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CHAPTER 30 - AIRCRAFT OPERATIONS

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Approved: VICTORIA C. CHRISTIANSEN
Deputy Chief, S&PF

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New Document	5709.16_30	46 Pages
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Digest:

30 - Revises the following section with no additional changes to the chapter:

36.7 - Establishes code and caption, “Small UAS Operations,” and sets forth direction for the operation of small unmanned aircraft.

Table of Contents

This chapter establishes aviation standards and procedures for all Forest Service flight operations and mission planning activities, including in-service and contract aviation services, aircraft, personnel, and facilities. Policy, objectives, authorities, responsibilities, definitions and references are found in FSM 5700 and throughout other chapters in this Handbook.

30.5 - Definitions

Flight Following. The method(s) and process(s) through which an aircraft is tracked from departure point to destination to provide knowledge of aircraft location and condition with a reasonable degree of certainty.

Sterile Cockpit. Procedures by which the crew of an aircraft do not perform any conversations between each other, with other aircraft, or with any ground activity that are not directly related to flying the aircraft in a safe manner.

31 - AIRCRAFT OPERATIONS AND STANDARDS

For related information, see FSM 5710.31, 5711, and 5711.1.

31.1 - Weather Reports and Forecasts

For additional guidance, see 14 CFR, part 135.213.

1. All Forest Service Instrument Flight Rules (IFR) flight operations must be conducted using weather reports and forecasts provided by one of the following:

   a. United States National Weather Service.

   b. A source approved by the Federal Aviation Administration (FAA) Administrator.

   c. A source approved by a Regional Aviation Officer or the National Aviation Operations Officer.

2. The pilots-in-command may use weather information based on their own observations for operations under Visual Flight Rules (VFR).

31.2 - Flight Planning and Operating Information

Ensure that the information and publications required by Title 14, Code of Federal Regulations, sections 135.81 and 135.83 are made available to Forest Service employee pilots for flight planning and operating information. Information requirements, such as aircraft checklists, aeronautical publications and charts, and aircraft equipment manuals, must be maintained in current and good condition.

31.21 - Flight Crew

31.21a - Flight Crew Equipment

The Forest Service must provide employee pilots the equipment required by the Federal Aviation Regulations (FARs) contained in 14 CFR 135.81 and 135.83. However, pilots flying Forest Service missions are responsible for ensuring:

a. That a flight kit (bag) incorporating the necessary equipment, publications, and charts required by the FARs is complete, current, and on board the aircraft.

b. That they possess sufficient personal equipment to perform their preflight duties and operational functions on board the aircraft during day and night operations.

31.21b - Flight Crew Certification and Requirements

Employee pilots, or pilots provided to the Forest Service under contract or rental agreements (sec. 11.22), shall possess the appropriate FAA certificates, ratings, and authorizations for the type operation and shall meet the following minimum requirements:

1. Except for aviation operations requiring an airline transport pilot certificate under the FARs, pilots shall possess FAA commercial pilots certificates, instrument ratings (except helicopter), and aircraft ratings (multi-engine, helicopter, and so on) appropriate for the mission.

2. Competency records must be maintained in the employee pilot's competency and proficiency file or, for contract pilots, according to the vendor's FAA operations specifications (sec. 11.22).

3. All Forest Service flight operations shall comply with the minimum flight crew requirements specified in the FAA-approved Airplane Flight Manual or with the aircraft type certificate data sheet and limitations. Refer to FSM 5714.3, paragraph 3 for requirements specific to single-pilot smokejumper operations.

31.21c - Flight Crew Medical Requirements

1. FAA Medical Certificates. All flight crew personnel, employee and contract, shall maintain in their possession a current FAA medical certificate appropriate for the type operation:

a. Second Class for operations requiring a Commercial Pilot Certificate; or

b. First Class for operations requiring an airline transport pilot certificate (sec. 11.22).

2. Flight Physicals. Employee pilots are responsible for scheduling flight physicals in a timely manner.

3. Blood Donations. Flight crewmembers shall not serve as pilots in any position within 72 hours of a blood donation. A blood test is not considered a "donation."

4. Use of Intoxicants. Flight crewmembers shall not use any form of intoxicants while on duty or within the 8 hours prior to performing any flight crew duties (14 CFR 91.17).

5. Scuba Diving. Flight crewmembers shall not participate in scuba diving within 24 hours preceding any flight.

31.21d - Reporting for Duty

All flight crewmembers shall report for duty in sufficient time to plan the flight and perform preflight duties, but in no event later than 30 minutes prior to scheduled departure time.

31.21e - Enroute Servicing

The pilot-in-command, when practical, shall make every effort to purchase services at the best price available at all enroute stops. These services include fuel, oil, maintenance, lodging, and transportation.

31.22 - Fixed-Wing Flight Manager

Designate a Fixed-Wing Flight Manager whenever a transport mission is flown involving two or more passengers.

31.22a - Fixed-Wing Flight Manager Certification

The designated Fixed-Wing Flight Manager must have completed the Flight Manager/Fixed-Wing Flight Manager Training. Registration and access to the course is at: *http://iat.nifc.gov/*.

31.22b - Fixed-Wing Flight Manager Duties

The Fixed-Wing Flight Manager shall:

1. Brief the traveling personnel providing an overview of travel purpose and final destination, route of travel, intermediate stops, if applicable, and estimated time(s) of arrival.

2. Ensure the passenger manifest is accurate and contains the correct names and weights. Note: The pilot is ultimately responsible for ensuring correct weights, balance and power computations.

3. Provide one copy of the manifest to the pilot-in-command and ensure that additional copies are available for the receiving unit and the sending dispatcher.

4. Assist the pilot-in-command with weight distribution and the stowage of bags, packs, and/or cargo.

5. Assemble the personnel in an orderly manner in the designated staging area.

6. Ensure the pilot and aircraft are currently authorized for the intended mission and the pilot-in-command can verify the aircraft is within weight and balance limitations.

7. Maintain a current list of telephone numbers for the sending and receiving units.

32 - FLIGHT OPERATING PROCEDURES

32.1 - Record Keeping Requirements

An individual record of each Forest Service employee pilot used in operations must include all the information required in Title 14, Code of Federal Regulations, section 135.63 (a)(4)(b) (14 CFR 135.63 (a)(4)(b)) and must be maintained for the length of time for each unit as required by record file code 5710, FSH 6209.11, section 41. File code 5710 requires the forests to retain records for 3 years, the regions for 5 years, the Washington Office for 10 years.

32.11 - Logging Pilot Flight Time

Forest Service employee pilots shall record the breakdown of flight time as required in 14 CFR 61.51 and shall document the breakdown on Form FS-5700-25, Record of Individual Flying Time. These records must be maintained in the individual pilots' competency and proficiency files (sec. 32.1).

32.12 - Load Manifest

For aircraft carrying passengers or cargo, a load manifest must be prepared by the pilot-in-command before each takeoff and must meet the direction provided in 14 CFR 135.63 (c)(1) through (d) and section 11.29 in this Handbook.

1. Instructions for Load Manifest Forms. Each type of aircraft operated by the Forest Service must have an approved load manifest/weight and balance form with instructions for determining the basic index and procedures for completing the required information. This form can be a Forest Service approved form identified in this Handbook for a specific type aircraft or an approved form from the Airplane Flight Manual (Pilot's Operating Handbook) (sec. 31.06 and 14 CFR 135.63 (c)(1)(d)).

2. Pilot-in-Command Responsibility for Load Manifest. The pilot-in-command is responsible for the accuracy of the load manifest/weight and balance information and calculations and shall comply with the direction in 14 CFR 135.63 C(1) thru (8).

32.2 - Passenger and Cargo Loading and Unloading

1. Fixed-wing pilots-in-command are responsible for:

   a. Ensuring the aircraft is properly loaded and fueled.

   b. Weight and balance document has been completed.

   c. Aircraft is within approved weight and balance limitations.

   d. Coordination with the Fixed-Wing Flight Manager regarding passenger boarding and deplaning requirements.

2. Prior to each takeoff, the pilot-in-command shall ensure that all baggage and/or cargo has been adequately secured or stowed in approved cargo or baggage areas.

32.21 - Aircraft and Access

1. Unless otherwise provided for in an approved operations plan or in section 11.29, aviation operations managers shall ensure the pilot-in-command shuts down all engines prior to loading or unloading passengers in any fixed-wing aircraft. The pilot-in-command, fixed-wing base manager, and Fixed-Wing Flight Manager are jointly responsible for ensuring routes to and from the aircraft are free of hazards; when there are hazards, they must provide other means to safely manage passenger loading and unloading.

