



United States Department of Agriculture

STANDARDS FOR AIRTANKER OPERATIONS



Forest Service



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1.0 Introduction

1.1 Background

Since 1955, airtankers have played a key role in suppressing wildfires. Airtankers deliver fire retardant to wildfires, thereby reducing fire intensity and rate of spread, allowing ground firefighters time to contain and/or control new, emerging and large fires. The reduced intensity and rate of spread can allow more effective use of hand crews and engines. As fire intensity increases, or as fire spread rates increase, they become more difficult to control and costly to extinguish. Accessibility of terrain or the location of a wildfire can delay the deployment of ground resources. Consequently, aerial delivery of fire retardant is often the only available method to slow the growth of wildfires until ground firefighters can establish containment and/or control lines.

In February 2012, the USDA Forest Service (FS) released the Large Airtanker Modernization Strategy (https://www.fs.fed.us/fire/aviation/airtanker_modernization_strategy.pdf) outlining a broad plan to modernize the airtanker fleet with a more mission capable and cost-effective mix of next-generation (NG) aircraft better suited to the complex wildland fire environment of the 21st century. The transition from reciprocating engine airtankers to newer turbine airtankers is a significant aspect of modernization and current airtanker operations.

For simplicity, when this document refers to airtankers Large Airtankers (LAT) and Very Large Airtankers (VLAT) are included. Single Engine Airtankers (SEATs) are contracted by the Bureau of Land Management and are not part of this operational plan. Forest Service SEAT operations shall be governed by the NWCG Standards for Airtanker Base Operations, Chapter 7, SEAT Operations.

Water scoopers (single engine or multi-engine) are not considered airtankers. Operationally they operate and are used more like Type 1 helicopters. Refer to the Forest Service Amphibious Water Scooper Aircraft Operations Plan for water scooper planning, safety and operations, available at <https://www.fs.fed.us/managing-land/fire/aviation/publications>

1.2 Objective

The Forest Service Airtanker Operations Plan references or supplements policy and connects contract requirements with policy for the planning, management and operations of FS large and very large airtanker operations.

Contract Large airtankers (3000- 5000 gallons) are the primary initial attack airtanker and the core part of the Forest Service's airtanker fleet.

Modular Airborne Firefighting System (MAFFS) airtankers provide surge capability to the contract LAT and VLAT fleet. MAFFS require a leadplane or Aerial Supervision Module.

Cooperator LATs and VLATs if federally approved provide surge capability to the contract LAT and VLAT fleet.

VLATs (>8000 gallons) are a specialized airtanker resource and intended for large fire support.

The objective of this operating plan is to identify standardized processes and procedures for utilization by staff, supervisors, specialists, and managers for planning, administering and conducting airtanker operations.

The FS will primarily use Exclusive Use (EU) contract airtankers. Call-When-Needed (CWN) airtankers and Modular Airborne Firefighting System (MAFFS) are available to supplement the EU fleet should operational necessity require additional LATs or VLATs. Approved cooperator LAT and VLAT use is based on necessity at the Geographic Area or National level.

The large airtankers being used are multi-engine turbine fixed-wing airplanes that carry a minimum of 3,000 gallons of retardant, providing sufficient coverage level for any terrain. The current LAT fleet consists of the following aircraft: RJ-85, MD-87, BAe-146, CV-580, B-737 and C-130. The current VLAT fleet consists of two aircraft, the DC-10 and B-747.

1.3 Scope

The scope of LAT and VLAT is positioning and utilization to meet existing and anticipated incident, preparedness, severity, and wildland fire needs regardless of geographic location or agency affiliation. LATs and VLATs are “national resources” in terms of national utilization, high demand, limited availability and unique status.

SEATs are not part of this operational plan. Refer to the NWCG Standards for Airtanker Base Operations, PMS 508 for SEAT operations.

Airtankers delivering retardant are one part of a multi-faceted national interagency wildfire response effort, they are important to Federal, state, and local wildland firefighting missions of protecting communities and natural resources from wildfires.

1.4 Policy

All airtanker operations shall comply with the applicable provisions of:

- Title 14 Code of Federal Regulations (14 CFR). Parts 91, 137 and 145.
- FS Manual (FSM – 5700)
- FS Handbook (FSH - 5709.16)
- NWCG Standards for Airtanker Base Operations
- FS Fire and Aviation Management Qualifications Guide (FSH - 5109.17)
- Interagency Standards for Fire and Fire Aviation Operations (Redbook)
- Interagency Aerial Supervision Guide (IASG current version)

- National Interagency Mobilization Guide
- FS Procurement Documents (Firm Fixed Price contracts, Basic Ordering Agreements, Blanket Purchase Agreements, contract modifications)

Airtanker operations require regulations, manuals, guides, plans, standards and checklists to execute and coordinate operations in a safe and effective manner. Where the terms “shall” and “must” are used in manuals, handbooks, standards or guides, compliance with those items is mandatory and not discretionary (FSM 1110.8 - Exhibit 01 Degree of Compliance or Restriction in Directives).

When the aircraft and flight crews are performing operations for other agencies or cooperators where policy may differ, the Forest Service’s policies, guidance, and standard operating procedures shall be followed.

2.0 Program Management

All airtankers under contract with the FS shall adhere to the specifications set forth in the contract under which they are operating. Any concerns, requests, or proposed deviations to contract specifications shall be vetted through the assigned Contracting Officer and/or the National Airtanker Program Manager prior to execution. The airtanker program requires regional management and oversight in addition to national program management.

2.1 Contract Administration

Contracted airtankers are procured through the Washington Office (WO) Acquisition Management (AQM) Incident Support Branch (ISB). Mandatory Availability Periods (MAP) and Call-When-Needed activation of airtankers will be coordinated with Contracting Officer, Airtanker Program Manager, Contracting Officer’s Representative and Fixed-wing Coordinator based upon national fire requirements and needs.

EU contracts are those awarded for a specific time period/MAP, during which the government has exclusive use of the aircraft and retardant delivery services.

CWN Basic Ordering Agreements (BOA) do not guarantee placement of orders, days or flight hours.

States may have similar contracts or agreements, which are unique to that entity. Although not under contract to the FS, these airtankers must meet interagency standards to be used on federally protected lands. Consult with the appropriate Regional Aviation Officer for assistance with state airtankers. In addition, during periods of high fire activity airtankers from Alaska State and/or provinces in Canada may be used within the United States. Canadian Provincial airtankers should be ordered through the National Interagency Fire Center and Canadian Interagency Firefighting Centre (NIFC – CIFFC) agreement, not through state compacts. Airtanker contract and cooperator information is available by contacting the National Airtanker Program Manager in Boise, Idaho.

The Contracting Officer (CO) is responsible for all contracting actions including contracting procedures, contract legality with existing laws, regulations, contract administration, and termination. In the contract administrations function, decisions on claims and disputes are final and can only be appealed to the Board of Contract Appeals or Court of Claims. The COs, for all FS LAT contracts are located in Boise, Idaho.

The Contracting Officers Representative (COR) is directly responsible to the CO for monitoring contract performance.¹ This is a contract chain of command and may not include the COR's direct supervisor, forest or regional aviation staff. The COR and the National Airtanker Program Manager shall make every effort to maintain open dialogue with regions when contract issues affect regional airtanker operations and planning. Airtanker contract CORs are assigned by the Contracting Officer and are generally, airtanker base managers or other regional and WO aviation personnel. The COR is primarily responsible for assuring compliance with the provisions of the contract. The COR maintains communications with the vendor concerning day-to-day operation, though this may be further delegated to the Project Inspector. The COR may represent the CO in making minor allowances which do not modify the price or other provisions of the contract. The COR is responsible for verifying the work performed upon which payment is based. Refer to the current Schedule of Items for specific COR personnel and telephone numbers.

The COR is responsible for entering contract information, flight time, availability, miscellaneous costs, etc. into the Incident Business System (IBS).² This information must be entered as soon as possible after the end of the day while on contract.

COR certification information regarding training requirements, external training opportunities, and the Federal Acquisition Institute Training Application System (FAITAS) is located at: <http://fsweb.wo.fs.fed.us/agm2/wo/pros/cor.php>

2.2 Program Management

The National Airtanker Program is managed by the National Airtanker Program Manager. Additional programmatic and operational oversight shall be provided by:

- National Aviation Branch Chiefs and staff
- Regional Aviation Officers (RAO)
- Regional Fixed-wing Specialists
- Regional Aviation Safety Managers (RASM)
- Regional Aviation Maintenance Inspectors (AMI)

The National Fixed-Wing Coordinator and staff in coordination with the National Interagency Coordination Center (NICC) coordinate operational and strategic movement of airtankers

¹ Refer to the Designation of COR provided to each Airtanker Contract COR for specific duties and responsibilities.

² IBS was previously known as ABS, Aviation Business System

with the Geographic Area Coordination Centers and the vendors to optimize response efficiency and effectiveness.

The Washington Office, in cooperation with Regional Office Aviation Staff and Airtanker Base Managers, continue to adapt and develop operations and equipment to ensure a stable, efficient and safe program. This is accomplished with quality assurance review of the current management approach for effectiveness to include program funding, permanent positions, contract specifications, contract length, facilities, specialized training, placement of resources, and operations.

Communication between the regions, airtanker bases, and Washington Office is critical to maintain national mobility and response to support aviation and land management operations.

2.3 FLIGHT

FLIGHT is a software application that shares all agency aviation resource use and cost information. FLIGHT creates a single program of record for reporting that meets USDA security requirements. It interfaces with IRWIN for incident information and allows for the capture of daily information in a standardized format with real time data storage and recovery. FLIGHT will also provide an avenue for aviation field personnel to document and share operational information reporting.

FLIGHT has been fully implemented in January 2019. Every Forest Service airtanker base manager that has a Forest Service contracted airtanker located on the base shall enter daily information for that airtanker throughout the day and finally at the end of the day.

Note: FLIGHT is mandatory and is not optional for Forest Service airtankers. No other daily tracking program, application or web based systems are authorized.

3.0 Interagency Airtanker Board (IAB)

The purpose of the IAB is to promote the effectiveness, and efficiency of airtankers through approval of water and retardant delivery systems and recommendations to the contracting agencies. IAB evaluates delivery systems and drop performance. IAB criteria shall apply to fixed-wing airtankers intended for interagency use.

3.1 Approval Process

The Board has established a step-by-step criteria and process of evaluation and approval of the retardant delivery systems. All aircraft and delivery systems proposed as airtankers shall be submitted by the Proponent to the IAB chairperson for processing through the Board. The Board reviews material submitted at each step and must be satisfied that all requirements of a step are met before the Proponent will be allowed to proceed to the next step.

New large airtankers, and older airtankers with newly modified tank and gate systems may be given an IAB “Interim Approval” while field evaluations are conducted. The Interim Approval shall have an expiration date. Once the Interim Approval has expired, a full IAB approval must be granted to continue operating for the government.

To view the most current IAB Criteria, visit Publications at the site below

<https://www.nwcg.gov/committees/interagency-airtanker-board>

4.0 Aircraft Inspection and Approval

Each year prior to use of large airtankers and flight crews on Forest Service contracts, the Forest Service will conduct pre-use inspections of aircraft for compliance with the contract specifications and conditions. Pre-use inspection shall be scheduled by the Contractor with the appropriate Forest Service airworthiness or pilot inspector to occur approximately 21-days prior to the MAP. When the airtanker has met contract inspection criteria it will be issued an aircraft approval card. If the pilots meet contract evaluation criteria, they will be issued a pilot qualification card. Once carded (airtanker and pilots) the airtanker is available to operate as specified in the contract. The cards are valid through the expiration date and can only be changed by the appropriate Forest Service airworthiness or pilot inspector.

4.1 Airtanker Return to Contract Availability Process

1. The pilot and/or the agency Project Inspector notifies contractor Director of Maintenance of the discrepancy
2. The agency Project Inspector notifies the appropriate Forest Service Washington Office, Regional Aviation Maintenance Inspector (AMI) and COR assigned to the specific make and model of airtanker.

Airtanker AMI Return to Contract Availability Contacts³

Company & Model	Primary Contact	Secondary Contact
Erickson Aero Air MD-87	Kevin Bailey 801-725-5582	Cory Noordermeer 208-407-6076
Aero Flite RJ85	Cory Noordermeer 208-407-6076	Kevin Bailey 801-725-5582
Coulson C-130	Cory Noordermeer 208-407-6076	Kevin Bailey 801-725-5582
Coulson B-737	Cory Noordermeer 208-407-6076	Jared Daly 916-640-1031
Neptune BAe-146	Kevin Bailey 801-725-5582	John Farro 406-370-3347
10 Tanker DC-10	Cory Noordermeer 208-407-6076	Kevin Bailey 801-725-5582

³ If additional Make and Model airtankers are awarded contracts this table will be updated.

GST 747-400	Cory Noordermeer 208-407-6076	Jared Daly 916-640-1031
CALFIRE	Marty Buno 916-531-4096	

3. Maintenance action is taken by the contractor to correct the discrepancy
4. The AMI monitors progress of contractor's maintenance action
5. The aircraft is approved for "Returned to Service" in accordance with 14 CFR by the contractor's maintenance personnel and the maintenance log is signed off
6. Once the aircraft is approved for "Return to Service" by the contractor, the AMI approves the aircraft to "Return to Contract Availability" by phone call to the COR.
7. The COR documents and tracks "Unavailability"
8. Once the agency COR has completed all the above steps, the aircraft is "Available."

4.2 Aircraft Maintenance

Airtankers require frequent inspection and maintenance especially when they are flying several hours per day. The Airtanker Base Manager and contractor will coordinate maintenance needs and timing.

