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# Firefighting Aircraft

## Recognition Guide

CAL FIRE Aircraft Contact Frequency 122.925  
CDF Air to Ground 151.2200



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# Information Facts and Photos

## Table of Contents

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.

## History

The CAL FIRE Air Program has long been the premier firefighting aviation program in the world. CAL FIRE's fleet of over 50 fixed wing and rotary wing, make it the largest department owned fleet of aerial firefighting equipment in the world. CAL FIRE's aircraft are strategically located throughout the state at CAL FIRE's 13 airbases and nine helicopter bases.

### Airtanker Program

CAL FIRE first began using airtankers in the 1950s when agriculture spraying planes were used to drop water on fires. In 1958, CAL FIRE, then CDF, contracted with a private airtanker service for the use of their converted World War II aircraft. By 1970 the department began to evaluate the use of former military Grumman S-2 aircraft. Over the next ten years CAL FIRE continued to build up its fleet of S-2A airtankers.

In 1987, CAL FIRE began the process of upgrading the engines to turbine driven. By 2005 all of CAL FIRE's airtanker fleet had been converted to S-2T airtankers. The department once again made history in 2006 when it contracted with the first "Very Large Air Tanker", a converted DC-10.

### Air Tactical Aircraft

In the mid 1970s the department found that the contractor-owned air attack planes did not provide the airspeed and safety needed for the new airtanker program. In 1974, the department acquired 20 Cessna O-2 aircraft from the United States Air Force, which had been used in Vietnam.

In 1993, CAL FIRE obtained 16 North American OV-10A aircraft from the US Navy. The OV-10s replaced the O-2s that had served the department well for more than 20 years. The OV-10's turbine-powered twin-engines helped meet the needs for the next-generation Air Attack platform.

### Helicopter Program

CAL FIRE began using contractor-owned helicopters for fire control in the mid 1960s. In 1981, CAL FIRE obtained 12 Bell UH-1F series helicopters from the Air Force. In the late 1980s CAL FIRE began to phase out the "F" model and upgrade to newer, larger UH-1H helicopters. The UH-1H aircraft were significantly modified to meet the department's specialized needs. The modified helicopters were designated as "Super Huey's".

## Index

### Air Tactical

Air Tactical Aircraft ..... 2 – 4

### Fixed Wing

#### Aerial Tankers

Type I ..... 5 – 10  
Type II ..... 11 – 12  
Type III ..... 13

### Rotor Wing

#### Helicopters

Type I ..... 14 – 20  
Type II ..... 21 – 24  
Type III ..... 25 - 31

### Military

Aerial Tankers ..... 32  
Helicopters ..... 33 – 36

Glossary page ..... 37

## OV-10A "Bronco"

Air Tactical Aircraft



### Specifications:

**Cruise Speed:** 258 mph

**Gallon Capacity:** not applicable

### Manufacturer

North American-Rockwell,  
Columbus, Ohio.

### Crew

Pilot and Air Tactical Group  
Supervisor

### Original Owner

U.S. Navy/Marines, 1968-1993. The OV-10A was used as a counter-insurgency (military intelligence) aircraft and close air-support to military ground forces.

### Acquired by CAL FIRE

In 1993, CAL FIRE acquired 16 OV-10As from the Department of Defense. Fourteen of those have been converted and are available for use as air attack planes. The OV-10s replaced the original cessna O-2As that CAL FIRE had been using for air attack. The OV-10s are newer, larger, and faster, provide a larger field of vision for the crew and are more maneuverable than the older O-2As.

### Mission

CAL FIRE uses OV-10As as aerial command and control of aircraft on wildland fires. The crew provides tactical coordination with the incident commander on the ground, providing information on the movement and spread of the fire. The OV-10A crew then directs CAL FIRE's airtanker and helicopter pilots where to make their retardant and water drops.

## Beechcraft King Air 200

Air Tactical Aircraft



### Specifications:

**Cruise Speed:** 333 mph

**Gallon Capacity:** not applicable

### Manufacturer

Hawker Beechcraft

### Crew

Lead Plane Pilot and Air Tactical Group Supervisor

### 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.

## AH-1 Firewatch "Cobra"

Air Tactical Aircraft



### Specifications:

**Cruise Speed:** 172 mph

**Gallon Capacity:** not applicable

### Manufacturer

Bell Helicopters, Fort Worth, Texas

### Crew

Pilot and Air Tactical Group Supervisor

### Acquired by USFS

In 2003, the U.S. Forest Service acquired 25 retired AH-1Fs from the U.S. Army. These have been designated Bell 209s and are being converted into Firewatch Cobras with infrared and low light sensors and systems for real time fire monitoring. The Florida Department of Forestry has also acquired 3 AH-1Ps from the U.S. Army. These are called Bell 209 "Firesnakes" and are equipped to carry a water/fire retardant system.