2. The fixed-wing base manager is responsible for ensuring loading ramps and wheel chocks are clear and the flight crew has been briefed on marshalling instructions. The Fixed-Wing Flight Manager and fixed-wing manager are jointly responsible for keeping passengers in a safe area and well back from any moving aircraft, propellers, and/or jet blast.

3. Pilots of either a fixed-wing aircraft or helicopter may not leave the cockpit of an aircraft unattended while any engine is running.

32.22 - Passenger Briefing

1. The pilot-in-command or a designated crewmember shall provide the oral briefing required by 14 CFR 135.117, unless the pilot-in-command determines that the passengers are familiar with the contents of the briefing, such as during multiple legs of the same trip with no new additions to the passenger manifest.

2. Prior to takeoff, the pilot-in-command shall ensure that passengers, who may need assistance in moving to an exit in an emergency, have other passengers assigned to assist and to provide additional emergency procedure information.

32.23 - Diagram of Emergency Exits and Equipment

Each aircraft passenger cabin shall be equipped with printed passenger briefing cards for each passenger seat location containing the information required by 14 CFR 135.117.

32.24 - Safety Belt Use

Each passenger shall be briefed on when, where, and under what conditions it is necessary to have their safety belts fastened about them. The briefing shall also include complete instructions as to the operation of the seat belt hardware and, if installed, any shoulder harness.

32.25 - Smoking

1. Each passenger shall be briefed on when, where, and under what conditions smoking is prohibited. This briefing shall include a statement that the FARs as well as Forest Service policy require compliance with crewmember instructions.

2. Certain areas on and near aircraft staging areas are designated “NO SMOKING” and should be clearly signed. In the absence of such designations, the following applies:

a. Ground. Smoking is not allowed within 50 feet of any parked aircraft or any flammable or chemical storage area.

b. Aircraft in Flight. Smoking is not allowed on Forest Service or contract aircraft at any time.

32.26 - Emergencies and Emergency Evacuation Duties

For related direction, see 14 CFR 135.123 (a) and (b).

For each type aircraft as appropriate, flight crewmembers shall be assigned the functions necessary in an emergency or in a situation requiring emergency evacuation.

1. The pilot-in-command shall ensure that those functions can be practicably accomplished and would meet reasonably anticipated emergencies, including incapacitation of individual crewmembers or their inability to reach the passenger cabin because of shifting cargo.

2. All flight crewmembers shall annually review and remain familiar with the emergency procedures and equipment outlined in the Airplane Flight Manual (Pilot's Operating Handbook) (sec. 06) and emergency checklist for each type aircraft assigned. In the event of an emergency, comply with those emergency procedures.

32.3 - Manipulation of Flight Controls

For related direction, see 14 CFR, part 135.115. The pilot-in-command may not allow any passenger to manipulate the flight controls of any aircraft during flight except:

1. A pilot who is employed by the Forest Service or authorized by a Regional Aviation Officer, the National Aviation Operations Officer, or their designees, and who is appropriately rated in the type aircraft, or

2. An authorized FAA safety inspector who has the permission of the pilot-in-command qualified in the aircraft, or

3. Provided there are no other passengers on board the aircraft, a Forest Service employee who is approved under a training plan that includes basic aeronautical knowledge, such as in-flight maneuvers.

33 - FLIGHT PLANS AND FLIGHT FOLLOWING

33.04 - Responsibility

33.04a - Pilot-in-Command

1. Flight Safety. The pilot-in-command has the authority to delay, divert, discontinue, or cancel a flight when conditions do not appear suitable for safe continuation of the flight. Amend the flight plan in accordance with the decision of the pilot-in-command when, in the pilot's opinion, the flight cannot continue safely or efficiently.

2. Firefighting and Special Missions. The pilot-in-command is responsible for the preflight planning and flight operations in compliance with the applicable FARs and Forest Service direction in FSM 5700 and this Handbook, and is responsible for:

a. Providing the originating dispatcher with complete details of the proposed flight, including time, route, and destination for unit-initiated firefighting or special missions.

b. Notifying the originating dispatcher of time airborne, estimated time of arrival (ETA) at the destination, and any changes in the flight plan or manifest.

c. Advising the originating dispatcher's office or enroute dispatcher when any delay will be greater than 30 minutes.

d. Checking in periodically (15-minute intervals when possible) with either the originating dispatcher or appropriate enroute dispatch office.

e. Reporting the termination of the flight through the nearest Forest dispatch office or directly to the originating dispatch office by telephone.

3. Flights Under Instrument Flight Rules or Visual Flight Rules. Pilots-in-command of flights conducted under FAA flight plans Instrument Flight Rules (IFR) or Visual Flight Rules (VFR) are required to report only the departure and arrival information and any extensive delay of one hour or more to a Forest Service dispatch office.

33.04b - Originating Dispatcher

The originating dispatcher is responsible for:

1. Notifying the receiving dispatcher of the flight schedule, aircraft identification number, pilot's name, and manifest.

2. Determining with the pilot where the Forest Service flight plan is to be closed.

3. Informing the pilot-in-command of any special instructions that may not be covered in the resource order.

33.1 - Forest Service Flight Operations

Forest Service point-to-point flight operations with passengers or cargo shall only be conducted with a filed Federal Aviation Administration (FAA) flight plan, Visual Flight Rules (VFR) (14 CFR 91.153), Instrument Flight Rules (IFR) (14 CFR 91.173), or an acceptable locating procedure (14 CFR 135.79) as applicable.

33.11 - Forest Service Flight Following

Coordinate all Forest Service flight activities through an originating dispatch office during their hours of operation, except those missions conducted under IFR flight plans and in positive control by air traffic control (ATC) (14 CFR 91.173).

33.2 - FAA Flight Plans

For additional direction, see FSM 5716.5.

33.21 - FAA Flight Following

33.21a - Pilot-in-Command

The pilot-in-command shall ensure that:

1. The appropriate type of FAA VFR or IFR flight plan is filed which includes the telephone number of the appropriate dispatch office and the aviation unit's address and telephone number.

2. The originating dispatch office is advised that the flight will be conducted under a filed FAA flight plan. Provide the estimated time of departure (ETD), the estimated time of arrival (ETA), and reporting any changes in the resource order, manifest, or planned flight. Reporting shall be completed by the most expeditious means to the originating dispatch office during their hours of operation. During periods when the originating dispatch office is closed, the pilot-in-command accomplishes required reporting by advising the answering service or by using other means available to ensure the message has been relayed.

33.21b - Originating Dispatcher

The originating dispatcher shall:

1. Notify the receiving forest dispatcher the flight is being conducted on a filed FAA flight plan. Include the aircraft identification, pilot's name, manifest information, and planned flight schedule.

2. Inform the pilot of any instructions or information not previously covered in the resource order or verbal instructions.

33.22 - Preflight Planning

The pilot-in-command must ensure that the preflight planning and the operation of the flight are completed and in compliance with the Federal Aviation Regulations (FARs) and the requirements of FSM 5700 and this Handbook.

33.23 - Flight Plan Amendment and Cancellation

The pilot-in-command is responsible for amendments to the original flight plan, closing of the FAA filed flight plan, and/or cancellation with Air Traffic Control (ATC) when, in the pilot's opinion, the flight cannot operate or continue to proceed safely as planned.

33.24 - Overdue Aircraft

An aircraft is considered overdue one hour after the filed arrival time. Responsible aviation managers or coordination centers should initiate preliminary actions, such as a followup inquiry, when no word has been received 30 minutes beyond the scheduled time of arrival. The following information should be readily available as followup:

1. Aircraft type and registration number.
2. Name of the pilot(s).
3. Names and address of passengers.
4. Color of aircraft.
5. Type mission.
6. Last known location.
7. Point of departure.
8. Destination.
9. Filed flight plan - FAA or Forest Service.
10. Estimated time of arrival.
11. Flight following responsibility.

33.24a - Reporting

The first person or organization to determine that an aircraft is overdue shall initiate overdue aircraft reporting requirements in accordance with a National or Regional aviation safety plan (FSM 5720) and shall:

1. Notify the nearest FAA Flight Service Station when the flight has been conducted under Forest Service flight following procedures.
2. Notify the Regional Aviation Officer.
3. Notify the Regional Aviation Safety and Training Manager.

4. Notify the Forest Aviation Officer.

5. Complete Form FS-5700-14/AMD-34, SAFECOM Report for all overdue flights.

In the event the aircraft is not located within 1 hour and 30 minutes after becoming overdue, the FAA notifies the Rescue Coordination Center at Scott Air Force Base, Illinois.

33.24b - Search and Rescue

For related direction, see FSM 1599 and FSM 5713.53.

