

COORDINATION AND CONTROL (Revised September 2001)

8341

GENERAL (No. 4 January 2003)

8341.1

Aerial fire fighting occurs in a very dynamic environment. Fire fighting aircraft often work in close proximity to each other, ground personnel, and surrounding terrain. This is routinely accomplished under conditions that are less than ideal as aircrews contend with high temperatures, wind, turbulence, and visibility restrictions caused by smoke and terrain. Furthermore, fire-fighting aircraft, in contrast to most commercial aviation, must provide their own safe separation. It is for these reasons that AIRSPACE COORDINATION is of the utmost importance with respect to safety. Though the ATGS is responsible for overall control of aircraft on an incident, it is incumbent upon all aircrew personnel to participate in this endeavor by adhering to the rules set by policy and the instructions given by the ATGS.

An air tactical group supervisor (ATGS) will be dispatched to a fire where aircraft are, or will be committed. The air tactical group supervisor will be responsible for directing and controlling all aircraft during incident operations. The ATGS will ordinarily fly in an orbit above the level of the airtankers and will describe targets to the airtanker and helicopter pilots.

The incident ATGS will place requests for relief in a timely manner so as to provide uninterrupted ATGS coordination on incidents. U.S. Forest Service lead planes may perform as ATGS or airtanker coordinator if qualified at incidents for limited periods of time when the availability of dedicated ATGS aircraft is delayed. Lead planes will not routinely be used for relief ATGS assignments.

OPERATIONAL COORDINATION AND CONTROL (No. 4 January 2003)

8341.2

The ATGS is responsible for providing air traffic control and coordination at an incident. The ATGS will:

- Discontinue flight operation anytime conditions appear unsafe.
- Advise inbound aircraft of known hazards, such as, obstacles, power lines, turbulence, visibility restrictions, etc., and other aircraft on the incident.
- Issue a clearance to each inbound aircraft prior to their arrival. The clearance will include specific routing and altitude when applicable. See this section "Incident Complexity and Span of Control".
- Establish traffic patterns and control procedures. ([See Incident Routes and Patterns – FTA Dimensions](#))

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- Ensure that during retardant drop runs, the frequency used to direct the drops remains clear throughout the base, final, and release. Communications during drop runs will be limited to the transmissions between the dropping airtanker and the controlling aircraft.

Pilots shall advise ATGS or control aircraft:

- 12 NAUTICAL MILES from an incident - stating their distance, direction, and altitude. (Example: "Tanker 100, 12 miles west, 2,500.")

NOTE: Aircraft inbound to an incident will not proceed closer than 7 NAUTICAL MILES until CLEARANCE is received from the control aircraft.

- Arrival AT SCENE.

NOTE: Depending on the fire size and complexity, "at scene" may include an area extending as far as 5 nautical miles from the incident center coordinates.

- When beginning drop runs, downwind, base and final. ATGS or airtanker coordinator must acknowledge these calls.

NOTE: No airtanker will begin a drop maneuver until cleared so by the ATGS or airtanker coordinator.

- When lifting off for helicopter missions.
- When moving between operating/target areas.
- When departing or re-entering an incident area.
- When changing radio frequencies.
- When encountering any unusual or unsafe situations.
- Prior to performing a non-standard maneuver. (Ref. Section [8341.6.2.2](#))

Pilots are responsible for maintaining aircraft separation, radio contact and adherence to correct flight patterns and altitudes.

Helicopter operations will be cleared and coordinated through the ATGS. In absence of air attack supervisor, helicopters will establish communications and control procedure with the airtankers to avoid possible conflicting flight paths.

INCIDENT COMPLEXITY AND SPAN OF CONTROL

8341.2.1

(No. 4 January 2003)

An incident can increase in complexity to where safety, efficiency, and control are diminished. The following actions enable air operations to keep pace with incident growth:

