.2. Added to all altitudes in the procedure:

8.13.1.6.2.1. In designated mountainous regions (FAR 95.11) whenever the outside air temperature is 32°F/0°C or below; or

8.13.1.6.2.2. When the outside air temperature is –30°C or below; or

8.13.1.6.2.3. Whenever the procedure turn, intermediate approach altitude Height Above Aerodrome (HAA)/Height Above Threshold (HAT) are 3,000 ft. or more above the altimeter setting source.

8.13.1.6.3. Advise ATC whenever a temperature correction of greater than 80 ft. is applied to any altitude.

8.13.2. **After Beginning Descent or Approach.** If a pilot has begun the en route descent or published approach and subsequently determines the weather is below minimums (visibility for straight-in approaches or either ceiling or visibility for circling approaches), the pilot must not deviate from the last ATC clearance until obtaining a new or amended clearance. The pilot may elect to:

8.13.2.1. Request clearance to a holding fix or alternate airport as applicable.

8.13.2.2. When authorized by the MAJCOM, continue the approach as published to the Missed Approach Point (MAP) and land, if the aircraft is in a position to make a safe landing and the runway environment (as defined in AFMAN 11-217, Volume 1) is in sight.

8.13.2.2. (AFMC) AFMC authorizes pilots to continue the approach in these circumstances.

8.13.3. **Determining DH/DA/MDA.** Pilots shall determine minimum approach altitudes (DH, DA or MDA) with the barometric altimeter except:

8.13.3.1. When flying a Category II/III ILS approach use the radar altimeter to determine DH and use the barometric altimeter as a supporting instrument.

8.13.3.2. For all other approaches, MAJCOM should direct procedures for the use of radar altimeters.

8.13.3.2. (AFMC) For other than Category II/III Instrument Landing System approaches, radar altimeters should be set to HAT/HAA (unless flight manual procedures direct otherwise). However, primary reference for MDA/DH is the barometric altimeter.

8.13.4. **Descent Below DH/DA/MDA.** Continuing an approach below DH/DA/MDA is not authorized until sufficient visual reference with the runway environment has been established and the aircraft is in a position to execute a safe landing. The term "runway environment" is defined in the glossary and AFMAN 11-217, Volume 1, *Instrument Flight Procedures*.

8.13.5. **Executing the Missed Approach.** If on arrival at the MAP or DH/DA (or at any time thereafter) any of the requirements in paragraph **8.13.4.** above are not met, the pilot must immediately execute the appropriate missed approach procedure, ATC issued climb out instructions or other ATC clearance.

8.13.5.1. To ensure obstacle/terrain clearance, the missed approach procedure may not be initiated until over the MAP/DH/DA, unless otherwise cleared by ATC. Climbing prior to the MAP/DH/DA is permitted but ATC should be advised as soon as practical.

8.13.5.2. Unless a higher climb gradient is published or assigned by ATC, a minimum climb gradient of 200 ft/NM OEI must be maintained during the missed approach procedure. For helicopter operations using "Copter Only" approaches a minimum climb gradient of 400 ft/NM is required.

8.13.5.2.1. Exception: In the event of an emergency return shortly after takeoff, PICs will ensure the aircraft can meet or exceed 200 ft/NM (400 ft/NM for copter only) or the published climb gradient, whichever is higher, AEO, and vertically clear all obstacles along the missed approach routing OEI.

8.14. Determining Visibility Minimums for Approach and Landing.

8.14.1. RVR reports (feet or equivalent meters), when given for a particular runway, apply to all takeoffs and landings on, and approaches to, the runway. Prevailing visibility (PV) may be used when RVR is not reported. For circling approaches, PV shall be used.

8.14.1.1. **Operational Criteria for Arriving Aircraft**. For Category I (1800 RVR or greater) and Category II (1200 RVR up to but not including 1800 RVR) weather conditions, touchdown zone RVR will be used to determine whether visibility is suitable for the instrument approach procedure. Mid/rollout RVR values will be used as advisory information. Rollout RVR (or mid RVR, if rollout RVR inoperative) is required when RVR is less than 1600 to provide advisory information to pilots (mid field and rollout requirements NA for helicopters).

8.14.1.2. (NA for helicopters) Visibility minima below 2,400 feet will not be authorized unless touchdown zone (TDZ) and centerline lighting (C/L) are available. MAJCOMs that permit Category III approaches shall prescribe visibility requirements IAW AC 97-1A, Runway Visual Range.

8.14.2. **Inoperative Approach Lighting.** Unless paragraph **5.9.5.2.** applies, when the runway approach lighting system (ALS) is inoperative, pilots shall increase the published visibility minimums of an instrument approach by one of the following:

8.14.2.1. As directed by the inoperative components table in FLIP.

8.14.2.2. As stated in NOTAMs.

8.14.2.3. As stated on ATIS.

8.14.2.4. As depicted on the approach plate.

8.14.2.5. If no other guidance is provided, increase the published visibility by ½ mile.

NOTE: This paragraph applies only to the ALS itself, not to Visual Approach Slope Indicator (VASI), Precision Approach Path Indicator (PAPI), and other lights that are not a component of the ALS.

8.15. IFR "VFR on Top." MAJCOMs may authorize IFR "VFR on Top" operations if a specific mission requires such clearances.