### Mission

The Vietnam-era army attack helicopters have been stripped of their weapons and lasers. Cameras and infrared sensors have been added to convert them to Cobra Firewatch Helicopters.

In 1996, the U.S. Army retired 25 of its Cobra helicopters, which are able to reach speeds of 160 mph. The U.S. Forest Service eagerly accepted the hand-me-downs and refitted them with an arsenal of high-tech gadgets. The new Cobras don't extinguish fires by themselves. Their main purpose is to relay information to ground crews about the direction and strength of a blaze and to help larger planes make more accurate water or fire-retardant drops.

The Firewatch's infrared thermal imager can detect the heat of a wildfire even through thick smoke. Its low-light and color cameras can pick up fine resolution images of the fire, and then its transmission equipment can send those images—in real time—to firefighting crews up to 30 miles away. Also, the Cobra can direct larger water haulers by providing precise GPS coordinates.

## DC-10

Very Large Air Tanker



### Specifications:

**Cruise Speed:** 600 mph

**Gallon Capacity:** 12,000

### 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 DC-10 is the only wide-body jet air tanker currently in the fire service. The aircraft, operated by 10 Tanker Air Carrier, is used for fighting wildfires, typically in rural settings. The turbofan-powered craft carries up to 12,000 gallons of fire retardant in an exterior belly-mounted tank, which can be released in eight seconds. This aircraft will not be used on all fires, and will not be used on initial attack. 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 equipped aerial firefighting base (currently Victorville and McClellan 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.

## Boeing 747

Very Large Air Tanker



### Specifications:

Cruise Speed: 565 mph

Gallon  
Capacity: 24,000

### Manufacturer

Boeing Aircraft

### Crew

Pilot, Co-pilot and Flight Engineer

### Mission

The Evergreen Supertanker has a pressurized system that can disperse retardant under high pressure, or drop retardant equivalent to the speed of falling rain. This system allows the aircraft to operate within its design criteria. Using the pressurized system, the aircraft can deliver retardant to the scene of a fire while flying at a height of 400 to 800 ft, at approximately 140 kts, configured as if it were on approach for landing.

The Evergreen Supertanker's tank system can be configured for segmented drops, allowing the contents of the tank to be released at multiple intervals while in flight.

## Martin Mars

Type I Airtanker



### Specifications:

Cruise Speed: 190 mph

Gallon  
Capacity: 7,200

### Manufacturer

Glenn L. Martin Company

### Crew

Pilot, Co-pilot and two Flight Engineer

### Mission

The Martin Mars was originally used as a bomber for long range missions and patrols. The production aircraft were redesigned and classified for long-range general transport because of the demonstrated heavy-lift capability of the prototype. The Martin Mars established airlift and endurance records which remain valid today and logged some 87,000 accident-free hours before being retired by the U.S. Navy and sold to Flying Tankers.

After the aircraft were retired from the Navy, they were transformed into firefighting aerial tankers. The aircraft can carry 7,200 gallons of water or retardant and their drop can cover an area of up to 4 acres. The Mars are also equipped to deliver fire retardant gel as well as sea or fresh water. The Martin Mars can fill its tanks by skimming over a large waterway.

## Lockheed P-3 Orion

Type I Airtanker



### Specifications:

Cruise Speed: 380 mph

Gallon  
Capacity: 3,000

### Manufacturer

Lockheed Corporation

### Original Owner

United States Navy

### Crew

Pilot, Co-pilot and Flight Engineer

### Mission

Lockheed P-3 Orion, was developed in 1959 during the Cold War as a maritime patrol aircraft. It has been used by numerous military forces around the world, primarily for maritime patrol, reconnaissance, anti-surface warfare and anti-submarine warfare. The P-3's primary mission was to track and eliminate ballistic missiles and fast attack submarines in the event of war in international waters.

Aero Union, Inc. operates eight ex-USN P-3As configured as air tankers, which are leased to the U.S. Forest Service, CAL FIRE and other agencies for firefighting use.

