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**National Wildfire  
Coordinating Group**



# NWCG Standards for Single Engine Airtanker Operations

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The *NWCG Standards for Single Engine Airtanker Operations* standardizes procedures for Single Engine Airtanker (SEAT) operations conducted by participating agency providers and users of SEATs. The objectives of this publication are to:

- A. Promote safe, cost effective, and efficient aviation services in support of agency and interagency goals and objectives.
- B. Through standardization, facilitate interchange, and cross utilization of agency SEAT resources.
- C. Provide a common, interagency operational guide when working with SEAT contractors and agency air operations management.
- D. Provide a framework within which areas, regions, states, and local units can provide supplemental agency specific guidance.

All Federal Department of the Interior (DOI) SEAT contracts are administered by the Department of the Interior Office of Aviation Services (DOI-OAS). Program management responsibility is vested with DOI Bureau of Land Management (BLM) in accordance with lead agency concepts.

***Changes made to this document since the previous edition are printed in bold italics.***

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The National Wildfire Coordinating Group (NWCG) provides national leadership to enable interoperable wildland fire operations among federal, state, tribal, territorial, and local partners. NWCG operations standards are interagency by design; they are developed with the intent of universal adoption by the member agencies. However, the decision to adopt and utilize them is made independently by the individual member agencies and communicated through their respective directives systems.

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# CHAPTER 1 – PERSONNEL

## I. Introduction

This section discusses the qualifications, training, certification, and currency requirements necessary to perform as a Single Engine Airtanker (SEAT) pilot, as well as the duties and responsibilities of the SEAT Manager and SEAT Coordinator.

## II. SEAT Pilot Requirements

### A. Pilot Certification

The United States DOI Office of Aviation Services (USDOI-OAS) is responsible for inspecting and approving SEAT pilots, aircraft, and support vehicles for interagency use. The USDOI-OAS uses an Interagency Pilot Qualification Card, an Aircraft Data Card, and a Service Truck Data Card to document this process. Specific qualifications and certifications necessary to be carded as a SEAT pilot will be listed in the procurement document.

### B. Flight/Duty Hour Limitations

All SEAT pilots must comply with the Flight Crew Member Duty and Flight Limitations in the procurement document. This section stipulates that a maximum of 14 consecutive duty hours during any assigned duty period must be adhered to at all times. The pilot must be given a minimum of ten consecutive hours of *uninterrupted* rest (off duty), not to include any pre-flight or post-flight activity, prior to any assigned duty period. During any 14 consecutive calendar days the pilot must be given two calendar days of rest. *Days off do not need to be consecutive.*

### C. Flight Crew Limitations

Flight *Crews are* limited to a maximum of eight hours flight time during any assigned duty period, and a maximum of 42 hours flight time during any consecutive six day period. When a pilot acquires 36 or more flight hours in a consecutive six day period, the pilot must be given the following calendar day off for rest, after which a new six day cycle will begin.

During times of prolonged heavy fire activity, the federal agencies may issue a notice further limiting the pilot duty day and/or flight time, on a local, regional, agency, or interagency wide basis.

*Reference the Interagency Standards for Fire and Fire Aviation Operations, Chapter 16,*  
[https://www.nifc.gov/policies/pol\\_ref\\_redbook.html](https://www.nifc.gov/policies/pol_ref_redbook.html).

### III. SEAT Pilot Carded Ratings

All SEAT pilots shall be rated and carded as either a Level I or Level II. They are utilized within the following limitations:

#### A. Level II Rated Pilots

Level II permits pilot performance of missions without benefit of aerial supervision in the fire traffic area (FTA) with the SEAT plus one other aircraft. With more than two aircraft within the FTA, aerial supervision for the Level II pilot is required.

#### B. Level I Rated Pilots

The Level I endorsement permits the pilot to perform missions in the FTA without aerial supervision, and allows them to conduct operations in a multiple tactical aircraft environment. This encompasses all missions from initial attack through large fire aerial operations. The Level I rated pilot will be familiar with and have experience in complex aerial fire suppression methods, and therefore, will be more effective in those types of situations.

### IV. SEAT Manager (SEMG) Position

#### A. General

In order to ensure adherence to contract specifications, safety requirements, and fiscal accountability, a qualified SEAT Manager (SEMG) will be assigned to each operating location to provide for the management of the operation. *An Airtanker Base Manager (ATBM) may manage SEATs without an SEMG present while operating at a large airtanker base.*

#### B. Qualification Documents

All SEMGs and trainees must have a copy of their agency's fire and aviation qualifications documentation card *with them* at all times.

#### C. Span of Control

- ✓ Administrative Span of Control
  - The SEMG will be allowed to administratively manage up to three SEATs without the assistance of additional SEMGs. This span of control is intended to be the maximum allowable for a trained and experienced SEMG. It is also dependent on the ability and comfort of the SEMG.
- ✓ Operational Span of Control
  - When the number of SEATs exceeds the standard span of control (three per SEMG) additional personnel shall be ordered to provide adequate oversight of ramp operations and traffic control.

- The SEMG must anticipate the need for and request additional personnel during periods of high activity and/or complexity and order additional personnel as necessary. During periods of high activity and/or complexity a minimum of two personnel *will* be on site during operations.
- Refer to the Recommended Best Practices for Minimum Staffing Levels in *the SEAT Base Staffing Matrix and Training Elements* ([https://www.nifc.gov/aviation/av\\_BLMseat.html](https://www.nifc.gov/aviation/av_BLMseat.html)) for support positions that can be ordered.
- ✓ An ATBM is permitted to manage SEATs that are assigned to their base without a qualified SEMG present. The ATBM should consider ordering an SEMG to maintain span of control and assist with oversight of SEATs assigned to their base.

#### D. The SEMG Duties and Responsibilities

The duties and responsibilities of the SEMG *can be categorized as follows:*

- ✓ **Initial Contract Duties**
  - *These duties must be completed each time the aircraft is hired.*
  - Fax/email the initial Resource Order that the aircraft is hired under to the National SEAT Coordinator (NSECO) with the first Daily Operations Worksheet.
  - Complete Pre-Use Information and Inspection Sheet for Contractor/Vendor equipment and personnel.
  - Conduct Initial Pilot/Loader In-Briefing with contractor personnel. Review Base Operations Plan and local SOPs.
  - Ensure the “Resource Advisor (READ) File” is available for pilots to review and sign. The READ File can be found at [https://www.nifc.gov/aviation/av\\_BLMsafety.html](https://www.nifc.gov/aviation/av_BLMsafety.html).
  - Performs as liaison between contractor, airport, and using agency or unit.
- ✓ **Daily Operational Duties**
  - Ensure operations adhere to the using agency guidelines and regulations, as well as continued compliance with relevant national requirements.
  - Communicate aircraft and staffing status to dispatch on a daily basis.
  - Conduct daily briefings, mission briefings, and debriefings with the pilots, other contract personnel, and government employees assigned to the operation including mission priorities, quality of retardant, drop effectiveness, or any other problems or concerns that may arise. Document on Daily Ops Sheet.
  - Establish communication needs at the base of operations and ensure that all base radio equipment is maintained in working order. Communicate changes in frequencies as necessary.

- Regulate all aircraft and motor vehicle movements as well as supervise agency and contractor personnel on and around the SEAT operations base. SEMGs are responsible for the safe operation of the ramp and loading pit area.
  - The SEMG has the authority to resolve all safety concerns encountered in any aspect of aircraft, ramp and/or personnel operations. By initiating corrective actions, these risks can be mitigated and/or removed. The SEMG should discuss any concerns and possible corrective actions with local aviation management and/or the Contracting Officer Representative (COR) (as appropriate).
  - SEMG (t) will remain under the supervision of the SEMG at all times. Situations where the SEMG (t) operates at a site away from the trainer are not *permitted*.
  - Coordinate efforts to ensure that all fuel and retardant spills, regardless of size, are properly cleaned according to the established base procedures or environmental and/or hazardous materials procedures.
  - Ensure retardant quality in mixing and testing to specifications prior to loading of aircraft by monitoring the refractometer readings by the contractor or agency personnel (when appropriate) and conduct periodic assurance checks. *Assurance checks will be documented and files maintained by SEMG.*
  - *Ensure that federally-contracted aircraft are only loaded with fire chemicals on the Qualified Products List (QPL) list. Current QPL lists can be found at <https://www.fs.fed.us/rm/fire/wfcs/index.htm>.*
  - Ensure retardant and water supplies and base logistical needs are adequate for anticipated fire activity.
- ✓ **Administrative Duties**
- Determine the type of contract and appropriate Task Order the SEAT was ordered under (National On-Call or Exclusive Use), and ensure compliance with contractual specifications.
  - Complete required administrative and operational forms as required by local aviation management, and ensure that the contractor completes records and reports as required by the using agency.
  - Ensure the official *SEAT Base Operating Plan including Appendix B* has been completed for the base, and update as necessary.

