

FOREST SERVICE HANDBOOK  
WASHINGTON, D.C.

FSH 5709.16 - FLIGHT OPERATIONS HANDBOOK

Amendment No. 5709.16-99-1

Effective December 2, 1999

POSTING NOTICE. Amendments are numbered consecutively by Handbook number and calendar year. Post document in numerical order of chapters. Remove entire national text of the Handbook and replace with this amendment. Retain this transmittal as the first page of this document.

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Digest:

5709.16 - Changes the title of this Handbook to Flight Operations Handbook (formerly In-Service Flight Operations Handbook). Reorganizes, recodes, and revises direction throughout this Handbook to ensure conformance with requirements in interagency operations guides; to update position titles, unit names, and forms; and to reflect the incorporation of direction formerly issued in FSH 5709.11, Fixed-Wing Operations Handbook, which has been removed from the directive system.

MIKE DOMBECK  
Chief

FSH 5709.16 - FLIGHT OPERATIONS HANDBOOK  
WO AMENDMENT 5709.16-99-1  
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UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

FSH 5709.16  
FLIGHT OPERATIONS HANDBOOK

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This Handbook specifies standards and procedures for Forest Service flight operations. The direction contained in this Handbook applies to aviation activities conducted as contract aviation services and in-service flight operations. For further direction, see FSM 5700 and the interagency operations guides listed in FSM 5706.1.

02 - OBJECTIVES (FSM 5702).

03 - POLICY. (FSM 5703).

1. All flight operations shall be conducted by proficient pilots with the training, preparedness, qualifications, and skill to provide aviation services in a professional, efficient, and safe manner. The concept of pilot (aircrew) proficiency refers to the level of knowledge, experience, skill, and sound judgement that permits safe, efficient, and effective performance for Forest Service aviation missions (ch. 20).

2. Forest Service flight operations shall adhere to the principles of safety, cost effectiveness, and selection of the right aviation resources for the mission. The foundation of aviation management and operational effectiveness is safety. Use sound risk management practices to ensure acceptable levels of risk for all aviation operations. Plan for and conduct all aviation operations in accordance with the Forest Service Aviation Management Triangle: Safety, Cost-Effective, and Right.

04 - RESPONSIBILITY. Pilots are responsible for the safety of their aircraft and occupants. The pilot-in-command is the final authority as to whether or not a mission may be flown. (For direction on responsibilities of other positions in flight operations, see FSM 5704).

05 - DEFINITIONS. (FSM 5705). Definitions, abbreviations, and acronyms contained in Federal Aviation Regulation (FAR) 1 apply to Forest Service aviation operations (Title 14, Code of Federal Regulations (14 CFR), part 1). The Glossary in chapter 50 contains a list of the terms, abbreviations, and acronyms used in this Handbook.

06 - REFERENCES (For additional information on references, see FSM 5706.1). For references available from the National Interagency Fire Center (NIFC), 3833 S. Development Ave., Boise, ID 83705-5354, contact the specific NIFC unit cited.

Aeronautical Information Manual (AIM). Issued by the Federal Aviation Administration; copies are available from the Government Printing Office and commercial sources.

Aircraft Inspection Guide Handbook. Available through the Boise Aviation Unit, NIFC.

Airplane Flight Manual (AFM). Manufacturer's manual available in each aircraft operated by the Forest Service.

Facilities Inspection Guide. Issued by the Forest Service; copies are available from the Boise Aviation Unit, NIFC.

Frequency Users Guide. Issued by the Forest Service; copies are available from the Boise Aviation Unit, NIFC.

Helicopter Flight Evaluation Guide. Available from the Boise Aviation Unit, NIFC.

Interagency Air Tactical Group Supervisor Guide (IATGS). Available from the Great Basin Cache, NIFC.

Interagency Airtanker Base Directory. Available from NIFC (NFES No. 2557).

Interagency Airtanker Base Operations Guide (IABOG). Available from the Great Basin Cache, NIFC.

Interagency Helicopter Operations Guide (IHOG). Available from the Great Basin Cache, NIFC.

Interagency Leadplane Operations Guide (ILOG). Available from the Boise Aviation Unit, NIFC.

Pilots Handbook for Smokejumper and Mountain Flying. Available from the Aviation Unit, Forest Service Northern Region (R-1), Missoula, MT.

Pilot's Operating Handbook (POH). Another name for the FAA Approved Airplane Flight Manual; available in each aircraft operated by the Forest Service.

Recommended Fuel Transfer and Storage Procedures. Available from the National Fire Protection Association (NFPA 395).

Standards for Aircraft Fuel Servicing. Publications for standards on storage of flammable and combustible liquids on farms and isolated areas; available from the National Fire Protection Association (NFPA 407).

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CHAPTER 10 - ADMINISTRATION

This chapter contains procedures and operational requirements for the administration of Forest Service contract aviation services and in-service flight operations. For further direction, see FSM 5710 and the interagency operation guides listed at section 06 and FSM 5706.

10.4 - Responsibility.

10.41 - Washington Office.

10.41a - Director, Fire and Aviation Management Staff. (FSM 5704.2).

10.41b - Assistant Director, Fire and Aviation Management Staff. (FSM 5704.21).

10.41c - National Aviation Officer. (FSM 5704.22).

10.42 - Field Units.

10.42a - Regional Foresters, Station Directors, and Area Director . (FSM 5704.3, 5704.4, and 5704.5).

10.42b - Regional Aviation Officer. (FSM 5720.47c).

10.42c - Regional Aviation Safety Officer. (FSM 5720.44).

10.42d - Forest Aviation Officer. (FSH 5704.6). The Forest Aviation Officer is responsible for serving as a staff advisor to the Forest Supervisor in all phases of aviation activities taking place on the Forest.

11 - AVIATION ADMINISTRATION

11.04 - Responsibility. (FSM 5704).

11.04a - Washington Office. (FSM 5704).

11.04b - Field Units. (FSM 5704).

11.1 - Aviation Management. Each Regional Forester shall include in their Aviation Management Plans the duties, responsibilities, and authorities of all aviation management positions involved with Forest Service aviation operations in that Region and the person or persons assigned to those positions.

11.11 - Aircraft Contract Specifications. Use the standard aviation technical specifications provided in this chapter for all aircraft contracts providing aviation services to the Forest Service (FSM 5710).

11.12 - National Aircraft Contracts. The National Aviation Officer (located at the National Interagency Fire Center (NIFC)) shall ensure jointly with the Department of Interior, Office of Aircraft Services, that national aircraft contracts for the following services are developed for use at NIFC:

1. Airtankers, including single-engine airtankers (SEATS) and helitankers (SEATS are contracted nationally by the Department of Interior Office of Aircraft Services (OAS));
2. Large transport aircraft (contracted nationally by OAS);
3. Smokejumper/paracargo airplanes;
4. Heavy (type I) and medium (type II) helicopters; and
5. National aircraft maintenance for force account aircraft.

Administration of these contracts is accomplished by the Washington Office, Director of Fire and Aviation Management, and by the Regional Directors of Fire and Aviation Management in each Region where aviation missions are performed.

11.2 - Call-When-Needed and Rental Agreement Aircraft. Aircraft services procured through call-when-needed contacts, purchase orders, or rental agreements must conform to the special mission use technical requirements specified in those documents and the applicable administrative requirements in this chapter (FSM 5703.1, 5703.2, 5703.4).

11.21 - Aircraft Certifications and Operations. (FSM 5703.2).

1. Obtain and utilize contract aviation services only from contractors certified under FAR 119, 119.2, 121 and 135, except for those operations requiring certification under FAR 133 and 137 (14 CFR parts 119, 119.2, 121, 133, 135, and 137; FSM 5703.2).
  - a. Contractors are required to maintain and make available copies of their Federal Aviation Administration (FAA) operating certificates and operations and maintenance manuals to approved interagency aircraft inspectors.
  - b. Contractors are required to maintain a record of approved aircraft and pilots in accordance with FAR 133, 135.63, 137, 119.7, 121.683, and 121.685.

2. Ensure that contractor aircraft are operated in accordance with the requirements of their operating authorities (FAR's applicable to the specific contract) and the aviation regulations of States as appropriate, except for those requirements specifically waived by the Forest Service Grants of Exemption (FSM 5714) or otherwise directed in FSM 5700.

11.21a - Operations as Public Aircraft. (FSM 5703.3). The requirements for compliance with the FAR's for any Forest Service aviation operations are not altered by "public aircraft" (see FAR 1.1 for this definition), except as provided in this Handbook and FSM 5700 and as otherwise exempted by the Grants of Exemption in FSM 5714.

11.22 - Contract Pilot Qualifications. (FSM 5703.1, 5703.4, 5710.34).

1. Pilots provided to the Forest Service under contract or rental agreement shall be approved by Forest Service or interagency aircraft pilot inspectors.

2. These pilots are required to possess the appropriate FAA certificates, ratings, and authorizations for the type operation conducted and to meet the following minimum requirements:

a. Except for aviation operations requiring an airline transport pilot certificate under the FAR's, pilots shall possess a current FAA commercial pilot certificate, instrument rating, and aircraft ratings (multiengine, helicopter, and so on) appropriate for the mission.

b. Pilots shall possess a valid FAA medical certificate; second class for those operations requiring a commercial pilot certificate or first class for those operations requiring an airline transport pilot certificate.

11.22a - Experience Standards - Contract Fixed-Wing Pilots. (For airtanker pilot experience standards, see sec. 11.22c and 11.22d):

<u>1. All Airplanes</u>	<u>Flying Hours</u>
Total time	1,500
Pilot-in-command total	1,200

Pilot-in-command hours as follows:

Category and class to be flown	200
Fixed-wing - preceding 12 months	100
Cross-country	500
Operations in typical terrain	200
Night	100
Instrument - in flight	50
Instrument - actual/simulated	75
Make and model to be flown	25
Make and model - preceding 60 days	10

2. Heavy Multiengine; Pilot-in-Command (over 12,500 pounds gross weight)

Pilot-in-command - multiengine	250
Pilot-in-command in type within the past 5 years with an unrestricted type rating in the applicable aircraft to be flown	25

11.22b - Experience Standards - Contract Helicopter Pilots .

1. All Helicopters Flying Hours

Pilot-in-command as follows :

Pilot-in-command - helicopters	1,500
Helicopter - preceding 12 months	100
Weight class (over 12,500 pounds)	100
Make and model	50
Make, model, series, last 12 months	10
Helicopter - last 60 days	10
Mountain flying	200
Mission experience - make and model	10

2. Helitanker Pilot Qualifications and Experience (sec. 15.23)

11.22c - Experience Standards - Airtanker Pilots-in-Command. (Refer to the current national airtanker contract, section C, for the experience standards required in this section).

11.22d - Experience Standards - Airtanker Copilots. (Sec. 15.22).

11.23 - Contract Pilot Approvals.

1. For other than point-to-point flight operations, pilots may be required by a Forest Service or interagency pilot inspector to demonstrate competency and proficiency in flight for the category, class, and type of aircraft and for the mission to be flown under the contract or agreement.

a. Contract pilots, except airtanker pilots, shall be approved for a period not to exceed 12 calendar months from the date of approval. Refer to the current airtanker contract requirements for airtanker pilot approval duration.

b. Contract pilots are required upon request to present their pilot approval documents.

c. More stringent requirements may be specified for pilot positions requiring a higher level of experience, including specific aircraft ratings, training, or unique aviation qualifications.

2. Point-to-point flight operations by contract pilots engaged in FAR 135 operations may be approved for a period not to exceed 24 calendar months from the date of approval.

11.24 - Contract Aircraft Requirements.

11.24a - General Requirements.

1. Aircraft furnished to the Forest Service under contract or rental agreement must possess a standard or transport category airworthiness certificate, except aircraft contracted for special missions requiring only "restricted" category certifications, such as airtankers.

2. Unless authorized by an approved FAA aircraft flight operations manual (sec. 06) minimum equipment list, aircraft shall not be approved or used if any accessory or instrument listed on the aircraft type certificate data sheet is inoperative.

3. Aircraft upholstery, paint, and Plexiglas shall be in good condition.

4. Aircraft shall not be approved if any engine, component, or propeller time in service exceeds the manufacturer's recommended time between overhaul, unless approved under an FAA time extension in hours or calendar months,

5. New or newly overhauled engines must accumulate 3 hours of operating time, including 2 hours in flight, prior to Forest Service use.

6. Agency personnel shall not be carried in helicopters under the following conditions:

a. Helicopters powered with reciprocating engines.

b. Civil helicopters registered in the restricted category

c. Helicopters not meeting the requirements of this chapter, including the requirements in the Interagency Helicopter Operations Guide (sec. 06).

11.24b - Equipment. Aircraft used point-to-point for passenger or cargo carrying operations shall be equipped in accordance with the applicable FAR requirements and approved minimum equipment:

1. FAA approved shoulder harness(s) for each front seat occupant.

2. A flight meter or recording tachometer displaying actual flight time in hours and tenths.

3. First aid kit.

4. Dual controls, if essential for initial pilot performance evaluation.

11.24c - Avionics.

1. As a minimum, aircraft shall be equipped with the following functioning avionics equipment for day visual flight rules (VFR) operations:
  - a. Two 720-channel VHF transmitter/receivers for fire operations.
  - b. One 200-channel VHF navigation (omni directional range) receiver.
2. Multiengine aircraft shall meet FAR 135 avionics requirements for night and IFR passenger flights prior to dispatch or use for that type of mission.
3. Authorized Forest Service employees shall check and maintain any Government-furnished communications equipment.
4. Avionics shall be installed so as not to interfere with passenger space and comfort, yet be readily accessible for servicing.
5. Under the terms of the contract, the contractor shall be liable for loss or damage to Government-furnished equipment while it is installed in the vendor's aircraft.

11.25 - Contract and Rental Agreement Requirements and Approvals.

Requirements for contract or rental agreement pilot and aircraft approvals are as follows:

1. Aviation services provided under contract or rental agreements shall be:
  - a. Specifically approved by authorized Forest Service or interagency aircraft and pilot inspectors; and
  - b. Identified by the inspector's name and qualifications on the current and annually updated national interagency pilot and aircraft inspector listing available from the Washington Office, Fire and Aviation Management Staff, Aviation Unit, NIFC.
2. Only passengers authorized by the Forest Service or interagency authorities may be carried on flights under these contracts or agreements (FSM 5711.2 and sec. 13.2).
3. Substitute pilots and aircraft shall not be used in place of scheduled pilots or aircraft without prior approval by the Forest Service official authorized to order the flights.

11.26 - Operational Requirements - All Pilots. Requirements for all pilots flying Forest Service missions are as follows:

1. Instrument Flight Conditions. (FSM 5716.12). Use only multiengine aircraft for such flights, except as provided in FSM 5716.12.

2. Night Flights. (FSM 5716.2). For night flights use only multiengine aircraft, except:

a. This restriction does not apply to pilots flying night vision goggle missions in single-engine helicopters.

b. Single-engine aircraft flights at night are authorized for ferry and cargo missions at the option of the vendor, agency, and pilot-in-command (FSM 5716.2, FAR 91).

3. Flight Below 500 Feet. (FSM 5716.3). Except for approved special mission activities (FSM 5705) and landings and takeoffs, flight below 500 feet above ground level (AGL) in fixed-wing airplanes is prohibited.

11.27 - Flight and Duty Limitations.

11.27a - Flight and Duty Limitations for All Flight Crew Members - Phase 1. The basic requirements of phase 1 apply generally to all Forest Service aviation missions. Phases 2 and 3 (sec.11.27b and 11.27c) shall be implemented during extended periods of high levels of flight mission activity.

1. All flight crew members flying Forest Service missions shall be limited to the following tours of duty, and all work-related time shall count toward these limitations:

a. Duty shall include flight time, ground duty of any kind, and standby or alert status at any location. This restriction does not include "on-call" status outside of any required rest or off-duty periods.

b. A duty day is defined as any day a flight is made or any day in which 4 hours or more of duty are performed.

c. Flight time shall not exceed a total of 8 hours per duty day.

d. Assigned duty of any kind shall not exceed 14 hours in any 24-hour period.

e. Flight crew members accumulating 36 hours of flight time in any 6 consecutive days or less are required to have the following day off. Maximum cumulative flight hours shall not exceed 42 hours in any 6 consecutive days.

f. Within any 24-hour period, flight crew members shall have a minimum of 10 consecutive uninterrupted hours off duty immediately prior to the beginning of the next duty day.

g. During any 14-consecutive-day period, flight crew members shall be off duty for two 24-hour periods from the time of last duty. The 24-hour off-duty periods need not be consecutive.

2. Two-pilot crews flying point-to-point missions (airport to airport) shall be limited to 10 hours flight time in any duty day. Pilots flying two-pilot crew missions, who may be assigned to fly other types of Forest Service missions during the same duty period, shall be limited to the flight hour limitations in the preceding paragraphs 1a to 1g of this section.

3. Regional Aviation Officers or their designees may waive the "consecutive" limitation in the preceding paragraph 1e in this section to enable pilots flying infrared or aerial spray projects two shorter off-duty rest periods, provided they aggregate 12 hours of rest or more in any 24-hour period. One of the rest periods shall include at least 8 hours of uninterrupted rest. Waiver of the "consecutive" limitation in paragraph 1e may not be granted more than three times in any 14-duty-day cycle.

11.27b - Interim Flight and Duty Limitations - Phase 2. During extended periods of high levels of flight mission activity or an accumulation of the maximum 14-hour duty days, aviation managers and fire overhead officials must consider the associated fatigue factors for flight crews over an extended period of time and may, with interagency cooperation, implement phase 2 of the interim flight and duty limitations.

1. Official written notification of implementation of phase 2 at the Regional or Area levels shall be made by the responsible Regional Aviation Officer or Department of Interior Aviation Manager, or their designees, through the Geographic Area Coordination Center.

2. Implementation on the National level shall be made through the National Interagency Fire Center (NIFC) by the National Aviation Officer or designee.

3. When phase 2 has been implemented, flight crew members shall adhere to the flight and day-off limitations in phase 1 (sec. 11.27) and the following limited duty requirements:

a. Flight crew members shall not be scheduled for duty exceeding 12 hours in any duty day.

b. Flight crew members must be given 12 hours of uninterrupted rest (off-duty) in each duty day cycle.

c. Pilots assigned to double crews (two complete flight crews assigned to an aircraft), augmented flight crews (an additional pilot-in-command assigned to an aircraft), and flight crews working a rotating schedule (for example, 2 days on and 1 off) may be exempted from the limitations in phase 2, provided their scheduling and duty cycles conform to or exceed the provisions of section 11.27a.

4. Exemptions. The 12-hour flight crew duty day in paragraph 3b in this section may be extended for the completion of a mission, provided the cumulative duty day does not exceed the 14-hour duty day limitation in phase 1 (sec. 11.27a, para. 1d).

a. Flight crew rest must be adjusted (increased) so that the next flight crew rest period equals the extended duty day; that is, a 13-hour duty day requires 13 hours of rest, and 14 hours of duty requires 14 hours of rest.

b. Extended duty applies only to the completion of a mission. Standby may not be extended beyond the 12-hour limitation enacted in phase 2.

11.27c - Interim Flight and Duty Limitations - Phase 3. Activation of phase 3 should be based on a careful assessment of the degree of aviation activity and duration and the associated fatigue factors. Phase 3 flight and duty limitations include:

1. The 8-hour flight time limitation in phase 1 (sec. 11.27a, para. 1c), and

2. The flight crew duty limitations in phase 2 with the following additional duty limitations:

a. Each flight crew member shall be given 1 additional day off in a 14-consecutive-day period.

b. Flight crews on 12 days on and 2 off shall be limited to 11 days on and 3 days off.

c. Flight crews assigned 6 days on with 1 day off shall be limited to 5 days on and 2 off, alternating with 6 days on and 1 day off in each 14-day cycle in either the first or second week of implementation.

3. Double flight crews, augmented flight crews, rotating flight crews, and relief crews, as defined in phase 2 (sec. 11.27b, para. 3c), may be exempted from phase 3 limitations, provided the duty cycles meet or exceed phase 3 limitations and are approved by the responsible Regional Aviation Officer or Department of Interior Aviation Manager.

4. Aircraft fixed daily rates and special rates, when applicable, shall continue to accrue during periods with the additional day off required in phase 3. Contractors may provide additional approved crews to maximize utilization of their aircraft. All costs associated with providing the additional crew members shall be at the contractor's expense, unless the additional flight crew members are requested by the Government.

11.28 - Flight Following. (FSM 5716.5, and sec. 33).

11.29 - Operational Requirements - All Aircraft and Pilots .

1. All aircraft operations (except smokejumper aircraft in the following para. 2 shall be within manufacturer's allowable gross weights, the performance criteria for the aircraft, and flight manual limitations.

2. For smokejumper aircraft mission operations, the second segment climb gradient is established as 0.6, regardless of the aircraft certification bases.

3. Pilots shall make computations considering weight, density altitude, and available runway length in determinations of safe departures and arrivals.

4. For helicopter operations, pilots shall compute take-off performance based on the applicable Hovering In Ground Effect (HIGE) and Hovering Out of Ground Effect (HOGE) parameters.

5. Pilots are expected to make sound and mature decisions, including canceling a flight plan when conditions or circumstances may cause an undue hazard (FSM 5704).

6. Except as provided for smokejumper aircraft, airtankers, helicopters, and large transports, all engines shall be shut down for passenger loading and unloading activities.

11.3 - Records and Payments. Payments for flight times and other charges for services delivered under contract or rental agreements shall be made only for activities ordered by designated Forest Service officials using the procedures outlined in section 13, FSM 5711, and FSM 5717.

11.31 - Special Requirements. (Sec. 11.29).

11.32 - Aircraft Accidents, Incidents, and Hazards . (FSM 5720).

12 - EMPLOYEE PILOTS.

12.1 - Hiring and Promotion. Comply with Office of Personnel Management (OPM) X-118 qualification and classification standards in the hiring and promotion of Forest Service pilots. More stringent requirements may be specified for positions requiring a higher level of experience, including specific aircraft ratings, training, or unique aviation qualifications.

1. Persons hired from a vacancy announcement specifying a noncompetitive promotional potential, such as GS-7/9/11, should be promoted to the next higher grade at the end of the year in the lower grade; however, a delay may be necessary if the employee does not perform at the present or next higher grade level, does not fully meet the X-118 minimum flight time requirements, or does not satisfactorily complete the required training.

2. Pilots hired for a specific position and at a specific grade level are not entitled to noncompetitive promotion. This limitation must be specified in the vacancy announcement or request to OPM for a certificate and must be explained to the pilot at the time of employment.

3. Promotion actions are subject to the employee's meeting the appropriate flight experience requirements, demonstrated ability to perform, and minimum OPM time-in-grade requirements.

4. Pilots hired at the GS-12 level and above should possess preferred experience; that is, a pilot-in-command in mutiengine aircraft with experience in related wildland fire and aviation programs or agricultural aviation operations can be considered as having a working knowledge of the guidelines and procedures within the position functions, such as smokejumper, leadplane, infrared, or helicopter pilot related operational experience.

#### 12.11 - Experience Standards for Employee Pilots.

12.11a - Experience Standards - Employee Fixed-Wing Pilots. (Sec. 12.24). Pilots hired into the Forest Service at the GS-12 level are considered to be qualified and approved fixed-wing pilots. In addition to the requirements in section 12.1, pilots hired at the GS-12 level must meet the following minimum flight time requirements:

<u>1. All Airplanes</u>	<u>Flying Hours</u>
Total time	1,500
Pilot-in-command total	1,200
<u>Pilot-in-command as follows:</u>	
Category and class to be flown	200
Cross country	500
Operations in typical terrain	200
Night	100
Instrument - in flight:	50
Instrument - actual/simulated	75
Category - preceding 12 months	100
- preceding 60 days	10

2. Heavy Multiengine Pilot-in-Command (12,500 pounds GTOW and Over)

Multiengine pilot-in-command (PIC)	250
PIC in type within the past 5 years with an unrestricted type rating in the applicable aircraft	25

12.11b - Experience Standards - Employee Helicopter Pilots .

<u>All Helicopters</u>	<u>Flying Hours</u>
Pilot-in-command, helicopter	1,500
Helicopter preceding 12 months	100
Weight class	100
For turbine aircraft operations	100
For reciprocating aircraft	200
Make and model	50
Make, model, series, last 12 months	10
Helicopter last 60 days	10
Mountain flying	200
Mountainous terrain, make/model	10

12.2 - Employee Pilot Duty Assignments. Employee pilots may not serve in any capacity which is clearly above their grade level. Position classification standards for GS-2181 pilots, although quite specific in some respects, are generally descriptive and do not cover all work situations. These standards are subject to some interpretation by the employee's direct supervisor relative to Forest Service missions.

1. The criteria used to classify grade levels for GS-2181 pilots consist of three elements and must be considered in combination to determine grade level in accordance with the OPM classification standard:

- a. Nature and purpose of the assignment.
- b. Aircraft operated during the assignment.
- c. Degree of hazard involved in the assignment.

2. Employee pilots shall receive flight and duty assignments commensurate with their experience. The individual pilot's aeronautical knowledge and skills shall be the basis for duty assignments by the appropriate aviation manager.

3. Individual pilot positions must be classified according to Office of Personnel Management (OPM) classification standards. The typical Forest Service pilot activities in the following sections 12.21 to 12.25a determine assignment of grade levels. Use these guidelines when considering flight and duty assignments for employee pilots.