- Aircraft maintenance is typically performed before and after duty hours. During the duty day, the contractor may request maintenance time. The aircraft may be released from standby for scheduled or preventive maintenance and the Contractor will continue to be paid the availability rate. The Contractor shall provide a reasonable estimated time of completion (ETOC) with the request for an authorized break. Approval to remove the aircraft from standby will be wholly discretionary by the Government. Per C-23 Availability, 2) (iii)
- "Scheduled maintenance" does not normally require action by agency personnel, just appropriate entries in the aircraft maintenance log, aircraft contract diary, and/or air base daily log. Agency personnel will become involved if the maintenance requires an aircraft to be placed in "unavailable" status and/or major parts are changed out. Communication between the airtanker base manager, COR and contractor personnel is essential. The pilot and/or COR will communicate maintenance information to the designated agency aircraft Maintenance Inspector.
- Unscheduled maintenance must be reported to an Airworthiness Maintenance Inspector (AMI).
- Only a qualified AMI can return an aircraft to contract availability after being unavailable. All details will be documented in the appropriate aircraft contract daily diary/air attack base daily log. If a SAFECOM is to be filed for a maintenance deficiency, it shall include the name of the inspector who approved the aircraft back to contract availability.

- Aircraft maintenance and engine run-ups at the air base will be coordinated with the ramp manager. Depending upon the situation, it may be necessary to move the aircraft to another area to avoid impacting other aircraft or operations.

4.3 Pilot Inspection and Approval

Pilots not previously carded or that have not received a flight check in the past 3 years will receive a competency/proficiency flight check.

Proficiency flight checks for airtanker pilots requires actual drops.

If the pilots meet contract evaluation criteria including Practical Test Standards, they will be issued a pilot qualification card.

Refer to the Interagency Airplane Pilot Practical Test Standards 2012 Revision 2.0 for additional information.

5.0 Conduct and Ethics

All airtanker personnel employed or contracted by the Forest Service are accountable to the public for their actions. Professional conduct is expected at all times and is measured by accountability, respect, leadership, communication and the integrity of the program. Personnel will conduct all operations with the highest regard to safety and within the boundaries of policy and/or the contract. Personnel will only perform those services in which they are qualified, trained, and equipped. They will continue to educate themselves in order to improve and advance their qualifications and performance.

6.0 Communications

Lines of communications are established to keep all parties informed of pending or potential issues that may arise.

Contract related issues will be communicated through the COR to the CO and the National Airtanker Program Manager.

Operational issues will be communicated to the National Airtanker Program Manager.

National and Regional personnel and airtanker crew or company representative are responsible for:

- Resolving problems/issues at the lowest level possible.
- Early and proactive communication to anticipate issues or problems that could be a safety issue or affect the availability of an airtanker.
- Notify the COR with all contract compliance questions and/or concerns, major maintenance or mechanical issues, disputes, etc.
- The COR will notify the CO or National Airtanker Program Manager if the concerns or issues are outside the scope of his/her COR designation.
- Notify the appropriate national or regional personnel such as maintenance inspectors, inspector pilots, aviation safety managers, operations specialists, etc. depending on the nature of the issue.
- Notify the appropriate dispatch center of aircraft status, i.e. available/unavailable.

7.0 Airtanker Operations

The Forest Service airtanker mission is primarily focused on wildfire suppression dropping retardant in support of ground firefighters. The primary mission for large airtankers is initial attack of new and emerging fires. Large airtankers are initial attack capable without leadplane/ASM supervision. Very Large airtankers are primarily used for large fire support and require leadplane/ASM supervision to be on scene prior to being dispatched to the fire. The mission profiles for large airtankers may vary somewhat based on the specific aircraft retardant delivery system, range and performance capabilities; however, the general features of the mission remain the same. A mission sortie is assumed to be less than .91 flight time (55 minutes) on average; this includes transit to and from the airtanker base and delivery of retardant. The Forest Service expects to fly approximately 250 flight hours per airtanker during an above average wildfire season.

Airtankers shall not be loaded with water with the intention of dropping water instead of retardant. Local fire management plans, agreements or environmental conditions which limit or restrict the use of retardant will utilize water dropping aircraft such as helicopters and water scoopers.

Use of water enhancers (gels) and foam is prohibited in Forest Service contract airtankers.

Airtankers on cooperator or foreign country contracts may be contracted to use water enhancers or foam. Prior to being inspected to start a Forest Service contract, the airtanker retardant delivery system shall be thoroughly cleaned and rinsed of any water enhancer or foam residue.

Airtankers are not assigned to bases to facilitate national mobility and response. A COR is assigned to each airtanker (contract line item). The COR provides technical direction, clarification, guidance and reporting with respect to the contract and payment system, IBS. The COR is delegated contract administration duties by the CO.

7.1 Airtanker Bases

Airtanker Bases (ATB) are generally managed by local forests with national and regional oversight. The host forest is responsible for ensuring all established facilities are maintained and operated per the Forest Service policy, NWCG Standards for Airtanker Base Operations (SABO) and the Occupational Safety and Health Administration (OSHA) standards. Airtanker Base Managers (ATBM) are responsible for development of a base operations plan based on regional and national direction.

All airtanker bases, permanent, call-when-needed, or temporary, shall have an operations plan as outlined in the Interagency Airtanker Base Operations Guide. Approval of the actual airport in terms of airtanker aircraft performance shall be pre-approved by the National Airtanker Program Manager in coordination with regional aviation staff.

All airtanker bases, permanent, call-when-needed, and temporary, will have overweight authorizations or waivers if large airtanker exceed the published weight bearing capacity. The written authorization or waiver shall come from the airport authority and be in place

prior to any airtanker operations. Overweight authorizations and waivers will address runways, taxiways, and ramps, and be specific to airtanker Max Gross Landing Weight and Max Gross Taxi Weight. The Forest Service shall not be held liable for airtanker operations unless the Forest Service or the airtanker vendor cause damage due to operator error or negligence.

When Forest Service contracted airtankers operate from airtanker bases owned or managed by state or local agencies, that Forest Service Region should provide a liaison between the agency managing the ATB and the Forest Service. The liaison will assist and provide oversight to the administration of the Forest Service airtanker contract, policies and operational procedures that affect Forest Service airtankers.

Airtanker Base facilities, base operations, procedures, ramp operations, aircraft maneuvering, emergency procedures, ATB job descriptions, and dispatch information can be found in the NWCG Standards for Airtanker Base Operations, or at <https://www.nwcg.gov/sites/default/files/publications/pms508.pdf>.

Airtanker Base and fixed-wing base ramp operations shall adhere to the ramp operations procedures in the SABO.

7.1.1 Airtanker Base Types

There are three basic types of airtanker bases, permanent, call-when-needed and temporary.

All permanent, CWN and temporary bases will have an Airtanker Base Operations Plan (ABOP), and a qualified Airtanker Base Manager (ATBM) prior to operations out of the airtanker base airport. All personnel conducting airtanker base operations should review the SABO and have it available. ATBM's are authorized to manage SEATs, the ATBM should review the NWCG Standards for Single Engine Airtanker Operations and have it available. Both airtankers as well as SEATs have applicable aircraft contracts that will be available for reference, as well as the National Long-Term Fire Retardant Contract.

Permanent Base: A base that has permanent infrastructure installed in an identified area to service airtankers and support aircraft. In addition, the base will have permanent personnel whose main role is to act as management for the base and its facilities.

Call When Needed Base: A base that has permanent infrastructure installed in an identified area to service airtankers and support aircraft. The base does not have permanent personnel whose main role is to act as management for the base but could have personnel identified at the local level who have collateral duties to the base. A CWN base may also be a reload base.

Temporary Base: When an airport that could serve the need of loading airtankers has been identified and approved. The airport would have little if any infrastructure to support the loading of airtankers and the corresponding equipment would have to be delivered and set up. This term would be used regardless of the ownership of the mixing and loading equipment. Personnel shall be identified at the local unit to facilitate the management of the

temporary base or personnel from outside of the area may be utilized in the management of the base.

7.1.2 Airtanker Base Staffing

There are three configurations for staffing an airtanker base, full time, seasonal and CWN.

Full Time: The base is at least minimally staffed in a configuration that allows a very short to immediate availability to provide support year round.

Seasonal: The base is minimally staffed in a configuration that allows very short to immediate availability and support only during a “season” based on local historic need.

Call When Needed: The base is staffed only when fire severity or activity occurs.

None of the terms is descriptive of an airtanker base. These terms are only descriptive of the staffing. Seasonal and CWN staffing are generally used at temporary bases.

7.1.3 Temporary Airtanker Base Equipment: Portable and Mobile

There are two type of retardant mixing and loading equipment, Portable and Mobile.

Portable Airtanker Base (PAB): Currently refers to operations, standby facilities and retardant mixing equipment that can be transported to a location and set up. Currently there are two maintained in Region 8. Additional PABs maintained by the National Office and hosted by regions may be available in 2021.

Mobile Retardant Base (MRB): Currently refers to a contract portable retardant mixing plant available through the national retardant contract.

Neither term is descriptive of an airtanker base. These terms are only descriptive of the types of equipment and facilities that may be in use at a temporary airtanker base. A base is not identified by the method equipment and facilities are procured or obtained.

7.2 Concept of Operations

The Forest Service, using historical data, estimates the average annual retardant delivered by each LAT to be approximately 500,000 gallons on approximately 200 missions.

To maintain total mobility and effectiveness, all contracted Forest Service Next Generation airtankers shall carry the maximum contract retardant dispensing payload and shall carry the contract fuel load (no less than 2.5 hours) when departing from an airport in support of firefighting operations unless environmental factors preclude it. Airtanker contract, Section B-4, (b), (3). On the initial load with full fuel, a download of up to 30% of the full IAB approved payload will be allowed. All subsequent loads will be 90% or greater of the full IAB approved retardant payload. If downloading is necessary to meet environmental performance requirements, the Pilot in Command (PIC) shall adjust the aircraft weight and balance to mitigate unnecessary risk. When downloading retardant is necessary, the Airtanker Base Manager (ATBM) shall document the retardant downloads. This process shall be identified in the specific airtanker base operating plan.

Airtankers are approved by IAB for gallons at 9 pounds per gallon, regardless of the actual or average weight of the retardant. The payload in pounds shall not be exceeded.

Airtanker Gallons	Pounds per Gallon	Payload in Pounds
3,000	9	27,000
4,000	9	36,000
9,400	9	84,600
19,200	9	172,800

Exception: When load and return missions are requested, it is not necessary to refuel if the amount of fuel on board is sufficient to complete the load and return request and the PIC can meet fuel reserve requirements.

The PIC is responsible for the weight and balance and shall have the final authority as to the quantity of retardant loaded onto the aircraft. If the PIC decides to use less than a full load of retardant airtanker crew shall also inform the ATBM and their COR of the downloading. The PIC is responsible for the safe operation of the aircraft. The PIC has the final authority whether the flight can be accomplished safely and shall refuse any flight or landing which they consider unsafe.

7.3 Airtanker Flight Profile

The following Forest Service Airtanker Mission Flight Profile and Example Segment Parameters and Conditions (Figure 1) collectively illustrate the diverse nature of the airtanker flight environment. Table 1 lists the types and capacities of airtankers.

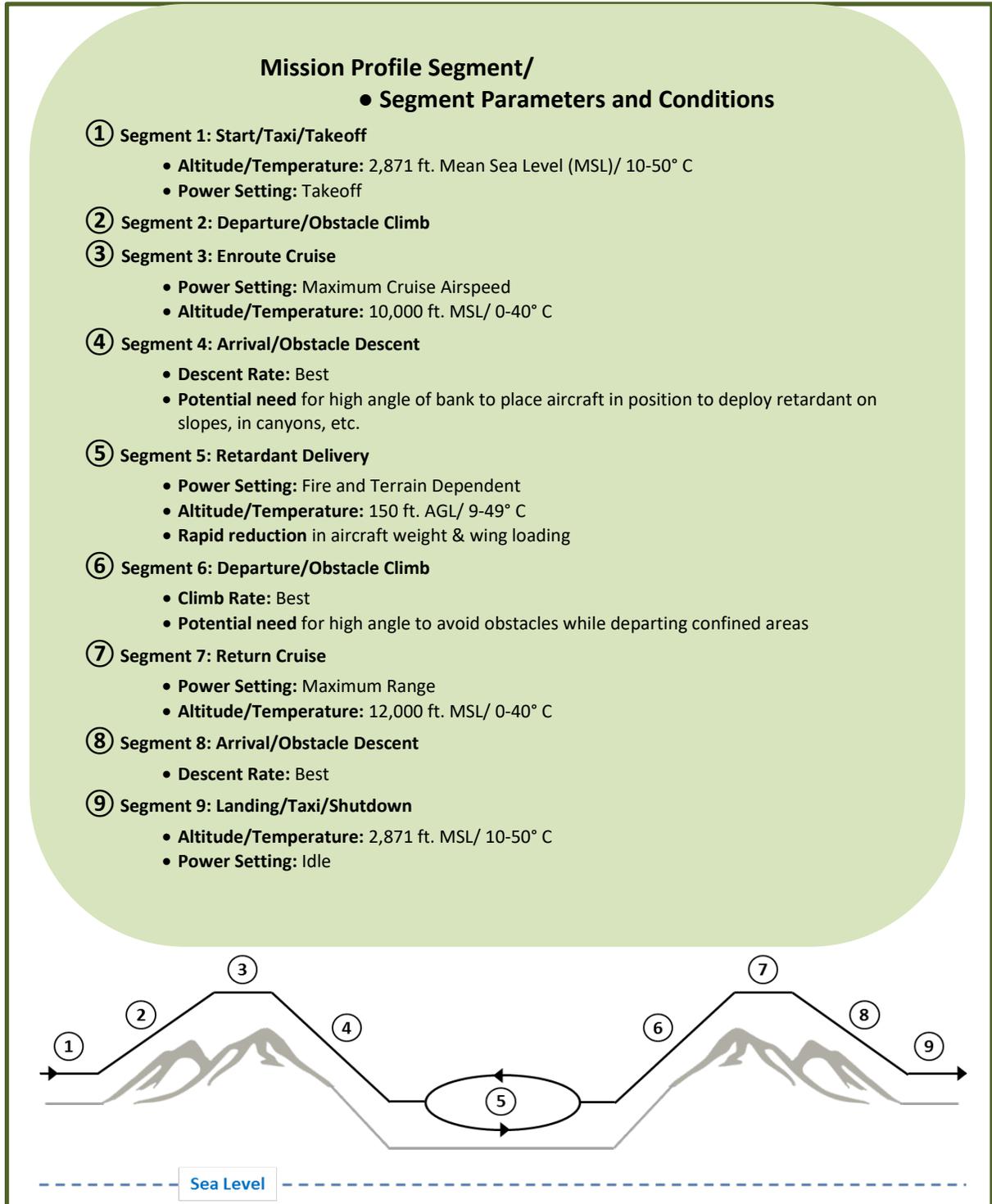


Figure 1. Airtanker Mission Profile Example

Table 1. Types of Airtankers

TYPE	CAPACITY GALLONS	EXAMPLES
VLAT	> 8000	DC-10, B-747
1	3000 – 5000	BAe-146, RJ85, MD-87, C-130, B-737
2	1800 – 2999	Q-400, CV-580, P-3
3	800 to 1799	S-2T, AT-802F
4	Up to 799	Thrush