- The operations plans at Large Airtanker Bases will satisfy this requirement *if the plan addresses the requirements of the SEAT Base Operating Plan and addresses local procedures and policy specific to SEAT operations*. The assigned SEMGs must be familiar with the plan in place.
- If the SEMG/ATBM is unable to confirm the SEAT Pre-Use Information and Inspections Sheet has been completed, they must complete the form prior to operations.
- Accurately complete the following documentation for each aircraft managed on a daily basis regardless if any flight time has occurred:
  - Aircraft Use Report (OAS-23E)
  - SEAT Daily Operations Worksheet
  - Cost Summary Sheet
  - SEAT Pilot Flight Time/Duty Day Cumulative Log
  - SEAT Support/Service Vehicle Driver Duty Day Cumulative Log
- *Forms can be found at* [https://www.nifc.gov/aviation/av\\_BLMseat.html](https://www.nifc.gov/aviation/av_BLMseat.html)
- Email or fax copies of the Daily Operations Worksheet to the National SECO ([blm\\_fc\\_seat@blm.gov](mailto:blm_fc_seat@blm.gov) or fax 208-387-5199) and the assigned Project Inspector for that contract by 10 AM (MT) each day regardless of flight activity.
- Ensure retardant lot acceptance quality assurance procedures are followed by routing samples accordingly. Refer to Missoula Technology and Development Center (MTDC) website at <https://www.fs.fed.us/rm/fire/wfcs/index.htm>.
- When appropriate the SEMG will submit agency SAFECOMs in a timely manner (<https://www.safecom.gov>).
- Complete the *Evaluation Report on Contractor Performance* (OAS-136A) at the end of the assignment for each of the aircraft they have managed, and submit a copy to the Contracting Officer *with a cc to the Administrative Project Inspector or COR*. Note: copies should not be provided to the contractor. Contractor evaluations will be made available to the contractor once reviewed by the Contracting Officer (CO).
- Document all aircraft maintenance on daily operations worksheet. Obtain *Contracting Officer Technical Representative (COTR)* authorization to put aircraft back in contract availability if unscheduled maintenance resulted in unavailability. Communicate with local aviation manager.
- When SEAT aircraft are utilized by neighbor units, the originally assigned SEMG shall promptly contact the receiving SEMG/ATBM to discuss span of control and administrative duties.

## **E. SEMG Duties at Established Large Airtanker Bases**

ATBMs are authorized to manage SEATs without the presence of the SEMG while SEATs are assigned to work out of their base. When a SEAT is located at a large airtanker base with no SEMG assigned, the ATBM will be responsible for ensuring the safety, policy and contract compliance of the SEAT.

The following duties are outlined to help the SEMG coordinate with the ATBM and assigned base personnel to ensure all efforts are being made for safe and efficient SEAT operations conducted from these bases.

- ✓ The ATBM is responsible for all aircraft and personnel working from their established base. All efforts MUST be made to coordinate all aspects of the SEAT operations with the ATBM. The ATBM will provide the SEMG, SEAT pilot and contractor personnel a thorough briefing on the operational procedures and logistical support at the large airtanker base prior to commencing SEAT operations.
- ✓ The SEMG will coordinate with the ATBM regarding any separate loading and fueling areas or procedures in the event that SEAT loading is required to be separated from large airtanker retardant loading operations.
- ✓ The ATBM is responsible for ensuring the SEMG receives refractometer reading documentation for each load of retardant ensuring compliance with manufacturer's specification.
- ✓ The ATBM and the SEMG will coordinate all SEAT assignments or dispatches with each other and process the orders through the proper dispatch channels.

## **F. SEMG Training and Experience**

SEMG training is conducted by authorized cadre experienced in SEAT operations. SEMG is an NWCG red-carded position. After satisfactory completion of the nationally approved SEMG training course, a prospective manager will serve as a trainee until it is determined that he or she is performing at the required level and providing the appropriate supervision. This shall be reflected in a properly documented task book.

- ✓ Training, qualifications, currency and experience requirements for this position are listed in the *NIMS Wildland Fire Qualification System Guide*, PMS 310-1 (<https://www.nwcg.gov/publications/310-1>).
- ✓ To maintain red-card currency, an SEMG is required to attend an approved SEAT Manager Workshop triennially. Elements and criteria of an approved SEAT Manager Workshop can be found on the BLM National SEAT website at [https://www.nifc.gov/aviation/av\\_BLMseat.html](https://www.nifc.gov/aviation/av_BLMseat.html).

- ✓ It is strongly recommended that each SEMG attend ramp manager training and complete the FWPT/RAMP position task book, as indicated in either the *Wildland Fire Qualifications Supplement* or *NIMS Wildland Fire Qualifications System Guide*, PMS 310-1.

## **G. SEMG Kit and Mandatory Guides, Reference Material and Forms**

The operational SEAT Managers kit should include, but not be limited to, the following: (“hard copy” or downloaded to a USB device is acceptable as long as SEMG has access.)

The documents listed below can be found on the BLM National SEAT website at [https://www.nifc.gov/aviation/av\\_BLMseat.html](https://www.nifc.gov/aviation/av_BLMseat.html):

- ✓ Aircraft Use Report OAS-23E
- ✓ *NWCG Standards for Single Engine Airtanker Operations*, PMS 506 (<https://www.nwcg.gov/publications/506>)
- ✓ Current copy of the National SEAT Contract and Task Order List
- ✓ Interagency Aviation Mishap Response Guide and Checklist, PMS 503 (<https://www.nwcg.gov/publications/503>)
- ✓ Aircraft Dispatch Form (NFES 2657)
- ✓ Evaluation Report on Contractor Performance (OAS-136A)
- ✓ SAFECOMs (<https://www.safecom.gov/>)
- ✓ Initial Pilot/Manager Briefing
- ✓ The following SEAT forms:
  - SEAT Pre-Use Information and Inspection Sheet
  - SEAT Daily Operations Worksheet
  - SEAT Cost Summary Sheet
  - SEAT Pilot Flight Time / Duty Day Log
  - SEAT Fuel Truck Duty Day Log
  - SEAT Base Operating Plan
- ✓ Eye protection
- ✓ Ear protection
- ✓ VHF-AM handheld radio/headset (should be provided by ordering unit)

### **Recommended items:**

- ✓ *Aviation Technical Assistance Directory*, PMS 504 (<https://www.nwcg.gov/publications/504>)
- ✓ Fire/Aviation telephone contact directories
- ✓ National Interagency Mobilization Guide
- ✓ Interagency SEAT Operational Procedures Handbook (Job Aid)
- ✓ Interagency Standards for Fire and Fire Aviation Operations (NFES 2724)
- ✓ Pocket calculator
- ✓ Pens and pencils / note pads
- ✓ Flashlight

- ✓ Clock and/or wristwatch
- ✓ Programmable VHF-FM
- ✓ Cell phone
- ✓ Lap top

## H. SEMG Decertification

If a SEMG is deficient and or unsafe in the performance of their duties and responsibilities:

- ✓ SEMG will be counseled on appropriate behaviors and deficiencies and corrective actions.
- ✓ *If deficiencies continue*, the event will be documented on a performance evaluation or unit log as appropriate.
- ✓ The documentation will be forwarded to the State/Regional Aviation Manager and the individual's supervisor or sponsoring agency/official.
- ✓ All actions will be documented within the individual's Incident Qualifications and Certification System (IQCS) record.
- ✓ The State/Regional Aviation Manager and the individual's supervisor or sponsoring agency/official will discuss the appropriate course of action to take including:
  - Immediate removal of the SEMG qualification.
  - The individual may be placed as unavailable in ROSS.
  - Evaluation of the individual's performance as an SEMG on an assignment by another highly experienced SEMG.
- ✓ If the evaluation assignment is selected, the following outcomes are possible with approval of the supervisor or sponsoring agency/official:
  - Satisfactory performance as an SEMG on the evaluation assignment and return to available status in ROSS.
  - If performance is unsatisfactory, individual will be returned to SEMG(t) status. Individual will remain in trainee status until a satisfactory performance is obtained.
  - If satisfactory performance cannot be achieved, the SEMG qualification will be removed by the supervisor or sponsoring agency/official through the appropriate IQCS official.

## V. Field SEAT Coordinator (SECO) Position

### A. Introduction

The SECO position was developed to be mobilized at a state or regional level to help coordinate SEAT operations within a geographical area. The intent for the SECO is to work with all interagency partners within the defined area. Efforts for mobilizing a SECO for a specified area should involve coordinating with ALL agencies utilizing SEATs within that area. While deployed, the SECO will be under the day-to-day direction of the local State Aviation Manager or Regional Aviation Officer.

