AIR

OPERATIONS

FIREFIGHTING AIRCRAFT
RECOGNITION GUIDE

CAL FIRE AIRCRAFT CONTACT FREQUENCY 122.925
CDF AIR TO GROUND 151.2200 TONE 16
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With a fleet consisting of more than 60 fixed and rotary wing aircraft, CAL FIRE boasts the largest civil aerial firefighting fleet worldwide. Strategically positioned across California, CAL FIRE's aircraft can be found at 14 air tanker bases, 10 CAL FIRE helitack bases, and one CAL FIRE/San Diego County Sheriff helitack base. In as little as 20 minutes, these aircraft can reach even the most remote State Responsibility Area (SRA) fires. The CAL FIRE Aviation Management Unit is located at Sacramento McClellan Airport and operates with support from contractors *DynCorp/ Amentum* and *Logistics Specialties Incorporated* (LSI).

Airtanker Program

Aircraft were first proposed for fighting California's wildland fires in 1931, and again in the late 1940s after World War II. CAL FIRE used several small airtankers on a Call-When-Needed basis between 1954-1957, and in 1958, the Department contracted with private aviation companies for airtanker services. The air program expanded until the early 1970s, when CAL FIRE owned and operated 14 turboprop air tactical aircraft and seven multi-engine retardant/water dropping aircraft. Early aircraft included SOCATA TBMs, Grumman F7Fs, Consolidated PBYs, and a Boeing B-17.

By the late 1970s, CAL FIRE made the Grumman S-2 its primary airtanker. In 1987, the Department began upgrading to turbine-driven engines and, by 2005, all airtankers had been converted to the Grumman S-2T model. In 2006, CAL FIRE placed the first "Very Large Air Tanker" on contact, a converted McDonnell Douglas DC-10, further enhancing initial and extended attack capabilities.

In July 2018, California obtained approval for the acquisition of seven C-130H aircraft for CAL FIRE to further improve firefighting capabilities. The 2019 National Defense Authorization Act allowed for the transfer of the planes from the United States Coast Guard to California, following modifications by the United States Air Force, including the replacement of center wing boxes and outer wings, general programmed depot level maintenance, painting, and retardant dispersal system installation. Once complete, the United States Coast Guard can transfer ownership to CAL FIRE. The first transferred C-130Hs will be response-ready in the near future, following extensive wing-box modifications, RDS contracting/installation by the United States Air Force, and pilot training and certification.

Air Tactical Aircraft

In 1974, CAL FIRE acquired 20 Cessna O-2 aircraft from the US Air Force, previously used during the Vietnam War, for use as an Air Attack platform to direct airtankers, helicopters, and provide incident updates to ground resources.

In 1993 the Department replaced the aging O-2 platform with 16 North American OV-10A aircraft, which were obtained from the Department of Defense. The OV-10s were equipped with turbine-powered twin engines and served as the next-generation Air Attack platform. The current fleet consists of 15 "A" models and one "D" model.

To support fleet maintenance and surge capacity, CAL FIRE recently acquired four additional OV-10 Air Tactical Aircraft from NASA. These aircraft will undergo extensive refurbishment before entering service in the coming years.

Helicopter Program

In 1981, CAL FIRE took a significant step towards strengthening its fleet by acquiring 12 Bell UH-1F series helicopters from the United States Air Force. These helicopters were a valuable addition to the Department's operations as they provided exceptional agility and maneuverability during firefighting operations.

As CAL FIRE continued to expand its services, it became increasingly evident that the "F" model helicopters were no longer suitable for their needs. This prompted CAL FIRE to initiate a phase-out of the "F" model and an upgrade to newer, larger UH-1H helicopters in the late 1980s. These UH-1H aircraft were significantly modified to meet the Department's specialized needs and provide enhanced capabilities during firefighting operations.

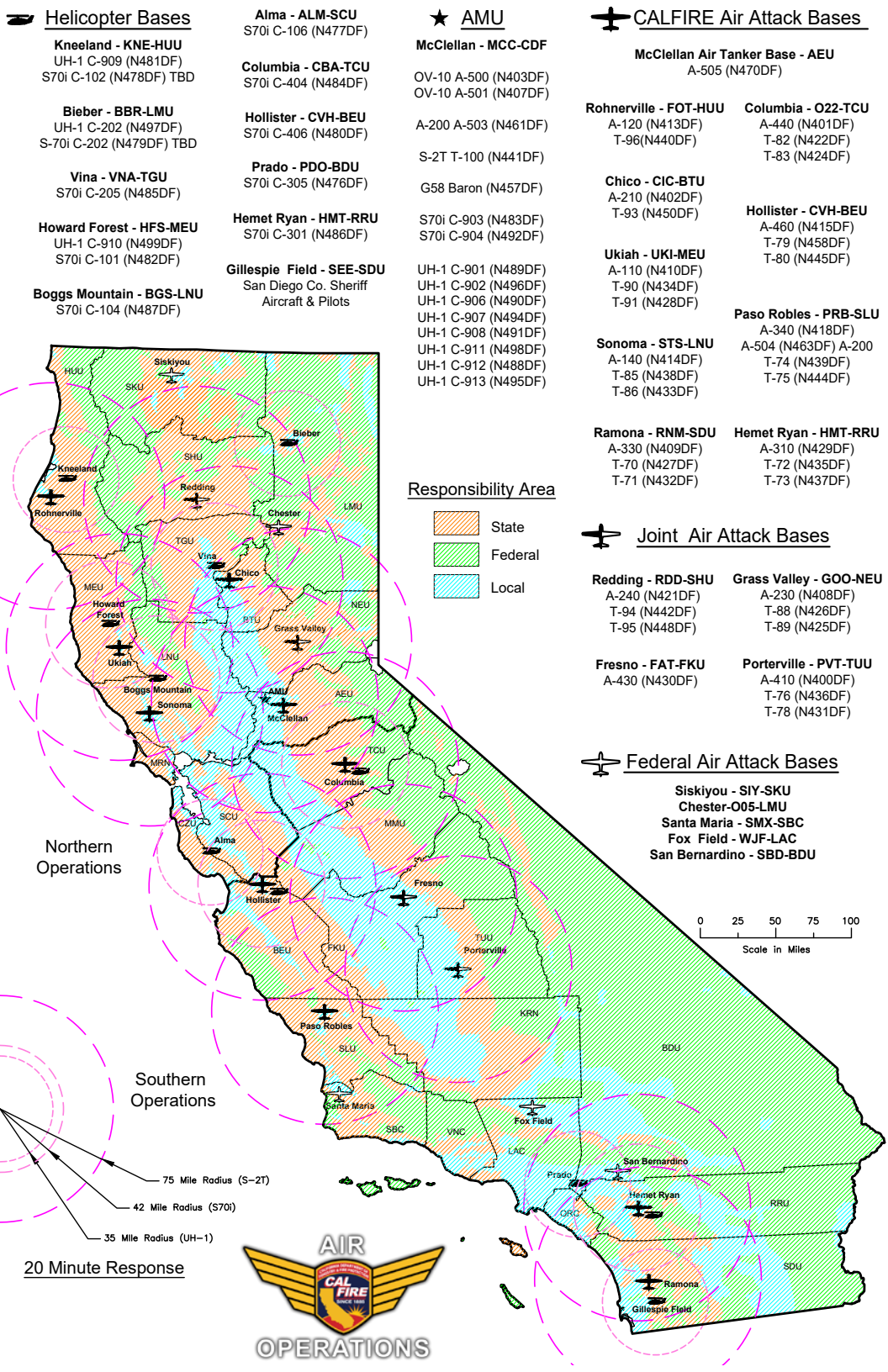
The modified helicopters were designated as "Super Hueys," a name that perfectly reflected their superior performance and exceptional capabilities. The modifications included upgraded engines, advanced communication systems, and specialized equipment for fire suppression and search and rescue operations. These helicopters were truly a game-changer in CAL FIRE's firefighting operations, as they provided enhanced maneuverability, greater lift capacity, and faster response times.

