Interagency Smokejumper Pilots Operations Guide

May 2018

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Approvals

This revision of the Interagency Smokejumper Pilots Operations Guide (ISPOG) is approved as follows:

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APPLICABILITY: This Bureau of Land Management and United States Forest Service (BLM/FS) operational document provides information and guidance to their respective employees and contractors. Where stated, the use of "will", "shall", or "must" is considered mandatory. The use of "should" or "may" is considered good practice, but not mandatory. Contract Smokejumper Pilot compliance is limited to those sections of this publication specifically stipulated in their contract.

ACCESSIBILITY: Electronic downloading is the primary means of distribution for this Interagency Guide: https://www.fs.fed.us/fire/aviation/av_library/

This Guide will be reviewed on a biennial basis. When updates are due, the Forest Service and the Department of Interior (OAS and BLM) will bilaterally facilitate updates and approve those updates through the NIAC approval process.

SUPERSEDES: 2009/2010 ISPOG

WAIVER AUTHORITY: Waivers from this guide will be handled per the agencies policy seeking the waiver.

SUMMARY OF CHANGES: This document has been substantially revised and must be completely reviewed. A significant re-write combines and changes order of paragraphs for better chronological flow throughout the SJ mission. Major changes include deletion of: extraneous information that is not guidance or policy, definitions not utilized in the ISPOG, and the Example Syllabi. Additions were made to Flight Following in Chapter 5; 'Tandem Drop' changed to 'Multi-Jumpship Operations'; references to Designation of Inspector/Check Airmen (Chapter 8); roles and responsibilities of pilots and spotters were revised (including in the FTA); and a Glossary of Standard Callouts in incorporated. The Low Level (LL) chapter has been combined with the Paracargo chapter. Forms and policy changes have been updated and clarified. The Smokejumper PTS has been replaced with a reference (Chapter 7), along with reworking of a chart to reflect the current advisory circular (Table 2-1).

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CONTENTS

1.0 – INTRODUCTION

1.1 Introduction

A smokejumper aircraft assigned to support wildland fire activity will be utilized in a variety of operations (e.g. transportation, reconnaissance, airdrop, jumper retrieval, etc.). These operations are usually short-range missions from a main operations base. It is common practice to preposition aircraft to airports adjacent to the dispatched area to be covered. Many of these airports are established seasonally or as spike bases.

1.2 Overview

This pilot guide has been prepared to establish standard procedures for operating smokejumper and paracargo aircraft in Alaska and the lower 48 states. Included is a training and evaluation chapter that complements the Smokejumper syllabus.

1.3 Smokejumper Program Mission Statement

To provide a safe, highly trained, fully equipped, and self-sufficient workforce to support the land stewardship and public safety goals of the U.S. Forest Service and Bureau of Land Management.

Core duties of smokejumpers are to protect human life, defend property at risk, and conserve natural resources. In cooperation with federal, state, and local partners, smokejumpers are a workforce that natural resource and emergency managers utilize for safe and effective response to wildfires, all-risk emergencies, and project work. Smokejumpers train to carry out a wide range of conservation projects that serve to promote our Nation's legacy of healthy and productive forests, grasslands, and rangelands.

2.0 – SMOKEJUMPER OPERATIONS

2.1 General

Smokejumpers are considered a unique 'initial attack asset' due to their ability to respond quickly and staff fires. The Interagency Dispatch system exercises operational control of the deployment, employment, and demobilization of jumpers based on fire activity in relation to regional and national resource availability.

2.2 Communications

The smokejumper spotter is in control of the mission, while the Pilot-in-Command (PIC) is in charge of aircraft safety. This dynamic requires continuous clear communication and coordination between crew members. When missions and airspace become complex, the importance of being clear and concise becomes more critical. Aircrew should monitor assigned frequencies well prior to arriving on scene, and anticipate higher complexity scenarios. Prebriefing a communications plan allows fires to be staffed rapidly and efficiently while providing required air traffic separation with other incident aircraft. Establishing good crew communication techniques cannot be overemphasized; and directly equates to operational efficiency.

2.3 Roles and Responsibilities

2.3.1 Pilot(s)

1. Ultimate safety of flight responsibility.
2. Continually assesses and manages operational risk.
3. Aircraft preflight.
4. Weather, Notice-to-Airmen (NOTAMS), and Temp Flt Restriction (TFR) planning.
5. Confirms firefighters and cargo are properly loaded / secured.
6. Navigation.
7. Communication with all Air Traffic Control (ATC) entities and non-incident aircraft.
8. May coordinate with incident aircraft.
9. Selects cargo drop pattern and gives the 'kick' command.

2.3.2 Spotter(s) (Compliments and Expands on ISMOG Section 7)

1. Serves as Mission Coordinator for all aspects of jumper / paracargo flights.
2. Preflight equipment: door latches, static line / anchors, cargo, restraints, jump door, and boot edge.
3. Load manifesting.
4. Ensures pilot briefing and relevant comm / avionics checks are performed.
5. Takes requests from dispatch.
6. Ensures personnel and equipment are properly configured, loaded, and restrained.
7. Continually monitors personnel ground and flight safety (which may involve passenger

transport if qualified per agency & aircraft guidelines).

8. Assists in navigation using available maps, and GPS.
9. Updates fire coordinates and provides fire size-up to dispatch.
10. Coordinates with ground resources if applicable.
11. Selects jump spot, analyzes conditions, orients jumpers, directs pilot over exit point, and gives jumpers the exit command.
12. Ascertains jumper welfare and inventories equipment.
13. Coordinates with pilot to deploy cargo in selected spot.
14. A qualified smokejumper spotter coordinates smokejumper operations with on-scene aircraft over a fire until a qualified ATGS arrives (See Chapter 5 for further considerations). Coordination with on-scene aircraft may be delegated to the pilot(s) prior to entering an FTA.

2.4 Smokejumper Operations Procedures

Aerial delivery of personnel and equipment into small, open spots in steep, forested terrain requires pinpoint accuracy. Excellent crew coordination and sound judgment must be used if these activities are to be accomplished safely and effectively.

Aircrew should ready the aircraft as soon as possible after reporting for duty by completing preflight and first-flight-of-the-day checklists. Quick-turn checklists should be used whenever authorized.

Aircrew are required to travel and must be ready for assignments away from their duty station at all times. An initial attack order can develop into an extended stay at an outstation or another jump base.

2.5 Loading and Unloading Smokejumpers

The following procedures must be followed:

1. The PIC must be in the cockpit if engine(s) running or when it is not official daylight hours.
2. The spotter directs smokejumper loading, but may delegate responsibility to ground personnel. The spotter should never leave the aircraft with jumpers on board or engines running without first informing the pilot.
3. For "Hot Loading" a trained Fixed Wing Parking Tender or Smokejumper Spotter (Interagency Aviation Training) must be present (can be spotter supervising loading), and:

    A. Forest Service – right engine running / left engine shutdown (see FSH 5709.16 Section 34.22).

    B. BLM – flight crewmember escorts with both engines running / left engine feathered (see 351 DM 1.5)

2.6 En Route

Flight crews should fly the most direct route possible without compromising safety. Unless otherwise instructed by ATC, aircraft responding to, or operating over wildland fire operations shall use transponder code 1255. Unless delegated to the pilot, the spotter will make a radio call to other aircraft (or in the blind) at least 12 miles from the fire (see Chapter 5 for expanded discussion on Communications in the

FTA). The pilot(s) shall ensure pulse lights are on, and complete mission checklists prior to reaching the fire.

Terrain Awareness & Warning System (TAWS) and/or Ground Proximity Warning System (GPWS) should be enabled and operating for all en route segments. Both systems may be silenced and/or disabled during actual Smokejumper or Paracargo operations upon arrival in the FTA. Smokejumper checklists are specific to aircraft type, but should include checking the status of these systems before entering and exiting the FTA.

2.7 Maneuvering

If an aircraft is equipped with an inflight door, prior to maneuvering the aircraft for jump spot selection, the pilot will notify the spotter when they can open the inflight door. The pilot must maneuver the aircraft in a manner to provide the spotter and smokejumpers with an unobstructed view of the fire and surrounding area. This is usually best accomplished by establishing a left-hand orbit approximately 1500 feet above the incident. The spotter selects the jump spot and then identifies it to the pilot. The pilot should plan the final approach into the direction of the wind unless terrain or visibility restrictions make this unsafe. Any change from a standard left-hand, into-the-wind pattern should be agreed on by the pilot and spotter. Left turns allow the spotter (and jumpers) to observe the intended jump spot, the behavior of streamers, and jumpers during their exit, descent, and landing.

Additionally, it helps orient jumpers in the aircraft to the location of the fire in relation to the jump spot and general lay of the country.

2.8 Low Pass or High-Low

Prior to a Low Pass a high recon must be completed and a safe escape route determined and briefed.

There are two approved (pre-jump) observation pass techniques. A Low Pass is a flyby offset to the right of a proposed jump spot at a moderate speed, and nominal altitude of 200 feet AGL. The High-Low is the same as a Low Pass except, it is done no lower than 500 feet AGL. At the discretion of the spotter and the pilot the Low Pass or High-Low may be omitted.

The Low Pass or High-Low allows the spotter and jumpers to evaluate the jump spot and identify hazards in and around the jump spot. It also allows the pilot to evaluate air conditions and determine jump spot elevation. When over the intended jump spot the pilot must note the radar altitude and barometric altitude. Jump spot elevation is then calculated by subtracting the radar altitude from the barometric altitude.

2.9 Streamer Line Up

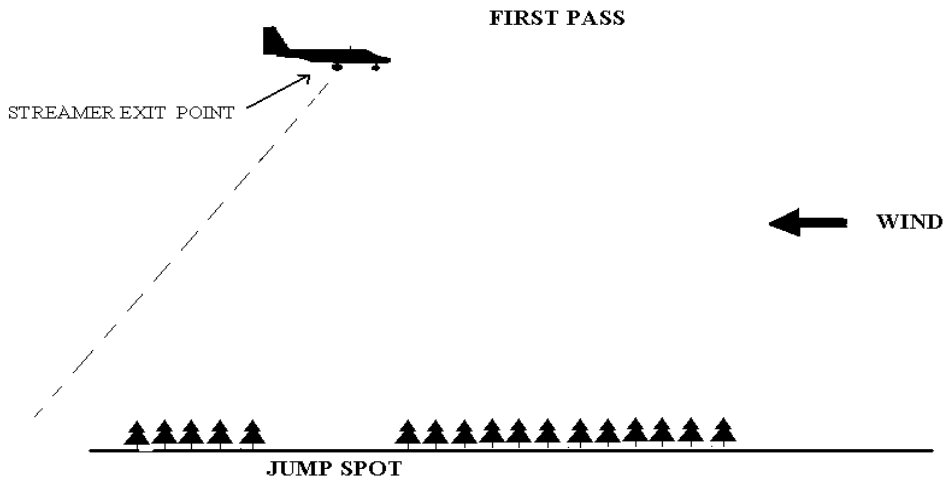
The pilot should plan turns so that the aircraft will be lined up wings-level on final at 1500 feet AGL; optimally 10-15 seconds from drop. The spotter gives voice commands to initiate pilot corrections (e.g. "**left**" or "**right**"). In the absence of a specified number of degrees, when the spotter simply directs "**left**" or "**right**", the standard heading change is 5°. "**Hard left**" or "**hard right**" commands a 10° heading change. Heading changes greater than 10° will be given as "**left 15°**" or "**right 20°**" etc. All corrections will be executed using standard rate (coordinated) turns. The pilot should primarily use terrain references to align flight path, then backup with directional gyro. Altitude must be held constant throughout (See Figure 2-1). However, in the case of rising terrain at the jump spot or beyond, the spotter (or pilot) may request altitude changes. Such changes are usually voiced as "**up *x*00**".

2.10 Dropping Streamers

Wind direction and velocity is determined by dropping sets of crepe paper ('drift streamers'). The streamers are weighted to drift and descend at the same rate as the round parachute. The same set of streamers provide conservative data for Ram-Air parachutes

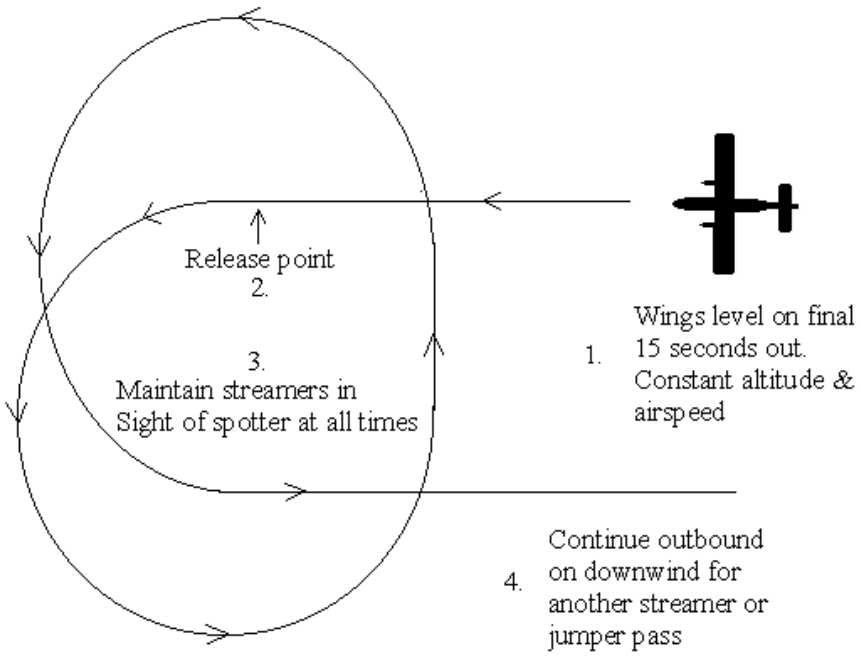
At least two streamer passes are generally made. On the first streamer pass, the spotter releases the streamers directly over the selected jump spot. The streamers will land downwind indicating wind drift and direction. The spotter reads the drift, then projects a round parachute exit point upwind from the jump spot equal distance to the streamer drift. To verify, a set of 'check streamers' is then dropped over the exit point. If calculated correctly, they should drift back and land close to the jump spot. For Ram-Air jumpers, the exit point may be up to double the distance of the round exit point, depending on winds aloft.