## **B. Delegation of Authority**

The SECO will receive written delegation of authority identifying the participating agencies, points of contacts, and assignment objectives.

## **C. Field SECO Duties and Responsibilities:**

- ✓ Perform as a liaison between the agency and each SEAT base of operations.
- ✓ Report directly to the agency's state or regional level aviation managers when assigned to a specific area of responsibility.
- ✓ Perform base inspections in the field using the standard SEAT base inspection form developed for pre-season or readiness reviews.
  - Provide assistance in rectifying any discrepancies.
  - Offer recommendations to improve safety and operational efficiency.
- ✓ Report to the State Aviation Manager or Regional Aviation Officer or designee on a daily basis or other schedule that is approved in advance.
- ✓ Report all concerns/issues to the State Aviation Manager or Regional Aviation Officer as they are discovered or occur.
- ✓ At the conclusion of the assignment, a written report will be completed and presented to the local State Aviation Manager or Regional Aviation Officer as well as conducting a closeout briefing.
- ✓ Perform area inventory of possible temporary SEAT bases.
  - Compile a list of each prospective base of operations, listing the location, local **contacts** and phone numbers, latitude and longitude, and length, width, and composition of the landing surface.
  - Provide a list of all the facilities and identify those that would be available for use by the agency for SEAT operations.
  - Identify restrictions or possible limitations of each site.
- ✓ Provide procurement officer with general information to help them establish agreements with local contractors for water, equipment, and supplies that may be needed for the SEAT operations.
- ✓ Assist the agency personnel with developing agreements or Memorandums of Understanding (MOU) for the use of airports or airstrips. (The SECO does not have the authority to procure any contractors or make any agreement for rental or lease.)
- ✓ Perform an evaluation of the SEMG and the base operations. Offer assistance and recommendations to the SEMG to provide a more efficient and effective base of operations using the *SEAT Base Inspection and Evaluation Form*.
  - Has the authority to sign-off specific tasks within the guidelines of the SEMG position task book.
- ✓ Provide assistance to SEMG for completing a contractor performance evaluation of the SEAT pilot and support personnel.

- ✓ Assist agency unit aviation managers with deployment and movement of SEAT resources, including recommending types or resources to be deployed.
- ✓ Identify the capabilities and limitations of the resources that are available for deployment. Receives a briefing from the state or regional level aviation managers on the coordination of SEAT resources involving Multiagency Coordination System groups.
- ✓ Assist the using agency with finding available SEMGs and temporarily fill in for SEMGs on their days off when necessary.
- ✓ May act as a liaison for the contractor to help identify and resolve concerns or conflict issues that may surface between the contractor, the SEMG or the using agency. Conflicts or concerns will be documented and reviewed with the COR or the CO.
- ✓ Compile a comprehensive report on all SEAT operations that were reviewed within the assigned geographical area. The report will contain evaluations of contractor performance, SEAT base operations, SEMG evaluations, and the agency's utilization of the SEAT in their fire program.

#### **D. Qualification and Experience Requirements**

- ✓ Must be a currently qualified SEMG with a minimum of five (5) years of experience as a SEMG.
- ✓ Designated and approved to function as a Field SECO by the State/Regional Aviation Manager.

#### **E. Nomination and Approval Process**

Nominations for the SECO position will be submitted to the State Aviation Manager or Regional Aviation Officer. The nomination process requires written documentation of the nominee's fire and aviation background, red-card qualifications, and SEAT experience. Selection for the SECO positions will be based on the individual's field experience, aviation knowledge, and program needs.

# CHAPTER 2 – OPERATIONS

## I. Introduction

It is essential that all aviation operations be planned with the utmost consideration given to safety. All SEAT missions can be accomplished safely, provided that a high degree of pre-planning, risk management, and hazard analysis be applied. This chapter will discuss actions that must be taken during the flight planning process, types of missions that SEATs will be asked to perform, and mission specific requirements and responsibilities.

The SEMG is responsible for ensuring that the pilot receives a complete mission briefing prior to departing the SEAT base. Briefings may be given to the SEAT pilot by personnel other than the SEMG, e.g., during divers, radio briefings at remote locations, or when the SEAT is under the operational control of aerial supervision. The SEMG is responsible for documenting the information that was provided to the pilot for a mission briefing on their *SEAT Daily Operations Worksheet*. The mission briefing will include the following items at a minimum:

- ✓ Lat/Long and/or bearing and distance (elevation, if known).
- ✓ Both AM and FM radio frequencies and contact assigned to the incident (including narrow and wide band programming).
- ✓ Additional aircraft ordered or at the incident.
- ✓ Any known aerial hazards and airspace deconfliction concerns.

Note: All items for the pilot mission briefing **may be** documented on the *Aircraft Dispatch Form* (NIFC 9400-31). This form was developed as a self-duplicating form that allows the SEMG to document critical information needed for a mission briefing and provide the pilot with a carbon copy.

## II. General Flight Safety

During **all** mission flights, including amphibious aircraft, the anti-collision strobe lights shall be on while making the retardant drops. The landing lights shall be on while in the FTA unless prohibited by aircraft limitations.

### A. Flight Safety

The pilot is an essential part of any aviation mission. The pilot must be made an integral part of a team effort with a goal of flight safety and efficiency. The pilot has the authority to refuse any mission or maneuver which compromises flight safety. The pilot will refuse any flight or situation which he/she considers hazardous or unsafe or may cause the pilot to violate any Federal Aviation Administration (FAA) rules, regulations, or the specifications contained in the contract.

Operating an aircraft in violation of any FAA regulations or outside the strict adherence of the contract specifications will not be tolerated and may be grounds for suspension and/or revocation of the Interagency Pilot Qualifications Card.

**B. *Day/Night Flight Limitations***

*SEAT operations are limited to flight during the official daylight hours. Daylight hours are defined as 30 minutes prior to official sunrise until 30 minutes following official sunset and under visual flight rule conditions (Federal Aviation Regulations (FAR) part 91.151 through 91.159). Caution must be taken in mountainous or hilly terrain. One 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, Air Tactical Group Supervisor (ATGS), or lead plane because of low visibility conditions caused by smoke, and/or shadows.*

**C. *Situational Awareness***

Loss of situational awareness or “focus” while in command of an aircraft has been responsible for, or factored into, numerous accidents and incidents. It is imperative that the pilot-in-command remain focused on the overall environment in which he/she is operating. To maintain situational awareness or “focus,” the pilot must evaluate the flight profile and mission environment to include, but not limited to, proximity of obstacles, winds, rate of descent, target location, and terrain features.

**D. *Minimum Safe Altitudes***

It is critical that fire suppressant materials be placed as accurately as possible on the target areas of the fire. Conditions such as winds, fuels, drop material density, and gate opening shall be considered. In order to achieve greater accuracy, the pilot should, when possible, ascertain from fire officials (Incident Commander, Airtanker Coordinator, or ATGS) the precise drop location. Adherence to the minimum safe altitudes specified in *14 CFR 91.119* is required unless engaged in actual dispensing operations where the requirements of *14 CFR 137.49* will apply. **Drop height adjustments that are made must always be higher than the minimum altitude of 60 feet above the ground cover/canopy. Except for takeoff and landing, the pilot must maintain at least 60 feet of obstacle clearance at all times.**

**E. *Fire Traffic Area (FTA)***

*The FTA was developed by aerial firefighting personnel to provide a standardized initial attack airspace structure to enhance safety and air traffic separation over wildland fire incidents. Additional training and information about the FTA can be found under Airspace Education on the BLM National Aviation Office website at [https://www.nifc.gov/aviation/av\\_BLMairspace.html](https://www.nifc.gov/aviation/av_BLMairspace.html).*

## **F. Mitigating Risk**

*Safety at SEAT bases and around aircraft is a cooperative effort between pilots, mechanics, agency employees, contract personnel, and all others at the base. Safety is also an individual responsibility for which each person is accountable. In no circumstance will safety be compromised.*

*The primary way in which we prevent accidents in wildland fire and aviation operations is through aggressive risk management. Although we must accept that aviation operations have an inherent risk, it is incumbent upon us all to mitigate that risk to every extent possible. Through organized, comprehensive and systematic risk management, we can determine the acceptable level of risk that will allow us to provide for safety while still achieving our objectives.*

*There are many different ways to complete the Risk Assessment process, including Job Hazard Analysis (JHA)/Risk Assessment Worksheets, Safety Management System (SMS) programs, Daily Risk Assessments, and Daily Briefings.*

### *How to Refuse Risk*

*All individuals (government and contracted employees) have the right and obligation to report safety problems affecting his or her safety and have the right to contribute ideas to correct the hazard.*

*Every individual also has the right to turn down unsafe assignments. 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.*

*When an individual feels that an assignment is unsafe, he/she also has the obligation to identify, to the extent possible, safe alternatives for completing that assignment.*

*Reference: BLM Aviation memo, How to Properly Refuse Risk (Aviation), at*

*<https://www.nifc.gov/aviation/BLMsafety/RefuseRisk.pdf>*

*Refer to the BLM Aviation Safety page at*

*[https://www.nifc.gov/aviation/av\\_BLMsafety.html](https://www.nifc.gov/aviation/av_BLMsafety.html) and to the Appendix of this document for more information and resources on the Risk Management Process.*

## **III. Types of Flight Missions**

### **A. Ferry Flight or Repositioning of Aircraft**

This entails the movement of an aircraft from one location to another for the purpose of positioning that aircraft at a specific location or returning the aircraft to its home base.