8.15. (AFMC) IFR "VFR on Top." The DFO may authorize IFR "VFR on Top" operations according to the provisions of FLIP, General Planning, if specific mission requirements dictate.

8.16. Operations within the Minimum Navigation Performance Specifications (MNPS) Airspace.

8.16.1. Pilots will not fly in MNPS airspace unless their aircraft equipment has been properly certified by the lead command. Prior to approval, lead command will ensure aircraft are "properly certified".

8.16.2. Aircraft meeting the North Atlantic Track (NAT) MNPS requirements meet the Canadian Minimum Navigation Performance Specifications (CMNPS) requirements.

8.16.2.1. Pilots operating aircraft in NAT airspace designated as MNPS must comply with requirements specified in applicable area planning documents. (e.g. Flip AP/1, Chapter 3, FLIP AP/2, Chapter 5)

8.16.2.2. Pilots operating aircraft in CMNPS airspace must comply with the requirements specified in FLIP AP/1, Chapter 3.

8.16.2.3. HQ AFFSA must approve waivers to the requirements of NAT MNPS and/or CMNPS airspace.

8.17. Reduced Vertical Separation Minimums (RVSM). Pilots will not fly in RVSM airspace unless their aircraft equipment has been properly certified by the lead command or unless ATC provides a clearance allowing entrance of a non-RVSM certified aircraft into RVSM airspace. Prior to operational approval, MAJCOMs will ensure pilots operating aircraft IAW RVSM criteria comply with requirements specified in FLIP AP/2, Chapter 3 and Chapter 5, FLIP AP/3 Chapter 1.

8.17.1. Prior to entry into RVSM airspace the following equipment shall be operating normally:

8.17.1.1. Two primary altitude measurement systems,

8.17.1.2. One automatic altitude control system (autopilot),

8.17.1.3. One altitude alerting device, and

8.17.1.4. An operational transponder.

8.17.2. Should any of the equipment above fail after entering RVSM airspace notify the controlling agency as soon as possible.

8.18. Required Navigation Performance Area Navigation (RNP RNAV) Airspace. Pilots will not operate in RNP RNAV airspace unless aircraft system and equipment have been certified and lead commands have provided operational approval. This certification will be based on applicable civil standards.

8.18.1. MAJCOMs will ensure that crews are aware of any special conditions or limitations associated with operations in each level of RNP RNAV airspace.

8.18.2. The applicable RNP level and any equipment conditions or limitations will be depicted on affected FLIP charts and procedures.

8.18.3. Pilots will advise ATC if an equipment failure or other malfunction causes the aircraft to lose its ability to continue operating in the designated RNP airspace.

8.18.4. When a specified RNP level cannot be achieved, the pilot should revise the route, or delay the operation until appropriate RNP level can be ensured.

8.18.5. **Operations within RNP-10 airspace.**MAJCOM approval to fly in RNP-10 airspace will be based on aircraft systems that are “properly certified”.

8.18.6. **Operations within Basic Area Navigation (BRNAV) airspace.**MAJCOM approval to fly in BRNAV airspace will be based on aircraft systems that are “properly certified”.

Chapter 9

CREW REST AND FLIGHT DUTY LIMITATIONS

9.1. Background Information. This chapter prescribes crew rest and maximum flight duty periods (FDP) for aircrew members in Air Force aircraft. Basic guidance for alertness management strategies and waiver authority procedures are also addressed. It applies to all personnel who operate USAF aircraft.

9.1.1. **Waiver Authority.** Procedures in this chapter may be waived by:

9.1.1.1. MAJCOM/DO, ANG/XO, or 34 TRW/CC, when an ORM assessment determines that mission requirements justify the increased risk. At their discretion, waiver authority may be further delegated to no lower than the operations group commander, or equivalent level. Exception: When authorized by the MAJCOM/DO, ANG/DO, or 34 TRW/CC, to compensate for unplanned mission delays, the PIC may extend maximum FDP up to 2 hours provided the mission requirements justify the risk and the PIC is unable to contact the waiver authority.

9.1.1.2. Commander Air Force Forces (COMAFFOR) for forces under his/her operational control during contingencies and impending or actual hostilities.

9.1.1.3. Waivers to crew rest and flight duty limitations may be published in a MAJCOM Supplement to this AFI or on a case-by-case basis.

9.2. Air Force Policy.

9.2.1. Commanders and mission planners must assess the impact of factors that reduce aircrew alertness. Specific considerations include the fatiguing effects of weather, extremes of temperature, nighttime operations and use of night vision imaging systems, poor sleeping conditions (due to both location and time of day), mission delays, and restrictive personal equipment.

9.2.2. Flight publications describe procedures for loss of pressurization, loss of oxygen, loss of cockpit temperature control, inoperative autopilot, and other in-flight malfunctions or emergencies that restrict flight duration and contribute to aircrew fatigue. Such limitations in flight publications, when applicable, take precedence over less restrictive standards in this instruction.

9.2.3. The PIC may recommend restricting duty time or extending crew rest periods to the MAJCOM approval authority. PICs must terminate a mission or mission leg if safety may be compromised by fatigue factors, regardless of authorized FDP.

9.3. Terms Explained.

9.3.1. **Aircrew or Crew.** The full complement of officers and enlisted members required to operate an aircraft and to complete an assigned mission. AFI 65-503, *US Air Force Cost and Planning Factors*, lists authorized aircrew composition.