## Lockheed P-2 Neptune

Type II Airtanker



### Specifications:

Cruise Speed: 403 mph

Gallon  
Capacity: 2,700

### Manufacturer

Lockheed Corporation

### Crew

Pilot, Co-pilot and Flight Engineer

### Mission

The P-2V Neptune was a naval patrol bomber and anti-submarine warfare aircraft for the United States Navy. The P-2 Neptune replaced the PV-1 Ventura and PV-2 Harpoon and is being replaced, in turn, with the P-3 Orion.

The P2V aircraft were rebuilt and converted into aerial tankers with a maximum fire retardant capacity of 2,700 gallons with six door retardant dispensing tanks. Over 8 P2Vs are currently employed in aerial firefighting roles by operators such as Aero Union and Neptune Aviation Services.

## Douglas DC-6

Type I Airtanker



### Specifications:

Cruise Speed: 315 mph

Gallon  
Capacity: 2,800

### Manufacturer

Douglas Aircraft Company

### Original Owner

United States Air Force  
United States Navy

### Crew

Pilot, Co-pilot and Flight Engineer

### Mission

The DC-6 is a piston-powered airliner and transport aircraft. Manufactured from 1946 to 1959, the aircraft was originally intended as a military transport during World War II. It was reworked after the war to compete with the Lockheed Constellation in the long-range transport market. The DC-6 was known as the C-118 Liftmaster in United States Air Force service, and as the R6D in United States Navy service. More than 700 were built and many still fly today in cargo, military and wildfire control roles.

## Douglas DC-7

Type I Airtanker



### Specifications:

Cruise Speed: 355 mph

Gallon  
Capacity: 3,000

### Manufacturer

Douglas Aircraft Company

### Original Owner

United States Air Force  
United States Navy

### Crew

Pilot, Co-pilot and Flight Engineer

### Mission

The DC-7 is an American transport aircraft built from 1953 to 1958 and was the last major piston engine powered transport made by the Douglas Aircraft Company.

Three hundred forty-eight DC-7s were produced and about 40 are still in service today flying cargo, military, and wildfire control roles.

## CL-215/ Bombardier 415 "Superscooper"

Type II Airtanker



### Specifications:

**Cruise Speed:** 189/233 mph

**Gallon  
Capacity:** 1300/1621

### Manufacturer

Canadair / Bombardier, Canada

### Crew

Pilot and Co-pilot

### Contracting

These aircraft have been leased for use during fire season in numerous counties including Los Angeles and San Diego.

### Mission

Both the CL-215 and Bombardier 415 are Canadian aircraft built specifically for fire suppression and are known in the U.S. as Superscoopers. 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. These turbine aircraft scoop water from 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.

## Grumman S-2T

Type III Airtanker



### Specifications:

**Cruise Speed:** 305 mph

**Gallon  
Capacity:** 1,200

### Manufacturer

Grumman Aerospace, Bethpage,  
New York

### Crew

Pilot

### Original Owner

U.S. Navy, 1954-1972. The S-2E/G was used as a carrier-based anti-submarine warfare airplane.

### Acquired by CAL FIRE

In 1996, CAL FIRE acquired 26 S-2E/G planes from the Department of Defense. CAL FIRE had the aircraft converted for fire-fighting configuration and fitting them with modern, powerful turboprop engines. The completely reconditioned S-2Ts are faster, safer, and more maneuverable. They can carry a larger retardant payload than the older S-2A air tanker CAL FIRE utilized since the 1970's. The S-2T air tanker is part of CAL FIRE's air program modernization efforts that will result in the safest and most efficient mix of aircraft to carry out the fire fighting mission. CAL FIRE currently has 23 S-2Ts that are utilized state-wide.

### Mission

CAL FIRE utilizes the S-2T air tankers for fast initial attack delivery of fire retardant on wildland fires.