This does not include any mission type flights. Typically, the flight originates at one SEAT base or developed airport, with the flight route being direct to another SEAT base or developed airport. The flight is conducted solely for the purpose of transportation.

**B. Initial Attack Missions**

This is the control effort taken by the first resources to arrive at the incident. This is typically the suppression effort that takes place during the first burning period, the initial phase of the suppression effort. Most often this is where the SEAT is sent to a reported fire and begins the suppression activity, often without other aerial resources either assigned or over the fire. The complexity of the air operation during the initial attack phase is generally low; however, the initial attack phase can be the most challenging, as the fire command system is in the building stage and standardization of operating procedures is still to be established.

**C. Extended Attack Missions**

This is the control effort taken when initial attack activity has been expanded into the second full burning period, or when the initial attack resources assigned were insufficient to suppress the fire. The complexity of the air operation during the extended attack phase is usually higher. There may be several aircraft assigned to the fire organization and the level of supervision will also be higher.

**D. Fire Missions within an Incident Management Team Structure**

This is the control effort taken when both the initial attack and extended attack resource capabilities have been exceeded. This phase of the fire suppression effort has the most complex level of air operations, with multiple types of air resources assigned, as well as several layers of supervision. The airborne communication complexity is also increased because of the multiple frequencies required.

**E. Flights Over Congested Areas**

All SEAT flight operations must comply with the Federal Aviation Regulations concerning flight over congested areas. These are stipulated in *FAR part 91.119(b)* and *FAR part 137.51* and *137.53*. All SEAT missions shall comply with *FAR part 91* during all flight operations, except when over the fire itself, then all SEAT operations shall comply with *FAR part 137*.

**BLM and USDA-FS policy and the NWCG Standards for Airspace Coordination, PMS 520** (<https://www.nwcg.gov/publications/520>), all require a lead plane on order for low level retardant operations over congested areas. **Reference the Interagency Standards for Fire and Fire Aviation Operations, (NFES 2724)** [https://www.nifc.gov/policies/pol\\_ref\\_redbook.html](https://www.nifc.gov/policies/pol_ref_redbook.html).

**F. Mission Currency Training Flights**

Mission Currency Training Flights (MCTFs) should be conducted every 14 days if no fire missions have been flown in that time period. Transition flights or point-to-point flights do not qualify as mission flights. MCTFs should be conducted as an overall training exercise for all aspects of SEAT operations including the dispatch procedures, loading operations, ramp management, flight operations, flight following, and air-to-air and air-to-ground communications. The contractor will be paid for all MCTFs. Units requesting funding for mission currency flights should submit a request to the local aviation manager for approval at least two days prior to mission currency flight. If circumstances preclude the government from conducting an MCTF the pilot and aircraft will remain available under the contract and be able to be dispatched.

**G. Pilot Proficiency Flights**

***Pilots must be proficient when they start the contract. It is the contractor's responsibility to provide proficient pilots. Proficiency flights may be conducted while the pilot and aircraft are under contract with approval from the local agency managers. The SEMG will inform dispatch of any proficiency flight activity.***

***Availability will not be affected during proficiency flights; however, flight time will not be paid by the agency.***

## **IV. Fire Chemicals Use and Mitigation**

**A. Fire Chemical Use Near Waterways/Sensitive Areas**

When approaching a waterway (lakes, rivers, streams, and ponds) visible to the pilot, the pilot shall terminate the application of retardant, water, gel, or foam approximately 300 feet before reaching the waterway. When flying over the waterway, the pilot will not begin dropping until 300 feet after crossing the far bank or shore. The pilot shall make adjustments for airspeed and ambient conditions such as wind to avoid dropping within the 300 foot buffer zone.

These guidelines do not require the pilot to fly in such a way as to endanger their aircraft, other aircraft, or compromise ground personnel safety. Any deviation from the above requirements must be approved by the local fire manager or aerial supervision.

All accidental drops into waterways shall be reported immediately to the aerial supervisor or ground contact if no aerial supervision is available. For reporting requirements see Chapter 12 of the *Interagency Standards for Fire and Aviation Operations*.

When switching from fire chemicals to water loads, the tank should be rinsed thoroughly before filling with water. Refer to agency policy.

#### **B. Considerations When Using Amphibious Aircraft**

When using amphibious aircraft (Fire Boss), care must be taken to minimize the potential spread of invasive species.

Refer to the *Interagency Standards for Fire and Aviation Operations*, Chapter 11, and the *Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations*, PMS 444, <https://www.nwcg.gov/publications/444>. Review Base Operations Plan for local direction.

### **V. SEAT Contracting**

SEAT aircraft are to be procured the same way as all other contractor supplied aircraft services. All federal contracts for SEAT aircraft will be requested through the regular agency channels and awarded through contract services.

#### **A. National On-Call Contract**

The National On-Call contract provides the agencies with a contract to obtain service from a SEAT for either a non-specified time frame or to meet a known requirement occurring that year. Generally, this contract is used by agencies during high fire activity to provide aerial support for a short duration of time (day by day).

#### **B. Exclusive Use Contracts**

Exclusive Use Contracts are those awarded to a vendor for a specified time frame (typically multiple years) in which the vendor provides exclusive use of its aircraft and support equipment to the government. Request for this type of contracting will be requested through and awarded by federal *or state agencies as appropriate*.

### **VI. Placing an Order for a SEAT**

Placing an order for SEATs will be in compliance with all national and regional mobilization guidelines, using the appropriate dispatching procedures identified in those documents.

A National SEAT Coordinator position was developed to help facilitate the ordering and movement of SEAT aircraft and managers. The National SEAT Coordinator works directly with the National Interagency Coordination Center (NICC) on a daily basis.

**A. National On-Call Contract**

Dispatch centers located within the individual Geographic Area Coordination Center (GACC) can place orders for a SEAT through established ordering procedures using the National On-Call contract. Orders for vendors not home based within the GACC will be processed through the regular channels to NICC.

**B. Exclusive Use**

Orders for obtaining services from any Federal Exclusive Use SEAT already on contract will be placed through the established dispatch channels.

## **VII. Preparing for SEAT Operations**

Well in advance of ordering SEAT aircraft, FMOs and Aviation Managers should use the following checklist to properly prepare for SEAT operations:

**A. Funding**

Pre-suppression, Suppression, or Severity funding to include:

- ✓ Aircraft Daily Availability
- ✓ Retardant/Gel/Foam Products
- ✓ Airbase Facilities
- ✓ SEAT Mob/Demob Costs
- ✓ Tanks, Pumps, Fittings, etc.
- ✓ SEAT Manager Salary/Per diem
- ✓ Additional SEAT base support personnel Salary/Per diem
- ✓ Water Source Costs
- ✓ SEAT base support personnel vehicles
- ✓ Training /*MCTF* Flight Time
- ✓ VHF-AM Radios

**B. Facilities**

Designate and develop the base of operations. Monetary or non-monetary agreements may have to be made with city, county, state or private entities. Secure arrangements for the following:

- ✓ Ramp space/Tie downs
- ✓ Retardant Storage/Water
- ✓ Vehicle Parking/Taxi
- ✓ Office/Lounge
- ✓ Phones and Radios
- ✓ Fuel Spills
- ✓ Restrooms
- ✓ Security
- ✓ Garbage *removal*

**C. Aircraft Management**

Before a SEAT is utilized there must be a trained and qualified SEMG assigned. The SEMG should become part of your organization; they should be supervised by an Aviation Manager if

possible. SEMGs shall be ordered through the established dispatch channels.

**D. Operational Planning**

A local SEAT Operations Plan will be developed for all Category I SEAT Bases. For Category II Bases, the SEAT Base Operations Plan will be completed before operations. The written plan will include at a minimum the elements listed in SEAT Plan-001.

See the *SEAT Base Operations Plan* example on the BLM SEAT website at [https://www.nifc.gov/aviation/av\\_BLMseat.html](https://www.nifc.gov/aviation/av_BLMseat.html).

