WILDFIRE AVOIDANCE FOR AVIATORS

Tucson Interagency Fire Center

WILDFIRE SUPPRESSION

Every year wildfires burn approximately 7 million acres of lands in the United States impacting communities, infrastructure, and natural resources. Firefighting aircraft respond to many of these fires.

Federal Branches including the U.S. Department of Agriculture and the Department of Interior deploy aircraft to combat wildfires. Aircraft are essential to firefighting operations and are integrated into all phases of fire suppression.

INITIAL ATTACK

Firefighting aircraft respond rapidly to a fire deploying fire fighters, dropping fire suppressants, and coordinating aerial activities.

EXTENDED ATTACK

Firefighting aircraft respond rapidly to a fire deploying fire fighters, dropping fire suppressants, and coordinating aerial activities.

Aircraft support continuous fire operations with delivery of additional fire fighters, fire suppressants and aerial coordination. They also deliver cargo and gather fire intelligence.

RECOVERY AND REPAIR

Firefighting aircraft respond rapidly to a fire to deploy fire fighters, drop fire suppressants, and coordinate aerial activities.

Aircraft support continuous fire operations with delivery of additional fire fighters, fire suppressants and aerial coordination. They also deliver cargo and gather fire intelligence.

Aircraft support post-wildfire rehabilitation activities including mapping, seeding and erosion control.

AIR & GROUND OPERATIONS

Firefighting aircraft operate from a few hundred to a few thousand feet over a fire. Aircrews coordinate their actions with other fire aircraft and firefighters on the ground.

Air Operations center on supporting strategies and tactics of ground firefighters.

FIRE RETARDANT

Retardants are dropped from aircraft onto surfaces of vegetation, reducing a plant's ability to burn. It is applied next to a fire to slow its spread until ground firefighters can secure a fire's edge.

WATER & FOAM

Water and foam are applied directly to a fire to knock it down, allowing firefighters to work at a fire's edge.

LOGISTICS

Equipment, supplies, and communication systems are some of the logistical items delivered by aircraft to wildfires. Large fires are supported by a temporary base camp and a helibase established near the fire.

FIRE REHABILITATION

Aircraft are sometimes used to spread soil stabilization and seed products to aid recovery after a wildfire. Aircraft may be present over a burned area well after the smoke is gone.

FIREFIGHTING AIRCRAFT

Contractor and government owned aircraft make up the nation's aerial firefighting fleet. A variety of fixed and rotor wing aircraft carry out firefighting missions.

AIRTANKERS

Airtankers drop fire suppressants from low level at fires. They operate from bases located near areas of high fire potential.

10 TANKER AIR CARRIER

AIRTANKER TYPES

AIRTANKER TYPES

AERIALFIRE MAGAZINE

MIKE MCKEIG

STEVE WHITBY

AERIAL SUPERVISION

Air Attack

Air Attack aircraft manage the airspace at a fire and coordinate aircraft operations with fire fighters on the ground. ‘Air Attack’ consists of a pilot and an air tactical group supervisor (ATGS).

ATGS

AERIAL SUPERVISION

Lead Plane

Lead planes direct the low level activities of airtankers, providing verbal descriptions and visual references of where to drop retardant.

Lead planes use smoke to mark the start point for an airtanker drop.

AERIAL SUPERVISION

Aerial Supervision Module

Aerial Supervision Modules (ASMs) combine the roles of Air Attack and Lead plane into one aircraft; Lead pilots guide airtankers through drops, air tactical supervisors manage airspace and coordinate air operations with firefighters on the ground.

ROTOR WING

Helicopters and their crews support firefighting operations in a variety of roles. They carry out aerial supervision, fly reconnaissance, move personnel, drop water, deliver supplies, and provide medical transport.