In 2018, CAL FIRE embarked on a mission to modernize and bolster our aerial firefighting fleet capabilities. To achieve this, we sought approval from the Governor's Office to purchase up to 12 new Sikorsky S70i helicopters. The approval was granted, and by the spring of 2023, all 12 of these state-of-the-art helicopters had been acquired and were in service, responding to emergencies such as vegetation fires and rescue missions.

In the 2022-2023 fiscal year, the Governor's Office provided additional funding for the purchase of 4 more CAL FIRE Hawk helicopters. These additional helicopters are being acquired to increase surge capacity and to ensure operational readiness during mandatory maintenance cycles.

The new generation of S70i CAL FIRE Hawk helicopters have brought a myriad of improvements to the firefighting operations. With improved flight safety features, higher payload capacity, increased power margins, and the ability to operate at night, CAL FIRE can now tackle emergency situations more efficiently and effectively. These state-of-the-art helicopters have proven to be a valuable asset to the firefighting fleet, enabling CAL FIRE to respond more quickly to emergency situations and providing a greater degree of safety for firefighters and residents alike.

This Guidebook has been assembled for those who want information on firefighting aircraft used by the local, state and federal agencies. The guide provides the most current facts, specifications and reference photos in four categories; air tactical, fixed-wing, rotor-wing and military aircraft.


Helicopter Bases
Kneeland - KNE-HUU
UH-1 C-909 (N481DF)
S70i C-102 (N478DF) TBD
Bieber - BBR-LMU
UH-1 C-202 (N497DF)
S-70i C-202 (N479DF) TBD
Vina - VNA-TGU
S70i C-205 (N485DF)
Howard Forest - HFS-MEU
UH-1 C-910 (N499DF)
S70i C-101 (N482DF)
Boggs Mountain - BGS-LNU
S70i C-104 (N487DF)
Alma - ALM-SCU
S70i C-106 (N477DF)
Columbia - CBA-TCU
S70i C-404 (N484DF)
Hollister - CVH-BEU
S70i C-406 (N480DF)
Prado - PDO-BDU
S70i C-305 (N476DF)
Hemet Ryan - HMT-RRU
S70i C-301 (N486DF)
Gillespie Field - SEE-SDU
San Diego Co. Sheriff
Aircraft & Pilots
AMU
McClellan - MCC-CDF
OV-10 A-500 (N403DF)
OV-10 A-501 (N407DF)
A-200 A-503 (N461DF)
S-2T T-100 (N441DF)
G58 Baron (N457DF)
S70i C-903 (N483DF)
S70i C-904 (N492DF)
UH-1 C-901 (N489DF)
UH-1 C-902 (N496DF)
UH-1 C-906 (N490DF)
UH-1 C-907 (N494DF)
UH-1 C-908 (N491DF)
UH-1 C-911 (N498DF)
UH-1 C-912 (N488DF)
UH-1 C-913 (N495DF)
CALFIRE Air Attack Bases
McClellan Air Tanker Base - AEU
A-505 (N470DF)
Rohnerville - FOT-HUU
A-120 (N413DF)
T-96(N440DF)
Columbia - O22-TCU
A-440 (N401DF)
T-82 (N422DF)
T-83 (N424DF)
Chico - CIC-BTU
A-210 (N402DF)
T-93 (N450DF)
Hollister - CVH-BEU
A-460 (N415DF)
T-79 (N458DF)
T-80 (N445DF)
Ukiah - UKI-MEU
A-110 (N410DF)
T-90 (N434DF)
T-91 (N428DF)
Paso Robles - PRB-SLU
A-340 (N418DF)
A-504 (N463DF) A-200
T-74 (N439DF)
T-75 (N444DF)
Sonoma - STS-LNU
A-140 (N414DF)
T-85 (N438DF)
T-86 (N433DF)
Ramona - RNM-SDU
A-330 (N409DF)
T-70 (N427DF)
T-71 (N432DF)
Hemet Ryan - HMT-RRU
A-310 (N429DF)
T-72 (N435DF)
T-73 (N437DF)
Responsibility Area
State
Federal
Local
Joint Air Attack Bases
Redding - RDD-SHU
A-240 (N421DF)
T-94 (N442DF)
T-95 (N448DF)
Grass Valley - GOO-NEU
A-230 (N408DF)
T-88 (N426DF)
T-89 (N425DF)
Fresno - FAT-FKU
A-430 (N430DF)
Porterville - PVT-TUU
A-410 (N400DF)
T-76 (N436DF)
T-78 (N431DF)
Federal Air Attack Bases
Siskiyou - SIY-SKU
Chester-O05-LMU
Santa Maria - SMX-SBC
Fox Field - WJF-LAC
San Bernardino - SBD-BDU
Siskiyou
Kneeland
Rohnerville
Redding
Bieber
Chester
Chico
Vina
Howard Forest
Ukiah
Boggs Mountain
Sonoma
Grass Valley
McClellan
Columbia
Alma
Hollister
Fresno
Porterville
Paso Robles
Santa Maria
Fox Field
San Bernardino
Prado
Hemet Ryan
Ramona
Gillespie Field
HUU
SKU
SHU
LMU
TGU
MEU
NEU
BTU
LNU
AMU
AEU
MRN
TCU
CZU
SCU
MMU
BEU
FKU
TUU
KRN
SLU
BDU
SBC
VNC
LAC
ORC
RRU
SDU
Northern Operations
Southern Operations
0 25 50 75 100
Scale in Miles
75 Mile Radius (S-2T)
42 Mile Radius (S70i)
35 Mile Radius (UH-1)
20 Minute Response
AIR
CAL FIRE
OPERATIONS

Index

AIR OPERATIONS

SPECIFICATIONS:

Cruise Speed:
258 mph

Gallon Capacity:
not applicable

Manufacturer
North American-Rockwell, Columbus, Ohio.

Crew
Pilot and observer (Chief Officer or Fire Captain).

AIR OPERATIONS

Original Owner
United States Navy/Marines, 1968-1993. The OV-10 was used as a counterinsurgency aircraft and close air-support to military ground forces.