**E. Meals**

The contractor personnel need to be prepared to provide their own lunch during normal day-to-day operations. During high fire activity, the government may provide lunch if they deem it necessary. (When the government deems it necessary to provide meals to the contractor aircrew and support personnel, all aircrews and support personnel at that base will be included.)

**F. Jettison Areas**

At any time other than required by emergency, SEATs are not to land loaded. The using agency is responsible for designating a jettison area for all SEAT bases. The location of the jettison area will be relayed to the SEAT Manager and the contractor.

**VIII. Availability Requirements for Federal Contracts**

**A. Availability**

The contractor personnel are required to be available a minimum of nine (9) hours each day or as scheduled by the government.

**B. Unavailability**

*If a contractor is not capable of providing the services as requested by the Agency, they will be considered unavailable until the situation is remedied.*

*When Unavailability occurs, the SEMG will contact local aviation management and the PI/COR as a courtesy call.*

*If the Unavailability is due to a mechanical problem, follow the process in C below.*

### **C. Process for Returning a SEAT to Contract Availability**

Below is the guidance provided by OAS for returning a SEAT to contract availability for any major repair or alteration that requires a certified A&P mechanic with inspection authorization.

*A SAFECOM is used to report any condition, observation, act, maintenance problem, or circumstance with personnel or the aircraft that has the potential to cause an aviation-related mishap. Consultation with a DOI/USFS approved Maintenance Inspector prior to submission is encouraged.*

- *USFS contracted SEATs: Do not return aircraft having mechanical or equipment deficiencies to service until the aircraft has been approved by an authorized aircraft inspector.*

*When any unscheduled maintenance or repairs are performed for mechanical or equipment deficiencies, a DOI/USFS approved Maintenance Inspector and the Contracting Officer will be notified for “return to contract availability”, before the aircraft may again be allowed to fly under the contract. Depending on the complexity of the maintenance or repair, notice may be given by electronic or verbal means.*

- *DOI contracted SEATs: The vendor must immediately notify the COR and COTR of any change to any engine, power train, flight control or major airframe component or of any major repair following an incident or accident and must describe the circumstances involved.*

*DOI contracts do not require an aircraft to be returned to availability by a DOI/USFS approved Maintenance Inspector after maintenance. The vendor returns the aircraft to “service” after maintenance is completed with a logbook entry by the mechanic and by the pilot if a test flight was required. The SEAT Manager or ATBM returns it to “contract availability” when notified by the vendor that they are back in service. DOI vendor aircraft operate under Federal Aviation Regulations and are maintained by trained and qualified maintenance professionals. DOI/USFS approved Maintenance Inspectors are available to help the on site aircraft manager assess the efficacy and appropriateness of corrective actions documented by the vendor mechanic. Examples where technical assistance from a DOI/USFS approved Maintenance Inspector may prove beneficial are:*

- *Any unscheduled maintenance action requiring a post maintenance test flight for the purpose of ensuring discrepancy correction.*

- ***Anytime the manufacturer requires a Conditional Inspection be performed, e.g., hard landing, blade or prop strike, sudden stoppage, engine over-speed, engine or transmission over-temp, over-torque, engine compressor stall or surge.***
- ***Any condition affecting flight control maneuverability or responsiveness.***
- ***Any un-commanded jettison of retardant loads.***
- ***Malfunctioning of vendor provided equipment such as retardant gates, radios etc.***
- ***Any repair following an incident or accident.***

***State and local agencies should consult agency directives.***

Call the OAS inspectors for your region at:

Atlanta, Georgia: 770-458-7474  
(0745-1630, Eastern Time Zone)

Boise, Idaho: 208-334-9310  
(0745-1630, Mountain Time Zone)

Anchorage, Alaska: 907-271-3700  
(0745-1630, Alaska Time Zone)

# CHAPTER 3 – DISPATCHING, FLIGHT FOLLOWING, AND COMMUNICATIONS

## I. Introduction

Dispatching, flight following, resource tracking, and communications are key elements in promoting aircraft mission safety and efficiency. Flight following, whether performed from a dispatch office or other facility, must be given a high priority by all personnel involved.

## II. Dispatch Procedures

### A. Pre-Dispatch Briefing and Orientation

*The SEMG is responsible for ensuring that the pilot receives a complete mission briefing prior to departing the SEAT base. Briefings may be given to the pilot by personnel other than the SEMG, e.g., during divers, radio briefings at remote locations, or when the SEAT is under the operational control of aerial supervision. The SEMG is responsible for documenting the information that was provided to the pilot for a mission briefing on their SEAT Daily Operations Worksheet.*

### B. Dispatch/Reaction Times

*Fifteen minutes is the standard reaction time as specified procurement document. The 15-minute standard is not applicable for delays caused by the agency, local air traffic, weather, planning for extended dispatches, crews released for lunch by the SEMG, MTC flights, and other causes beyond the pilot's control.*

### C. Standard Flight Resource Order Information

*All aircraft flights for fire and repositioning purposes will be supported by a resource order. Upon initial dispatch, the pilot will be provided with the following minimum information from the resource request:*

- ✓ *Lat/Long and/or bearing and distance (elevation, if known)*
- ✓ *Correct frequencies*
- ✓ *Ground contact, if known*
- ✓ *Additional aircraft ordered or at the incident*
- ✓ *Any known aerial hazards and airspace deconfliction concerns*

### D. Rotation Policy

*All LATs, VLATs, and SEATs operating from the same base shall be dispatched in rotation based on the type of airtanker requested on a first in/first out basis regardless of contract type (EU, CWN/On-Call or Forest Service owned) or the location of the incident.*

*Refer to Interagency Standards for Fire and Aviation Operations ([https://www.nifc.gov/policies/pol\\_ref\\_redbook.html](https://www.nifc.gov/policies/pol_ref_redbook.html)), Chapter 16 for specific guidance.*

### III. Flight Following

The purposes of flight following and resource tracking procedures are to:

- ✓ Ensure the safety and welfare of the flight crew.
- ✓ Promote effective utilization of aerial resources and resource tracking.

Pilots, dispatchers, and SEMGs must be knowledgeable in the differences between flight following and resource tracking, and of the different methods and options available to accomplish the task. It is understood that frequently the two intermix (for example, a flight following check-in accomplishes resource tracking, and vice versa).

#### A. Definitions

##### 1. Flight Following

Flight following is the knowledge of the aircraft location and condition with a reasonable degree of certainty such that, in the event of mishap, those on board may be rescued quickly.

##### 2. Resource Tracking

In order to facilitate cost effective use of aircraft and planning of resources, scheduling offices and ordering offices may request flight status information at designated intervals.

#### B. Flight Following Requirements

At the time the flight is planned or during the morning briefings, flight following procedures and requirements should be clearly identified by the dispatcher, unit aviation manager, SEMG, or other responsible party.

#### C. Methods of Flight Following

There are several methods of flight following, including but not limited to the following:

- ✓ An *FAA* Flight plan with radio check-in to an FAA facility at intervals specified. This method is often utilized for ferry flight/point-to-point missions.
- ✓ An agency Visual Flight Rules flight plan maintaining contacts at intervals specified in the flight plan, but not to exceed agency minimums.
- ✓ Automated Flight Following (AFF), an electronic satellite tracking service. *AFF is the preferred method of flight following for mission flights.*

### IV. Flight Following and Resource Tracking Options and Requirements

Check-in requirements differ between point-to-point type flights and mission type flights.

- Point-to-point/ferry flights: Check-ins are made at intervals not to exceed 60 minutes, or following FAA flight plan requirements.
- Mission flight: Those flights that do not meet the definition of point-to-point require work to be done in the air, such as dropping retardant or water delivery. Check-ins will be made at intervals not to exceed fifteen (15) minutes, *utilizing AFF (or radio contact if AFF is unavailable)*.

#### A. Check-in Information

*Radio* check-ins are to be made after takeoff and landing to ensure correct frequencies are being used. *If positive contact is established, in flight check-ins may be made with AFF.*

*Initial check-ins will consist of:*

- ✓ Call sign
- ✓ Departure location
- ✓ Souls on board
- ✓ Fuel on board
- ✓ Destination and heading
- ✓ Estimated Time en Route
- ✓ Positive AFF?

The *in flight* check-ins made by the pilot for mission flights shall consist of:

- ✓ *Call sign,*
- ✓ Current location – geographic location and/or latitude and longitude (DD.MMM) by GPS are acceptable, and
- ✓ Current direction of flight (use compass heading.)

#### B. Failure to Meet Check-in Requirements

The dispatch or other flight following facility will initiate the emergency response procedures for overdue or missing aircraft, according to the *Interagency Aviation Mishap Response Guide and Checklist*, PMS 503 (NFES 2659),

<https://www.nwcg.gov/publications/503>.