NIFC PHOTOS

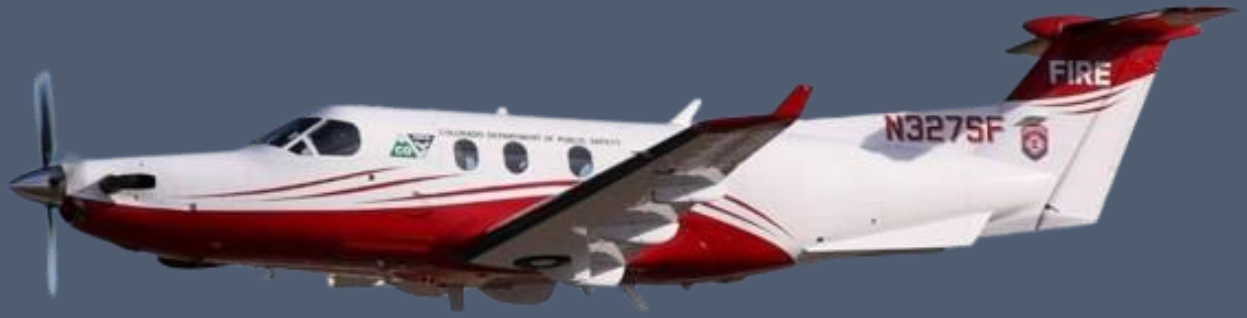
ROTOR WING TYPES

SMOKEJUMPER

Multiple types of fixed wing, twin engine aircraft deliver firefighters “Smokejumpers” to a fire by parachute. Smokejumper aircraft also support firefighters with Para-cargo drops of food, equipment and supplies.

INTELLIGENCE GATHERING

Aircraft equipped with infrared (IR) and other sensing technology fly over wildfires to detect heat and collect fire activity information. Information is distributed to firefighters for operational planning.



UNMANNED AIRCRAFT SYSTEMS

Unmanned Aircraft Systems (UAS) support various fire management activities. UAS map wildfires, provide situational awareness, and conduct firing operations.

Drones and helicopters are capable of dropping ping pong-sized spheres filled with combustible materials to burn vegetation near a fire. ‘Firing Out’ is a tactic sometimes used to keep an approaching fire from crossing containment lines.

Drones and UAVs loiter above a fire to supply firefighters with mapping and real-time information about fire size & growth, fire behavior, and areas of heat concentration.

FLIGHT OPERATIONS ENVIRONMENT

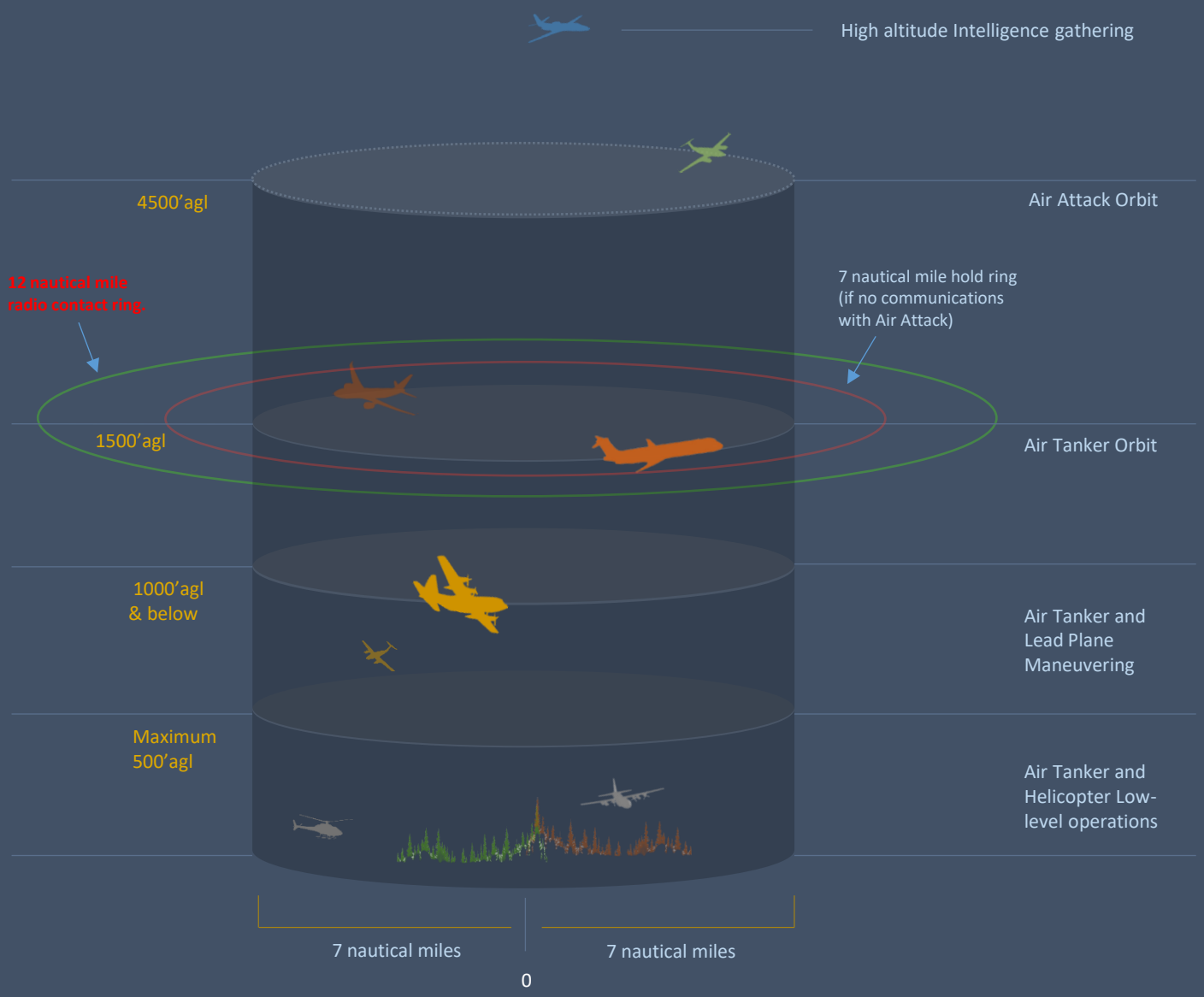
The flight environment at a wildfire is dynamic. Atmospheric conditions, flight activities, and airspace requirements contribute to the complexity of fighting fire from the air.