7.4 Mobilization

The National Interagency Coordination Center (NICC) based on National Multi-agency Coordinating Group (NMAC) priorities, will allocate federal airtankers nationally by positioning them in areas of current or predicted high wildfire danger or activity. Geographic Areas managing these aircraft will make them available for wildfire assignments when ordered by the NICC. This will be accomplished by ensuring that all support functions (i.e. airtanker Bases and Local Dispatch Centers) that are required for the mobilization of national resources (i.e. Airtankers, Lead Planes, Aerial Supervision Modules, and Type 1 and 2 helicopters) are staffed and maintained to support mobilizations. Host GACCs will check with NICC prior to releasing flight crews on T-1 and T-2 airtankers and VLATs for the day when those resources are not being used within the host area, and could be utilized elsewhere for emerging or ongoing fire activity.

When a Geographic Area has depleted available airtankers, request(s) will be placed with the NICC. LATs may be used for initial attack across a GACC boundary when incident proximity allows for airtankers to respond loaded direct to the fire. An Aircraft Dispatch Request (or similar) should be sent direct to the sending GACC and dispatch center to launch the airtanker. An Interagency Resource Ordering Capability (IROC) resource order from the receiving GACC should be placed to NICC who will then place the order with the sending GACC.

Mobilization will occur through the NICC, then to the GACC where the airtanker is located. All airtanker resources are required to have a resource order generated through the IROC or Aircraft Dispatch Request (or similar) prior to departure. The airtanker type mobilized will be based on incident needs, resource availability, location in relation to the requesting unit, and aircraft and crew capability.

Note: Prepositioning may require a job code for the flight. The National Fixed-wing Coordinator has an assigned prepositioning code for this use. The job code will be provided to a requesting GACC.

Note: ASM/Lead planes shall be ordered and mobilized immediately with airtankers that require a lead plane. If an airtanker is not capable of or qualified to do initial attack, it shall not be dispatched. Reference Airtanker Rotation below.

7.5 Dispatching Procedures

Airtankers shall be dispatched using an Aircraft Dispatch Form, either the one generated by IROC or GACC. Reference Appendix A, Aircraft Dispatch Form. IROC Resource order forms are not an acceptable aircraft dispatch information format.

When ordered for Initial Attack an Aircraft Dispatch form is acceptable both within Geographic Area (GA) boundaries and when responding to a neighboring GA within a direct load carrying proximity—followed by a IROC order.

The following terminology will be used when requesting aircraft through NICC:

- Knots (kts) will be the standard term used to reference airspeed.
- VORs (Very High Frequency Omni-directional Range) will be used to reference direction.
- Latitude/Longitude must be provided in Degrees Decimal Minutes (DDM), utilizing GPS Datum WGS84 degrees and minutes.
- Airtankers will be referenced by the airtanker number; e.g., T-00.

7.6 Flight Following Procedures

7.6.1 Flight Following

Airtanker resources are identified in AFF as an orange fixed-wing icon.

Flight-Following is mandatory for all flights. Refer to the *National Interagency Mobilization Guide* for specific direction.

The pilot and dispatcher will determine the means of flight following before take-off, but this may also be accomplished once the aircraft is airborne.

Assigned dispatch will handle local flight-following responsibilities, unless otherwise specified. If agency flight following cannot be established or maintained, or radio communications cannot be established or maintained between the airtanker and other aerial resources, or ground personnel, the flight will be terminated. Dispatch will follow local *Airspace Boundary Plan* protocols for airspace de-confliction in jurisdictional boundary areas with adjoining cooperators/agencies before dispatching aircraft to those areas (reference aerial hazard maps).

- Agency FM radio capability is required for all mission flights.
- For mission flights, there are two types of agency flight following: Automated Flight Following (AFF) and radio check-in. AFF is the preferred method of agency flight following. If the aircraft and flight following office have AFF capability, it shall be utilized. Reference the AFF procedures section of the *National Interagency Mobilization Guide* for more information.

- All dispatch centers designated for fire support shall have the ability to monitor AFF as well as the capability to transmit and receive “National Flight Following” and “Air Guard.”
- If AFF becomes inoperable the aircraft will normally remain available for service, utilizing radio/voice system for flight following. Each occurrence must be evaluated individually and decided by the COR/CO.

7.6.2 National Flight Following Frequency (168.6500 MHz)

The National Flight Following Frequency is used for flight following, dispatch, or redirection of interagency and contract aircraft. No other use is authorized.

Airtankers will establish/terminate flight following, and confirm Automated Flight Following (AFF) on the National Flight Following frequency. All dispatch centers/offices will monitor the National Flight Following frequency at all times. A CTCSS tone of 110.9 must be placed on the transmit and receive sides of the National Flight Following frequency. Refer to the National Interagency Mobilization Guide, Chapter 50, Flight Management Procedures for detailed flight following procedures and requirements.

7.6.3 Flight Following Script

The following information is required every time a flight is initiated or continued with a dispatch center.

- Call Sign (Airtanker/ Tanker 36)
- Departure Location
- Number of flight crew on board
- Fuel on board (hours)
- Estimated time enroute (ETE)
- Destination
- AFF Confirmation

7.7 Airtanker Use In Optional and Post Season Periods

Note: Need for airtankers in pre and post season should be anticipated through use of Predictive Services at least 24-48 hours in advance. This allows for a much quicker response to actual airtanker orders. Orders shall be communicated to NICC through the GACC with a follow up to the National Fixed-Wing Coordinator.

Note: All airtanker orders outside of the MAP (unless already on Optional Use) or Optional Use period will allow 24-48 hours for activation. In some cases, aircraft and/or pilots may need annual inspections, which may take several days to arrange.

Post Season and Optional Use airtanker activations are processed by the CO, through the Designated Administrative Contracting Officers (ACO). The following process is used to activate airtankers during the Post Season and Optional Use periods:

1. The requesting GACC will place request(s) for airtankers with NICC
2. Regional or GACC personnel will not directly contact Contracting Officers or vendors for nationally contracted aircraft to inquire about aircraft availability.
3. NICC will notify the National Airtanker Program Manager (NATPM) or National Fixed-wing Coordinator (FWC) of the order. Alternate to the PM or FW Coordinator would be the National Aircraft Coordinator.
4. Informal inquiries to the NATPM or FWC regarding airtanker availability or other mobilization issues is appropriate, but the NATPM or FWC will also notify NICC to maintain communications.
5. NICC will notify the CO and the NATPM or FWC of request(s).
6. The CO and the NATPM will determine the availability of airtankers and will notify the national airtanker inspector(s) and pilot inspectors if needed. The CO will modify the contract as needed to activate the airtanker.
7. The NATPM or FWC will notify NICC of the available airtankers, inspection timing if necessary and other activation issues.
8. NICC will notify the GACC of the airtanker activation.

7.8 Very Large Airtankers

A VLAT carries in excess of 8,000 gallons of retardant. Because of their size, weight, and gallons, they will require additional operational, logistical equipment and considerations.

VLAT airtanker base operations will not limit or restrict the capacity of an airtanker base to load large airtankers. Large airtankers are the primary airtankers in the fleet, operations which affect their loading and turnaround in the pits or base will not be allowed. If this is the case or anticipated to be the case, a separate VLAT retardant base or alternate base must be planned for and implemented.

7.8.1 Flight Operations Considerations

- VLATs may be used on fires to augment Type 1, Type 2 and Type 3 airtankers, but not as a replacement.
- Establish flight paths holding areas/altitudes, to avoid creating hazards to other aerial resources within the Fire Traffic Area (FTA).
- To avoid wake turbulence, it is required to wait a minimum of 3 minutes after the VLAT has dropped to resume aerial operations near the pattern from the drop.
- Aerial supervision (leadplane or Aerial Supervision Module) is required by contract and interagency policy for VLATs while dropping retardant.

- The leadplane or ASM must be on scene prior to dispatching the VLAT.
- VLATs are less maneuverable than large airtankers and should be used in less challenging terrain that affords better maneuverability and effectiveness for dispensing.
- The VLATs minimum drop height is 250 feet above the ground or canopy cover whichever is higher. Generally, drop heights should increase when using higher coverage levels.

Each region/GACC will request evaluation by the National Airtanker Program of airports and/or airtanker bases where VLATs will operate. In most cases, these locations most likely will not be existing airtanker bases, but separated from an existing airtanker base on a pre-designated ramp area of an airport supported by a temporary retardant base.

Each designated VLAT base is required to have available the following for VLAT airtanker base operations:

- Airport overweight agreements. Airport overweight agreements shall be current and provide the appropriate weight allowances for the applicable VLAT. The VLATs on contract at this time have dual tandem main landing gear and fully loaded can weigh between 400,000 and 700,000 pounds.
- VLATs using existing airtanker bases will not impact LAT access to the pits or loading to include mixing and loading capacity.
- Maneuvering space during taxi into and out of the airtanker ramp and pit area. A minimum of 30 feet clearance (nose, wing tips and tail) from any other aircraft and obstacles.
- Foul line/boxes will be established for ground support equipment (GSE) to be relocated to prior to aircraft movement.
- Air stairs appropriate for the VLAT(s) on contract. The only VLAT on contract at this time cannot deplane easily. The VLAT contractor is responsible for hiring or leasing air stairs. The company (FBO or other) offering the air stairs is responsible to maneuver and place the air stairs. Forest Service personnel shall not operate or maneuver air stairs.
- Aircraft tug appropriate for the VLAT(s) on contract. VLAT's can weigh between 400,000 and 700,000 pounds fully loaded. Forest Service personnel shall not operate or maneuver tugs for contract aircraft.
- Retardant mixing and pump capacity to sustain continued VLAT operations for one day with resupply available for current or expected operations.
- Retardant off-load capability for the contracted retardant payload. The VLATs on contract will require approximately between 10,000 and 18,000 gallons of off-load liquid capacity.
- Defense Logistics Agency Aviation Into-plane Reimbursement (AIR) Card fuel on airport.

7.9 Modular Airborne Firefighting Systems (MAFFS)

MAFFS is a joint Forest Service and Department of Defense (Air Force) program governed by an interagency agreement. The Forest Service provides eight (8) MAFFS retardant delivery units. Three Air National Guard wings and one Air Force Reserve wing provide the C-130H/J aircraft and flight crews.

MAFFS provides surge capability to supplement commercial airtankers on wildland fires. MAFFS are National Resources when mobilized nationally and are used as a reinforcement measure when contract airtankers are committed or not readily available. MAFFS will be made available to assist foreign governments when requested through Department of State or other diplomatic Memorandum of Understanding (MOU).

Geographic Areas are responsible for ascertaining all suitable commercial large airtankers are assigned to wildland fires or committed to initial attack before placing a request for a MAFFS mission to NICC. For additional information, see the MAFFS Operating Plan.

The NICC is responsible for ascertaining that all suitable commercial contract airtankers nationally are committed to wildland fires, initial attack, or cannot meet timeframes of requesting units. When this occurs, the Coordinator on Duty (COD) will notify the WO Assistant Director, Operations. The WO Assistant Director, Operations or his/her acting, or in his/her absence, the WO Assistant Director, Aviation is responsible for initiating a MAFFS mission. Once approval is given, the NICC Manager activates the request through proper Department of Defense (DOD) channels.

After the initial contact has been made, the NICC will submit a Request for Assistance (RFA) to the DOD Liaison at NIFC. The Governors of California, Wyoming, and North Carolina may activate their respective Air National Guard MAFFS Wings for State-controlled fires. Approval for use of MAFFS equipment must be obtained from the FS Assistant Director, Operations, prior to this activation.

When National Guard MAFFS are activated by a governor, the FS Regional Office for that State will assign an accounting code for the incident. The Regional Office shall notify the WO Assistant Director, Operations of state MAFFS activations.

7.10 MAFFS Ordering Criteria

1. FS domestic requests will be placed through established ordering channels to NICC.
2. NICC will place a Request for Assistance (RFA) to the NIFC Defense Coordinating Officer (DCO). The DCO places the RFA concurrently with the US Northern Command and the Joint Directorate of Military Support for approvals.
3. The requesting Geographic Area needs to order the following support:
 4. 1 each MAFFS Liaison Officer (MLO aka MAFF) and 1 each MLO trainee
 5. 1 each Airbase Radio Kit (NFES 4660)
 6. 1 each MAFFS Communications Specialist (THSP)

7. 1 each Assistant MAFFS Liaison Officer
8. 1 each MAFFS Airtanker Base Manager (MABM) and 1 each MABM trainee
9. Logistics, Finance, and Information personnel
10. MAFFS Operations must also include a MAFFs qualified Lead Plane.