Although search and rescue is not considered a Forest Service mission, personnel are involved from time to time. When Forest Service personnel become involved, follow procedures outlined in the applicable Forest aviation safety plan to initiate search and rescue operations.

33.25 - Aircraft Accidents and Incidents with Potential

For related direction, see FSM 5720.

Immediately following an aircraft accident at an airport, the base manager shall initiate rescue by:

1. Assisting survivors and rendering first aid until relieved by medical personnel.

2. Providing exits away from the danger of post-crash fire by moving the survivors a safe distance away from the aircraft.

3. Ensuring that unauthorized personnel remain clear of the crash area.

4. Establishing the no smoking rule in proximity to raw fuel spills and fumes.

5. Searching the wreckage (if possible) for other survivors.

6. Preserving the accident site, using local law enforcement personnel to secure the site when available.

7. Adhering to notification procedures.

8. Obtaining the names, addresses, and written statements of witnesses.

9. Completing SAFECOM Form (AMD-34/FS-5700).

34 - LARGE TRANSPORT CONTRACT AIRCRAFT

For related direction, see FSM 5703.2, and sec. 11.12 of this Handbook.

34.1 - Large Transport Certification

1. Large transport aircraft under contract that are used for passenger and/or cargo transportation shall be certified and operated under Title 14, Code of Federal Regulations, parts 119, 121, and 125. The authorized Forest Service aircraft and inspector pilots shall require large transport aircraft contractors to provide copies of their FAA operating certificates, operations specifications, listing of approved aircraft by registration number, and the names and crew positions of assigned flight crewmembers.

2. The flight crewmembers must be listed in the contractor's FAA-approved operations specifications.

34.11 - Air Carriers

For additional direction, see FSM 5713.5 and 5713.6. Certification requirements are not applicable for flights on scheduled airlines or scheduled commuter airlines (14 CFR 121, 135.2).

34.2 - Large Transport Operations

See sec. 39 for further direction about airfields.

1. Operation as "public aircraft" does not alter the requirement for compliance with 14 CFR 121.

2. FSM 5714.11, exhibit 04, Exemption 392, permits a deviation from 14 CFR 121 and 135.2 for transportation of persons between staging areas and airfields not equipped with radio aids or not meeting all of the requirements of FAR 121 and 135.2 for large aircraft.

34.21 - Personnel

Assign only qualified personnel who meet the Forest Service qualifications (FSH 5109.17, chapter 20) for fixed-wing base manager, deck coordinator, fixed-wing parking tender, and loadmaster. Large aircraft staging supervisors involved in handling or supervising hazardous materials, shall meet training requirements found in section 34.31 of this handbook.

34.22 - Loading and Unloading Operations

Supervisors for large transport aircraft shall ensure that large transport operators handle baggage and cargo in accordance with the operator's FAA operating certificate and operations manual (14 CFR, parts 121 and 125, and section 135.2).

Prior to any passenger and/or cargo loading or unloading, all engines must be shut down. However, under certain circumstances passengers and baggage may be loaded or unloaded with one engine running on the opposite side of the aircraft when all the following conditions have been met:

1. Ground power is not available.

2. A plan for large transport operations has been approved by the National Aviation Operations Officer and the contracting officer.

3. The flight deck is occupied by a flight crewmember or a person qualified to operate and taxi the aircraft.

4. An engine guard is positioned at the operating engine.

5. Passengers are restricted from the side of the aircraft with the operating engine, and marshalling procedures are in place to ensure safe passenger egress.

6. The aircraft parking area is clear and aircraft marshalling procedures are in place.

7. Passengers (fire crews) are instructed to remain clear of the aircraft until directed to proceed under the marshalling plan.

8. The Fixed-Wing Flight Manager has coordinated with the fixed-wing base manager and/or flight crew regarding the specific requirements for loading and unloading passengers and baggage.

34.23 - Load Manifest

A load manifest must be completed for each takeoff carrying passengers and/or cargo in accordance with the operating specifications and requirements in 14 CFR 135.63 and must include the:

1. Number and names of passengers.

2. Takeoff gross weight.

3. Maximum allowable takeoff weight for that flight.

34.24 - Large Transport Staging

For additional direction, see FSM 5706. Comply with the procedures outlined in the Interagency Airtanker Base Operations Guide (IABOG).

34.3 - Hazardous Materials

(For additional direction, see FSM 5714.2.) All hazardous materials shipped by air must be transported in accordance with the hazardous materials regulations at 49 CFR, part 175. The only exemption from this requirement is a Department of Transportation Exemption 9198 (FSM 5714.2). This exemption allows carriage of certain hazardous materials that are specifically identified. All provisions of the exemption must be met and a copy of the exemption carried aboard the aircraft.

34.31 - Hazardous Materials Training

Forest Service employees assigned duties and responsibilities for handling or carriage of hazardous materials shall have received, within the preceding 3 years, training and certification by the unit manager on:

1. The proper shipment certification, packaging, marking, labeling, and documentation for hazardous materials.

2. The compatibility, loading, stowing, and handling characteristics of hazardous materials.

Forest Service employees not meeting the requirements in the preceding paragraphs 1 and 2 may handle hazardous materials if working under the direct supervision of a person meeting the requirements of this section.

35 - AIRTANKERS AND HELITANKERS

Airtanker operations must be conducted in accordance with 14 CFR, parts 91 and 137 that govern all civil aircraft, except as provided for in Exemption 392 (FSM 5714, ex. 01).

Operation as “public aircraft” does not alter the requirement for compliance with the rules for civil aircraft (14 CFR, parts 91 and 137) and the aviation regulations of the States in which the aircraft are operated, except as provided for in the preceding paragraph.

35.1 - Airtanker and Helitanker Certification - Inspection Requirements

35.11 - Forest Service Contracted or Procured

Airtankers and helitankers contracted or procured by the Forest Service must be approved by the Interagency Airtanker Board (IATB) and must have been issued a standard or restricted Airworthiness Certificate for the aircraft by the Federal Aviation Administration (FAA) or have been approved under a previously published Type Certificate (TC) with an approved FAA supplemental type certificate (STC) for the installed retardant or suppressant tank.

1. ATC and/or STC must have been issued individually for each aircraft and/or tank installation or as a multiple TC or STC for a specific aircraft make and model and retardant tank system.

2. Airtankers and helitankers must have been issued a Standard or Restricted Airworthiness Certificate.

35.12 - Interagency

Cooperator or military airtankers or helitankers not fully meeting the IATB requirements may be used on Forest Service fires, provided they meet the requirements listed in FSM 5713.43 and 5713.44 and provided that a memorandum of understanding is in effect between the Forest Service and the cooperating agency.

35.13 - Former Military Aircraft

Airtankers and helitankers configured from former military aircraft, having an FAA TC based on military requirements in lieu of a manufacturer's TC, must be in compliance with all applicable time compliance technical orders (TCTO's) or Navy Service Bulletins, including:

1. Where the FAA has established more restrictive limits, those limits shall prevail.

2. Any modification or alteration which may affect aircraft performance, flight characteristics, or operational limitations must be approved by the Interagency Airtanker Board (IATB).

35.14 - Airtanker Takeoff Requirements

1. In accordance with the manufacturer's recommended normal takeoff configuration, ensure that four-engine airtankers (except turbine powered) are capable of accelerating on all engines to takeoff safety speed and liftoff within 80 percent of the effective runway. Use the takeoff safety speed as defined as the manufacturer's or FAA-approved safety speed or, if not available, 115 percent of power-off stall speed.

2. Ensure that two- and three-engine airtankers meet accelerate stop requirements. The airtanker must be capable of accelerating on all engines to the manufacturer's or FAA-approved decision speed, experience a failed engine, and either continue to accelerate to takeoff with a failed engine within the remaining runway, or come to a complete stop on the runway.

a. For airtankers manufactured under 14 CFR, part 25, Transport Category, such as Douglas DC-4, DC-6, and DC-7, the takeoff distance may include a legal "stopway" (14 CFR, part 1.1).

b. Stopways must have been designated and approved by the airport authorities for use in decelerating the airplane during an aborted takeoff.

3. For turbine-engine-powered airtankers, in addition to the compliance requirements in the preceding paragraphs 1 and 2, ensure that:

a. The accelerate-stop distance is no greater than the length of the runway plus the length of the stopway (if present) (14 CFR, part 1.1);

b. The takeoff distance is no greater than the length of the runway plus the length of the "clearway" (if present) (14 CFR, part 1.1); and

c. The takeoff run is no greater than the length of the runway (14 CFR, part 91.605 (c) (3)).