12.21 - Pilots - GS-7. Pilots at the GS-7 level are hired primarily as trainees and can perform only limited flight missions.

1. They may serve as flight crew members on more difficult assignments provided they meet the following minimum qualifications:

a. Pilot-in-Command, VFR only point-to-point or reconnaissance flight assignments in light single-engine aircraft provided they meet the training and experience requirements of FAR 135, Subpart E, 135.243 (b).

b. Serve as copilot on light twin-engine aircraft, such as Aero Commander or Beechcraft Baron, provided they meet the minimum qualifications in FAR 135, Subpart E.

c. Perform the duties of second-in-command in transport category aircraft, provided they meet or exceed the qualifications and training required in FAR 121, Subpart O, including the satisfactory completion of all flight currency and check rides appropriate to the position.

2. In the event a GS-7 pilot candidate is unable to comply with the check ride and currency requirements, the pilot shall remain in training status without mission assignments until successfully completing all the requirements. Repeated failure can result in personnel action, such as reassignment or termination.

12.21a - Minimum Flight Time Requirements - GS-7. Pilots hired into the Forest Service at the GS-7 grade level shall, in addition to the requirements in sections 12.1, 12.2, and 12.21, meet the minimum flight time requirements as follows:

<u>All Airplanes</u>	<u>Flying Hours</u>
Total Time	500
Pilot-in-Command	200
Multiengine	50
IFR/Night	25
Last 12 Months	50

12.22 - Pilots - GS-9. Pilots at the GS-9 level are hired in career ladder (9-11-12) positions with expectations for advancement after extensive training in a variety of Forest Service mission activities.

1. GS-9 pilots are expected to maintain instrument flight currency to familiar airports and mission qualifications, including copilot assignments, in the aircraft approved for the following missions:

- a. Pilot-in-command in light single- and multiengine aircraft 12,500 pounds gross take-off weight or less, and
- b. Copilot assignments in transport category aircraft providing they have met the training and experience requirements of FAR 135, Subpart E, or FAR 121, Subpart O, as applicable.

2. Employee pilots at the GS-9 level may not be assigned leadplane pilot responsibilities due to the degree of hazard involved in the mission.

12.22a - Minimum Flight Time Requirements - GS-9.

<u>All Airplanes</u>	<u>Flying Hours</u>
Total Time	1,200
Pilot-in-Command	250
Multiengine	100
IFR/Night	100
Last 12 Months	100

12.23 - Pilots - GS-11.

1. Pilots at the GS-11 level may be assigned duties as pilot-in-command of light single- and multiengine aircraft 12,500 pounds or less GTOW for VFR point-to-point missions, including IFR missions for any aircraft for which they are qualified and approved.

2. Pilots at the GS-11 level may also be assigned pilot-in-command duties for:
  - a. Special firefighting missions, provided all required training, experience, and flight checks have been completed and are appropriate for the mission, and
  - b. Missions that involve limited hazardous flying.

12.23a - Minimum Flight Time Requirements - GS-11.

<u>All Airplanes</u>	<u>Flying Hours</u>
Total time	1,500
Pilot-in-command	500
Multiengine	500
IFR	50
Night	100
Last 12 months	100

12.24 - Pilots - GS-12. Pilots at the GS-12 level are considered to be at an experience level fully functional and authorized to be assigned pilot-in-command duties for any Forest Service flying mission for which they are qualified and approved, including hazardous flying activities. This grade level includes operational helicopter pilots and helicopter check pilots. Additionally:

1. Pilots at the GS-12 level shall maintain the training, proficiency, and special ratings for the equipment and mission(s) approved for and applicable to FAR 135, Subpart E, or FAR 121, Subpart O.

2. GS-12 pilots who currently hold an instrument instructor and multiengine rating from the FAA may be assigned as check pilot for instrument training.

3. Special or firefighting check pilot authority may be authorized for GS-12 level pilots who are currently qualified in a special or firefighting mission and who fully meet the annual mission currency requirements for pilot-in-command and check pilots.

12.24a - Minimum Flight Time Requirements - GS-12. (Sec. 12.11).

12.25 - Pilots - GS-13. Pilots at the GS-13 level should be evaluated and selected on the basis of aeronautical experience as well as aviation program management skills. Typically, pilots at the GS-13 level should be Airline Transport Pilot rated (ATP) and should have (or are able to obtain) a First Class Airman's Medical Certificate.

1. Qualifications, aeronautical training, and currency requirements of GS-13 pilots shall comply with:

a. FAR 121, Subpart O, for the appropriate transport category aircraft,  
or

b. FAR 135, Subpart E, for pilot-in-command assignments in aircraft less than 12,500 pounds (GTOW).

2. Pilots at the GS-13 level should be assigned collateral duties that include aviation program management, employee supervision, or national aviation program oversight responsibilities, such as Regional Aviation Officer or Chief Pilot assignments for special firefighting mission activities, including check pilot authority.

12.25a - Minimum Flight Time Requirements - GS-13. Pilots at the GS-13 level shall meet all of the experience requirements in section 12.11 for fixed-wing pilots and in section 12.11a for helicopter pilots.

12.3 - Flight Evaluation Board. This section provides procedures for convening and conducting a flight evaluation board (FEB) for the purpose of determining a Forest Service pilot's fitness for duty.

1. Scope. The FEB is an administrative, fact-finding proceeding conducted to ensure all information relevant to a pilot's qualifications is reviewed and evaluated in a knowledgeable, fair, and impartial manner.

a. The FEB shall not be conducted or chartered as an adversarial proceeding.

b. During the proceeding, board members shall avoid informal conversation or comment and reference to extraneous matters. Members shall conduct the evaluation and develop recommendations in closed session. The board reports findings and recommendations to the Washington Office, Director of Fire and Aviation Management, if the FEB is conducted for a Washington Office pilot, and reports to the Regional Office, Director of Fire and Aviation Management if the FEB is conducted for a Regional pilot.

2. Review of Report. Before final action can be taken, the report must be reviewed at the National or Regional Office level as follows:

a. National: Director of Fire and Aviation Management; Assistant Director of Fire and Aviation Management; National Aviation Officer (NAO); and National Aviation Safety and Training Manager (NASM).

b. Regional: Regional Director of Fire and Aviation Management; Regional Aviation Officer (RAO); and Regional Aviation Safety Manager (RASM).

3. Findings for Pilot Disqualifications. Recommendations by the FEB to disqualify a pilot from flight status must be based on clear, factual, and logical findings as to the pilot's ability to safely and effectively perform Forest Service missions. Apply the following guidelines in formulating recommendations for action:

a. Recommendations to disqualify a pilot from flight status shall not be based on a single incident or recent action that disregards an otherwise outstanding record. Incidents or actions that clearly demonstrate willful or wanton disregard for established rules, regulations, or procedures, or otherwise unacceptable performance, may be grounds for disqualification from aviation services.

b. The FEB and convening supervisor must consider the pilot's credentials, experience, and basic flying skills and, when applicable, the pilot's potential to perform more complex skills after receiving additional training and flying experience.

c. Pilots demonstrating only marginal potential for improvement may be recommended for disqualification.

12.31 - Convening Flight Evaluation Board. An FEB may be convened by the senior aviation manager of any Forest Service unit operating aircraft or employing pilots. The manager may delegate this authority to the first- or second-level supervisor. The convening official shall select the members, and the convening official's unit is responsible for all travel and other associated costs the board may generate.

1. Pilot-Requested FEB. A pilot receiving disciplinary action related to technical competence and/or flying skills may request an FEB through the senior aviation manager in the absence of management convention of an FEB.

- a. A pilot who possesses new evidence related to the pilot's case may request the board be reconvened.
- b. An employee pilot who disagrees with a management action affecting safety of flight or the employee pilot's flight status may request an FEB to resolve the issue.
- c. In the event the pilot's request for an FEB is denied, the pilot has the right to grieve the decision (FSM 5722.2).

2. Board Membership and Selection. The FEB must provide a fair and impartial evaluation. The convening official must ensure board members have not been directly involved in the case and are fully qualified pilots.

- a. The board must be composed of at least three Forest Service pilots not assigned to the same unit as the pilot being evaluated. Consultants, or nonvoting technical specialists, may be included as advisors to the board.
- b. Pilot board members must be currently qualified Forest Service pilots or aviation managers.
- c. At a minimum, one pilot board member must be current in the same type of aircraft and mission as the pilot being evaluated.
- d. The convening official shall not serve as a member of the board.
- e. The pilot being evaluated may request a union representative (provided the pilot is a bargaining unit employee) or other representation that would ensure the pilot receives a fair and impartial evaluation.
- f. A Federal Aviation Administration (FAA) designated flight surgeon or medical officer may be appointed as a nonvoting member of the board when a suspected medical problem may be a contributing factor in the pilot's performance.

g. When aviation management officials suspect there is probable cause for an adverse action related to the pilot's conduct or performance, a personnel employee relations specialist must be appointed as a nonvoting member. In this situation, the board shall be the primary investigating body, and the employee relations specialist shall take statements, as appropriate, and assemble documents creating a case file. The board's recommendation(s) must become part of the file.

h. The official convening the FEB shall select one of the voting members to act as chair.

12.32 - Responsibility of Board Chairperson. The chairperson is responsible for conducting the board in accordance with the established procedures and timelines in sections 12.3 to 12.38.

1. Evaluation Preparations. Prior to convening the board, the chairperson:

- a. Specifies the time and place where the FEB will convene. The chairperson must make arrangements for a meeting in a location consistent with the gravity and privacy of the proceedings.
- b. Accommodates the pilot's request for any information relative to the pilot's case and evaluates requests for delay in convening the board.

2. Board Proceedings. The chairperson:

- a. Convenes the board.
- b. Explains the purpose of the evaluation to the board members and pilot.
- c. Defines the evaluation process and procedures.
- d. Conducts the evaluation in an orderly manner.
- e. Makes certain the pilot is allowed to present the pilot's side of the issue(s).
- f. Ensures the findings of the board are complete and factual, are clearly stated, and are fully supported by the evidence.
- g. Makes certain the recommendations of the board are consistent with the limits of the board's authority.

h. Adjourns the board.

3. Post-Evaluation Duties. The chairperson prepares the Flight Evaluation Board report, ensures its completeness and accuracy, and makes certain that all members have signed the document in the appropriate blocks.

12.33 - Timeliness of Action.

1. Convening FEB. Convene the board at the earliest practical date and no later than 10 working days from appointment of the board.

2. Pilot Notification. Notify the pilot in writing that an FEB has been convened. This notice of intent must include:

- a. Specific information relative to the reason(s) for convening the FEB, including allegations and/or references;
- b. The time when the pilot is directed to appear before the board;
- c. The location of the meeting;
- d. Instructions for acknowledgment of the notification; and
- e. Information on the pilot's rights in presenting the pilot's side of the issue.

3. Pilot's Voluntary Removal from Flight Status. A pilot subject to an FEB hearing may voluntarily request to be taken off flight status in lieu of convening an FEB. Should this course of action be elected, the pilot must prepare a written request for voluntary removal from flight status within 5 working days of receipt of the notification letter.

- a. Upon receipt of the pilot's request for voluntary removal from flight status, the convening official shall immediately suspend the pilot from flight status and defer convening the FEB until further action is determined.
- b. In the event the pilot's request for voluntary removal from flight status is disapproved, the pilot must be advised in writing of the denial and of the intention to proceed with the FEB.

4. Previous Flight History Review. The FEB must take into consideration the pilot's performance history, as well as all other pertinent facts, prior to making any recommendations to the convening official (sec. 12.3, para. 2b).

12.34 - Board Findings. The FEB shall be responsible for the accuracy of the information used in the evaluation of pilot performance and must fully consider any extenuating circumstances surrounding the facts, including those that the pilot may present. Information on extenuating circumstances aids the board in determining if the pilot had complete control over the factors involved. Members of the FEB must use their professional knowledge, insight, and common sense in conflict management. Each finding must be supported by evidence of record and must include, as a minimum:

1. Factual information of specific instances that support a conclusion the pilot cannot safely perform aviation duties.
2. Supporting testimony and evidence of unsafe past performance.
3. Evidence that the pilot did or did not have complete control over the circumstances leading to the incident/accident.
4. Written comments on the allegations or points of question, stated separately in brief, clear language and including specific dates, places, and events.

12.35 - Board Recommendations.

1. FEB Report Recommendations. Recommendations of the FEB must be consistent with the relevant findings supporting the determination(s) for:

- a. Continued aviation services as a pilot,
- b. Additional training required, or
- c. Disqualification from flight status as a Forest Service pilot. Other mitigating circumstances could be cause for interim measures, such as disqualification from certain aircraft types or removal from specific mission duties.

2. Minority Report. In the event of disagreement among the board members, a minority report may be prepared as appropriate that clearly states the scope of the disagreement(s), findings, and recommendations. Members supporting the minority opinion must be identified in the report.

12.36 - Review Process. The Director responsible for aviation management within the affected unit is responsible for review of the FEB report and final action(s) based on the findings and recommendations.

1. Provided the Washington Office, Director of Fire and Aviation Management (for a Washington Office assigned pilot) or the Regional Director of Fire and Aviation Management (for a Regional pilot) agree with the findings and recommendations of the FEB, the Director may include additional comments and/or recommendations when dating and signing acceptance of the report.

- a. The Director of Aviation Management within the affected unit has the authority to determine the pilot's qualifications to remain on flight status.
- b. The head of the servicing Human Resources Management office has the authority for taking adverse actions in cases involving FEB recommendations approved by aviation management officials.

2. In the event the unit Director of Aviation Management does not concur with the FEB findings and recommendations, the Director must identify specific areas of contention and explain the reasons in the written comments.

3. Where the board makes a finding of lack of proper supervision or supervisory error, the Washington Office, Director of Fire and Aviation Management or the Regional Director of Fire and Aviation Management must include a statement relative to the corrective action taken or contemplated.

4. Final Action. The Washington Office, Director of Fire and Aviation Management or Regional Director of Fire and Aviation Management is responsible for determining appropriate corrective action following concurrence with the FEB findings and recommendations.

12.37 - Reconvening Flight Evaluation Board. Aviation management officials may reconvene an FEB provided:

1. Initial board action was not in compliance with established procedures set forth in this sections 12.3 to 12.38, or prejudicial errors concerning the rights of the pilot occurred in the initial proceedings.

2. New information that could materially affect the findings and recommendations of the board is discovered and brought to the attention of the convening official.

3. The pilot has been given notice of the aviation management official's intent to reconvene the FEB and has been allowed 10 days to prepare a response.

12.38 - Administrative Instructions.

1. Flight Evaluation Board Report. The FEB report must be completed as soon as possible, but no later than 5 working days from the day the board adjourns. The Washington Office Director of Fire and Aviation Management or Regional Director of Fire and Aviation Management may authorize additional time due to unforeseen circumstances. When additional time is required, the reason for the delay must be specified in the report.

2. Report Processing. Aviation management officials within the affected unit (Washington Office, Region) must review the FEB report (sec. 12.3, para.2) and record additional comments and recommendations as follows:

a. Washington Office: The Director and/or Assistant Director of Fire and Aviation Management, National Aviation Operations Officer (NAOO), and National Aviation Safety Manager (NASM).

b. Regional Office: The Regional Director of Fire and Aviation Management, Regional Aviation Officer (RAO), and Regional Aviation Safety Manager (RASM).

3. Report Retention. The Directors responsible for Aviation Management in the respective units shall maintain a file copy of all FEB activity for a period of four years; FEB reports shall not be included in pilots' official personnel folders.

### 13 - ADMINISTRATIVE FORMS AND RECORDS

13.1 - Flight Use Report, Form FS-6500-122. (FSM 5711.2). All flights must be recorded on Form FS-6500-122, Flight Use Report.

13.2 - Documentation of Administrative Use. (For definitions of terms, see FSM 5710.5.)

1. Record the justification for each use of Forest Service owned or other Government aircraft to carry passengers and/or cargo for administrative purposes (FSM 5711.2), by providing the information required on Form FS-5700-10, Flight Request/Justification for Administrative Use of Aircraft (see ex. 01 for a completed sample of this form). Exhibit 02 contains a sample of Form FS-5700-11, Cost Comparison Travel Worksheet, for comparing the cost of using Government aircraft with other means of transportation. Exhibit 03 is an acceptable passenger manifest format. Exhibit 04 is a sample of Form FS-5700-12, Day Trip Authorization (for further direction on authorizing day trips, see FSM 5716.4).

2. For decisions to use Forest Service owned or other Government aircraft instead of airlines without doing a cost comparison, ensure that the documentation clearly explains why airline service will not meet the travel needs in the same calendar day(s). If a further choice between types of Government aircraft is then made, that choice must be justified by the same criteria if no cost comparison is done. If the explanation does not satisfy these criteria, complete a cost comparison (ex. 02). Following are examples of acceptable explanations of a decision to use Government aircraft instead of airline service:

- a. "One or more destination airports were not served by airlines. An all weather pressurized aircraft was required for this trip, and no such suitable charter aircraft was available that could meet the time constraints." (Decision: Use Forest Service aircraft.)
- b. "Airline schedules on the day(s) of travel did not allow sufficient work time at the destination. Available charter aircraft did not permit the party and luggage to travel together." (Decision: Use Forest Service aircraft).
- c. "Neither the airline nor the Forest Service aircraft available allowed completion of travel on the same calendar day. The airline schedule would have required an extra day of travel, and the single-engine Forest Service aircraft could not return at night after the dinner meeting." (Decision: Use rental agreement aircraft.)

3. When any two of these three forms of air transport--that is, airlines, or Government-operated, or contract--are reasonably available and suitable, conduct a cost comparison using Form FS-5700-11 (ex. 02) and attach it to the Flight Request/Justification, Form FS-5700-10 (ex. 01).

13.2 - Exhibit 01

FS-5700-10 (9/93)

FLIGHT REQUEST/JUSTIFICATION FOR ADMINISTRATIVE USE OF  
AIRCRAFT  
(FSM 5710; FSH 5709.16, Ch. 10)

User: R3, RO-FPM Date(s) of Use: 09-02-92  
Agency/Unit

Purpose of trip: One day meeting with western zone staff in Reserve, NM

Service requested: Same day round trip for 4 FS employee passengers from Albuquerque to Reserve, NM. Side trip to Flagstaff, AZ possible. Need pressurized, all-weather aircraft because of forecast poor weather.

Planned travel requires the use of air transportation, and Forest Service-operated or charter aircraft will be used because (check a, b, or c. If c is checked, attach a cost comparison):

- (a) The aircraft is scheduled to perform a bona fide mission, training, or proficiency activity compatible with secondary use of the flight for transportation, and the minimum mission, training, or proficiency requirements have not been exceeded.
- (b) No airline service is reasonably available to effectively fulfill the transportation requirement, that is, within the same calendar day as required.

Explanation: (Example for use of FS operated aircraft) No airline service to Reserve or Flagstaff from Reserve. Pressurized IFR capable charter aircraft not available in Albuquerque on day of travel.

- (c) The actual cost<sup>1</sup> of using this aircraft is not more than other suitable and available air transportation. (Use FS-5700-11, Cost Comparison Travel Worksheet.)

/s/ Sam Smith, Entomologist (Chief of Party)  
Signature/title

This cost should be the total cost to the Government; calculations should include per diem, overtime, and lost work time as well as actual transportation costs.

13.2 - Exhibit 02

FS-5700-11 (9/93)

COST COMPARISON TRAVEL WORKSHEET  
(FSM 5710; FSH 5709.16, Ch. 10)

ITEMS TO BE COMPARED: GOVERNMENT OPERATED AIRCRAFT, AIRLINE, COMMERCIAL AIRCRAFT UNDER CONTRACT AND ANY OTHERS.

STEP 1: ANALYZE TRAVEL NEED Consider number of travelers, weight and nature of baggage or cargo, and all known constraints. Typical constraints could be time away from home station, working time needed at destination(s), specific dollar limits, and vulnerability to weather delays. Do not include a method of transport that is obviously unsuitable. Normally, the decision to travel by air will have been made before using this form, but columns for other means are provided for use when appropriate. Summarize analysis: (example) Government-operated and charter aircraft both capable of performing requested service. Airline service did not meet time constraints for conference, nor did any form of ground transport.

STEP 2: COST COMPARISON

	Common Carrier (Airline)	Common Carrier (Rail)	Government Owned (Aircraft)	Commercial Aircraft (Contract)	Other	Other
1. Fares/ flight costs	<u>N/A</u>	<u>N/A</u>	<u>525.00</u>	<u>637.50</u>	_____	_____
2. Per diem/ overnight charges	_____	_____	_____	_____	_____	_____
3. Lost worktime	_____	_____	_____	_____	_____	_____
4. Local transportation	_____	_____	_____	_____	_____	_____
5. Overtime/ standby	_____	_____	<u>50.00</u>	<u>90.00</u>	_____	_____
6. Other	_____	_____	_____	_____	_____	_____
7. Total cost	_____	_____	<u>575.00</u>	<u>727.50</u>	_____	_____

Remarks: Forest Service aircraft N133Z will be used for this flight.

/s/ John Jones  
Name of Preparer

RO-R3 Timber Management  
Unit

13.2 - Exhibit 03

SUGGESTED FORMAT FOR PASSENGER MANIFEST

Aircraft/Flight No: N131Z/R3X-001  
(the same flight number as block 14 of  
Form FS-6500-122, Flight Use Report)

Date of flight: 9-2-92

Name	Affiliation (Agency/Organization)	Sponsor (Non-Federal Passengers)	SES?	Leg(s)
Sam Smith	FS RO-R3 FPM		No	All
John Jones	FS RO-R3 FPM		No	All
Mary Brown	NM State Forester's Off.	FS-R3	No	1
Alan Dale	Nature Conservancy	FS-R3	No	All
Larry Teal	R3 Regional Forester		Yes	

13.2 - Exhibit 04

FS-5700-12 (9/93)

DAY TRIP AUTHORIZATION  
(FSM 5710: FSH 5709.16, Ch. 10)

Date: 09/27/93

Make/Model of Aircraft: Bell 206 BIII Registration No: N2345Q

Operator: Sky High Helicopters

Purpose of trip: Show newspaper and television reporters the extent of the Big City fire, erratic behavior problems, and threat to structures and watershed .

Route of flight: Big City fire camp heliport along northern perimeter to Hoboken Mountain, then down Slick Creek drainage to Highway 48 and back to heliport.

Passenger Name	Affiliation
----------------	-------------

Klinger, C.C.	KBOG TV, Phoenix, AZ
---------------	----------------------

Osco, Marlene	Sky Harbor Daily News
---------------	-----------------------


Forest Service sponsoring unit: Black River National Forest

I certify that the person(s) listed above has an official purpose for being on this flight and any associated surface transport. I recognize that the Government may incur increased liability exposure under the Federal Tort Claims Act, 28 U.S.C. 2671-2680, and that ownership of the conveyance(s) in question does not alter the Government's liability (Comptroller General Decision B-231814, January 19, 1989). I have determined that the benefits justify the operation.

/s/ Harry Hunter, Incident Commander

Signature and title of sponsoring unit representative (FSM 5716.4).

14 - INSPECTION PROCEDURES - CONTRACT RESOURCES The Regional Aviation Officer or the National Aviation Officer, or their designated inspectors of pilots and aircraft, must approve all contract and rental agreement pilots and aircraft used to fly Forest Service missions. Such approvals shall be in writing and shall be specific to each pilot and each aircraft, unless exempted by section 14.12.

14.1 - Aircraft and Pilot Inspector Designations. The Regional Aviation Officer or the National Aviation Officer shall designate authorized aircraft, maintenance and pilot inspectors (sec. 10.41c, 10.42c).

14.11 - Military and Cooperator Aircraft and Pilots. (FSM 5712.14, 5713.43). Designations may be for each individual pilot or aircraft, or by letter including all authorized pilots by name and aircraft by identification/registration numbers.

14.12 - Point-to-Point Flight Operations. (FSM 5705). Contract pilots and aircraft flying only point-to-point missions under the provisions of FAR 119 and 135 with passengers and/or cargo may be issued designations without inspection, provided they meet the requirements of FSM 5703.2, 5703.4, and 5706.

1. The contractor/vendor is responsible for providing pilots and aircraft meeting the requirements of the procurement document.
2. Forest Service pilot and aircraft inspectors are responsible for reviewing the contractor's aircraft and pilot documentation to ensure, through verification with the FAA if required, that the pilot and aircraft fully comply with the requirements of this Handbook, FSM 5700, and the procurement document. The Forest Service verification of the contractor's compliance with FAA requirements and with the requirements of the contract shall not be considered an airworthiness inspection.
3. Pilot and aircraft approval shall be documented by identifying the following required information:
  - a. Aircraft type and registration number.
  - b. Point-to-point mission approvals; that is, VFR day, night, IFR, and so on.
  - c. Pilot's name, FAA certificate number(s), and appropriate ratings (that is, instrument; multiengine; type ratings when applicable; and mission authorizations (VFR day or night, and IFR, for example)).

A copy of the documentation must be available in each aircraft for passenger review on demand.

4. Noncompliance with any of the provisions of Forest Service policy and procedures or the terms of the procurement document shall be reported to the procurement official and the FAA as appropriate.

