Battling the blaze from above …

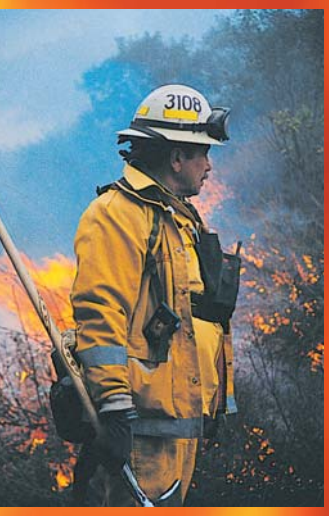
AERIAL FIRE BOMB

STORY AND PHOTOS BY TED CARLSON

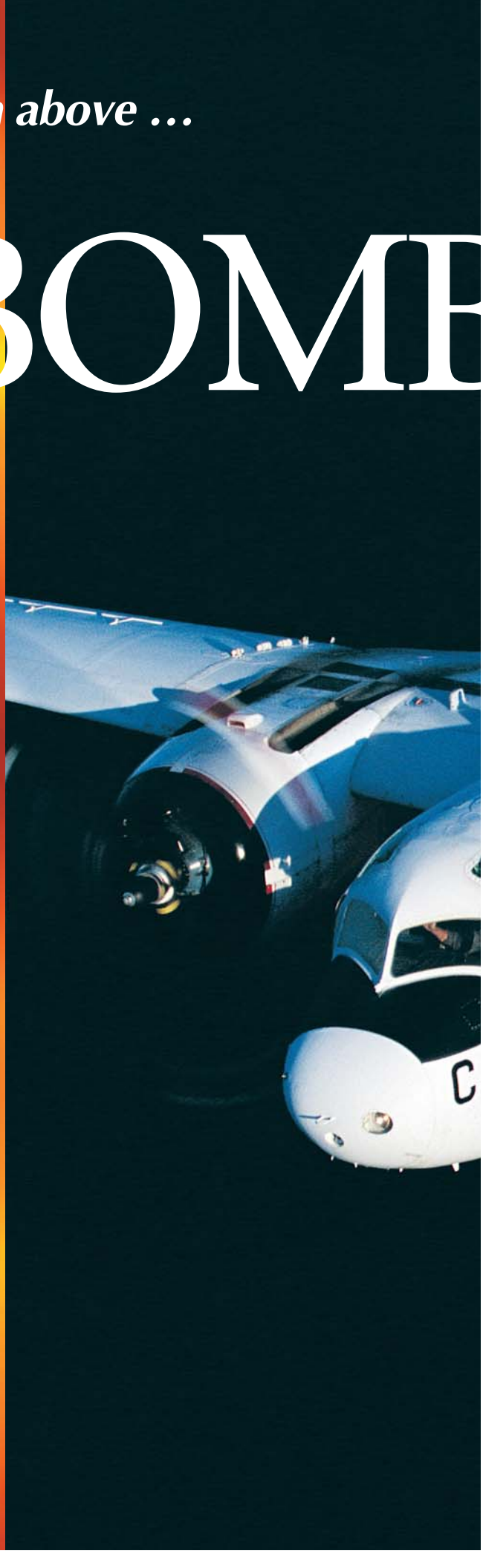
Nicknamed "The Golden State," majestic California boasts some of the best weather in the world. It is also home to some 34 million residents and has numerous metropolitan areas as well as remote and extensive forests, deserts, hills and grasslands. Although California is a popular place to live, and there is plenty to do in its excellent climate, the enormous landmass is subjected daily to a meteorological smorgasbord.

Traditional weather cycles include some rain in the winter and spring, but it seldom rains in the summer and fall. Seasonal rains turn the vegetation green and allow it to grow, but during the summer, it becomes parched and dry—a potential fire hazard. The combination of all the people and machines with Mother Nature and the dry vegetation can bring disaster!

One of the worst years for fires in California was 1999; 7,562 wildfires burned 285,272 acres and more than 1,300 structures. Tankers engaged in the battle logged 12,100 hours, breaking the record of 11,400 hours in 1996. 2000 wasn't quite as bad as the previous year, but some 5,177 wildfires swept through 72,718 acres and destroyed 53 structures. 2001 began with a major fire in San Diego County that took days to extinguish.



The state's official firefighting and fire-protection organization is the California Department of Forestry (CDF). California actually owns the largest firefighting aviation fleet in the world (the U.S. Forestry Service [USFS] leases the tankers it uses). The National Guard also lends its support with a variety of aircraft.



BERS

Flying CDF TS-2A tanker number 72, Deen Oehl punches off a load of retardant over Southern California. The TS-2A can be identified by its radial engines, compared with the S-2T that has turbine engines.