The Receiving Unit must be prepared to provide administrative support (procurement, motel rooms, phones, office space, clerical and timekeeping support, transportation) to accommodate as many as 26 people per two (2) aircraft. Refer to the current MAFFS Operating Plan for specifics.

7.11 Airtanker Rotation

The national interagency airtanker fleet is composed of EU and CWN airtankers. All large and very large airtankers operating from the same base shall be dispatched in rotation based on the type of airtanker requested (LAT, VLAT), on a first in/first out basis regardless of contract type (EU, CWN), or the location of the incident.

For example, if an incident commander orders an airtanker without specifying LAT or VLAT, the procedure would be for the airtanker base through dispatch to ensure that the IC could use either one. If one or the other, the rotation may be changed to accommodate the order.

First in/first out also applies to airtankers that are requested for a load/return. When an incident requires multiple loads of retardant, aerial supervisors/incident commanders will notify the appropriate dispatch center of the need for additional retardant and any operational retardant delivery requirements. Dispatch will provide any restrictions or limitations in the order to the airtanker base. To ensure timely and effective retardant delivery, the next available airtanker in rotation that can fill the order, is available and located at the load and return airtanker base will be dispatched.

7.12 Exceptions

1. Airtankers that are not Initial Attack (IA) qualified will not be dispatched to a fire unless a Lead Plane or Aerial Supervision Module (ASM) is on scene.
2. Incident commanders and/or aerial supervisors determine aircraft use based on operational necessity or safety.
3. The next airtanker in rotation has an operating restriction at the base where it is being assigned. Operating restrictions include but are not restricted to: fuel and retardant availability, significant downloading, performance degradation, incident proximity negates effectiveness, daylight remaining, and airtanker base or airport restrictions.
4. Repositioning of an airtanker closer to where their maintenance crews or supplies are available. The National Interagency Coordination Center (NICC) will facilitate in coordination with the Geographic Area Coordination Center (GACC).

5. If a benefit to the government would be realized by changing the rotation based on a specific order, the rotation may be changed. This will be facilitated by the GACC or NICC with consideration to days off, mission requirements, and/or anticipated need.
6. Airtankers returning after day(s) off. Upon returning to availability, these airtankers will be at the end of the rotation at the airtanker base. Airtankers that work a seven day schedule retain their position in the rotation.
7. MAFFS and Canadian airtankers supplementing the commercial airtanker fleet will begin rotation at the base after the contracted and FS owned airtankers at the beginning of each day.

Water scoopers will not be included in airtanker base rotations.

7.13 Rotation of State and Compact Airtankers

Rotation of State and State hosted Compact resources on State incidents at a state airtanker base is established by the host state agency. In cases where federally approved State and Compact resources are operated in conjunction with federally contracted airtankers on an incident primarily on federal lands they will be added to the rotation after the federal airtankers at the beginning of each day.

At federal airtanker bases, State and Compact airtankers not federally approved will be not be part of the rotation. They shall not be dispatched to federal incidents except for the exception in the Interagency Standards for Fire and Fire Aviation Management Operations Chapter 16.

Note: FS/Department of Interior (DOI) contracted airtankers, when assigned to incidents managed by other agencies or state cooperators remain under the direction of the Contracting Agency. FS and DOI contracted airtankers are bound only by their contract and will be treated fairly and equitably during their assignment with other federal or state agencies.

7.14 Cooperator and Canadian Airtankers

Cooperator contracted airtankers also on an existing federal CWN contract with federal aircraft and pilot cards may be utilized on federally-managed fires when cooperative agreements are in place and the aircraft have been approved by USDA Forest Service/ Department of the Interior letter.

Utilization of approved Cooperator airtankers shall be limited based on 49 United States Code §40125.

- All approved Cooperator aircraft used on federally-managed fires shall be released when federal aircraft become reasonably available.
- The use of Cooperator aircraft must involve a “significant and imminent threat to life or property” documented daily on the Cooperator Aircraft Use Validation Worksheet (National Mobilization Guide Chapter 80 Forms) to document the justification for aircraft utilization.

7.14.1 Canadian Airtankers

Canadian airtankers and scoopers can be activated through the NIFC/CIFFC agreement or through Compacts (US State-to-Canadian Province). These Canadian airtankers typically operate as a “group” with Canadian Bird Dogs as part of their operational model. Bird Dogs have a Canadian Air Attack Officer (AAO) on board and function similar to a U.S. ASM.

- NIFC/CIFFC Ordered Canadian Aircraft – Aircraft ordered through the National Interagency Fire Center agreement with the Canadian Interagency Forest Fire Center may be used on federal lands if the aircraft have been inspected and approved by USDA Forest Service/ Department of the Interior letter.
- Compact Ordered Aircraft – Aircraft and flight crews ordered through U.S. State to Canadian Province compacts will be considered non-federally approved Cooperator aircraft, unless they have been previously inspected and approved by the USDA Forest Service/ Department of the Interior.

The standard operating procedure for the Canadian Airtanker Groups is as follows:

- Canadian airtankers must be supervised by a Bird Dog or U.S. ASM/leadplane, and must include at a minimum a low level “show me” pass.
- Canadian Bird Dogs may provide low level target identification runs (“show me” pass) for either Canadian or US contracted airtankers.
- Canadian Bird Dogs are not authorized to “lead” U.S. federally-contracted 8 airtankers.
- Canadian Bird Dogs can perform the functions of an ATGS.
- U.S. ASM/leadplanes are authorized to “lead” Canadian airtankers.

Refer to the Interagency Standards for Fire and Aviation Operations, Chapter 16 for additional information regarding Cooperator and Canadian airtankers.

7.15 Operations in Low Light/Adverse Flight Conditions

Incident aviation operations are often conducted under adverse flight conditions. Congested airspace, reduced visibility, poor weather and mountainous terrain all add risk and complexity to operations.

Complexity must dictate the level of supervision required to safely and effectively conduct aerial operations. Aerial supervision may be provided by a Leadplane, ASM, ATGS or HLCO. Dispatchers and Airtanker Base Managers, in consultation with aerial supervisors, are mutually responsible for ensuring that policies are applied and limitations not exceeded.

7.16 Retardant Operations during Low Light Conditions

Retardant operations will only be conducted during daylight hours. Multi-engine airtankers may be dispatched to arrive over a fire (with no aerial supervision scene) not earlier than 30 minutes after official sunrise and not later than 30 minutes before official sunset. Retardant operations are permitted after official sunset, but must have concurrence by the involved flight crews. In addition, aerial supervision (Lead, ASM, or ATGS) must be on scene. Daylight hours are defined as 30 minutes prior to sunrise until 30 minutes after sunset as noted in figure 2 below. Flights by multi-engine aircraft to assigned bases may occur after daylight hours.

1. In Alaska an airtanker pilot shall not be authorized to drop retardant during periods outside of civil twilight.
2. SEATs and helicopters are limited to flight during the official daylight hours.
3. Flight crews might experience late dawn or early dusk conditions based on terrain features and sun angle, and flight periods should be adjusted accordingly. Daylight hours may be further limited at the discretion of the pilot, aviation manager, ATGS, ASM, or Leadplane because of low visibility conditions caused by smoke, shadows or other environmental factors.

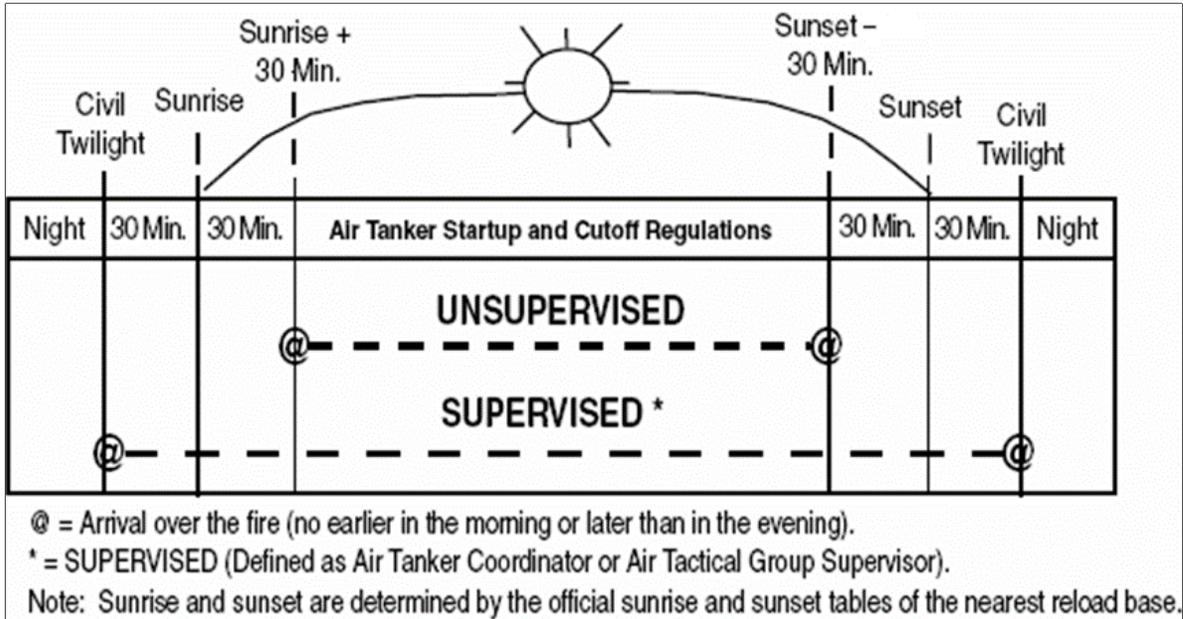


Figure 2. Multi-engine Airtanker Startup and Cutoff Regulations

7.17 Loading Retardant

Forest Service contracted airtankers and Modular Airborne Firefighting System (MAFFS) airtankers shall be loaded using a Mass Flow Meter to measure the retardant payload in pounds regardless of which agency owns or manages the airtanker base. Airtankers may only carry tank loads less than or equal to their Interagency Airtanker Board approved max tank volume at calculated at nine (9) pounds per gallon of retardant. Neither limit may be exceeded without approval from the National Airtanker Program Manager. Loading ceases once the first limit is reached.

The retardant load total weight and average density of the load shall be reported to the airtanker pilot-in-command. The retardant load total weight shall be used in the preflight completion of the aircraft’s weight and balance computation.

NOTE: LATs and VLATs shall not be loaded with water with the intent of dropping water instead of retardant.

7.18 Retardant Hot Loading

Retardant Hot Loading (RHL) is the loading of retardant with one or more propulsion engines running.⁴ Retardant Hot Loading can save turnaround time during reloading operations while responding to ongoing fires. It also significantly reduces maintenance times on turbine engine components. Both contractors and cooperators may be approved for RHL.

Approval for RHL shall be in writing to contractors and in cooperator approval letters.

Retardant Hot Loading for turbine airtankers is authorized with the following actions:

1. Cooperator airtankers will have been evaluated and approved by the appropriate Regional Aviation Officer in a Cooperator Letter for this purpose.
2. The contractor or a cooperator will document a risk assessment and operating practices for their particular airtanker and comply with those policies during this activity.
 - a. For contractors, the risk assessment and operating practices will be provided to the Contracting Officer and reviewed by the National Airtanker Program Manager and the Branch Chief, Aviation Safety.
 - b. For cooperators, the risk assessment and operating practices will be provided to the appropriate RAO and reviewed by the RASM.
3. Each airtanker base that intends to conduct Hot Retardant Loading will develop an annex or supplement to the local Base Operating Plan which will describe the training and practices to be used. The supplement will be reviewed by the RAO.
4. Base personnel who will participate in this operation will be trained using the Hot Retardant Loading supplement. A record of this training will be maintained at the base.
5. Retardant Hot Loading shall be requested by the government (Base Manager) on a case by case basis.
6. A documented pre-operational briefing shall occur between the flight crew and base personnel prior to any Retardant Hot Loading operations. This briefing will include a review of the local Retardant Hot Loading Operations supplement, contractor procedures, and airport procedures.
7. No engines on the side of the retardant loading activity may be running.

7.19 Simultaneous Fueling and Retardant Loading

Simultaneous loading (SL) is the concurrent loading of fuel and retardant with propulsion engines stopped. An onboard Auxiliary Power Unit (APU) may be in operation.

⁴ Retardant Hot Loading is also known as Hot Retardant Loading. The 2015 Washington Office letters regarding contract and cooperator Hot Retardant Loading will be considered to be referring to Retardant Hot Loading.

Simultaneous loading can save turnaround time during reloading operations while responding to ongoing fires. In some cases with very large turbine aircraft this can be as much as 30 minutes. Both contractors and cooperators may be approved for SRL.

Approval for SL shall be in writing to contractors and in cooperator approval letters.

Simultaneous loading for turbine airtankers is authorized with the following actions:

1. The contractor or a cooperator will provide documentation of a risk assessment and operating practices for their particular airtanker and comply with those policies during this activity.
 - a. For contractors, the risk assessment and operating practices will be provided to the Contracting Officer and reviewed by the National Airtanker Program Manager and the Branch Chief, Aviation Safety.
 - b. For cooperators, the risk assessment and operating practices will be provided to the appropriate RAO and reviewed by the RASM.
2. Each airtanker base that intends to conduct Simultaneous Loading will develop an annex or supplement to the Base Operating Plan which will describe the training and practices to be used. The supplement will be reviewed by the Regional Aviation Officer (RAO).
3. Base personnel who will participate in this operation will be trained using the Simultaneous Loading supplement and a record maintained at the base.
4. Simultaneous Loading shall be requested as needed by the government (Base Manager) on a case by case basis.
5. A documented pre-operational briefing shall occur between the flight crew, Base Manager, and local airport fuelers prior to any simultaneous loading operation. This briefing will include a review of the Simultaneous Loading Operations supplement, contractor procedures, and airport procedures.
6. Only the Auxiliary Power Unit may be running, no propulsion engines are allowed to run.