14.13 - Special Missions. (FSM 5705). Annual inspections and approvals are required each calendar year for both pilots and aircraft, contract aviation services performing special missions with required crew members only, such as smokejumper or reconnaissance (FSM 5712.22, 5713.44).

14.2 - Authorized Aircraft and Pilot Inspectors. Only those persons authorized by Regional Aviation Officers or the National Aviation Officer and whose names, Regions, locations, and authorizations appear on the annually updated national pilot inspector listing maintained by the Forest Service and Department of Interior, Office of Aircraft Services (OAS) shall inspect and approve contract pilots and aircraft (sec. 11.25).

1. Forest Service units may use pilots approved and carded by authorized employees of cooperators and States for specific missions without reinspection provided the pilot inspector has been approved by the National Aviation Officer, or designee, and identified by letter annually.

2. Forest Service units may use pilots with OAS approval for point-to-point transportation regardless of the specific type of approval document (FSM 5712.22).

3. Forest Service units may use aircraft approved by the OAS for specific missions without reinspection (FSM 5713.44).

4. Designated pilot inspectors must meet the qualifications outlined in this Handbook and in addition must:

a. For large transport approvals, possess an Airline Transport Pilot Rating and a type rating without limitations in aircraft over 12,500 pounds gross weight.

b. For airtanker flight crew approvals, possess at least a commercial pilot certificate and a type rating without limitations in an aircraft over 12,500 pounds gross weight and have at least 100 hours as pilot-in-command engaged in actual firefighting operations in an airtanker; or 500 hours as pilot-in-command in a leadplane engaged in actual firefighting operations.

c. For smokejumper pilot approvals, 100 hours smokejumper operations experience or 50 smokejumper/paracargo missions and type rating if the applicable smokejumper aircraft requires two pilots.

d. For helicopter pilot approvals, meet the requirements of sections 20.35, 20.41, and 25.34 in this Handbook.

5. Forest Service Regional Aircraft Maintenance Inspectors must possess a current Airframe and Powerplant Certificate issued by the FAA and, additionally, must meet the requirements for Inspection Authorization (IA) (sec. 42.1).

6. Authorized interagency aircraft and pilot inspectors who do not possess an Airframe and Powerplant Certificate issued by the FAA may approve only light fixed-wing aircraft.

14.3 - Facilities Inspections - Contract and Rental Agreement Operators . (FSM 5710.34). Ensure that all contract and rental agreement aircraft services provided meet the operational and safety standards required by their Federal Aviation Administration (FAA) approved operating authorities and specifications (FSM 5703).

14.31 - Review of Contractor FAA Operating Authority. Contractors and rental agreement operators are subject to review by approved Forest Service pilot and aircraft inspectors for verification of FAA operating authorities and certificates, including:

1. Operations specifications.
2. Approved aircraft and pilot listing for point-to-point FAR 135 operators.
3. Operations and maintenance manuals.
4. Facilities.
5. Aircraft and pilots for fire and/or special mission activities.

15 - PILOTS - CONTRACT AND RENTAL AGREEMENT (FSM 5704.7). Forest Service pilot inspectors are responsible for ensuring contract and rental agreement pilots meet the experience and qualification requirements of this Handbook (sec. 11.25).

15.1 - Light Aircraft Pilots.

1. Point-To-Point Transportation Only. (Sec. 15.12).
2. Special Missions. (Sec. 15.13). Contract and rental agreement light aircraft pilots used in special mission activities, such as reconnaissance, shall be inspected annually by an authorized interagency pilot inspector. This inspection must include a qualifications and currency check and provide the following qualifying experience documentation:
  - a. As a minimum, an FAA commercial pilot's certificate with appropriate ratings.
  - b. Current second class airman medical certificate (minimum).
  - c. Bound record of flying experience or an approved 30-day flight time record form.
  - d. Currency in FAR 135, Subpart G - Crewmember Testing Requirements:

- (1) FAR 135.293, Initial and Recurrent Pilot Testing Requirements.
  - (2) FAR 135.297, Pilot-in-Command Instrument Proficiency Check Requirements.
  - (3) FAR 135.299, Pilot-in-Command Line Checks, Routes and Airports.
- e. All special qualifications required by the procurement document.
  - f. Completed Form FS-5700-20, Pilot Qualification Record.

15.11 - Flight Checks - Light Aircraft Contract and Rental Agreement Pilots.

Authorized pilot inspectors shall conduct a flight check in the category and class aircraft to be used for initial approval of light aircraft pilots-in-command for firefighting (reconnaissance) or other special missions. Subsequent check flights are discretionary based on an assessment of the applicant's Forest Service activity record or at any time considered necessary by an authorized pilot inspector.

1. Flight checks shall be conducted in typical terrain and include maneuvers such as slow flight, mountain flying techniques, orbits providing the best visibility, and engine out procedures.

2. Mountain flying techniques and the overall safety of the operation shall be of primary importance in evaluating the applicant.

15.12 - Aviation Operations Briefing - Light Fixed-Wing Pilots.

1. Provide all light aircraft pilots a safety briefing following initial approval and annually at the beginning of the contract or rental agreement period.

2. Sign the written documentation of the briefing and provide a copy to be retained by the pilot. Exhibit 01 is a recommended format to be used for the safety briefing. Regions may supplement this document to include local requirements and/or safety issues.

15.12 - Exhibit 01

USDA FOREST SERVICE AVIATION OPERATIONS BRIEFING:

LIGHT FIXED-WING PILOTS, CONTRACT AND RENTAL AGREEMENT

I. PILOT QUALIFICATION AND CERTIFICATION

A. Required Certificates:

1. As minimum, a current FAA unrestricted Commercial Pilot's Certificate with an instrument rating and appropriate aircraft ratings.
2. A current FAA Second Class Medical Certificate.

B. Required Flying Experience (FSH 5709.16, sec. 11.22a):

1. All Airplanes

Flying Hours

Total time	1,500
Pilot-in-command total	1,200
Pilot-in-command as follows:	
Category and class to be flown	200
Cross country	500
Operations in typical terrain (low level, mountainous)	200
Night	100
Instrument, in-flight	50
Instrument, actual/simulated total	75
Category - preceding 12 months	100
Make and model - preceding 60 days	10

2. Heavy Multiengine. (Over 12,500 pounds gross weight)

Multiengine - Pilot-in-command	250
Pilot-in-command in type within the past 5 years with an unrestricted type rating in the applicable aircraft to be flown.	25

C. FAR 135 Competency.

1. Pilots shall possess an FAA 8410-3 competency form as pilot-in-command for the type operations to be approved, such as ASEL and/or AMEL, VFR or IFR.
2. Pilots shall be approved for VFR or IFR, day or night, passenger and cargo only as specified in the operator's FAR 135 Operating Specifications.

15.12 Exhibit 01--Continued

3. Pilots approved for "airplane multiengine land" may also be qualified in "airplane single-engine land" without an additional checkride providing they have an FAR 135 letter of competency for ASEL and can provide documentation of at least 200 hours pilot-in-command in that class aircraft.

D. Certification of Pilot Approval. Pilots meeting the requirements for certification in FSH 5709.16, section 16.12 must be issued an approval by letter or approval card that must be in their possession during all Forest Service missions.

II. FLIGHT AND DUTY LIMITATIONS - PHASE 1. (FSH 5709.16, sec. 11.27).

A. All pilots flying Forest Service missions shall be limited to the following tours of duty. Any work-related time shall count toward these limitations:

1. Flight time shall not exceed 8 hours in any duty day.
2. Assigned duty of any kind shall not exceed 14 hours in any 24-hour period.
3. Pilots accumulating 36 hours of flight time in any 6 consecutive days or less are required to have the following day off. Maximum cumulative flight hours shall not exceed 42 hours in any 6 consecutive days.
4. Within any 24-hour period, pilots shall have a minimum of 10 consecutive uninterrupted hours off duty immediately prior to the beginning of the next duty day.
5. Duty shall include flight time, ground duty of any kind, and standby or alert status at any location. This restriction does not include "on-call" status outside of any required rest or off duty periods.
6. During any 14-consecutive-day period, pilots shall be off duty for two 24-hour periods from the time of the last duty. The 24-hour off duty periods need not be consecutive.
7. A duty day is defined as: any day a flight is made or 4 hours or more of duty is performed.

B. Two pilot crews flying point-to-point (airport to airport) shall be limited to 10 hours of flight time in any duty day.

1. Pilots flying two-pilot point-to-point crew missions, who are or have been assigned to other Forest Service missions during the same duty period, shall be limited to the flight hour limitations in paragraph II, A, 1.

15.12 - Exhibit 01--Continued

C. Regional Aviation Officers, or their designees, may waive the "consecutive" limitation in paragraph II, A, 6 of this section to enable pilots flying infrared or aerial spray projects, two shorter off-duty periods provided they aggregate 12 hours or more in any 24-hour period. One of the rest periods shall include at least 8 hours of uninterrupted rest. Waiver of the "consecutive" limitation in paragraph A, 6 may not be granted more than three times in any 14-duty-day cycle.

III. OPERATIONS.

A. Flight operations not specifically identified in this section shall be conducted in accordance with the applicable FAR 135.

1. Aircraft shall be maintained in a neat and clean condition, both exterior and interior.
2. Only pilots and aircraft specifically approved by the Forest Service or the Department of Interior, Office of Aircraft Services shall be used under these contracts or agreements.
3. Only passengers authorized by the Forest Service or interagency authorities may be carried on flights under these contracts or agreements (FSM 5711.2 and FSH 5709.16, sec. 13.2).
4. Substitute pilots and aircraft shall not be used in place of scheduled pilots or aircraft without prior approval by the Forest Service official authorized to order the flights.
5. Except for approved firefighting mission activities (FSM 5705) and landings and take-offs, flight below 500 feet above ground level (AGL) in fixed-wing airplanes is prohibited.

B. Night flights (FSM 5716.2). Use only multiengine aircraft for night flights, except that single-engine aircraft flights at night are authorized for ferry and cargo missions at the vendor's (contractor/rental agreement operator) option.

C. Instrument flight conditions. Use only multiengine aircraft for flights under instrument meteorological conditions, except that single-engine aircraft may be operated under instrument flight rules (IFR) conditions provided they meet the requirements of FAR 135.181 (1) and (2) (i) where visual flight rules (VFR) conditions exist to a point no more than 15 minutes flying time at normal cruise speed from the departure airport (FSM 5716.12).

15.12 - Exhibit 01--Continued

D. All aircraft engines shall be shut down for fueling operations, except that single-engine airtankers or helicopters equipped with an FAA- approved closed circuit refueling system may be fueled with the engine operating.

E. All aircraft engines shall be shut down for loading and unloading operations, except that single-engine airtankers may conduct loading and unloading operations with the engine operating, provided an approved "hot reloading" plan is available for the specific type aircraft and location.

F. Flight plans and flight following. All Forest Service ordered flights shall be on an FAA-filed flight plan or shall monitor Forest Service flight following frequencies and shall give position reports as requested, when possible. Regions shall establish flight following procedures commensurate with the type mission being flown.

G. Pilot-in-command route familiarization. Pilots are expected to familiarize themselves with the most practical and direct route of flight to each destination and to proceed accordingly at normal established cruising speeds. When departure or arrival times cannot be met within 30 minutes, pilots and operators are expected to notify the appropriate Forest Service dispatcher of the delay.

H. All flight operations shall be within allowable gross weights and performance limitations. Pilots shall make computations of aircraft weight, density altitude, and available runway length to determine safe departures and arrivals. Sound and mature judgement shall be exercised at all times, even if that means the mission cannot be accomplished. Pilots who unnecessarily jeopardize themselves or others may be suspended from further operations for the Forest Service.

I. Accidents or incidents must be reported to a Forest Service dispatcher as soon as practical.

IV. PILOT RESPONSIBILITIES (FSM 5704.7). Pilots contracted by the Forest Service have the responsibility to ensure safe accomplishment of the mission:

A. Maintain flight proficiency and mission currency in accordance with applicable FAA regulations and Forest Service procurement document requirements.

B. Brief passengers on operational and emergency procedures.

C. Cancel, postpone, or change flights when existing or impending conditions make those flights unsafe. The decision of the pilot-in-command is final.

15.12 - Exhibit 01--Continued

V. CERTIFICATION.

I the undersigned certify that I have received the USDA Forest Service safety briefing for pilots of light aircraft and that I understand and will comply with all of the requirements herein.

\_\_\_\_\_  
CONTRACT/RENTAL AGREEMENT PILOT

\_\_\_\_\_  
DATE

15.2 - Airtanker Pilot Approval. (Sec. 35). Only authorized interagency airtanker pilot inspectors shall approve airtanker pilots-in-command, copilots, and flight engineers who fully meet the national airtanker contract requirements, have demonstrated the ability to make accurate water drops, and comply with the following additional requirements. Where the applicable airtanker contract lists requirements different from those addressed in this section, the contract requirements shall prevail:

1. Type rating in the aircraft to be flown, not limited to VFR.
2. Recent flight experience, including at least the following:
  - a. For airtanker pilots-in-command, proof of annually meeting the requirements of FAR 61.58(a) proficiency flight check;
  - b. The general experience requirements of FAR 61.57(c);
  - c. Night experience requirements of FAR 61.57(d) and;
  - d. The instrument experience requirements of FAR 61.57(e).
3. Proof of completion of the Forest Service airtanker pilot video program or the national airtanker fire fighting academy course.
4. Attendance at a contract prework conference annually, including an agency sponsored operational briefing.
5. Proof of compliance with FAR 137.53 for congested areas.
6. The time in make and model aircraft to be flown, which may be reduced to 10 hours provided the pilot-in-command holds an initial attack rating and has completed training in maneuvers simulating airtanker operations.
7. During the preceding 12 months, at least 100 hours of flight time or performance as an airtanker pilot or initial attack pilot
8. Pilots who have served as copilots in multiengine airtanker operations may count 50 percent of that time toward the 100 hours pilot-in-command requirement to a maximum of 50 hours.
9. In make and model to be flown, 5 hours annually during the 60 days prior to the contract's mandatory availability period. This requirement shall be performed from the left seat and shall include:
  - a. Five takeoffs and landings.
  - b. Dropping two full loads of water in typical terrain under the observation of a designated airtanker pilot inspector at the initial reporting base:

(1) Water drops may be accomplished at other than the designated contract base, provided the drops have been approved in advance by the contracting officer.

(2) When water drops have been accomplished at bases other than the designated base, Regional Aviation Officers should require additional water drops at the designated base and at Governments expense.

10. Current pilot log books, which shall be made available to authorized airtanker pilot inspectors annually for verification or required flight time and experience.

15.21 - Airtanker Pilot Safety Briefing. Provide each airtanker pilot annually with a safety briefing prior to commencing any airtanker operations. This briefing is normally conducted during the annual contract pre-work and shall include at least the following elements:

1. Pilot flight and duty limitations phases 1, 2, and 3 (sec. 11.25 and 11.27).
2. Evidence of appropriate loading and weight and balance requirements provided by the contractor's representatives.
3. Safe and effective drop altitudes and accuracy criteria (airtanker contract).
4. Persons other than flight crew members aboard the aircraft (refer to section C in the national airtanker solicitation).
5. Use of personal protective equipment and how it should be worn (FSM 5716.31 and section C in the national airtanker solicitation).
6. Check-in prior to entering the incident area and procedures over the incident (FSM 5716.32).
7. Initial attack procedures and the importance of locating persons and property on the ground.
8. Flight operations in congested areas (FSM 5714).
9. Engine shut down during fueling and loading and unloading (sec. 11.29).
10. Geographic area briefing, including hazards that may affect safety of flight and the location of approved jettison areas.

15.22 - Airtanker Copilot Approval.

1. Candidates for airtanker copilot positions shall meet the following criteria as a minimum prior to being issued a Government agency pilot qualification card by a USDA/USDI approved airtanker pilot inspector.

- a. Pilot-in-command, airplane: 800 hours.
- b. Total flight hours in the preceding 12 calendar months, or performance as an airtanker copilot/pilot, or a type rating in the make and model to be flown in the past 12 months: 100 hours
- c. Commercial pilot certificate issued by the FAA.
- d. Instrument rating, airplane.
- e. Compliance with the requirements of FAR 61.55 and 61.56.

2. Up-to-date log books shall be made available to authorized airtanker pilot inspectors annually for verification of the copilot's time and experience.

15.22a - Airtanker Copilot Manipulation of Controls On and Over Incident .

Airtanker copilots shall be authorized to fly the aircraft on and over incidents only when the copilot holds an airtanker pilot (AKP) qualification card and is authorized by the airtanker pilot-in-command and the airtanker coordinator (leadplane pilot).

15.23 - Helitanker Pilot-in-Command Approval. (Sec. 35). Only authorized interagency helitanker pilot inspectors shall approve pilots-in-command who fully meet the national helicopter contract requirements, have demonstrated the ability to make accurate water drops, and are in compliance with the following additional requirements for helicopter pilots-in-command:

1. The following recent flight experience and standards:
  - a. Annually meeting the requirements of FAR 61.58(a) proficiency flight check;
  - b. Having proof of compliance with FAR 137.53 for congested areas;
  - c. Meeting the general requirements of FAR 133 and 137 applicable to helitanker operations;
  - d. In make and model to be flown, having flown 10 hours annually during the 60 days prior to the contract mandatory availability period, including at least the dropping of two full loads of water in typical terrain under the observation of a designated helitanker pilot inspector. ("Full load" is defined as separate drops of partial or full loads where varying approaches and departures are performed.)
  - e. For initial attack ratings (IA), meeting the currency requirements specified in the contract.
2. Annual attendance at a contract pre-work conference.
3. Completion of the Forest Service airtanker pilot video program or the National Aerial Firefighting Academy.

15.24 - Helitanker Copilot Qualifications. Copilots (second-in-command) must meet the requirements of the contractor's FAA certification and must be verified by the interagency pilot inspector. They are not issued an agency qualification card.

15.3 - Contract Smokejumper Pilots. (Sec. 27). Smokejumper pilots performing smokejumper and paracargo missions shall meet all of the applicable requirements in section 27 in this Handbook.

15.31 - Smokejumper Operations. (FSM 5714.3). Smokejumper and paracargo aircraft shall have crews in accordance with their type certification. Aircraft that do not require two pilots may be operated with one pilot, provided the requirements of FSM 5714.3 are met and the spotter/loadmasters who occupy the right cockpit seat have received the training specified in FSM 5714.3, exhibit 01.

15.4 - Contract Pilot Approval Forms.

15.41 - Contract Pilot Application. Each pilot applicant shall complete Form FS-5700-20 Airplane Pilot Qualifications and Approval Record, or FS-5700-20a, Helicopter Pilot Qualifications and Approval Record, as appropriate.

15.42 - Contract Pilot Approval Card. Complete the applicable information on the Interagency Airplane Pilot Qualification Card, OAS Form 30A, to document approval of the contract pilot.

16 - CONTRACT AIRCRAFT DATA AND APPROVAL RECORD Aircraft inspectors shall complete Form FS-5700-21, Airplane Data Record, or FS-5700-21a, Helicopter Data Record, for each aircraft inspected, except airtankers (sec.16.3).

16.1 - Aircraft Pre-Use Inspection Discrepancy Report. Interagency aircraft inspectors must complete the applicable information on Form FS-5700-33, Aircraft Pre-use Inspection Discrepancy Report. Record discrepancies in the blocks provided, including references to the contract by item and page number.

16.11 - Discrepancy Report Distribution. The discrepancy report must be signed and dated by the aircraft inspector upon completion of the inspection. Forward the white copy to the appropriate contracting officer and ensure the operator receives both the yellow and pink copies of the report. Instruct the operator to return the yellow copy to the inspector when (if applicable) all discrepancies are corrected.

16.2 - Aircraft Approval Card. Provided the aircraft (except airtankers, sec. 16.33) is free of discrepancies, or when the contractor has cleared any identified discrepancies, the aircraft inspector may complete form FS-5700-21, Aircraft Data Record, or FS-5700-21a, Helicopter Data Record, and issue the original to the contractor for display in the aircraft, with one copy to be retained by the aircraft inspector and one copy by the contracting officer.

16.3 - Airtanker Inspection Form. Document airtanker inspections by completing Form FS-5700-30, Airtanker Inspection. Ensure all entries recorded are accurate and include the operator's name, contract number, item number, and designated operator's base.

1. Review the aircraft log books and maintenance records for current time/life status of all components and attachments, including the airframe and inspection status.
2. Record the engine serial numbers and the time since overhaul or new installation for each engine attached and for each propeller.
3. Identify the assigned flight crew, including the flight engineer and a mechanic when applicable.
4. Complete the remarks section; indicate the number of discrepancies identified on Form FS-5700-33, Aircraft Pre-Use Inspection Discrepancy Report; and sign and date the form at the time of pre-use inspection.

16.31 - Avionics Inspection Report. Only qualified and approved avionics inspectors shall inspect and test the function of airtanker avionics and document the inspection on Form FS-5700-31.

1. Complete all applicable contract items on the report and indicate in the boxes provided whether the avionics equipment is approved or whether re-inspection is required; or
2. In the case of re-inspection, indicate if the avionics equipment is approved after correction of the discrepancy or rejected after re-inspection.

16.32 - Aircraft Contract Status Report. Complete Form FS-5700-32, Contract Status Report, and document the status of approval, corrective actions not needing re-inspection, and re-inspection requirements.

16.33 - Airtanker Approval Card. Where discrepancies have been found and indicated on the inspection reports during the course of aircraft inspection, do not issue the Form FS-5700-4, Aircraft Approval Card, to an airtanker until all discrepancies have been cleared.

16.34 - Aircraft Inspection Forms Management.

1. Interagency aircraft inspectors have the responsibility to ensure all applicable aircraft inspection forms, status reports, and approval cards are complete and the contractor has been briefed as to the status of each aircraft.
2. Inspectors shall ensure the contractor has received the appropriate copies of each inspection form and status report.

a. Airtanker pilot inspectors shall complete the airtanker pilot inspection forms (sec. 15) and ensure the appropriate copies are maintained along with the contractor's aircraft inspection documentation.

b. When discrepancies have been identified, the inspectors ensure the contractor is fully briefed on their nature and expected corrective action necessary before issuing Form FS-5700-21, Aircraft Data Record; or Form FS-5700-21a, Helicopter Data Record; or Form FS-5700-4, Aircraft Approval Card, for airtankers.

3. Aircraft inspectors shall maintain all contracting officers' and inspectors' copies of the inspection documentation and status reports together for each aircraft, pilot, copilot (except helitanker copilot), and flight engineer. Ensure that the Washington Office, Director of Fire and Aviation Management receives one set of copies to maintain in the files; the Forest Service contracting officer at the National Interagency Fire Center in Boise, Idaho, receives the complete file.

17 - CONTRACT AIRCRAFT INSPECTION GUIDELINES Use the following guidelines in addition to Form FS-5700-21, Aircraft Data Record, or Form FS-5700-21a, Helicopter Data Record, when inspecting aircraft for Forest Service and interagency use:

17.1 - Contract Specifications Familiarity. Aircraft inspectors shall be familiar with the appropriate contract specifications for aircraft use.

1. Initial inspections of aircraft should be accompanied by a Contracting Officer's Representative (COR) thoroughly familiar with the provisions of the solicitation.

2. Aircraft inspectors shall use the contract specifications as a checklist to ensure the contractor understands the Government's expectations.

17.11 - Contractor's FAA Operating Authority. Aircraft inspectors shall verify the contractor's FAA operating authority by review of the appropriate operating certificates (FAR 119, 121, 133, 135, 137). Aircraft inspectors must ensure the following publications, specifications, and personnel and equipment listings are in place:

1. Approved operations and maintenance manuals.
2. FAA-approved operations specifications.
3. Current list of approved aircraft by serial and identification numbers.
4. Current list of FAA-approved pilots, ratings, certificate numbers, training records, log books, endorsements, and mission approvals.

17.12 - Aircraft Inspectors' Review of Records. Aircraft inspectors shall review the following records:

1. Aircraft, engine, gearbox, and propeller or rotor logbooks.
2. Maintenance records.
3. Applicable FAA Airworthiness Directives and Manufacturer's Service Bulletins.
4. Aircraft weight and balance data for currency and compliance with the contract or rental agreement specifications.
5. Aircraft performance charts, which ensure the aircraft performs within the contract or rental agreement specifications

17.2 - Aircraft Return to Contract Service. (FSM 5713.41). Do not return aircraft having mechanical or equipment deficiencies to contract availability until the aircraft has been approved by an authorized aircraft inspector. Depending on the complexity of the mechanical breakdown, an on-site inspection may not be required by an authorized interagency aircraft inspector and approvals may be given by electronic means.

17.3 - Aircraft Inspection Guide Handbook. In addition to the aircraft inspection guidelines established in this chapter, aircraft inspectors should use the Aircraft Inspection Guide Handbook (sec. 06) to ensure complete compliance with the contract requirements. The FAA has the responsibility for the airworthiness of the aircraft and equipment.

17.4 - Responsibility of Interagency Aircraft Inspectors. Interagency aircraft inspectors have the responsibility to ensure aircraft maintenance is being performed in compliance with the contract specifications and the operator's FAA-approved maintenance plan; the aircraft are documented as within the required maintenance checks; and the aircraft comply with the applicable FAA Advisory Directives, Service Bulletins, and Military Technical Orders (if applicable).