WEATHER

Wildfires can develop convective columns like thunderstorms. Updrafts and downdrafts from the columns are capable of producing extreme turbulence and strong winds. Smoke from wildfires can reduce visibility to near zero.

FIRE TRAFFIC AREA

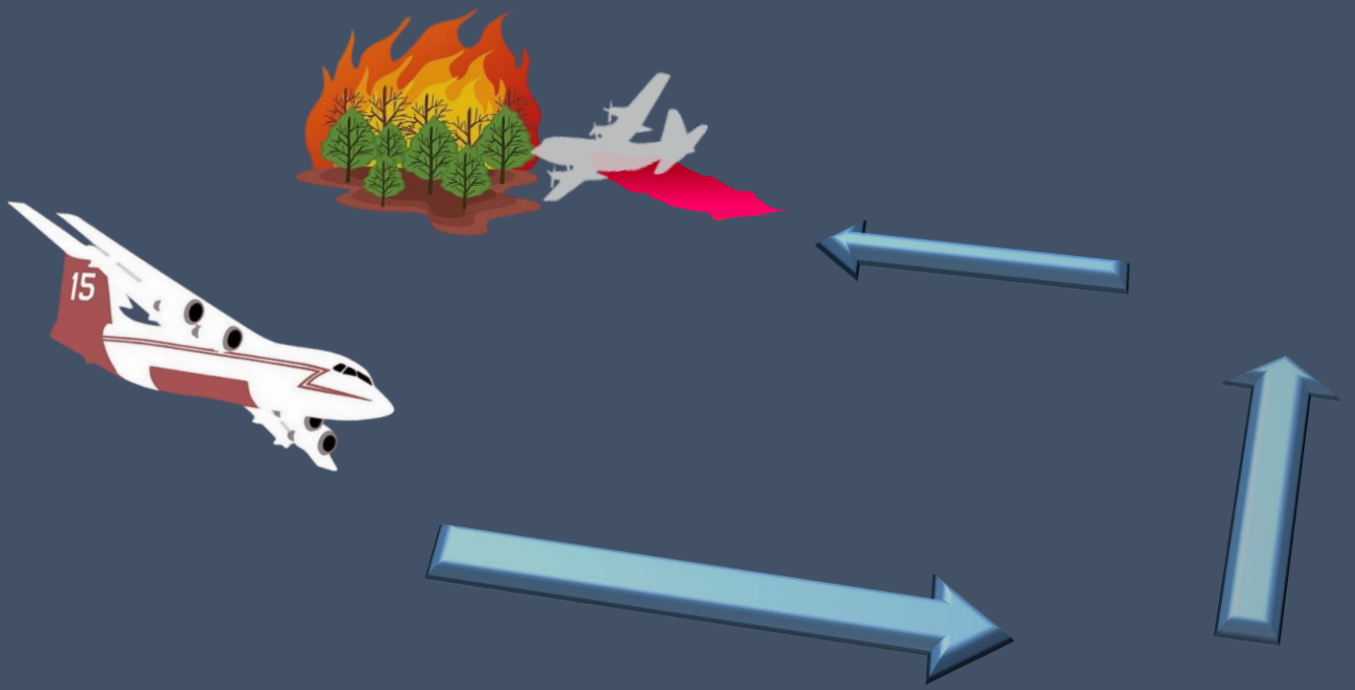
The Fire Traffic Area (FTA) provides for coordination of fire aircraft over a wildfire. Although designed for wildland firefighting operations, the FTA structure and communications requirements are patterned after Class D airspace.