9.3.2. **Aircrew Member.** An individual who meets all the following:

9.3.2.1. Is an aircrew member as explained in AFPD 11-4, Aviation Service, and AFI 11-402, Aviation and Parachutist Service, Aeronautical Ratings and Badges.

9.3.2.2. Is assigned to a position listed in AFI 65-503.

9.3.2.3. Is designated on orders to fulfill specific aeronautical tasks.

9.3.3. **Augmented Aircrew.** A basic aircrew supplemented by additional aircrew members to permit in-flight rest periods.

9.3.4. **Basic Aircrew** . Aircrew positions as explained in the T.O. for the aircraft concerned and identified in AFI 65-503, Atch 36-1.

9.3.5. **Crew Rest Period.** Crew rest is required prior to in-flight duties. The crew rest period is normally a minimum 12-hour non-duty period before the FDP begins. Its purpose is to ensure the aircrew member is adequately rested before performing flight or flight related duties. Crew rest is free time, which includes time for meals, transportation, and rest. Rest is defined as a condition that allows an individual the opportunity to sleep.

9.3.5.1. (Added-AFMC) Time spent traveling (e.g., as a passenger or in a POV) to or from a TDY location does not count as crew rest for subsequent FDP.

9.3.5.2. (Added-AFMC) USAF TPS students will not be scheduled for events, which would deny them 12 hours of crew, rest. However, students may elect to use school facilities (i.e., computers, data reduction equipment and audio-visual equipment) so long as it does not interfere with the opportunity for at least 8 hours of uninterrupted rest during the 12 hours immediately prior to the beginning of the flight duty period.

9.3.6. **FDP.**

9.3.6.1. A period that starts when an aircrew reports for a mission, briefing, or other official duty and ends when engines are shut down at the end of the mission, mission leg, or a series of missions.

9.3.6.1. (AFMC) For deployed crews, FDP normally begins upon arrival to the aircraft unless crew briefing occurs earlier. Aircraft commanders should apply judgment to adjust FDP start time to unique situations such as lengthy travel times from billeting. The crew chief is responsible to the pilot in command when deployed. IAW AFI 21-101, the pilot in command will determine how long the crew chief can safely perform aircraft maintenance actions. As a minimum, the crew chief must have the opportunity to sleep 8 hours in each 24-hour period.

9.3.6.2. FDP for ROA operations ends at engine shut down or on completion of an in-flight handover briefing.

9.3.6.3. **"Deadhead" Time** . For crew rest purposes, "deadhead" time is computed as flight duty time. If an aircrew member will perform in-flight or crew-specialty related duties (i.e., aircraft off-loading or performance data calculations) in conjunction with "deadheading", paragraphs **9.8.**, **9.9.** and **Table 9.1.** apply.

9.3.6.4. (Added-AFMC) FCF/ACF, proficiency training, test sorties, and tactical events, must be completed during the first 12 hours of the FDP and are limited to a maximum of three sorties per day. Sorties are defined as stops for the purpose of refueling or stops with significant ground time/delay. FCF/ACF missions will be rescheduled if unexpected delays prevent completion of all required items within the normal flight duty period. Waiver authority for this paragraph is the DFO.

9.3.7. **Sleeping Provisions.** Crew bunks or suitable substitute rest facilities aboard the aircraft. Rest facilities should allow adequate privacy and acceptable or decreased noise levels to obtain suitable rest.

9.4. Alert Duty. MAJCOMs establish alert and compensatory periods in keeping with mission requirements and an ORM assessment.

9.5. Maximum Flying Time. 56 hours logged flight time per 7 consecutive days, 125 hours logged flight time per 30 consecutive days and 330 hours per 90 consecutive days.

9.6. Maximum FDP. (see Table 9.1.)

9.6.1. When official post-flight duties are anticipated to exceed 2 hours, consideration should be given to reducing the FDP to ensure fatigue does not affect the safe completion of those duties.

Table 9.1. Maximum Flight Duty Periods (Hours).

Type Aircraft	Basic Aircrew (NOTE 1)	Augmented Aircrew
Fighter, Attack, or Reconnaissance (Single Control)	12	
Fighter, Attack, or Reconnaissance (Dual Control)	12	16 (NOTE 2)
Bomber or Reconnaissance (Single Control)	12	
Bomber, Reconnaissance, Electronic Warfare, or Battle Management (Dual Control)	16	24
Transport	16 (NOTE 3)	
Transport (Sleeping Provisions)	16 (NOTE 3)	24
Tanker	16	
Tanker (Sleeping Provisions)	16	24
Trainer	12	16 (NOTE 2)
Rotary Wing (without Auto Flight Control System)	12	14 (NOTE 2)
Rotary Wing (with Auto Flight Control System)	14	18 (NOTE 2)
Utility	12	18 (NOTE 2)
Remotely Operated Aircraft (Single Control)	12 (NOTE 4)	
Remotely Operated Aircraft (Dual Control)	14 (NOTE 4)	

9.6.2. ***NOTES:***

9.6.2.1. For single seat aircraft or when only one pilot has access to the flight controls, the maximum flight duty period is 12 hours.

9.6.2.2. Applies when basic aircrew requires only one pilot and a second qualified pilot (includes pilots enrolled in an AETC formal aircrew training course) is designated an aircrew member to augment pilot duties.