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CHAPTER 20 - EMPLOYEE PILOTS - QUALIFICATIONS AND TRAINING

20.2 - Objective. The objective of training for Forest Service in-service aviation personnel is to ensure that each individual involved in the Forest Service aviation program has the opportunity to:

1. Develop and maintain special skills and related judgment to ensure safe aviation standards and practices through frequent practice.
2. Foster new techniques to stay abreast of industry and aviation state-of-the-art advancements.
3. Maintain a working level of aviation proficiency and safety to ensure a positive outcome in all Forest Service flight operations and flight check requirements.

20.3 - Policy.

20.31 - Forest Service Pilots.

20.31a - Training.

1. Schedule of Training. Schedule flight and ground training at the national and regional levels according to the requirements of this chapter.

2. Notification. Notify flight crew members, check pilots, and associated support personnel of scheduled training and aviation orientation sessions.

3. Training and Proficiency Records. (Sec. 21.11, 21.31, and 21.4). Maintain training and proficiency records for all pilots in their respective units containing, but not limited to:

- a. Record of Individual (30 day) Flying Time (Form FS-5700-25), detailed by category, such as crew position, instrument, night, instrument approaches, and mission type.
- b. Photocopy of all pilot certificate(s) and current Federal Aviation Administration (FAA) medical certificate, as applicable.
- c. Record of ground school attendance, providing space for original signature.
- d. Results of all examinations.
- e. Record of aircraft flight training, including simulator or training device.

- f. Documentation of pilot competency/proficiency flight checks, providing all of the elements equal to the requirements of FAR 135.293, 135.297, and FAR 135.299; flight maneuver grades; result of the check; and check airman verification.
- g. Organized file of completed training certificates and letters, including mission specific pilot and check pilot workshops, cadre workshops, and any associated training or workshop documentation.
- h. Mission approvals.
- i. Check pilot authorities.

4. Hazardous Materials. Each person who has completed the approved Forest Service or equivalent course in the handling of hazardous materials shall maintain a certificate of completion in their pilot training files.

20.31b - Qualifications. Ensure that Forest Service pilots are appropriately rated for the category and class aircraft assigned.

1. For aircraft 12,500 pounds gross take-off weight (GTOW) or less, pilots must possess at least a valid FAA commercial pilot certificate, instrument rating, and appropriate aircraft ratings.

2. For flight operations where the Federal Aviation Regulation (FAR) 135 requires an airline transport pilot rating (ATPR), pilots-in-command shall possess a valid ATP certificate with the appropriate ratings, including type ratings for the aircraft assigned.

3. Pilots must possess a valid FAA medical certificate as appropriate; second class with 12-month validity for those operations requiring a commercial pilot's certificate, or first class with 6-month validity for those operations requiring an airline transport pilot certificate.

4. Pilots must meet or exceed all flight crew member requirements outlined in FAR 135, Subpart E for aircraft 12,500 pounds GTOW or less and/or FAR 121, Subpart O for Transport Category Aircraft; and, as a minimum, Office of Personnel Management (OPM) X-118 Handbook requirements for grade and experience appropriate to the mission. These requirements include:

- a. Minimum flight hour experience for all pilots.
- b. Instrument flight rules (IFR) and visual flight rules (VFR) flight hour experience and currency.

Where higher flight hour experience requirements are identified in chapter 10 of this Handbook, they shall take precedence over the hourly requirements specified in the FAR's.

5. Forest Service pilot new hires must have their flying skills evaluated and pass an initial agency flight check by an appropriately rated check pilot.

6. Pilots must maintain currency for flight crew member testing requirements specified in FAR 135, Subpart G. An exception to the requirements of that part is; that designated Forest Service check pilots may administer special mission flight checks identified in this chapter without FAA designations.

#### 20.4 - Responsibility.

20.41 - National Aviation Officer. (FSM 5704.22).

20.42 - National Fixed-Wing Standardization Officer. The National Fixed-Wing Standardization Officer, National Interagency Fire Center (NIFC), Boise, Idaho, reports to the National Aviation Officer and has the responsibility to:

1. Provide leadership for the implementation of Service-wide standardization and training; and
2. Establish the content and methodology of the national aircraft pilot training program for meeting the national goals and objectives of a safe, effective, and standardized aviation program.

The National Fixed-Wing Standardization Officer may delegate some of these responsibilities to qualified aircraft pilot instructors and check pilots.

20.43 - National Leadplane and Large Aircraft Coordinator. The National Leadplane and Large Aircraft Coordinator, NIFC, reports to the National Aviation Officer and is responsible for;

1. The development, modification, implementation, and coordination of the utilization of large fixed-wing aircraft and leadplanes for resource protection and management; and
2. The planning and organization of the training programs for leadplane pilots and coordination of the training program for Modular Airborne Fire Fighting System (MAFFS) operations.

20.44 - National Helicopter Standardization Pilot. [Reserved].

20.6 - References. (Sec. 06 and FSM 5706).

### 21 - FOREST SERVICE PILOT TRAINING

21.1 - Training Program Elements for Employee Pilots. The Forest Service pilot flight and ground training program shall be accomplished in accordance with FAR 135, Subpart H and shall include, as minimum, the following elements:

1. Forest Service Orientation. Training for newly hired Forest Service pilots including, but not limited to, an orientation to the Forest Service Fire and Aviation Management organization (sec. 21.22).

2. Initial Training. The training required for crew members who have not qualified and served in similar capacities on similar aircraft.

3. Recurrent Training. Training required for flight crewmembers to maintain a high level of proficiency in each type aircraft for which they qualify by position, type of mission, and assignment(s).

4. Upgrade Training. Training required for crew members who have qualified and served as second-in-command on an aircraft type, before they serve as pilot-in-command on that type aircraft.

5. Differences Training. Training required for crew members who have qualified and served on a particular type aircraft, when the National Aviation Officer or designee determines differences training is necessary due to variations on that type aircraft.

6. In Flight. The maneuvers, procedures, or functions that must be conducted in the aircraft (sec. 21.5).

7. Special/Mission Training. The training required to qualify a crew member to perform specific Forest Service special missions and fire fighting missions.

8. Crew Resource Management (CRM) Training. (Sec. 21.6).

#### 21.11 - Training Certification.

1. Each phase of training must be successfully accomplished, certified, and documented prior to an employee flight crew member's being assigned to any Forest Service mission in a required crewmember capacity.

2. Each instructor, check pilot, or supervisor who is responsible for the particular training subject or flight check shall certify the satisfactory completion or performance of the training or check (sec. 20.31a, para. 3).

#### 21.2 - Ground Training - Employee Pilots. (Sec. 21.5).

#### 21.21 - Syllabus and Records. (Sec. 21.11).

21.22 - New Pilot Orientation. All newly hired flight crewmembers shall receive an orientation briefing to familiarize them with Forest Service regulations, procedures, employee responsibilities and conduct, and aviation operational requirements. The responsible aviation management official (Regional Aviation Officer, supervisory pilot, or their designees) shall maintain a signed record of the new hires' attendance and document all phases of the orientation, including an employee development plan and safety briefing.

20.23 - Reduction in Ground School Hours. Newly hired pilots or pilots transferred from another agency, who have recent training and experience equal to the requirements of FAR 135, Subpart H, or recent FAR 121 qualifications, may have the required ground school hours reduced in certain circumstances. Flight crewmembers having comparable training and experience within the previous 6 months may have the aircraft initial equipment ground training curriculum reduced as follows:

1. For the same type aircraft: The recurrent training curriculum for the type aircraft may be given.

2. For a different type of aircraft: The complete initial equipment training curriculum shall be given without reduction in ground school hours.

21.3 - Flight Training - Employee Pilots.

21.31 - Flight Training and Proficiency Records. All flight training and proficiency records and certifications shall be maintained in the individual employee's proficiency and recurrent flight records file and shall contain at least the following (sec. 20.31, para. 3):

1. A master syllabus of training.
2. Record of training flights.
3. Record of initial and recurrent flight checks.
4. Record of line check certification.
5. Record of mission qualification checks.
6. Record of simulator/training device training.

21.32 - Simulator/Training Device. When a non-visual simulator or training device is used in conjunction with the instrument time requirements, that time shall not be more than 50 percent of the requirement.

1. Providing the simulator/training device is capable of performing the required maneuvers, training and practice in all the procedures and maneuvers are authorized.

2. A simulator or training device capable of duplicating the procedures and performance of a specific type aircraft, Beechcraft 58P for example, may be approved for every other 6-month proficiency check, provided:

- a. A simulator/training device proficiency check plan has been approved by the National Aviation Officer, and
- b. The FAA has approved the plan and certified its use.

21.33 - Flight Crewmember Evaluation.

1. Crewmembers With Prior Experience in Type. When a flight crew member has had previous experience in the same type aircraft, the amount of initial flight training may be predicated on an in-flight evaluation by an appropriately rated check pilot.

a. The evaluation flight may in itself constitute an initial or recurrent proficiency check, provided all required maneuvers and procedures have been evaluated and are satisfactory.

b. Any items checked unsatisfactory (U) shall be made part of the recommended flight training syllabus for that individual.

2. Crewmembers With No Prior Experience in Type. All required maneuvers and procedures on the flight training/proficiency check form shall be completed.

21.34 - Reduction in Programmed Hours.

1. A pilot who progresses successfully through flight training, is recommended by an instructor or check pilot, and successfully completes the appropriate flight check, need not fully complete the programmed hours of flight training for the particular type airplane.

2. Any reduction in the programmed flight training hours shall be fully documented and approved by the appropriate supervisory pilot responsible for the aviation activity.

21.35 - Operational Workshops and Training. Forest Service fixed-wing and helicopter pilots must attend the appropriate operational workshop at least once every 24 calendar months (biennially).

1. National Fixed-Wing Standardization Workshop. All fixed-wing Forest Service employee pilots shall attend the National Fixed-Wing Standardization Workshop (NFSW) biennially.

2. National Helicopter Pilot Inspector Standardization Workshop. All Forest Service employee helicopter check pilots shall attend the National Helicopter Pilot Inspector Workshop (NHPIWS) biennially.

3. Check Pilot Workshops. Designated check pilots shall on a biennial basis attend the appropriate Special/Mission Standardization Workshop for which they are authorized (sec. 21.45, 21.46, and 25).

21.4 - Currency Requirements - All Pilots. Pilots-in-command of Forest Service aircraft shall meet the recent flight experience requirements outlined in FAR 135.247 for VFR flights and FAR 61.57 for IFR flights and the following additional currency requirements applicable to their assignments and/or designations:

1. Initial and Recurrent Flight Checks. A competency flight check must be successfully completed in the type aircraft and in the configuration to be operated since the beginning of the 12th calendar month before the flight (FAR 135.293b).

- a. The check must be conducted by an authorized agency check pilot or an authorized FAA inspector.
- b. One competency flight check, equipment or instrument, must be accomplished with an out of region or out of agency check pilot annually in one type aircraft to be flown.
- c. The equipment check required by this section shall include a written or oral test given by an authorized check pilot (FAR 135.293a).

2. Instrument Proficiency Check. Since the beginning of the 6th calendar month before any flight, pilots shall have successfully passed an instrument flight check by an authorized interagency check pilot in accordance with FAR 135.297, except that pilots not completing this check are limited to day visual flight rules (VFR) only.

3. Line Check. A person may not serve as pilot-in-command under IFR unless, within the preceding 12 calendar months, that person has satisfactorily passed a line check (routes and airports) given by an authorized interagency check pilot in accordance with FAR 135.299. Pilots not completing this check are limited to Visual Flight Rules (VFR) only.

4. Approach Certification. (FAR 135.297). Pilots shall not use any type of instrument approach procedure under IFR unless, since the beginning of the 6th calendar month before that use, the pilot has successfully demonstrated that type of approach procedure to an authorized check pilot.

5. Night Proficiency. (Sec. 11.25). Pursuant to FAR 61.57, pilots shall not initiate a flight that will terminate more than 1 hour after official sunset unless that pilot has performed at least 3 landings to a full stop at night in the preceding 90 days.

6. Autopilot Use. Each person taking an autopilot check in conjunction with the instrument proficiency check required by the preceding paragraph 2 must demonstrate proficiency to:

- a. Conduct instrument operations competently.
- b. Properly manage all flight deck resources and communications.

7. Category and Class. Within the preceding 90 days of any flight carrying passengers or for working missions, pilots must:

- a. Accomplish three take-offs and landings to a full stop in the category and class aircraft to be flown (FAR 91.345), and
- b. Have at least 5 hours as pilot-in-command in each category and class aircraft to be flown.

8. Special Mission Flight Requirements. Annually, pilots-in-command shall have had 3 hours mission practice, actual or simulated, incorporating the flight maneuvers, procedures, and techniques associated with each type working mission in category and class aircraft prior to any working mission (sec. 21.34).

9. Pilot Performance. Each pilot who takes any of the flight checks required by this section must demonstrate proficiency in the aircraft, with the successful outcome of the maneuver or procedure never in doubt.

10. Grace Provisions. Crewmembers required to take a test, flight check, or recurrent training who complete it in the calendar month before or after the calendar month in which it is required, shall be considered to have completed it in the calendar month in which it is required (FAR 135.301).

11. Training Documentation. (Sec. 20.3). A crewmember who successfully completes a course of instruction from a factory school, an authorized training facility, or FAR Part 135 or 141 operational facility, shall have the documentation included in the individual crewmember's currency and proficiency training record. Check pilots shall, in addition, comply with the record keeping requirements of section 25.

12. Emergency Procedures Training. All Forest Service employee pilots-in-command, in addition to the requirements of section 21.35, paragraph 1 and 2, and the 6-month instrument check requirements in section 21.4, paragraph 2, shall accomplish the emergency procedures training as follows:

- a. Each fixed-wing pilot-in-command shall attend annually an authorized professional simulator training facility for emergency, instrument, and equipment training, in addition to the required biennial National Fixed-Wing Standardization Workshop. Attendance annually at either the National Fixed-Wing Standardization Workshop or a professional simulator training facility fulfills the 12 month out-of-region/agency check ride requirements and/or equipment check in type aircraft (sec. 21.4, para. 1).

- b. At the discretion of the supervisory pilot or NAO, a pilot completing the outside simulator training may be required to take a flight check in the applicable aircraft.

c. Each rotor-wing pilot-in-command shall attend biennially either rotor-wing factory training or an authorized professional simulator training facility for emergency, equipment, and, when applicable, instrument training. Helicopter pilot inspectors shall attend the training requirements annually.

d. Prior to initial qualification, helicopter pilots shall attend the National Helicopter Mountain Flying Course. This is a one-time only requirement, with the recurrent training incorporated into the National Helicopter Pilot Inspector Standardization Workshop (sec. 21.35, para. 2) or another comparable course approved by the National Helicopter Management Specialist.

e. Emergency procedures training in a simulator may be waived by the National Aviation Officer when a simulator is not immediately available for pilots flying VFR only at the request of the appropriate supervisory pilot. An example of VFR operations only includes the Region 9 DHC-2 Beaver operations.

21.41- Annual Flying Experience. As a minimum, all Forest Service employee fixed-wing and helicopter pilots, including check pilots, shall meet the following annual experience requirements:

1. Pilots shall complete 100 hours of flying annually, including at least 25 hours in the preceding 6 months. This level of annual experience shall be considered the minimum for mission safety. Regions and other units operating aircraft are encouraged to support cost-effective aircraft operations that maintains annual individual pilot flight times above the minimum requirements.

2. Pilots who have completed all of the training requirements in this chapter, but have not accumulated the required minimum annual flight hours required by the preceding paragraph 1, shall reestablish pilot-in-command proficiency and currency by undergoing such recurrent training and proficiency evaluations as deemed necessary by an appropriately authorized interagency check pilot in the category and class aircraft to be flown.

3. Pilots who do not meet the minimum requirements of the preceding paragraphs 1 or 2 may not serve as pilots-in-command on working missions. Pilots may be authorized, however, to conduct flight checks for point-to-point flights when they meet the following currency requirements:

a. Twenty-five hours as pilot-in-command in the previous 12 months, of which at least 10 hours were in the same category and class aircraft and 5 hours were flown within the preceding 90 days, and

b. Successful completion of the National Fixed-Wing Standardization Workshop, rotor-wing factory school, or authorized professional simulator training course within the preceding 12 calendar months.

21.42 - Multiple Aircraft Currency for Pilots-in-Command. For pilots-in-command qualified in more than one "group" of aircraft (FAA bulletin #77-1-0), 6-month proficiency checks shall be given alternately in each aircraft. Examples of the defined groups are:

1. Beech-65-90, 90, 99, 100 (Turboprop).
2. Beech-200 Turboprop "T" tail.
3. Cessna 310, 320, 340, 400 series (except 441).
4. Rockwell Commander-500, 560, 680, 685, 720.
5. Rockwell Commander-680T, 680V, 680W, 681, 690 (Turboprop).

For purpose of "Multiple Aircraft Currency," qualification in more than one airplane in the same group constitutes currency in one aircraft.

20.43 - Maximum Multiple Aircraft Currency. For pilots-in-command, the pilot shall not be qualified in more than three groups of aircraft at any given time. Provided a need for additional aircraft type currency is required, the following procedures shall apply:

1. The pilot-in-command must drop the currency on one of the three aircraft previously authorized to maintain overall currency of only three aircraft.
2. Prior to any working mission the pilot-in-command must accomplish an equipment check flight with an authorized check pilot in the group type aircraft to be added.
3. The pilot shall have completed an authorized equipment ground school for the type aircraft in the previous 12 months.
4. The pilot must comply with the applicable flight crew member requirements of FAR 135, Subpart E.
5. The pilot must meet the applicable requirements of this section when requalifying as a pilot-in-command in a previously authorized group type aircraft.

21.44 - Copilot Authorization - Multiple Aircraft Types.

1. Forest Service employee pilots at the GS-7/9/11 levels functioning as copilots only, may maintain currency in no more than three types of aircraft at any one time. In the event qualification in another type aircraft is required, the copilot must drop authorization in one of the previously assigned aircraft to maintain the maximum number of three types.

2. Qualified pilots-in-command at the GS-11/12/13 and 14 levels may act as copilots on no more than two aircraft types, in addition to the three aircraft types in which the pilots-in-command maintain currency. For pilots-in-command to function as copilots on aircraft for which they are not qualified as pilots-in-command they must meet the following requirements:

- a. Any person acting as copilot must have successfully completed the appropriate equipment ground school in the previous 12 months and must meet the requirements of FAR 135, Subpart E for copilots on aircraft 12,500 pounds or less GTOW.
- b. For aircraft 12,500 pounds GTOW and greater, a copilot must comply with the requirements of FAR 121, Subpart O.

21.45 - Check Pilot Requirements. (Sec. 21.46 and 25). Each aviation unit manager shall designate only qualified individuals as check pilots to ensure standardization and safety within the aviation function.

21.46 - Designations - Fixed-Wing Check Pilots. (Sec. 25). Regional Aviation Officers, the National Aviation Officer and the Chief Pilot for the Washington Office shall designate an adequate number of check pilots for their units qualified in the equipment and missions to ensure the proficiency standards for each type mission are maintained and the required periodic flight checks are provided for Forest Service pilots.

1. Regional Aviation Officers and the National Aviation Officer shall maintain complete and current listings of their qualified check pilots for their units, including their mission and aircraft authorizations.

2. In addition to meeting the requirements of this section and section 25 on check pilot training, persons authorized to perform instrument competency and currency checks shall possess the following credentials and qualifications:

- a. A current and valid flight instructor's certificate issued by the FAA for the category and class aircraft with an instrument instructor's endorsement;
- b. Completion of the check pilot training outlined in FAR 135.337 and the initial and transition training in FAR 135.339; and
- c. Meeting the requirements of FAR 61.197 for Flight Instructor recurrency.

3. In addition to meeting the requirements of section 25, pilots designated as check pilots for special and fire fighting missions, both fixed-wing and helicopter, and qualified to administer initial and recurrent flight checks shall:

- a. Be fully qualified as pilot-in-command for the mission for which the check is being given, such as smokejumper/paracargo, leadplane, infrared, and so on.

- b. Meet the annual currency requirements for special/mission flight techniques in section 21.4, para. 8.
- c. Have successfully completed the appropriate mission check pilot standardization workshop in the previous 24 months.

21.5 - Aircraft Type Training - Employee Pilots. In addition to the training required in section 21.1, Forest Service employee pilots shall receive ground and flight training in each type aircraft for which they are authorized.

21.51 - Ground Training - Program Curriculum. (Sec. 21.33, 21.34). The curriculum for pilot training in each phase initial, recurrent, upgrade, and so on prescribes the minimum time in hours considered necessary to achieve the desired level of proficiency. The curriculum must include ground and flight training required by FAR 135, Subpart H - Training.

1. Training shall include complete detailed descriptions of the aircraft systems using the Airplane Flight Manual (Pilot's Operating Handbook) as the principal source for information. Other training aids and publications may be used to enhance the quality of information.
2. Detailed descriptions of the normal, abnormal, and emergency systems, procedures, and functions that will be required during the flight training phase or flight check shall be a part of the curriculum.
3. Written examinations and documentation of training certification shall be in accordance with section 21.11.
4. The programmed hours of flight training may be reduced in accordance with section 21.34.

21.51a - Ground Training - Aero Commander 500B.

1. Initial Equipment Ground Training - 8 Hours. Equipment ground training must include instruction in at least the following aircraft systems, operations, and procedures; the Airplane Flight Manual (Pilot's Operating Handbook) shall be the principal source of technical information for each aircraft type:
  - a. Aircraft system descriptions for normal, abnormal, and emergency functions and procedures, including electrical, hydraulic, powerplants, and other associated aircraft systems and attachments;
  - b. Aircraft performance capabilities and limitations;
  - c. Aircraft general description, weight and balance procedures and calculations, and flight/fuel planning; and
  - d. Avionics systems, including communications, navigation, and agency-specific avionics, such as FM radios, global positioning, and/or other related equipment.

2. Recurrent Ground Training - 4 Hours. The curriculum shall include instruction necessary to ensure the pilot's continuing competence in the type aircraft and shall also include other subjects as determined to be necessary, such as severe weather avoidance and winter operations.

3. Differences Ground Training - 2 Hours. Instruction should focus on descriptions and functions of equipment, attachments, or instruments uncommon to Forest Service fleet aircraft.

21.51b - Ground Training - Beechcraft 58 Baron.

1. Initial Equipment Ground Training - 20 Hours. Equipment ground training shall include instruction in aircraft systems, operations, and performance. The Airplane Flight Manual (Pilot's Operating Handbook) shall be used as the principal source of technical information including, but not limited to, the following subjects:

- a. Major aircraft systems descriptions for normal, abnormal, and emergency functions and procedures (electrical, hydraulic, pressurization, and powerplants).
- b. Aircraft performance capabilities and limitations.
- c. Avionics systems, including communications, navigation, and agency-specific avionics, such as FM radios, global positioning, and other related equipment.
- d. Aircraft dimensions and weight and balance procedures and calculations;

2. Recurrent Ground Training - 10 Hours. The curriculum shall include the instruction necessary to ensure a pilot's continuing competency in the type aircraft.

3. Differences Ground Training - 4 Hours. The curriculum should focus on the description and function of equipment, attachments, or instruments uncommon to Forest Service fleet aircraft.

21.51c - Second Pilot Duties and Responsibilities. Both the King Air and DHC-6 Twin Otter are basically single-pilot operations; however, two qualified pilots are often assigned to the same aircraft, either by necessity or for purposes of transportation. Assigned duties and responsibilities flow from the pilot assigned as pilot-in-command to the second pilot and should, as a minimum, include the following assignments:

1. Read the checklist command and reply.
2. Manage all radio communications.
3. Set up the navigation radios as directed by the pilot-in-command.

4. Monitor all enroute and approach procedures.
5. Be aware and responsive to all aspects of the flight.

21.51d - Ground Training - DHC-6 Twin Otter .

1. Initial Equipment Ground Training - 32 Hours . Equipment ground training shall include instruction in airplane systems, operations, and performance. The Airplane Flight Manual (Pilot's Operating Handbook) shall be the principal source of technical information, including, but not limited to, the following subjects:

- a. Major aircraft systems descriptions for normal, abnormal, and emergency functions and procedures, such as electrical, hydraulic, and powerplants.
- b. Aircraft performance capabilities and limitations.
- c. Dimensions, weight, and balance.

2. Recurrent Ground Training - 16 Hours . The curriculum shall include the instruction necessary to ensure a pilot's continuing competency in the type aircraft.

3. Upgrade Training - 16 Hours . Flight crew members who have served as second-in-command on DHC-6 Twin Otter equipment for at least 100 hours and are upgrading to pilot-in-command, may have the initial equipment ground training reduced by 50 percent. The training emphasis should focus on procedures (normal and emergency) and aircraft performance capabilities and limitations.

4. Differences training - 4 Hours . Curriculum should focus on the description and function of equipment, attachments, or instruments uncommon to Forest Service fleet aircraft.

21.51e - Conduct of Training - Two-Pilot Aircraft . This section provides guidance on the proper procedures, methods, and techniques for the operation of aircraft compatible with two-pilot flight crews.

1. Use of Power . The pilot should always use a call for the appropriate power setting specified for a maneuver. However, during training or a check flight, the instructor pilot or check pilot may restrict the power to a lower value to simulate a higher gross weight aircraft.