## Sikorsky S-61

Type I Helicopter



### Specifications:

**Cruise Speed:** 154 mph

**Gallon  
Capacity:** 1,000

### Manufacturer

Sikorsky Aircraft Corp

### Crew

Pilot and Co-pilot

### 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.

## Sikorsky S-64 "Skycrane"

Type I Heavy Lift Helicopter



### Specifications:

**Cruise Speed:** 105 mph

**Gallon  
Capacity:** 2,650

### Manufacturer

Sikorsky Aircraft Corp / Erickson Air-Crane

### Crew

Pilot and Co-pilot

### 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.

## Sikorsky S-70 "Firehawk"

Type I Helicopter



### Specifications:

Cruise Speed: 183 mph

Gallon  
Capacity: 1,000

### Manufacturer

Sikorsky Aircraft Corp

### Crew

Pilot, Co-pilot and a Military Helicopter Manager

### Sikorsky S-70 "Firehawk"

The Firehawk is the civilian version of the U.S. Army's popular Blackhawk or UH-60 and the U.S. Navy's Seahawk. The UH-60 was originally designed for the U.S. Army in the 1970s as a light transport helicopter used for air assault and as a military medievac helicopter. The aircraft is a four bladed, twin engine helicopter. For water or retardant delivery, the S-70 can have a large tank mounted on the bottom or can carry a bucket.

## Eurocopter AS332L "Super Puma"

Type I Helicopter



### Specifications:

Cruise Speed: 156 mph

Gallon  
Capacity: 2,000

### Manufacturer

Aerospatiale / Eurocopter

### Crew

Pilot and Co-pilot

### Eurocopter AS-332L

The AS332L "Super Puma" is a twin engine medium-weight helicopter that has a large cabin which works well for passenger transport. The AS332L first flew in 1978 and flown for both civilian and military use. The aircraft is often used by oil companies to ferry personnel and equipment to and from oil platforms. In 2000 the U.S. Forest Service in California used this aircraft for initial attack with a "Heli-Shot" crew. These aircraft are not very common on California wildfires.

## Boeing-Vertol 107 "Vertol"

Type I Heavy Lift Helicopter



### Specifications:

Cruise Speed: 140 mph

Gallon  
Capacity: 1,100/bucket

### Manufacturer

Boeing Company / Vertol Aircraft Company

### Crew

Pilot and Co-pilot

### 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.

## Boeing 234 "Chinook"

Type I Heavy Lift Helicopter



### Specifications:

Cruise Speed: 137 mph

Gallon  
Capacity: 3,000/bucket

### Manufacturer

Boeing Company / Vertol Aircraft Company

### Crew

Pilot and Co-pilot

### 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.

## Kaman "K-Max"

Type I Heavy Lift Helicopter



### Specifications:

Cruise Speed: 91 mph

Gallon  
Capacity: 700

### Manufacturer

Boeing Company / Vertol Aircraft Company

### Crew

Pilot

### 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.

## Bell 212

Type II Helicopter



### Specifications:

Cruise Speed: 115 mph

Gallon  
Capacity: 360

### Manufacturer

Bell Helicopter

### Crew

Pilot and Co-pilot

### 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.

## UH-1H "Super Huey"

Type II Helicopter



### Specifications:

**Cruise Speed:** 125 mph

**Gallon  
Capacity:** 360 plus  
324/bucket

### Manufacture

Bell Helicopters, Fort Worth, Texas

### Crew

Pilot, two Fire Captains  
and eight Firefighters

### Original Owner

U.S. Army, 1963 to 1975. The UH-1H was used as a troop and cargo transport and specialized operations.

### Acquired by CAL FIRE

In 1981, CAL FIRE acquired 12 helicopters from the Department of Defense. They were heavily modified by CAL FIRE for firefighting use and went into service in 1989. CAL FIRE has 9 helicopters available state-wide with two reserve helicopters available from CAL FIRE's Aviation Management Unit (AMU) in Sacramento to fill in behind scheduled maintenance.

### Mission

CAL FIRE utilizes the Super Hueys for fast initial-attack on wildland fires. The copters are able to quickly deliver a nine-person fire crew wherever needed as well as battle fires with water/foam drops. The copters are also utilized for medical evacuations, backfiring operations, (internal and external loads), infra-red mapping of incidents and numerous non-fire emergency missions. CAL FIRE helicopter crews are highly trained for "short-haul" rescues. A short-haul involves a crew-member being lowered from a hovering helicopter to an injured or trapped person below. Once hooked to a harness or stokes basket, the victim and crew-member are then carried a short distance to safety.

## Bell 205 A++

Type II Helicopter



### Specifications:

**Cruise Speed:** 125 mph

**Gallon  
Capacity:** 360 plus  
324/bucket

### Manufacture

Bell Helicopters, Fort Worth, Texas

### Crew

Pilot, Co-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.