Fighting the enemy: tactics and strategies

Fires always start out small, and it's paramount to put them out early, before they turn into raging monsters. Hundreds of small fires that could escalate occur every year in California, but they are ended quickly by the CDF's prompt action. When a fire breaks out, the person in charge initially is the incident commander (IC), who is generally on the ground.

When CDF fire aircraft are dispatched, the launch usually includes the OV-10, two S-2s ("Stoofs"; originally designated S-2F) and a Super Huey. Ninety percent of the time, this combination of aircraft handles small fires that range over between one and five acres. They rarely make the news. The aerial firefight is run by an air attack officer, who is the CDF captain in the back seat of the OV-10A that usually orbits above the action. The air attack officer reports to the IC and instructs all civilian tankers, military tankers and helicopters.

The OV-10A air attack crews are taught to look for four things first (in addition to keeping an eye out for hazards such as wires, trees, snags, etc.): the origin of the fire, the left flank, the right flank and the head of the fire, where the aircraft concentrate their attention. The head of the fire is where the fire spreads most rapidly. Sometimes, one burning flank may be heading into rock or a cliff, and this means that the fire will burn itself out, so the aircraft don't bother to work the area.

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The air attack officer is responsible for monitoring the airspace bubble around the fire. Most important is ensuring that all players have safe separation for safety of flight. The greatest hazard for the OV-10 crew is smoke, which is always avoided. In the event of a large fire, the CDF requests a temporary flight restriction (TFR) from the FAA. It references a VOR, a given radial and distance. A five-mile radius and an altitude between 2,000 and 12,000 feet are standard, and nonessential aircraft must remain clear.

Aircraft working within the area might include large and small tankers and an array of helicopters and lead planes. Because of the many VHF and FM radios on board, communications can become very hectic for the hard-

working air attack crew. The air attack officer has specific open channels to the helicopters, tankers and main command frequencies.

The USFS Beech Baron lead planes sometimes lead the large tankers to the drop. They fly about a quarter mile ahead of the tanker, ensure that conditions are safe for low-level drops and watch for dangerous air currents or winds. A large tanker's drop speed is usually a slow 130 knots indicated; thus, the Baron runs no risk of having a tanker run it down.

When a tanker arrives, the air attack officer gives its pilot an altimeter setting and an altitude at which to orbit. The tanker pilot is informed of any hazards and is told where to drop. The tankers then get to work. In the event of an unforeseen problem, such as the loss of an engine or a load that won't release during the run-in, the tanker pilots always have an exit and escape route planned. They try to avoid flying through smoke or toward rising terrain, wires and tree snags, and they constantly watch for birds.

Tanker pilots must consider such factors as wind direction and wind drift, slope angles, smoke, speed, speed buildup if diving, altitude and the release point. The ideal drop situation is to fly into the wind while traveling downhill. S-2s average about 150 to 200 feet AGL and between 110 to 130 knots during drops, and thus, the missions tend to be mostly in the uncomfortable "low and slow" mode. But dropping from that altitude is ideal for coating the vegetation with retardant. Depending on the size and parameters of the fire, the tankers will either drop the load ahead of the fire (known as an indirect attack) or directly on a fire (a direct attack).

A direct attack is sometimes used to cool a fire and reduce hot spots and embers. Drops are occasionally made behind the head of the fire in an attempt to eliminate burning embers that can blow ahead of the fire and cause more problems. Tanker pilots can feel the heat radiating from the fire, and the turbulence and updrafts that the blaze produces can bounce a Stoof around pretty well.

Todd Deline and Steve Calkins man this CDF OV-10A Bronco. The former USMC Broncos make excellent platforms for the air attack role and are fast, which enables them to arrive quickly on the scene.

For small fires or when a "stop gap" is needed for ground personnel, a tanker may drop its load on the head of the fire; this is known as "head hunting." However, most drops are ahead of the fire or at its flanks.

Above: Mike Venable makes a practice water drop in TS-2A tanker number 73. When making practice drops for proficiency, tanker pilots will often use water in lieu of the red/pinkish dyed retardant. Left: the S-2s have a convenient cam-lock fitting at the end of the fuselage that is great for expeditious refilling.

Tankers are used more to suppress fires, not extinguish them; that is the ground personnel's responsibility. The S-2 makes an excellent tanker for smaller fires because it can get into tight places. The first drops are probably the most important, as they may succeed in stopping a blaze before it turns into a raging fire.

There are several types of fire retardant, and all are dyed pink or red. The dye helps participants see where drops have already occurred so the same areas aren't hit again. The choice of retardant depends on the fire's ground fuel source. The dyes are environmentally friendly and are bleached away by the sun. Larger tankers almost always drop their 2,000 to 3,000 gallons of retardant ahead of the fire line, effectively pretreating the area. When the fire reaches the treated area, it slows down considerably, thus giving firefighters more time to work.