## V. Resource Tracking

On point-to-point/ferry flights, the dispatcher may require the pilot to make resource tracking check-ins.

Once an aircraft has been released off of a resource order back to the vendor, or it has gone off its exclusive use contract, it is not necessary for the agency to track that aircraft back to the vendor base or other location determined by the vendor.

Only if the aircraft is reassigned through the dispatch system does it need to be tracked *to its destination*.

## VI. Communications

It is important that a line of communication be established and maintained throughout the aviation and dispatch organizations. Communications at all levels should be encouraged to resolve situations before they become a problem.

- Local units should ensure that the existing communications network is adequate to meet both fire and agency needs.
- All carded aircraft shall be equipped with agency compatible radios with tone guard capabilities.
- Aircraft with avionics problems that do not allow positive communications must return to the base for repair until the problem is rectified.
- A review of the communication plan shall be conducted during the daily briefing, ensuring that all personnel are aware of frequencies to be used and any changes *from the previous day*.
- Ensure that any problems are brought to the attention of the air operations staff and the communications unit as well as the local aviation manager.

## VII. Incident Communications

During complex air operations, there is no standard communication plan that will work for all situations and all agencies. On an incident, the number of air operational communications functions is dependent upon the complexity of the situation.

### A. SEAT Base RAMP Frequencies

This function is commonly called the "base" frequency. This frequency can be used to coordinate the departing and arriving aircraft at the base of operations and direct ramp operations. Frequencies vary by location. When arriving at a base, verify the local base frequency in use. If no frequency is assigned, one must be requested from the local dispatch center.

### B. Air-to-Air Tactical Frequencies

Air-to-Air (A/A), *as assigned by dispatch*, frequencies are used by all tactical aircraft over the fire *to coordinate aerial activities*.

### C. Air-to-Ground Tactical Frequencies

Air-to-Ground (A/G) frequencies, *as assigned by dispatch*, are used to coordinate aerial activities with the ground activities.

### D. Command Frequencies

*Command frequencies are used* to link the Incident Commander with the air operations staff and ATGS. These should be limited to overhead communications and should not be used for other traffic unless during an emergency.

### E. Air Guard Frequency

Air Guard is a national frequency with specific designated uses, such as emergencies, initial contact at an incident by inbound aircraft, and long range dispatch or rerouting. At no time shall Air Guard be an assigned frequency, nor shall it be used if other frequencies become overloaded, but it must be monitored at all times.

### F. Communication Requirements and Options

- ✓ Frequency Compatibility: It is essential that all aircraft and ground personnel have compatible radios and frequencies in order to perform needed communication functions.
- ✓ Radio Traffic and Radio Discipline: Radio traffic must be disciplined and concise. Use the following guidelines in managing radio traffic:
  - Use clear text on all operations.
  - Keep messages brief and to the point.
  - Only use frequencies for their designated purpose.
  - Identify the radio or frequency *being used*. This will enable the *receiver* to identify which radio or frequency to use to respond.
- ✓ Frequency Monitoring: Simplifying the amount of frequencies a pilot has to monitor will increase their immediate environmental awareness and lessen the fatigue factors.
- ✓ Switching Frequencies: Due to the single-pilot workload of SEAT operations, frequency changes are a source of distraction, and increase the task saturation for the pilot.
- ✓ Combining Functions: On smaller or less complex incidents, communication functions can be combined. A drawback to combining functions is the resultant increase in radio traffic on each frequency.
- ✓ *Issuing* Air Traffic Information: Safety is dependent upon adequate air traffic information being given, received, and acknowledged. In most situations the pilot needs to know the following information:
  - Which aircraft are affected by the advisory.
  - What type of traffic (helicopter, fixed-wing).
  - What the traffic is doing (turning, climbing, descending).
  - Location of the traffic.
  - Direction of travel.

## **G. Sterile Cockpit Environment**

Sterile cockpit rules apply within a five-mile radius of the airport and/or after climb checks are complete.

The flight crew (Single and Dual) shall not perform radio or cockpit communications that are not directly related to safe operation of the aircraft. This includes all taxi time to and from the pit until chocked and within a 5-mile radius of the airport. This important phase of airtanker operations consists of reading checklists, communicating with Air Traffic Control (ATC), Flight Service Stations, Unicom, or other aircraft with the intent of ensure separation or compliance with ATC requirements.

This means communications with dispatch, airtanker base personnel, ground personnel, and other aircraft concerning mission information is prohibited except for essential transmissions. Communication from ground personnel during this time should be limited to safety of flight or mission essential information only.

SEAT bases need to review their established procedures for communicating roll times and alter them as required to ensure that sterile cockpit, as discussed above, is maintained. Flight crews will communicate non-essential information, such as roll times, to the departing base following climb checks and when clear of the five-mile radius.

# CHAPTER 4 – SEAT AIRCRAFT REQUIREMENTS, CAPABILITIES AND LIMITATIONS

## I. Introduction

It is essential that the SEAT users gain at least a rudimentary knowledge of SEAT capabilities and limitations. The brief summary in this chapter should be supplementary to basic air operations and safety training that provides further specific information concerning SEAT limitations and operating characteristics. SEAT users and SEMGs alike are encouraged to enhance their knowledge and understanding of SEAT operational capabilities by conferring with the individual most qualified—the pilot.

## II. SEAT Aircraft Performance Standards

The performance of each particular airplane will vary by aircraft type. They carry 500 to 800 gallons of retardant/suppressant. The speeds of these aircraft will also vary depending on aircraft type and the load being carried. The aircraft may be slower when loaded depending on atmospheric conditions. They range in cruise speeds from 100 mph to 200 mph. However, the majority of SEATs have a cruise speed around 145-165 mph.

Each SEAT will be required by contract to have special purpose load capacity charts generated for that specific aircraft, available to the pilot in the cockpit.

### A. Wind and Turbulence Limitations for SEAT Operations

Because of conditions normally encountered during fire suppression activities, it is important to consider safe and effective aerial operating parameters when windy and/or gusty conditions are present.

Additional caution should be taken when operating in wind conditions above 20 knots or when wind gust spread exceeds 10 knots.

**SEAT operations shall cease when the SEAT pilot, Aerial Supervisor, or Lead Plane has been notified that there are sustained winds greater than 30 knots at the fire operations area, or that the wind gust spread exceeds 15 knots in the fire operations area.**

This does not prevent a decision to cease operations when any unsafe or inefficient conditions are present. This limitation in no way supersedes any aircraft or pilot operational restrictions.

## III. Aircraft Equipment, Communications, and Instrument Requirements

All SEAT aircraft shall have either a standard or a restricted category airworthiness certificate and be equipped with all firefighting equipment as specified in the contract. Refer to the procurement document for specifics.

## IV. Tank and Gate Requirements and Standards

Tank capacities and drop gate configurations vary with make and model and between individual contractor's equipment. The volumes range from 500 to 800 gallons. The following requirements are common to all SEATs, regardless of make, model, or release mechanism:

### **Tank/Hopper**

- ✓ Tank/Gate systems should not leak when loaded at the interagency carded permissible loads (gallons in the hopper).
- ✓ Tank (hopper) quantity indicators shall be visible to the loading crew and pilot.

### **Gate/Drop Door**

- ✓ Gate must be re-closable in flight (as opposed to manually resetting the door on the ground after a single-shot salvo drop).
- ✓ Gates must be capable of salvo drops as well as split drops.
- ✓ All systems must have an emergency dump feature that enables the pilot to drop the load in less than 6 seconds by using the normal dump handle in a single, one-step operation.

### **Hopper/Tank Venting**

- ✓ The tank must be properly vented to prevent negative pressures developing within the tank, resulting in cavitation and non-uniform flows. Vents may be top mounted, spring-loaded doors which are vacuum operated, venturi or positive pressure scoop type vents, or mechanically operated vents which deploy in relation to the gate opening. There should be no routine leakage of water or retardant or slop over from the vent areas. Internal anti-slosh baffle plates are acceptable.

## V. SEAT Aircraft Markings

Historically, SEATs are called on to operate at low level and in an environment that is filled with smoke; therefore it is imperative that the aircraft itself be highly visible and easily identified. The miscellaneous SEAT contracts specify the aircraft paint schemes, identification stripes, and tanker number specifications.

Because of the growing number of SEATs that qualify as Type 3 airtankers the numbering system for SEATs will be as follows:

All SEATs that qualify as Type 4 SEATs will continue to be issued airtanker designation numbers and call signs starting at 400 and ending with 499.

All SEATs that qualify as Type 3 SEATs will be issued airtanker designation numbers and call signs starting at 800 and ending with 899.