9.6.2.3. For the purpose of this paragraph, the T-43 and the T-39 may be considered a transport.

9.6.2.4. ROA FDP limitations constitute the period of time an individual crewmember may be on duty, whether at the controls or not, prior to requiring crew rest.

9.6.2.5. (Added-AFMC) To minimize risk due to fatigue, supervisors at all levels may further restrict crew duty day for events such as flight test, practice takeoffs, emergency procedures, air refueling, low level operations, low approaches, touch-and-go landings, or night operations.

9.6.2.6. (Added-AFMC) AFMC/DO authorizes unit DFOs to extend the flight duty period, as outlined in this chapter, up to 2 hours. The PIC is not authorized to extend flight duty period. For all other waivers to this chapter forward the request to HQ AFMC/DOV.

9.7. Crew Rest.

9.7.1. Air Force aircrews require at least 10 hours of continuous restful activities including an opportunity for at least 8 hours of uninterrupted sleep during the 12 hours immediately prior to the FDP.

9.7.1.1. If an aircrew member remains after flying to perform official duties, the crew rest period begins after termination of these duties.

9.7.2. In addition to the requirements of paragraph **9.8.1.**, crew rest is required prior to any of the following flight related duties: preflight, load, start, and taxi aircraft.

9.7.3. **Crew Rest Interruptions.** Any official business required of an aircrew member interrupts the crew rest period. This includes official business conducted on the telephone. If crew rest is interrupted so that an individual cannot get an opportunity for at least 8 hours of uninterrupted sleep, the individual must be afforded the opportunity for at least 8 more hours of uninterrupted sleep plus reasonable time to dress, eat, travel, etc. Any crew rest interruptions must be made only under the most exceptional circumstances. The individual must consider unofficial interruptions so that the intent of paragraph **9.8.1.** is met.

9.7.4. **Exceptions to the 12-Hour Minimum Crew Rest Period** .

9.7.4.1. For continuous operations when basic aircrew FDPs are greater than 12 but less than 14 hours, subsequent crew rest may be reduced proportionally to a minimum of 10 hours in order to maintain a 24-hour work/rest schedule.

9.7.4.1.1. Continuous operations is defined as three or more consecutive FDPs of at least 12 hours duration separated by minimum crew rest.

9.7.4.1.2. The 10-hour crew rest policy is only to be used to keep crews in their 24-hour clock cycles, not for scheduling conveniences or additional sortie generation.

9.7.4.1.3. Any reduction from 12 hours crew rest requires pre-coordination of transportation, meals and quarters, so that crewmembers are provided an opportunity for at least 8 hours of uninterrupted sleep.

9.7.5. Each aircrew member is responsible for ensuring that they receive the proper rest during crew rest periods and that they do not engage in activities that would prevent the opportunity to obtain at least 8 hours of uninterrupted sleep.

9.7.5.1. If crew rest is violated for an individual, it is the individual's responsibility to inform their supervisor and remove themselves from the flight schedule, if required.

9.7.6. **Cumulative Fatigue.**

9.7.6.1. When an individual sleeps less than his/her physiologically required duration, or experiences poor quality sleep over successive days, cumulative fatigue develops. Cumulative fatigue persists and results in worsening physical and mental performance until restorative sleep occurs. Most individuals require two consecutive night's sleep to fully recover from a significant sleep debt.

9.7.6.2. During continuous operations, to reduce the risk of cumulative fatigue, commanders should consider granting additional crew rest when a crewmember's flight duty period exceeds 14 hours.

9.7.6.3. MAJCOMs will implement programs or procedures to manage cumulative fatigue.

9.8. Scheduling Restrictions.

9.8.1. Aircrews will not perform flight duties until the requirements of paragraphs **9.8.** have been met.

9.8.2. Before reporting for flight duty, aircrew members must report all medical/dental treatment obtained through civilian sources or any medical condition that hinders duty performance to the appropriate military medical authority.

9.8.2.1. Use of medication or dietary supplements is governed by AFI 48-123, or as approved by a flight surgeon.

9.8.3. Aircrew members will not fly:

9.8.3.1. Within 24 hours of compressed gas diving (including scuba/HEEDS training); surface supplied diving, or hyperbaric (compression) chamber exposure and aircraft pressurization checks that exceed 10 minutes duration. (Not applicable to ROA operations)

9.8.3.1. (AFMC) AFMC/DO waives the 24-hour restriction for aircraft pressurization checks that keep the aircraft cabin at or above sea level. The 24-hour flight restriction does apply for any aircraft pressurization checks that result in a cabin pressure below sea level for more than 10 cumulative minutes in a 24-hour period.

9.8.3.1.1. **Exception:** Pararescue and Combat Control personnel will follow guidelines IAW US Navy Diving Manual Volumes I and II on flying and diving restrictions. Specifically, divers should not fly for 12 hours after surfacing from a decompression dive or for 2 hours following a no-decompression dive. If aircraft cabin pressure is maintained below 2,300 ft. MSL, then flying may be done immediately after any breathing mixture (air, N2O2, or HeO2) dive. Flying is permitted immediately after 100 percent oxygen diving.