2. Use of Checklists . The pilot shall call for the appropriate checklists in a timely manner. During training, the instructor pilot may require that the pilot complete various checklists personally to become familiar with the items contained in the checklists.

3. Standard Procedures . The instructor pilot or check pilot should emphasize standard procedures (sec. 25) to promote crew coordination and standardization.

21.51f - Ground Training - Beechcraft King Air (All Models) .

1. Initial Equipment Ground Training - 20 Hours. Equipment ground training shall include instruction in aircraft systems, operations, and performance in accordance with the Airplane Flight Manual (Pilot's Operating Handbook) (sec. 06 and 20.06) as the principal source of technical information, including, but not limited to, the following subjects:

- a. All aircraft systems descriptions for normal, abnormal and emergency functions and procedures, such as electrical, hydraulic, powerplants, and all other associated aircraft systems and attachments;
- b. Aircraft general description, and weight and balance procedures and calculations (unless the Washington Office, National Aviation Officer has approved a different method);
- c. Aircraft performance capabilities and limitations; and
- d. Avionics, including communications, navigation, and any additional agency required avionics systems.

2. Recurrent Ground Training - 10 Hours. The curriculum shall include a review of the aircraft systems necessary to ensure the pilot's continuing competency in the specific type aircraft.

3. Upgrade Ground Training - 10 Hours. Flight crew members who have served as second-in-command on King Air groups of airplanes for at least 100 hours and are upgrading to pilot-in-command, may have the initial equipment ground training reduced by 50 percent. The training emphasis should focus on procedures (normal and emergency) and aircraft performance capabilities and limitations.

4. Differences Ground Training - 4 Hours. The curriculum shall include equipment descriptions and functions uncommon in similar Forest Service aircraft or unique to the type aircraft including installed avionics equipment.

21.51g - Ground Training - Shorts SD-3 (C-23) .

1. Initial Equipment Ground Training - 40 Hours. Equipment ground training shall include instruction in aircraft systems, operations, and performance in accordance with the Airplane Flight Manual (Pilot's Operating Handbook) (sec. 06 and 20.06) as the principal source of technical information, including, but not limited to, the following subjects as a minimum:

- a. All aircraft systems descriptions for normal, abnormal, and emergency functions and procedures, such as electrical, hydraulic, powerplants, and other associated aircraft systems and attachments;
- b. Aircraft general description and recommended weight and balance procedures (unless the Washington Office, National Aviation Officer has approved a different method);

- c. Aircraft performance capabilities and limitations; and
- d. Avionics systems, including communications, navigation, and any additional agency required avionics systems.

2. Recurrent Ground Training - 16 Hours. The curriculum shall include a review of the aircraft systems necessary to ensure the pilot's continuing competency in the specific type aircraft.

3. Upgrade Ground Training - 20 Hours. Flight crew members who have served as a second-in-command on Shorts SD-3 (C-23) equipment for at least 100 hours and are upgrading to pilot-in-command, may have the initial equipment ground training reduced by 50 percent. The training emphasis should focus on procedures (normal and emergency), and aircraft performance capabilities and limitations.

4. Differences Ground Training - 4 Hours. The curriculum shall include equipment and systems descriptions and functions uncommon in similar Forest Service operated type aircraft, including avionics.

21.51h - Ground Training - DC-3TP.

1. Initial Ground Training - 40 Hours. Equipment ground training shall include instruction in aircraft systems, operations, and performance. The Airplane Flight Manual (Pilot's Operating Handbook) (sec. 06 and 20.06) shall be the principal source of technical information. The training syllabus shall include, but not be limited to, the following subjects:

- a. Introduction to all aircraft systems descriptions and functions for normal, abnormal, and emergency functions and procedures, including electrical, hydraulic, powerplants, and all other associated systems and attachments;
- b. Aircraft general description and recommended weight and balance procedures and calculations, except where the Washington Office, National Aviation Officer has approved a different method of calculation that is documented in this chapter.
- c. Aircraft performance capabilities and limitations; and
- d. Avionics systems, including communications, navigation, and any additional agency required avionics systems.

2. Recurrent Ground Training - 16 Hours. The curriculum shall include a review of the aircraft systems necessary to ensure the flight crew's continuing proficiency and competency in the aircraft.

3. Upgrade Ground Training - 20 Hours. Flight crewmembers who have served as second-in-command on DC-3TP equipment for at least 100 hours and are upgrading to pilot-in-command, may have the initial equipment ground training reduced by 50 percent. The training emphasis should focus on procedures (normal and emergency), and aircraft performance capabilities and limitations.

4. Differences Ground Training - 4 Hours. The curriculum shall focus on equipment and systems uncommon in similar aircraft types, including installed avionics.

21.51i - Ground Training - Sabreliner.

1. Initial Ground Training - 40 Hours. Equipment ground training shall include instruction in the airplane systems, operations, and procedures. The Airplane Flight Manual (Pilot's Operating Handbook) (sec. 06 and 20.06) shall be the principal source of technical information, including, but not limited to, the following subjects:

- a. Aircraft systems descriptions for normal, abnormal, and emergency functions and procedures, such as electrical, hydraulic, powerplants, and other associated systems and attachments;
- b. The aircraft general description and weight and balance procedures and calculations;
- c. Aircraft performance capabilities and limitations; and
- d. Avionics systems, including communications, navigation, and any agency-specific avionics equipment, such as FM radios, global positioning, and other special mission equipment.

2. Recurrent Ground Training - 16 Hours. The curriculum shall include a review of the aircraft systems necessary to ensure the flight crews remain competent and proficient in their assigned positions.

3. Upgrade Ground Training - 20 Hours. Flight crew members who have served as second-in-command in the same group type (Sabreliner) equipment and who are upgrading to pilot-in-command shall, in addition to the initial equipment ground school previously attended, receive the upgrade training prescribed by this section to include not less than 50 percent of the initial ground training requirements.

4. Differences Ground Training - 4 Hours. The curriculum shall include equipment descriptions, procedures, and performance uncommon in similar Forest Service aircraft types operated, including installed avionics.

21.51j - Ground Training - Cessna 206. [Reserved].

21.51k - Ground Training - DHC-2 Beaver. Refer to the National training syllabus on file in the Region 9 Fire and Aviation Management Staff for information pertaining to training and proficiency requirements for the DHC-2 Beaver.

21.51l - Ground Training - Bell 206 Helicopter. [Reserved].

21.6 - Crew Resource Management Training. (Sec. 21.1). All employee pilots shall attend, or shall have attended within the previous 3 years, a Washington Office approved Crew Resource Management (CRM) course.

21.7 - Flight Training - Forest Service Pilots. Employee pilots shall receive flight training in each specific type aircraft and flight crew position assigned, including the appropriate curriculums for the phase training required in accordance with sections 21 - 24; check pilot training, section 25; and special missions training (sec. 26 - 28, and sec. 29, helicopter special use).

22 - PILOT FLIGHT TRAINING AND PROFICIENCY CHECK STANDARDS - ALL FIXED-WING MULTIENGINE PILOTS Minimum acceptable performance standards shall be equivalent to those specified in the FAA Practical Test Standards: FAA-S-8081-2 for Commercial Pilots or, for aircraft over 12,500 pounds Gross Take-Off Weight (GTOW), FAA-S-8081-5 for Airline Transport Pilots. The test standards shall be the same for employee pilots as well as contract pilots.

The following procedures in sections 22.1 - 24.5 shall be used for flight training and proficiency check flights, as appropriate.

22.1 - Preflight.

1. An initial equipment test (oral or written) shall be part of the practical test. An equipment examination must be coordinated with the flight maneuvers portion and shall cover at least the following:

- a. Practical knowledge of the airplane, powerplants, systems, components, and performance data.
- b. Normal, abnormal, and emergency procedures.
- c. The appropriate provisions of the Airplane Flight Manual (Pilot's Operating Handbook (POH)).

The check pilot may accept, as equal to this equipment test, verification of the pilot's satisfactory completion of ground school within the preceding 6 calendar months.

2. During the preflight inspection the pilot must:
  - a. Conduct a preflight inspection of the aircraft.
  - b. Complete the appropriate checklists.

22.2 - Takeoff. The pilot must meet the following standards for takeoff:

1. Normal Takeoff. (Sec. 37.13a). Demonstrate procedures in accordance with the applicable Airplane Flight Manual (Pilot's Operating Handbook) and ensure all power applications are smooth and within recommended limits.

- a. Landing gear retraction shall not begin until a positive rate of climb has been established and adequate runway length for emergency landing no longer exists.
- b. Power reduction to maximum except takeoff (METO), or climb values, shall not be made until reaching a safe altitude of at least 400 feet above ground level (AGL).

2. Instrument Takeoff. Comply with the recommended instrument takeoff procedures in the applicable Airplane Flight Manual (Pilot's Operating Handbook).

- a. Ensure all anti-ice and de-ice equipment is tested and operable.
- b. Ensure that avionics equipment applicable to the minimum equipment list is operable for instrument flight.
- c. Demonstrate simulated instrument takeoff procedures in accordance with the pilots operating handbook procedures and, at the discretion of the check pilot, with the instrument hood lowered at 100 feet above ground level (AGL).

3. Crosswind Takeoff. (Sec. 37.13a). Comply with the applicable Airplane Flight Manual (Pilot's Operating Handbook) recommended procedures. Establish a drift heading to maintain the appropriate ground track.

4. Simulated Engine Failure - Takeoff. (See sec. 37.13e for procedures).
5. Rejected Takeoff - Simulated. (See sec. 37.13d for procedures).

22.3 - In-Flight Maneuvers. (Sec. 37.14).

1. Climbing and Normal Turns. Use standard rate turns and approximately 30 degrees of bank.

2. Steep Turns. Unless waived, accomplish one steep turn in each direction of at least 180 degrees, but not more than 360 degrees with a 45-degree bank. Smoothness, altitude control, airspeed, and bank control should be graded along with roll-out headings.

3. Approach to Stalls. Conduct the approach to stall in accordance with the pilot training procedures outlined in section 22. Pilots shall demonstrate stalls in each type airplane assigned, including:

- a. Takeoff configuration.
- b. Clean configuration.
- c. Landing configuration.

When the approach to stall occurs, recover straight ahead with minimum loss of altitude. Special attention shall be given to the pilots stall recognition and proper recovery technique.

4. Minimum Speed Maneuvers. Fly aircraft at an airspeed 10 percent above stall speed in various configurations. Shallow banked turns left and right should be accomplished through 90 degrees of turn. Attention shall be given to the pilot's ability to adjust attitude for configuration/power changes, maintaining heading and altitude and avoiding unintentional stall.

5. Powerplant Failures. Simulated engine failures during different phases of flight must be given to each trainee or pilot being checked during different phases of flight. The check pilot shall ensure the pilot follows the appropriate emergency checklist procedures.

22.4 - Aircraft Systems Use. The check pilot shall ensure the pilot being checked is familiar with the aircraft systems in the normal, abnormal, and emergency functions. Use the applicable Airplane Flight Manual (Pilot's Operating Handbook) for systems descriptions.

22.5 - Failure of Flight Check. In the event a pilot fails a flight check, or is involved in a disagreement with the check pilot or procedures, the pilot may request a re-check through the supervisory pilot, the Regional Aviation Officer, the National Aviation Officer, or their designees.

23 - EMERGENCY PROCEDURES - PILOT FLIGHT TRAINING/PROFICIENCY CHECKS. Pilots shall use the Airplane Flight Manual (Pilot's Operating Handbook) in each aircraft and the recommended emergency procedures checklist for all emergency training and flight checks.

23.1 - Checklist - Memory Items. Trainees and pilots must strictly follow emergency checklists. Immediate action items shall constitute memory items. Memory items should be kept to a minimum and those items for different aircraft shall, as much as possible, parallel procedures in other Forest Service operated aircraft.

23.11 - Emergency Checklists.

1. Engine Fire (Ground and Flight). The pilot being checked shall use the appropriate emergency checklist and perform the tasks in the recommended sequence for each different systems malfunction, such as:

- a. Electrical Smoke or Fire,
- b. Fuel,
- c. Pressurization,
- d. Manual Gear Extension,
- e. Hydraulic, and
- f. Pneumatics.

2. Simulated Engine Failure. Pilots shall develop a knowledge of aircraft characteristics under simulated engine-out conditions, together with the control applications necessary to achieve a maximum margin of safety.

- a. Engine Shutdown in Flight. Refer to the appropriate checklist in the Airplane Flight Manual (Pilot's Operating Handbook) (sec. 37.13e).
- b. Beech Baron 58P Procedures. Ensure that the Beech Baron 58P propeller synchronization system is turned off prior to simulated engine failure and is not be reactivated until engine power is equalized.
- c. Powerplant Inoperative Maneuvering. (Sec. 37.13e). Use the Airplane Flight Manual (Pilot's Operating Handbook) for the specific aircraft performance and procedures.
- d. Air Start. Accomplish unfeathering in accordance with the procedures outlined in the applicable Airplane Flight Manual (Pilot's Operating Handbook).
- e. Performance Guidelines. Evaluate proficiency on the basis of maintaining a desired heading within +/-10 degrees, safe airspeed consistent with the maneuver being performed, and altitude desired within +/-100 feet; prompt identification of a failed engine; and the accuracy of shutdown and restart procedures.

24 - INSTRUMENT PROCEDURES The minimum acceptable performance standards shall be equivalent to those specified in the FAA Practical Test Standards: FAA-S-8081-2 for commercial pilots or, for aircraft over 12,500 pounds Gross Take-Off Weight (GTOW), FAA-S-8081-5 for Airline Transport Pilots. The test standards shall be the same for employee pilots as well as contract pilots.

24.1 - Area Departure and Arrival. The crew member being checked shall request radios tuned and identified as required and shall brief the check pilot on departure, approach, or missed approach procedures. Compliance with appropriate checklists, aircraft control, and all air traffic control ATC procedures shall be the bases for evaluation.

24.11 - Navigation Systems. The crew member being checked must demonstrate navigation systems use, including adherence to assigned radials.

24.12 - Holding Pattern. Entry and holding shall be in accordance with the current FAA- recommended procedures. Entry turns authorized include the most expeditious means to establish the standard or nonstandard holding pattern, as directed or depicted. Those entries can include the following procedures:

1. Parallel entry,
2. Tear drop, and
3. Direct entry.

24.13 - Procedure Turns Authorized. Procedure turns authorized are:

1. Standard,
2. 90-270,
3. Tear drop, and
4. From the holding pattern.

24.14 - Descent. Normally, descents from the initial fix should be made at holding airspeed. Drag devices (gear, flaps, or other deceleration devices) may be used as necessary.

24.15 - Altitude Awareness and Descent Rates. In single pilot aircraft, pilots are encouraged to discipline themselves to make special note of the following critical altitudes during instrument approach:

1. Initial approach altitude.
2. 500 feet above decision altitude (DA), or minimum decent altitude (MDA).
3. 100 feet above decision altitude (DA), or minimum decent altitude (MDA).
4. Upon reaching decision altitude (DA), or minimum descent altitude (MDA).

24.2 - Approach Charts. When required for a specific approach, place the Instrument Approach Procedure (IAP) charts for easy and continuous viewing. In single-pilot aircraft, pilots are encouraged to brief themselves on the applicable information in the same manner as an approach briefing in two-pilot aircraft.

24.21 - Approaches. Accomplish checklists as the approach develops: descent, approach, before landing, and completion of checklist for landing. Make descents and approaches at the configurations and airspeeds governed by the Airplane Flight Manual (Pilot's Operating Handbook) or profiles, Air Traffic Control (ATC) procedures, and safety of flight. Accomplish instrument approaches, circling, and missed approaches in accordance with procedures and limitations approved for the approach facility used.

24.22 - Instrument Approaches. Ensure trainees and pilots accomplish the following instrument approaches during training and proficiency checks:

1. Normal Instrument Landing System (ILS) approach.
2. At least one ILS approach with a simulated failure of one powerplant that occurs before initiating the final approach course and continuing to touch down.
3. At least two non-precision approaches, which can be VHF omni-directional range (VOR), non-directional beacon (NDB), or localizer back course.

24.23 - Circling Approach. (Sec. 37.37a and 37.38). The circling approach shall include an approach to minimum altitude under simulated instrument conditions, followed by necessary maneuvering by visual reference to maintain published circling minimums and to permit a normal landing on a runway at least 90 degrees from the final approach course.

The circling approach must be performed without excessive maneuvering, and without exceeding the normal operating limits of the airplane. The angle of bank shall not exceed 30 degrees.

24.24 - Missed Approach. Trainees and pilots shall demonstrate proficiency in the following missed approaches:

1. Missed approach from an ILS;
2. Missed approach from a non-precision approach;
3. Missed approach that includes a simulated powerplant failure; and
4. At least one missed approach with a complete missed approach procedure.

24.3 - Judgment. Throughout the maneuvers prescribed by this manual, the crew member must demonstrate judgment commensurate with a high level of safety. Consideration should be given to:

1. Adherence to approved procedure.
2. Action in situations where there is no prescribed procedure or recommended practice.

24.4 - Autopilot Use. If the pilot-in-command is authorized to use an autopilot system, the pilot must show, during the required instrument check, the ability to:

1. Conduct instrument procedures competently, including at least one autopilot coupled approach.
2. Properly conduct air-ground communications and comply with complex air traffic control instructions.

24.5 - Inflight Training and Safety.

1. Of paramount importance to training, as well as normal operations, is a continued visual scan by all crew members. Check pilots shall give first priority to safety, especially when the other pilot is under an instrument hood.
2. Procedures for the check/instructor pilot to take over control of the aircraft in the event of an imminent unsafe situation shall be thoroughly discussed and understood prior to flight. The flying pilot shall relinquish control to the check/instructor pilot when such pilot states, "I have the controls."
3. Air-work training and engine shutdown shall be accomplished at a minimum altitude of 3,000 feet AGL. Engine-out training below 3,000 feet AGL altitude shall only be simulated and shall be in accordance with the applicable engine zero thrust power values. Full feather above 3,000 feet AGL shall not be attempted in reciprocating powered aircraft at temperatures below 40 degrees F or plus 4 degrees C.

25 - CHECK PILOT TRAINING (Sec. 21.35, 21.45, and 21.46). All designated check pilots shall receive initial and recurrent training appropriate for the mission and aircraft type. Training must include a review of this Handbook as operational policy for the mission standards and review of the guidance contained in the interagency operations guides listed in FSM 5706.

25.1 - Ground Training - Check Pilots.

1. Check Pilot Functions. Check rides must be conducted in a timely manner to enable pilots to maintain currency requirements. Check pilots are responsible for making a fair and objective assessment of a pilot's competency and for ensuring:
  - a. A record of each check ride has been entered into the competency and proficiency record of both the pilot and the check pilot.
  - b. Results are documented as pass or fail, including:
    - (1) An objective judgment of pilot performance, and
    - (2) The use and adherence to the following policies, guidelines, and publications as a checklist:

- (A) Chapters 20 and 30 of this Handbook;
- (B) FAA Flight Test Guide (sec. 06);
- (C) Helicopter Flight Evaluation Guide (sec. 06); and
- (D) The appropriate interagency operations guides listed in FSM 5706.

2. Knowledge. Check pilots shall give first priority to safety of flight.

a. Check pilots must possess a thorough knowledge and understanding of the following:

(1) This Handbook and the interagency operations guides (sec. 06) appropriate for the task, such as training or mission-specific procedures.

(2) Federal Aviation Regulation (FAR) 135, Subpart H - Training, and FAR 61, 91, and 121 as appropriate for the aircraft and mission.

(3) The FAA Practical Test Standards S-8081-2 for Commercial Pilots; FAA-S-8081-4A for Instrument Pilots; and FAA-S-8081-5 for Airline Transport Pilots.

(4) Airplane Flight Manual (Pilot's Operating Handbook).

b. Check pilots must have attended within the previous three years a Washington Office approved Crew Resource Management (CRM) course (sec. 21.6).

c. Check pilots must have the required training and proficiency forms, such as:

(1) Pilot training records,

(2) Check ride form, and

(3) Autopilot authorization.

3. Techniques. Check pilots must not make candidates feel undue pressure. They must be firm, but fair, in their requirements to ensure the pilot's knowledge. The pilot being checked should be briefed on exactly what is to be expected as to the level of skill and performance standards prior to each check flight, which shall include at least the following:

a. An oral quiz that can be as detailed as necessary to determine the pilot's knowledge of the airplane, Forest Service operations, FAA procedures, regulations, and pilot requirements;

b. A walk-around inspection that includes a quiz on the purpose of specific items and aircraft performance; and

c. A demonstration of the candidate's ability to accurately compute the aircraft weight and balance (CG) from manifest and loading information.

4. Pre-Flight Briefing. Prior to flight, the check pilot shall communicate to the candidate their respective roles and responsibilities during the flight portion of the check. Establish the following determinations as a minimum:

a. Determination of the pilot-in-command during a check ride. The pilot being checked is the designated pilot-in-command of the aircraft, unless the check pilot actually takes over the controls to demonstrate a maneuver or, for emergency purposes, to recover from a potentially dangerous situation (sec. 24.5, para. 2); and

b. Conduct during emergencies, which shall include a thorough description of all single-engine emergencies involving a simulated or actual engine shutdown. Actual engine shut-down shall be demonstrated above 3,000 feet AGL (except helicopters) and shall be conducted at a safe altitude and with a suitable airport close by in case a re-start fails (sec. 24.5, para. 3).

5. Evaluation. Check pilots must be capable of determining adequacy of training based on pilot performance during both the ground phase and flight portions of the check. A safety attitude and awareness can be determined by the pilot's attention to safety, standard procedures, and the use of checklists. Use the applicable FAA Practical Test Guide as minimum performance levels during equipment and instrument proficiency checks. Additionally, the direction in this section and the appropriate guidance in special mission interagency operations guides (FSM 5706) shall be used for special mission evaluations and flight checks. Pilot applicants must demonstrate:

a. Obvious mastery of each maneuver, with no doubt of the successful outcome.

b. Knowledge of the aircraft, its systems, weight and balance data, and performance. The Airplane Flight Manual (Pilot's Operating Handbook) may be used as a reference source by the applicant during an equipment oral examination pertaining to performance (questions requiring the use of performance charts, for example).

6. Corrective Action.

a. Unsatisfactory Maneuvers.

(1) The check pilot shall attempt to correct deficiencies by verbal direction or with a demonstration of the maneuver, and shall allow the pilot one or two attempts to correct the unsatisfactory technique.

(2) If after no more than two attempts the maneuver is still not satisfactory, the check pilot shall assign the grade "U."

b. Unsatisfactory Check Ride. The check pilot shall document an unsatisfactory (U) check ride by:

- (1) Recording a "U" on the pilot check form.
- (2) Informing the pilot and the pilot's immediate supervisor of what additional training is needed.
- (3) Outlining the requirements for another check.

7. Approved Methods for Conducting a Check Flight. The check pilot shall comply with direction in this chapter and use the appropriate additional training handbooks, guides, and certification forms to conduct the check flight and document the results.

#### 25.2 - Flight Training - Check Pilots.

1. Check pilots shall practice all maneuvers while flying in the seat opposite the normal pilot-in-command seat to ensure proficiency in handling the aircraft from that side and to demonstrate their ability to take over quickly in the event of an emergency.

2. Simulated emergencies shall be conducted at safe altitudes and in accordance with Forest Service policy (sec. 23).

3. Check pilots shall be continuously aware of the potential results of unsafe procedures. Allowing the pilot being checked to put the aircraft in a compromising situation before taking corrective action could result in the check pilot's inability to safely control the aircraft.

25.3 - Check Pilot Biennial Mission Training. Forest Service check pilots must attend biennial recurrent mission training to maintain their designations and authority.

25.31 - Leadplane Check Pilots. Leadplane check pilot authority requires biennial recurrent training in conjunction with the National Modular Aerial Fire Fighting System (MAFFS), leadplane pilot training program (Interagency Leadplane Operations Guide, chapter 2; FSM 5706).

1. The purpose of this training is to maintain national interagency standardization in the leadplane program.

2. The National Aviation Officer shall review and approve the MAFFS/Leadplane Pilot training agenda biennially (Interagency Leadplane Operations Guide, chapter 2; FSM 5706).

25.32 - Smokejumper/Paracargo Check Pilots. Recurrent training is required biennially for smokejumper/paracargo pilot check pilots to maintain certification and authority.

1. The purpose of this biennial workshop is to maintain national interagency standardization in smokejumper operations, including in the different aircraft types in use.

2. The National Aviation Officer shall review and approve the agenda for the workshop biennially.

25.33 - Fixed-Wing Equipment and Instrument Check Pilots. Designated fixed-wing instrument check pilots shall attend the National Fixed-Wing Standardization Workshop cadre meeting biennially.

1. The purpose of this training is to ensure national interagency standardization in fixed-wing operations. The National Aviation Training Standardization Pilot formulates the workshop agenda biennially for review and approval by the National Aviation Officer.

2. This training is required prior to a check pilot's initial certification and designation.

25.34 - Helicopter Equipment Check Pilots. Designated helicopter check pilots are required to attend the National Interagency Helicopter Check Pilot and Standardization Workshop biennially.

1. The purpose of this workshop is to ensure national standardization in all helicopter operations. The workshop normally is organized and facilitated by the National Helicopter Management Specialist, and the agenda must be approved by the National Aviation Officer.