7.20 Contract Airtanker Deployments to Canada

Forest Service contracted airtankers may be ordered for more than initial response through agreement for use in Canadian provinces.

When ordered and deployed for more than two operational periods, an airtanker COR approved by the National Airtanker Program Manager will be ordered and deployed with the contract airtanker to administer the contract and be a liaison with the province and the Canadian Interagency Forest Fire Center.

The order and assignment will be coordinated with NICC and FS Operations.

8.0 Aerial Supervision

National coordination and management of leadplane and ASM aircraft and staffing is required to ensure there is aerial supervision coverage, response and capability nationwide. The Forest Service Aerial Supervision Program Manager and Forest Service Fixed-wing Coordinator coordinate and manage aerial supervision staffing, aircraft readiness and availability, capability, and response with pilots, aerial supervisors, regional aviation staff, Bureau of Land Management National Aviation staff, and the National Interagency Coordination Center.

8.1 Retardant Drops

1. Qualified Initial Attack Airtanker Pilots (AKI) are authorized to drop retardant on fires without the supervision of a Leadplane (LP)/ASM, or Air Tactical Group Supervisor (ATGS).
2. Non-AKI qualified pilots are not authorized to drop retardant on fires unless an LP or ASM is over the fire and supervises the drop.
3. Retardant shall be dropped as accurately as possible on the designated target areas of the fire. Minimum drop height for large airtankers is 150 feet above the ground or canopy cover, whichever is higher. Minimum drop height for very large airtankers is 250 feet above the ground or canopy cover, whichever is higher.
4. Generally, drop heights should increase when using higher coverage levels.
5. To reduce the hazards of airtanker retardant drops in the early morning and late afternoon hours, the following limitations shall apply. These limitations apply to the time the aircraft arrives over the fire, NOT to the time the aircraft conducts retardant drops.

Aerial supervision resources must be launched together with the airtanker on the initial order to maximize safety, effectiveness, and efficiency of incident operations. Incidents with 3 or more aircraft over/assigned will have aerial supervision over/assigned the incident. Federal policy dictates additional requirements listed as follows in table 2.

Table 2. Aerial Supervision Requirements

SITUATION	LEAD/ASM	ATGS
Airtanker not IA rated	Required	N/A
MAFFS	MAFFS endorsed LEAD/ASM	N/A
VLAT	VLAT Endorsed Lead/ASM	N/A
Requested by airtanker, ATGS, Lead, or ASM	Required	Required

SITUATION	LEAD/ASM	ATGS
Foreign government airtankers	Required if no ATGS	Required if no Lead/ASM
Multi-engine airtanker: Retardant drops conducted between 30 minutes prior to, and 30 minutes after sunrise, or 30 minutes prior to, or 30 minutes after sunset	Required if no ATGS	Required if no Lead/ASM
Retardant drops in congested/urban interface areas	Order	May use if no Lead/ASM
Periods of marginal weather, poor visibility or turbulence	Order	Order
Single engine airtanker (SEAT) – Must have landed sunset + 30 min	See level 2 SEAT requirement	See level 2 SEAT requirement
Level 2 SEAT requirements: Level 2 rated SEAT operating over an incident with more than one other tactical aircraft on scene	Required if no ATGS	Required if no Lead/ASM
<i>Source: 2017 Interagency Aerial Supervision Guide.</i>		

8.2 Tactical Flight Profiles

8.2.1 Show Me Profile

A Show Me Profile (figure 3) is a low level pass made over the target using the physical location of the aircraft to demonstrate the line and start point of the retardant drop. The Show-Me Profile is normally used for the first airtanker on a specific run or when an incoming airtanker has not had the opportunity to observe the previous drop. A Show-Me can be used alone or before other profiles. The pilot begins the run when the airtanker crew can visually identify the aircraft, hazards, line, start and exit point of the drop.

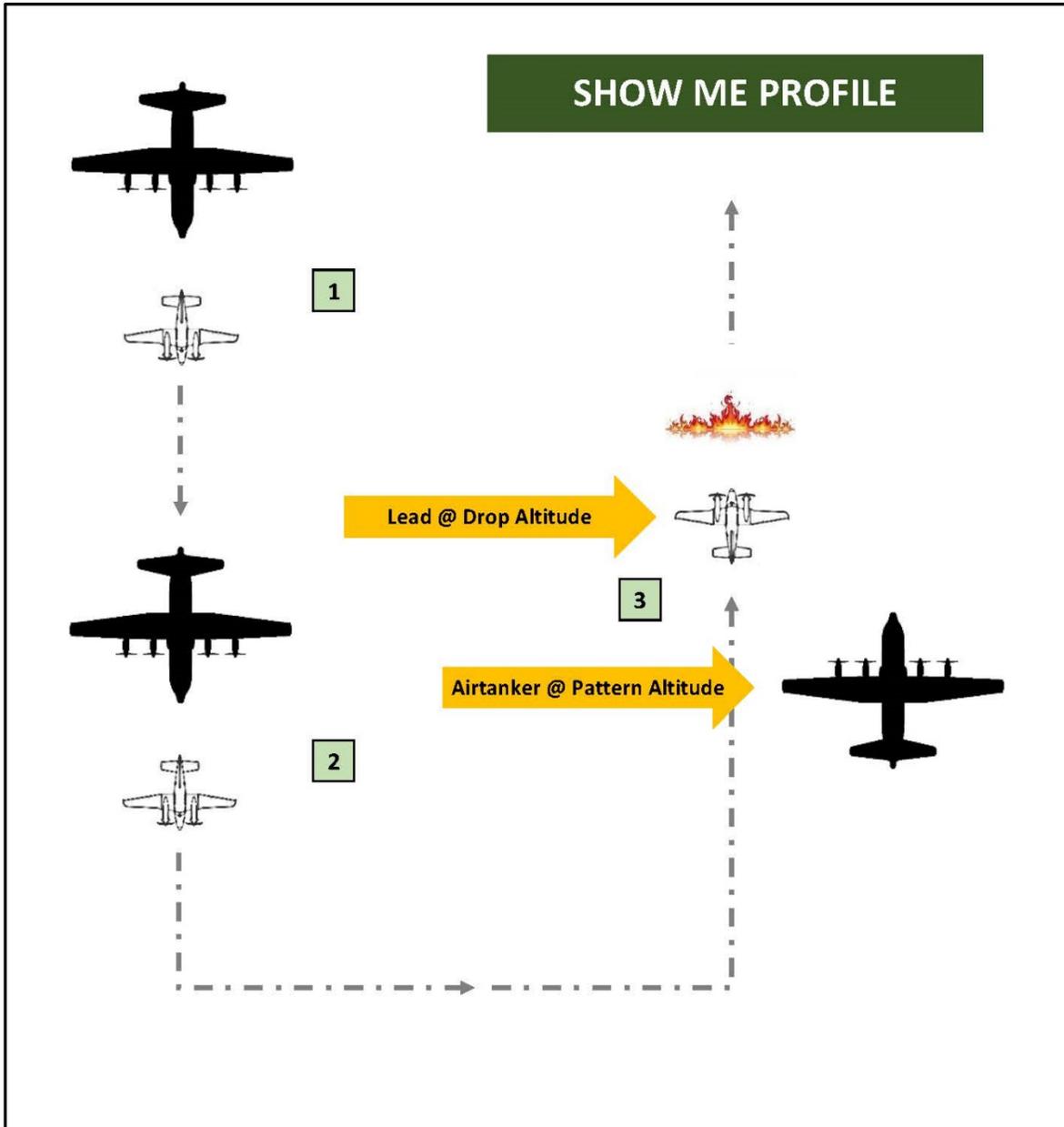


Figure 3. Show Me Profile

8.2.3 Lead Profile

The Lead Profile (figure 5) is a low level (below 500' AGL) airtanker drop pattern, made with the Leadplane approximately 1/4 mile ahead of the airtanker. The Lead Profile is used at the request of the Airtanker Crew, or when the line or start point is difficult to see or to describe due to lack of visibility or references.

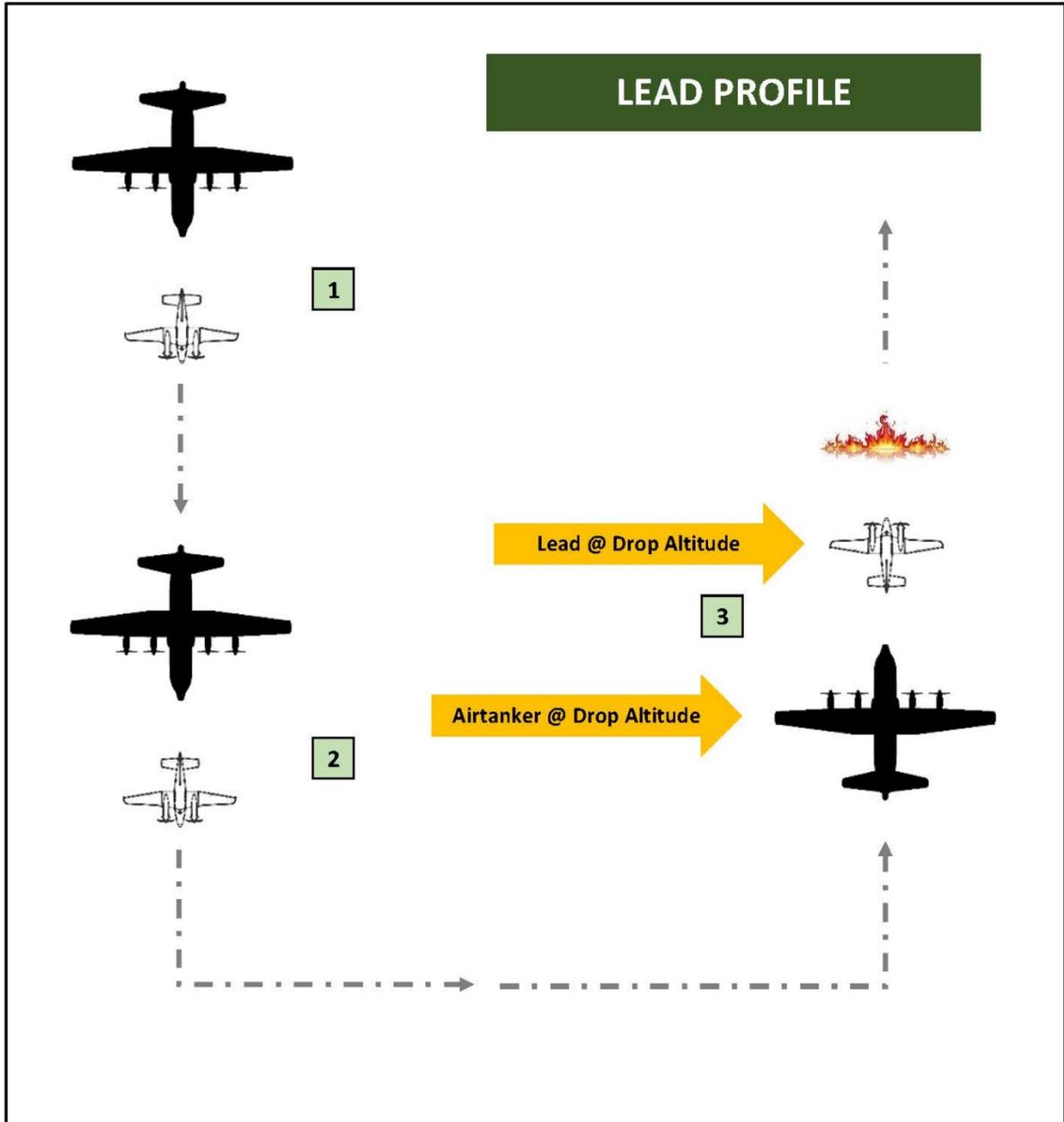


Figure 5. Lead Profile

9.0 Pilot Proficiency

Each year prior to use of pilots working on FS airtanker contracts, the FS will conduct pre-use inspections of contract pilots for compliance with the contract specifications and conditions.

Pre-use check flights shall be scheduled by the Contractor with the FS to occur approximately 21-days prior to the MAP. When a pilot has met inspection criteria they will be issued a pilot card. Once carded the pilot may operate as specified in the airtanker contract. The card is valid through the expiration date and can only be altered by FS Pilot Inspector who issued the card.

Refer to the contract for pilot proficiency requirements during the MAP.

10.0 Flight Hour and Duty Limitations

All flight time when actually flying the aircraft as PIC or SIC, regardless of how or where performed, except personal pleasure flying, shall be reported by each Flight Crewmember and used to administer flight hour and duty time limitations.

Flight time includes, but is not limited to: military flight time; charter; flight instruction; 14 CFR Part 61.56 flight review; flight examinations by FAA designees; any flight time for which a flight crewmember is compensated; or any other flight time of a commercial nature whether compensated or not.