9.8.3.2. Within 12 hours after completion of a hypobaric (altitude) chamber flight above 25,000 ft. MSL. Personnel may fly as passengers in aircraft during this period, providing the planned mission will maintain a cabin altitude of 10,000 ft. MSL or less. For altitude chamber flights to a maximum altitude of 25,000 ft. MSL or below, aircrew members may fly without delay as crewmembers or passengers if their cabin altitude does not exceed 15,000 ft. MSL. (Not applicable to ROA operations)

9.8.3.3. Within 72 hours after donating blood. The flying unit commander must approve the donation of blood by crewmembers in a mobility assignment or who are subject to flying duties within this 72-hour period. Restrict all other active fliers who donate blood from flying until cleared by a flight surgeon.

9.8.3.4. Within 12 hours of consuming alcohol or while impaired by its after effects.

9.9. Alertness Management Strategies. Commanders, schedulers, aerospace medicine personnel, and crewmembers all share responsibility for dealing with the complex issue of aircrew fatigue.

9.9.1. Aircrew members must receive adequate rest to maintain optimum mental and physical functioning. The principle factors in determining required rest are: the duration and intensity of work done, quality and duration of sleep in the previous several days, the time of day relative to the body's internal circadian clock, and the degree of circadian disruption (e.g. shift work or jet lag).

9.9.2. When an individual sleeps less than his/her physiologically required duration, or experiences poor quality sleep over successive days, fatigue develops. As little as two hours sleep loss can result in significant reductions in an individual's performance. Likewise delaying sleep too long results in excessive fatigue and degrades performance.

9.9.3. The failure to acquire sufficient sleep over two or more days results in cumulative sleep debt. Sleep debt persists and results physical and mental performance loss until the individual has achieved adequate sleep. For most individuals, two consecutive night's sleep is needed to fully recover from a significant sleep debt. During periods of high operations tempo mission planners should give particular consideration to providing aircrew regular opportunities to recover from cumulative fatigue.

9.9.4. Skills critical to flying tend to be among the most susceptible to mental fatigue including monitoring tasks, embedded tasks (e.g. instructing while flying), and higher cognitive processes (such as problem solving in emergencies). Performance is most impaired during the period of the circadian trough, normally 0200 to 0600 hours. Therefore, the use of alertness management strategies must be considered for nighttime missions.

9.9.5. The instructions in this chapter cannot provide a solution to all the challenges posed by the 24-hour demands of Air Force flight operations. It is essential, therefore, that Commanders utilize other reasonable means to sustain crew alertness and performance. Consultation with aerospace medicine or other fatigue management experts is advisable. Examples of alertness management strategies that are currently available include tactics to promote effective rest and minimize pre-mission duration of wakefulness, such as extended crew rest periods, pre-positioning and sleep quarantine facilities; non-pharmacological countermeasures, such as controlled cockpit rest, bright light or physical activity breaks; pharmacological agents (go and no-go pills); and alertness management education and training.

9.9.6. **Controlled Cockpit Rest.**Unless further restricted in a MAJCOM Supplement or MDS specific Volume 3, controlled cockpit rest may be implemented when the basic aircrew includes a second qualified pilot.

9.9.6. (AFMC) AFMC does not further restrict controlled cockpit rest. Critical phases of flight are as defined in AFI 11-401 AFMCS 1.

9.9.6.1. Must be restricted to non-critical phases of flight between cruise and one hour prior to planned descent.

9.9.6.2. The resting crewmember must be immediately awakened if a situation develops that may affect flight safety.

9.9.6.3. Cockpit rest shall only be taken by one crewmember at a time.

9.9.6.4. All cockpit crewmembers including the resting member must remain at their stations.

9.9.6.5. A rest period shall be limited to a maximum of 45 minutes.

9.9.6.6. More than one rest period per crewmember is permitted if the opportunity exists.

9.9.6.7. Controlled cockpit rest is not authorized with any aircraft system malfunctions that increase cockpit workload (e.g., Autopilot, Navigation Systems).

9.9.6.8. Cockpit rest shall not be a substitute for any required crew rest.

9.10. Forms Prescribed. AF 70, Pilot's Flight Plan and Flight Log; AF 72, Air Report (AIREP); DD 175, Military Flight Plan; DD 175-1, Military Weather Briefing; and DD 1801, DoD International Flight Plan.

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

Allied Communication Publication (ACP) 160, US Supplement 1

AFCAT 36-2223, US Air Force Formal Schools

AFH 11-203, Weather for Aircrews, Volume 2

AFI 10-701, Performing Electronic Countermeasures in the United States and Canada

AFI 11-204, Operational Procedures for Aircraft Carrying Hazardous Materials

AFI 11-207, Flight Delivery of Fighter Aircraft

AFI 11-209, Air Force Participation in Aerial Events

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

AFI 11-215, Flight Manuals Programs (FMP)

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

AFI 11-230, Instrument Procedures

AFI 11-403, Aerospace Physiological Training Program

AFI 13-201, Air Force Airspace Management

AFI 13-203, Air Traffic Control

AFI 13-207, Preventing/Resisting Aircraft Piracy (FOUO)

AFI 13-208, Security Control of Air Traffic and Air Navigation Aids (SCATANA)

AFI 15-114, Weather Support Evaluation

AFI 15-128, Aerospace Weather Operations - Roles and Responsibilities

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AFI 36-2212, Flight Management

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AFI 48-123, Medical Examination and Standards

AFI 65-503, US Air Force Cost and Planning Factors

AFI 90-301, Inspector General Complaints

AFI 90-901, Operational Risk Management

AFI 91-202, The US Air Force Mishap Prevention Program

AFI 91-204, Safety Investigations and Reports

AFM 55-9, Terminal Instrument Procedures (TERPS)