Figure 2-1: First Streamer Pass



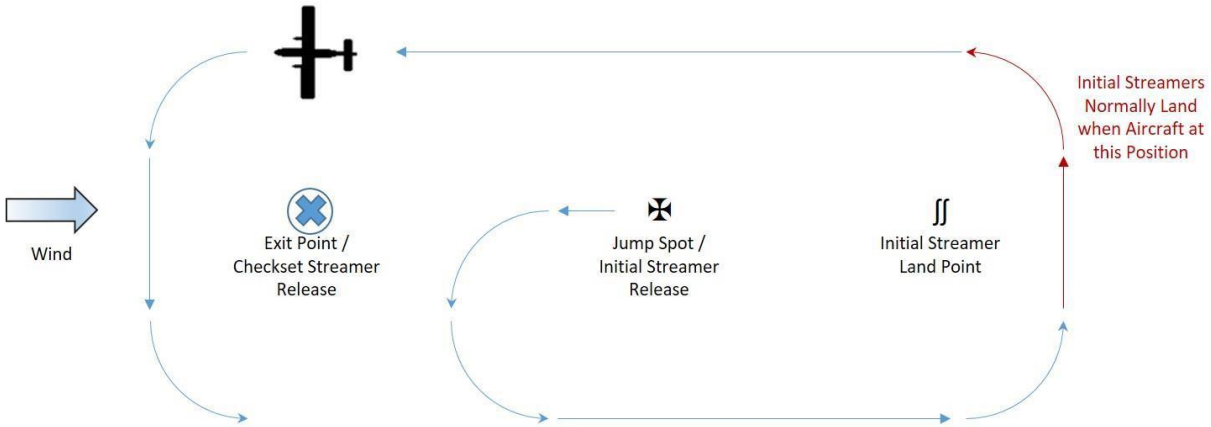
At the spotters "**streamers away**" call, the pilot immediately replies with the actual release altitude by calling "**XXX AGL**" (based on radar altimeter); then commences a left turn (into the direction of the open door) at a bank angle commensurate with aircraft type (approximately 30°, not to exceed 45°). See Figure 2-2. The pilot notifies the spotter that they see the streamers by announcing **"I have the streamers".** The spotter must be able to observe the streamers at all times in order to determine wind drift, vertical air currents, ground winds, and exit point. The pilot will be able to determine how to maneuver the aircraft "streamers to spot" by watching the streamers. Avoid or minimize steep turns not only for safety, but also because the low wing tends to mask the streamers from jumper view. If the view is blanked out by the wing or fuselage for longer than a few seconds it may be impossible to relocate them. If the exact point of streamer impact cannot be determined, a pass is wasted. The pilot must be able to locate the streamers for subsequent streamer and jump passes.

Figure 2-2: Standard Streamer Observation Profile



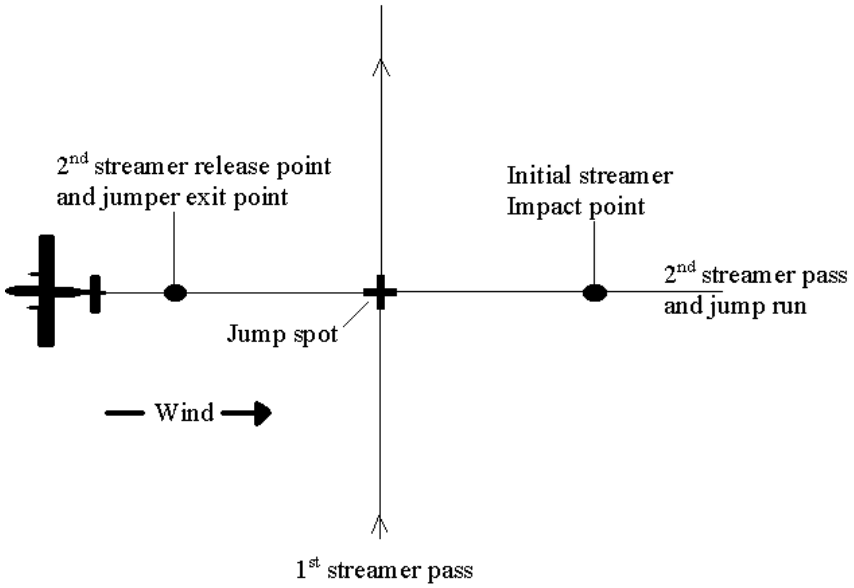
After the initial streamers land (and before flying *streamers-to-spot*) the spotter may request the pilot "**fly around the exit point***"* (Figure 2-3). When requested to fly around the exit point, fly a line offset right of the initial set of streamers, into the wind, and around the approximate location of the exit point. Once the pilot has flown slightly past the exit point, initiate the crosswind allowing the spotter to double check the potential exit point relative to the jump spot and streamers. This maneuver provides an opportunity for the spotter to select an exact exit point to track throughout the pattern.

Figure 2-3: Fly Around the Exit Point



The pilot then turns downwind to set up for *streamers-to-spot* for the check set.

Figure 2-4: Second Streamer Pass in Relation to First



Unless otherwise required for terrain (or requested by the spotter) pilots will maintain 1500 feet AGL above the jump spot elevation for check sets, to allow for accurate timing on the part of the spotters. This may mean that streamers are released higher or lower than 1500 feet AGL above the release point. At the spotters "**Streamers Away**" call, the pilot will note the Radar Altitude and call out either:

1. "1500 feet" if the check set release point and jump spot elevations are the same, or
2. The displayed Radar Altitude (if different than 1500') along with confirmation that they're still flying 1500 feet above jump spot (e.g., "**1300' at check set, but still 1500' above jump spot**"). This raises awareness that ground is rising or falling away in the vicinity of the release point.

The spotter will be timing the descent of the streamers to measure vertical and horizontal air movement (usually 65-70 seconds in vertically calm air). Short descents may indicate dangerous downdrafts which may preclude dropping jumpers or necessitate changing the jump spot.

2.11 Dropping Jumpers

When the spotter is satisfied that all conditions are satisfactory, the spotter informs the pilot that jumpers will be dropped on the next pass. If needed, the pilot will increase altitude to an absolute minimum of 1500 feet AGL (or 3000 feet AGL for Ram-Air) above the jump spot or release point whichever is higher, prior to dropping jumpers. This altitude is known as the drop altitude or jump altitude. Any increase in altitude should be briefed to the spotter. Since some radar altimeters don't register to 3000 feet AGL, simple math must be used to calculate the proper barometric altimeter readout. All altitude callouts to the spotter are in AGL, with the one exception of jump spot elevation which is in MSL.

For Ram-Air operations, the spotter shall be notified upon reaching 3000 feet AGL, to ensure jumpers arm their Automatic Activation Device (AAD) or confirm their Automatic Activation Device is armed. With the AAD system, it is important to be stabilized at 3000 feet AGL for the jumpers to arm their AAD. If the aircraft is above 3000 feet AGL when armed (e.g. rough air, bad math) do not descend back to 3000 feet AGL; stay at the higher altitude. It is better to stay a couple hundred feet high than have the AAD think the jumper is already a couple hundred feet lower than they really are. Unless the altitude deviation is significant there is no need to descend back to 3000' to rearm the system. If in doubt, communicate with the spotter to determine what constitutes a significant deviation.

Procedures for dropping jumpers are similar to that used for dropping streamers with the following exceptions: drop altitude, slowing on final to a minimum of 1.3 Vso or 90 KIAS (whichever is greater), and there is no need to call out the altitude as jumpers exit the aircraft.

A standard pattern can be established as illustrated in Figure 2-5. Occasionally, topographical hazards, make it desirable to deviate from a normal into-the-wind jump pattern. In some cases, a (nonstandard) crosswind (see Figure 2-6), downwind, or right-hand pattern may be requested.

Figure 2-5: Standard into Wind Pattern

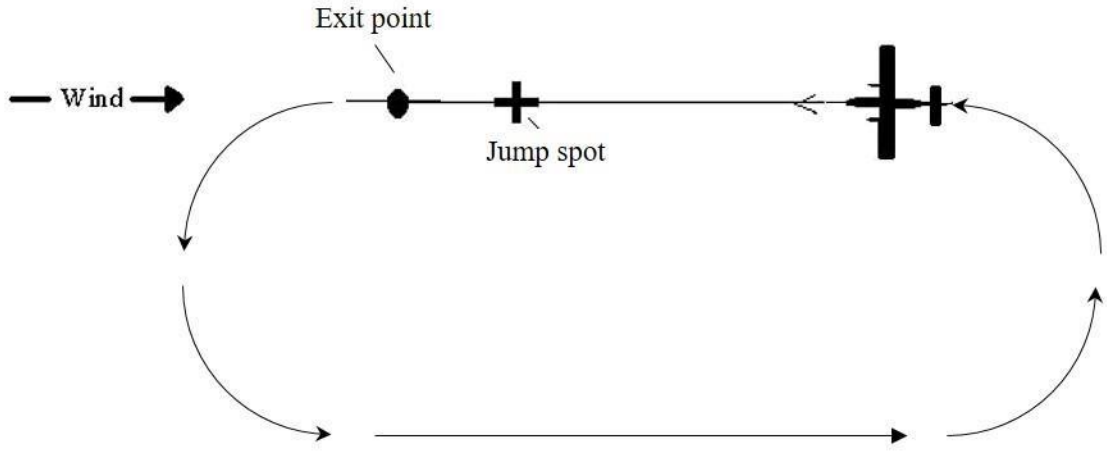
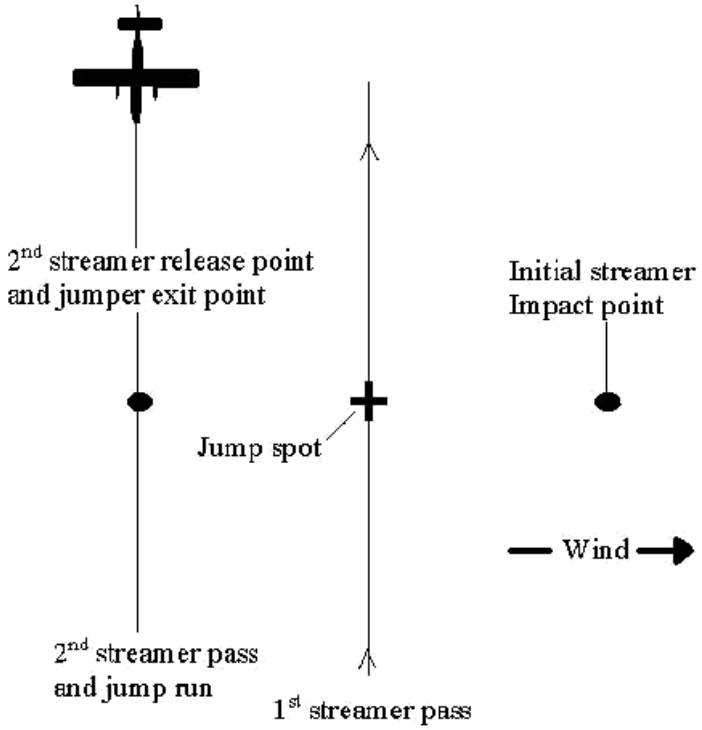


Figure 2-6: Crosswind Pattern (Nonstandard)



The ideal pattern should allow for no more than a 30° bank with enough time on final for the spotter to determine the correct line up and give corrections. The pilot calls "**downwind"** and "**turning base**" for spotter timing and awareness. The pilot should make the call "turning base" several seconds prior to making the turn, this allows the spotter to request that the downwind leg be extended if additional time is needed. When established on final, the pilot will call "**on final, 1500, rounds**" (for round canopies) or "**on final, 3000, squares**" (for Ram-Air canopies). The spotter is not required to acknowledge standard callouts, since they are likely briefing the smokejumper stick. The spotter calls "**jumpers away**" after each jumper or stick of jumpers has cleared the aircraft. The pilot maintains aircraft heading and airspeed until receiving this command. A standard rate turn to the downwind heading is then initiated.

2.12 Checking Jumper Status

After the first stick of jumpers lands, the spotter may choose to establish communication with the jumper-in-charge (JIC), before dropping more personnel. This is to confirm: welfare, exit point suitability, anticipated winds, and identify unbriefed jump spot hazards.