Acquired by CAL FIRE
In 1993, CAL FIRE acquired 15 OV-10As from the Federal Excess Personal Property (FEPP) program. These have since been converted for use as air attack platforms replacing the original Cessna 0-2As that CAL FIRE had been using. The OV-10As are newer, larger, faster, provide a larger field of vision for the pilot and air attack officer and are more maneuverable than the older O-2As. In 2009, CAL FIRE also acquired three OV-10Ds, of which one has been converted and is in use.

Mission
CAL FIRE uses the OV-10s as the primary command and control platform on wildland incidents. The air attack officer, a highly trained and experienced fire officer, coordinates with the incident commander on the ground, providing an unique aerial perspective on fire conditions, anticipated resource needs and potential threats to life and property.

The Air Attack Officer is also responsible for the safe coordination of all aerial resources on an incident and where to make retardant and water drops based upon the Incident Commander's control objectives. The OV-10 can be utilized as a lead plane, for Very Large Air Tankers (VLAT) when not assigned as a command and control platform.

Original Owner

United States Army

Acquired by CAL FIRE

In service operationally for CAL FIRE 2010

Mission

The King Air 200 is part of a line of twin-turboprop aircraft produced by the Beechcraft Division of Hawker Beechcraft. It is used by the U.S. Forest Service and BLM as an Aerial Supervisory Module, which can perform low level Airtanker leading. The U.S. Army, U.S. Air Force, U.S. Navy, and the U.S. Marine Corps all fly versions of the King Air 200 today.

CAL FIRE operates two King Air 200's as Air Tactical Group Supervisor (ATGS) training platforms.

SPECIFICATIONS:

Cruise Speed:

333 mph

Gallon Capacity:

not applicable

Manufacturer

Hawker Beechcraft

Crew

Pilot and Air Tactical Group Supervisor

AIR OPERATIONS

SPECIFICATIONS:

Cruise Speed:
485 mph

Gallon Capacity:
9,400

Manufacturer
McDonnell Douglas

Crew
Pilot, Co-pilot and Flight Engineer

Original Owner

Originally delivered as a civil passenger plane to National Airlines in 1975, it subsequently flew for Pan Am, American Airlines, Hawaiian Airlines and Omni International.

Acquiring/Contracting

In 2006, the aircraft was operated on a limited evaluation contract from the State of California. In 2006, it was offered on a "call-when-needed" basis. Governor Schwarzenegger authorized a contract for exclusive use of the aircraft for the 2007-2009 fire seasons.

Mission

The aircraft, operated by 10 Tanker Air Carrier, is used for fighting wildfires, typically in rural settings. The turbofan-powered craft carries up to 9,600 gallons of fire retardant in an exterior belly-mounted tank, which can be released in eight seconds. It is utilized in extended attack fires as it is limited in time effectiveness for reloading fire retardant as well as its need to reload and refuel at an appropriately equipped aerial firefighting base (currently McClellan, Castle, San Bernardino and Santa Maria are the only bases in California serviceable for this large an aircraft). One drop for the DC-10 is equivalent to 12 drops of an S2-T or a line of retardant that is 300 feet wide by one mile in length.

AIR OPERATIONS

Original owner

United States Coast Guard, 1985-present (USCG HC-130H)

Acquired by CAL FIRE

On July 24, 2018, California secured approval for the future acquisition of seven C-130H's aircraft to CAL FIRE. A provision included in the 2019 National Defense Authorization Act (NDAA) allowed the transfer from the United States Coast Guard, to California, upon the completion of modifications by the United States Air Force.

This modification process includes replacement of center wing boxes and outer wings, general programmed depot level maintenance, (PDM), painting, and Retardant Dispersal System (RDS) installation. Once complete, the United States Coast Guard can transfer ownership to CAL FIRE. Based on the extensive wing-box modifications, RDS contracting/installation by the United States Air Force, and need for pilot training and certification, the first transferred C-130H's will be response ready in the near future.

Mission

The C-130H's will be used for rapid initial attack delivery of fire retardant on wildand fires. These 7 new airtankers will support CAL FIRE's existing fleet of aircraft from air attack bases strategically located throughout California.

SPECIFICATIONS:

Cruise Speed:

360 mph

Gallon Capacity:

4,000 gallons long-term fire retardant

Manufacturer

Lockheed Martin, Marietta Georgia

Crew

Three-person crew; pilot, co-pilot, and flight engineer

AIR OPERATIONS

British Aerospace Bae 146/ Avro RJ85

Type I Airtanker

SPECIFICATIONS:

Cruise Speed:
380 mph

Gallon Capacity:
3,000

Manufacturer
British Aerospace / Avro

Crew
Pilot, Co-pilot

Original Owner

The British Aerospace 146 (also BAe 146) is a short-haul and regional airliner that was manufactured in the United Kingdom by British Aerospace, production ran from 1983 until 2002. The 146 was introduced into Royal Air Force service in 1986 as a VIP transport and is operated by 32 (The Royal) Squadron. Manufacture of an improved version known as the Avro RJ began in 1992.

Mission

The BAe 146 is powered by four Avco Lycoming ALF 502 turbofan engines, which are fixed on pylons underneath the aircraft's high wing. The AVRO RJ85 is powered by four LF 507 Turbofan engines. The aircraft is equipped with the Retardant Aerial Delivery System II "RADS II" and the system is internal to the aircraft. The RADS II tank is scale-able to any size or type of aircraft, enabling it to be installed in aircraft ranging in size from the BAE146 to the C-130.

AIR OPERATIONS

PHOTO © JEREMY ULLOA

Original Owner

McDonnell Douglas launched development of the MD-87 on January 3 1985, following the placement of launch orders from Finnair and Austrian in December 1984. First flight took place on December 4 1986 and US FAA certification was granted on October 21 1987. The MD-87 is a shortened version of its predecessors.

Mission

This aircraft can operate from most existing Airtanker Bases with little or no impact. Large Air Tankers (LATs), like the MD-87 can be used in challenging terrain. The MD-87 is relatively agile for its size and requires some planning by the supervising aircraft to provide a stabilized path for delivery. Flight paths for pattern speeds of 130 to 140 knots on final should be planned.

SPECIFICATIONS:

Cruise Speed:
400 mph

Gallon Capacity:
3,000

Manufacturer
McDonnell Douglas

Crew
Pilot, Co-pilot

SPECIFICATIONS:

Cruise Speed:
517 mph

Gallon Capacity:
4,000

Manufacturer:
Boeing

Crew:
Pilot and Co-pilot

Original Owner

The Boeing 737 is a narrow-body aircraft produced by Boeing Commercial Airplanes at its Renton Factory in Washington. Developed to supplement the Boeing 727 on short and thin routes, the twinjet retains the 707-fuselage cross-section and nose with two underwing turbofans. Envisioned in 1964, the initial 737-100 made its first flight in April 1967 and entered service in February 1968 with Lufthansa. The lengthened 737-200 entered service in April 1968. It evolved through four generations, offering several variants for 85 to 215 passengers.