1. Pilots
 - a. Flight time will be measured using the information in G-2 of the airtanker contract.
 - b. Flight time shall not exceed a total of 8-hours per day
2. Pilots accumulating 36 or more flight hours in any 6-consecutive duty-days shall be off duty the next day. Flight time shall not exceed a total of 42-hours in any 6-consecutive days. After any 1-full off-duty day, pilots begin a new 6-consecutive day duty-period for the purposes of this clause, providing during any 14-consecutive day period, each pilot shall have 2 full days off-duty. Days off need not be consecutive. The contractor may propose alternate schemes for crew days off (i.e. 12 on and 12 off, see B-7 of the airtanker contract).
3. Assigned duty of any kind shall not exceed 14-hours in any 24-hour period. Within any 24-hour period, pilots shall have a minimum of 10-consecutive hour's off-duty immediately prior to the beginning of any duty day. Local travel up to a maximum of 30-minutes each way between the work site and place of lodging shall not be considered
4. Duty time. When one-way travel exceeds 30-minutes, the total travel time shall be considered as part of the duty day.

5. Duty includes flight time, ground duty of any kind, and standby or alert status at any location.
6. Pilots may be relieved from duty for fatigue or other causes created by unusually strenuous or severe duty before reaching duty limitations.
7. During times of prolonged heavy fire activity, the Government may issue a notice reducing the pilot duty-day/flight time and/or increasing off-duty days on a geographical or agency-wide basis.
8. Flights point-to-point (airport-to-airport, etc.) with a pilot and co-pilot shall be limited to 10-flight hours per day. (An aircraft that departs “Airport A,” flies reconnaissance on a fire, and then flies to “Airport B,” is not point-to-point).
9. When pilots act as a mechanic, mechanic duties in excess of 2-hours shall apply as flight time on a one-to-one basis toward flight time limitations.
10. Relief, additional, or substitute pilots reporting for duty under this contract shall furnish a record of all duty and all flight hours during the previous 14-days. Pilots shall be FAA qualified, FAA current, proficient and approved in the special mission and FAA current in the aircraft.

11.0 Aviation Safety

11.1 Hazards

Aerial firefighting presents many hazards and risks associated with the dynamic nature of operations and the fire environment. Historic data identifies most hazards develop while airborne and during times of communication complexities. Common hazards include but are not limited to:

1. Airspace congestion/aircraft proximity/co-altitude
2. Low visibility
3. Hazardous/masking terrain
4. Low level flight profiles
5. Weather/wind shift/Variable wind conditions
6. Insufficient aerial supervision
7. Lack of communication
8. Communication blocking
9. Sense of urgency
10. Mission focus based on unreasonable expectations

This environment demands a significant level of situational awareness. Hazards such as these can overwhelm operators, causing loss of situational awareness, possibly leading to more complex/simultaneous hazards increasing risk and mishap potential.

11.2 Operational Risk Management

A Flight Risk Assessment Tool (FRAT) is required for every FS flight. It is recommended to use a FRAT sheet during mission planning, and update as necessary (see Appendix D).

11.3 Risk Refusal

Every individual (government and contracted employees) has the right and obligation to report safety problems affecting his or her safety and has the right to contribute ideas to correct the hazard. In return, supervisors are expected to give these concerns and ideas serious consideration. When an individual feels an assignment is unsafe, he or she also has the obligation to identify, to the degree possible, safe alternatives for completing that assignment. Turning down an assignment is one possible outcome of managing risk.

Note: Any threat, implied or otherwise regarding release from assignment, adverse contract action or reassignment based on refusing risk shall be reported to Regional/State and National Aviation Safety Managers who will coordinate with the specific aircraft program manager and contracting officer.

A “turn down” is a situation where an individual has determined he or she cannot undertake an assignment as given, and is unable to negotiate an alternative solution. The turn down of an assignment must be based on assessment of risks and the ability of the individual or organization to control or mitigate those risks. Individuals may turn down an assignment because of safety reasons when: There is a violation of regulations, aviation policy or safe aviation practices;

- There is a violation of regulated safe aviation practices.
- Communication issues.
- Airspace congestion or inadequate management.
- Aircraft capabilities, performance and/or limitations.
- Environmental conditions make the work unsafe.
- Flight crew, air crew or support personnel lack the necessary qualifications or experience.

Individuals will directly inform their supervisor that they are turning down the assignment as given. The most appropriate means of documented turn down criteria is using the Aviation Watch Out Situations (*IRPG*).

Supervisors will notify the Air Operations Branch Director (AOBD) or Unit Aviation Leadership immediately upon being informed of a turn down. If there is no AOBD, notification shall go to the appropriate Section Chief, the Incident Commander or local fire and aviation staff. Proper handling of turn downs provides accountability for decisions and initiates communication of safety concerns within the incident organization.

If the assignment has been turned down previously and the supervisor asks another resource to perform the assignment, he or she is responsible to inform the new resource

that the assignment had been turned down and the reasons why. Furthermore, personnel need to realize that a “turn down” does not stop the completion of the assigned operation. The “turn down” protocol is an integral element that improves the effective management of risk, for it provides timely identification of hazards within the chain of command, raises risk awareness for both leaders and subordinates, and promotes accountability.

If an unresolved safety hazard exists the individual needs to communicate the issue/event/concern immediately to his or her supervisor and document as appropriate.

Twelve Standard Aviation Questions That Shout **Watch Out!**

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Is this flight necessary?</p> <p>2. Who is in charge?</p> <p>3. Are all hazards identified and have you made them known?</p> <p>4. Should you stop the operation on the flight due to change in conditions?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Communications <input type="checkbox"/> Weather <input type="checkbox"/> Confusion <input type="checkbox"/> Turbulence <input type="checkbox"/> Personnel <input type="checkbox"/> Conflicting Priorities <p>5. Is there a better way to do it?</p> <p>6. Are you driven by an overwhelming sense of urgency?</p> | <p>7. Can you justify your actions?</p> <p>8. Are there other aircraft in the area?</p> <p>9. Do you have an escape route?</p> <p>10. Are any rules being broken?</p> <p>11. Are communications getting tense?</p> <p>12. Are you deviating from the assigned operations of flight?</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Anyone can refuse or curtail a flight when an unsafe condition may exist. Never let undue pressure (expressed or implied) influence your judgment or decisions.
Avoid mistakes, don't hurry!**

MFES 1129 (1998)

12.0 Large Airtanker Information

12.1 Aircraft: Boeing (McDonnell Douglas) MD-87 Next Gen Large Airtanker

Vendor: Erickson Aero Air (Aero Air)

Background: The MD-87 was awarded two line items Next Generation (NG) 1.0 Large Airtanker Exclusive Use contract.

Key Points:

- ▶ The MD-87 has a retardant capacity of 3000 gallons or 27,000 pounds.
- ▶ The MD-87 can operate from almost all existing Airtanker Bases with no operational limitations.
- ▶ The MD-87 is required to drop retardant with their landing gear down per their FAA Supplemental Type Certificate.
- ▶ **Facilities:** The MD-87's normal operating weight is approximately 124,000 lbs. in contract configuration. For weight bearing purposes it has a dual wheel configuration.
- ▶ Airtanker Base and parking ramps must have a weight bearing capacity sufficient to support the MD-87. Local bases need to insure both the airport and agency engineering have data indicating ramp weight bearing capacity at the base. Letters documenting waivers for over-weight operations and drawings of the ramp structure must be on file at the airtanker base.
- ▶ Operations of the MD-87 may need to be more closely monitored with other aircraft types for nose tail spacing and wing tip clearance. Wing walkers are essential near obstacles as the wing tips are less visible from the flight deck. Break away thrust as they begin their taxi should be considered in all parking arrangements.
- ▶ Simultaneous Loading and Fueling and/or Retardant Hot Loading (RHL) may be authorized. The contractor must have documented risk assessment and operations practices approved by the CO, NATPM and the WO Branch Chief, Aviation Safety. The airtanker base manager (ATBM) is delegated the decision authority for these types of operations.
- ▶ Loading and servicing the MD-87 can be accomplished on either side of the aircraft. A connector allows for extension of the port during loading. A sample loading operation can be found here: http://youtu.be/3ho_R_ovd3Q
- ▶ **Response Time and Supervision:** Low-level aerial supervision (a Leadplane/ ASM) may be required for this aircraft if the Pilot in Command is not Initial Attack rated.



- ▶ The cruising speed of the MD-87 is around 320 knots (TAS) on fire response and 420 knots for reposition flights. Users/dispatchers will need to plan for LP/ASM arrival if the pilot is not initial attack qualified. Responses shorter than 150 nm will be similar to existing airtankers.
- ▶ The Aero Air MD-87s have full IAB approval for 3000 gallons of retardant.
- ▶ **Terrain:** Large Airtankers (LATs), like the MD-87 can be used in challenging terrain.
- ▶ The MD-87 is relatively agile for its size and requires some planning by the supervising aircraft to provide a stabilized path for delivery. Flight paths for pattern speeds of 130 to 140 knots on final should be planned.
- ▶ The MD87 drop height is a minimum of 150 feet above the ground or canopy cover, whichever is higher. Generally, drop heights should increase when using higher coverage levels.

12.2 Aircraft: British Aerospace BAe-146

Vendor(s): Neptune Aviation Services and Air Spray USA Ltd.

Background: Neptune has 4 line items on the 2.0 Large Airtanker Exclusive Use contract and several line items on the Call-When-Needed (CWN) contract.

Air Spray has not produced an airtanker that meets the current contracts to date.



Key Points:

- ▶ The BAe-146 has a retardant capacity of 3000 gallons or 27,000 pounds.
- ▶ The BAe-146 has operational limitations at Airtanker Bases which have short runways or high elevations and higher temperatures.
- ▶ **Facilities:** The BAe-146 normal operating weight is approximately 88,000 lbs. in contract configuration. For weight bearing purposes it has a dual wheel configuration.
- ▶ Letters documenting waivers for over-weight operations and drawings of the ramp structure must be on file at the airtanker base.
- ▶ Operations in and out of existing pits have occurred for several years. The jet engines may create more thrust as they begin rolling than prop aircraft so consideration should be given for items placed both behind the aircraft while parked and objects that may be affected by the thrust as the aircraft turns during taxi.
- ▶ Simultaneous Loading and Fueling and/or Retardant Hot Loading (RHL) may be authorized. The contractor must have documented risk assessment and operations practices approved by the CO, NATPM and the WO Branch Chief, Aviation Safety. The

airtanker base manager (ATBM) is delegated the decision authority for these types of operations.

- ▶ Loading and servicing the 146 can be accomplished on either side of the aircraft. The two doors on either side provide access to loading port, control switches, lights, and readouts. A short adaptor hose is used to facilitate loading due to the recessed nature of the loading port.
- ▶ **Response Time and Supervision:** Low-level aerial supervision (a Leadplane/ ASM) may be required for this aircraft if the Pilot in Command is not Initial Attack rated.
- ▶ The cruising speed of the 146 is approximately 340 knots (TAS) on fire response and 380 knots for reposition flights. Responses shorter than 150 nm will be similar to existing airtankers.
- ▶ The Neptune 146s have full IAB approval for 3000 gallons of retardant. Air Spray has just begun drop testing as of late 2018.
- ▶ This aircraft can land partially loaded but will normally require a jettison down to max landing weight.
- ▶ **Terrain:** Large Airtankers (LATs), like the 146 can be used in challenging terrain.
- ▶ The 146 is relatively agile for its size and requires some planning by the supervising aircraft to provide a stabilized path for delivery. Flight paths for pattern speeds of 130 to 140 knots on final should be planned.

The 146 drop height is a minimum of 150 feet above the ground or canopy cover, whichever is higher. Generally, drop heights should increase when using higher coverage levels.

12.3 Aircraft: Avro RJ85

Vendor: Aero Flite

Background: Aero Flite was awarded two line items on the NG 1.0 and two on the 2.0 Large Airtanker Exclusive Use contract and several line items on the CWN contract.

The airframe is very similar to the BAe-146 but has upgraded avionics, improved engines, and a higher max gross weight and is generally 10 years newer than the -146.



Key Points:

- ▶ The RJ85 has a retardant capacity of 3000 gallons or 27,000 pounds.
- ▶ The RJ85 has operational limitations at Airtanker Bases which have short runways or high elevations and higher temperatures.

- ▶ **Facilities:** The RJs normal operating weight is approximately 97,500 lbs. in contract configuration. For weight bearing purposes it has a dual wheel configuration.
- ▶ Letters documenting waivers for over-weight operations and drawings of the ramp structure must be on file at the airtanker base.
- ▶ Operations of the RJ have occurred out of existing airtanker bases for several years. The jet engines may create more thrust than propeller aircraft as they begin rolling so consideration should be given for items placed both behind the aircraft while parked and objects that may be affected by the thrust as the aircraft turns during taxi.
- ▶ Simultaneous Loading and Fueling and/or Retardant Hot Loading (RHL) may be authorized. The contractor must have documented risk assessment and operations practices approved by the CO, NATPM and the WO Branch Chief, Aviation Safety. The airtanker base manager (ATBM) is delegated the decision authority for these types of operations.
- ▶ Loading and servicing the RJ85 can be accomplished on either side of the aircraft. Access panels on both sides of the aircraft open to reveal loading ports. Lights and switches in the fuselage assist in loading to the proper volume.
- ▶ **Response Time and Supervision:** Low-level aerial supervision (a Leadplane/ ASM) may be required for this aircraft if the Pilot in Command is not Initial Attack rated.
- ▶ The cruising speed of the RJ is around 340 knots (TAS) on fire response and 380 knots for reposition flights. Users/dispatchers will need to plan for LP/ASM arrival when responding on longer dispatches if the pilot is not initial attack qualified. Responses shorter than 150 nm will be similar to legacy airtankers.
- ▶ The RJ85 has full approval from the IAB for 3000 gallons of retardant.
- ▶ This aircraft can land partially loaded but will require a jettison down to max landing weight.
- ▶ **Terrain:** Large Airtankers, like the RJ85 can be used in challenging terrain
- ▶ Flight paths for pattern speeds of 130 to 140 knots on final should be planned.
- ▶ The RJ85 drop height is a minimum of 150 feet above the ground or canopy whichever is higher. Generally, drop heights should increase when using higher coverage levels.