(Diagram not to scale)

RETARDANT DROP SEQUENCE

Airtankers follow each other from their orbit altitude to a drop area. They typically fly a left downwind, left base, and final approach to a fire. Tankers drop anywhere from 65’ to 250’ agl, depending on aircraft size and terrain. Once they complete a drop, they depart the Fire Traffic Area at low level.



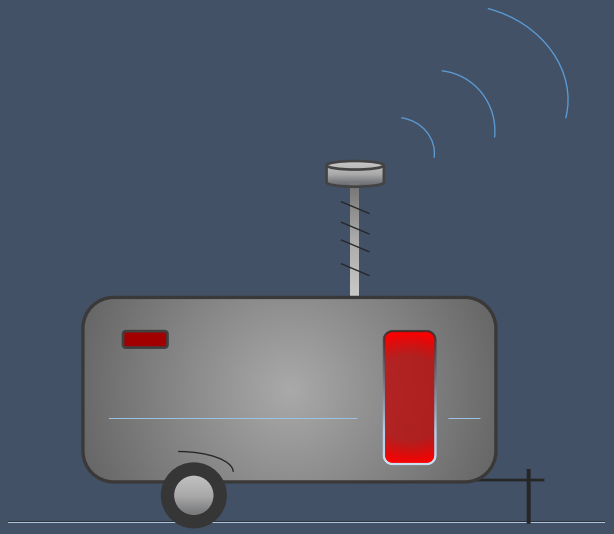
HELICOPTER OPERATIONS

500’

Helicopters remain at or below 500’ AGL inside a fire traffic area. They also transit to and from fires low level from bases and airports outside the FTA.

UAS

UAS are operated at wildfires for both Line of Sight and Beyond Visual Line of Sight missions. Small UAS normally remain at or below 400’ AGL. UAVs typically operate 1,200’-2000’ AGL within the FTA.



AIR SUPPORT BASES

Airtanker Bases supply airtankers with fire retardants. Aerial Supervision aircraft are usually positioned with airtankers at tanker bases to respond to fires.

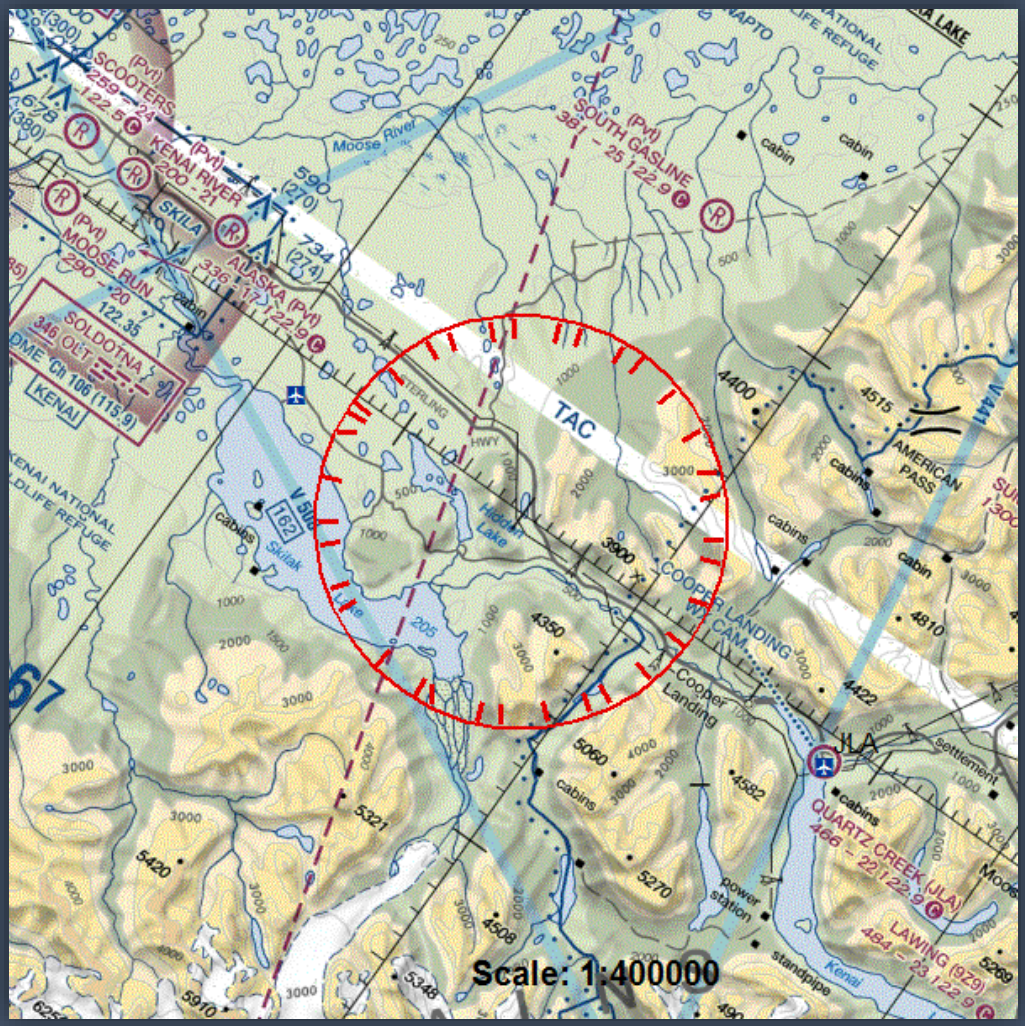
Temporary helicopter bases are established close to a large wildfire to reduce response times for air support missions.