Mission

The newest addition to the firefighting fleet are the Coulson 737 FIRELINER's. Coulson Aviation is the first in the world to convert Boeing's 737 commercial airliners into FIRELINER's. Coulson has six 737's in line for conversation, each receiving 43,000+ technician hours to become fully compliant and operational. The FIRELINER is the only multi-use Large Air Tanker in the world and can carry retardant and up to 72 passengers without re-configuring the airplane.

AIR OPERATIONS

CL-215/ Bombardier 415 "Superscooper"

Type II Airtanker

Original Owner

Both the CL-215 and Bombardier 415 are Canadian aircraft built specifically for fire suppression and are known in the U.S. as Super Scoopers. CL-215 and the Bombardier 415 are amphibious aircraft, which can operate on land and water. The CL-215 was first built in 1969 and was later replaced by the Bombardier 415 in 1994.

Mission

These turbine aircraft scoop water from oceans, lakes and reservoirs which can be dropped as regular water or be mixed with a foam retardant. The aircraft can also be utilized for maritime search and rescue. These aircraft have been leased for use during fire season in numerous counties including Los Angeles and San Diego. The U.S. Forest Service also has some of these aircraft on Exclusive use contracts.

SPECIFICATIONS:

Cruise Speed:
189/233 mph

Gallon Capacity:
1,300/1,621

Manufacturer
Canadair / Bombardier, Canada

Crew
Pilot and Co-pilot

AIR OPERATIONS

PHOTO © JEREMY ULLOA

SPECIFICATIONS:

Cruise Speed:
270 mph

Gallon Capacity:
1,200 gallons long-term fire retardant

Manufacturer
Grumman Aerospace, Bethpage, New York

Crew
One pilot

Original Owner
United States Navy, 1958-1975; The S-2E/G carrier-based anti-submarine warfare airplane.

Acquired by CAL FIRE
In 1996, CAL FIRE acquired 26 S-2E/G planes from the Federal Excess Personal Property (FEPP) program. Marsh Aviation converted the planes to a firefighting configuration and were retrofitted with modern, powerful turboprop engines. The completely reconditioned S-2Ts are faster, safer, more maneuverable, and carry a larger retardant payload than the original S-2A airtankers CAL FIRE had used since the 1970s. The final three S-2Ts were completed and delivered in 2005. CAL FIRE has 23 S-2T one of which is in Sacramento at CAL FIRE's Aviation Management Unit (AMU) as maintenance relief.

Mission
The S-2T airtankers are used for rapid initial attack delivery of fire retardant on wildand fires. These airtankers are strategically located throughout California responding to the most remote State Responsibility Areas (SRA) within approximately 20 minutes.

AIR OPERATIONS

Original Owner

The Air Tractor AT-802 is an agricultural aircraft that may also be adapted into fire-fighting or armed versions. It first flew in the United States in October 1990 and is manufactured by Air Tractor Inc. The AT-802 carries a chemical hopper between the engine firewall and the cockpit. In the U.S., it is considered a Type III SEAT, or Single Engine Air Tanker.

Mission

Used by sub-contractors a fast-initial attack aircraft for water, phosphate based retardant, gel, and foam fire retardants. Sub-contractors supply field service vehicles which allow the aircraft to be operated from remote bases. Aircraft can be dispatched in groups to allow for larger coordinated drops

SPECIFICATIONS:

Cruise Speed:

180 mph

Gallon Capacity:

800

Manufacturer

Air Tractor, Inc. Olney, TX, USA

Crew

Pilot

AIR OPERATIONS

Air Tractor AT-802A "FireBoss"

SPECIFICATIONS:

Cruise Speed:
170 mph

Gallon Capacity:
800 lbs.

Manufacturer
Air Tractor, Inc. Olney, TX, USA

Crew
Pilot

Original Owner
The Air Tractor AT-802 is an agricultural aircraft that may also be adapted into fire-fighting or armed versions. It first flew in the United States in October 1990 and is manufactured by Air Tractor Inc. The AT-802 carries a chemical hopper between the engine firewall and the cockpit. In the U.S., it is considered a Type III SEAT, or Single Engine Air Tanker.

Mission
Used by sub-contractors a fast-initial attack aircraft for water, phosphate based retardant, gel, and foam fire retardants. Aircraft can be used as a land based or a water scooping aircraft. The FireBoss aircraft's capability to operate either as wheeled to floated operations allowed the aircraft to be dispatched from an airport to a river or lake for multiple water drops on one fuel cycle. Sub-contractors supply field service vehicles which allow the aircraft to be operated from remote bases. Aircraft can be dispatched in groups to allow for larger coordinated drops.

AIR OPERATIONS

Original Owner

The Short C-23 Sherpa is a twin-engine turboprop aircraft a small military transport aircraft built by Short Brothers in Belfast, Ireland. It was designed to operate from unpaved runways and make short takeoff and landings. It features a large squared fuselage with a full-width rear cargo door/ramp. It was produced from 1984 to 1990.

Mission

In its current configuration, it flies an initial attack load of 10 smokejumpers plus cargo with an endurance of 3 hours. From Redding, the Sherpa has the ability to initial attack all North Ops forests and some of the more northerly South Ops forests without a fuel stop. The aircraft is also available for Para-cargo missions, with up to 4,500 pounds of cargo deliverable via parachute or delivery to a suitable airport.

SPECIFICATIONS:

Cruise Speed:
230 mph

Payload
4,500 lbs.

Manufacturer
Short Brothers

Crew
Pilot, Co-pilot

AIR OPERATIONS

Dornier Do-228

SPECIFICATIONS:

Cruise Speed:
250 mph

Payload:
3,500 lbs.

Manufacturer
Dornier GmbH

Crew
Pilot and Co-pilot

Original Owner
The Dornier Do-228 is a twin-turboprop STOL utility aircraft, designed and first manufactured by Dornier GmbH (later DASA Dornier, Fairchild-Dornier) from 1981 until 1998, 245 were built in Oberpfaffenhofen, Germany.

Mission
It is configured to deliver an initial attack load of 8 smokejumpers plus cargo with an endurance of 3 hours. From Redding, the Dornier has the ability to initial attack all North Ops forests and some of the more northerly South Ops forests without a fuel stop. However, the Dornier is often positioned in Porterville (PTV) for a majority of the summer. The aircraft is also available for Para-cargo only missions, with up to 3,500 pounds of cargo deliverable via parachute or delivery to a suitable airport.

AIR OPERATIONS

Sikorsky S-61

This aircraft is used primarily for external cargo and water bucket operations. In the late 1950s and early 1960s the U.S. Navy worked with Sikorsky Aircraft to create a very high performance helicopter with the latest technologies. The aircraft uses two large twin turbine engines and a boat-type hull with retractable landing gear. The S-61 requires a two-person crew to fly it, but can carry a large number of passengers. Today the S-61 is used extensively for logging operations in the commercial sector.