35.2 - Retardant and Suppression Use

35.21- Approved Retardants and Suppressants

Use only approved retardant chemical formulations of fire retardant that currently are identified on the national list of approved retardants/suppressants available through the San Dimas Technology and Developmental Center (SDTDC) or the Missoula Technology and Development Center (MTDC).

35.22 - Retardant and Suppressant Loading Locations

Airtankers, except single-engine airtankers (SEATS), must be operated and loaded with chemical solutions of fire retardant liquids only from approved airtanker base locations currently listed in the Interagency Airtanker Base Directory, available through NIFC (see chapter zero code, sec. 06 of this Handbook) or, in an emergency, from temporary retardant base locations. Temporary retardant base locations must be approved by the Regional Aviation Officer or the National Aviation Operations Officer.

35.23 - Guidelines for Aerial Application Near Waterways

Avoid aerial application of retardant or foam within 300 feet of any waterway or body of water including lakes, rivers, streams and ponds whether or not they contain aquatic life. Exceptions to these guidelines are allowed when:

1. Life or property is threatened and use of retardant or foam is reasonably expected to alleviate the threats.

2. Alternative line construction tactics are not available due to terrain constraints, congested area, life and property concerns, or lack of ground personnel.

3. Potential damage to other natural resources outweighs possible loss of aquatic life.

For related direction, see FSH 5109.19, sec. 52.2.

35.24 - Loading Operations

1. Load Forest Service contracted large airtankers with fire retardant or water measured in pounds.

2. Report each retardant load total weight to the airtanker pilot-in-command. Use retardant load total weight in the preflight completion of the aircraft's weight and balance computation.

3. Follow the requirements for retardant/water metering:

a. Maintain retardant/water motionless measuring devices at each airtanker base, and ensure their capability to record the weight of the retardant loaded into an airtanker in pounds prior to flight.

b. Keep a copy of a departing airtanker's weight and balance computation for a period of one year in the airtanker base manager's files.

c. Calibrate motionless measuring devices at airtanker bases no less than every 24 calendar months. Do not use airtanker bases that have not done a motionless measuring device calibration within 24 calendar months.

35.25 - Retardant Hot Loading - Turbine Airtankers

In order for a specific airtanker to be hot loaded with retardant while any engine is running, the local base supplement must contain an operations plan with authorization to do so from the Regional Aviation Officer (RAO), per requirements in the Interagency Airtanker Base Operations Guide, appendix E. (For reference, see sec. 06 of this Handbook.)

35.26 - Congested Area Retardant Operations

For related direction, see FSM 5714 and 14 CFR, part 137.51.

1. Takeoff. Conduct airtanker takeoffs over congested areas under the accelerate-stop requirements specified in14 CFR, part 137.51.

2. Retardant Dropping. Conduct all aerial retardant operations over congested areas in accordance with the Forest Service Grant of Exemption 392 (FSM 5714.11, exhibit 01).

a. Drop Accuracy. Drop retardant as accurately as possible on the designated target area of the fire.

b. Minimum Drop Height. The minimum drop height for heavy fixed-wing airtankers is 150 feet above the ground or canopy cover, whichever is higher.

35.27 - Safe and Effective Drop Height - Fixed-wing Airtankers

Depending on the volume of retardant dropped at one time, safe and effective drop height increases from the minimum 150 feet as quantity increases. The air tactical group supervisor and/or air tanker coordinator (Leadplane/ASM Pilot) shall ensure that large quantities of retardant are dropped from a safe and effective drop height that enables the retardant to enter the fuel surface vertically.

35.3 - Airtanker and Helitanker Administration

35.31 - Airtanker Dispatch Rotation

1. The first dispatch each day must be the airtankers, including ones returning from days off, that are assigned to their designated base.

2. Thereafter, dispatch all airtankers in rotation, regardless of the location of the incident, except when:

a. The next airtanker in rotation has an operating restriction at the new base to which it is assigned.

b. Changing the rotation would result in a demonstrated benefit to the agency and the contractor. Acceptable reasons for changing the rotation are:

(1) Returning contractors to their designated base for a new incident.

(2) Returning contractors to their designated base.

(3) Repositioning contractors to a base where their maintenance crews or supplies are available.

c. Transient airtankers are returning to contract availability after day(s) off, in which case these airtankers begin at the end of the rotation line.

d. Additional contract airtankers are brought on to supplement the primary contract airtankers, in which case these additional airtankers begin rotation after the primary contract airtanker(s) at the beginning of each day.

e. Modular Airborne Fire Fighting Systems (MAFFS) and Canadian airtankers are brought on for the purpose of supplementing the commercial airtanker fleet, in which case such airtankers begin rotation after the contract airtanker(s) at the beginning of each day.

35.32 - Startup and Cutoff Times

To reduce the hazards of airtanker retardant drops in the early morning and late afternoon hours, dispatch shall comply with the limitations on times when airtankers may drop retardant on fires. The following limitations apply to the time the aircraft arrives over the fire to conduct the drop, not to the time the aircraft is dispatched from a base.

1. Limitations on Startup and Cutoff Times. Normally, airtankers are dispatched to arrive over a fire not earlier than 30 minutes after official sunrise (startup) and not later than 30 minutes before official sunset (cutoff).

2. Exceptions. Airtankers may arrive over a fire as early as 30 minutes prior to official sunrise and may drop as late as 30 minutes after official sunset provided a qualified air tactical group supervisor or airtanker coordinator (Leadplane/ASM pilot):

a. Is on the scene;

b. Has determined, with concurrence with the pilot-in-command, that visibility and other safety factors are suitable for dropping retardant; and

c. Notifies the appropriate dispatcher of this determination.

3. Determination of Official Sunrise, Startup, Cutoff, and Sunset Times. Each airtanker base and dispatch office must have tables showing the official sunrise, startup, cutoff, and sunset times at those locations.

4. Determinations for Airtanker Dispatch. For airtanker dispatch, use the official sunrise, startup, cutoff, and sunset times of the airtanker base nearest the fire and comply with the limitations in the preceding paragraphs 1 and 2.

35.33 - Takeoff Computation Data

Compute runway requirements for takeoff based on the actual takeoff gross weight (TOGW) as documented with weight and balance data. Ensure compliance with all weight and speed restrictions placed on the aircraft by the FAA. Include the following factors to determine the minimum weight requirements for takeoff, beginning from the basic operating weight (BOW) of the aircraft in airtanker configuration:

1. Density altitude with International Standard Atmosphere (ISA) plus 30 degrees Fahrenheit.

2. Required flight crew weights (14 CFR, part 91.313d).

3. Flight kits and necessary publications and materials.

4. Necessary operating fluids (except fuel). Some newer turbine-powered airtankers require a certain amount of "slosh" fuel that is included in the basic operating weight (BOW). In that case, the computations begin with the BOW.

5. Two and one-half hours of fuel (minimum), computed by flight manual recommended takeoff power/fuel burn values and:

   a. Recommended climb power/time to climb fuel burn computation to 5,000 feet;

   b. Level flight cruise configuration at 55 percent rated power for reciprocating powered airtankers; and

   c. Cruising at best speed without exceeding manufacturer or FAA limitations for turbine-powered airtankers; FAA limitations include a 250-knot speed restriction below 10,000 feet MSL.

6. Contract retardant load calculated at an average 9 pounds per gallon.

7. Fly-away kits (spare parts) and other supplies aboard the aircraft.

35.4 - Airtanker Crew Proficiency Flights

For related direction, see sec. 15.2 of this Handbook. Airtanker pilots-in-command, copilots, and flight engineers (when applicable), in addition to the requirements in section 15.2, shall maintain flight crew readiness and proficiency requirements and must fly a minimum of 20 minutes during any 15-day period. Ferry time, training, or fire-related flying may count toward meeting this requirement.

36 - SPECIAL MISSIONS

For definition, see FSM 5710.5

36.04 - Responsibility

Observer/Air Tactical Group Supervisor (ATGS). The observer/ATGS determines the intended route of flight, objectives, and expected duration and obtains agreement from the pilot-in-command. The observer/ATGS has the responsibility to:

1. Trace the planned flight route on aeronautical charts showing the height of terrain, drainages, rivers, and other landmarks suitable for navigation.

2. Ensure the pilot understands the aspects to be observed from the observer's or ATGS's side of the aircraft.

3. Maintain contact with local Forest dispatch and/or the area coordination center and accomplish flight following in accordance with agency policy.

36.1 - Communications

1. VHF-FM Radio. VHF-FM radio must be the primary communications radio for the observer, the ATGS, and the pilot. Following takeoff and sterile cockpit procedures found in section 36.53, establish FM radio communications with the dispatcher. The following information must be transmitted:

   a. Aircraft identification.

   b. Time airborne.

   c. Destination (reconnaissance area).