TEMPORARY FLIGHT RESTRICTION

Temporary Flight Restrictions (TFRs) for firefighting are intended to provide a safe environment for aircraft participating in disaster/hazard relief activities. TFRs usually mimic a Fire Traffic Area.

Firefighting agencies consider impacts on military, commercial, and general aviation airspace when establishing a TFR. Not all fires which utilize aircraft have a TFR.

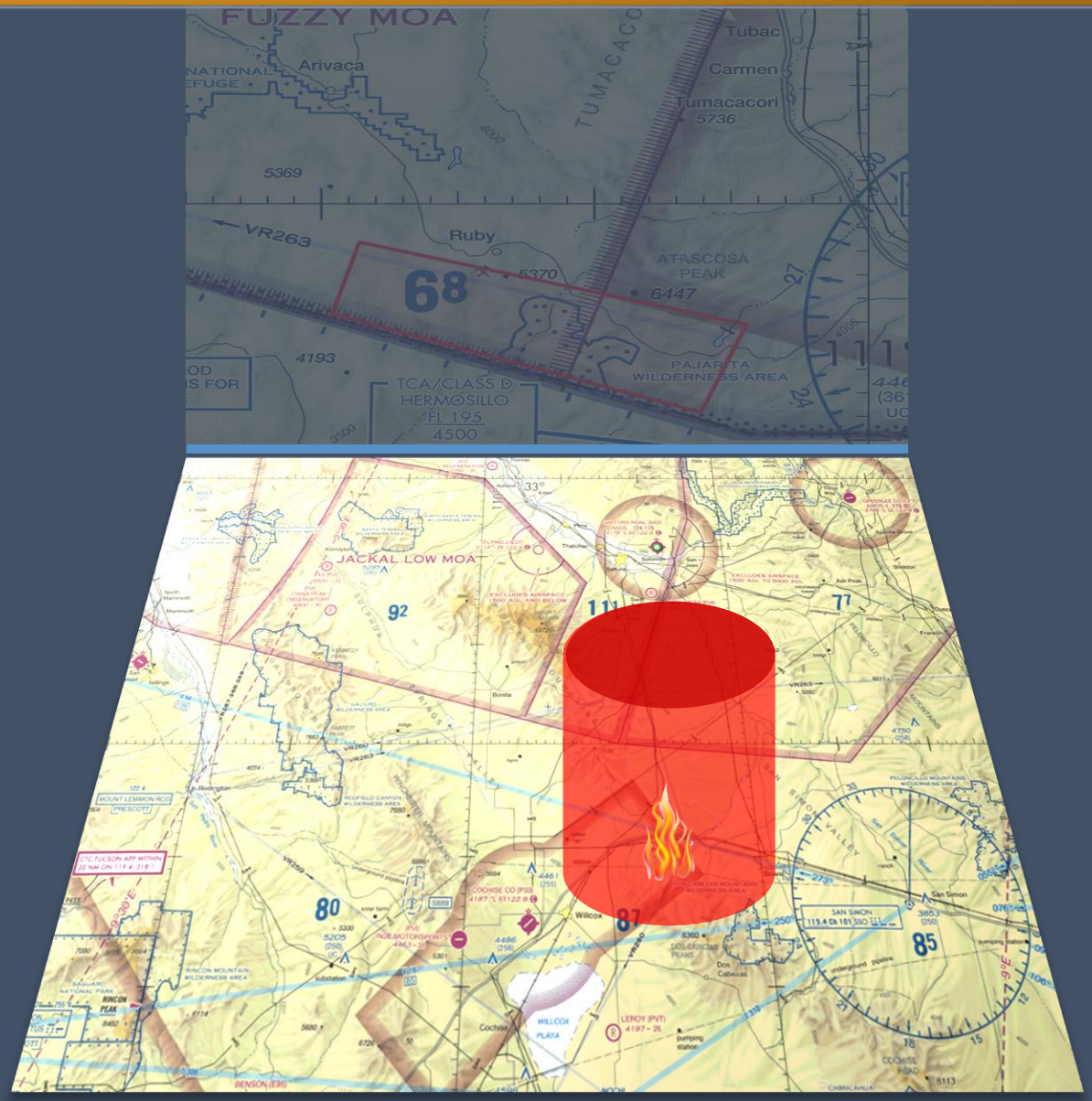
TFR shapes and ceilings vary based on fire size, elevation, and type of aircraft assigned.