12.4 Aircraft: Lockheed C-130Q

Vendor: Coulson Aviation USA

Background: The C-130Q was awarded one line item on the NG 1.0 Large Airtanker Exclusive Use contract and Coulson has one line item on the CWN contract.

Key Points:



- ▶ The C-130Q has a retardant capacity of 4000 gallons or 36,000 pounds.
- ▶ The C-130Q can operate from most existing Airtanker Bases with no operational limitations.
- ▶ **Facilities:** The C-130HQ has a normal operating weight of 126,800 pounds. For weight bearing purposes C-130 has a Single Tandem configuration. Airtanker Bases, runway, taxiways and parking ramps must have a weight bearing capacity sufficient to support the aircraft. Local bases need to insure both the airport and agency engineering have data indicating ramp weight bearing capacity at the base. Letters documenting waivers for over-weight operations and drawings of the ramp structure must be on file at the airtanker base.
- ▶ Operations of the C-130Q may need to be more closely monitored with other aircraft types for spacing and wing tip clearance. While there is good visibility from the flight deck, wing walkers are essential for taxi and base maneuvering.
- ▶ Simultaneous Loading and Fueling and/or Retardant Hot Loading (RHL) may be authorized. The contractor must have documented risk assessment and operations practices approved by the CO, NATPM and the WO Branch Chief, Aviation Safety. The airtanker base manager (ATBM) is delegated the decision authority for these types of operations. Loading and servicing the C-130Q can be accomplished on either side of the aircraft.
- ▶ **Response Time and Supervision:** Low-level aerial supervision (a Leadplane/ ASM) may be required for this aircraft if the Pilot in Command is not Initial Attack rated.
- ▶ The cruising speed of the C-130H is approximately 300 knots (TAS) on fire response and 360 knots for reposition flights. Users/dispatchers will need to plan for LP/ASM arrival when responding on longer dispatches if the pilot is not initial attack qualified. Responses shorter than 150 nm will be similar to existing airtankers.
- ▶ The C-130Q has full approval from the IAB for 4000 gallons of retardant. The dispensing system can select all required coverage levels.
- ▶ **Terrain:** Large Airtankers (LATs), like the C-130Q can be used in challenging terrain. Crews have significant experience both in the aircraft and as Captains in the MAFFS program.
- ▶ The C-130H is highly agile for its size yet still requires a stabilized path for delivery. Flight paths for pattern speeds of 120 to 130 knots on final should be planned.
- ▶ The C-130Q drop height is a minimum of 150 feet above the ground or canopy whichever is higher. Generally, drop heights should increase when using higher coverage levels.

12.5 Aircraft: Lockheed C-130H/J MAFFS

Operator: Department of Defense

Background: MAFFS is a shared surge capacity airtanker program with the Department of Defense and three states. Wyoming, Nevada and California Air National Guard wings are trained in the MAFFS airtanker program. The Air Force Reserve wing in Colorado Springs also part of the MAFFS program. MAFFS uses a specially designed modular compressed air retardant delivery system. The current version is MAFFS II.

Key Points:

- ▶ **Facilities:** The HC-130H has a max operating weight of 155,000 pounds. For weight bearing purposes the C-130s have a Single Tandem configuration. It will be deployed from FSAS MCC to and from select airtanker bases within a 500NM radius as requested by ordering agency, (See most current USAF AEG-WFF/CC MAFFS Airtanker Base List). Aircraft may be deployed for weeks at a time with a maintenance crew, returning home for R&R or major maintenance.
- ▶ Airtanker Bases, runway, taxiways and parking ramps must have a weight bearing capacity sufficient to support the aircraft. Local bases need to insure both the airport and agency engineering have data indicating ramp weight bearing capacity at the base. Letters documenting waivers for over-weight operations and drawings of the ramp structure must be on file at the airtanker base.
- ▶ Operations of the HC-130H/J may need to be more closely monitored with other aircraft types for spacing and wing tip clearance. While there is good visibility from the flight deck, wing walkers are essential taxi and base maneuvering.
- ▶ Retardant loading and servicing the HC-130H/J can only be accomplished on the right side of the MAFFS aircraft
- ▶ **Response Time and Supervision:** Low level aerial supervision (Leadplane/ASM) is required for this aircraft.
- ▶ The cruising speed of the HC-130H/J is approximately 300 knots (TAS) on fire response and 360 knots for reposition flights. Users and/or dispatchers will need to plan for LP/ASM arrival when responding on longer dispatches. Responses shorter than 150 nm will be similar to existing airtankers.
- ▶ The dispensing system can select all required coverage levels. The dispensing system is currently rated at 3,000 gallons.
- ▶ **Terrain:** Large Airtankers (LATs), like the HC-130H/J can be used in challenging terrain. Crews have significant experience both in the aircraft and as Captains in the MAFFS program.



- ▶ The HC-130H/J is highly agile for its size yet still requires a stabilized path for delivery. Flight paths for pattern speeds of 120 to 130 knots on final should be planned.
- ▶ The MAFFS drop height is a minimum of 150 feet above the ground or canopy whichever is higher. Generally, drop heights should increase when using higher coverage levels.

12.6 Aircraft: Boeing 737-300

Vendor: Coulson Aviation USA

Background: The Boeing 737-300 was substituted for one of Coulson's line items on CWN 1.0. The 737 is a new airframe to the next generation airtanker fleet.



Key Points:

- ▶ The B-737 has a retardant capacity of 4000 gallons or 36,000 pounds.
- ▶ The B-737 can operate from most existing Airtanker Bases with no operational limitations.
- ▶ **Facilities:** The B-737 has a normal operating weight of 123,454 pounds. For weight bearing purposes B-737 has a dual wheel configuration. Airtanker Bases, runway, taxiways and parking ramps must have a weight bearing capacity sufficient to support the aircraft. Local bases need to insure both the airport and agency engineering have data indicating ramp weight bearing capacity at the base. Letters documenting waivers for over-weight operations and drawings of the ramp structure must be on file at the airtanker base.
- ▶ Operations of the B-737 may need to be more closely monitored with other aircraft types for spacing and wing tip clearance. Wing walkers are essential for taxi and base maneuvering.
- ▶ Simultaneous Loading and Fueling and/or Retardant Hot Loading (RHL) may be authorized. The contractor must have documented risk assessment and operations practices approved by the CO, NATPM and the WO Branch Chief, Aviation Safety. The airtanker base manager (ATBM) is delegated the decision authority for these types of operations. Loading and servicing the B-737 can be accomplished on either side of the aircraft.
- ▶ **Response Time and Supervision:** Low-level aerial supervision (a Leadplane/ ASM) may be required for this aircraft if the Pilot in Command is not Initial Attack rated.
- ▶ The cruising speed of the 737H is approximately 330 knots (TAS). Users/dispatchers will need to plan for LP/ASM arrival when responding on longer dispatches if the pilot is not

initial attack qualified. Responses shorter than 150 nm will be similar to existing airtankers.

- ▶ The B-737 has an interim approval from the IAB for 4000 gallons of retardant while it goes through field evaluation. The dispensing system can select all required coverage levels.
- ▶ **Terrain:** Large Airtankers (LATs), like the B-737 can be used in challenging terrain. Crews have significant experience both in the aircraft and as Captains in other large airtankers.
- ▶ The B-737 is highly agile for its size yet still requires a stabilized path for delivery. Flight paths for pattern speeds of 130 to 140 knots on final should be planned.
- ▶ The 737 drop height is a minimum of 150 feet above the ground or canopy whichever is higher. Generally, drop heights should increase when using higher coverage levels.

13.0 Very Large Airtanker Information

13.1 Aircraft: Boeing (McDonnell Douglas) DC-10

Vendor: 10 Tanker LLC

Background: With the capability of carrying 9,400 gallons of retardant, the DC-10 is a Very Large Airtanker (VLAT). The DC-10 was awarded one line item each on the NG 1.0 and 2.0 Large Airtanker Exclusive Use contracts and several line items on the CWN 2.1 contract. The VLAT because of its size and performance requires additional consideration for use.



Key Points:

- ▶ **Facilities:** The DC-10 weight in contract configuration of 9,400 gallons has a normal operating weight of approximately 390,000 lbs. For weight bearing purposes it has a Dual Tandem configuration.
- ▶ Regions have designated several VLAT base locations, which in most cases are not existing airtanker bases. Regions will have planned for facilities and logistical support including runway, ramp and taxiway limits, water, electricity and operational space for a separate VLAT base away from the existing airtanker base.
- ▶ Airtanker Bases, runways, taxiways and parking ramps must have a weight bearing capacity sufficient to support this airtanker. Local bases need to insure both the airport and agency engineering have data indicating ramp weight bearing capacity at the base.

- ▶ Letters documenting waivers for over-weight operations and drawings of the ramp structure must be on file at the airtanker base.
- ▶ A Mobile Retardant Base (MRB) may be requested thru the CO where operations from existing airtanker base are not prudent.
- ▶ Ground operations of the DC-10 will need to be more closely monitored with other aircraft types for thrust, spacing, and wing tip clearance. While there is good overall visibility from the flight deck, the wing tips are not viable from the flight deck, therefore wing walkers are essential during taxi and base maneuvering.
- ▶ Simultaneous Loading and Fueling and/or Hot Retardant Loading (HRL) may be authorized. The contractor must have documented risk assessment and operations practices approved by the CO, NATPM and the WO Branch Chief, Aviation Safety. The airtanker base manager (ATBM) is delegated the decision authority for these types of operations. Loading and servicing the DC-10 can be accomplished on either side of the aircraft.
- ▶ There are only five ATBs that can offload the DC-10 if the retardant tanks are empty. The ATBs are: Mesa-Gateway, Moses Lake, Roswell, San Bernardino, and McClellan.
- ▶ **Response Time and Supervision:** Low level aerial supervision (a Leadplane or ASM) is required for this aircraft.
- ▶ The cruising speed of this VLAT is around 380 knots (TAS) on fire response and 480 knots for reposition flights. A DC-10 shall not be dispatched to a fire unless a Leadplane or Aerial Supervision Module (ASM) is on scene. Initial responses shorter than 150 nm will be similar to legacy airtankers due to the time it takes to load the tank with retardant.
- ▶ The DC-10 has full approval from the IAB for 9400 gallons of retardant.
- ▶ **Terrain:** The DC-10 can be used in moderately challenging terrain. Crews have gained significant experience in the aircraft and are capable of splitting the load up or delivering it in one long line.
- ▶ Pattern speeds of 150 knots on final should be planned.
- ▶ The DC-10 drop height is a minimum of 250 feet above the ground or canopy whichever is higher. Generally, drop heights should increase when using higher coverage levels.

13.2 Aircraft: Boeing 747-400

Vendor: Global Supertanker

Background: With the capability of carrying 19,200 gallons of retardant, the 747 is a Very Large Airtanker (VLAT). The 747 was awarded one-line item the CWN 2.1 contract. The 747 because of its size and performance requires additional consideration for use.



Key Points:

- ▶ **Facilities:** The 747 weight in contract configuration of 19,200 gallons has a normal operating weight of approximately 650,000 lbs. For weight bearing purposes it has a Double Dual Tandem configuration.
- ▶ Only three existing airtanker bases can load the 747. McClellan (CAL FIRE), San Bernardino and Colorado Springs. Off load is only available at these bases.
- ▶ Additional bases will require planning for and set up of VLAT capable mobile retardant plants. At least 24-48 hours lead time should be planned to order, set up and be operational.
- ▶ Airtanker Bases, runways, taxiways and parking ramps must have a weight bearing capacity sufficient to support this airtanker. Local bases and airports need to insure both the airport and agency engineering have data indicating ramp weight bearing capacity at the base.
- ▶ Letters documenting waivers for over-weight operations and drawings of the ramp structure must be on file at the airtanker base.
- ▶ A Mobile Retardant Base (MRB) may be requested thru the CO where operations from existing airtanker base are not prudent.
- ▶ Ground operations of the 747 will need to be more closely monitored with other aircraft types for thrust, spacing, and wing tip clearance. While there is good overall visibility from the flight deck, the wing tips are not viable from the flight deck, therefore wing walkers are essential during taxi and base maneuvering.
- ▶ The 747 requires numerous vehicles, personnel and equipment during loading. Bases must plan for movement and coordination of the additional equipment and personnel.
- ▶ Simultaneous Loading and Fueling and/or Hot Retardant Loading (HRL) may be authorized. The contractor must have documented risk assessment and operations practices approved by the CO, NATPM and the WO Branch Chief, Aviation Safety. The airtanker base manager (ATBM) is delegated the decision authority for these types of operations.
- ▶ **Response Time and Supervision:** Low level aerial supervision (a Leadplane or ASM) is required for this aircraft.
- ▶ It takes 30 minutes to one hour to load the 747 depending on the loading capability of the airtanker base.
- ▶ The cruising speed of this VLAT is around 380 knots (TAS) on fire response and 480 knots for reposition flights. The 747 shall not be dispatched to a fire

unless a Leadplane or Aerial Supervision Module (ASM) is on scene. Initial responses shorter than 150 nm will be similar to other airtankers due to the time it takes to load the tank with retardant.

- ▶ The 747 has an interim approval from the IAB for 17,500 gallons of retardant, but the aircraft must be loaded with 19,200 gallons. It retains the difference throughout most drops.
- ▶ The 747's interim approval through December 31, 2020. GST must resolve outstanding discrepancies and pass the grid before they carded in 2021.
- ▶ **Terrain:** The 747 should be used in moderate terrain, but no downhill drops. Crews have gained significant experience in the aircraft and can split the load up or deliver it in one long line.
- ▶ Pattern speeds of 150 knots on final should be planned.
- ▶ The 747-drop height is a minimum of 250 feet above the ground or canopy whichever is higher. Generally, drop heights should increase when using higher coverage levels.