All amphibious AT-802s will be issued airtanker designation numbers and call signs starting at 200 and ending with 249.

The numbers are painted on the aircraft as spelled out in the contract specifications.

## ***VI. Required Support Equipment***

Support equipment, when required by contract, will be located at the same base of operations as the SEAT unless otherwise agreed upon beforehand by both the contractor and the using agency. The SEMG will coordinate the movement and setup of the support equipment.

# CHAPTER 5 – SEAT BASES

## I. Introduction

To realize the full economic and operational effectiveness of SEATs and to optimize their self-sufficient capabilities, SEAT flight operations should be established as close to the incident as possible using available airports. Therefore, it is crucial that the user be familiar with the operational limitations of these types of aircraft.

## II. Planning

The responsibility for planning the most efficient use of SEATs falls directly on the aviation management of the user agency. SEATs are very versatile and can be used from a wide variety of aviation facilities. The user agency should conduct pre-planning efforts that include identifying suitable landing sites and operational areas that will promote effective use of the SEAT. Agreements and operational plans should be developed for these sites prior to fire season.

Some of the criteria that can be used in choosing these sites:

- ✓ Facilities located in areas with historically high fire occurrences.
- ✓ Locations that allow rapid movement of support equipment.
- ✓ Locations that are close to a water source and aviation fuel.
- ✓ Locations that can be easily accessed for providing logistical support.
- ✓ Areas that have good communications established.
- ✓ Facilities that are not subjected to high public use.
- ✓ Flight paths over congested areas are minimized.
- ✓ Locations that can expand to meet the incident's needs.
- ✓ Locations that will help facilitate any security needs.
- ✓ Locations that will accommodate aircraft size, type, or performance.

## III. Operations from Established Airtanker Bases

SEATs may operate from the same facility as large airtankers. The SEAT Contractor *and SEMG (if present)* must receive a complete briefing from the ATBM prior to conducting operations from an established airtanker base.

## IV. Operations from Established Bases and Airports

The best utilization of SEATs requires that they be placed close to forecasted and current fire activity. This may best be accomplished by placing the SEAT operation at the nearest airport.

Coordination with the local airport manager is crucial to the safe and efficient operation of this resource.

It is the responsibility of the local aviation manager along with the SEMG to establish a working relationship with the airport manager. The procurement section of the user agency will be required to set up rental agreements and payment schedules.

The SEMG will be responsible for the set up and day-to-day safe and efficient operation of the SEAT base.

## V. SEAT Base Categories

SEAT bases will be identified by the following categories, *based on their use and equipment and/or staffing available*:

### A. Category I Bases

A Category I Base is any large airtanker base or SEAT base with an established full service, bulk, or BPA retardant contract that is published in the *NWCG Airtanker Base Directory*, PMS 507 (<https://www.nwcg.gov/publications/507>). Personnel are either permanently assigned or placed on an on-call status to immediately support SEAT operations. Equipment and retardant are on site year-round. All Category I Bases will meet the standards identified in the SEAT Base Checklist(s).

*Checklist can be found at*

[https://www.nifc.gov/policies/pol\\_ref\\_intgncy\\_prepcheck\\_BLMchec\\_klist.html](https://www.nifc.gov/policies/pol_ref_intgncy_prepcheck_BLMchec_klist.html)

### B. Category II Bases

A Category II base includes airports that have been identified as capable of supporting SEAT operations and will support parking mobile loading equipment for a limited time frame on a call-when-needed basis. Appropriate agreements are in place with hosting airport authority. Personnel are assigned to the base as needed to support short term SEAT operations. A water supply may be identified and available on site.

## VI. Required Elements for SEAT Bases

No matter what category of base or location SEATs are operated from, the following **minimum** standards are required for each base:

- ✓ The using agency must ensure the appropriate arrangements have been made for using the ramp space and any facilities at the SEAT base.
- ✓ The SEMG must be provided with a complete briefing about the base location and operational procedures by the using agency.
- ✓ A crash rescue plan must be identified or developed for the SEAT base.

- ✓ The SEMG must be briefed on and follow the agency's procedures established for hazardous materials and retardant spills for the base. The briefing must be conducted by the Aviation Manager responsible for the base or a knowledgeable designee.
- ✓ The SEMG must be briefed on and follow the requirements of the Storm Water Prevention Pollution Plan (SWPPP). The briefing must be conducted by the Aviation Manager responsible for the base or knowledgeable designee.
- ✓ A *Risk Management Worksheet* (RMW) or JHA must be available to the SEMG to review and use at the site.
- ✓ Adequate facilities and logistical support must be in place to ensure the welfare and safety of all personnel assigned to the base.
- ✓ An assessment of security concerns must be made by the using agency.
- ✓ A jettison area must be designated for the base.
- ✓ A VHF-AM radio must be available for monitoring the ramp frequency.
- ✓ An adequate method must be established for providing the SEMG with daily intelligence used for briefing pilots.
- ✓ **Prior to a SEAT base becoming operational** a current and up-to-date SEAT Base Operating Plan must be completed.

## VII. SEAT Base Operating Plan

A *SEAT Base Operating Plan* is required for Category I/II SEAT bases. The plan must be updated annually and made available to all personnel at the base. The SEMG will ensure the operating plan is current during the time frame they are assigned to the base. A blank *SEAT Base Operating Plan* can be found on the BLM National SEAT website at [https://www.nifc.gov/aviation/av\\_BLMseat.html](https://www.nifc.gov/aviation/av_BLMseat.html).

## VIII. SEAT Base Security

### A. Aircraft Security

The SEAT pilot is responsible for the security of the aircraft, vehicles, and associated equipment used in SEAT operations. SEATs are required by contract to be physically secured via a dual-lock method whenever the aircraft is unattended. The contract outlines the type of acceptable locking devices and methods that can be utilized by the contractor.

### B. SEAT Base Facilities

The user agency is responsible for ensuring the proper level of risk assessment has been made for utilizing the facilities as a SEAT base. The SEMG is responsible for reporting any acts or situations that they perceive as a possible security threat to the base.

# CHAPTER 6 – PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

## I. Ramp Operations

- ✓ Shoes may not be open-toed and should have a non-slip sole. No flip flops or sandals. Tennis shoes or hiking type boots ***are recommended***.
- ✓ Appropriate hearing and eye protection must be worn when working around aircraft with engine or propeller running.
- ✓ It is recommended that eye and ear protection be worn when in proximity of running pumps or other loud noise-making equipment.
- ✓ Personnel working on the ramp ***will*** wear high visibility clothing or vests. Personnel should check to ensure that clothing and items within pockets of their clothing do not present a source of FOD.
- ✓ Contractor personnel are required to have Personal Protective Equipment during fire operations. Refer to the procurement document for specifications.

# CHAPTER 7 – SEAT LOADING AND FUELING

## I. Introduction

Unless otherwise specified by the base operating plan, all loading and fueling operations are the sole responsibility of the contractor. However, there may be times when the SEAT is to be loaded with fire retardants or suppressants at an established airtanker base or SEAT base. (Units utilizing agency personnel as RTCM/MXMS must be approved by the local Aviation Officer and State Aviation or Regional Officer prior to operations). All personnel authorized for loading operations, shall be fully trained and qualified in the procedures established at each base prior to operations.

All SEATs are approved for hot reloading; however, the SEAT contractor must comply with the procedures established at all bases. These procedures may or may not allow hot reloading.

The contractor or qualified agency personnel are required to verify compliance with retardant manufacturer's specification prior to induction into the aircraft. The SEMG will be supplied with the results of the refractometer readings for their records. SEMGs will conduct periodical quality assurance checks. When operating from a large airtanker base, the ATBM is responsible for ensuring that the loading personnel meet this requirement.

The pilot will supervise the retardant contractor or other qualified personnel during the entire loading operation.

## II. Single Engine Airtanker Hot Loading/Fueling

### A. Definition

Hot loading is loading an aircraft with fire retardant or suppressant while the engine is running. Hot fueling is fueling the aircraft while the engine is running. An aircraft shall not be refueled while the engine is running or propellers turning unless the aircraft is equipped with an appropriate dry-break fueling system.

### B. *This chapter provides safe and efficient procedures for hot loading or hot fueling SEATs.*

### C. Responsibility

Unless otherwise specified by contract, the fueling operations are the sole responsibility of the contractor and will not be performed by government personnel. Each SEMG or ATBM is responsible for overseeing compliance with established procedures to ensure safe and efficient fueling and loading operations.

### D. Site Specific Loading/Fueling Procedures

Some airtanker bases and other localities have policies prohibiting one or more of these procedures. In those cases, comply with the local agency policy.