CONGESTED AIRSPACE

Air operations at fires are best described as aerial choreography. Multiple aircraft at various altitudes engage in firefighting simultaneously inside a Fire Traffic Area.

"See and Avoid" is a significant task in the airspace over a fire. When non-firefighting aircraft enter a TFR or fire traffic area, aerial operations are disrupted and fire aircraft may have to make evasive maneuvers. Airborne Collision Avoidance Systems (such as TCAS) do not always alert fire pilots of other aircraft in the fire area.



SEE & AVOID

Are firefighting aircraft easy to see?

SEE & AVOID

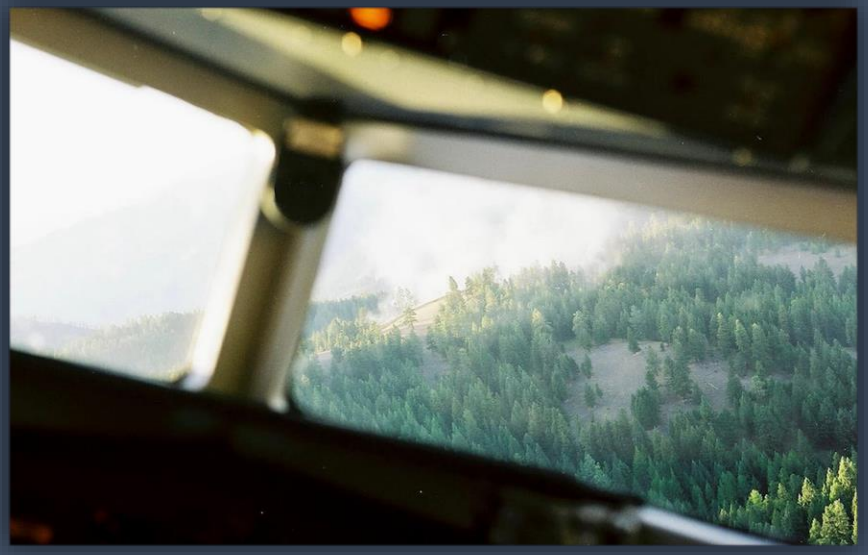
Are firefighting aircraft easy to see?

Bighorn Fire (Coronado National Forest)

SEE AND AVOID

View from the flight deck

Smoke from a wildfire is sometimes hard to spot. Sun angle and low contrast against the horizon and surrounding terrain may contribute to aviators not seeing smoke until they are over it. Flames are not always visible even from short distances.



WHAT YOU CAN DO

Firefighting aircrews operate aircraft a few hundred to a few thousand feet above ground level. They must coordinate their actions with ground personnel and other aircraft, maneuver around terrain, and monitor fire activity.

You can help our aircrews by checking for firefighting NOTAMs, deconflicting airspace, maintaining a safe distance from smoke, and watching for firefighting aircraft transiting to and from fires.

For more information about aviation operations on federal lands in southern Arizona contact:

Tucson Interagency Dispatch Center
Aircraft Desk
aztdc@firenet.gov

"Only You Can Prevent Aviation Mishaps"