SPECIFICATIONS:

Cruise Speed:
154 mph

Gallon Capacity:
1,000

Manufacturer
Sikorsky Aircraft Corp

Crew
Pilot and Co-pilot

AIR OPERATIONS

Sikorsky Si-70 "CAL FIRE Hawk"

SPECIFICATIONS:

Cruise Speed:
160 mph

Gallon Capacity:
Fixed tank - 1000 gallons of water/foam with pilot controlled drop volumes.

Manufacturer
Sikorsky Aircraft, Stratford, Connecticut (Built in Mielec, Poland)

Crew
One pilot, two Helitack Captains, an operations supervisor, and up to nine personnel.

AIR OPERATIONS

Original Owner
CAL FIRE, 2019

Acquired By CAL FIRE
In 2018 funding was secured for the purchase of 12 of CAL FIRE's next generation helicopter, the Sikorsky S70i CAL FIRE HAWK. S70i CAL FIRE HAWK helicopters bring enhanced capabilities including flight safety, higher payloads, increased power margins, and night flying capabilities.

In Fiscal Year 2022-2023 additional funding was approved to purchase four additional S70i Fire Hawk Helicopters to increase surge capacity and to maintain operational capabilities during required maintenance cycles.

Mission
The CAL FIRE HAWK's primary mission is responding to initial attack wildfires and rescue missions. When responding to wildfires, the helicopter can quickly deliver up to a 9-person Helitack Crew for ground firefighting operations and quickly transition into water/foam dropping missions.

The helicopters are also used for firing operations using either a Helitorch or a Chemical Ignition Device System (CIDS) on wildland fires or prescribed burns, transporting internal cargo loads, mapping, medical evacuations and numerous non-fire emergency missions.

The CAL FIRE HAWK is also equipped with an external hoist for rescue missions. This specialized rescue technique involves highly trained firefighters being lowered from a hovering helicopter to an injured or trapped person below. Once secured to a harness or stokes basket, both the victim and rescuer are then hoisted into the helicopter and flown to a landing zone.

Boeing-Vertol BV 107

The Boeing-Vertol (BV)107, often referred to as the "Vertol," is the civilian version of the U.S. Marine Corps' CH-46 "Sea Knight." The aircraft was originally designed by the Vertol Aircraft Company in the late 50s. The company was purchased by Boeing in 1960. The BV 107 was designed to be a medium-lift helicopter, and is primarily used to transport cargo. Both the BV 107 and the BV 234 are used for timber harvesting in the commercial sector. The BV 107 has a little less than half the lifting capability as compared to the BV 234. The BV 107 (CH-46) and the BV-234 are most recognizable by their tandem rotors.

SPECIFICATIONS:

Cruise Speed:
140 mph

Gallon Capacity:
1,100/bucket

Manufacturer
Boeing Company / Vertol Aircraft Company

Crew
Pilot and Co-pilot

SPECIFICATIONS:

Sikorsky S-64

The S-64 "Skycrane" was originally designed for the military and had interchangeable pods that fit underneath for troop transport and cargo movement. The S-64 has six rotor blades and two turbine powered jet engines, which allows it to carry heavy loads. In 1992 Erickson Air Crane purchased the manufacturing rights to the S-64 and modified it to carry a 2,650 gallon tank. The tank can be filled by a draft hose in less than one minute, while the helicopter is hovering. The S-64 requires a pilot and co-pilot to fly it and typically has a 6 to 8 person support crew.

Cruise Speed:
105 mph

Gallon Capacity:
2,650

Manufacturer
Sikorsky Aircraft Corp / Erickson Air-Crane

Crew
Pilot and Co-pilot

AIR OPERATIONS

Kaman "K-Max"

The K-MAX, also called the "Air Tractor," is designed specifically as a heavy lift helicopter. The aircraft, which is built for a pilot only, has a tandem, counter rotating, intermeshing rotor system.

The K-MAX can fly a variety of different missions ranging from logging and thinning to firefighting.

SPECIFICATIONS:

Cruise Speed:
91 mph

Gallon Capacity:
660

Manufacturer
Boeing Company / Vertol Aircraft Company

Crew
Pilot

AIR OPERATIONS

SPECIFICATIONS:

Boeing 234

The Boeing 234 is the civilian version of the U.S. Army's CH-47 "Chinook." The aircraft was originally designed by the Boeing Company in the early 60s, to be a medium-lift helicopter to transport cargo and military personnel. Both the BV 107 and the 234 are used for timber harvesting in the commercial sector. The Boeing 234 (CH-47) and the BV-107 (CH-46) are most recognizable by their tandem rotors. The 234 has almost twice the lifting capability (between 15,000-25,000 pounds) of the smaller BV-107, which allows it to operate with a larger water bucket for fire suppression.

Cruise Speed:
137 mph

Gallon Capacity:
3,000/bucket

Manufacturer
Boeing Company / Vertol Aircraft Company

Crew
Pilot and Co-pilot

AIR OPERATIONS

Original Owner

United States Army, 1963 to 1975. The UH-1H was used as a troop/cargo transport and for specialized operations.

Acquired By CAL FIRE

In 1981, CAL FIRE acquired 12 UH-1F helicopters through the the Federal Excess Personal Property (FEPP) program. In 1990 they were replaced by newer, highly modified, Vietnam-era UH-1H helicopters referred to as the "Super Huey."

Mission

The CAL FIRE Super Huey's primary mission is responding to initial attack wildfires and rescue missions. When responding to wildfires, the helicopter can quickly deliver up to a 9-person Helitack Crew for ground firefighting operations and quickly transition into water/foam dropping missions.

The helicopters are also used for firing operations using either a Helitorch or a Chemical Ignition Device System (CIDS) on wildland fires or prescribed burns, transporting internal cargo loads, mapping, medical evacuations and numerous non-fire emergency missions.

In 1997, CAL FIRE personnel were trained to do "short haul" rescues. Since 2011 CAL FIRE has moved away from the Short Haul program and started utilizing the Hoist program. This specialized rescue technique involves highly trained firefighters being lowered from a hovering helicopter to an injured or trapped person below. Once secured to a harness or stokes basket, both the victim and rescuer are then hoisted into the helicopter and flown to a landing zone.

CAL FIRE continues to place our Super Huey helicopters in reserve status as CAL FIRE HAWKS are placed in service.

SPECIFICATIONS:

Cruise Speed:

126 mph

Gallon Capacity:

Bucket operations: 324 gallons of water/foam

Fixed tank: 360 gallons of water/foam with pilot controlled drop volumes

Manufacturer

Bell Helicopters, Fort Worth, Texas

Crew

One pilot, two Helitack Captains, and eight personnel.

AIR OPERATIONS

SPECIFICATIONS:

Bell 212

The Bell 212 was introduced by Bell Helicopter in 1968. The 212 aircraft is used for passenger transport and cargo movement, both internal and external. This aircraft has twin engines and two rotor blades. The 212 is one of the most popular Type 2 helicopter on the national call-when-needed helicopter contract. The Bell 212 is the civilian version of the UH-1N "Twin Huey." Many local fire departments use the Bell 212.