2. Helicopter pilots newly hired for this function, based on recent experience at the same level, or in-service helicopter pilots never having performed in this capacity, shall attend this workshop prior to performing any operational check rides unless the National Helicopter Management Specialist recommends the check ride be waived, and the waiver is approved by the National Aviation Officer.

26 - LEADPLANE PILOT QUALIFICATIONS This section establishes the direction for training, performance, administration, and experience requirements necessary to qualify as a leadplane pilot consistent with the Interagency Leadplane Operations Guide (FSM 5706).

26.02 - Objective. The mission of the leadplane pilot, as the sole occupant of the aircraft, is to ensure safe, cost efficient, and effective use of airtankers in the management of wildland fires or other incidents.

26.04 - Responsibility. Regional Aviation Officers or the National Aviation Officer, or their designees, are responsible for the designation of leadplane pilots on the basis of their ability to evaluate performance, mission competence, and depth of experience. For further direction see section 12 and the Interagency Leadplane Operations Guide, chapter 2 (FSM 5706). Designations shall be made in writing (sec. 26.1).

1. Leadplane Pilot. The leadplane pilot is responsible to the air tactical group supervisor (ATGS) for filling the responsibilities and functions of the airtanker coordinator utilizing the techniques and procedures prescribed in the Interagency Leadplane Operations Guide (ILOG). In the absence of an air tactical group supervisor, the leadplane pilots shall assume those responsibilities for which they are qualified.

2. Leadplane Pilot Instructor. (ILOG, ch. 2).

3. Leadplane Check Pilots. (Sec. 25.31).

26.1 - Leadplane Pilot Designation. Candidates for leadplane pilot designation must be Federal or State employees who have the necessary ratings and qualifications meeting all of the requirements of this Handbook. Designations must be in writing and must specify Modular Airborne Fire Fighting System (MAFFS) qualifications, when applicable, and the details of any restriction.

27 - SMOKEJUMPER/PARACARGO PILOT QUALIFICATIONS (Sec. 15.3). This section provides direction for qualifications, training, performance, administration, and experience requirements necessary to qualify as a smokejumper/paracargo pilot. These requirements are summarized in section 27.2 and in the Pilots Handbook for Smokejumper Mountain Flying, which is available to each Region and may be obtained from the Region 1, Fire and Aviation Management Staff, Missoula, Montana (sec. 06).

27.02 - Objective. To standardize the qualifications, training, and performance requirements for all smokejumper/paracargo pilot approvals and operations to accomplish smokejumper/paracargo missions safely and effectively by both Forest Service employee pilots and contract pilots.

27.04 - Responsibility. Regional Aviation Officers and the National Aviation Officer, or their designees, are responsible for the designation of qualified smokejumper/paracargo pilots on the basis of qualifications, experience, training, and mission competence (sec. 12 and 22.3).

27.1 - Smokejumper/Paracargo Pilot Qualifications and Training. The direction contained in sections 15.3 (contract smokejumper pilots) and 27.2 shall be used as a training syllabus and as a reference for satisfactory performance for smokejumper/paracargo pilot candidates during initial and/or recurrent ground and flight training.

1. Smokejumper/paracargo flight crewmembers assigned to two-pilot aircraft shall be evaluated for crew resource management (sec. 21.6). Failure to manage and coordinate all the flight deck resources may be a basis for an unsatisfactory check ride.

2. Smokejumper/spotters or loadmasters who occupy the right front cockpit seat in single-pilot smokejumper aircraft shall do so in accordance with FSM 5714.3 and exhibit 01 of that section.

3. The minimum flight crew requirements for smokejumper/paracargo operations are contained in section 31.26 in this Handbook and include the requirements for single pilot-operations.

27.2 - Smokejumper/Paracargo Pilot Training Guide. (Sec. 15.31 and 25). Training of pilots to perform smokejumper and paracargo missions shall be in accordance with the requirements of the Smokejumper/Paracargo Pilot Training Guide outlined in exhibit 01.

27.2 - Exhibit 01

SMOKEJUMPER/PARACARGO PILOT TRAINING GUIDE

I. OBJECTIVE. To standardize a training program for the development of pilots who can safely perform and execute the duties of pilot-in-command in smokejumper and paracargo aircraft.

II. DEFINITIONS.

A. Smokejumper Pilot. The pilot in command of an aircraft used for the delivery of personnel and cargo supporting fire suppression and other resource activities in the Forest Service and other agencies.

B. Trainee. A pilot who meets all of the requirements of FSM 5700 and contract specifications when required, and is determined to be suitable for advanced training by a pilot inspector, smokejumper base manager, and a contracting officer.

C. Instructor Pilot. A pilot designated by the Regional Aviation Officer. The instructor may be a qualified Forest Service pilot and aircraft inspector or a contractor's designated pilot who is a qualified smokejumper and paracargo pilot.

D. Approving Authority. A qualified Forest Service pilot inspector, designated by the Regional Aviation Officer.

III. AUTHORITY.

A. Any time the instructor is positively assured that the trainee is incapable of determining the aircraft's limitations or repeatedly exceeds the limitations in any manner, this observation will be grounds for termination.

B. The instructor shall be responsible for aircraft contract compliance.

C. Pilots with previous experience in dropping of smokejumpers and paracargo shall be flight-checked as determined by the approving authority to verify that they still possess the skills necessary to safely accomplish the intended mission.

D. The approving authority shall have the final word.

IV. REQUIREMENTS. Specific numbers of maneuvers in this program shall be determined by the instructor, according to the trainee's ability. The instructor should expose the trainee to as many conditions, demonstrations, and training sessions as the instructor and the trainee deem necessary. After certification, the pilot should be periodically given an operational check.

27.2 - Exhibit 01--Continued

The trainee shall participate in actual fire operations under the guidance of an instructor. During each phase of training, the instructor should describe the type of drops made on the back of the Trainee Pilot Evaluation Record. The instructor's judgment must be relied upon when the trainee is ready for final evaluation by the Approving Authority.

V. PROGRAM

A. Aircraft Familiarization. Pilots should receive sufficient ground and flight instruction in the aircraft to proficiently demonstrate knowledge of the following and to pass an oral or written exam by the approving authority:

1. Aircraft systems,
2. Aircraft performance and operating limitations,
3. Normal and emergency operating procedures, and
4. Weight and balance.

B. Dropping of Smokejumpers. Each trainee should observe practice jumps; then the trainee should simulate jumper runs before actual dropping commences. Ground and flight training should emphasize the following procedures:

1. Aircraft weight and balance determination.
2. Smokejumper, freight, and paracargo loading and restraint.
3. Pilot-spotter coordination and in-flight communications, including:
  - a. Fire location.
  - b. Map (chart) reading and navigation.
  - c. In-flight communications reports.
  - d. Air traffic control.
  - e. Jump spot selection (DZ).
  - f. Cargo spot locations.
  - g. Ground and in-flight emergency procedures.

27.2 - Exhibit 01--Continued

4. Mountain flying techniques.
5. Estimation of jump altitude.
6. Estimation of wind direction and velocity.
7. Flap settings.
8. Streamer runs.
9. Corrections.
10. Altitude control.
11. Streamers maintained in sight at all times and radius of turn.
12. Jumper run - streamers to DZ flight patterns.
13. Air speed control.
14. Power application.
15. Power application following drop and radius of turn.
16. Altitude control following drop.

C. Paracargo Dropping.

1. Each trainee should make simulated cargo runs at different locations before actual cargo dropping commences. The different locations should include, but not be restricted to, the following locations:
  - a. Ridge top.
  - b. Side hill.
  - c. Canyon bottom.
  - d. Dead-end canyon.
2. Simulated and actual cargo dropping practice should emphasize the following:
  - a. Cargo loading and restraint.
  - b. Weight and balance.
  - c. Selection of DZ.
  - d. Maintaining sight of or a reference to DZ.

27.2 - Exhibit 01--Continued

- e. Orientation.
- f. Altitude and temperature consideration.
- g. Wind direction and velocity.
- h. Selection of exit or escape route.
- i. Selection of entry or approach.
- j. Power settings.
- k. RPM settings.
- l. Flap settings.
- m. Speed control (depending on aircraft).
- n. Application of power.
- o. Use of landing gear, etc.
- p. Altitude control.
- q. Entry procedure.
- r. Timing.
- s. Exit.
- t. Power application and cleanup following drop.
- u. Climbing to altitude or returning to DZ.
- v. Pattern.
- w. Orientation.
- x. Free-fall cargo delivery.

3. High altitude dropping. [Reserved].

VI. EVALUATION RECORD An evaluation record of trainee pilot performance shall be completed for each mission flown on actual fire operations prior to certification, including contract smokejumper pilots as required by section 312 of the National smokejumper aircraft and pilot contract. The instructor pilot shall use the following format to record the trainee's performance.

27.2 - Exhibit 01--Continued

SMOKEJUMPER TRAINEE PILOT EVALUATION RECORD

Pilot \_\_\_\_\_ Date \_\_\_\_\_  
Type Aircraft \_\_\_\_\_ 10-hours Specialized Training  
Flight Training Hours \_\_\_\_\_ Completed on \_\_\_\_\_ and  
Contractor \_\_\_\_\_ Recommended suitable for flight  
Training by \_\_\_\_\_  
Base Manager \_\_\_\_\_  
Contracting Officer \_\_\_\_\_  
Inspector Pilot \_\_\_\_\_

Grading

Start      Finish

1. Attitude \_\_\_\_\_
2. Knowledge of Aircraft and Systems \_\_\_\_\_
3. Weight and Balance \_\_\_\_\_
4. Awareness to Instruction \_\_\_\_\_
5. Ground Operation - Taxiing, etc. \_\_\_\_\_
6. Procedures-Normal and Single Engine \_\_\_\_\_
7. Smoothness \_\_\_\_\_
8. Attention to Flying Aircraft \_\_\_\_\_
9. Pilot-Spotter Cooperation \_\_\_\_\_
10. Streamer Patterns \_\_\_\_\_
11. Jumper Runs (Live) \_\_\_\_\_

27.2 - Exhibit 01--Continued

- 12. Patience \_\_\_\_\_
- 13. Maneuvering \_\_\_\_\_
- 14. Moderate and Deep Canyon Work \_\_\_\_\_
- 15. Pattern Selection to DZ \_\_\_\_\_
- 16. Approaches to DZ \_\_\_\_\_
- 17. Awareness of Airspeed \_\_\_\_\_
- 18. Power and Flap Application  
and Timing \_\_\_\_\_
- 19. Basic Cargo (Dry Runs) \_\_\_\_\_
- 20. Live Cargo Runs \_\_\_\_\_

Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Recommended for Evaluation Checkride by \_\_\_\_\_  
(Instructor Pilot)

1/ Grading System Based on a 1 to 10 scoring system with 10 being a perfect score, 8 satisfactory, 6 improving, 4 and less unsatisfactory performance.

27.3 - Smokejumper/Paracargo Pilot Designation. (Sec. 21.45, 21.46, and 25.32).

## 28 - INFRARED DETECTION PILOT QUALIFICATIONS AND TRAINING

28.02 - Objective. To develop and standardize a program of training for flight crew members assigned to infrared mission aircraft.

28.04 - Responsibility. The Chief Pilot, Infrared Aviation Mission, National Interagency Fire Center, Boise, Idaho is responsible for the training and qualification of flight crew members assigned.

28.1 - Infrared Pilot Qualification and Designation. Do not assign pilots as pilot-in-command of infrared detection/mapping (IR) flights unless they are specifically approved by the Chief Pilot. Pilots-in-command for this mission shall have the following experience and training, including the successful completion of a flight check:

1. Experience.

- a. 25 hours in type.
- b. 10 hours in the specific infrared aircraft to be flown.
- c. 10 hours as copilot on infrared missions.
- d. 5 infrared missions or 3 actual fire missions as copilot.

2. Training. The pilot-in-command must complete the required equipment ground and flight training for each type aircraft assigned (sec. 21 and 22) and successfully pass the required flight equipment and proficiency checks.

## 29 - HELICOPTER SPECIAL USE QUALIFICATIONS

29.03 - Policy. Comply with the direction in the Interagency Helicopter Operations Guide (IHOG) and the Helicopter Flight Evaluation Guide as minimum direction for qualifications, training, and mission performance requirements for all helicopter operations and special techniques (FSM 5703.4, 5706.1, and sec. 06).

1. Use the IHOG and Helicopter Flight Evaluation Guide for missions requiring special techniques, such as the following (FSM 5706):

- a. Long line;
- b. Rappel;
- c. External load;
- d. Helitorch; and
- e. Suppression operations (buckets, tanks).

2. For direction on determining satisfactory performance for initial and recurrent check rides and standards for mission performance, comply with the Interagency Helicopter Operations Guide (FSM 5706) and the Helicopter Flight Evaluation Guide (sec. 29.03), obtainable through the National Interagency Fire center, Boise, ID.

29.04 - Responsibility. The National Aviation Officer or the National Helicopter Management Specialist is responsible for the designation of helicopter check pilots based on the applicant's ability to evaluate performance and mission competence, including experience. Designations shall be in writing (sec. 29.03 and 29.1).

29.1 - Helicopter Check Pilot Designation. Candidates for helicopter check pilot designation must be Federal or State employees who have the necessary ratings and qualifications and who meet the requirements of this chapter (sec. 25.34). Designations must be in writing.

29.2 - Helicopter Operations Specialist. In addition to the requirements contained in the Interagency Helicopter Operations Guide, helicopter operations specialists shall meet the following qualifications and training requirements:

1. Three years experience as a helicopter manager supervising helicopter operations.
2. One season experience as a helicopter Contracting Officer's Representative (COR) or three seasons as an inspector on aircraft contracts.
3. Demonstrated instructional skills in helicopter operations.

29.21 - Helicopter Operations Specialist Training. Regional helicopter operations specialists shall attend the following training courses:

1. Aviation Management Contracting Officer's Representative (COR) training at the Regional level (FSM 6300, FSH 6309.11).
2. National Interagency Helicopter Operations Workshop as a Regional representative prior to initial designation.
3. National Senior Level Aviation Management course within 3 years of designation.

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CHAPTER 30 - AIRCRAFT OPERATIONS

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.

31 - AIRCRAFT OPERATIONS AND STANDARDS (FSM 5710.31, 5711, 5711.1).

31.03 - Policy.

1. Flight Operations and Planning. (FSM 5701, 5703.2, and 5703.3). Conduct all Forest Service aviation operations, contract and in-service, in compliance with the Federal Aviation Regulations (FAR's) applicable to the mission, except where exempted by FSM 5714 or by direction in this Handbook.

2. Emergency Aviation Missions. Give first priority to Forest Service emergency aviation missions (FSM 5710.33).

3. Contract Aviation Services. (FSM 5703.2, 5705).

4. In-Service Flight Operations. (FSM 5703.3, 5705).

5. Cooperator Standards. Aviation services provided to the Forest Service by other agencies and cooperators shall meet the levels of operational standards and safety comparable to those required of contractors (FSM 5710.35).

6. Pilots and Aircraft Approvals. (FSM 5703.1). Approve contract, rental agreement, and employee pilots and aircraft for all Forest Service flight operations and missions in accordance with the standards and procedures specified in FSM 5710, this Handbook, and the appropriate interagency operations guides (FSM 5703.4, sec. 06, and FSM 5706).

31.04 - Responsibility. (FSM 5704).

31.06 - References. (Sec. 06 and FSM 5706).

31.1 - Weather Reports and Forecasts. (FAR 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. U.S. National Weather Service.
- b. A source approved by the FAA Administrator.
- c. A source approved by a Regional Aviation Officer or the National Aviation Officer.

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

31.2 - Flight Planning and Operating Information. (FAR 135.81, 135.83). Ensure that the information and publications required by FAR 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, shall be maintained in current and good condition.

31.21 - Flight Crew Equipment. Each pilot flying Forest Service missions has the responsibility to ensure a flight kit (bag) incorporating the necessary equipment, publications, and charts required by FAR 135.81 and 135.83 is complete, current, and on board the aircraft.

1. The Forest Service shall provide the equipment required by those FAR's to employee pilots.

2. Flight crewmembers shall possess sufficient personal equipment to perform their preflight duties and operational functions on board the aircraft during day and night operations.

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

1. Except for aviation operations requiring an airline transport pilot certificate under the FAR's, pilots shall possess FAA commercial pilots certificates, instrument ratings (except helicopter), and aircraft ratings (multiengine, 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).

31.22a - Flight Crew Medical.

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 those operations requiring a Commercial Pilot Certificate or

b. First Class for those 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 to be a "donation."

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

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

31.23 - 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.

31.24 - 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.

31.25 - Logging Pilot Flight Time. (FAR 61.51). Forest Service employee pilots shall record the breakdown of flight time on Form FS-5700-25, Record of Individual Flying Time. These records shall be maintained in the individual pilots' competency and proficiency files (sec. 32.1).

31.26 - Minimum Flight Crew Requirements. All Forest Service flight operations shall comply with at least the minimum flight crew requirements specified in the FAA-approved Airplane Flight Manual or the aircraft type certificate data sheet and limitations. Refer to section 27, Smokejumper/Paracargo Pilot Qualifications, in this Handbook for the additional requirements specific to single-pilot smokejumper operations.

## 32 - FLIGHT OPERATING PROCEDURES

32.1 - Record Keeping Requirements. (FAR 135.63 (a) (4) (b)). An individual record of each Forest Service employee pilot used in operations shall include all of the information required in FAR 135.63 (a) (4) (b) and shall be maintained for at least 12 months after the record is made.

32.11 - Load Manifest. (FAR 135.63 (c) (d)). For aircraft carrying passengers or cargo, a load manifest must be prepared before each takeoff and must meet the requirements of FAR 135.63 (c) (1) - (d) and section 11.29 in this Handbook.

1. Instructions for Load Manifest Forms. Each type aircraft operated by the Forest Service shall 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 either a Forest Service approved form identified in this Handbook for a specific type aircraft or an approved format from the Airplane Flight Manual (Pilot's Operating Handbook) (sec. 06 and FAR 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 following:

a. The load manifest/weight and balance form must be prepared before each takeoff and must include:

- (1) The number of passengers;
- (2) The total weight of the loaded aircraft;
- (3) The maximum allowable takeoff weight for the flight;
- (4) The center of gravity (CG) limits;
- (5) The CG of the loaded aircraft, except that the actual center of gravity need not be computed if the aircraft is loaded according to a loading schedule or other approved method that ensures the CG of the loaded aircraft is within approved limits; in those cases, an entry shall be made on the manifest indicating the CG is within limits in accordance with the approved method;
- (6) The registration number of the aircraft;
- (7) The origin and destination; and
- (8) Identification of the crewmembers and their crew position(s).

b. The pilot-in-command shall carry a copy of the completed form to its destination. Maintain the original for at least 30 days at the principal operations base where the aircraft is located, or at another location approved by the National Aviation Officer.

32.12 - Chief of Party Responsibilities. Designate a chief of party whenever a transport mission is flown involving multiple personnel. The duties and responsibilities of the chief of party are to:

1. Provide a briefing for the traveling personnel covering the following subjects:
  - a. Overview of travel purpose and final destination; and
  - b. 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.
  - a. 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;
  - b. Assist the pilot-in-command with weight distribution and the stowage of bags, packs, and/or cargo;
  - c. Assemble the personnel in an orderly manner in the designated staging area;
  - d. 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.
  - e. Maintain a current list of telephone numbers for the sending and receiving units.

32.2 - Passenger/Cargo Loading/Unloading.

1. The pilot-in-command shall coordinate with the chief of party regarding passenger boarding and deplaning requirements.
2. Fixed-wing pilots-in-command are responsible for ensuring the aircraft is properly loaded and fueled; the weight and balance document has been completed; and the aircraft is within approved weight and balance limitations.
  - a. Unless otherwise provided for in an approved operations plan or in section 11.29, paragraph 4, aviation operations managers must ensure the pilot-in-command shuts down all engines prior to loading or unloading passengers in any fixed-wing aircraft; and
  - b. Pilots of either a fixed-wing aircraft or helicopter may not leave the cockpit of an aircraft unattended while any engine is running.

3. The pilot-in-command, fixed-wing base manager, and chief of party are jointly responsible for ensuring egress and exit routes to and from the aircraft either are free of hazards or have been provided with stanchions, ropes, and pennants to safely guide the passengers.

4. 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.

5. The chief of party and fixed-wing base manager are jointly responsible for keeping passengers in a safe area and well back from any moving aircraft, propellers, and/or jet blast.

32.21 - Passenger Briefing.

1. Before each takeoff, the pilot-in-command of aircraft carrying passengers shall ensure that all passengers have been orally briefed on all of the requirements of FAR 91.519 (for exceptions, see sec. 32.22).

2. Prior to takeoff, the pilot-in-command must ensure that each passenger who may need assistance in moving to an exit in an emergency has been designated another passenger to assist and provide additional information as to the emergency procedure.

32.22 - Diagram of Emergency Exits and Equipment. (FAR 91.519 (b) and (c)).

1. The pilot-in-command or a designated crewmember shall provide the oral briefing required by the preceding section 32.21, unless the pilot-in-command determines that the passengers are familiar with the contents of the briefing, such as on multiple legs of the same trip with no new additions to the passenger manifest.

2. Each aircraft passenger cabin shall be equipped with printed passenger briefing cards for each passenger seat location containing the information required by FAR 91.519 (b) (2) and (c).

32.23 - Smoking and Safety Belt Use. (FAR 91.519).

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

2. Seat Belts. 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.

32.23a - Smoking - General Requirements. Certain areas on and near aircraft staging areas are designated "NO SMOKING" and may be clearly signed. In the absence of such designations, the following applies:

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

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

32.24 - Emergencies and Emergency Evacuation Duties. (FAR 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.

32.25 - Securing and Stowing of Baggage or Cargo. Prior to each takeoff, the pilot-in-command shall ensure that all baggage and/or cargo has been appropriately and adequately secured or stowed in approved cargo or baggage areas.

32.26 - Manipulation of Flight Controls. (FAR 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 Officer, or their designees, and who is appropriately rated in the type aircraft.

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.

33.1 - Forest Service Flight Operations. (FSM 5716.5, FAR 91.153, and FAR 91.173). Conduct Forest Service flight operations point-to-point with passengers or cargo with a filed FAA flight plan Visual Flight Rules (VFR) (FAR 91.153) or Instrument Flight Rules (IFR) (FAR 91.173), or an acceptable locating procedure (FAR 135.79) as applicable.

33.11 - Forest Service Flight Following. (FAR 135.79). 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) (FAR 91.173).

33.11a - Authority of Pilot-in-Command. (FSM 5705.7). 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.

#### 33.11b - Responsibility of Pilot-in-Command.

1. For Firefighting and Special Missions. The pilot-in-command is responsible for the preflight planning and flight operations in compliance with the applicable FAR's and Forest Service direction in FSM 5700 and this Handbook. Additionally, the pilot-in-command is responsible for (FSM 5716.5):

- 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

2. 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.

33.11c - Responsibility of Originating Dispatcher. The originating dispatcher has the responsibility to:

1. Notify the receiving dispatcher of the flight schedule, aircraft identification number, pilot's name, and manifest.
2. Determine with the pilot where the Forest Service flight plan is to be closed.
3. Inform the pilot-in-command of any special instructions that may not be covered in the resource order.

33.11d - Diversions and Cancellations. 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.

33.2 - FAA Flight Plans (FSM 5716.5).

33.21 - FAA Flight Following. The pilot-in-command shall ensure the FAA flight plan includes the telephone number of the appropriate dispatch office and the aviation unit's address and telephone number. The pilot-in-command is also responsible for:

1. Filing the appropriate type FAA flight plan (VFR/IFR);
2. Reporting any changes in the resource order, manifest, or planned flight to the originating dispatch office prior to departure;
3. Advising the originating dispatch office that the flight will be conducted under a filed FAA flight plan and providing the estimated time of departure (ETD) and the estimated time of arrival (ETA); and
4. Reporting as required in this section 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 any other means available to ensure the message has been relayed.

33.22 - Responsibilities of Dispatcher - FAA Flight Plans. The dispatcher has the responsibility to:

1. Notify the receiving forest dispatcher the flight is being conducted on a filed FAA flight plan and 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.

33.23 - Preflight Planning. The pilot-in-command is responsible for the preflight planning and the operation of the flight in compliance with the FAR's, and the requirements of FSM 5700 and this Handbook.

33.24 - 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 ATC when in the pilot's opinion the flight cannot operate or continue to proceed safely as planned.

33.25 - Overdue Aircraft - Search and Rescue. (FSM 5713.53, 5720).

34 - LARGE TRANSPORT AIRCRAFT - CONTRACT (FSM 5703.2, and sec. 11.12).

34.1 - Large Transport Certification. Ensure that large transport aircraft under contract that are used for passenger and/or cargo transportation are certified and operated under 14 CFR Parts 119 or 121, and 125 (FAR 119, or 121, and 125). Contractors shall make available to authorized Forest Service aircraft and pilot inspectors 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.

34.11 - Inspection and Approval - Large Transport Contract Aircraft and Flight Crewmembers. Crewmembers assigned to large transport aircraft engaged in transportation of Forest Service personnel or cargo, must be listed in the contractor's FAA-approved operations specifications.

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

2. FSM 5714.11, exhibit 04, Exemption 392, permits a deviation from FAR 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 for large aircraft.

34.12 - Air Carriers. (FSM 5713.5, 5713.6). Authorizations required under FSM 5713.5 are not applicable for flights on scheduled airlines or scheduled commuter airlines (FAR 121, 135.2).