AFMAN 10-206, Operational Reporting

AFJMAN 11-226 United States Standard for Terminal Instrument Procedures (TERPS)

AFMAN 11-208, The US Military Notice to Airmen (NOTAM) System

AFMAN 11-210, Pilot's Instrument Refresher Course (IRC) Guide

AFMAN 11-217, Volume 1 and 2, Instrument Flight Procedures

AFP 51-45, Electronic Combat Principles

AFP 64-5, Aircrew Survival

AFP 64-15, Survival and Emergency Uses of the Parachute

AFPAM 11-216, Air Navigation

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AFPD 11-3, Life Support

AFPD 11-4, Aviation Service

AFPD 13-2, Air Traffic Control, Airspace, Airfield, and Range Management

AFI 37-360, Volume 8, The Air Force Forms Management Program

AFR 55-34, Reducing Flight Disturbances

FAA Advisory Circular 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors

FAA Advisory Circular 20-138, Airworthiness Approval of Global Positioning System (GPS) Navigation Equipment for use as a VFR and IFR Supplemental Navigation System

FAA Advisory Circular 90-45A, Approval of Area Navigation Systems for Use in the US National Airspace System

FAA Advisory Circular 90-94, Guidelines for Using Global Position System Equipment for IFR En Route and Terminal Operations and for Non-Precision Instrument Approaches in the United States, National Airspace System

FAA Advisory Circular 97-1A, Runway Visual Range (RVR)

FAA Advisory Circular 120-33, Operational Approval of Airborne Long Range Navigation Systems for Flight within the NAT-MNPS Airspace

FAA Handbook 7110.65, Air Traffic Control

FAA Handbook 7400.2, Procedures for Handling Airspace Matters

FAA Handbook 7610.4, Special Military Operations

FAA Handbook 8260.19, Flight Procedures and Airspace

FAR Part 91, General Operating and Flight Rules

FAA TSO-115B, Airborne Area Navigation Equipment Using Multi-Sensor Inputs

FAA TSO-129a, Airborne Supplemental Navigation Equipment Using the Global Positioning System (GPS)

T.O.-00-20-1, Preventive Maintenance Program, General Policy Requirements and Procedures

T.O.-00-20-5, Aircraft, Drone, Aircrew Training Devices, Engines, and Air-Launched Missile Inspections, Flight Reports, and Supporting Documents

T.O.-00-25-172, Ground Servicing of Aircraft and Static Grounding/Bonding (ATOS)

T.O.-1-IB40, Weight and Balance Data

T.O.-1-IB-50, Basic T.O. for USAF Aircraft Weight and Balance

T.O. 1-1-300, Acceptance/Functional Check Flight and Maintenance Operational Checks

T.O. 42C-1-2, Anti-Icing, De-Icing and Defrosting of Parked Aircraft

Abbreviations and Acronyms

AC—Advisory Circular

ACAS—Aircraft Collision Avoidance System (ICAO) (see TCAS)

ADIZ—Air Defense Identification Zone

AFFSA—Air Force Flight Standards Agency

AFH—Air Force Handbook

AFI—Air Force Instruction

AFJI—Air Force Joint Instruction

AFMAN—Air Force Manual

AFPD—Air Force Policy Directive

AFRC—Air Force Reserve Command

AFREP—Air Force Representative to the FAA

AGL—Above Ground Level

AIM—Aeronautical Information Manual

AIREP—Air Report

ALS—Approach Lighting System

ALTRV—Altitude Reservation

ANG—Air National Guard

AP—Area Planning

ARCP—Air Refueling Control Point

ARTCC—Air Route Traffic Control Center

ASRR—Airfield Suitability and Restrictions Report

ATC—Air Traffic Control

ATCAA—Air Traffic Control Assigned Airspace

ATIS—Automatic Terminal Information Service

BARO-VNAV—Barometric Vertical Navigation

BRNAV—Basic Area Navigation

CMNPS—Canadian Minimum Navigation Performance Standards

CNS/ATM—Communications, Navigation and Surveillance/Air Traffic Management

COA—Certificate of Authorization

COMAF—FORCommander Air Force Forces

CONUS—Continental United States

DA—Decision Altitude

DH—Decision Height

DP—Departure Procedure

EGPWS—Enhanced Ground Proximity Warning System

ETA—Estimated Time of Arrival

ETCA—Education and Training Course Announcement

FAA—Federal Aviation Administration

FAAO—Federal Aviation Administration Order

FAR—Federal Aviation Regulation

FAWP—Final Approach Waypoint

FCG—Foreign Clearance Guide

FDE—Fault Detection and Exclusion

FDP—Flight Duty Period

FIH—Flight Information Handbook

FL—Flight Level

FLIP—Flight Information Publication

FOD—Foreign Object Damage

FSS—Flight Service Station ft.Ft.