## Bell 412

Type II Helicopter



### Specifications:

**Cruise Speed:** 140 mph

**Gallon  
Capacity:** 360

### Manufacturer

Bell Helicopter

### Crew

Pilot and Co-pilot

### 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.

## Bell 407

Type III Helicopter



### Specifications:

**Cruise Speed:** 152 mph

**Gallon  
Capacity:** 180

### Manufacturer

Bell Helicopter

### Crew

Pilot

### Bell 407

The Bell 407 is one of 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.

## Bell 206B "JetRanger"

Type III Helicopter



### Specifications:

**Cruise Speed:** 115 mph

**Gallon  
Capacity:** 120/bucket

**Manufacturer**  
Bell Helicopter

**Crew**  
Pilot

### 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.

## Bell 206L-III "LongRanger"

Type III Helicopter



### Specifications:

**Cruise Speed:** 120 mph

**Gallon  
Capacity:** 120

**Manufacturer**  
Bell Helicopter

**Crew**  
Pilot

### 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 Bell 206L-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.

## Eurocopter AS350 AStar

Type III Helicopter



### Specifications:

**Cruise Speed:** 161 mph

**Gallon  
Capacity:** 180

### Manufacturer

Aérospatiale / Eurocopter Group

### 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.

## MD 500D

Type III Helicopter



### Specifications:

**Cruise Speed:** 144 mph

**Gallon  
Capacity:** 120

### Manufacturer

Hughes Helicopters /  
McDonnell Douglas

### 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.



## Aérospatiale SA 315B "Lama"

Type III Helicopter



### Specifications:

Cruise Speed: 115 mph

Gallon  
Capacity: 180

### Manufacturer

Aérospatiale

### Crew

Pilot

### Aérospatiale SA 315B "Lama"

The Lama is a French helicopter originally designed in the late 60s for high altitude work. It holds the altitude record for helicopters, reaching an altitude of 40,820 feet. It is a virtual workhorse for its size and weight. It is one of few helicopters that can actually lift its own weight.

The helicopter has outstanding visibility for observation and reconnaissance. They are used for a variety of activities: aerial reconnaissance, aerial ignition, and wildland fire suppression.

Passenger seating is limited to one in the front and three in the rear. The helicopter has a cargo basket on each side.

## Alouette 316B

Type III Helicopter



### Specifications:

Cruise Speed: 115 mph

Gallon  
Capacity: 180

### Manufacturer

Aérospatiale

### Crew

Pilot

### Alouette 316B

The Alouette III is a French helicopter that has the same power plant and rotor system as the "Lama", but unlike the Lama, the Alouette has wheels instead of skids for landing gear. The helicopter has good visibility for observation and reconnaissance. They are used for a variety of activities such as aerial reconnaissance, aerial ignition, and wildland fire suppression.

Unfortunately, the Alouette III has limitations similar to the Lama. Because of older technology the helicopter is maintenance intensive and extremely noisy. It is slow compared to other helicopters and burns about one gallon of fuel per minute. Due to main rotor blade design, the main rotors have a low droop at the front of the aircraft. Passenger seating is limited to one in the front and three in the rear. The helicopter has a cargo basket on each side.

## Lockheed C-130

Type I Airtanker - Modular Airborne Firefighting System



### 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.

## UH -60 "Blackhawk"

Military Helicopter



### Specifications:

Cruise Speed: 183 mph

Gallon  
Capacity: 780/bucket

### Manufacturer

Sikorsky Aircraft Corp

### Crew

Pilot, Co-pilot and a Military Helicopter Manager

### 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 medevac 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.

## Boeing CH-46 "Sea Knight"

Military Helicopter



### Specifications:

**Cruise Speed:** 140 mph

**Gallon Capacity:** 224/bucket

### Manufacturer

Boeing Company /  
Vertol Aircraft Company

### Crew

Pilot , Co-pilot and  
a Military Helicopter Manager

### 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.

## CH-47 "Chinook"

Military Helicopter



### 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

### 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.

## CH-53E “Super Stallion”

United States Marine Firefighting Aircraft



### Specifications:

**Cruise Speed:** 173 mph

**Gallon  
Capacity:** 2,000/bucket

### Manufacturer

Sikorsky Aircraft Corp.

### Crew

Pilot, Co-pilot and  
a Military Helicopter Manager

### 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.

## Glossary

**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, 11 helicopters and 14 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 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.