34.13 - Large Transport Operations. (FSM 5716.03). The transportation of passengers (firefighters) and cargo in transport category aircraft requires planning for staging to accommodate the large numbers of people and amounts of material associated with large fire support (see sec. 39 for further direction).

1. Personnel. To supervise large transport staging operations, use only qualified personnel who meet the National Wildlife Coordinating Group (NWCG) experience requirements.

2. Loading and Unloading Operations. Prior to any passenger and/or cargo loading or unloading, all engines shall be shut down except:

a. Under certain circumstances where ground power may not be available and the procedures and operating plan have been approved by the National Aviation Officer and the contacting officer, passengers and baggage may be loaded or unloaded with one engine on the opposite side of the aircraft operating, provided:

- (1) The flight deck must be occupied by a flight crewmember or a person qualified to operate and taxi the aircraft;
- (2) An engine guard must be positioned at the operating engine;
- (3) Passengers are restricted from the side of the aircraft with the operating engine; and
- (4) Marshalling procedures must be in place to ensure safe passenger egress and exit.

b. The fixed-wing base manager shall ensure the parking area is clear and aircraft marshalling procedures are in place:

- (1) Passengers (fire crews) shall be instructed to remain clear of the aircraft until directed to proceed under the marshalling plan; and
- (2) The chief of party shall coordinate with the fixed-wing base manager and/or flight crew regarding the specific requirements for loading and unloading passengers and baggage.

3. Load Manifest - Large Transports. For each takeoff carrying passengers and/or cargo a load manifest shall be completed in accordance with the operating specifications and shall include as minimum:

- a. Number and names of passengers,
- b. Takeoff gross weight, and
- c. Maximum allowable take-off weight for that flight.

4. Baggage Loading, Stowing, Securing. All large transport operators are responsible for ensuring the handling of baggage and cargo is in accordance with their FAA operating certificate and operations manual (FAR 121, 125, or 135.2).

34.14 - Large Transport Staging. (FSM 5706). Comply with the procedures outlined in the Interagency Airtanker Base Operations Guide (IABOG), Appendix A as the standard for large transport staging (sec. 06 and 39).

34.2 - Hazardous Materials. All hazardous materials shipped by air must be transported in accordance with the hazardous materials regulations at 49 CFR Part 175, Carriage by Aircraft. The only exemption from this regulation is Forest Service Grant of Exemption DOT-E 8016 (FSM 5714.22), which allows carriage of certain detonating cord and exploding bridge wire detonators under specified conditions. All provisions of the exemption must be met and a copy of the exemption must be carried aboard the aircraft.

34.21 - Hazardous Materials Training. Persons assigned duties and responsibilities for handling or carriage of hazardous materials shall have received training in:

1. The proper shipper certification, packaging, marking, labeling, and documentation for hazardous materials.
2. The compatibility, loading, stowing, and handling characteristics of hazardous materials.
3. This training shall have been accomplished within the preceding 3 years of the assignment, and must be certified by the unit manager conducting the training.
4. Untrained persons used to handle hazardous materials must be under the direct supervision of a person who meets the requirements of this section.

### 35 - AIRTANKERS/HELITANKERS

35.1 - Airtanker/Helitanker Approval. Contract or procure only those airtankers and helitankers approved by the Interagency Airtanker Board (IATB) that meet current IATB aircraft and tank criteria and that either have been issued a standard or restricted Airworthiness Certificate for the aircraft by the FAA or have been approved under a previously published Type Certificate (TC) with an approved FAA supplemental type certificate (STC) for the retardant/suppressant tank installed.

1. A TC and/or STC shall 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/helitankers shall have been issued a Standard or Restricted Airworthiness Certificate.
3. Airtankers/helitankers configured from former military aircraft and 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:
  - a. Where the FAA has established more restrictive limits, those limits shall prevail; and
  - b. Any modification or alteration which may affect aircraft performance, flight characteristics, or operational limitations shall be approved by the Interagency Airtanker Board (IATB).

35.11 - Airtanker/Helitanker Use - Interagency. Cooperator or military airtankers or helitankers not fully meeting the IATB requirements may be used on Forest Service fires, provided a memorandum of understanding is in effect between the Forest Service and the cooperating agency.

35.2 - Airtanker/Helitanker Operations.

1. Airtanker operations must be conducted in accordance with the requirements of FAR 91 and 137 governing all civil aircraft except as provided in Exemption 392 (FSM 5714, ex. 01).

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

35.3 - Retardant/Suppressant Use. Only approved retardant chemical formulations of fire retardant liquids may be used 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).

35.31 - Airtanker Bases. (Sec. 39). Airtankers, except single-engine airtankers (SEATS), shall 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 (sec. 06) or, in an emergency, from temporary retardant base locations.

35.32 - Retardant Hot Loading - Turbine Airtankers. When retardant hot loading is conducted at any base, the appropriate Regional Aviation Officer is responsible for ensuring a retardant hot loading plan is current and in effect for each turbine type contract airtanker and selected airtanker base location, prior to allowing retardant loading operations to occur while any engine is running.

35.4 - Airtanker Performance.

35.41 - Airtanker Take-Off Requirements.

1. In accordance with the manufacturer's recommended normal take-off configuration, ensure that four-engine airtankers (except turbine powered) are capable of accelerating on all engines to take-off safety speed and lift off within 80 percent of the effective runway. Take-off safety speed is 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 shall 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 take off with a failed engine within the remaining runway, or come to a complete stop on the runway.

a. For airtankers manufactured under FAR 25, Transport Category, such as Douglas DC-4, DC-6, and DC-7, the take-off distance may include a legal "stopway" (FAR 1.1); and

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

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) (FAR 1.1);

b. The take-off distance is no greater than the length of the runway plus the length of the "clearway" (if present) (FAR 1.1); and

c. The take-off run is no greater than the length of the runway (FAR 91.605 (c) (3)).

35.42 - Airtanker Take-Off Computation Criteria. For all airtankers, compute runway requirements for takeoff based on the actual take-off 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 take off, 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 (FAR 91.313d).

3. Flight kits and necessary publications and materials.

4. All 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 take-off 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.

35.5 - Congested Area Retardant Operations. (FSM 5714 and FAR 137.51).

1. Take off. Airtanker take offs over congested areas shall be conducted under the accelerate-stop requirements specified in FAR 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).

35.51 - Retardant Drop Accuracy. Retardant shall be dropped as accurately as possible on the designated target area of the fire.

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

35.53 - 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 is increased. The air tactical group supervisor and/or air tanker coordinator (Leadplane 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.

35.6 - Airtanker Startup and Cutoff Times. To reduce the hazards of airtanker retardant drops in the early morning and late afternoon hours, 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 shall be dispatched to arrive over a fire not earlier than 30 minutes after official sunrise and not later than 30 minutes before official sunset. These times are termed "startup and cutoff" times, respectively.

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 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 shall 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.

35.7 - Airtanker Flight Crew Proficiency Flights. (Sec. 16.2). Airtanker pilots-in-command, co-pilots, and flight engineers (when applicable), in addition to the requirements in section 16.2, 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 - RECONNAISSANCE AND SURVEY

36.1 - Reconnaissance and Survey 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.

1. Minimum Horsepower Rating:

a. Single-engine airplanes used for special missions, such as reconnaissance and survey shall have a power loading of not more than 13.5 pounds per horsepower;

b. Multiengine airplanes shall be capable of at least 200 horsepower per engine; any engine developing less than 240 horsepower shall be turbo/supercharged; and

c. Regional Aviation Officers may grant certain special approvals for single- and multiengine airplanes not meeting the requirements in the preceding paragraphs a. and b, provided the mission does not take place over mountainous terrain.

2. Flight patterns should be flown to provide the observer the best possible perspective to view the terrain.

3. Flight routes must be planned and selected in consideration of mountain topography to provide the best views with the least amount of maneuvering.

36.11 - Operating Altitude. 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 AGL.

1. Minimum Altitude. Except for landing and take off and for helicopter operations, observe the prohibition on flight below 500 feet AGL.

2. Minimum Safe Mission Altitude. Select mission altitudes over the intended route of flight that will clear all terrain by at least 1,000 feet 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.

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

- a. Topography;
- b. Sun angle and direction;
- c. Degree of cloud and terrain shadow;
- d. Presence of haze; and
- e. Height of crossing ridges.

36.12 - 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  $V_{s1}$  plus 20 knots. In this case, use the approach flap to increase the lift coefficient on the wing and stabilize the platform.

36.13 - Observer's Responsibility. The intended route of flight, objectives, and expected duration shall be planned by the observer and agreed to with the pilot-in-command. The observer has the responsibility to:

1. Trace the actual 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 side of the aircraft.

3. Maintain contact with local Forest dispatch and/or the area coordination center and check in at least every 15 minutes with time, altitude, location, and any other information pertinent to the mission.

- a. The VHF-FM radio is the primary communications radio for the observer. There may be times when communications requires contact on the VHF radio. Coordinate with the pilot for frequency selection and access to the VHF equipment.
- b. Instructions and Forest frequency assignments are contained in the Frequency Users Guide (sec. 06) for the operation and use of the FM radio. It is essential that the observer be very familiar with the operation of this equipment.
- c. VHF-FM radio communications with the dispatcher shall be established after take off and shall be clear of the "sterile cockpit" requirements. The following information shall be transmitted:
  - (1) Aircraft identification;
  - (2) Time airborne; and

(3) Destination (reconnaissance area).

d. The observer should normally perform these communications unless otherwise occupied. The pilot shall monitor all communications and maintain required or prudent VHF communications with the FAA Flight Service Station and/or other airborne resources, such as an Air Tactical Group Supervisor (ATGS), leadplane, smokejumper aircraft, and rotorcraft.

36.14 - Observing/Reporting. [Reserved].

36.15 - Hazards/Safety. 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.

36.2 - Mountain Flying. Standards and procedures for mountain flying techniques are contained in the Pilots Handbook for Smokejumper and Mountain Flying (sec. 06). This handbook can be obtained through the Aviation Unit, Region 1, Missoula, MT, or the National Interagency Fire Center, Boise, ID.

36.3 - Back Country Airstrips. [Reserved].

37 - STANDARD FLIGHT PROCEDURES - LIGHT TWIN-ENGINE AIRPLANES  
This section outlines the flight procedures standard throughout Forest Service for in-service light twin-engine flight operations.

37.1 - Flight Standards and Procedures. The following standards and procedures are applicable to most light twin-engine airplanes with wing mounted engines. The applicable Airplane Flight Manual (Pilot's Operating Handbook) (sec. 06) shall be used as the principal source of information and procedures for each normal and abnormal flight maneuver. Special mission flight requirements and techniques are contained in the applicable sections of this Handbook and the approved interagency operating guides (FSM 5706).

37.11 - Preflight.

1. Familiarization. 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.

2. Preflight Inspection. Requirements are in the applicable Airplane Flight Manual (Pilot's Operating Handbook).

3. Engine Start Procedures. Procedures are set out in the following checklists in the Airplane Flight Manual (Pilot's Operating Handbook).

- a. Before starting;
- b. Starting; and
- c. After starting and taxi.

37.12 - Taxi Procedures.

1. Taxi at a moderate speed and avoid making fast turns that put abnormal side loads on the landing gear. Maximum speed for taxiing is that which would allow the aircraft to be safely controlled in the event of a brake failure. Unless passing close to another aircraft or object, always keep the nose of the aircraft following the painted taxi lines.

2. Following these standard guidelines:

- a. Test the brakes immediately after the aircraft begins to move;
- b. Maintain a safe distance from other aircraft and objects;
- c. Taxi at a safe speed; and
- d. Refer to the taxi and before take-off checklist in the Airplane Flight Manual (Pilot's Operating Handbook) for pre-take-off checks.

37.13 - Take-Off.

37.13a - Normal and Cross-Wind Take Off. Refer to the take-off checklist in the appropriate Airplane Flight Manual (Pilot's Operating Handbook) (sec. 06).

1. Prior to flight operations, pilots shall know the airspeed limitations for the type aircraft operated. These speeds are normally found in the Airplane Flight Manual (Pilot's Operating Handbook) limitations section and include, as a minimum, the applicable speeds for the type aircraft defined in FAR 1.2, Abbreviations and Symbols.

2. 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 ( $V_y$ ), +/-5 knots during the climb:

- a. Maintain lift-off speed at no less than the velocity of safe single-engine speed ( $V_{sse}$ );
- b. Maintain directional control and proper wind drift correction by maintaining alignment with the runway centerline;
- c. 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 take-off flap is used, retract it after a positive rate of climb has been established;

- d. Maintain take-off power to 400 feet AGL and climb speed within +5 to -5 knots of best rate of climb ( $V_y$ );
- e. Maintain directional control and proper wind drift correction throughout the take off and climb;
- f. Use noise abatement procedures, as required; and
- g. Complete the prescribed checklist(s).

**37.13b - Short-Field Take Off and Climb.** Prior to take off, 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 ( $V_{mc}$ ); velocity of safe single engine speed ( $V_{sse}$ ); velocity best single-engine angle of climb ( $V_{xse}$ ); velocity of best single-engine rate of climb ( $V_{yse}$ ).

1. Position the airplane for maximum utilization of available take-off area.
2. Position the flight controls and wing flaps (if applicable) for the existing conditions.
3. Advance the throttles (power levers) to take-off power:
  - a. Rotate at the recommended airspeed and in no case less than  $V_{sse}$ ;
  - b. Establish a climb in the manufacturer's recommended configuration and airspeed or, in their absence, at  $V_x$ , +5/-0 until the obstacles are cleared, or until the airplane is at least 50 feet (20 meters) above the surface;
  - c. After clearing the obstacle, accelerate to and maintain  $V_y$ , +5/-5 knots;
  - d. Retract the landing gear and flaps after a positive rate of climb has been established;
  - e. Maintain take off power to a safe maneuvering altitude (no less than 400 feet AGL) and then set climb power;
  - f. Maintain directional control and proper wind drift correction throughout the take off and climb; and
  - g. Complete the prescribed checklist(s).

**37.13c - Rejected Take Off.**

1. If a take off is to be rejected, reduce power to idle and employ normal stopping procedures. Practice of rejected take offs should be executed at speeds of not more than 50 percent of  $V_{mca}$ .
2. Ensure the following:

- a. The proper sequence of procedures; and
- b. Maintenance of the positive directional control of the aircraft.

37.13d - Engine Failure During Take Off. Refer to the appropriate checklists in the emergency section of the Airplane Flight Manual (Pilot's Operating Handbook).

1. Prior to reaching V<sub>mc</sub>, utilize the prescribed emergency procedures outlined in the applicable Airplane Flight Manual (Pilot's Operating Handbook).
2. Promptly and smoothly close the power levers (throttles) of both engines;
3. Maintain directional control within 15 feet (10 meters) of the runway centerline while applying the breaks as necessary.

37.13e - Engine Failure After Lift Off.

1. Promptly recognize engine failure, maintain directional control, and utilize the prescribed emergency procedures.
2. Identify and feather (simulate) the propeller of the failed engine while continuing to climb.
3. Reduce drag by raising the landing gear, when applicable, and flaps, if utilized, when a positive rate of climb has been established.
4. Promptly and smoothly accelerate to the best single engine rate of climb (V<sub>yse</sub>). If obstructions are present, establish the best single engine angle of climb (V<sub>xse</sub>) or, V<sub>mc</sub> + 5 knots, whichever is greater, until the obstruction is cleared; then go to V<sub>yse</sub>.
5. Follow the prescribed engine failure take-off checklist after reaching 400 feet (130 meters) or safe obstruction-clearance altitude.
6. Establish a bank (approximately 5 degrees) toward the operating engine for best performance.
7. Attempt to determine the reason for the engine malfunction;
8. Monitor the operating engine and update decisions based on observations.
9. Determine if it is feasible to re-start the affected engine; if so, follow the appropriate restart procedures in the Airplane Flight Manual (Pilot's Operating Handbook).
10. Return to the airport for landing or, if unable, to a suitable landing area.

37.13f - Instrument Take-Off Procedures . [Reserved]

37.14 - Climb/Cruise.

1. Climb. Refer to the climb recommendations in the operations section of the applicable Airplane Flight Manual (Pilot's Operating Handbook) .

2. Cruise. Refer to the operating section of the appropriate Airplane Flight Manual (Pilot's Operating Handbook) for the recommended power settings in cruise configuration.

37.15 - Maneuvering With One Engine Inoperative. Refer to the applicable Airplane Flight Manual (Pilot's Operating Handbook) for recommended procedures and power settings.

37.16 - Normal and Crosswind Approach and Landing. Refer to the applicable Airplane Flight Manual (Pilot's Operating Handbook), for normal and crosswind landing procedures, power settings, and airspeeds. Additionally, pilots must consider the following procedures and applied skills for each intended approach and landing:

1. Comply with the published or indicated traffic pattern requirements of the intended uncontrolled airport for landing or, at controlled airports, instructions provided by air traffic control (ATC). Pilots should also be aware that some uncontrolled airports may have special traffic pattern instructions approved, by the airport manager in place, such as an upwind approach for example.

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

3. Select a suitable touchdown point.

4. Establish the recommended approach and landing configuration, and adjust the power and flight attitude as required.

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

6. Remain aware of the possibility of wind shear and/or wake turbulence.

7. Maintain crosswind correction (when applicable) and directional control throughout the approach and landing.

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

37.16a - Approach and Landing - Inoperative Engine. Refer to 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:

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.
7. Monitor the operating engine and update decisions based on observations.
8. 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) .
9. Plan and follow a flight pattern to the selected landing area.
10. Complete the prescribed emergency and landing checklists.

37.16b - Short Field Approach and Landing. Normally Forest Service flight operations must not be planned into short, soft, landing areas. In the event, however, that circumstances require operations in this category, follow the procedures outlined in the applicable Airplane Flight Manual (Pilot's Operating Handbook), and the following additional requirements:

1. Consider the wind conditions, landing surface, and obstructions.
2. Select the most suitable touchdown point, normally as near the approach end of the landing surface as possible.
3. Establish the recommended approach and landing configuration and adjust the approach angle and power as necessary.
4. Maintain a stabilized approach; controlled rate of descent; and recommended airspeed (or, in the absence of an airspeed of not more than 1.3 V<sub>so</sub>, with gust correction factors applied, +/-5 knots).
5. Touchdown at 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).
6. After landing, position the flight controls appropriately and maintain sufficient speed to taxi on the soft surface.
7. Complete the after landing checklist.

37.16c - Emergency Descent. Refer to the applicable Airplane Flight Manual (Pilot's Operating Handbook) for the recommended emergency descent procedures for the type aircraft operated. Additionally:

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 decent.
6. Complete the prescribed checklist(s).

37.17 - 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.

37.2 - Anti-Ice/DeIce. Use anti-icing and deicing systems as necessary. Pilots must 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 approved emergency checklists.

37.21 - Icing Limitations - Beechcraft 58 Baron.

1. As a precaution, pilots flying Beechcraft 58 and 58P Barons must comply with the following requirements:
  - a. Do not fly into known or forecast severe icing conditions.
  - b. Do not fly into known or forecast moderate icing conditions for sustained periods.
2. Pilots may fly into known or forecast moderate icing conditions 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.
3. When un-forecasted moderate or severe icing is encountered in flight, the pilot shall 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.
4. Do not pitch over to sustained dive angles of more than 15 degrees.

37.3 - Instrument Approach Standards.

37.31 - Instrument Flight Rules (IFR) Approach Procedures. Flights conducted under Instrument Flight Rules (IFR) shall comply with the FAR's applicable for each type of instrument approach, in accordance with FAR 61 and 91, and Chapter 5, Air Traffic Procedures, Aeronautical Information Manual (AIM) (sec. 06).

37.32 - Instrument Approach Procedure (IAP) Chart. Instrument approaches to civil airports requires the use of Standard Instrument Approach Procedures (SIAP's) charts prescribed for the airport of the intended landing (FAR 91.175a).

1. Forest Service pilots flying into or out of military airports shall comply with the IAP's and takeoff and landing minimums prescribed by the authority having jurisdiction at those airports (FAR 91.175g).

2. All IAP's (standard, special, civil, and military) are based on joint civil and military criteria.

3. Instrument approach procedures are designed to provide an IFR descent from an enroute environment to a point where a safe landing can be made. It is critical that pilots understand these procedures and the Air Traffic Procedures in AIM (sec. 06).

37.33 - VOR/VORTAC Instrument Approach Procedures. The pilot-in-command shall ensure the correct IAP chart is immediately available for quick, easy reference and 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. Establish two-way communications with ATC or the appropriate ground contact. Use proper radio phraseology and technique.

2. Select, tune, identify, and confirm the operational status of the navigation equipment to be used for the approach procedure.

3. Comply with all clearances issued by ATC.

4. Maintain instrument scan and be alert for inaccurate or inoperative information sources.

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

6. Establish the appropriate aircraft configuration and airspeed in consideration of turbulence and wind shear. Complete the checklist items appropriate to the phase of flight.

7. Prior to beginning the final approach segment, maintain altitude within 100 feet and heading within 10 degrees; allow less than a full-scale deflection of the CDI, or within 10 degrees in the case of an RMI; and maintain airspeed within 10 knots.

8. Apply 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; and
- d. National Weather Service (NWS) reporting factors and criteria.

9. Establish a rate of descent and track that will ensure arrival at the MDA prior to reaching the 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, allow no more than a three-quarter scale deflection of the CDI, or within 10 degrees in the case of an RMI, and maintain airspeed within 10 knots.

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

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

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

37.34 - Nondirectional Beacon (NDB) Instrument Approach Procedure. The pilot-in-command shall ensure the correct IAP chart is immediately available for quick, easy reference and 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 nondirectional beacon (NDB) instrument approach. Other requirements of the NDB approach include the following pilot actions:

1. Select and comply with the appropriate NDB IAP procedure to be performed.

2. Establish two-way communications with ATC, as appropriate to the phase of flight or approach segment, and use proper radio communications phraseology.

3. Select, tune, identify, confirm, and monitor the operational status of ground and aircraft navigation equipment to be used for the approach procedure.
4. Comply with all clearances issued by ATC.
5. Recognize when heading and/or altitude indications are inaccurate or inoperative.
6. Advise ATC any time the aircraft is unable to comply with the approach clearance.
7. Establish the appropriate aircraft configuration and airspeed in consideration of turbulence and wind shear, and complete the aircraft checklist appropriate to the phase of flight.
8. Prior to beginning the final approach segment, maintain the altitude within 100 feet, heading and bearing within 10 degrees, and airspeed within 10 knots.
9. Apply the necessary adjustments to the published MDA and visibility criteria for the aircraft approach category when required, such as:
  - a. Class II NOTAMS;
  - b. Inoperative aircraft and ground navigation equipment;
  - c. Inoperative visual aids associated with the landing environment; and
  - d. National Weather Service (NWS) reporting factors and criteria.
10. Establish a rate of descent and track that will ensure arrival at the MDA prior to reaching 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.
11. While on the final approach segment, maintain a deviation of not more than 10 degrees from the specified bearing and maintain airspeed within 10 knots.
12. Maintain the MDA, when reached, within +100 feet, - 0 feet to the MAP.
13. Execute the missed approach procedure when the required visual references for the intended runway are not distinctly visible and identifiable at the MAP.
14. Execute a normal landing from either a straight-in or circling approach, whichever is applicable.

37.35 - Instrument Landing System (ILS) Instrument Approach Procedure. The pilot-in-command shall ensure the correct IAP chart is immediately available for quick, easy reference and shall reviewed the information for familiarity with the surrounding environment, terrain, obstacles, appropriate altitudes, headings, distances, navigation radio frequencies, and other specified limitations and/or information pertinent to the ILS instrument approach procedure. Other requirements for the approach include:

1. Select and comply with the appropriate ILS instrument approach procedure to be performed.
2. Establish two-way communications with ATC, as appropriate to the phase of flight or approach segment, and use proper radio communications phraseology and technique.
3. Select, tune, identify, and confirm the operational status of ground and aircraft navigation equipment to be used for the approach procedure.
4. Comply with all clearances issued by ATC.
5. Advise ATC immediately any time the aircraft is unable to comply with a clearance.
6. Establish the appropriate aircraft configuration and airspeed, considering turbulence and wind shear, and complete the aircraft checklist items appropriate to the phase of flight.
7. Prior to beginning the final approach segment, maintain the specified altitude within 100 feet, heading or course within 10 degrees, and airspeed within 10 knots.
8. Apply the necessary adjustments to the published decision altitude (DA) and visibility criteria for the aircraft approach category when required, such as:
  - a. Class II NOTAMS;
  - b. Inoperative aircraft and ground navigation equipment;
  - c. Inoperative visual aids associated with the landing environment; and
  - d. National Weather Service (NWS) reporting factors and criteria.
9. Establish an initial rate of descent at the point where the electronic glide slope is intercepted, which approximates that required for the aircraft to follow the glide slope.
10. While on the final approach segment, allow no more than three-quarter-scale deflection of either the localizer or glide slope indications, and maintain the specified speed within 10 knots.

11. Avoid descent below the decision altitude (DA) before initiating a missed approach procedure or transitioning to a normal landing approach.

12. Immediately initiate the missed approach procedure when, at the decision altitude (DA), the required visual references for the intended runway are not distinctly visible and identifiable.