GATM—Global Air Traffic Management

GCAS—Ground Collision Avoidance System

GP—General Planning

GPS—Global Positioning System

GPWS—Ground Proximity Warning System

HAA—Height Above Aerodrome

HAT—Height Above Threshold

HDD—Head-Down Display

HMD—Helmet-Mounted Display

HUD—Head-Up Display

IAP—Instrument Approach Procedure

ICAO—International Civil Aviation Organization

IFR—Instrument Flight Rules

ILS—Instrument Landing System

IMC—Instrument Meteorological Conditions

INS—Inertial Navigation System

KIAS—Knots Indicated Airspeed

LAHSO—Land and Hold Short Operations

LNAV—Lateral Navigation

LOA—Letter of Agreement

MAGR—Miniature Airborne GPS Receiver

MAJCOM—Major Command

MAHP—Missed Approach Holding Point

MAP—Missed Approach Procedure

MAWP—Missed Approach Waypoint

MDA—Minimum Descent Altitude

MDS—Mission Design Series

MEA—Minimum En route Altitude

MNPS—Minimum Navigation Performance Specifications

MOA—Military Operations Area

MOCA—Minimum Obstruction Clearance Altitude

MSL—Mean Sea Level

MTR—Military Training Route

NACO—National Aeronautical Charting Organization

NAS—National Airspace System

NAT—North Atlantic Track

NAVAID—Navigational Aid

NIMA—National Imagery and Mapping Agency

NM—Nautical Mile

NOAA—National Oceanic and Atmospheric Administration

NOTAM—Notices to Airmen

NVG—Night Vision Goggle

OEI—One Engine Inoperative

OROCA—Off Route Obstruction Clearance Altitude

ORM—Operational Risk Management

ORTCA—Off Route Terrain Clearance Altitude

PAPI—Precision Approach Path Indicator

PFPS—Portable Flight Planning System

PFR—Primary Flight Reference

PGU—Portable GPS Unit

PIC—Pilot in Command

PIREP—Pilot Report

PLGR—Precision Lightweight GPS Receivers

PMSV—Pilot-to-Metro Service

PRM—Precision Runway Monitoring Approach

PV—Prevailing Visibility

OWS—Operational Weather Squadron

RA—Resolution Advisory

RAIM—Receiver Autonomous Integrity Monitoring

RNAV—Area Navigation

RNP—Required Navigation Performance

ROA—Remotely Operated Aircraft

RSRS—Reduced Same Runway Separation

RVR—Runway Visual Range

RVSM—Reduced Vertical Separation Minimum

RVV—Runway Visibility Value

SARP—Standards and Recommended Practices

SCNS—Self Contained Navigation System

SDP—Special Departure Procedures

SFO—Simulated Flameout

SID—Standard Instrument Departure

SM—Statute Mile

SUA—Special Use Airspace

SVFR—Special Visual Flight Rules

TA—Traffic Alert

TAWS—Terrain Awareness and Warning System (see EGPWS)

TCAS—Traffic Alerting and Collision Avoidance System (see ACAS)

TEMPO—Temporary

TERPS—Terminal Instrument Procedures

TFR—Terrain Following Radar

T.O.—Technical Order

TSO—Technical Standard Order

VASI—Visual Approach Slope Indicator

VFR—Visual Flight Rules

VMC—Visual Meteorological Conditions

VNAV—Vertical Navigation

WX—Weather

Terms

Aerobatics—Intentionally performed spins, vertical recoveries, and other maneuvers that require pitch and bank angles greater than 90 degrees.

Air Combat Tactics—A general term that includes basic fighter maneuvers, air combat maneuvers, and air combat tactics.

Airfield Qualification and Familiarization Program—A booklet developed by Jeppeson produced booklet to supplement other USAF and MAJCOM methods used to familiarize pilots with unique airports in accordance with ICAO requirements. The booklet provides pictorial, textual and graphical information on airfields selected from a list of worldwide airfields that have been deemed to be unique due to surrounding terrain, obstructions or complex approach and departure procedures.

Civil Twilight—The period that ends in the evening when the center of the sun's disk is 6 degrees below the horizon and begins in the morning when the center of the sun's disk is 6 degrees below the horizon.

Day—The time between the end of morning civil twilight and the beginning of evening civil twilight, as published in the American Air Almanac, converted to local time.

Diverse Departure—If the airport has at least one published approach, the absence of any non-standard takeoff minimums and/or IFR departure procedures for a specific runway normally indicates that runway meets diverse departure criteria. Pilots departing a diverse runway may climb runway heading to 400 ft. above the departure end of the runway (DER) elevation and then turn in any direction provided the aircraft maintains a minimum climb gradient of 200 ft. per nautical mile until reaching the appropriate IFR altitude. For a more detailed explanation, refer to AFMAN 11-217, Volume 1, Instrument Flight Procedures.

FAA Authorization—An authorization is an official written FAA document which provides the petitioner relief from specified parts of the Federal Aviation Regulations (FARs).

FAA Exemption—An exemption is an official written FAA document which provides the petitioner relief from specified parts of the Federal Aviation Regulations (FARs).

Formation Flight—More than one aircraft which, by prior arrangement between the pilots, operates as a single aircraft with regard to navigation and position reporting. Separation between aircraft within the formation is the responsibility of the flight leader and the pilots of the other aircraft in the flight. This includes transition periods when aircraft within the formation are maneuvering to attain separation from each other to effect individual control and during joinup and breakaway. Such a group is treated for ATC purposes as a single aircraft.

Fuel Reserve—The amount of usable fuel that must be carried on each aircraft, beyond that required to complete the flight as planned.

GPS "Overlay" Approaches—These are instrument approaches that have been approved for use with GPS based on an existing traditional instrument approach such as a VOR or NDB approach.

Ground Control Element—Comprises the ROA ground control station, power generation units, communications infrastructure and antenna arrays.