# **THERE SHALL BE NO SIMULTANEOUS HOT LOADING AND FUELING.**

## **III. Hot Loading Procedures**

### **A. Initial Arrival Procedures**

For the purposes of hot loading, when a SEAT first arrives at a base for an incident, the SEAT pilot shall receive a briefing which covers the following procedures with the base manager:

- ✓ Ramp traffic flow procedures
- ✓ Hot loading/fueling procedures (including hand signals, aircraft valve operation)
- ✓ Verify how much retardant should be loaded
- ✓ Pump speed (GPM)
- ✓ Base communication procedures
- ✓ Emergency procedures
- ✓ Basic safety procedures
- ✓ Jettison area(s)

This briefing can occur either over the radio with engine in idle or in person (in person is the preferred method for initial briefing) after the aircraft has been shutdown. This should be outlined in the local base operating plan.

If the SEAT has just been hired, initial inspection and briefing procedures must occur prior to operations being conducted.

### **B. Ramp Procedures**

- ✓ Prior to entering the loading area the pilot will contact the SEMG (or RAMP when available) on the designated base frequency to ensure that the loading area is clear before the aircraft is directed to approach the assigned loading pit.
- ✓ Once in the loading pit the pilot will stop the aircraft and put the engine at idle and lock the brakes.
- ✓ When the pilot has secured the aircraft, he will inform the base by radio or use the airtanker operations hand signal.
- ✓ The retardant loaders and fuelers will remain clear of the loading area until signaled by the pilot (or SEMG/RAMP/FWPT as available) that it is safe to approach the aircraft.
- ✓ The SEMG/RAMP/FWPT (as available) will position himself at all times to allow a clear view of the pilot, aircraft propeller, and loaders and fuelers. The SEMG/RAMP/FWPT shall remain in communication with the pilot at all times through radio contact or hand signals.
- ✓ If any hazardous situation is developing, the SEMG/RAMP/FWPT shall communicate to the pilot to shut down the aircraft engine immediately.

## C. Retardant/Suppressant Loading Procedures

### **ALL HOT LOADING OPERATIONS MUST COMPLY WITH THE FOLLOWING:**

- ✓ The SEMG/RAMP/FWPT and the pilot shall remain in contact with each other by radio or hand signals throughout the loading operations.
- ✓ Loaders will approach and depart the aircraft only in the safety area behind the trailing edge of the front wing. All loading and fueling operations must be conducted in this safety area.
- ✓ The SEMG/RAMP/FWPT shall keep the loading area secure from any unauthorized personnel.
  
- ✓ *The pilot shall remain at the controls of the aircraft during all hot loading operations.*
  
- ✓ The pilot will signal the loader to shut off the pump when the aircraft has been loaded to the desired level. The loader will then disconnect the hose and pull it back away from the loading area.
  
- ✓ *When the loading operations are complete, the SEMG/RAMP/FWPT shall notify the pilot by radio or hand signals that the loading crew and their equipment are clear of the aircraft. The pilot will then be cleared and directed from the pit area by the SEMG/RAMP/FWPT.*

## IV. Fueling SEAT Aircraft

### A. *Standard Procedures for Fueling SEAT Aircraft*

*The following should be kept in mind when fueling SEAT aircraft:*

- ✓ Fueling operations are the sole responsibility of the contractor and will not be performed by government personnel.
- ✓ All fueling operations are to be conducted in a secure area and without presenting any undue hazard to other aircraft or personnel.
- ✓ Bonding procedures shall be followed by all fueling personnel.
- ✓ Some SEATs are approved for hot fueling provided the appropriate dry-break equipment is installed and approved fueling procedures are followed.
- ✓ Hot fueling is only allowed to be performed if the base operation plan approves the operation. The SEAT contractor must comply with the base operation plans.
- ✓ Hot fueling, if allowed, can only be performed by the SEAT Contractor's personnel and equipment.

- ✓ The pilot shall remain at the controls of the aircraft during all hot fueling operations.
- ✓ *Consideration should be taken for giving the pilot a break from flying when hot fueling (to not conduct hot fueling) as necessary.*
- ✓ When the fueling operations are complete, the SEMG/RAMP/FWPT (*as available*) shall notify the pilot by radio or hand signals that the fueling crew and their equipment are clear of the aircraft. The pilot will then be cleared and directed from the pit area by the SEMG/RAMP/FWPT.

## B. Emergency Procedures

In case of any type of emergency situation, the SEMG/RAMP/FWPT will notify the pilot by radio or hand signals of the type of emergency.

- ✓ Fire: In the event of a fire, the SEMG/RAMP/FWPT will immediately notify the pilot, loaders and fuelers by radio or using hand signals. Fire extinguisher will be manned for pilot protection and appropriate base procedures will be followed. ***Ramp personnel will not discharge a fire extinguisher directly into an engine unless directed to do so by the pilot.***
- ✓ Communication Loss: If radio communications are lost, the SEMG/RAMP/FWPT will establish eye contact with the pilot and pat the ear phones followed by a thumbs-down signal. Loading and/or fueling operations may continue, using hand signals, until the radio problem has been identified and corrected.
- ✓ Engine Shutdown: In the event that any situation requiring engine shutdown occurs, the SEMG/RAMP/FWPT will notify the pilot by radio or hand signal (drawing the index finger across the throat). The pilot will immediately shut down the engine.

## C. General Precautions

- ✓ Always maintain communication with the pilot by radio or hand signals.
- ✓ Only authorized personnel shall perform aircraft fueling and loading operations.
- ✓ Only essential personnel shall be allowed in the loading and fueling area during these procedures.
- ✓ All personnel must obtain permission from the pilot prior to approaching the aircraft while it is running.
- ✓ All operations shall remain within the safety area.
- ✓ Review and update all base fire emergency procedures.

## APPENDIX – REFERENCE MATERIALS

The following should not be considered policy unless referenced in the preceding document as a requirement or as specified by agency policy.

- A. SEAT Base Staffing Matrix and Training Elements:  
[https://www.nifc.gov/aviation/av\\_BLMseat.html](https://www.nifc.gov/aviation/av_BLMseat.html)
- B. SEAT Base Operating Plan Template:  
[https://www.nifc.gov/aviation/av\\_BLMseat.html](https://www.nifc.gov/aviation/av_BLMseat.html)
- C. BLM SEAT Base Preparedness Checklist:  
[https://www.nifc.gov/policies/pol\\_ref\\_intgncy\\_prepcheck\\_BLMchecklist.html](https://www.nifc.gov/policies/pol_ref_intgncy_prepcheck_BLMchecklist.html)
- D. Hand Signals for Airtanker Base Ramp Operations: *NWCG Standards for Airtanker Base Operations*, PMS 508,  
<https://www.nwcg.gov/publications/508>
- E. Safety and risk management resources:
  - ✓ NIFC Safety:  
[https://www.nifc.gov/safety/safety\\_init\\_addResources.html](https://www.nifc.gov/safety/safety_init_addResources.html)
  - ✓ USFS Aviation Safety Center:  
[https://www.fs.fed.us/fire/av\\_safety/index.html](https://www.fs.fed.us/fire/av_safety/index.html)
  - ✓ USFS Aviation Risk Management:  
[https://www.fs.fed.us/fire/av\\_safety/risk\\_management/index.html](https://www.fs.fed.us/fire/av_safety/risk_management/index.html)
  - ✓ NWCG Risk Management Committee:  
<https://www.nwcg.gov/?q=committees/risk-management-committee/resources>
  - ✓ *Interagency Standards for Fire and Fire Aviation Operations*, Chapter 16: Aviation Operations/Resources:  
[https://www.nifc.gov/policies/pol\\_ref\\_redbook.html](https://www.nifc.gov/policies/pol_ref_redbook.html)
- F. For information on the national, interagency Airtanker Rotation Policy applicable to all airtankers, refer to the *Interagency Standards for Fire and Fire Aviation Operations*, Chapter 16:  
[https://www.nifc.gov/policies/pol\\_ref\\_redbook.html](https://www.nifc.gov/policies/pol_ref_redbook.html)
- G. *NWCG Glossary of Wildland Fire*:  
<https://www.nwcg.gov/glossary/a-z>

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While they may still contain current or useful information, previous editions are obsolete. The user of this information is responsible for confirming that they have the most up-to-date version. NWCG is the sole source for the publication.

This publication is available electronically at <https://www.nwcg.gov/publications/506>.

Printed copies of this guide may be ordered from the Great Basin Cache at the National Interagency Fire Center in Boise, Idaho. Refer to the annual *NWCG NFES Catalog Part 2: Publications*, PMS 449-2, and find ordering procedures at <https://www.nwcg.gov/catalogs-ordering-quicklinks>.

Comments, questions, and recommendations shall be submitted to the appropriate agency program manager assigned to the SEAB. View the complete roster at <https://www.nwcg.gov/committees/single-engine-airtanker-board/roster>.

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