After the last jumpers exit the aircraft, the spotter will direct the pilot to stay wide on the jump pattern and above the highest jumper so that they can visually follow them to the ground. When the drop is complete and all personnel are on the ground, the spotter confirms with the JIC that there are no injuries. Occasionally radios may be damaged in the drop, but it is rare that voice communication cannot be established. If necessary, ground visual signals may be used (e.g. orange panels forming the letter "L" indicating everything ok). In any case, communications must be established before commencing paracargo.

2.13 Multi-Jumpship Operations

It is possible that more than one jumpship is dispatched to the same incident during the same timeframe. This has potential to lead to confusion and impact overall safety and efficiency; particularly in a congested FTA. Basic mutual contracts are an effective means of reducing airspace time requirements; and contribute to a safer, more efficient multi-jumpship operation. This section prescribes the interagency considerations and tactics applicable only among smokejumping aircraft, and is not incorporated in other guides. Therefore, do not assume Aerial Supervisors are proficient assessing or directing these tactics.

Aircrew should provide suggestions to the ATGS / ASM to assist them in sequencing multi-jumpship operations with other assets.

The plethora of scenarios for both initial, and extended attack incidents is too great to prescribe nuanced tactics. Therefore, reliance on basic deconfliction concepts below, and inter-aircraft CRM is the overarching multi-jumpship game plan.

2.13.1 Role Definitions:

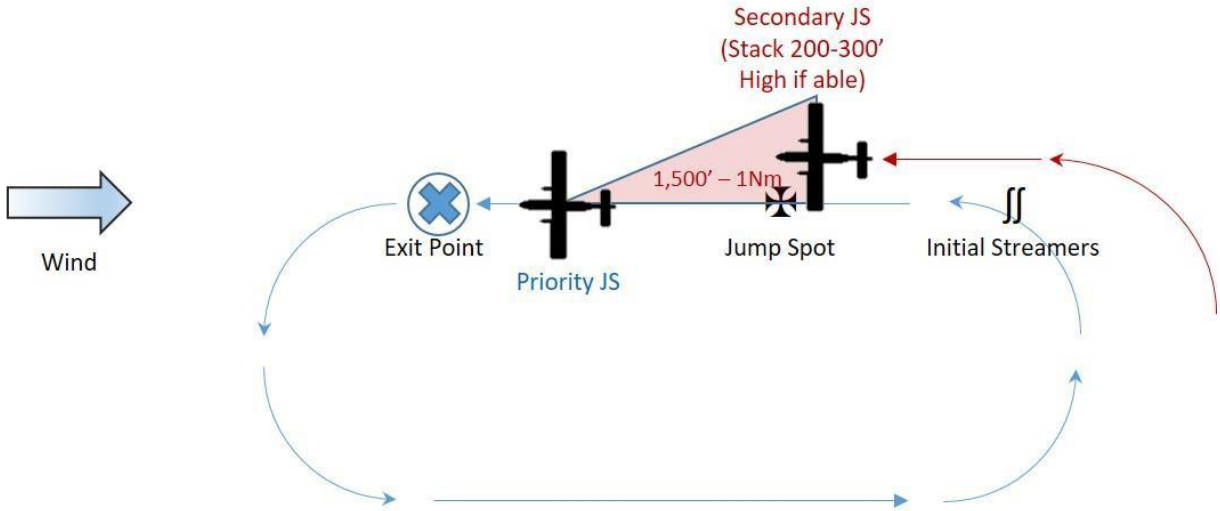
- **Priority Jumpship (JS)** – the aircraft with maneuvering priority as well as final decision authority to mix various phases of jump operations.
- **Secondary JS** – the aircraft responsible for maintaining continuous visual deconfliction with the Priority Jumpship.
- **Tertiary JS** – highly unlikely, but the aircraft will hold beyond 7NM When two jumpships are involved on the same incident, roles (Priority or Secondary) will be positively identified and established. Generally, role establishment is based on which aircraft was first over the fire. In the event two aircraft have essentially the same ETA, the aircraft with less loiter time available should be labeled the Priority JS. The aircrew of both jumpships will discuss and confirm their role over the radio. Approaching the fire, the Secondary JS will confirm they have the Priority JS in sight.

Based on the dynamic variables of each incident, either aircraft can suggest a multi-ship option that maximizes safety and efficiency. The aircrew on both aircraft must be in agreement to execute multi-ship operations; and the Priority JS will have final decision authority when more than one option is feasible. When there is doubt of the tactical efficacy of both aircraft being in the jump pattern vicinity, the Secondary JS should hold out >7NM or coordinate with Aerial Supervision

NOTE: Tandem jump operations where Priority and Secondary JS are both dropping jumpers with minimal timing (less than 20 seconds) is NOT authorized. Tandem jump operations are suitable for round parachutes, but not Ram-Air parachutes.

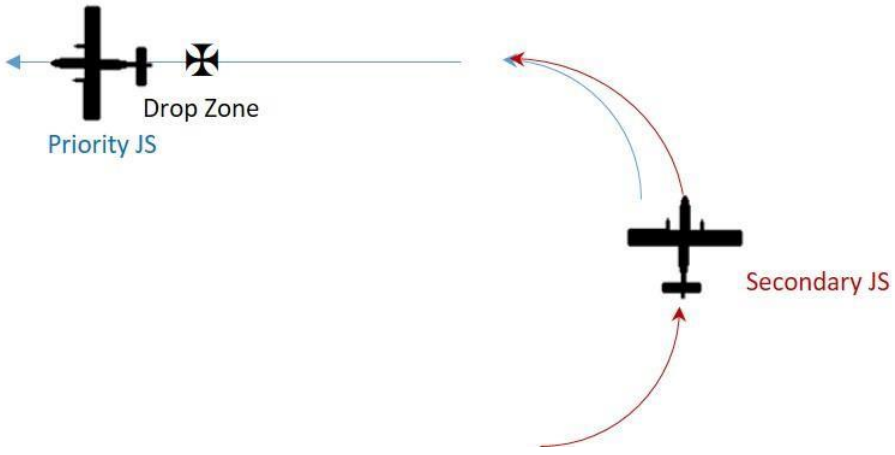
Observation position (Figure 2-7): when operating in concert, the Secondary JS should pick up an 'observation position' approximately 1,500' – 1NM behind, and slightly right, of the Priority JS to adequately allow continual visual monitoring. If ATGS assigned altitudes permit, the Secondary JS should fly 200-300' above the Priority, but never below. Maintaining position outside the Primary JS will probably require flying 10+ KIAS faster through the turns. The Secondary JS should continually assess wake turbulence cones, and never be in a position to cause concern for jumpers exiting the Priority JS.

Figure 2-7: Observation Position



Trail position (Figure 2-8): this position is only utilized for combined paracargo operations on the same cargo spot (see drop zone). Its parameters are similar to the observation position with the exception that spacing will be looser at 3,000' – 2NM. In no case should the Secondary JS be forward of the Priority JS. The Secondary JS remains responsible for visual deconfliction, and if there is any doubt (e.g. due to possible wake turbulence, challenging terrain, etc.), combined paracargo will not be conducted. The Priority and Secondary JS are both responsible to confirm that the cargo spot is clear before dropping live cargo.

Figure 2-8: Trail Position



2.13.2 Loss of Visual Contact: Once roles have been established, the Secondary JS is required to continually maintain the 'visual'. In the event the Secondary JS loses visual contact, the pilot should immediately call out "**J*xx*, lost sight of J*yy*, and is at_feet**" (altitude). The Priority JS will check altitude and work to stay >500' vertically separated while informing the Secondary JS of their position in the pattern. The Secondary JS may resume normal operations once the visual is reacquired and conveyed to the Priority JS.

2.13.3 Emergencies: Routinely smokejumping aircraft operate in demanding conditions such as high-density altitudes, tight canyons, low-level, and STOL Take-Off and Landings. In these areas of flight, aircraft are operating at near maximum performance, and there is little margin for error in the event of an emergency. Pilots and spotters must have an emergency plan of action. Aircraft procedures can vary. Therefore, when working with new crew members, brief planned actions in the event an emergency should arise.

The *Interagency Smokejumper Operations Guide* categorizes emergencies into two categories:

A. Non-critical Emergency Exit. The pilot shall inform the spotter concerning the nature of the emergency and course of action. If an emergency exit is necessary, the spotter shall be responsible for maintaining control over the jumpers and for ensuring that the emergency exit is orderly and timely. Emergency exit procedures in a noncritical emergency usually are the same as those for a operational jump. In some cases, the spotter may even select a jump spot.

B. Critical Emergency Exit. The spotter must maintain control of the jumpers in a critical emergency to ensure that exits proceed as smoothly and quickly as possible.

For either type of agency reserve, 500 feet AGL is the absolutely lowest altitude at which a jumper may reasonably expect a successful reserve deployment, and sufficient deceleration prior to impact.

2.14 Training, Proficiency, and Demonstration Jumps

Practice jumps for proficiency are common. It is required to coordinate with jumper liaisons, operations, or dispatch to ensure Parachute Jumping Exercise NOTAMs are filed with the local Flight Service Station. Ultimately jump pilots are responsible for safety under FAR part 91 and 105. While smokejumping is uniquely a government endeavor with little specific FAA oversight, Advisory Circular 105-2E can be referenced for transferable guidance.

Table 2-1: AC 105-2E Practice Jump Notification Chart

Practice / Demonstration Jump Airspace NOTAM Flow Chart				
Location of Jump	**Kind of Authorization Required**	**When to Apply or Notify**	**Where to Apply and Notify**	**FAR 105 Section Reference**
Over or into a congested area or **open-air assembly of persons**	FAA Form 7711-1	10 business days before the jump	FSDO having jurisdiction over the area where jump is to be made	§105.21
Over or onto any airport	Prior approval (verbal can be used)	Prior to jump	Airport Management	§105.23
In or into Class A, B, C, or D airspace	ATC authorization (verbal can be used)	Prior to jump	ATC facility having jurisdiction	§105.25
In or into Class E or G airspace	ATC notification	Between 24 hour and 1 hour prior to jump	ATC facility having jurisdiction	§105.25
Over or within restricted or prohibited areas.	Prior authorization (verbal can be used)	Prior to jump	Controlling agency as noted on sectional chart.	§105.25
This chart is from AC 105-2E				

3.0 – PARACARGO

3.1 General

The importance of carefully and accurately analyzing terrain, obstructions, and wind effect before committing to a low-altitude cargo pass cannot be over-emphasized. This 'terrain size-up' should commence immediately upon arrival over the fire. Each fire is different, and there are few occasions where conditions will be ideal.

Low level operations are intentional mission phases conducted less than 500 feet from the surface (not including takeoff, landing, or en route to an incident); and are regulated by 14 CFR Part 91.

3.2 Deviations and Waivers/Exemptions

3.2.1 Deviations: Life-threatening emergencies may require deviation from Federal Aviation Regulations, Departmental Manual, and Forest Service policy. For in-flight emergencies, the pilot shall take appropriate action to ensure safety of flight. Deviations shall be reported as soon as possible to the appropriate authority and documented on a SAFECOM.

3.2.2 Waivers/Exemptions: The Department of Interior and USFS (FSM 5700) have low-level waivers ('Grant of Exemption') from the FAA. The waivers are specific in nature and should be reviewed during initial training, and annually thereafter. There is no Service-wide waiver or exemption. Current waivers and exemptions may be found in each agency's directives.

3.3 Low Level Operation Requirements

3.3.1 Pilot Qualifications and Experience: To operate low level, agency-employed pilots shall meet the special mission training requirements outlined in 351 DM 3.1D or FSM 5700/FSH 5709.16. Vendor PIC qualifications are listed in contract specifications.

3.3.2 Personal Protective Equipment: All personnel on board aircraft participating in low level operations shall wear PPE in accordance with the Aviation Life Support Equipment Handbook as stated in agency policy or contractual language.

3.3.3. Drop Planning: A low-altitude cargo pass should never be made into rising terrain.. Pilots shall plan down-hill patterns so that the ground level falls away after cargo is 'kicked'. In steep-wall topography, consider a down-ridge (parallel) pattern to prevent short / long cargo 'kicks' from floating into canyon bottoms.

Cargo drops are often required in the bottom of steep and winding canyons where a turn into the wrong drainage could result in a dead end. Always leave a way to turn out in case of down drafts, turbulence, engine failure, or the rare case of cargo in tow.

Cargo run finals should not be flown towards engines, vehicles, houses, crews, etc. A parachute malfunction or a late kick could have tragic results. If ground resources are seen approaching the cargo spot, aircrew should confirm that they are clear prior to dropping cargo. Consideration should be given to impact points on bundles being cut away.

Specially rigged parachutes, turbulence, restricted visibility, timberlines or other terrain features and other considerations may dictate changes to standard patterns and altitudes.

3.3.4 Procedures: Normally, paracargo operations will not commence until the status of all jumpers is known, and the JIC confirms that they are ready to receive cargo.

After the last jumper has exited, the spotter readies the cargo for dropping. The standard cargo spot is the jump spot. Tactical considerations may dictate utilizing a different cargo spot. The aircrew and JIC must all reach consensus on the desired and most practical place to drop paracargo. The pilot shall carefully analyze the terrain and conditions in relation to the desired impact area, and may make a dry run in all but the easiest drop areas. The spotter will normally inform the pilot of cargo type and number of bundles to be dropped. If heavier than standard paracargo is being dropped, it's good practice to specify the size of the canopy. Airspeed is at the discretion of the pilot, but cannot exceed the limitations of the parachute.