Instrument Meteorological Conditions—Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.

Land and Hold Short Operations (LAHSO)—Procedures developed to expedite traffic flow at civil and joint-use airports needing additional tools to increase capacity. Allows civilian aircraft to operate on intersecting runways simultaneously.

Minimum Fuel—Indicates that an aircraft's fuel supply has reached a state where, upon reaching the destination, it can accept little or no delay. This is not an emergency situation but merely indicates an emergency situation is possible should any undue delay occur.

National Airspace System—The National Airspace System (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 are: 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 Air Force Instructions are applicable. (See paragraph **1.2.**)

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

Non-Standard Formation—Operating under any of the following conditions:

a. When the flight leader has requested and ATC has approved other than standard formation dimensions.

b. When operating within an authorized altitude reservation (ALTRV) or under the provisions of a letter of agreement.

c. When the operations are conducted in airspace specifically designed for a special activity.

Obstacle Climb Gradient—FLIP products often provide different climb gradients, ATC and Obstacle. Only the obstacle climb gradient need be considered for OEI departure planning. If no obstacle climb gradient is published, the aircraft must achieve a minimum climb gradient of 200 ft/nm, or as specified in para **8.7.2.2.** for OEI.

OROCA—An off-route altitude which provides obstruction clearance with a 1,000 ft. buffer in non-mountainous terrain areas and a 2,000 ft. buffer in designated mountainous areas within the United States. This altitude may not provide signal coverage from ground-based navigational aids, air traffic control radar, or communications coverage.

ORTCA—An off-route altitude that provides terrain clearance with a 3,000 ft. buffer from terrain. This altitude may not provide signal coverage from ground-based navigational aids, air traffic control radar, or communications coverage. This altitude is used on en route charts covering those areas outside the United States.

P Airfield—Civil airport wherein permit covers use by transient military aircraft.

PRM Approach—An instrument landing system (ILS) approach conducted to parallel runways whose extended centerlines are separated by less than 4,300 ft. and the parallel runways have a Precision Radar Monitoring (PRM) system that permits simultaneous independent ILS approaches.
http://www.faa.gov/avr/afs/prmtraining/prmaim041802.rtf

Reduced Lighting—External aircraft lighting that is less than that required by **5.17.3.** and **5.17.4.**

Reduced Same Runway Separation—Allows reduction of the normal ATC aircraft separation standards during landing/touch-and-go and restricted low approach operations to increase the airport/runway capacity.

Remote/Island Destination—Any aerodrome that, due to its unique geographic location, offers no suitable alternate (civil or military) within two (2) hours flying time.

Remotely Operated Aircraft—An aircraft designed or modified not to carry a human pilot and is operated through remote or self-contained autonomous control. As an aircraft an ROA must meet all applicable standards required of a manned aircraft.

Runway Environment—The runway environment consists of one or more of the following elements:

The approach light system (except that the pilot may not descend below 100 ft. above the Touch Down Zone Elevation using the approach lights as a reference unless the red termination bars or the red side row

bars are also visible and identifiable), the threshold, threshold markings or threshold lights, the runway end identifier lights, the touchdown zone lights, the runway or runway markings, the runway lights, the visual approach slope indicator. For more information, refer to AFMAN 11-217, Volume 1.

Runway Visual Range—The maximum distance in the direction of takeoff or landing at which the runway, or the specified lights or markers delineating it, can be seen from a position above a specified point on its center line at a height corresponding to the average eye-level of pilots at touch down. This value is normally determined by instruments located alongside and about 14 ft. above the runway and calibrated with reference to the high-intensity runway lights.

Single Medium Display—A single medium display is a Head-Up Display (HUD), Head-Down Display (HDD), or Helmet-Mounted Display (HMD) presenting flight instrumentation on a single display such as a HUD combiner, a "glass" multifunction display, or a helmet visor.

Special Departure Procedure (SDP)—An SDP is an IMC procedure designed to allow increased takeoff gross weight for multi-engine aircraft whose OEI climb rate would otherwise not meet the requirements of paragraph **8.7.2.** The runway and all obstacles along a chosen takeoff path are analyzed and compared to the aircraft OEI takeoff and climb performance. The procedure provides a maximum allowable takeoff gross weight for given performance conditions that ensure vertical and lateral obstacle clearance safety margins. The minimum allowable gross and net climb gradients for SDPs are typically lower than TERPS standards. Unlike TERPS, the takeoff path is selected to minimize obstacle clearance requirements and only those obstacles within the lateral limits of the chosen flight path are considered. The term SDP encompasses both the use of the textual obstacle data table information and the graphical departure procedures.

Standard Formation—A formation in which no participating aircraft is more than 1 NM horizontally and 100 feet vertically from the lead aircraft.

Stopover Flight—A flight where intermediate stops are planned en route to a final destination.

Unmonitored Navigational Aid—A NAVAID must be monitored for maintenance purposes by a staffed ATC facility or other agency for it to be considered operational. Unmonitored NAVAIDS listed in the IFR supplement may not be operational and/or may provide unreliable navigational information.

Visual Meteorological Conditions (VMC)—Meteorological conditions in which visual flight rules apply; expressed in terms of visibility, ceiling height, and aircraft clearance from clouds along the path of flight. When these criteria do not exist, instrument meteorological conditions prevail and instrument flight rules must be complied with.