Cruise Speed:
115 mph

Gallon Capacity:
360

Manufacturer
Bell Helicopter

Crew
Pilot, two Fire Captains and eight Firefighters

AIR OPERATIONS

Bell 412

The Bell 412 was developed in the late 1970s and is essentially a Bell 212 with a four bladed rotor system. It can perform slightly better than the 212 at higher altitudes. This aircraft can also carry passengers, cargo, and do long line work. Many local fire departments use the Bell 412 for fire suppression. The Bell 412 can have a large tank mounted on the bottom or can carry a bucket.

SPECIFICATIONS:

Cruise Speed:
140 mph

Gallon Capacity:
360

Manufacturer
Bell Helicopter

Crew
Pilot

AIR OPERATIONS

Bell 205 A++

SPECIFICATIONS:

Cruise Speed:
125 mph

Gallon Capacity:
360 plus
324/bucket

Manufacturer
Bell Helicopters, Fort Worth, Texas

Crew
Pilot and nine Firefighters

Mission
The Bell 205 is the civilian version of the UH-1H that CAL FIRE uses for its helicopter fleet. Their missions are identical. In San Diego County, CAL FIRE jointly staffs a Bell 205-A1++ with the sheriff's department. The 205-A1++ has an improved rotor system and more powerful engine than the original 205. With seating for up to 9 passengers, this aircraft can be used for initial-attack fire missions as well as crew transport. A tank can be equipped on the belly of the aircraft that can hold 375 gallons.

AIR OPERATIONS

Bell Jet Ranger 206B

The Bell 206B, also known as the "JetRanger," was designed in the 1960s for the U.S. Army. After the original Bell 206 was developed it did not win the Army's contract. Bell completed modifications, which made the series one of the most popular helicopter manufactured. The Bell 206B is also one of the first light helicopters built using a turbine engine power plant. This series is one of the most dependable helicopters ever built.

As with most light helicopters, the 206B has the ability to take-off and land in relatively small areas. The aircraft are used for a variety of activities: aerial reconnaissance and aerial ignition. The helicopter has passenger seating for five including the pilot. The Jet Ranger has a cargo compartment in the tail boom and no cargo baskets. The 206B does not perform as well when temperature and elevation increases. The Jet Ranger is normally not the helicopter to use for take-off and landings at altitudes of 9,000 feet or greater.

SPECIFICATIONS:

Cruise Speed:
115 mph

Gallon Capacity:
120/bucket

Manufacturer
Bell Helicopter

Crew
Pilot

PHOTO BY STEVE WHITBY PHOTOGRAPHY

SPECIFICATIONS:

Bell 407

The Bell 407 is one the newest additions to the Jet Ranger family. The 407 is based on the older Bell 206L-3. The aircraft has some major modifications from older models including a four bladed main rotor system, increased engine performance and slightly expanded inside cabin area. Passenger seating is the same as the Bell Long Ranger, providing seating for a total of six passengers excluding the pilot. As with most light helicopters, they have the ability to take-off and land in relatively small areas.

The Bell 407 can be used for a variety of activities including aerial reconnaissance and aerial ignition. For wildland fire use, it is becoming the light helicopter of choice at many bases. The helicopter's increased speed, lifting capability and improved density altitude performance makes this helicopter ideal for wildland fire initial attack.

Cruise Speed:
152 mph

Gallon Capacity:
180

Manufacturer
Bell Helicopter

Crew
Pilot

Eurocopter AS350 AStar

The AStar series was originally designed by the French manufacturer, Aerospatiale, to compete with Bell Helicopter's JetRanger. It was the first helicopter to be predominantly constructed of composite materials. It is one of the quietest helicopters manufactured. It's worth noting that the main rotor blades on French made helicopters turn counter clock-wise, the opposite direction as American made helicopters.

As with most light helicopters, The AS350s have the ability to take-off and land in relatively small areas. They are used for a variety of activities: aerial reconnaissance, aerial ignition, and fire suppression. The AS350 B3 has increased speed, lifting capability and improved density altitude performance making this helicopter ideal for wildland fire initial attack. The helicopter has passenger seating for four, one in the front and three in the back. It has a cargo compartment in the tail boom. Some AStars may have cargo baskets to provide additional space for cargo.

SPECIFICATIONS:

Cruise Speed:
161 mph

Gallon Capacity:
180

Manufacturer
Aérospatiale / Eurocopter Group

Crew
Pilot

AIR OPERATIONS

SPECIFICATIONS:

Bell Jet Ranger 206 L-III

The Bell 206L-III was built on the same platform as the 206B "JetRanger," but has more room to carry passengers. Two seats were added providing seating for a total of six passengers, one in the front and five in the rear. In addition, they added a larger engine, increasing performance. As with most light helicopters, they have the ability to take-off and land in relatively small areas.

The Bell206L-III can be used for a variety of activities including aerial reconnaissance, aerial ignition, and wildland fire suppression. The easiest way to identify the Long Ranger is by the center window, which extends the appearance from the side. The larger engine also has a rectangular, instead of round turbine tailpipe. Another identifier is the vertical wings attached to the horizontal stabilizer on the tail section.

Cruise Speed:
120 mph

Gallon Capacity:
120

Manufacturer
Bell Helicopter

Crew
Pilot

MD 500D

The 500D was originally manufactured by Hughes Helicopters, which is now owned by McDonnell Douglas Corporation. The civilian Model 500 is a direct descendent of the U.S. Army's OH-6A, originally designed as an observation helicopter during the Vietnam conflict. The egg shape design provided excellent crash survival characteristics. The 500 model is very maneuverable. They are used for a variety of activities such as aerial reconnaissance, aerial ignition, and wildland fire suppression.

There are several unique features of this aircraft. The engine exhaust pipe is directly under the tailboom. Seating in the 500D is extremely cramped. There are three seats in the back, but they can actually accommodate only two. Front seat passenger sits on the right side instead of the left.

SPECIFICATIONS:

Cruise Speed:
144 mph

Gallon Capacity:
120

Manufacturer
Hughes Helicopters / McDonnell Douglas

Crew
Pilot

AIR OPERATIONS

PHOTO © JEREMY ULLOA

SPECIFICATIONS:

Cruise Speed:
275 mph

Gallon Capacity:
3,000

Original Owner
U.S. Air Force
Air National Guard
Air Force Reserve

Crew
Pilot, Co-pilot and Flight Engineer

Mission
A MAFFS (Modular Airborne FireFighting System) unit is a 3,000 gallon pressurized tank installed on a military Lockheed C-130 cargo/utility aircraft. Retardant or water is dropped out of the tank in under five seconds through two tubes at the rear of the plane or through one tube out of the side in the newer models. The retardant dropped can cover an area of one quarter mile long and 60 feet wide to act as a fire barrier. The objective of the MAFFS program is to provide additional emergency aircraft to supplement the existing airtankers during major fire sieges. The MAFFS is not used for initial attack.