To assist the spotter's cargo-prep timing & spatial awareness, pilots should use standard pattern callouts (i.e. "**downwind"**, "**turning base"**, and "**on final**") over intercom. Pilots employ a cadence ("**short final…standby…kick**") to establish a release rhythm for the spotter. Normal cadence is 2-3 seconds prior to arriving at the release point cargo spot. The pilot should make the pattern size commensurate with spotter's ability to access and ready the cargo. The spotter will call out "cargo away" once the cargo has cleared the aircraft.

Pilots must continually strive for cargo accuracy. Terrain can be very difficult for jumpers to walk in; and major exertion is required to pack a 90+ lb. cargo bundle. Consider that at 90-100 KIAS the aircraft travels ~ 50 yards per second. One second too soon or too late can easily put cargo in the trees.

Cargo drops are usually made between 200-250 feet AGL. Cargo will not be dropped lower than 150 feet AGL. Radar altimeters do not account for tree height. Chutes need time to fully open and to decelerate. At the discretion of the pilot, the cargo may be dropped at a higher altitude. The spotter may also request that the pass be made at a higher altitude in order to give the parachute more time to deploy. At higher altitudes cargo may drift significantly making precise placement challenging.

The pilot shall devote full attention to flying the aircraft in order to clear obstructions and shall not attempt to see where the cargo landed until at a safe altitude on crosswind, downwind or final portion of the pattern.

3.4 Free-Falling Cargo

Free-falling cargo may include sleeping bags, various hand tools, and most often climbers. If the cargo is hung in the trees, climbing spurs are dropped by free fall. Free-fall items are sometimes attached to small stabilizing parachutes that slightly affect the trajectory.

The technique is basically the same as paracargo deployment, except dissimilar trajectory must be factored along with considerable post-impact ground travel.

Free-falling cargo is extremely hazardous to ground personnel. In particular, climbing spurs may possibly ricochet in heavy timber. It is incumbent upon the pilot to get drop clearance from ground personnel in advance; and suspend operations if anything looks unsafe. If the cargo does not have a small stabilizing parachute, it is good technique to drop from a slightly higher altitude to dissipate horizontal trajectory.

3.5 Cargo-in-Tow EMERGENCY

A malfunction in static line deployment could generate a cargo-in-tow scenario. This is considered an emergency situation that could interfere with flight controls, and/or cause aircraft structural damage. Unless prebriefed otherwise, the standard immediate response prescribed in the ISMOG (Section 6) is for the spotter to cut it away. It is essential that prior to commencing paracargo, pilots visually clear the area beyond the cargo spot to ensure no hazards exist. If a spotter does not respond with "cargo away" the pilot will need to confirm that the cargo has been deployed. Although it is a rare circumstance, the spotter's lack of immediate response may be because they are perfoming a cargo in tow emergency procedure. The aircraft should be flown in a manner as to minimize turns and G forces on the spotter while the emergency situation is being handled.

4.0 – RECONNAISSANCE AND DETECTION

4.1 Reconnaissance or Detection

Reconnaissance or detection flights may be ordered on the basis of thunderstorm and lightning activity. It is not uncommon to execute reconnaissance flights 'Initial Attack (IA) Ready' with jumpers onboard.

Knowledge of mountain flying techniques, convective & mechanical wind hazards, and weather radar interpretation are required. Familiarity with the assigned area (i.e. sectional study, hazard map analysis, consulting with local resources, etc.) is critical.

The pilot and observer(s) should collaborate on optimum routing and altitudes to efficiently observe the assigned area of interest. Select an appropriate course offset and/or altitude that allows the observer(s) the best possible field of view. Anticipate observers' needs and maneuver the airplane rather than forcing observers to constantly shift position. Observers should be encouraged to direct the pilot on desired flight path and altitudes to meet their objectives. Strive to find smooth air, and maneuver predictably to maximize effective scan and minimize stress. Make early decisions to use alternate routes to avoid weather cells and moderate or greater turbulence.

Flight altitude is determined by: minimum safe altitude, haze layers, width of observation strip, topography, cloud & hill shadow, sun angle & direction, and turbulence. Under most circumstances, reconnaissance is optimized at an intermediate altitude (1500-5000 feet AGL).

Flights **shall not be** conducted at less than 500 feet above the vegetation. Unless dispatched to a specific incident, comply with all regulatory and NOTAM minimum altitudes such as overflight of congested areas and published TFR's. A good technique to obtain optimum visual coverage is to select an altitude that clears all terrain over the flight path with minimum maneuvering. Above 3000 feet AGL, standard VFR hemispheric cruise altitudes should be used. Both high and low cruise speeds have advantages depending on conditions and observation objectives.

5.0 – COMMUNICATIONS, FIRE TRAFFIC AREA, RESOURCE TRACKING AND FLIGHT FOLLOWING

5.1 Communications

Smokejumper Aircraft (agency & contract) require audio control panels be installed and operational at the pilot, copilot, and spotter positions. This enables spotter(s) to communicate directly with ground personnel, or other aircraft as necessary. The required FM radio is a dispatch, ground, and aircraft communications link for all fire activity. With the exception of California, VHF transceivers are normally used for air-to-air communications. It is essential that pilots are proficient in the operation of audio control panels, and all radios. No aircraft (agency, contract, cooperator, news media, or military) will be allowed to operate (or continue to operate) over any fire without an operational radio capable of maintaining clear communication on assigned frequencies.

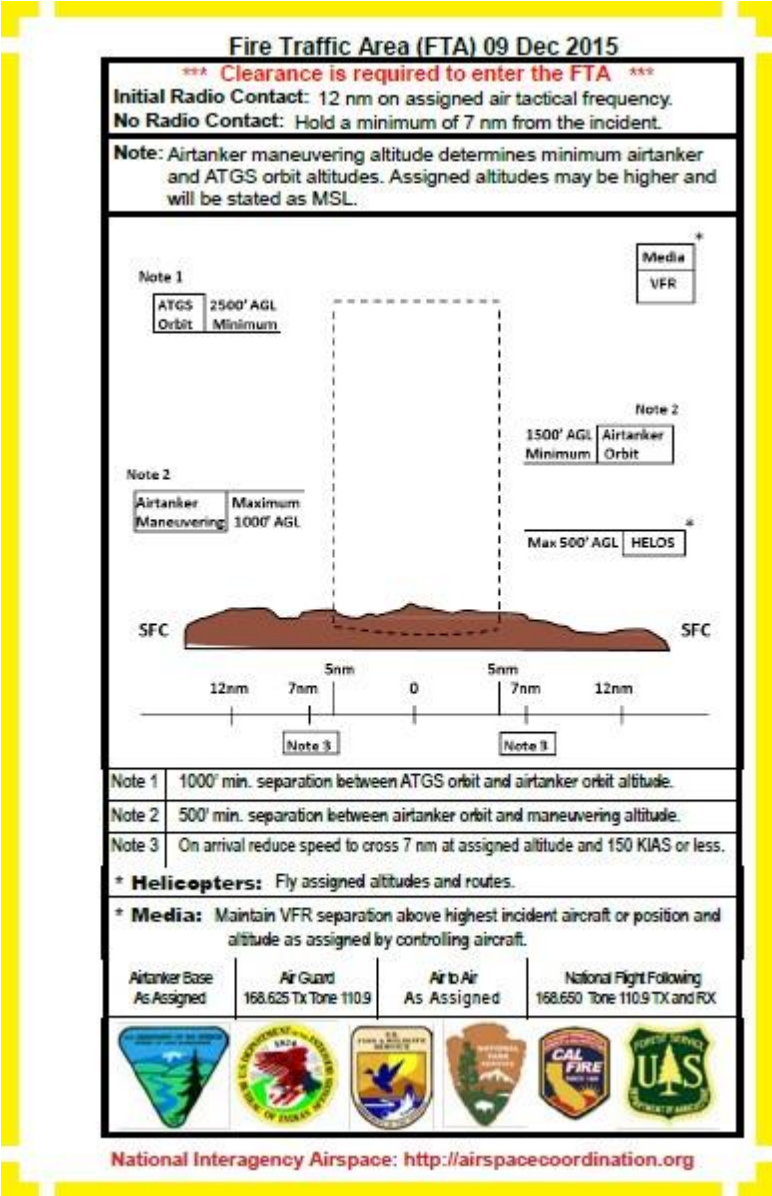
Pilot-in-Command (PIC) legal responsibilities must be balanced with spotter mission coordinator responsibility. This makes aircrew communication protocols & expectations an important pre-brief item. Normally, pilots handle all communication & position reports associated with FAA facilities; while the spotter handles communications with dispatch (position reports), and ground contacts. Ultimately however, pilots are directly responsible for ensuring all flight following requirements are met. En route, pilots will communicate with non-participating aircraft. The spotter typically handles agency flight following either by confirming they are positive on AFF or with 15 minute position checks. Clear, concise communications within the FTA is paramount to safety. Either the pilot or spotter may handle interactions with other fire-assigned aircraft. Therefore, a mutual understanding of which aircrew member is responsible for air-to-air communications is essential prior to operating in an FTA. Some dynamic factors to consider when assigning air-to-air communication responsibilities include: presence (or not) of an ATGS, pilot FTA experience, spotter FTA experience, spotter qualification as ATGS, tactics, crew member task saturation levels, holding aircraft out vs actively engaged, and synchronized operations (e.g. paracargo with helo drops). It is permissible to swap air-to-air radio responsibilities based on phase of mission, but aircrew must positively acknowledge the change. Ultimately if any aircrew member is concerned or uncomfortable with the status of air-to-air communications (and subsequent deconfliction), it is the obligation of the pilot to safely exit the FTA until the situation resolves.

An intercom system allows the pilot and spotter to communicate while in flight, and monitor other frequencies at the same time. Prior to entering the FTA, pilots and spotters shall brief radios they are monitoring. As mission phases and/or needs evolve, advise fellow crewmembers of changes to ensure all mission frequencies are continually being monitored.

5.2 Fire Traffic Area

Aviation activity over a fire can quickly become congested thereby necessitating proper traffic and communication management. The Fire Traffic Area (FTA) is an interagency airspace procedural control measure that is always assumed in effect over a fire regardless of the number of aircraft. The FTA is not formally recognized by the FAA, but is closely modeled after Class D airspace.

Figure 5-1: Fire Traffic Area



Dispatch should provide incident air and / or ground contact frequencies to the aircrew. Per FTA measures shown above, aircraft must receive permission to enter an FTA, or hold out over a specified location. Always assume other aircraft are present in the FTA.. While initial contact should be made no later than 12 miles from the fire, it is good operating practice to monitor the assigned frequency and activity as far out as possible. A 12-mile call should be made in the blind to ensure no other resources are on the fire. Utilize all available information to assess if your aircraft is first on scene: resource order/dispatch form indicates a new incident, no other radio traffic is present on assigned frequency, TCAS shows clear at the approximate fire location, and see and avoid techniques. If no communications are received and all indications are your aircraft is first on scene, proceed inside the FTA exercising vigilance. If other aircraft are noted present over the fire but the pilot or spotter is unable to establish positive clearance into the FTA, hold 7 miles out from the incident while establishing radio contact.

If unable to establish contact with the air attack, leadplane, or other aircraft over the incident, attempt contact on alternate frequencies or reconfirm the correct frequency with the applicable dispatch office. As a last resort, air guard may be used to make initial contact and confirm working frequencies. The bottom line: **No aircraft is to enter a fire traffic area without establishing radio contact with other aircraft working on the same fire.**

On larger incidents with multiple airborne resources, Aerial Supervision (in synch with Operations Branch) will drive priorities and tactics. Drop priority is usually given to air tankers if they arrive over the fire at the same time as other aircraft. Smokejumper aircraft may be stacked on top of tankers. If the smokejumper aircraft is in the process of dropping jumpers, it will normally be allowed to continue until all personnel are safely on the ground. At that time, a pause may be prudent to confirm follow-on priorities with Aerial Supervision. Based on the operational dynamic, the jumpship may be asked to pull out of the area to allow retardant aircraft to drop, and then subsequently return to deliver the cargo.

Ensure Aerial Supervision is aware of limiting fuel factors if applicable. If a jumper is injured in the drop, the jumper aircraft has priority over other aircraft to provide emergency assistance (drop medical supplies, become radio relay, or drop additional EMT qualified jumpers if still onboard). The emergency needs to be announced to clear the proper frequencies for uninterrupted communication. Personnel on the fire (air and ground) shall be notified of the seriousness of the emergency: life or non-life threatening.

5.3 FTA without Aerial Supervision

As initial attack aircraft, smokejumper aircraft may be the first ones on scene. The most critical situation is during the initial attack phase of an emerging fire when several aircraft arrive over the scene at almost the same time.

In many situations, combinations of air activities can be accomplished safely on the same fire. Examples include: air tankers and helicopters are needed on opposite sides of the fire, traffic patterns can be flown well clear of the other activity, and good communication is maintained between all aircraft.