COMPLEX INCIDENT

CONDITION	REQUIREMENT
<u>When additional aircraft are ordered:</u>	<ul style="list-style-type: none">▪ Entry altitudes assigned to all aircraft▪ Orbit altitude assigned to all airtankers▪ Flight routes assessed for conflict▪ Air Tactics restricted to essential communications
<u>When either of the following occurs:</u> <ul style="list-style-type: none">▪ Reload base is within 10 miles of fire▪ More than ONE reload base is used	<ul style="list-style-type: none">▪ Routes and altitudes between the airport(s) and incident will be established to avoid conflict.
<u>When any of the following occurs:</u> <ul style="list-style-type: none">▪ Total number of aircraft exceeds 10▪ Total number of airtankers exceeds 6▪ Total number of helicopters exceeds 6	<ul style="list-style-type: none">▪ Routes and altitudes established for all aircraft▪ Orbit altitude assigned to all airtankers▪ 2nd Control Aircraft considered
<u>When any of the following repeatedly occurs:</u> <ul style="list-style-type: none">▪ ATGS not responding to radio calls▪ Required radio calls are not being made▪ Acknowledgements are not being given▪ Positive control is lost in any respect▪ Air to Air communications is overloaded	<ul style="list-style-type: none">▪ Operation will be slowed or stopped until problem is resolved.▪ 2nd Control Aircraft WILL be ORDERED
<u>When any of the following conditions occur:</u> <ul style="list-style-type: none">▪ High winds▪ Moderate or greater turbulence▪ Heavy smoke and reduced visibility▪ Suppression actions are ineffective▪ Targets are difficult and dangerous	<ul style="list-style-type: none">▪ Risk / Benefit assessment required▪ Suspension of air operations considered for some or all aircraft.

WHEN AIRTANKERS ARRIVE PRIOR TO ATGS

8341.3

(No. 4 January 2003)

When airtankers arrive over a fire before the ATGS, the following will apply:

The first airtanker on scene will:

- Orbit the fire at least once to size up the situation.
- Stay alert for the presence of other aircraft over the fire.
- Establish radio contact with ground personnel for instructions, if possible.

If ground personnel are not yet on the fire, or radio contact cannot be made with ground forces, the airtanker pilot will:

- Make a report on conditions to ECC.
- Develop a plan and communicate with other airtanker and helicopter pilots.
- Proceed with the mission to the best of their ability based on their knowledge of aerial fire fighting.

Succeeding airtankers will also attempt to contact ground personnel for instructions. If contact cannot be made, they will wait until the preceding airtanker has completed its drops and follow the plan that has been communicated to them by the preceding pilot.

Air-to-ground communications between airtankers and fire line personnel will be on the frequency assigned by ECC.

For safety reasons, there is to be only one ATGS in command at one time, and it is each person's responsibility to be aware of who this is.

There will be times when air tankers and CDF helicopters will be over the fire without a control aircraft or before a ground incident commander arrives. In these cases, the helitack captain shall control air traffic until relieved by an ATGS. All pilots must be aware of this decision and will make radio contact with each other before performing any mission.

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DIRECT PROTECTION AREA (DPA) BOUNDARIES

8341.4

(Revised September 2001)

There will be times when a fire is reported along the DPA boundary where airtankers and helicopters are dispatched. All air attack resources are available to either agency. There should be no hesitancy to send aircraft to a reported fire when requested, regardless of jurisdiction.

The first tactical aircraft over the fire will assume command of the air operations and will make it definitely known to ground forces, all aircraft, and both agencies in command.

After the initial attack period, all subsequent aircraft use will be ordered by the agency responsible for suppressing the fire. Operations will then continue under the regular procedures of that agency. In the absence of a determination by a ground force or control aircraft, dispatchers of both agencies will confer and determine which is the responsible agency.

POSITIVE CONTROL REQUIRED

8341.5

(Revised September 2001)

The simultaneous operation of any combination of airtankers and helicopters will occur only under the complete traffic control of an ATGS except:

For the purposes of quick initial attack, the pilots of a controlled number of aircraft may create a positive control environment where the pilot of each aircraft, through radio communication and positive position reporting, can accomplish initial attack objectives prior to the arrival of an ATGS. All participating aircraft and pilots will use the same radio frequency, normally the assigned air tactics channel for that incident. It is each pilot's responsibility to monitor the activity of the other participating aircraft both visually and through positive radio communications. The first aircraft on scene shall confirm with ECC that an ATGS or coordinator has been assigned and is responding.

AIRSPACE COORDINATION (Revised September 2001)	8341.6
GENERAL (Revised September 2001)	8341.6.1
TO BE WRITTEN	
INCIDENT TRAFFIC PATTERNS ROUTES AND ALTITUDES (Revised September 2001)	8341.6.2
FLIGHT HAZARDS (Revised September 2001)	8341.6.2.1

Aircraft Vortex Turbulence

The lower and slower an aircraft flies, the stronger the effect of turbulence will be . Wake vortices from aircraft wings or rotor blades are in the form of horizontal whirlwinds with velocities up to 125 mph and sufficient turbulence to cause sudden and violent changes in fire behavior.

Pilots can minimize the effects and dangers of wake vortices by:

- Flying parallel to the fire-line only when making a drop, veering off as soon as possible.
- Keeping aircraft high except when making the actual drop and pulling up as soon as possible.
- Being sure that ground crews are alert to the presence of aircraft and the pilot's intentions.
- Pilots should also be reminded of the effects of wake vortices on aircraft, as outlined in the FAA's Airmen's Information Manual (AIM).