2. VHF-AM Radio. During times when communication requires contact on the VHF-AM radio, coordinate with the pilot for frequency selection and for access to the VHF-AM equipment.

36.2 - Reconnaissance and Air Tactical Missions

Reconnaissance missions require a high degree of competence and judgment on the part of the pilot and observer. The pilot must be familiar with mountain flying techniques, including the meteorological events causing mountain currents and winds.

36.21 - Performance Criteria

1. General Requirements. Flight patterns should be flown to provide the observer/ATGS the best possible perspective to view the terrain. Flight routes must be planned and selected in consideration of mountain topography to provide the best views with the least amount of maneuvering. The pilot shall keep the observer advised of the flight conditions, such as adverse weather, fuel condition, and concerns with any segment or route of flight, including any requested maneuver with which the pilot does not feel comfortable.

2. Aircraft. Single-engine airplanes used for special missions (FSM 5710.5) must have a power loading of not more than 13.5 pounds per horsepower. Multi-engine airplanes used for special missions (FSM 5710.5) must be capable of at least 200 horsepower per

engine; any engine developing less than 240 horsepower must be turbo/supercharged. Regional Aviation Officers may grant special approvals for single- and multi-engine airplanes not meeting the requirements for use in that Region under specifically defined conditions. These conditions must be noted on Aircraft Approval Card.

3. Operating Airspeed. The normal cruise speed for the type aircraft should be used for reconnaissance missions. Certain situations may require a slower airspeed to adequately observe a specific area or developing ground situation. Conduct reduced airspeed or slow flight at no less than 130 percent of the stall speed for the aircraft configuration.

4. Operating Altitude.

a. Normally, reconnaissance flights are conducted at altitudes which provide the observer with a panoramic view of the surrounding terrain. Ridge-crossing altitudes should be planned for a minimum crossing altitude of 1,000 feet above ground level (AGL). The aircraft should always be in a position to effect a gliding turn to a down canyon heading without the degree of bank exceeding 30 degrees and without being rushed.

b. Altitude Selection Criteria. Determine safe and effective mission altitudes by:

(1) Topography.

(2) Sun angle and direction.

(3) Degree of cloud and terrain shadow.

(4) Presence of haze.

(5) Height of crossing ridges.

36.3 - Observing/Reporting [Reserved]

36.4 - Mountain Flying

Standards and procedures for mountain flying techniques are contained in the Pilots Handbook for Smokejumper and Mountain Flying (FSM 5706).

36.5 - Back Country Airstrips [Reserved]

36.6 - Uncontrolled Airports

Pilots shall be alert, look out for other traffic, and exchange traffic information with other pilots when approaching or departing airports with no operating tower. All Forest Service employed or contracted pilots shall utilize the common traffic advisory frequency (CTAF) designated for that airport, communicate their intentions and obtain and exchange airport and traffic information.

36.61a - Arrivals

1. When two or more aircraft are approaching an airport for the purpose of landing, the aircraft at the lower altitude has the right of way; however, the lower aircraft must not take advantage of this rule to cut in front of another plane that is on final landing approach or to overtake that aircraft (14 CFR Part 91.113(f)).

2. Airports without operating control towers usually have a segmented circle visual indicator system. The device provides visual information on established traffic patterns and comprises the following components: wind direction indicator, landing direction indicator, landing strip indicators, and traffic pattern indicators.

   a. Before entering the traffic pattern at an uncontrolled airport or an airport without an operational tower, the pilot should consult the indicator for the approach end of the runway to be used.

   b. When approaching for landing, all turns must be made to the left unless the airport displays approved light signals or visual markings indicating that turns should be made to the right.

   c. Helicopter pilots shall avoid the flow of fixed-wing aircraft (14 CFR Part 91.126).

3. The following procedures from the Federal Aviation Administration (FAA) and Airman's Information Manual (AIM) are recommended for fixed-wing aircraft entering the traffic pattern:

   a. Enter the traffic pattern in level flight, abeam the midpoint of the runway, at traffic pattern altitude (TPA).

   b. Maintain pattern altitude until abeam the approach end of the landing runway on the downwind leg;

   c. Complete the turn to final at least one-quarter mile from the runway; and

   d. If parallel runways exist, do not overshoot final or continue on a track that will penetrate the final approach of the parallel runway.

36.61b - Communications

Pilots of arriving aircraft shall select and monitor the designated Common Traffic Advisory Frequency (CTAF) or Air Traffic Control (ATC) assigned frequency when the aircraft is not less than 10 miles or more from the airport, except when Federal Aviation Regulations (FARs) or local procedures require otherwise. Communications must be established and maintained with the appropriate ground facility not less than 5 miles from the airport or the pilot shall make a self-announced broadcast if no ground facility is available. Communications must include the pilot's intentions, aircraft location, altitude, and any other information the pilot deems necessary to ensure the safe outcome of the arrival. Sterile cockpit procedures must be maintained at all times within a 5 mile radius of the airport.

36.62 - Departures

36.62a - Traffic Pattern

The following procedures from the FAA and Airman's Information Manual (AIM) are recommended for fixed-wing aircraft exiting the traffic pattern:

1. On takeoff, maintain runway heading until beyond the departure end of the runway.

2. If remaining in the traffic pattern, begin the turn to crosswind beyond the departure end of the runway and within 300 feet of the pattern altitude.

3. If departing the traffic pattern, continue straight out or exit with a 45-degree left or right turn beyond the departure end of the runway after reaching pattern altitude.

4. If parallel runways exist, do not continue on a track which will penetrate the departure path of the parallel runway.

36.62b - Communications

Pilots of departing aircraft shall select the designated CTAF or ATC assigned frequency, establish and maintain communications or make a self-announced broadcast prior to taxiing, and announce their departure intentions on the appropriate frequency prior to taxiing onto the active runway and prior to the takeoff roll.

1. Communications must include runway departing, direction of flight after departure, current altitude, the altitude the aircraft is climbing to and any other information the pilot deems necessary to ensure a safe outcome of the departure.

2. Sterile cockpit procedures must be maintained at all times while within a 5-mile radius of the airport.

3. The CTAF or ATC assigned frequency must be monitored continuously until the aircraft is at least 10 miles from the airport, except when FARs or local procedures require otherwise.

36.63 - Sterile Cockpit

1. Sterile cockpit is the procedure by which the crewmembers of an aircraft must not have any conversations between each other, with other aircraft, or with any ground facility unless the conversation is directly related to flying the aircraft in a safe manner. Normally, such conversation should consist of reading checklists, communicating with Air Traffic Control (ATC), Flight Service Stations, Unicom, or other aircraft with the intent of ensuring separation from other aircraft; or complying with ATC requirements. Ordering fuel, ground services, or checking in with the dispatch office should not be done during this time.

2. An exception to sterile cockpit requirements occasionally may be justified when there is a fire within 5 miles of an airport. In these cases, the departing aircraft must maintain a sterile cockpit until departing the traffic pattern and reaching final altitude. The pilot shall continuously monitor the CTAF frequency until engaged in the fire activity. Upon release, the pilot shall immediately select and/or continue to monitor the CTAF frequency and shall maintain sterile cockpit as soon as is practical, but no later than when entering into the traffic pattern.

36.7 - Small Unmanned Aircraft System Operations

1. Only Agency approved unmanned aircraft system (UAS) of any size may be used for Forest Service missions.

2. All UAS operations shall comply with Agency policy for privacy, transparency, reporting, tracking and data management. The National UAS Operations Plan provides operational guidelines and further references to policy.

3. UAS missions in the Fire Management function will adhere to the PASP or Operations Plan, as applicable.

37 - STANDARD FLIGHT PROCEDURES FOR LIGHT TWIN-ENGINE AIRPLANES

The principle source of information and procedures for light twin-engine airplanes is the airplane Flight Manual (Pilot's Operating Handbook) (FSH 5709.16, section 06). Special mission flight requirements and techniques are found in section 36 of this Handbook and the approved interagency operating guides (FSM 5706).

37.1 - Preflight

The pilot shall be familiar with the location of the basic components of the airplane and the cockpit arrangement, with emphasis on the use of the Forest Service installed avionics. The requirements for pre-flight inspection, engine start procedure (before starting, starting, after starting, and taxi) are found in applicable airplane Flight Manual (Pilot's Operating Handbook) (FSH 5709.16, section 06).

37.2 - Taxi Procedures

Pilots shall follow the following direction during taxiing operations:

1. Taxi at a moderate speed and avoid making fast turns that put abnormal side loads on the landing gear.

2. Taxi no faster than the speed that would allow the aircraft to be safely controlled in the event of a brake failure.

3. Unless passing close to another aircraft or object, always keep the nose of the aircraft following the painted taxi lines.