While it is ultimately the pilot's responsibility to "see and avoid" traffic, the order of authority for air traffic coordination, mission priorities, and aircraft tactical priorities is as follows:

1. ATGS
2. ASM
3. Leadplane
4. Spotter

If #1, #2 or #3 above are not present, the spotter shall develop a plan on how to manage the airspace. The spotter will discuss the plan with the aircrew. The plan will include traffic separation and mission priorities with on-scene aircraft over the fire. If any aircrew members have concerns, or suggestions on how to modify the plan they should be addressed during this discussion. The spotter will be responsible for managing the FTA until a higher qualified aerial supervisor arrives. Tasks associated with managing the FTA can be delegated to other aircrew members, but the responsibility will reside with the spotter. Pilots and spotters must have a clear understanding of each other's capabilities and priorities. Good CRM is crucial to conducting safe and efficient operations within the FTA. If any individual within the aircrew is not comfortable with a situation they have the full authority and the responsibility to exit the FTA to a safe area and if the risks cannot be mitigated to everyone's satisfaction, the mission should be terminated.

Red Book, Page 336: Incidents with three or more aircraft over/assigned to them should also have aerial supervision in the form of ATGS or ASM/Leadplane. A qualified smokejumper spotter (senior smokejumper in charge of smokejumper missions) may coordinate smokejumper operations with on-scene aircraft over a fire until a qualified ATGS arrives.

5.4 Resource Tracking and Flight Following

Flight following is an important resource accountability mandate. It is the responsibility of the PIC to ensure proper flight following; whether it is: FAA, ICAO, or an agency/bureau-approved flight following method. Agency flight following duties are commonly performed by the spotter. Local agency dispatch centers are the most common form of flight following during smokejumper missions. The use of Automated Flight Following (AFF) is the preferred method of interagency flight following. In the event AFF is unusable, the flight crew can revert to radio position reports to dispatch every 15 minutes. When local dispatch centers are closed or not staffed, the pilot must revert to an FAA Flight Plan / flight following methods.

6.0 – MOUNTAIN FLYING

6.1 Introduction

Flying missions in mountainous terrain requires special knowledge, experience and techniques to reduce the inherent operational risk. Rugged terrain, lack of suitable emergency landing areas, and adverse weather conditions add to the hazards.

6.2 Density Altitude

Aircraft operations at higher than standard temperatures well above sea level are commonplace in the Western United States. Such operations result in drastic reduction of airplane performance due to high density altitudes.

Density altitude is a measure of air density. It is not to be confused with pressure altitude, true altitude, or absolute altitude. It is not to be used as a height reference, but as determining criteria for the performance capability of an aircraft. Air density decreases with increase in altitude. As air density decreases, density altitude increases. The further effects of high temperature and high humidity are cumulative, resulting in an increasingly high density altitude condition. High density altitude reduces all aircraft performance characteristics. This means that normal horsepower output is reduced, propeller efficiency is reduced, and a higher true airspeed is required to sustain the airplane throughout its operating range. It means an increase in runway length requirements for takeoff and landing, and a decreased rate of climb.

Density altitude can be easily computed on most flight computers. Density altitude is pressure altitude corrected for nonstandard temperature. After computing density altitude, consult the manufacturer's performance data for your particular aircraft and do not operate outside the performance parameters.

6.3 Mountain Winds

Mountainous terrain interferes with the steady flow of air, which causes it to lift and sink in somewhat logical patterns. The shape of the terrain in relation to the wind, heating of sun-exposed slopes, and steeply sloping ridges with jagged cuts (i.e. mountain passes), all cause predictable shifts in wind direction and speed. Moving air masses surge up and over terrain causing updraft on the upwind side of a ridge and sometimes extreme downdraft on the lee side as the air mass follows the terrain similar to the way water flows in a riverbed. Terrain influence may cause the air to rise and descend, taking on the aspect of a wave action for as far as 100 miles on the lee side of a mountain range.

Any abrupt change in angle between the terrain and wind flow can be expected to generate moderate to severe turbulence and wind shear thereby potentially jeopardizing aircraft structural integrity. Generally, the strongest wind flow will be found at higher altitudes. The heating of slopes causes thermal convection, with resultant lift followed by downdraft as the thermal cools and disperses. Mountain passes create a venturi effect as the air is forced through small areas and accelerated.

Pilots should proceed with caution when ridge level winds in excess of 20 knots are known or forecast. When they are 30 knots or more, consider staying on the ground or altering route of flight. A mountain ridge line should be crossed at an angle to allow the pilot to turn away from the ridge with the least amount of turn required should down-drafts be encountered. Winds aloft in the mountain-west are predominantly westerly; however, surface winds may tend to flow up canyon from about noon until late

in the evening, due to the unequal heating of the sunny slopes and shaded canyons. Early morning and late evening flights will generally be less turbulent and can be made closer to the ridge line than during the heat of the day. During reconnaissance flights in the heat of the day, special care should be taken near ridge tops and extra altitude should be used as needed. (See section on reconnaissance). Always know where you are, where the nearest airstrip is, and how to reach the nearest terrain suitable for emergency landing.

Anticipate constantly changing winds. Do not rely exclusively on smoke drift or cloud shadows for surface wind direction. Never rely on riding an updraft to obtain sufficient altitude to clear the terrain. It could unexpectedly turn into a downdraft.

6.4 General Operating Procedures

When operating at altitudes below the ridgetops, flying down drainage is generally the best practice. When required to fly up drainage, ALWAYS rate the topography ahead and maintain proper position and sufficient altitude to turn around. The grade of the canyon may climb faster than your aircraft is capable. Keep to one side to observe potential emergency landing sites in the canyon bottom, safely complete a 180° turn for an emergency exit, and take advantage of rising air on the upwind side of the canyon.

Use caution when operating in the vicinity of weather. Do not be lulled into complacency by a weather report giving the ceiling at 1,500 to 2,000 feet. Mountains 2,000 to 5,000 higher may surround the reporting station. Insist on visibility as well as ceiling when flying in mountainous areas. Snow and rain can quickly reduce forward visibility to zero. Darkness often blends in perfectly with the color of the mountain, which may appear to be just another dark section of the sky.

Never go into any type of cloud while flying at low altitude in the mountains. Avoid unplanned IMC at all costs by seeking out PIREPS on Multicom (122.9), always having an exit plan, setting decision points ahead of the aircraft, and lastly utilizing GPS and TAWS. Long before encountering IMC in the mountains the pilot should brief the crew (if applicable) on what the Sectional Maximum Elevation Figure (MEF). When weather permits, make an early decision to ‘circle-up’ above the MEF while still in VMC conditions. If ceilings do not allow for a controlled VMC climb, abort the route by turning around well before IMC is encountered.

Key Factors to Consider:

- **Proper flight following is especially critical when operating in the mountains**. If you go down it may be a long time before help arrives due to the remote nature of wilderness.
- **Be familiar with the destination airport.** In advance of the flight, review available charts for altitude, length of runway, and obstructions.
- **Remember that spotting landmarks may be difficult**; a mountain shown as 8,000 to 9,000 feet on the charts may appear as a small knoll if the peak rises out of surrounding terrain having an elevation of 5,000 or 6,000 feet.
- **Always be on the lookout for wires and cables across canyons.**
- **Don’t operate into or out of high mountain areas with a tight schedule.** Give yourself plenty of time; weather must take precedence over any schedule.
- **Fly equipped with an emergency survival kit.** In the event of a forced landing, the general rule is to stay with the airplane.

7.0 – TRAINING AND EVALUATION

7.1 General

This chapter outlines basic training requirements for the training of smokejumper pilots, and is provided as a resource for development of a structured and standardized training program of ground and flight instruction for both agency and contract smokejumper pilot candidates. Any locally generated syllabus must meet the intent of this chapter but can add additional training to meet the local needs.

7.1.1 Applicable Texts:

- Interagency Smokejumper Pilots Operations Guide
- Departmental Manual (BLM)
- FSM 5700 (USFS)
- Aircraft specific Flight Manual
- National Smokejumper Training Manual (Spotter Training) (USFS or BLM)

7.1.2 Videos:

- Professional Smokejumper Pilot Video
- Smokejumper Spotter Video

7.1.3 Goals:

1. To become an integral part of a crew that safely delivers smokejumpers by either the BLM or USFS parachute delivery systems, and subsequently delivers paracargo at low levels in support of that or other missions.
2. Safely plan and execute smokejumper missions.
3. Safely plan and execute paracargo missions.
4. Standardize smokejumper pilot training and operations.

7.1.4 Requirements:

- Annual Equipment Ground School
- Annual Equipment Check Ride
- 6 Month IFR Proficiency Check Ride
- Initial Operating Experience (25 hours IOE for aircraft requiring a type rating)
- 25 Hours in Make and Model (Hours may be accomplished during equipment and smokejumper pilot training)

7.1.5 Evaluation:

- Designated Inspector (DOI) or Check Airman (USFS)

7.2 Phase Training:

Each phase of the training syllabus may encompass multiple ground and flight sessions.

The program calls for a smokejumper instructor pilot (IP) and a spotter to work as a 'training team' for a pilot candidate. Optimally, the same training team should work with the candidate throughout the course of instruction.

The spotter determines spot location, patterns, and altitudes relevant to the parachutes / paracargo being dropped. The IP monitors power, configuration, attitude, airspeed, altitude, safety, and cargo patterns. The IP may provide the spotter with change inputs in order to drive learning objectives in accordance with student progression.

Each ground instruction session will be conducted by the training team, and will include an in depth brief of the upcoming flight. The objectives for each lesson will be clearly defined for the candidate. Specific skills being developed will be framed as: task – conditions – passing standards.

7.3 Phase 1 Ground - Introduction to Basic Smokejumper Operations

1. Phase 1 Indoctrination:
    a. Professional Smokejumper Pilot video
    b. Professional Smokejumper Spotter video
2. Smokejumper mission
    a. Initial attack, varied duties
    b. Additional jobs - resupply, heavy cargo, back country retrieval
    c. High training standards for jumpers and pilots
    d. Safety standards and concerns regarding the mission
    e. Reconnaissance
3. Smokejumper equipment
    a. Tour of the loft
    b. Basic smokejumper equipment
        i. Jump gear and parachute—rounds and squares
        ii. Fire packs
        iii. Cubies
        iv. Saws
        v. Spurs
        vi. Radios
        vii. Cargo delivery system
            (1) High and low impact
            (2) Different size chutes
4. Spotting
    a. What is a spotter - expertise required
    b. Spotter responsibilities—picking the spot, etc.
    c. Pilot/spotter relationship
5. Operational Procedures

a. Jump ship patterns (standard and downwind, crosswind, turns and banks)
    i. Corrections (standard/non-standard)
    ii. Pattern call-outs
b. Streamer patterns
    i. Determining jump spot, pattern direction
    ii. Initial, standard, crosswind, downwind
    iii. Altitude/airspeed
    iv. Streamers away
    v. Streamer visibility - spotter and pilot
    vi. Selecting exit point
    vii. Streamer check set—why
    viii. Check set final (i.e., streamers to spot)
    ix. Common errors
c. Jumper drop pattern
    i. Altitude/airspeed/flap settings/power application
    ii. When and how to abort
    iii. Pilot to spotter communication of conditions
    iv. Jumpers away
    v. Climb to 3000 feet AGL for ram airs
d. Cargo
    i. Cargo spot selection
    ii. Altitude/airspeed
    iii. Dry run
    iv. Calls
    v. Lead/drift
    vi. Commands - “on final, standby, kick “
    vii. Aborting cargo run - why, call-outs
    viii. Accuracy - communication with ground and kicker
    ix. Accuracy is always sacrificed for safety
e. Emergency Procedures

7.4 Phase 1 Flight - Basic Smokejumper Mission Flight Procedures

Objective: To introduce and develop skills necessary to basic mission maneuvers and operational procedures. The student is left seat, IP in the right seat, and spotter in the door. The initial lesson is conducted over flat, open terrain with easily identified spots. The candidate should be able to fly streamer observation and jump patterns from any direction without having to concentrate on terrain avoidance. Emphasis items: understand the purpose of each maneuver, requirements for the spotter to do his job,

clear / concise communication, effective operational coordination with the spotter, smooth coordinated maneuvering, altitude, airspeed, and heading control.

1. Spotter calls for straight flight along a road, power line, etc, with left and right corrections which should result in standard 5 degrees of turn. Turns will be smooth and coordinated, no rudder turns. Watch for a tendency to drift back to the original line after a correction is made. Don't let the candidate rely exclusively on the DG or heading bug to hold their line. Have them make use of ground reference points and a point on the horizon.
2. Streamer patterns
    a. Proper positioning on observation pattern
        i. Keeping spotter in position to observe streamers
        ii. Pilot observation of streamers to the ground (where to look)
        iii. Streamers to spot

    Bank angle should not exceed 30°. Monitor airspeed and altitude control. Good communication with the spotter is important. Streamer-to-spot-to-exit point line should employ ground reference points to hold the line, the exit point could also be a timed count and not a landmark. Emphasize pilot awareness of exit point.
3. Jump patterns
    a. Consistent line on final
    b. Proper size pattern
    c. Proper altitude and airspeed

The candidate should be using ground and horizon reference points to turn on line and maintain it along with the directional gyro. Altitude and airspeed control is crucial along with power management at jumper exit. Turn off final should not be made until "jumpers away" call.