NON-STANDARD MANEUVER

8341.6.2.2

(No. 4 January 2003)

A non-standard maneuver is an action by a pilot (and aircraft) performed in a way other than the normal, usual, or predicted fashion. Non-standard maneuvers are necessary at times when the usual method would be either unsafe or ineffective. It must be understood, however, that a non-standard maneuver may require the suspension of other ongoing operations. Some examples of non-standard maneuvers are:

- A target identification pass by the Air Tactical aircraft
- A tanker drop performed out of a RIGHT turn
- Air Tactical aircraft flying a left hand orbit
- A helicopter flying a new or unassigned route within the incident boundary
- Any aircraft deviating from the assigned or expected altitude

BEFORE A NON-STANDARD MANEUVER IS EXECUTED:

Non-standard maneuvers must be REQUESTED (by the pilot intending to perform the maneuver) and APPROVED by the ATGS or applicable coordinator. Finally, all pilots of aircraft that may be affected by the maneuver must ACKNOWLEDGE that they are aware of the maneuver about to take place. (See [Non-standard Maneuvers Checklist](#).)

ALTITUDES

8341.6.2.3

(No. 4 January 2003)

Media or other aircraft will operate at altitudes assigned by the ATGS. Generally, this is an altitude above the air tactical aircraft.

The ATGS shall operate in a flight pattern suitable for overall command and control. This will normally consist of a right-hand pattern flown at a minimum of 2,000 feet altitude AGL (minimum 2,500 feet AGL during Extended Attack fires) and at least 1,000 feet above the airtanker orbit.

Airtankers will normally orbit in a left-hand orbit at a minimum of 1,000 feet AGL (minimum 1,500 AGL during Extended Attack fires). Airspeed will determine the size of the orbit. Overtaking aircraft will pass (outside) to the right of the aircraft being overtaken.

Airtanker drop patterns should be planned to avoid any abrupt pull-ups or excessive maneuvering such as turns beyond 90° immediately following the drop. Maximum drop maneuvering altitude shall be at least 500 feet BELOW the established orbit altitude. The orbit altitude will be adjusted, if necessary, to accommodate this.

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Helicopters will generally operate at 500 feet AGL or less in the incident area.

AGL Altitudes:

Aircraft	Minimum En route	ON AN INCIDENT		
		Minimum Orbit Initial	Minimum Orbit Complex incident	Minimum Special Maneuvers
Air Tac	1,000	2,000	2,500	500
Airtanker	1,000	1,000	1,500	150
Helicopter	1,000	Below 500	Below 500	Below 500

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FLIGHT ROUTES

8341.6.2.4

(Revised September 2001)

FLIGHT ROUTES TO/FROM AN INCIDENT

8341.6.2.4.1

(Revised September 2001)

Routes should be implemented when conditions warrant either temporarily or for longer periods of time. Such conditions may include poor visibility, coupled with numerous aircraft flying to and from multiple incidents in proximity. Longer-term flight routes should be a joint decision by pilots, base managers, and incident air operations personnel. Pilot feedback is critical on this issue. These routes should be communicated to the applicable Region CC for incorporation into the Daily Airspace Coordination/Communications Report.

ESTABLISHMENT OF AND COMMUNICATION OF SPECIAL AIRSPACE COORDINATION PROCEDURES

8341.6.3

(Revised September 2001)

The incident ATGS or AOBD is responsible for relaying special procedures (initial points, flight routes) to the ECC. The ECC is responsible for relaying this information to the applicable region CC for incorporation into the Daily Airspace

Coordination/Communications Report. Any modifications should be relayed timely. The primary purpose of this is to ensure that new arriving aircraft are made aware of procedures.

**TEMPORARY FLIGHT RESTRICTIONS
(FAR PART 91.137) (TFR)**
(Revised September 2001)

8341.6.4

A TFR should be considered when an air attack operation progresses beyond initial attack or to an extended attack situation.

A checklist of conditions to consider prior to requesting a 91.137 is listed in exhibit [91.137 Considerations Checklist](#).

**FLYING NEAR, TRANSITING OR ENTERING
INCIDENT AIRSPACE BY FIRE AIRCRAFT NOT
ASSIGNED TO THE INCIDENT**
(Revised September 2001)

8341.6.5

This situation is one where many airspace conflicts are experienced. Pilots and air crewmembers of non-incident aircraft are directly responsible for adhering to the following procedures. Dispatchers and unit aviation managers are responsible for ensuring aircraft performing these missions inform pilots and air crews of potential known conflicts (i.e., intrusions into TFR areas).