4. Test the brakes immediately after the aircraft begins to move;

5. Maintain a safe distance from other aircraft and objects;

6. Refer to the taxi and before-takeoff checklists in the Airplane Flight Manual (Pilot's Operating Handbook) for pre-takeoff checks.

37.3 - Takeoff

37.31 - Normal and Crosswind Takeoff

(For additional direction, see the Pilot's Operating Handbook, FSH 5709.16, sec. 06.)

Prior to flight operations, pilots shall know the airspeed limitations for the type aircraft operated. With power levers (throttles) set at recommended takeoff power, pilots should rotate at the recommended airspeed and accelerate to the best rate of climb speed (Vy), +/-5 knots. During the climb pilots shall:

1. Maintain lift-off speed at no less than the velocity of safe single-engine speed (Vsse).

2. Maintain directional control and proper wind drift correction by maintaining alignment with the runway centerline.

3. Retract the landing gear when a straight-ahead landing on the runway is no longer possible and a positive rate of climb has been established; if the takeoff flap is used, retract it after a positive rate of climb has been established.

4. Maintain takeoff power to 400 feet AGL and climb speed within +5 to -5 knots of best rate of climb (Vy).

5. Maintain directional control and proper wind drift correction throughout the takeoff and climb.

6. Use noise abatement procedures, as required.

7. Complete the prescribed checklist(s) identified in the Airplane Flight Manual (Pilot's Operating Handbook).

37.32 - Short-Field Takeoff

Prior to takeoff, pilots shall review the applicable Airplane Flight Manual (Pilot's Operating Handbook) for the recommended procedures, power settings, and speeds, including velocity of minimum control (Vmc); velocity of safe single-engine speed (Vsse); velocity best single-engine angle of climb (Vxse); velocity of best single-engine rate of climb (Vyse). During the climb pilots shall:

1. Position the airplane for maximum utilization of available takeoff area.

2. Position the flight controls and wing flaps (if applicable) for the existing conditions.

3. Advance the throttles (power levers) to takeoff power and rotate at the recommended airspeed, but in no case less than Vsse.

4. Establish a climb in the manufacturer's recommended configuration and airspeed or, in their absence, at Vx, +5/-0 until the obstacles are cleared, or until the airplane is at least 50 feet (20 meters) above the surface.

5. After clearing the obstacle, accelerate to and maintain Vy, +5/-5 knots.

6. Retract the landing gear and flaps after a positive rate of climb has been established.

7. Maintain takeoff power to a safe maneuvering altitude (no less than 400 feet AGL) and then set climb power.

8. Maintain directional control and proper wind drift correction throughout the takeoff and climb.

9. Complete the prescribed checklist(s) identified in the Airplane Flight Manual (Pilot's Operating Handbook).

37.33 - Rejected Takeoff

If a takeoff is rejected, reduce power to idle and employ normal stopping procedures maintaining positive directional control of the aircraft. Practice of rejected takeoffs should be executed at speeds of not more than 50 percent of velocity of minimum control in the air (Vmca). Follow the proper sequence of procedures identified in the Airplane Flight Manual (Pilot's Operating Handbook).

37.33a - Engine Failure During Takeoff

(For additional direction, see the appropriate checklists in the emergency section of the Airplane Flight Manual (Pilot's Operating Handbook.))

Prior to reaching Vmc, utilize the prescribed emergency procedures outlined in the applicable Airplane Flight Manual (Pilot's Operating Handbook). Promptly and smoothly close the power levers (throttles) of both engines, and maintain directional control within 15 feet (10 meters) of the runway centerline while applying the breaks as necessary.

37.33b - Engine Failure After Liftoff

Maintain directional control and utilize the prescribed Pilot Operating Handbook (POH) emergency procedures.

37.34 - Instrument Takeoff Procedures

1. Instrument takeoff procedures should be conducted in accordance with 14 CFR 91.175 (f) unless the pilot is authorized for lower-than-standard takeoff minimums.

2. Lower-than-standard takeoff minimums may be approved by the region when training and documentation of proficiency is accomplished during each instrument proficiency check.

3. Lower-than-standard takeoff minimums must not be authorized below ¼ mile visibility (also see sec. 22.2 2d).

4. Climb and cruise recommended standards found in the applicable Airplane Flight Manual (Pilot's Operating Handbook) should be used.

37.4 - Approach and Landing

37.41 - Normal and Crosswind Approach and Landing

For additional direction, see the applicable Airplane Flight Manual (Pilot's Operating Handbook), for normal and crosswind landing procedures, power settings, and airspeeds.

Pilots shall consider the following procedures and applied skills for airplane approach and landing:

1. Comply with the published or indicated traffic pattern requirements of the intended uncontrolled airport for landing and, at controlled airports, instructions provided by air traffic control (ATC).

2. Consider the wind conditions, landing surface, length, and obstructions.

3. Select a suitable touchdown point and establish the recommended approach and landing configuration and adjust the power and flight attitude as required.

4. Maintain a stabilized approach and recommended airspeeds with gust correction factors applied, +/-5 knots.

5. Remain aware of the possibility of wind shear and/or wake turbulence and maintain crosswind correction (when applicable) and directional control throughout the approach and landing.

6. Complete the approach, before-landing, and after-landing checklists, or the checklist sequence prescribed for the type aircraft.

37.41a - Approach and Landing - Inoperative Engine

See the applicable FAA-approved Airplane Flight Manual (Pilot's Operating Handbook) for the procedures, power settings, and airspeeds for inoperative engine procedures in the type aircraft being operated.

Pilots must also adhere to the following requirements for an approach and landing with an inoperative engine:

1. Recognize and identify the engine failure promptly.

2. Feather the affected propeller (if simulated, set zero thrust on the affected engine), check for feather, and check for fire.

3. Attain the best engine inoperative airspeed and trim the airplane for control.

4. Follow the prescribed emergency checklist to verify procedures for securing the inoperative engine.

5. Establish a bank into the operating engine, as necessary (approximately 5 degrees) for best performance.

6. Attempt to determine the reason for the engine malfunction and monitor the operating engine and update decisions based on observations.

7. Determine if it is feasible to restart the affected engine; provided there has been no evidence of fire or fuel leak, follow the appropriate restart procedures contained in the Airplane Flight Manual (Pilot's Operating Handbook).

8. Plan and follow a flight pattern to the selected landing area and complete the prescribed emergency and landing checklists.

37.42 - Short and Soft Field Approach and Landing

Landing operations should not be planned into short, soft, landing areas. However, when circumstances require landing operations in this category, follow the procedures outlined in the applicable Airplane Flight Manual (Pilot's Operating Handbook) and the following:

1. Consider the wind conditions, landing surface, and obstructions and select the most suitable touchdown point, normally as near the approach end of the landing surface as possible.

2. Establish the recommended approach and landing configuration and adjust the approach angle and power as necessary, maintaining a stabilized approach, controlled rate of descent, and recommended airspeed (or, in the absence of an airspeed of not more than 1.3 Vso, with gust correction factors applied, +/-5 knots).

3. Touch down at the minimum descent rate and airspeed and with the airplane's longitudinal axis aligned with the surface centerline. Make full use of wheel brakes and/or reverse thrust (if available).

4. After landing on the soft surface, position the flight controls appropriately and maintain sufficient speed to taxi.

5. Complete the after-landing checklist.

37.5 - In-Flight Emergencies

Refer to the emergency section of the appropriate Airplane Flight Manual (Pilot's Operating Handbook) for the emergency procedures listed and applicable emergency checklists.

37.51 - Emergency Descent

Refer to the applicable Airplane Flight Manual (Pilot's Operating Handbook) for the recommended emergency descent procedures for the type aircraft operated and:

1. Recognize immediately such situations as cabin depressurization and cockpit smoke and/or fire that require an emergency descent.

2. Establish the prescribed airspeed and configuration for the emergency descent as recommended by the manufacturer, without exceeding safety limits.

3. Establish the appropriate power settings.

4. Maintain orientation, division of attention, and proper planning.

5. Recognize the requirement to establish positive load factors during the descent.

6. Complete the prescribed checklist(s).

37.6 - Anti-Ice/De-Ice

Use anti-icing and de-icing systems as necessary. Pilots shall be familiar with the location and operation of the anti-ice/de-ice systems in each type aircraft operated and with the recommended procedures to follow in the event of failure of any of those systems, as outlined in the applicable Airplane Flight Manual (Pilot's Operating Handbook) and the approved emergency checklists.