4. Cargo dropping
    a. Cargo spot selection
        i. Communication with spotter regarding the cargo spot - may need to be different from jump spot. Type of cargo and chute size.
        ii. Good entry and exit routes
        iii. Down canyon and down sun
        iv. Lead in points
        v. Dry run
        vi. Commands
        vii. Lead/drift for accuracy
        viii. Aborting a live run
        ix. Safety
        x. Aircraft configuration: Flaps and Power settings, airspeed control, clean up during exit
        xi. Cargo in tow

7.5 Phase 2 Ground - Advanced Smokejumper Operations

1. Observation pass
    a. Low pass or high/low pass at spotter's option
        i. No pass lower than 200 feet AGL
    b. Why the spotter would request a low pass
2. Jump spot selection
    a. Hazards and terrain considerations in selecting a spot and a jump pattern
    b. Alternate spots
3. Jump altitude
    a. Minimum altitude and why—rounds vs. squares ("on final 3000 or 1500')
    b. Jump altitude is over the exit point not the jump spot
    c. Determining altitude
        i. Timing streamers
        ii. Radar altimeter
        iii. Low pass
4. Determining wind drift/velocity
    a. Accurate release of streamers over jump spot - why?
    b. Selecting exit point
    c. Terrain factors
        i. Needs to see streamers all the way to the ground to determine wind line
        ii. Understand the spotter's counting method to exit point (effected by wind speed and the need to determine the exit point), and the importance of maintaining the airspeed on the jump run. The Wind cone concept and parachute performance parameters - spotter.
5. Jump patterns
    a. Non-standard patterns
        i. Downwind pattern terrain and ground speed considerations
        ii. Crosswind pattern - same
        iii. Right hand patterns
        iv. Spotter guiding pilot onto proper pattern
    b. Changing line on final
        i. Offsetting the line left or right to parallel original line
    c. Pivoting the line left or right with the jump spot as pivot point (clock method).
    d. Emergencies
        i. Critical (Mass exit, Jumper in tow—spotter/pilot comm.)
        ii. Non-critical
6. Cargo dropping

a. Cargo spot selection - terrain factors
    i. Ridge top
    ii. Side hill
    iii. Canyon bottom
b. Considerations with different bundle weights and chute size
    i. Free fall delivery
    ii. High altitude dropping
c. Variations with different kickers
    i. Pilot makes corrections not the kicker
d. Importance of smooth maneuvering
    i. Impact of steep turns and high "G", maneuvers and pull outs on cargo kickers in the back of the airplane
e. Feedback
    i. Ground Contact

7.6 Phase 2 Flight- Advanced Smokejumper Mission Flight Procedures

Objective: Develop the pilot candidate's skills to the operational level by introducing successively more difficult steep terrain for jump spots and cargo spots, non-standard patterns, and emergency procedures. Student will be able to work effectively and efficiently with the spotter in streamer observation and jump patterns. Cargo dropping will emphasize safety and planning for emergencies in the more difficult terrain. Emphasis will be on situational awareness in typical terrain and technical skills needed to fly the smokejumper mission in mountainous terrain. Smooth, coordinated maneuvering and maintaining correct airspeed, altitude and heading should be developed at this level to where the IP has little need to direct corrections.

1. Observation pass
    a. Low pass at no less than 200 feet AGL
        i. Put spotter in proper position to see jump spot
        ii. Communicate pilot observation of atmospheric conditions - wind, turbulence, up and down drafts
2. Streamer patterns
    a. Proper observation pattern
    b. Throwing check streamers for non-standard patterns; downwind and crosswind
        i. Good communication between spotter and pilot of pattern changes
3. Jump patterns
    a. Standard and non-standard
    b. Spotter changing final line
    c. Terrain factors
    d. Emergency procedures
4. Cargo dropping
    a. Recon and dry run

b. Planning entry and exit routes with emergencies in mind
c. Changing pattern for safety and accuracy
d. Smooth flying - no hard turns of "G" loading on pull out if possible
e. Emergencies procedures
f. Test standard for accuracy

Spotter will set up successively more difficult jump scenarios. Spotter will set up jump pattern and corrections, but the student pilot will recon the cargo spot (consider both the jump spot and an alternate spot), and determine an appropriate cargo pattern. Emphasize safety and good judgement in all phases; particularly selecting and flying cargo patterns.

7.7 Phase 3 Ground - Smokejumper Mission Topics

1. Pilot and spotter responsibilities
    a. Flight and jumper safety
2. Radio communications
    a. Pilot to spotter system in the aircraft
    b. VHF and FM communications - who is responsible for what
    c. Current frequency lists
3. Programing
    a. FM radio
    b. GPS
4. Flight planning
    a. Navigation - familiarity with long range navigation equipment
    b. Fuel-jumper load with required reserve
    c. Check NOTAMS, TFRs and Hazards maps
5. Standby and Dispatch
    a. Daily base operations, including pilot/spotter briefings.
    b. Dispatch procedure - check-ins
    c. Duty limits, flight time limits, mandatory days off
    d. PPE - Nomex
    e. Agency regulations, forms and paperwork
    f. Loadmaster/Flight Attendant role
6. Other missions
    a. Crew hauls
    b. Paracargo
    c. Jumper retrieval
    d. Point-to-Point cargo
    e. Reconnaissance

7. Practice jumps
8. Fire Protocol
    a. Air Attack roles
    b. Mission priority
    c. Radio communications/ dispatch and required check ins
    d. Multiple aircraft on site
    e. Lights
    f. Fire Traffic Area (FTA)

7.8 Phase 3 Flight - Prep for Checkride and Live Cargo Drops

Objective: This phase will prepare the candidate for the final checkride with an agency inspector. The spotter will simulate a real jump request. The candidate will be familiar with aircraft performance charts and be able to determine if mission can be accomplished under conditions of the simulation. IP input and corrections should be minimal at this point.

1. Observation pass, streamer passes
2. Jump run
3. Cargo run
4. Simulated emergencies (deploying jumpers after takeoff, engine loss with jumpers and on cargo runs, cargo hung up, etc.) Potential emergency situations requiring smokejumper bailout are varied and detailed procedures for every conceivable situation are not possible. General bailout procedures for non-critical situations (such as landing gear malfunction) and critical emergencies (such as engine failure due to contaminated fuel) will be discussed in classroom training. Appropriate action then gets started with the spotter in control and the pilot free of aft CG problems.

The candidate should be able to perform all operations to mission ready standards. Live cargo drops should be practiced for accuracy. Live drops can be in an area where cargo retrieval will be fairly easy.

7.9 The Checkride

This guide is the evaluation standard for smokejumper/paracargo checkrides. The proper agency form in Appendix A will be used by the check pilot. The candidate will be required to take either a written or oral exam based on this guide and calculate a smokejumper related weight and balance. Should the check airman elect to conduct in-flight simulated emergencies during special use missions, engine failures shall only be simulated by retarding a power lever or throttle. Mission oriented emergencies will be **preplanned** with the spotter.

7.10 Smokejumper Pilot Practical Test Standards (PTS)

See the *Interagency Airplane Practical Test Standards Guide* at: https://www.iat.gov/library.asp

8.0 – FLIGHT CREW QUALIFICATIONS

8.1 Smokejumper Flight Crewmember Qualifications Table

Requirement	Smokejumper Foight Crewmember Qualicications Table			
	Position	Position	Position	Position
	Second In Command (SIC)	Pilot In Command (PIC)	Instructor	Inspector/Check Airman
Annual Ground School				
Annual Equipment Check Ride				
PIC: Annual Misssion Checkride SIC: Annual Mission Checkride SIC Initial: 5 Practice jumps as SIC				
Instrument Currency				
Mission Recurrent - 1 refresher flight with paracargo				
Initial Operating Experience (IOE) 25 hours in make and model of large aircraft				
Initial (one time) Mission Check in each airframe as PIC				
Designation by the Natl FW Standardization Officer or OAS, for the BLM - Natl Aviation Office concurrence				
100 hours in make and model - instructor only				Instructor Only
Standardization Checkride and/or National Office designation				
CFI, CFII, MEI				
PIC smokejumper and cargo mission experience in a varity of terrain, fuel types and geographic areas. Experience working with other aircraft during jump operations.				
Inspector/Check Airman Biennial Standardization Workshop				
3 Years Smokejumper PIC (agency or vendor) Experience				FS Only
1 year designation as a smokejumper pilot instructor				FS Only
2 years of insturctuor qualification				FS Only

8.2 Pilot Qualifications and Carding

All agency employed and contract pilots must have a current mission checkride documented within the previous 12 months in order to conduct smokejumper/paracargo missions. BLM agency and contract pilots are issued (and must be in possession of) a current Interagency Pilot Qualification Card.

Special Circumstance: FS pilots who are qualified as Smokejumper mission PIC of large aircraft (over 12,500 lbs), AND have less than 250 hrs of PIC in large aircraft, must receive one-time DOI/OAS written approval prior to carrying BLM personnel. The PIC will maintain a personal copy of this approval until such time as he/she has greater than 250 PIC hrs in large aircraft.

8.3 Large Aircraft Commander Evaluation Board

The purpose of this board is to approve candidates for upgrade to aircraft commander in airplanes with a gross takeoff weight above 12,500 pounds or that require a type rating. This position will hereinafter be referred to as large aircraft commander. The intention is to base the upgrade to large aircraft commander on performance and experience rather than minimum flight hour criteria and FAA certification.

The board will consist of at least four members representing the USFS, BLM and AMD. Board members will be appointed by the respective agencies and will be agency captains with check airman authority and a depth of experience in both operations and management. The board may designate additional captains to serve as evaluators when requested by the board. Members are identified by letter annually or upon change of membership. Board membership will be comprised of the U.S.F.S. National Fixed Wing Standardization Pilot, the

U.S.F.S. National Smokejumper Program Manager, the BLM Flight Standards / Transport Category Pilot, the AMD Fixed Wing Specialist and a U.S.F.S. Regional representative. The board will meet annually and additional meetings may be held when deemed necessary by the board.

The OPM Operating Manual for Qualification Standards for General Schedule Positions, (p. IV-B-282) for Aircraft Operation Series states:

> "Minimum eligibility requirements for positions in the occupation are based on 1) possession of the appropriate Federal Aviation Administration (FAA) pilot certificates and/or appropriate military ratings, 2) meeting the applicable flight hour requirements, and 3) possession of the knowledge and skills required for the positions."

In order to meet the letter and intent of the three conditions outlined in the statement above, all USFS and DOI large aircraft commanders must meet the following minimum requirements.

8.4 Flight Crew Qualifications

1. A current FAA ATP pilot certificate with appropriate type rating.
2. The following flight hours:
    a. 1500 hours Total Time
    b. 1200 hours Pilot in Command
    c. 500 hours Multi-engine
        i. 250 hours multi-engine PIC experience
        ii. 100 hours heavy multi-engine PIC experience, **USFS only.**

iii. 250 hours heavy multi-engine PIC experience, **DOI only.**

d. 75 hours Instrument – actual or simulated

e. 50 hours Instrument – in flight

f. 100 hours Night

g. 100 hours Turbine Engine Experience (PIC or SIC)

h. Annual Smokejumper Pilot Checkride.

3. Possession of the required knowledge and skills as evidenced by a designation as aircraft commander from the Aircraft Commander Evaluation Board.

All agency pilots who will be flying as a large aircraft commander, whether new hire or upgrade will go through the board evaluation and designation. If the candidate's large multi-engine airplane experience is in excess of 250 hours as pilot in command, the board may elect to reduce the number of evaluation flights based on performance. If the candidate is a DOI employee, this evaluation process may also serve as the initial flight evaluation required by 351 DM 3.4.

It should be noted that this process is intended to evaluate the candidate's potential as an aircraft commander and is not concerned with a specific mission qualification. This does not apply solely to smokejumper pilot candidates.

For the purposes of this document the following definitions will apply:

1. **Pilot in Command experience** – that flight time logged as defined in FAR Part 1: Definitions and Abbreviations,
    a. Pilot in command means the person who:
    b. Has the final authority and responsibility for the operation and safety of flight;
    c. Has been designated as pilot in command before or during the flight; and
    d. Holds the appropriate category, class, and type rating, if appropriate, for the conduct of the flight.
2. **Large Aircraft** – aircraft of more than 12,500 pounds maximum certificated takeoff weight, or requires a type rating to be pilot in command.

Candidates wishing to be considered for upgrade to aircraft commander will submit a recommendation package to the board. The candidate will be type rated prior to the package being submitted. The recommendation package will consist of a written recommendation for upgrade from the candidate's supervisor, training records (including type training), and flight experience records and upgrade recommendations from line captains who have flown with the candidate.

If the candidate is already qualified as a large aircraft commander and this is an additional aircraft to be added to their designation as aircraft commander, the candidate need only submit the upgrade recommendation and the type certificate training records. In this case the board, at their discretion, may approve the additional qualification with no evaluation flights.

If the initial package review is satisfactory, the board will recommend the candidate for evaluation flights. Based on the candidates experience a plan of action will be developed by the board for each evaluation flight. This will insure that any concerns and or issues board members may have with the applicant will be addressed during the appropriate evaluation flight.