History
Congress established the MAFFS program after the 1970 Laguna Fire overwhelmed the existing aviation firefighting resources. The U.S. Forest Service was directed to develop a program in cooperation with the Air National Guard and Air Force Reserve to produce the equipment, training and operational procedures to integrate military air tankers into the national response system. In 2009 the MAFFS 2 was unveiled as the next-generation portable retardant dispersal system. The MAFFS 2 is more efficient and effective in its retardant dropping capabilities.

AIR OPERATIONS

Boeing CH-46 "Sea Knight"

The Boeing CH-46, known as the "Sea Knight," is the military version of the Boeing-Vertol 107. The CH-46 was designed in the late 50s for the U.S. Marine Corps to be a medium-lift helicopter, and is primarily used to transport cargo. The aircraft is able to provide all-weather, day-or-night assault transport of combat troops, supplies and equipment. Assault Support is its primary function, and the movement of supplies and equipment is secondary. Additional tasks include combat support, search and rescue, support for forward refueling and rearming points. The CH-46 and the CH-47 are most recognizable by their tandem rotors.

SPECIFICATIONS:

Cruise Speed:
140 mph

Gallon Capacity:
224/bucket

Manufacturer
Boeing Company /
Vertol Aircraft Company

Crew
Pilot, Co-pilot and a Military Helicopter Manager

SPECIFICATIONS:

UH-60 "Blackhawk"

The UH-60 was originally designed for the U.S. Army in the 1970s as a light transport helicopter, air assault and a military medievac helicopter. The aircraft is a four bladed, twin engine helicopter. The popular UH-60 has a civilian version called a S-70 "Firehawk." Today CAL FIRE and other fire agencies train with members of the California and Nevada National Guard to use their aircraft as surge capacity during major wildfire events.

Cruise Speed:
183 mph

Gallon Capacity:
780/bucket

Manufacturer
Sikorsky Aircraft Corp

Crew
Pilot, Co-pilot and a Military Helicopter Manager

AIR OPERATIONS

CH-47 "Chinook"

The Boeing CH-47 "Chinook" has tandem rotors, and twin turbine engines. The Chinook is powered by two turboshaft engines, mounted on either side of the helicopter's rear end and connected to the rotors by driveshafts. The counter-rotating rotors eliminate the need for an anti-torque vertical rotor, allowing all power to be used for lift and thrust. If one engine fails, the other can drive both rotors. It was originally designed for the U.S. Army in the late 50's as a heavy lift helicopter and was used extensively in Vietnam. The civilian version of the CH-47 is the Boeing 234.

The Chinook is a multi-mission, heavy-lift transport helicopter. Its primary mission is to move troops, artillery, ammunition, fuel, water, barrier materials, supplies and equipment on the battlefield. Its secondary missions include medical evacuation, disaster relief, search and rescue, aircraft recovery, fire fighting, parachute drops, heavy construction and civil development.

The CH-47s provide the ability to carry heavy loads and operate with a large water bucket for wildland fire suppression. The lifting capability is between 15,000-26,000 pounds, depending upon temperature and elevation. The helicopter has excellent lifting capability for external and internal loads.

SPECIFICATIONS:

Cruise Speed:
137 mph

Gallon Capacity:
2,000/bucket

Manufacturer
Boeing Company /
Vertol Aircraft Company

Crew
Pilot, Co-pilot and a Military Helicopter Manager

AIR OPERATIONS

SPECIFICATIONS:

Sikorsky CH-53E "Super Stallion" (Sikorsky S-80E)

The Sikorsky CH-53E, known as the Super Stallion, is the largest and heaviest helicopter used by the U.S. Marine Corps and Navy. It is one of the few helicopters in the world that uses three turbine engines and can be refueled in flight. The aircraft is used to transport personnel and equipment, and lift heavy loads. The CH53E is capable of lifting 16 tons, transporting the load 50 miles and then returning. The aircraft is a shipboard helicopter configured especially for caring cargo back and forth from military ships. The CH-53E is designated the model S-80 by Sikorsky. During major firestorms, the CH-53E can be used to augment CALFIRE's own air fleet for fire suppression.

Cruise Speed:
173 mph

Gallon Capacity:
2,000/bucket

Manufacturer
Sikorsky Aircraft Corp.

Crew
Pilot, Co-pilot and a Military Helicopter Manager

AIR OPERATIONS

Firefighting Aircraft means support of the firefighters on the ground from aircraft in the air. Aircraft can access steep, rocky or unsafe areas before ground forces are able to gain entry. CAL FIRE has the largest state owned firefighting air fleet including 23 airtankers, 12 helicopters and 17 air attack aircraft.

Air Attack or Air Tactical Aircraft is an airplane that flies over an incident, providing tactical coordination with the incident commander on the ground, and directing airtankers and helicopters to critical areas of a fire for retardant and water drops. CAL FIRE uses OV-10As and King Air A200s for its air attack missions.

Airtanker is a fixed-wing aircraft that can carry fire retardant or water and drop it on or in front of a fire to help slow the fire down. CAL FIRE uses Grumman S-2T airtankers for fast initial attack delivery of fire retardant on wildland fires. The S-2T carries 1,200 gallons of retardant and has a crew of one – the pilot.

Helicopter is a rotary-wing aircraft that can be fitted with a tank or carry a bucket with water or fire retardant. The tanks or buckets can be filled on the ground by siphoning water from lakes, rivers or other water sources. CAL FIRE uses UH-1H Super Huey helicopters for fast initial attack on wildfires. CAL FIRE's copters are able to quickly deliver a nine-person fire crew wherever needed as well as battle fires with water/foam drops.

Fire Retardant is a slurry mix consisting of a chemical salt compound, water, clay or a gum- thickening agent, and a coloring agent. The retardant is used to slow or retard the spread of a fire. At nine pounds per gallon, an S-2T can carry 10,800 pounds.

Military Helicopter Manager is a trained firefighter that flies aboard military helicopters when they are called to assist during major wildfires. The Military Helicopter Manager helps guide and coordinate military pilots, while communicating with the air tactical supervisor. This position ensures that military aircraft are used safely and efficiently during emergencies.

Initial Attack means the first attack on the fire. The number of resources sent on the first dispatch to a wildfire depends upon the location of the fire, the fuels in the area (vegetation, timber, homes, etc) and current weather conditions. Municipal fire departments would call this the first alarm. Most fires are caught within the first burn period (the first two hours). Therefore, the vast majority of the fires CAL FIRE responds to are considered initial attack fires.

Extended Attack means that the fire has burned beyond the area of origin, and beyond the initial attack phase, and additional resources are called. If the fire cannot be confined in the area of origin even with a substantial addition of resources, and a long-term resource commitment and logistical support will be required, then it is considered a major attack or a major fire.