37.61 - Icing Limitations - Beechcraft 58 Baron

As a precaution, pilots flying Beechcraft 58 and 58P Barons shall comply with the following requirements:

1. Do not fly into known or forecast severe icing conditions.

2. Do not fly into known or forecast moderate icing conditions for sustained periods.

3. Flying into known or forecast moderate icing conditions is allowed if the latest available weather forecast and pilot reports indicate that these icing conditions would be encountered only for a brief period of time, and the intended route and aircraft capabilities would allow for a climb or descent to less than moderate icing conditions.

4. When un-forecasted moderate or severe icing is encountered in flight, disengage the autopilot and exercise the elevators and elevator trim tabs frequently to prevent ice buildup and to control jamming. Pilots shall take immediate and appropriate action to leave the area of icing conditions.

5. Never pitch over to sustained dive angles of more than 15 degrees.

37.7 - Instrument Approach Standards

37.71 - Instrument Flight Rules (IFR) Approach Procedures

Flights conducted under Instrument Flight Rules (IFR) shall comply with the FARs applicable for each type of instrument approach, in accordance with 14 CFR 61 and 91, and Chapter 5, Air Traffic Procedures, Aeronautical Information Manual (AIM) (FSH 5709.16, sec. 06).

37.71a - Instrument Approach Procedures

The pilot-in-command shall ensure that during VOR/TAC, non-directional-beacon, instrument landing system, and global positioning system instrument approaches that the correct IAP chart is immediately available for quick, easy reference; the pilot-in-command shall review the information for familiarity with the surrounding environment, terrain, obstacles, appropriate altitudes, headings, distances, radio frequencies, and other specified limitations and/or information pertinent to the instrument approach. Other requirements for the approach include:

1. Establishing two-way communications with ATC or the appropriate ground contact using proper radio phraseology and technique.

2. Selecting, tuning, identifying, and confirming the operational status of the navigation equipment to be used for the approach procedure.

3. Complying with all clearances issued by ATC.

4. Maintaining instrument scan and staying alert for inaccurate or inoperative information sources.

5. Advising the ATC immediately anytime the pilot is unable to comply with any clearance.

6. Establishing the appropriate aircraft configuration and airspeed in consideration of turbulence and wind shear and completing the checklist items appropriate to this phase of flight.

7. Prior to beginning the final approach segment, maintaining altitude within 100 feet and heading within 10 degrees; allowing less than a full-scale deflection of the course deviation indicator (CDI), or within 10 degrees in the case of a radio magnetic indicator (RMI); and maintaining airspeed within 10 knots.

8. Applying the necessary adjustments to the published minimum descent altitude (MDA) and visibility criteria for the aircraft approach category when required, such as:

a. Class II Notice to Airmen (NOTAMS).

b. Inoperative aircraft or ground navigation equipment.

c. Inoperative visual aids associated within the landing environment.

d. National Weather Service (NWS) reporting factors and criteria.

9. Establishing a rate of descent and track that will ensure arrival at the minimum descent altitude (MDA) prior to reaching the missed approach point (MAP), with the aircraft continuously in a position from which descent to a landing on the intended runway can be made at a normal rate using normal maneuvers.

10. While on the final approach segment, allowing no more than a three-quarter scale deflection of the CDI, or within 10 degrees in the case of an RMI, and maintaining airspeed within 10 knots.

11. Maintaining the MDA, when reached, within +100 feet, -0 feet to the MAP.

12. Executing the missed approach procedure when the required visual references for the intended runway are not distinctly visible and identifiable at the MAP.

13. Executing a normal landing from a straight-in or circling approach when appropriate.

37.72 - Instrument Approach Procedure Chart

Instrument approach procedures (IAP) provide an instrument flight rules (IFR) descent from an enroute environment to a point where a safe landing can be made. Pilots shall understand these procedures and the Air Traffic Procedures in Aeronautical Information Manual (AIM) (sec. 06). Pilots shall understand all IAPs (standard, special, civil, and military) which are based on joint civil and military criteria.

37.72a - Civil Airports

37.72b - Military Airports

Forest Service pilots flying into or out of military airports shall comply with the IAPs and takeoff and landing minimums prescribed by the authority having jurisdiction at those airports (14 CFR 91.175g).

37.73 - Missed Approach Procedure

When a landing cannot be accomplished, the pilot shall advise ATC. When the missed approach point (MAP) is reached, as defined in the approach procedure chart, the pilot shall comply with the missed approach instructions for the procedure being used or with an alternate missed approach procedure specified by ATC. Pilots-in-command shall adhere to the following requirements for missed approach procedures:

1. Be knowledgeable of the elements related to missed approach procedures (MAP) associated with standard instrument approaches.

2. Initiate the missed approach procedure promptly by applying power, establishing a climb attitude, and reducing drag in accordance with the aircraft manufacturer's recommendations.

3. Report to ATC when beginning the missed approach procedure.

4. Comply with the published or alternate missed approach procedure.

5. Advise ATC any time the aircraft is unable to comply with the clearance, restriction, or climb gradient.

6. Follow the recommended checklist items appropriate to the go-around procedure.

7. If appropriate, request ATC clearance to the alternate airport, clearance limit, or as directed.

8. Maintain the recommended airspeed(s) within +/-10 knots; heading, course, or bearing within +/- 10 degrees; and altitude(s) within + 100 feet during the missed approach procedure.

37.74 - Circling Approach Procedure

Published circling minimums provide obstacle clearance when pilots remain within the appropriate area of protection. Pilots shall remain at or above the circling altitude until the aircraft is continuously in a position from which a descent to a landing on the intended runway

can be made. Circling may require maneuvers at low altitude, at low airspeed, and in marginal weather conditions. Pilots shall use sound judgment, possess an in-depth knowledge of their own capabilities, and fully understand the aircraft capabilities. The following basic rules apply to circling approaches:

1. There is no restriction from passing over the airport or other runways. Fly the shortest path to the base or downwind leg, as appropriate, considering existing weather conditions.

2. Circling maneuvers may be made while VFR or other flying is in progress at the airport. Standard left turns or specific instruction from the controller for maneuvering must be considered when circling to land.

3. At airports without a control tower, it may be desirable to fly over the airport to observe wind and turn indicators and other traffic which may be on the runway or flying in the vicinity of the airport.

37.74a - Circling Approach Standards

For additional direction, see section 24.23. Pilots shall:

1. Ensure that maneuvers are within the capabilities and limitations of the aircraft.

2. Consider possible wind shear and turbulence.

3. Confirm the direction of traffic.

4. Adhere to all restrictions and instructions issued by ATC.

5. Never exceed the visibility criteria or descend below the minimum circling altitude until in a position from which a descent to a normal landing can be made.

37.75 - Landing Straight-In or Circling Approach

Pilots-in-command are responsible for ensuring an adequate knowledge of the elements related to the environmental, operational and meteorological factors which affect a landing from a straight-in or a circling approach, including:

1. Transitions at the decision altitude (DA), minimum descent point (MDA), or visual descent point (VDP) to a visual flight condition, allowing for safe visual maneuvering and a normal landing.

2. Adherence to all Air Traffic Control (ATC) advisories, such as:

a. NOTAMS;

b. Wind shear;

c. Wake turbulence; and

d. Runway surface conditions.

3. Completion of appropriate checklist items for the pre-landing and landing phase.

4. Maintenance of positive aircraft control throughout the complete landing maneuver.

38 - AVIATION FUELS

38.1 - Aviation Gasoline

Always use the grade of fuel that is authorized for a specific aircraft engine and that is specified in the Airplane Flight Manual (Pilot's Operating Handbook). All aviation gasoline is color coded to enable the user to determine fuel type and to provide for early detection of fuel leaks. AvGas 100LL (low lead) is color coded blue with an octane rating of 100.

For flight planning and weight and balance purposes, the average weight of a gallon of AvGas is 6.0 pounds per gallon with a flashpoint of -49 degrees Fahrenheit.

38.2 - Turbine Fuels

Use the correct turbine fuels. Commercially available turbine, or jet fuel, is Jet A and Jet A1. Jet A fuels are kerosene based and are a pale straw color.

38.21 - Grades

Use the correct grade of jet fuels. Military grades of jet fuels are performance-related to the aircraft and mission. The commercial grade is JP-8 and contains additives, such as glycol ether and other chemicals to prevent freezing at high altitudes, antibacterial growth agents, and static electricity suppressant.

38.22 - Specifications

Use the Airplane Flight Manual (Pilot's Operating Handbook) for determining the correct specifications for the type of jet fuel approved, additives, and turbine oil for the installed power plant(s). For flight planning and weight and balance purposes, the average weight of jet fuel is 7.0 pounds per gallon. The flashpoint is 100 to 135 degrees Fahrenheit depending on the type fuel and manufacturer.