The board may elect to designate the candidate as an aircraft commander with less than three evaluation flights. It should be noted that these are ***evaluation*** flights, not ***checkrides***.

1. **Evaluation Flight 1** – This flight is intended to establish the candidate's general level of proficiency in the aircraft, CRM and ability to command the aircraft and crew. If the candidate satisfactorily completes this flight they will be recommended for Evaluation Flight 2.
2. **Evaluation Flight 2** – This evaluation may consist of multiple flights and will include actual and/or simulated IFR and Enroute scenarios, aerial firefighting missions (if appropriate) and back country flight/airport operations (if appropriate). Satisfactory completion will result in recommendation for Evaluation Flight 3.
3. **Evaluation Flight 3** – Satisfactory completion of this flight will result in USFS candidates being signed off as aircraft commander and DOI candidates being recommended for their agency qualification check ride.

If mission training has been completed prior to the evaluation flights, Evaluation Flight 2 or 3 can be a mission qualification check ride with concurrence of the board members and the successful evaluation flight was administered by a Check Airman in the specific special mission.

A different board member or board member designee may conduct each Evaluation Flight. All evaluations will be documented in detail and any deficiencies in skill or judgment will be clearly identified. Remedial training at the unit level will also be well documented.

If any Evaluation Flight is unsatisfactory, the candidate will return to their home unit for additional training. After additional training the candidate will fly that Evaluation Flight again.

8.5 Currency Requirements

1. All (active) smokejumper pilots must have an annual mission checkride to remain current.
2. Instructor and Inspector pilots must be current smokejumper captains in order to conduct mission training or evaluations. Note: DOI does not require mission evaluators to be current smokejumper captains.
3. All pilots must attend an approved CRM course every three years.

8.6 Designation of Instructors, and Inspectors / Check Airmen

Refer to:

- FSH 5709.16
- OAS Instruction 202

8.7 Inspector / Check Airman Alternate Method of Compliance (AMOC)

In the event an inspector misses a workshop, they must follow agency direction for compliance.
Recommendation for compliance:

1. Review and discuss workshop minutes, ISPOG, agency policy, the Interagency Airplane Pilot Practical Test Standards, and perform training and checkrides with a current Inspector Pilot.
2. Have completed a mission checkride within the past 12 months. Note: DOI does not require mission evaluators to be current smokejumper captains.
3. Observe an evaluation flight given by a current and qualified Inspector.

4. In addition, if regaining Inspector qualification currency, conduct one mission checkride as an Inspector under the supervision of a current Inspector Pilot.

The non-current inspector is responsible for coordinating the above steps, and will work with the USFS WO Pilot Standardization Branch Chief / OAS National Fixed-Wing Specialist as appropriate to arrange the assignment of an inspector to comply with the conditions above. Failure to satisfy the requirements above by May 31st of the year of the workshop will result in expiration of inspector qualifications until all conditions have been met.

To regain qualification after missing two consecutive biennial workshops, an inspector must attend the next workshop, and complete steps 2-4 above.

8.8 Airline Transport Pilots (ATP) Giving Flight Instruction

ATPs who do not hold a current (and appropriate) CFI certificate may not give aircraft or smokejumper operational flight instruction; nor endorse logbooks or other training records.

GLOSSARY OF TERMS

AFF - Automated Flight Following.

AGL - Above Ground Level.

AIR TACTICAL GROUP SUPERVISOR – See ATGS.

ASM - a federal designation for an Aerial Supervision Module platform with an Air Tactical Pilot (Leadplane) and Air Tactical Supervisor (ATGS) on board. This module can perform aerial supervision and low-level operations including the lead profile.

ATGS – Air Tactical Group Supervisor. This ICS position is responsible for directing and coordinating airborne aircraft operations and management of an incident's airspace and reports to the Air Operations Branch Director, or Incident Commander.

BLM - Bureau of Land Management. A Bureau of the Department of the Interior, which among other responsibilities, is responsible for suppression of wildfires.

BURNING CONDITIONS - The combined conditions of fuel moisture, temperature, wind, humidity, etc., which effects how intensely wildfires will burn on a given day. Burning conditions, along with lightning forecasts, directly affect the degree of readiness maintained by the smokejumper project, specifically standby assignments.

CANOPY - The material and lines that make up what is usually identified as a parachute. Does not include container, D-bag, and other components of a parachute system.

CARGO DROP AIRSPEED - The airspeed an aircraft must fly to safely drop cargo.

COORDINATES - Latitude and longitude locations to the nearest hundredth of a minute which is the primary method used to describe the location of fires.

CORRECTION - Left or right changes in aircraft heading accomplished with bank turns in 5 degree increments, at the direction of the spotter on final approach to the jump spot or exit point. Corrections of greater magnitude than 5 degrees are accomplished with quick banked turns when requested.

DETECTION - Activities that focus on locating new fires at the earliest possible moment.

DOI - Department of the Interior.

DRIFT - The distance streamers drift downwind from their release point.

DROGUE - A static-line deployed stabilization parachute used with ram air canopies.

DROP ZONE (DZ) - Term used in reference to cargo drop areas.

DRY RUN - Term sometimes used to mean dummy run, though usually used to refer to a smokejumper mission that did not drop jumpers on a fire.

DZ – see Drop Zone.

EXIT POINT – For round canopies a point equal distance upwind of the jump spot as the streamers landed downwind and over which the jumpers must exit the aircraft to compensate for the wind drift. For square parachutes this may be up to twice the distance upwind as determined by the spotter.

EXIT - the procedure used by smokejumpers to jump from an aircraft.

FAR – Federal Aviation Regulation

FIRE PACK - A pre-packed box containing food, shelter, and fire fighting tools for two smokejumpers pre-rigged for cargo drop.

GO AROUND - An aborted live run.

HLCO – Helicopter Coordinator.

IC – Incident Commander.

IMC – Instrument Meteorological Conditions

INITIAL ATTACK - The critical first attack on a new fire with the objective of containing it while it is small.

JUMP SPOT - The area on the ground selected by the spotter as the most desirable area for smokejumpers to land from the standpoint of safety and tactical advantage to attack the fire.

KICKER - A smokejumper assigned in charge of paracargo missions to accomplish the actual dropping of cargo bundles out the open door of the aircraft.

LEADPLANE - An airplane crewed by a qualified leadplane pilot tasked to lead airtankers in low-level drop runs.

LIVE RUN - A flight pattern on which jumpers or cargo will be dropped after streamer runs or dry runs.

LOAD - The crew of smokejumpers carried by smokejumper aircraft with a standard amount of initial attack cargo.

LOFT - The facilities used for packing and repairing the parachutes. Consists of packing table room, drying tower, and sewing machines.

LOW PASS - A low pass made alongside a fire or jump spot to help the spotter size-up the fire or select a jump spot.

MAIN - Primary parachute used for intentional jumps.

MSL - Mean Sea Level.

NOTAM – Notices to Airmen. FAA notices to pilots that may affect safety of flight.

OBSERVATION POSITION – during multi-jumpship operations, a known position flown by the Secondary Jumpship (JS) approximately 1,500’ – 1NM behind, and slightly right, of the Priority JS to

adequately allow continual visual monitoring. If ATGS assigned altitudes permit, the Secondary JS should be 200-300' above the Priority JS, but never below.

PRIORITY JUMPSHIP – during multi-jumpship operations, the aircraft with maneuvering priority as well as final decision authority to mix various phases of jump operations.

RESERVE - Auxiliary chest mounted parachute for use in the event of a malfunction of the main parachute.

RETARDANT - Liquid chemicals dropped from airtankers to slow the spread of a fire.

SECONDARY JUMPSHIP – during multi-jumpship operations, the aircraft responsible for maintaining continuous visual separation with the Priority Jumpship.

SMOKEJUMPER DROP AIRSPEED - The airspeed the aircraft must fly for safe jumper exits and parachute deployment.

SMOKEJUMPER DROP ALTITUDE - The altitude AGL that the aircraft must fly to safely drop jumpers.

SMOKEJUMPER - An experienced professional firefighter who is trained to parachute into remote areas and in rugged terrain.

SPOTTER - A senior smokejumper who is trained to be in-charge of smokejumper missions.

STANDBY - Standby is assigned to pilots by operations at the request of FMOs and is determined by burning conditions and lightning forecasts.

STATIC LINE - Line attached from the main parachute to the static line cable in the jump aircraft which activates the parachute as a jumper falls away.

STREAMERS - Twenty-foot-long weighted crepe paper strips that descend at the same rate as a personnel parachute that is used by a spotter to help determine wind drift.

TAWS – Terrain Awareness Warning System, a GPS-based Ground Proximity Warning System required on all Turbine aircraft by March of 2005.

TCAS – Traffic Collision Avoidance System, required on all Smokejumper Aircraft.

TERTIARY JUMPSHIP – during multi-jumpship operations, the 3rd aircraft who will hold beyond 7NM or above the FTA until either the Priority or Secondary Jumpship depart the incident.

TRAIL POSITION – during multi-jumpship paracargo operations, a known position similar to the Observation Position with the exception that spacing will be looser at 3,000' – 2NM. In no case should the Secondary JS be forward of the Priority JS.

VMC – Visual Meteorological Conditions.

GLOSSARY OF STANDARD CALLOUTS

After departure but before the spotter makes the initial call to dispatch, let the spotter know the ETA to the fire and the amount of fuel on board.

"20 minutes out" – said when 20 minutes from the fire so jumpers can perform a primary equipment check.

"Five minutes out" – said when five minutes from the fire so ram air jumpers can perform a secondary equipment check.

Flying the Low Pass:

- **"[xxxx feet]"** – calculated jump spot elevation in MSL in the streamer pattern.
- **"On final, 1500, streamers"** – when on final for the first pass of streamers. This tells the spotter he can now give course corrections to the pilot.
- **"On final, 1500, streamers to spot"** – when on final for streamers to spot. This tells the spotter he can now give course corrections to the pilot.
- **"Streamers away"** – said by the spotter when the streamers are released.
- **"[xxxx]"** – AGL height based on the radar altimeter reading above the jump spot, said right after the spotter calls "streamers away."
- **"I have the streamers"** – when acquiring visual contact with the streamers as they fall.

In the jumper pattern:

- **"3,000 Feet"** – for ram airs, notify the spotter when reaching 3000 feet AGL so the jumpers can arm their AAD (Automatic Actuating Device).
- **"Downwind"** – when on downwind.
- **"Turning base"** –immediately prior to turning base. If jumpers are to be dropped, the spotter should respond with something like "jumpers ready" or "two in the door" to indicate that the pilot should continue in the drop pattern. If the spotter is not ready, the spotter should say "extend the downwind".
- **"On final, 1500/3000, rounds/squares"** – when on final. This tells the spotter he can now give course corrections to the pilot.
- **"Jumpers away"** – said by the spotter to let the pilot know it is ok to turn the aircraft to the crosswind leg.

In the cargo pattern:

- **"Downwind" – when on downwind.**
- **"Turning Base" – immediately prior to turning base.**
- **"On Final" –** when on final.

"Short final… standby… kick" – phrase when approaching the cargo spot

INDEX

APPENDIX A – FORMS

Training and Evaluation Forms are provided for convenience on the following pages.

Forest Service

- Forest Service Smokejumper Pilot Training Record (Front & Back)
- Forest Service Smokejumper Pilot Evaluation and Approval Record

BLM

- OAS-64A Interagency Airplane Pilot Evaluation Application (Form & Instructions)
    - Fillable: https://www.doi.gov/sites/doi.gov/files/uploads/oas-64a.pdf
- OAS-64D Airplane Pilot Flight Evaluation Application
    - Fillable: https://www.doi.gov/sites/doi.gov/files/uploads/oas-64d.pdf

SMOKEJUMPER PILOT TRAINING RECORD (Ref. 5709.16.27.2-Exhibit 01. VI.)