Appendix A: Aircraft Dispatch Forms

Either of the two following forms may be used until a national standard form is established.

AIRCRAFT DISPATCH FORM			
INCIDENT NAME:	DATE:	TIME:	SUNSET+30
INCIDENT ORDER #:	CHARGE CODE:		
DESCRIPTIVE LOCATION:			
LATITUDE (Degrees, Decimal Minutes):		LONGITUDE (Degrees, Decimal Minutes):	
BEARING (DEG):	DISTANCE (NM):	FROM:	ELEVATION:
INITIAL POINT (IP) – Fixed Wing (Optional):			
IP LATITUDE:		IP LONGITUDE:	
CHECK POINT (CP) – Rotor Wing (Optional):			
CP LATITUDE:		CP LONGITUDE:	
FLIGHT FOLLOWING:	F/F FREQUENCY:	TONE:	
AIR CONTACT:	A/A FREQUENCY:		
GROUND CONTACT:	A/G FREQUENCY:		
COMMAND:			
HAZARDS/MTR/SUA:			
OTHER AIRCRAFT:			
RELOAD BASE(S):		TFR NOTAM #	

DISPATCH CENTER:	
DISPATCH MAIN PHONE LINE:	
AIRCRAFT DESK:	
FAX:	
DISPATCH EMAIL:	

COMMENTS:

6/2016 Version



Interagency Aircraft Dispatch Form-Proposed

INCIDENT NAME/NUMBER*		DATE	TIME
ORDER # *			
DESCRIPTIVE LOCATION *			
LATITUDE *		LONGITUDE *	
BASE	BEARING	DISTANCE	
AIR TO AIR PRIMARY *		AIR TO AIR SECONDARY *	
AIR TO GROUND *		GROUND TACTICS *	
COMMAND *		FLIGHT FOLLOWING *	
INCIDENT AIRCRAFT *	A-	A-	
A-	A-	A-	
A-	A-	A-	
OTHER AIRCRAFT *		AIRCRAFT HAZARDS *	

*Denotes required INTERCOM information

**Required INTERCOM information if applicable

Appendix B: NWCG Airtanker Base Directory

The NWCG Airtanker Base Directory is available at:

<https://www.nwcg.gov/publications/507>

Appendix C: National Airtanker Base Radio Frequencies

Airtanker Base ramp frequencies are only available on hard copy versions of the NWCG Airtanker Base Directory available from the Great Basin Cache or directly from the airtanker base.

Appendix D: Day of Risk Assessment (DORA)

Operational Risk Assessment

DRAFT - 5/31/12

Mission/Flight: _____

Date: _____

Version 4.0

MISSION (If multiple mission profiles are to be performed, score the one mission with the highest risk level)		
Personnel or Cargo Transport – Point-to-Point	1	
Personnel or Cargo Transport – Non Point-to-Point, to improved remote sites	2	
Landing(s) to occur at unimproved remote site(s)	3	
Low Level flight (below 500 ft. AGL)	4	
External Load/Longline (which includes bucket ops)	5	
Other	?	
Subtotal		0

PROJECT PLANNING (select one)		
Mission(s) to be conducted as planned	1	
Mission(s) Changed from plan	2	
Divert to New Mission(s)	3	
Unscheduled, No Plan	5	
Subtotal		0

PROJECT COMPLEXITY (select one)		
1 or 2 Mission Types necessary to complete project	1	
3 to 4 Mission Types necessary to complete project	2	
5 or more Mission Types to complete project	3	
Mission(s) are complex, unfamiliar, or challenge the skills and knowledge of Flight Mgr. and/or Pilot	5	
Subtotal		0

URGENCY (select one)		
No time constraints – conduct at next opportunity	1	
Needed ASAP – essential for crew work	2	
URGENT – before nightfall	3	
Life and Death situation	5	
Subtotal		0

AIRCRAFT PERFORMANCE (Select one)		
Density Altitude below 3,500 ft	1	
Density Altitude: 3,501 - 7,500 ft	2	
Density Altitude: 7,501-10,000 ft	3	
Density Altitude Greater than 10,000 ft	5	
Subtotal		0

AIRSPACE (Select all that apply)		
No known airspace conflicts	1	
Multiple Aircraft participating in project/mission	2	
Mission occurs along GA flight corridors or within controlled airspace	2	
Mission occurs within Military Operations Area (MOA) or transects Military Flight Route(s)	3	
Subtotal		0

PILOT REST (select one)		
Pilot has had day off w/in the last 7 days	1	
Pilot has had no day off w/in the last 7 days	2	
Pilot has had no day off w/in the last 10 days	3	
Subtotal		0

PILOT CURRENCY (select one)		
Pilot has flown this mission w/in the last 15 days	1	
Pilot has flown this mission w/in the last 30 days	2	
Pilot has flown this mission w/in the last 60 days	3	
Pilot last flew this mission over 60 days ago	4	
Subtotal		0

TERRAIN (select one that represents the majority of flight operations)		
Flat to rolling terrain w/ available suitable landing options	1	
Mountainous terrain/limited landing areas	3	
Flight requires crossing of waterbodies (Helis and Wheeled Aircraft)	3	
Subtotal		0

WEATHER (select all that apply)		
Fair, unchanging weather	1	
Ground Fog	2	
Rain/Snow showers	3	
Winds in excess of 25 knots	3	
Wind gust spread in excess of 10 knots	3	
Thunderstorms, erratic winds	3	
Moderate or greater turbulence	3	
Low, lowering ceilings	4	
Weather conditions forecast to degrade during mission	4	
Subtotal		0

VISIBILITY (select one)		
Visibility > 10 miles	1	
Visibility > 3 miles but < 10 miles	2	
Visibility > 1 mile but < 3 miles	3	
Visibility > ½ mile but < 1 mile	5	
Subtotal		0

CUMULATIVE SCORE		0
Low Risk	0-16	
Moderate Risk	17-32	
Serious Risk	33-48	
High Risk	49+	

NOTE: Because the overall cumulative score is a composite of individual flight, environmental, and operational values, it may not fully emphasize a heightened level of risk that may be associated with an individual category. For example, extremely adverse weather in itself, exclusive of the other categories, may alone merit the suspension of operations. Conditions also change over time and distance, therefore, this tool should be used periodically throughout a mission as conditions change to assure that individual or overall risks have not measurably increased.

Pilot Signature: _____

Flight Manager Signature: _____

APPENDIX E. B-747-400 (T-944) Operations

Introduction

The Boeing 747, T-944 is on the Forest Service CWN 2.1 Airtanker contract, and is a carded aircraft by the Forest Service until December 2020. This appendix is only for operations while on the Forest Service CWN contract. It is intended to address characteristics of the aircraft for Dispatchers, Airtanker Bases and Aerial Supervision.

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 Aerial Supervision: Walter Bunt walter.bunt@usda.gov 530-515-4016

Ordering and Use

What objectives does the incident commander expect to achieve when using the 747 over a LAT or the DC-10?

The 747 is not an initial attack airtanker, but can be effective on emerging fires with values at risk.

The 747 can reinforce manmade or natural fire breaks for indirect attack.

The 747 is 25% larger in wingspan and length than the DC-10. The 747s operating weight is 40% heavier than the DC-10. Both of these factors should be considered when deciding where to use the 747.

The 747s retardant delivery system has a long trail off of retardant after the main drop that can affect retardant avoidance areas.

The 747 cannot effectively meet coverage level 3 or 6.

Deck angle, altitude gain and speed during the drop can significantly degrade the intended coverage level.

Downhill drops should not be used with the 747.

The 747 cannot maintain the 150 KIAS in the FTA. The 747 should be directed to fly at least 170 KIAS in the FTA.

Aircraft Specifications and Capabilities

Cruise Speed: (below 10,000 ft. MSL-250 Kts) Above 10,000 ft. MSL 400-500Kts

Retardant Payload: 19,200 gallons (approximately 17,500 typically dispensed)

Reload Times: 30 minutes to 1 hour depending on base capabilities.

Drop height: minimum drop height is 250 feet above the ground or canopy cover whichever is higher. Generally, drop heights should increase when using higher coverage levels.

Wake Turbulence: 3 min wait time for trailing aircraft.

Landing Loaded: The aircraft can land fully loaded.

Dispatch and Coordination

The 747-400 is a VLAT and the pilots are not initial attack rated. A VLAT requires a leadplane/ASM to be on scene prior to dispatching the VLAT.

Preplanning is essential for effective use of the 747-400 with a leadplane/ASM. The aircraft is capable of cruise speeds between 400-500 kts. Dispatches of over 150NM will require careful coordination to ensure the leadplane/ASM is on scene prior to dispatching the 747.

There will be an ATBM/COR onsite at the assigned airtanker base to act as a liaison with the company.

Rotation Policy

The 747-400 is a federally contracted VLAT and is subject to Airtanker Rotation Policy. **Refer to 7.11 in this document or the 2020 Red Book chapter 16 Exceptions to Airtanker Rotation Policy.** This resource will be ordered by the Aerial Supervisor/Operations/IC and facilitated by the GACC or NICC with consideration to days off, mission requirements, and/or anticipated need

Reassignment to Another Base

When requested to reload from another airtanker base, the 747-400 may have to reposition flight mechanics and ground support personnel to the new airtanker base before dropping retardant on the requested fire. The aircraft is not allowed to go direct from the dispatch base to the incident when being reassigned to another base. The Aircraft may depart the original base loaded with the mechanics and ground personnel on board but will be required to

land at the new base and deplane the mechanics and ground personnel prior to the drop mission.

Airtanker Bases

There are 3 permanent bases nationally that are available for the 747-400 to reload with retardant. McClellan, CA (MCC), San Bernardino, CA (SBD) and Colorado Springs, CO (COS). As new bases are added, the Airtanker Program Manager in consultation with National Airtanker Base Specialist, the RAO and Local Management will inform NICC, the GACC and the Contractor of the availability to operate from a new permanent or temporary airtanker base. The 747-400 requires a retardant loading computer for retardant loading operations. This computer is operated and maintained by the airtanker contractor's employees.

The 747-400 requires an air compressor for retardant dropping operations. This air compressor will be sourced, operated and maintained by the airtanker contractor's employees. At no time will Gov't personnel participate in the operation of the air compressor.

The 747-400 requires an air stair for airtanker base operations. These air stairs will be sourced, operated and maintained by the airtanker contractor's employees. At no time will Gov't personnel participate in the operation of the air stairs.

NOTE: The additional equipment of the loading computer, compressor, and air stairs will involve additional contractor vehicles, and personnel on the ramp during loading operations.

Airtanker base personnel shall plan accordingly, instituting vehicle access and movement procedures, equipment boxes, and personnel access and movement procedures.

The 747 has a "forward overflow tank" intended to catch any overflow from the loading procedure. The forward tank may require unloading occasionally into the offload tank. The volume of the forward tank is 1000 gallons.

The 747-400 may have residual retardant left in their drop tanks from a previous drop. If that retardant is of a different type than the retardant onsite, then the residual will need to be offloaded. Contact the Airtanker Program Manager for further guidance.

Aerial Supervision

All operations will be conducted using the National Wildland Coordination Group Standards for Aerial Supervision (NWCG-SAS, PMS 505) Interagency Policy.

- The on scene ATGS/ASM/LP will determine applicable type of VLAT ordered based on terrain, fuel type and complexity before ordering.
- The best practice for VLAT operations is to establish a VLAT specific IP outside the entry/exit routes of other incident airtankers.
- The VLAT and ASM/LP aircrews will follow all policies regarding the Fire Traffic Area (FTA).
- The requested drop speed for the VLAT is 150 Knots Indicated Airspeed (KIAS).
- The minimum drop height is 250 feet above the ground or canopy cover whichever is higher. Generally, drop heights should increase when using higher coverage levels.
- The 747 VLAT may land loaded.
- An ASM/LP is not required for jettison. The VLAT shall drop 1000 ft. Above Ground Level (AGL).
- Any unintended or emergency jettison of a load must be reported to the incident aerial supervision or dispatch center providing flight following. Minimum information relayed must include the location of drop in degrees, decimal minutes (DDM).

Aircrews

- All participating aircraft must remain aware of the VLAT incident routes and patterns to avoid an inadvertent upset by flying through wake turbulence. The ASM/Lead assigned shall ensure the VLAT routes and patterns established do not conflict with other at scene incident aircraft. Additionally, the ASM/Lead aircrews shall restrict the engagement of incident aircraft in the drop area for at least three minutes to ensure the wake turbulence has settled and no longer a

hazard to aircrews.

Fireline Ground Crews

- The incident Air Attack will communicate with the ground DIV/Operations to ensure the safe deployment of the VLAT. During the use of VLATs, when ground resources are in the area of a single drop, or a planned sequence of drops, prior to the initial drop, ground resources/aerial supervisor will confirm the drop area is clear of personnel. In the event of extenuating circumstances, including a life safety event, an aerial drop may occur without confirmation. Barring extenuating circumstances, the VLAT shall not drop on personnel.
- Rising terrain, cross winds or in-flight emergencies can cause drops to be lower than intended. Due to the velocity and mass of the drop out of a VLAT, low altitude drops can result in serious injury or death to ground crews in the path of the drop.
- Potential hazards are present to ground crews adjacent to the drop and near the fireline; as the wingtip vortices settle by gravity and prevailing wind, fire behavior may likely increase. Ground crews must constantly evaluate their position in relation to this hazard. It is expected that the ground crew communicate their presence to the incident Air Attack should this hazard threaten the crew’s safety.

Note: When using any airtanker with interim approval from the Interagency Airtanker Board (IAB), every effort should be made to capture and report the operational effectiveness. This presents an opportunity to validate safety, effectiveness, and overall program efficiency