When the Super Huey arrives, its first priority is to drop off the CDF helitack ground crew of five to eight firefighters. When the helicopters are ready to work, they often start at the flank opposite the tanker. The helicopters work on whichever flank is closer to a water source so they don't have to travel so far to refill.

The helicopter may also be instructed to support the ground crew it dropped off and to make drops in front of them so they can cut fire lines quickly. The helicopters involved communicate not only with the air attack officer but

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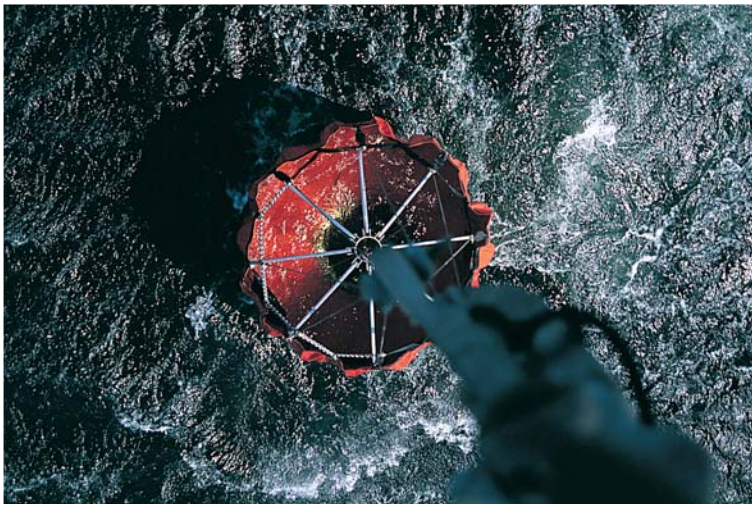

A California Army National Guard UH-60A Blackhawk makes a pickup in a lake with a Bambi bucket. The Guard is instrumental in helping out with large fires, and its rotary-wing assets that use the Bambi buckets include the CH-47D, HH-60G and UH-60A. Right: a California Army National Guard Blackhawk demonstrates the Bambi bucket in action. The 780 gallons it can hold weigh 6,240 pounds!

Dave Patrick is piloting this CDF Super Huey, which has the water tank with snorkel assembly below the fuselage. The water pickup pump on the distal end of the snorkel is noteworthy.

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also with the other helicopters involved via a specific helicopter frequency.

Sometimes a helicopter is directed to work a flank to hit a flare-up or spot fire. Buckets of water are more commonly used in timber country; the tanks are employed in rural and semi-arid areas. The Super Huey pilots like to make drops using the 60/50 rule: 60 knots indicated at about 50 feet AGL while heading into the wind. However, the parameters often change based on the terrain, fuel type, tree-line height and winds. Slow flight and hovering can actually fan the flames, and that is a bad profile to be in if an engine fails.

Helicopter pilots must monitor the locations of the ground crews working the fire line so that water is not accidentally dropped over them. The force of 360 gallons of water hitting someone at 60 knots could be somewhat traumatic. If the ground crew is below trees, the water could snap off branches and bring them down along with the flood.

In the National Guard Blackhawk helicopter, as the pilot approaches the water source, he calls "Short final," and the crew chief relays the height to help guide the helicopter to a good place to pick up the water while also watching for obstacles below. Fast-moving rivers are usually avoided, as the force of their flow can cause a helicopter-versus-river wrestling match that could result in having to pickle the bucket. Downhill drops can be tough because of limited visibility, and uphill drops can be hazardous if the water fails to release. Thus, helo drivers tend to follow a ridgeline when they are dropping.

The Blackhawk has a five-gallon foam container with a hand pump and a hose that runs down into the bucket. When the foam is used, drops are usually made ahead of the fire rather than on top of it. Dropping on top of reddish tanker retardant is also to be avoided, as water dilutes the retardant chemicals and hinders the chemical effectiveness of the concoction.

A CDF Super Huey crew returns from a training flight at Ryan Air Attack Base.

Not a perfect world

Aviation mishaps occur in all communities, and many accidents happen during landing and takeoff. Firefighting aircraft are no exception to this rule. Though almost all flights are uneventful, and most drops are routine, flying any aircraft for an extended time can result in some hair-raising moments. Some S-2 tanker pilots were kind enough to share their war stories with us.

Deen Oehl, an S-2 tanker pilot at Ryan Air Attack Base, describes a 1988 experience during a takeoff: "I had landed after a sortie at Porterville and had to top off with fuel and retardant, which put the S-2 at the maximum gross weight. I was then dispatched to a fire at Cajon Pass.