38.3 - Fuel Hazards

Follow additional direction related to the handling and transport of hazardous fuels and materials. Aviation grade fuels are subject to the hazardous materials regulations of the Department of Transportation (DOT), due to their extreme properties of flammability.

The Material Safety Data Sheets (MSDS) contain specific information for aviation fuels regarding firefighting techniques and Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and DOT regulations. The MSDSs are available from the local fixed-base operator (FBO) and/or the bulk fuel supplier.

38.4 - Fuel Transfer and Storage

Follow the most recent recommended fuel transfer and storage procedures that are contained in the National Fire Protection publications NFPA, Standard for Tank Vehicles for Flammable and Combustible Liquids, NFPA 385, Storage of Flammable and Combustible Liquids on Farms and Isolated Sites, and NFPA 395, and Standards for Aircraft Fuel Servicing (NFPA 407) (sec. 06). These publications are updated annually.

38.5 - Refueling Systems/Methods

38.51 - Single-Point Connection

Fuel is fed into the aircraft through high-pressure hoses at a single fueling point located on the aircraft. For single-point refueling, never connect more than one fuel truck to the same aircraft fueling manifold at any one time, except where precautions have been taken to prevent fuel from flowing back into the fuel truck due to a difference in pressures. Generally use single-point fueling because the fumes escaping are exiting through the fuel vents, cutting down on the amount of vapors available to support combustion.

38.52 - Over-the-Wing Refueling

Although over-the-wing refueling is the most common method used throughout Forest Service aviation operations (including by interagency cooperators) extreme precautions must always be taken when engaged in, or operating near, “open” or over-the-wing fueling, because:

1. There are increased fuel vapors present due to exposed raw fuel meeting the air between the nozzle and filler hole.

2. The chance of fuel spilling is much greater with open, over-the-wing fueling. The consequence of ignition is much greater than with the closed system from both the raw fuel and fuel vapors.

38.6 - Safety Precautions for Fueling

Ensure that all safety precautions have been taken prior to commencing fueling operations of any type because aircraft fueling operations present many dangers to ground handlers and equipment. Other than flight crewmembers, no Forest Service employees are allowed to perform fueling operations. Adhere to the following safety procedures for the type of fueling operation conducted:

1. Bonding. Regardless of the method or type of fuel being delivered to the aircraft, use bonding as the conductive to equalize static electricity between the fuel source and the aircraft.

*Note: Do not rely on grounding of the aircraft and/or fuel truck, because grounding does not prevent sparks at the fuel source and the grounding cable may not be sufficient to discharge the electrical charge.

2. Single-Point Fueling. Accomplish closed system fueling by first connecting the bonding cable to the aircraft from the fuel source. The connection source must be a clean, unpainted metal surface. Connect the fuel high-pressure hose to the single-point inlet on the aircraft. After fueling is done, disconnect the hose and bonding cable in reverse order of the connection.

3. Over-the-Wing Fueling. Accomplish open system fueling operations as follows:

   a. Connect the fuel source bonding cable to the aircraft.

   b. Before the fuel cap is removed, connect the hose nozzle bonding cable (clip or plug) to the aircraft fuel tank filler port. In the event the hose nozzle does not have a bonding cable, the nozzle must be touched to the filler port or fuel cap prior to removal.

   c. Keep the fuel nozzle in constant contact with the metallic filler neck throughout the fueling operation.

   d. After fueling is done, disconnect the fuel hose bonding cable in the reverse order of connection as set out in the preceding paragraph a.

4. Meteorological Events. Suspend all fueling operations until the threat of electrical discharge from thunderstorms has been removed. The presence of local thunderstorm activity is a source of static electricity having the potential to cause the combustion of fuel vapors. Where wildland fire activity is primarily caused by lightning from

thunderstorm activity, frequently those same storms are evident over or near where aircraft fueling operations are taking place. Helibase Managers, Airtanker Base Managers, and Fixed-Wing Base Managers are responsible for suspension of fueling operations as appropriate.

5. Fueling Area Security. Fueling area security is the responsibility of the Air Operation Base Managers. Ensure that all nonessential personnel are removed from the area of fueling operations, except as follows:

a. Air carriers, as approved by their FAA Operations Specifications, may be refueled while passengers are onboard provided those procedures require trained flight crewmembers to remain onboard for evacuation purposes if necessary.

b. In the event a non-ambulatory person or patient is on board an aircraft and fueling is required, follow these procedures:

(1) Provide a crewmember physically capable of assisting the person or patient, should evacuation be necessary.

(2) Ensure the availability of a crash crew in the event of a fueling spill or accident.

38.7 - Rapid Refueling for Turbine-Powered Aircraft

Aviation operations involving turbine powered fixed-wing aircraft and rotorcraft must have a plan for "rapid refueling" (fueling while the engine is running) for the type aircraft, location, and mission prior to allowing rapid fueling to occur while any engine is running.

1. For fixed-wing airplanes, rapid refueling is not authorized except in an emergency (resulting from the failure of an auxiliary power unit, for example). Rapid refueling is not authorized for turbo-prop or turbo-jet fixed-wing aircraft except for turbo-prop single-engine airtankers (SEATS) that have rapid refueling procedures detailed in the Airplane Flight Manual. (See the Pilot's Operating Handbook and Interagency Single Engine Airtanker Operations Guide for more information).

2. The National Aviation Operations Officer (NAOO) shall ensure a rapid refueling plan is in effect for the type aircraft, location, and mission prior to any rapid fueling operation. Regional Aviation Officers shall develop the rapid refueling plans for submission to the National Aviation Operations Officer and ensure the approved procedures outlined in the plan are followed.

3. Helicopter rapid refueling must be accomplished in accordance with the interagency helicopter contract standards, all applicable FAA standards, and National Fire Protection Association standards for rapid refueling in NFPA No. 407. Aircraft fuel servicing must be followed and no passengers may be on board during fueling operations.

39 - AIRPORT FACILITIES REQUIREMENTS

39.1 - Support Facilities

Requirements for airport facilities are related to the planned mission activities, the size and type aircraft planned for, the support equipment needed, and fuel types and stores required to support the intended operation(s).

39.11 - Planning

Planning for aviation operations must include the specific facility requirements needed for diversified aircraft and mission support. Fundamental consideration must be given to an adequate and sustained supply of aviation fuel meeting the specific requirements of the intended aircraft operations, such as Av-gas and/or jet fuel. Other considerations must include:

1. Area congestion.
2. Adequate staging and parking areas for large aircraft.
3. Crash/rescue equipment and timely availability.
4. Loading and unloading capabilities for cargo and/or passengers.

39.12 - Mission Facility Requirements

Facilities selected for specific aviation missions, such as retardant operations, fire crew staging, smokejumper operations, and so on, must be capable of meeting the performance requirements of the type aircraft used. Additional consideration must be given to the environmental sensitivity of the adjoining area and population, such as noise over congested areas and retardant spills. A facility maintenance plan must be prepared and submitted to the regional engineering unit responsible for approving the plan.

39.2 - Facility Safety Plan

Regional Foresters shall ensure that any airfield utilized as a base of operations, in support of aviation resource activities, has a safety plan. (See FSM 5700, chapter 20, and FSH 5709.16, and chapter 50, for additional direction for aviation safety plans.) The plan must outline contingency actions for disaster preparedness, must be kept current, and must be made readily available to assigned personnel. Contents of the safety plan should contain, but are not limited to:

1. Training plan for involved personnel.
2. Availability of crash/rescue equipment and/or location.
3. Report forms.

4. Flow charts to activate response (search/rescue).
5. Locations of nearest hospitals, telephone numbers, and capabilities, such as burn units.
6. List of emergency telephone numbers, including:
    a. Fire/crash rescue/Emergency Medical Technicians (EMTs).
    b. Aviation Representative at Forest Supervisor's office.
    c. Regional Aviation Safety Manager (RASM).
    d. Regional Aviation Officer (RAO).
    e. Geographic Area Coordination center.
    f. FAA control tower (if applicable).
    g. Flight Service Station (if applicable).
    h. Sheriff.
    i. Ambulance.
    j. Hospital.

39.3 - Facilities Inspection Guidelines

For guidelines on facilities inspection for fixed-wing airport operations, refer to the Interagency Airtanker Base Operations Guide (IABOG), Interagency Helicopter Operations Guide (IHOG) for helicopter operations (Chapter 8), and FSH 7309.11, Buildings and Related Facilities Handbook for additional criteria. Both the IABOG and IHOG are available from the National Interagency Fire Center (NIFC), Attn: Great Basin Cache, 3833 S. Development Ave., Boise, ID 83705-5354 (FSM 5706).