Use of Fire Suppressant/Retardant Chemicals to Aid in Control of Wildfires

- CAL FIRE uses a variety of fire Suppressant/Retardant chemicals in controlling wildfires.
- The Department's use of these materials, to enhance its fire fighting capabilities in protecting life and property, is a foreseeable occurrence.
- CAL FIRE's use of fire Suppressant/Retardant chemicals is a discretionary action subject to the California Environmental Quality Act (CEQA).
- CAL FIRE has adopted a mitigated negative declaration that described the Department's use of these chemicals and analyzed the potential of these chemicals to cause environmental impacts. This analysis identified particular situations where these chemicals have the potential to cause impacts to biological resources and water quality. The Department adopted seven (7) mitigation measures that substantially reduce the potential for these impacts to occur. Those mitigation measures have been incorporated into the Department's Wildland Fire Chemical Policies and firefighter training.

Summary of Mitigation Measures

1. CAL FIRE will limit the use of fire suppressant/retardant chemical mixtures in areas adjacent to waterways.
2. Proper protective clothing shall be worn while mixing and loading long term retardants.
3. All airbases which mix and load fire suppressant/retardant chemicals will be designed to contain any accidental spills of fire suppressant/retardant chemicals.
4. Mobile mixing plants deployed at major fires will be located away from waterways.
5. CAL FIRE will establish jettison areas nearby air retardant bases to minimize potential for contamination.
6. CAL FIRE shall notify the Department of Fish and Game and regional water quality control boards when accidental contamination has occurred that may result in harm to fish or wildlife.
7. CAL FIRE uses only retardants which are approved for use by the USFS WFCS.

Fire Suppressant/Retardant Chemicals and the Enviroment

There are no known adverse effects to domestic or farm animals which eat small amounts of foliage covered with retardant; however reactions of animals may vary by species. A veterinarian should be contacted if your animals eat significant amounts or fire suppression/retardantcoated vegetation.

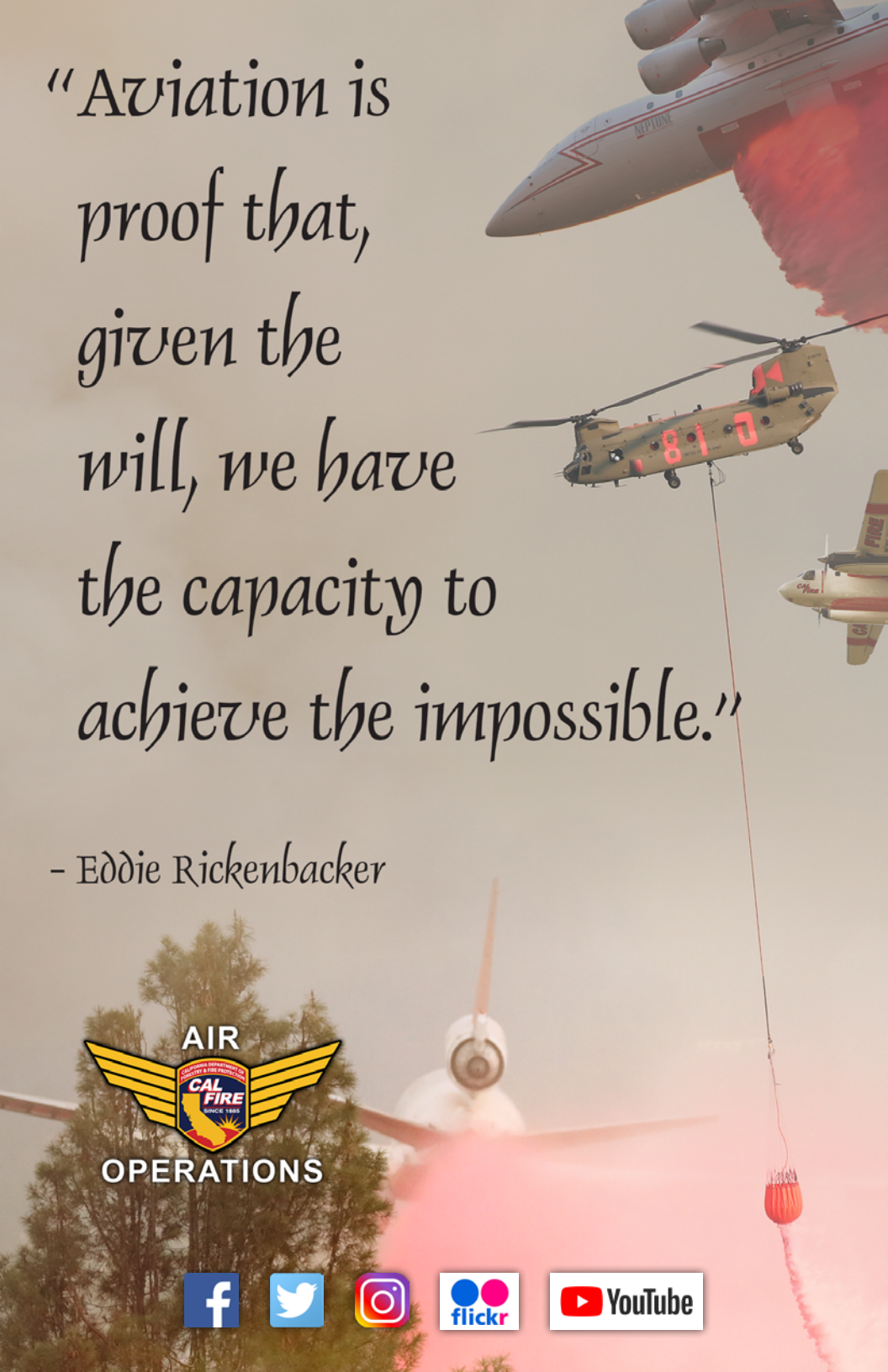
Like fertilizer, retardants which are not removed from vegetation, may cause the foliage to turn brown and plant to wither. After rain, how ever, the plant should return to normal and growth may be enhanced due to the added plant nutrients.

Retardants have been tested for toxicity to fish and water dwelling invertebrates. The result, presented in the MSDS, indicate a relatively low order of acute toxicity to these organisms. This indicates that runoff from the application of retardants is unlikely to pose a serious threat to aquatic life. However, the free ammonia present in all fire suppression/retardantsolutions can be quite toxic to aquatic life when directly applied. Care is recommended, and is exercise by the using agencies during applicationof the retardant, to minimize introduction into streams, ponds, and the like.

How Are Retardant Solutions Removed?

Wildland fire retardants are generally quite water soluble and can be removed with little effort prior to drying. When allowed to dry, however, the gum thickener can form films which tend to hold the dried retardant component rather tightly to that on which it lands. This is desirable when it lands on wildland fuels. It is less desirable, how ever, when trying to remove it from other areas. Retardant residues should consequently be removed as soon as possible. After drying, some scrubbing or power washing of structures and equipment may be required. A mild surfactant may assist in removal.

Solutions in general can increase the slipperiness of most surfaces. Retardant solutions are not exceptions and care should be taken when working in and around spilled or applied retardant. Spills should be cleaned up as soon as possible to avoid possible falls. Care needs to be taken by personnel working in areas treated with wildland fire retardants.


"Aviation is proof that, given the will, we have the capacity to achieve the impossible."
- Eddie Rickenbacker
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