13. Transition to a normal landing approach when the aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at normal rate of descent using normal maneuvers.

37.35a - Global Positioning System (GPS) Instrument Approach Procedures. The pilot-in-command shall ensure the correct IAP chart is immediately available for quick, easy reference and 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. Establish two-way communications with ATC or the appropriate ground contact. Use proper radio phraseology and technique.

2. Select, tune, identify, and confirm the operational status of the navigation equipment to be used for the approach procedure.

3. Comply with all clearances issued by ATC.

4. Maintain instrument scan and be alert for inaccurate or inoperative information sources.

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

6. Establish the appropriate aircraft configuration and airspeed in consideration of turbulence and wind shear. Complete the checklist items appropriate to the phase of flight.

7. Prior to beginning the final approach segment, maintain altitude within 100 feet, and heading within 10 degrees; allow less than a full-scale deflection of the CDI, or within 10 degrees in the case of an RMI; and maintain airspeed within 10 knots.

8. Apply 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 NOTAMS;

b. Inoperative aircraft or ground navigation equipment;

c. Inoperative visual aids associated within the landing environment;  
and

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

9. Establish a rate of descent and track that will ensure arrival at the MDA prior to reaching the 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, allow no more than a three-quarter scale deflection of the CDI, or within 10 degrees in the case of an RMI, and maintain airspeed within 10 knots.

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

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

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

37.36 - Missed Approach Procedure. When a landing cannot be accomplished, the pilot must advise ATC. Upon reaching the missed approach point (MAP) defined on the approach procedure chart, the pilot must 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 ensure adherence to the following requirements for missed approach procedures:

1. Possess adequate knowledge of the elements related to missed approach procedures associated with standard instrument approaches.

2. Initiate the missed approach 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 or 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.

37.37 - 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 must 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.

37.37a - Circling Approach Standards. (Sec. 24.23). Select and comply with the appropriate (IAP) circling approach procedure.

1. Ensure maneuvers are within the capabilities and limitations of the aircraft in consideration of possible wind shear and turbulence.

2. Confirm the direction of traffic and adhere to all restrictions and instructions issued by ATC.

3. 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.

37.38 - 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 DA, MDA, or VDP to a visual flight condition, allowing for safe visual maneuvering and a normal landing.

2. Adherence to all 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 - AIRCRAFT SERVICE AND SUPPORT

38.1 - Aviation Fuels. Commonly used aviation fuels are divided into two major types. The first is aviation gasoline (AvGas), used in internal combustion engines, and the other is turbine fuel used in turbine engines.

38.11 - Aviation Gasoline. All aviation gasoline are 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.

1. Normally, only one grade of fuel is authorized for a specific aircraft engine and is specified in the Airplane Flight Manual (Pilot's Operating Handbook).

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

38.12 - 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.

1. Grades. 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.

2. Specifications. Specifications for the type of jet fuel approved, additives, and turbine oil for the installed power plant(s) are contained in the Airplane Flight Manual (Pilot's Operating Handbook).

3. Jet Fuel Weight. For flight planning and weight and balance purposes, the average weight of jet fuel is 6.5 pounds per gallon. The flashpoint is 100 to 135 degrees Fahrenheit depending on the type fuel and manufacturer.

### 38.13 - Fuel Hazards.

1. Aviation grade fuels are subject to the hazardous materials regulations of the Department of Transportation (DOT), due to their extreme properties of flammability.

2. 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 MSDS's are available from the local fixed-base operator (FBO) and/or the bulk fuel supplier.

38.14 - Fuel Transfer and Storage. Recommended fuel transfer and storage procedures are contained in the National Fire Protection publication NFPA 395, Storage of Flammable and Combustible Liquids on Farms and Isolated Sites, and NFPA 407, Standards for Aircraft Fuel Servicing (sec. 06). These publications are updated annually.

38.15 - Refueling Systems/Methods. Refueling systems incorporate two distinctly different methods on both fixed-wing airplanes and helicopters. The first is a "closed" system (single-point connection). The other is referred to as an "open" system (over the wing refueling).

1. Single-Point Connection. Fuel is fed into the aircraft through high-pressure hoses at a single fueling point located on the aircraft.

- a. For single-point refueling, not more than one fuel truck shall be connected 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.
- b. The main advantage in single-point fueling is that the fumes escaping are exiting through the fuel vents, cutting down on the amount of vapors available to support combustion.
- c. Under most circumstances there is electrical power on the aircraft to open and close valves, transfer fuel, and record tank capacities.

2. Over-the-Wing Refueling. This method of refueling is the most commonly used throughout Forest Service aviation operations, including interagency cooperators. Extreme precautions must always be taken when engaged in, or operating near, "open" or over-the-wing fueling.

- a. Increased fuel vapors are present due to exposed raw fuel meeting the air between the nozzle and filler hole.
- b. 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.

38.2 - Safety Precautions - Fueling. Aircraft fueling operations present many dangers to ground handlers and equipment. Ensure that all safety precautions have been taken prior to commencing fueling operations of any type. 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: Grounding of the aircraft and/or fuel truck is no longer recommended because it 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. Then:

- a. Connect the fuel high-pressure hose to the single-point inlet on the aircraft.
- b. 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. First, 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 nonambulatory patient is on board an aircraft and fueling is required, follow these procedures:

(1) A crewmember physically capable of effecting the evacuation shall stand by with the patient, should evacuation be necessary.

(2) A crash crew should be available in the event of a fueling spill or accident.

**38.3 - Hot Refueling - Turbine-Powered Aircraft.** Aviation operations involving turbine powered fixed-wing aircraft and rotorcraft must have a "hot refueling plan" in effect for the type aircraft, location, and mission prior to allowing hot fueling to occur while any engine is running.

1. For fixed-wing airplanes hot refueling is not authorized except in an emergency (resulting from the failure of an auxiliary power unit, for example). Hot refueling is not authorized for turbo-prop or turbo-jet fixed-wing aircraft except turbo-prop single-engine airtankers (SEATS) that have hot refueling procedures detailed in the Airplane Flight Manual (Pilot's Operating Handbook) .

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

3. Helicopter hot refueling shall be accomplished in accordance with the national interagency contract standards, all applicable FAA standards, and National Fire Protection Association standards in NFPA No. 407. Aircraft fuel servicing shall be followed except that 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; and
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 shall be prepared and submitted to the regional engineering unit responsible for approving the plan.

39.2 - Facility Safety Plan. Regional Foresters shall ensure that each airfield utilized as a base of operations in support of resource aviation activities has a safety plan. 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/EMT.
  - b. Forest Supervisor's office.
  - c. Regional Aviation Safety Manager (RASM).
  - d. Regional Aviation Officer (RAO).
  - e. Coordination center.
  - f. FAA control tower (if applicable).
  - g. Flight Service Station (if applicable).
  - h. Sheriff.
  - i. Ambulance.
  - j. Hospital.

39.21 - Overdue Aircraft. (FSM 5720). An aircraft is considered overdue 1 hour after the filed arrival time. Responsible aviation managers or coordination centers should, however, initiate preliminary actions, such as a follow-up inquiry, when no word has been received 30 minutes beyond the scheduled time of arrival.

1. The following information must be readily available as informational follow-up:

- a. Aircraft type and registration number.
- b. Name of the pilot(s).
- c. Names and address of passengers.
- d. Color of aircraft.
- e. Type mission.
- f. Last known location.
- g. Point of departure.
- h. Destination.
- i. Filed flight plan - FAA or Forest Service.
- j. Estimated time of arrival.
- k. Flight following responsibility.

39.21a - Overdue Aircraft Reporting Responsibilities. The person or organization first determining an aircraft is overdue shall initiate overdue aircraft reporting requirements in accordance with a National or Regional aviation safety plan (FSM 5720).

1. The local coordination center manager has the following responsibilities:

- a. Notify the nearest FAA Flight Service Station when the flight has been conducted under Forest Service flight following procedures;
- b. Notify the Regional Aviation Officer;
- c. Notify the Regional Aviation Safety and Training Manager;
- d. Notify the Forest Aviation Officer.

2. 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, IL.

3. Complete Form FS-5700-14/OAS-34, SAFECOM Report.

39.22 - Aircraft Accidents and Incidents with Potential. (FSM 5720). Immediately following an aircraft accident at an airport, the base manager must be prepared to offer the following assistance and actions:

1. Initiate rescue by:
  - a. Assisting survivors and rendering first aid until relieved by medical personnel;
  - b. Provided a real danger of post-crash fire exists, moving the survivors a safe distance away from the aircraft;
  - c. Ensuring unauthorized personnel remain clear of the crash area;
  - d. Establishing the no-smoking rule in proximity to raw fuel spills and fumes;
  - e. Searching the wreckage (if possible) for other survivors; and
  - f. Preserving the accident site. Every piece of the aircraft is important to investigators. Use local law enforcement personnel to secure the site whenever available.

2. Follow notification procedures in the same order as in section 39.21a, paragraph 3 and, as a minimum, include:

- a. The names and addresses of witnesses;
- b. Written statements of witnesses; and
- c. The complete SAFECOM Form FS-5700-14/OAS-34.

39.3 - Search and Rescue. (FSM 1599, 5713.53). Although search and rescue is not considered to be a Forest Service mission, personnel do become involved from time to time in that activity. When Forest Service personnel become involved, follow the procedures outlined in the applicable Forest aviation safety plan to initiate search and rescue operations.

39.4 - Facilities Inspection Guidelines. Refer to the Interagency Airtanker Base Operations Guide (IABOG) for facilities inspection guidelines for fixed-wing airport operations and the Interagency Helicopter Operations Guide (IHOG) for helicopter operations (sec. 06). 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).

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CHAPTER 40 - AIRCRAFT INSPECTION AND MAINTENANCE

40.1 - Authority. (FSM 5701). Federal requirements concerning aircraft maintenance and inspection for civil aircraft are set out in Title 49 of the United States Code (49 U.S.C.) and in the Federal Aviation Regulations (FAR's) issued by the Federal Aviation Administration (FAA) at Title 14, Code of Federal Regulations (CFR) Parts 39, 43, and 91. The FAA issues additional direction in Airworthiness Directives (AD's) (FAR 39, 43, and 91).

40.2 - Objective. To provide safe, functional Forest Service owned or operated aircraft that meet Federal and Service-wide standards and procedures for inspection and maintenance applicable to the type mission being flown; that is, passenger-carrying or special missions (FSM 5710.5).

40.4 - Responsibility.

40.41 - Deputy Chief for State and Private Forestry. (FSM 5704.1).

40.42 - Director, Fire and Aviation Management Staff, Washington Office. (FSM 5704.2).

40.43 - National Aviation Maintenance Manager. The National Aviation Maintenance Manager, National Interagency Fire Center (NIFC), is responsible for:

1. Providing National leadership for the aviation maintenance program and ensuring that the modification, repair, and maintenance of Forest Service owned aircraft are completed in accordance with the applicable FAR's, the requirements of this Handbook, and the approved maintenance and inspection guides for the specific type aircraft (sec. 41.1).

2. Coordinating with business operations personnel and the National fixed-wing and helicopter program specialists for the inspection and approval of contract and rental agreement aircraft and facilities.

3. Approving aircraft inspection and maintenance guides for each type Forest Service owned and operated aircraft (sec. 41.1, para. 4).

4. Establishing and approving an inspection and maintenance program for non-standard category aircraft owned by the Forest Service (sec. 41.2).

5. Approving extensions to inspection frequency limits (sec. 43.3).

6. Tabulating and disseminating malfunction and deficiency reports for similar type aircraft (sec. 45.3).

7. Coordinating with the National Aviation Officer on the approval of Minimum Equipment Lists (MEL) for each type aircraft operated by the Forest Service (sec. 46).

40.44 - Aircraft Maintenance Inspectors. (See sec. 42.1 for direction on qualifications). Each Region operating Forest Service aircraft shall have a qualified Regional Aircraft Maintenance Inspector responsible for:

1. Providing Regional leadership for the maintenance and repair of Forest Service owned and operated aircraft in support of the National aviation program and Regional, Forest, and District level aviation objectives.

2. Ensuring coordination and oversight of contract and rental agreement aircraft and facilities inspections and approvals in conjunction with the National or Regional fixed-wing and helicopter management specialists.

3. Ensuring assigned Forest Service aircraft are maintained in standard configuration as determined by the National Aviation Maintenance Manager.

4. Establishing and maintaining a current aviation technical library specific to the type aircraft being operated.

Aircraft Maintenance Inspectors may delegate their inspection authority as provided in section 42.12.

40.45 - Avionics Inspectors. (See sec. 42.11 for direction on qualifications). Forest Service Regional Avionics Inspectors are responsible for:

1. Providing leadership for the installation, maintenance, and repair of avionics equipment and systems in Forest Service owned and operated aircraft in support of the National aviation program and the Regional, Forest, and District level objectives.

2. Ensuring assigned Forest Service aircraft are maintained in National standard avionics configurations, unless otherwise approved by the National Aviation Maintenance Manager, NIFC.

3. Establishing and maintaining a current aviation library specific to the types of avionics equipment and aircraft installations.

Avionics Inspectors may delegate their inspection authority as provided in section 42.12.

#### 41 - MAINTENANCE PROGRAM

41.1 - Standards. Maintain all Forest Service owned and operated aircraft in accordance with applicable FAR 39, 43, and 91 or equivalent standards approved by the National Aviation Maintenance Manager (sec. 40.43). Aircraft maintenance programs shall, as a minimum, include all of the requirements in the following paragraphs:

1. Provide an inspection program for each type aircraft that ensures they are maintained in an airworthy condition.

2. Include procedures that ensure all required inspections and maintenance are performed within the required frequency and level of quality (sec. 43.3).

3. Document the status of life-limited parts and overhaul time requirements for airframes, aircraft engines, propellers, and rotors (sec. 43.2).

4. Comply with Forest Service-approved inspection guides applicable to the type aircraft when performing inspections. Inspection guides for Forest Service aircraft shall be approved by the National Aviation Maintenance Manager (sec. 40.43).

5. Maintain a system for documenting the status of life-limited parts and overhaul requirements.

6. Provide aircraft inspection guides for use when performing inspections. Inspection guides for Forest Service aircraft shall be approved by the National Aviation Maintenance Manager.

41.2 - Airworthiness Certificates. Working Capital Fund (WCF) aircraft operated by the Forest Service that do not have airworthiness certificates issued by the Federal Aviation Administration (FAA) shall be maintained in accordance with an inspection program approved by the National Aviation Maintenance Manager.

41.3 - Maintenance Approval. Do not approve any aircraft for return to service unless it is in compliance with the standards for replacement times of life-limited parts and overhaul frequencies.

42 - MAINTENANCE PERSONNEL QUALIFICATIONS Only personnel meeting the qualifications of the Federal Aviation Regulations with appropriate ratings (FAR 43.7, 43.17) shall inspect, maintain, repair, or alter Forest Service owned or operated aircraft.

42.1 - Regional Aircraft Maintenance Inspectors. Except for light fixed-wing airplane inspection (sec. 14.2, para. 4b), Regional aircraft maintenance inspectors shall possess a current airframe and powerplant certificate (A&P) issued by the Federal Aviation Administration (FAA). Inspectors shall, in addition, meet the requirements for inspection authorization (IA) from the FAA (sec. 14.2 and 40.44).

42.11 - Regional Avionics Inspector. Avionics Inspectors shall be knowledgeable of the operations and theory of avionics systems and the installed equipment being inspected and shall have access to the appropriate test equipment to verify the integrity of the avionics systems requiring approval (sec. 40.45).

42.12 - Delegation of Inspection Authority. Regional Aircraft Maintenance Inspectors (sec. 40.44) and Regional Avionics Inspectors (sec. 40.45) may delegate their Forest Service inspection authority to properly qualified personnel for the inspection of contract aircraft operated exclusively by the Forest Service.

42.2 - Maintenance Personnel Training. Each active Aircraft Maintenance Inspector and Avionics Inspector shall receive a minimum of 24 hours of aircraft or avionics maintenance training annually.

#### 43 - AIRCRAFT MAINTENANCE AND INSPECTIONS (Sec. 41).

43.1 - Airworthiness Directives and Service Bulletins. Accomplish all work required by applicable Federal Aviation Administration (FAA) Airworthiness Directives (AD's) and manufacturer's Service Bulletins (SB's) considered mandatory (FAR 91.417 (a) (2) (v)).

43.2 - Parts and Components Approval. Install only FAA-approved parts or components on certified aircraft. Former military aircraft, such as the Shorts C-23A, may have Department of Defense (DOD) approved components and parts installed, provided the integrity of the installations and parts can be verified.

1. Retire life-limited parts at the appropriate time or shelf limit.
2. Overhaul time-controlled parts or systems at the required frequency.

43.3 - Inspection Frequency. Complete all required inspections within the approved time limits, except that the National Aviation Maintenance Manager may approve extensions when the safety of flight is not compromised (sec. 40.43).

44 - MAINTENANCE FLIGHT CHECK AND RETURN TO SERVICE Do not approve Forest Service owned or operated aircraft for return to service until a maintenance flight check has been performed following any repair or alteration that has appreciably changed the aircraft flight characteristics or operating limitations (FSM 5713.41).

44.1 - Maintenance Test Flights.

1. A test flight shall be conducted by a pilot qualified in the type aircraft with only those persons on board essential to the evaluation of the aircraft and/or systems.

2. The pilot performing the test flight shall make the appropriate entries in the aircraft records (maintenance log) describing the reason for the test flight and the results of the operational test.

44.11 - Fixed-Wing Aircraft. Test flights shall be conducted (but are not limited to these situations) when the following maintenance activities have been accomplished on fixed-wing aircraft:

1. Engine removal and installation.
2. Propeller removal and installation.
3. Flight control removal and installation.

44.12 - Rotorcraft. Test flights shall be conducted (but are not limited to these situations) when the following maintenance activities have been accomplished on rotorcraft:

1. Engine removal and installation.
2. Rotor removal and installation.
3. Power train component removal and installation.

44.2 - Engine Installation and Run-In. (Sec. 11.24a). Engine installations that are new, rebuilt, or overhauled must accumulate 3 hours of operating time, including 2 continuous hours in flight, prior to Forest Service use.

45 - MAINTENANCE RECORDS AND REPORTING

45.1 - Maintenance Records.

1. Ensure that each Forest Service aircraft carries a maintenance record (log) for recording flight hours, time in service, maintenance discrepancies, current aircraft inspection, and special aircraft inspection status in accordance with FAR 91.417. Flight crew members are required to initial and date maintenance discrepancies entered into the maintenance log.

2. Ensure that previously noted discrepancies have either been corrected by a maintenance sign-off or placed in deferred status prior to further flight. This is the responsibility of the pilot-in-command.

3. Ensure that maintenance personnel document the inspections and maintenance performed in the appropriate maintenance record (guides or forms) or logs, such as airframe, engine, propeller. Include this documentation as part of the permanent maintenance record (maintained at the aircraft's base of operations) containing all pertinent maintenance information, including, but not limited to:

- a. A listing of applicable Airworthiness Directives (AD's) issued by the FAA and the manufacturer's Service Bulletins and which are applicable to the type aircraft, engine, propeller, or rotor and equipment. Include in the listing the date and method of compliance and, if recurring, the next date/time due.
- b. Retain a copy of the completed inspection records, such as inspection guide, maintenance discrepancy list, and other records associated with the inspection, for a period of 24 months or until that work is repeated, whichever is less, at the assigned base of operations for the aircraft.

45.2 - Other Documentation. Each Forest Service unit operating and/or maintaining aircraft shall have current documentation (manuals) covering the type of aircraft operations and/or maintenance that unit performs. These documents must include flight and maintenance manuals for the type of aircraft operated, FAR's, and inspection guides and service publications for the type(s) of maintenance and operations conducted; that is leadplane, smokejumper, and so on.

45.3 - Reporting Malfunctions and Maintenance Deficiencies.

1. Report to the National Aviation Maintenance Manager, NIFC, all maintenance deficiencies or malfunctions occurring during operations or maintenance periods that are significant enough to affect not only that individual aircraft but also similar aircraft types utilized by the Forest Service (sec. 40.43).

2. Clearly describe and appropriately document significant deficiencies by completing the FAA Malfunction and Defect Report (FAA Form 80104) or by using the Forest Service SAFECOM (incident) reporting system (FSM 5720).

46 - MINIMUM EQUIPMENT LISTS

1. Operate aircraft with the appropriate equipment as required by FAR 91.205, Powered Civil Aircraft With Standard Category U.S. Airworthiness Certificates, Instrument and Equipment Requirements, unless otherwise approved by the National Aviation Maintenance Manager, NIFC, on the approved minimum equipment list (sec. 40.43).

2. Specific minimum equipment lists acceptable to the National Aviation Officer and National Aviation Maintenance Manager shall be retained in the FAA Approved Flight Manual (AFM) or, in an approved flight manual supplement.

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CHAPTER 50 - GLOSSARY

Section 51 contains a list of terms, abbreviations, and acronyms used in this Handbook. The complete list of Federal Aviation Administration (FAA) approved abbreviations and definitions can be found in Title 14, Code of Federal Regulations, Part 1.2 (14 CFR Part 1.2) (FAR 1.2).

51 - LIST OF AERONAUTICAL TERMS, ABBREVIATIONS, AND ACRONYMS

AC	Advisory Circular (FAA).
AD	Airworthiness Directive.
ADF	Automatic Direction Finder (see NDB).
AFM	Airplane Flight Manual.
AGL	Above Ground Level.
AI	Actual Instrument.
ALS	Approach Light System.
APP	Approach.
ASR	Airport Surveillance Radar.
ATA	Air Transport Association.
ATC	Air Traffic Control.
ATGS	Air Tactical Group Supervisor.
BETA	Negative angle of propeller blade (normally associated with reverse pitch).
BOW	Basic Operating Weight (weight except expendable fuel).
CAS	Calibrated Air Speed.
CAT II	Category II (landing system).
CDI	Course Deviation Indicator.
CG	Center of Gravity.

DA	Decision Altitude.
DME	Distance Measuring Equipment.
ETA	Estimated Time of Arrival.
EW	Empty Weight.
FAA	Federal Aviation Administration.
FAF	Final Approach Fix.
FAR	Federal Aviation Regulation.
FM	Fan Marker.
GS	Glide Slope.
GPS	Global Positioning System.
HIRL	High Intensity Runway Light System.
IA	Inspector Authorization.
IAS	Indicated Air Speed.
IFR	Instrument Flight Rules.
ILS	Instrument Landing System.
IM	Inner Marker (ILS).
INT	Intersection.
IP	Instructor Pilot.
kts	Knots.
LDA	Localizer Directional Aid.
LMM	Compass Locator - Middle Marker Beacon.
LOM	Compass Locator - Outer Marker beacon.
LP	Leadplane.
MAFFS	Modular Airborne Fire Fighting System.
MCA	Minimum Crossing Altitude.
MDA	Minimum Descent Altitude.



MEA	Minimum Enroute Altitude (IFR).
METO	Maximum Except Takeoff (power).
MM	Middle Marker Beacon.
MOCA	Minimum Obstruction Clearance Altitude.
MRA	Minimum Reception Altitude.
MSL	Measured Sea Level.
NAV	Navigation.
NDB	Non-Directional Beacon.
NOPT	No Procedure Turn Required.
NPA	Non-Precision Approach.
OAT	Outside Air Temperature.
OBS	Omni Bearing Selector.
OM	Outer Marker (ILS).
PAR	Precision Approach Radar.
PAX	Passengers.
PH	Photography.
PIC	Pilot-in-Command.
POH	Pilot's Operating Handbook.
PP	Pilot Proficiency.
Psi	Pounds per square inch.
RBN	Radio Beacon.
RC	Reconnaissance.
REIL	Runway End Identification Lights.
RVR	Runway Visual Range (horizontal distance measurement).
SB	Service Bulletin.

SIC	Second-in-Command.
SIM	Simulator.
SJ	Smokejumper.
TACAN	Tactical Air Navigation Aid (ultra-high frequency).
TAS	True Airspeed.
TBO	Time Before Overhaul.
TOGW	Takeoff Gross Weight.
TVOR	Terminal Omni Directional Range (very-high frequency).
Va	Design maneuvering speed.
VASI	Visual Approach Slope Indicator.
Vb	Maximum gust intensity Speed.
Vc	Cruising speed.
VDP	Visual Descent Point.
Vf	Design flap extension speed.
Vfe	Maximum flap extended speed.
VFR	Visual Flight Rules.
VHF	Very High Frequency.
Vle	Maximum landing gear extended speed.
Vlo	Maximum landing gear operating speed.
Vlof	Lift-off speed.
Vmca	Minimum control speed (critical engine inoperative).
Vmo	Maximum operating limit speed.
Vmu	Velocity minimum unstick speed.
Vne	Velocity never exceed speed.

Vno/Mno	Maximum structural cruising speed.
VOR	Very High Frequency Omni Directional Station.
VORTAC	Co-located VOR and TACAN.
Vr	Rotation speed.
Vs	Velocity of stall.
Vso	Steady flight speed in landing configuration.
Vs1	Stalling speed, or minimum steady flight speed, in a specified configuration.
Vsse	Safe single-engine speed.
Vx	Best angle of climb.
Vy	Best rate of climb.
V1	Take-off decision speed (go, no-go speed).
V2	Take-off safety speed.
XP	Transport.
ZFW	Zero Fuel Weight.