Incidents with a TFR:

- It is important that pilots and aerial supervisors of aircraft not assigned to the incident realize that they are non-participating aircraft under FAR 91.137 (a)(2) and fall under the same requirements as general aviation and commercial aircraft. All pilots are responsible for being aware of the TFR Notice To Airmen (NOTAM).
- They are responsible for remaining clear of the restricted airspace unless granted permission to enter or transit the airspace by the aerial supervisor in charge (or other coordination facility such as dispatch, who should in turn make contact with the aerial supervisor to obtain permission).
- An attempt to cross restricted airspace without making contact and obtaining permission for any reason (including frequency congestion) is not acceptable.
- Even if outside the TFR, a courtesy contact will not only enhance safety but also avoid needless follow up of a perceived intrusion.

Incidents without a TFR:

For aircraft not assigned to the incident, it is a basic aerial firefighting safety procedure for the pilot to avoid the incident airspace until contact can be made. This is commonly achieved via communication with the unit dispatching the aircraft or the unit with jurisdiction on the incident. Another method should always be contact on Air Guard or VHF-AM 122.925.

ROLES AND RESPONSIBILITIES WITH RESPECT TO TFRs.

8341.6.7

(Revised September 2001)

The following outlines airspace coordination and related duties and responsibilities for:

Air Attack Base Managers

- Conduct a briefing each morning that includes updated, accurate airspace coordination information. This briefing regarding local and statewide airspace coordination information should be conducted regardless of level of local activity.
- Update the ECC with any changes concerning aircraft status (both contract and agency), frequencies, etc. Conduct a nightly debriefing and recommending any necessary corrective action.

Aerial Supervisors

- These include both Air Tactical Group Supervisors, Air Tanker Coordinators, Helicopter Managers, etc.
- Relay corrected (actual) incident location and frequency information (if changed) to dispatch
- Request a Temporary Flight Restriction (TFR) if necessary, taking into account expected incident growth
- Center point if circular corner coordinates if non-circular
- Radius if circular
- Altitude MSL
- Air-To-Air contact frequency

- Special considerations (within Class B, C, or D airspace, airports, etc)
- Relay corrected or amended airspace coordination information (initial points, special procedures) and frequencies to ECC as necessary.
- Obtain Daily Airspace Coordination/Communications Report and conduct morning aircrew briefings and nightly debriefings. Ensure amended or corrected information is relayed for incorporation into next day's report.

Pilots

- Receive a comprehensive briefing on airspace coordination that provides updated, accurate information. Briefing should be conducted regarding local and statewide airspace coordination information, regardless of level of local activity.
- If not assigned to an incident with a TFR, remain clear of the TFR area until contact can be made with the aerial supervisor for transit through the TFR.
- If not assigned to an incident without a TFR, remain clear of the incident area until contact can be made with the aerial supervisor for entry into the area of operations (does not apply if tactical aircraft is first on scene).
- Update the base manager with any changes of which they become aware (aircraft status, frequencies, etc)
- Participate in a nightly debriefing, identifying any problems encountered, and recommending any corrective action necessary.

Air Operations Branch Directors (AOBDs)

- Relay corrected or amended airspace coordination information (initial points, special procedures) and frequencies to ECC as necessary.
- Obtain Daily Airspace Coordination/Communications Report and ensure morning aircrew briefings and nightly debriefings are conducted.
- Ensure local airbases and dispatch receive copies of the ICS-220, ICS-205, maps, and associated aviation information (e.g., latitude/longitude lists, special flight following procedures) no later than sunrise (i.e., in time for morning briefing). Note that faxed copies of topographic maps do not work well. Hand delivery is preferable.

Emergency Command Centers (ECCs)

- Update resource orders with corrected location and/or changed frequency information received from ATGS or other aerial supervisor, as well as from Air Operations Branch Directors on larger incidents. relay this information to the appropriate Region CC and reload bases.
- Depending on unit location, inform/update applicable Region CC daily on TFR status and other airspace coordination information.
- Brief local initial attack and other non-participating aircraft on procedures.

Region CC

- Implement TFRs for units within the Region CC upon request
- Receive updated information or requests for change/cancellation of TFRs, frequencies, and special procedures from ECCs.
- Obtain updated frequency information for large incidents by 1900 daily from North and South Operations Frequency Coordinators
- Consolidate Daily Airspace Coordination/Communications Report.

[\(see next section\)](#)

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[\(see Forms or Forms Samples\)](#)

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