PILOT:	A/C TYPE:	CONTRACTOR:
	FLIGHT TRAINING HRS:	

INSTRUCTOR PILOT_____

INSTRUCTOR SPOTTER

GRADING										
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.	AIRCRAFT									
	TIME									
	DATE									
SMOKEJUMPER PILOT / COPILOT										
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. Aircraft control - Airspeed, Altitude, Bank										
8. Attention to Flying the Aircraft										
9. Pilot - Spotter Cooperation										
10. Streamer Patterns										
11. Jumper Runs (Live)										
12. Patience										
13. Maneuvering										
14. Moderate and Deep Canyon Work										
15. Pattern Selection to DZ										
16. Awareness of Airspeed										
17. Timing of Power and Flap Application										
18. Basic Cargo (Dry Runs)										
20. Live Cargo Runs										
OTHER										
21. High Recon										
22. Low Recon										
23. Approach and Escape Routes										
GENERAL										
25. Judgment										
26. Crew Coordination										
27. Equipment & Procedures Knowledge										
28. Preflight Preparation										
29. Dispatch and Launch										
30. Enroute Procedures										
31. Safety (Clearing, Situational Awareness etc										
32. Flight Following										
TRAINEES INITIALS										

RECOMMENDED FOR EVALUATION CHECKRIDE BY:

INSTRUCTOR REMARKS and SIGNATURES

USFS SMOKEJUMPER PILOT EVALUATION AND APPROVAL RECORD

NAME OF PILOT (Last, First, M.I.)	LOCATION:	DATE OF CHECK:

NAME OF CHECK PILOT:	SPOTTER'S NAME:

PILOT CERTIFICATE INFORMATION:	TYPE A/C:	FLIGHT TIME:

PILOT MEDICAL INFORMATION:

GROUND PRE-FLIGHT BRIEFING/EXAM

GRADE DEFINITIONS: S - SATISFACTORY, U - UNSATISFACTORY

ORAL EXAM:	S	U
1. Smokejumper procedures	○	○
2. Use of crew resource management	○	○
3. Spotter/dispatch communications	○	○
4. Weight and balance	○	○
5. Aircraft performance (DA, SE climb)	○	○
6. Aircraft pre-flight inspection	○	○
GROUND OPERATIONS:		
7. Engine start procedures	○	○
8. Taxi operations	○	○
9. Spotter communications	○	○
10. Crew resource management	○	○
11. Use of check list	○	○
IN FLIGHT - ENROUTE:		
12. Radio set-up	○	○
13. Airport traffic departure	○	○
14. Long range navigation set up	○	○
15. Radio communications	○	○
16. Spotter communications	○	○
17. Crew resource management	○	○
18. Use of check list	○	○
ARRIVAL AT INCIDENT:		
19. Communication with ground and other aircraft	○	○
20. Establish jump spot identification	○	○
21. Establish probable streamer altitude	○	○
22. Low pass if agreed on with spotter	○	○
22a. Appropriate altitude	○	○
22b. Airspeed	○	○
22c. Power management	○	○
23. Spotter communication	○	○
24. Crew resource management	○	○
25. Use of check list	○	○
26. Density Altitude	○	○
27. Emergencies	○	○
RESULT OF CHECKRIDE:		
☐ YES APPROVED ?		
☐ NO		

STREAMER DROPS:	S	U
28. Established altitude	○	○
29. Altitude call out from radar altimeter	○	○
30. Appropriate airspeeds	○	○
31.Appropriate streamer pattern for visual	○	○
32. Appropriate call outs of streamers	○	○
33. Spotter communication	○	○
34. Crew Resource Management	○	○
35. Use fo check list	○	○
DROPPING JUMPERS:		
36. Configuration and transition	○	○
37. Jumper pattern	○	○
37a. General flight path	○	○
37b. Appropriate bank angles	○	○
37c. Call outs to spotter (altitudes and pattern	○	○
37d. Line up on final	○	○
37e. Adequate length final	○	○
37f. Corrections/coordinated/responsive	○	○
37g. Airspeed control	○	○
37h. Altitude	○	○
38. Spotter communication	○	○
39. Crew resource management	○	○
40. Use of check list	○	○
CARGO:		
41.Configuration and transition	○	○
42. Appropriate pattern	○	○
42a. Terrain	○	○
42b. Wind	○	○
42c. Land marks	○	○
42d. Altitude	○	○
42e. Airspeed	○	○
42f. Power management	○	○
42g. Call outs	○	○
42h. Accuracy	○	○
43. Spotter communication	○	○
44. Crew resource management	○	○
45. Use of check list	○	○
46. Emergencies	○	○

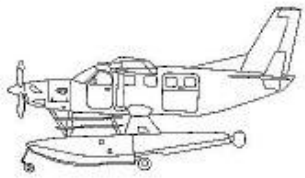
REMARKS:

PILOTS SIGNATURE:	CHECK PILOTS SIGNATURE:
X	X

OAS-64A (10-16)

U.S. DEPARTMENT OF THE INTERIOR

INTERAGENCY AIRPLANE PILOT EVALUATION APPLICATION



I. Applicant Information

a. Name (Last, First)	b. OfficeTelephone	d. Office E-mail

e. Employer	f. Previous Employer
Address	Address
City, ST ZIP	City, ST ZIP
Telephone	Telephone
Hire Date	Dates Employed

g. Flight Experience	Hours
Total Pilot Time	
Pilot-In-Command (PIC) Airplane	
PIC Airplane last 12 Months	
PIC Airplane Last 60 Days	
PIC Single Engine Airplane	
PIC Multiengine Airplane	
PIC Seaplane	
PIC Make & Model	
PIC Make & Model	
PIC Make & Model	
IFR Simulated	
IFR Actual	
PIC Night	
PIC Large Airplane (>12,500#)	
PIC Turboprop	
PIC Jet	
PIC Low Level Airplane (<500' AGL)	
PIC Airtanker/Dispensing Ops.	
PIC Mission Specific	
PIC Typical Terrain	
Second-In-Command (SIC) Airplane	
SIC in Class	
SIC Make and Model	
SIC Mission Specific	

h. PILOT HISTORY:

Date of Last Agency Flight Evaluation _____ ☐OAS ☐USFS

Date of Previous Agency Card _____ ☐OAS ☐USFS

(Attach a copy)

☐YES ☐NO Aircraft accidents within the last 5 years.

☐YES ☐NO FAA violations within the last 5 years.

☐YES ☐NO OAS or USFS pilot qualifications card denied, suspended, or revoked.

(Attach details and explanation for each YES)

i. 14 CFR 121/135 QUALIFICATIONS

Date	Make & Model	Type of Qualification
		☐VFR ☐IFR ☐IFR W/AP ☐SIC Only
		☐VFR ☐IFR ☐IFR W/AP ☐SIC Only
		☐VFR ☐IFR ☐IFR W/AP ☐SIC Only

(Attach FAA 8410-3 or equivalent)

j. AIRTANKER/SCOOPER OPERATIONS 14 CFR (dates as required)

61.55 SIC Qualification _____ 61.56 Flight Review _____

61.57 IFR Currency _____ 61.58 PIC Proficiency _____

(Attach a copy of endorsement or logbook entries)

k. I certify that the information listed on this form is true and correct. In addition, I certify that I have read the information provided pursuant to Public Law 93-579 (Privacy Act of 1974).

Date _____ Pilot Signature _____

PRIVACY ACT NOTICE

General - This information is provided pursuant to Public Law 93-579 (Privacy Act of 1974), December 31, 1974, for individuals supplying information for inclusion in a system of records.
Authority - The authority to collect the information on the attached form is contained in 5 USC 552A.
Purpose and Use - This information, along with data you may have supplied previously, and information developed by investigation will be for use by such as:

1. To determine your pilot qualifications to comply with contract specifications.
2. Transfer to the U.S. Department of Justice in the event of litigation.
3. Transfer, in the event there is indicated violation or potential violation of a statute, regulation, whether civil, criminal, or regulatory in nature, to the appropriate agency or agencies, whether Federal, State, local, or foreign, charged with the responsibility of investigation or prosecuting such violation or charged with enforcing or implementing the statute, rule, regulation, order, or license violated or potentially violated.

II. Inspector Information:

☐ Approved attach OAS-30A ☐ Disapproved (see remarks)

Inspector: _____ _____ _____ _____

(Print Name) (Signature) (Agency) (Date)

Remarks: _____

OAS-64A Instructions

I. Applicant Information

a-d. Contact information, telephone number and or email address, if available should be business contact information, not personal.

e. Employed by: This is the company with the contract or agreement

f. Previous employer information only required if previously carded by OAS or the USFS.

g. Provide times that are applicable to the contract or agreement. Write in each make and model offered in the space provided. Provide mission specific and typical terrain as specified in the contract.

h. Date of previous card and/or flight evaluation: Not required, but helpful in determining if a flight evaluation is required. Must answer yes or no to each question regarding accidents, violations and pilot card actions. Yes answers will not automatically disqualify the applicant. Attach as much additional information as necessary. If previously reported, attach only the evidence necessary to prove that the occurrence has been cleared by OAS. Report ALL accidents within the last 5 years. Only report FAA violations that were finalized within the past 5 years. Report all OAS and/or USFS card denials, suspensions and/or revocations within the past 5 years.

i. 14 CFR 121 or 135 Qualifications: Provide documentation, such as FAA 8410, as specified in the procurement document. Only fill in for aircraft that will be operated on contract.

j. Airtanker/Scooper: If SIC provide date of 14 CFR 61.55 compliance and a copy of logbook endorsement. If PIC provide date of 14 CFR 61.56 flight review compliance and a copy of logbook endorsement. If PIC and the contract requires IFR capability, provide the date of a current IPC and a copy of logbook endorsement or evidence of IFR currency. If a 14 CFR 61.58 Pilot-in-command proficiency check (PPC) is required for the aircraft under contract provide the date of last PPC and a copy of evidence of completion of said PPC.

k. The application must be signed and dated. Electronic signatures are acceptable.

II. Inspector Information – To be completed by the inspector. Check approved or Disapproved as appropriate. If approved attach a copy of pilot card issued. If disapproved provide explanation in the remarks section and document on OAS-68. Signature must be actual or electronic signature generated by HSPD-12.

Pilot History – If a pilot checks any yes box: Review all provided information and gather any additional information deemed necessary. Anything not previously cleared by OAS or the USFS forward to appropriate personnel for review and final disposition.

OAS-64D (10-16)

U.S. DEPARTMENT OF THE INTERIOR

AIRPLANE PILOT FLIGHT EVALUATION APPLICATION

I. Applicant Information

a. Name (Last, First)	b. Bureau	c. Office Phone	d. Office FAX	e. E-mail	
f. Office Address: Street/PO Box			g. City	h. State	i. Zip Code
j. Medical Date of Issue:	Class:	k. Last Flight Review 14 CFR 61.56:	l. Base month	m. Primary Aircraft	

II. Record of Training: I am in compliance with all OPM-22 requirements ☐Yes ☐No

III. Record of Pilot Experience All requested times are PIC, except blocks a, f and n are total time.

a. Total Time	b. Airplane	c. ASEL	d. Turbine	e. Night	f. IFR Simulated	g. Amph T/L Water	h. Airplane, last 12 month
i. Make & Model	j. AMEL	k. ASES/Amphib /	l. Large Airplane	m. Low Level	n. IFR Actual	o. Amph T/L Land	p. M&M, last 12 months

IV. Applicant Certification - I certify that the information listed on this form is true and correct. In addition, I certify that I have read the information provided pursuant to Public Law 93-579 (Privacy Act of 1974).

Date:	Applicants Signature:

PRIVACY ACT NOTICE

GENERAL-This information is provided pursuant to Public Law 93-579 (Privacy Act of 1974). December 31, 1974, for individuals supplying information for inclusion in a system of records.
AUTHORITY-The authority to collect the information on the attached form is contained in 5 USC 552A.
PURPOSES AND USE-This information, along with data you may have supplied previously, and information developed by investigation will be for use such as:

1. To determine your pilot qualifications to comply with the Department Manual.
2. Transfer to the U.S. Department of Justice in the event of litigation.
3. Transfer, in the event there is indicated violation or potential violation of a statute, regulation, whether civil, criminal, or regulatory in nature, to the appropriate agency or agencies, whether federal, state, local, or foreign, charged with the responsibility of investigation or prosecuting such violation or charged with enforcing or implementing the statute, rule, regulation, order, or license violated or potentially violated.

OAS-64D Instructions

I. Applicant Information

- a-j. Self-explanatory
- k. Provide the date of your last FAA Flight review. Most OAS flight evaluations will meet the requirements of 14 CFR 61.56. If you need a FAA flight review notify the OAS Pilot Inspector prior to the flight evaluation.
- l. Base month is the month your annual flight evaluation is done and OPM-22 compliance is verified, see OPM-16.
- m. Primary aircraft see OPM-16.

II. Record of Training – Check the appropriate box. OPM-22 compliance is checked once a year in conjunction with your annual flight evaluation in your base month and on your initial flight evaluation. Attach documentation.

III. Record of Pilot Experience – All requested times are PIC (as defined by 14 CFR 1.1), except blocks a, f and n are total time. All reported flight time must be legal flight time IAW 14 CFR 61.51

- a. Total Time – Total flight experience, all types and conditions.
- b. Airplane – Total PIC time in airplanes.
- c. ASEL – Total PIC time in airplane single engine land.
- d. Turbine – Total PIC time in turbine powered aircraft.
- e. Night – Total PIC time at night in airplanes.
- f. IFR Simulated – Total simulated instrument flight time, include simulator, flight training devises, aviation training devises and hood time in an aircraft.
- g. Amphib T/L water – Total PIC water take-offs and landings, separated by a forward slash, in an amphibious airplane.
- h. Airplane, last 12 month – Total PIC time in airplanes in the previous 12 calendar months.
- i. Make & Model – Total PIC time in the make and model or like make and model (OPM-23 for like make and model rules) airplane used for this flight evaluation.
- j. AMEL – Total PIC time in airplane multiengine land.
- k. ASES/Amphib – Total PIC time in airplane single engine sea and separated by a forward slash total PIC time in an amphibious airplane.
- l. Large Airplane – Total PIC time in airplanes with a maximum certificated takeoff gross weight over 12,500 pounds.
- m. Low Level – Total PIC time operating airplanes within 500 feet of the surface over typical terrain.
- n. IFR Actual – Total actual instrument flight time logged while in instrument meteorological conditions.
- o. Amphib T/L Land - Total PIC land take-offs and landings, separated by a forward slash, in an amphibious airplane.
- p. M&M, last 12 months - Total PIC time in make and model or like make and model in the previous 12 calendar months.

IV. Applicant's Certification – Signature must be actual or HSPD-12 generated.