"The weather was bad, it was warm, and there were thunderstorms in the vicinity, with erratic winds at the airport. Tankers were taking off in both southerly and northerly directions, depending on the mood of the twenty-or-so knots of wind at the time. I recall a DC-4 taking off that used up almost the entire runway, and he added a notch of down-flaps to recover and make it off.

"I took the active runway and commenced the takeoff roll. About the time when I was just breaking ground, the initial left-quartering headwind suddenly switched to a left-quarter tailwind. At that critical point, my airspeed rapidly deteriorated. Despite my best efforts, the S-2 began to settle. I had already actuated the gear retraction, so the gear was on its way up. The radial engine Stoof then settled back onto the runway due to loss of lift, creating a shower of sparks behind.

In addition to its primary firefighting role, the Super Huey is used for rescues (as evidenced here).

"Luckily, there was plenty of runway left, and the S-2 remained on the runway until it stopped. I tried to shut down the engines before it hit, but there was not enough time for them to wind down, resulting in prop strikes. Prop shrapnel from the right engine actually penetrated the fuselage, and one large piece just missed me and struck aft of my seat.

"The retardant tank on the belly was ground away, and retardant spilled out, which may have been a good thing. I was fortunate to escape without injury—other than to my pride. With the prop strikes and metal grinding, it was a deafening experience. It happened so fast, I didn't even have time to be scared. A few months later, that particular S-2

flew again."

S-2 instructor pilot Bob Valette flies out of Santa Rosa, and he pitched in, "I was flying down a canyon and was supposed to deliver retardant on one side of a house and then hit the other side coming back. It was a perpendicular run to the canyon, which is tough. It means you have to go down the side of a hill, punch off the load, pull the elevator up, advance to maximum allowable throttles and make a ninety-degree-heading change because of a mountain on the exit route.

"I punched half the load off, pulled the elevator, added power, pulled about three Gs and banked sharply to the left. Everything went well until I entered the left-hand bank. At ninety degrees of bank, the aircraft didn't want to roll out. It scared the heck out of me, and both hands went to the control yoke.

"I thought I was going to die, but the adrenaline rush helped me to move the yoke, which finally broke loose. The plane rolled out on a heading toward Sacramento, and I did an uneventful, long, straight-in landing at Mather using the rudders only. I had the controls lock up on me a second time about three years ago, and that time, I had a trainee with me: Charlie Jones, who now flies tankers out of Rohnerville. Charlie was flying, and we were near Vacaville, dropping on a fire that was moving uphill.

"Charlie was doing a good job on the approach, but during the final turn for the drop, he didn't roll out; he just kept turning. I looked at him, and you had to be there to see his startled expression! He had both hands on the yoke, with a wide-open mouth, obviously extremely concerned. The controls were locked in neutral, but in a thirty-degree left bank. I instantly dropped the load. Charlie is a strong guy, and I jumped on the controls with him.

"With our combined efforts, the ailerons eventually snapped with a big clank to the right, and then the plane rolled back into a right-bank position, with the controls now free. Due to the earlier problem, I wanted to avoid neutral. This had all happened so fast, and with all hands on the yoke, that we had not yet communicated. I told him to leave the bird the way it was.

"I put both feet on the rudder, and we were flying straight in a slide slip at that point. We declared an emergency and made a slow and lazy turn over the Santa Rosa base with other CDF aircraft in trail watching us. On short final, Charlie lowered the gear and flaps, which didn't have any adverse effects.

"On the ground, the controls were free and felt perfect. When the aircraft mechanics checked the plane and looked at everything, all they could find were rivet heads, a screwdriver and other debris. It could be that the screwdriver bounced up and locked an aileron. The S-2 is quite a strong airplane, and it has done a great job for California in the firefighting mission for more than twenty years. I have flown the new turbine aircraft, the S-2T, with the reliable Garrett turboprop engines. It is faster, larger, carries more retardant and is a fantastic airplane.

"Many people only hear about the ten or fifteen major fires statewide every year. Last year alone, I responded to four hundred forty-seven fires, and without the tankers, we would have been much worse off!

A Huey makes a drop during the 2001 San Diego fire. The Huey is still the most used helicopter at hot spots around California.

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Just as important as firefighting aircraft are the firefighting ground crews; they play a critical role in containment, as well. Ground crews are responsible for extinguishing fires to the end, and the aviation assets and ground crews work together as a team.

Lookng somewhat like a mosquito on steroids, a CH-54 (S-64) Skycrane is shown fighting a fire in California earlier this year. The Vietnam-vintage, former U.S. Army helicopter (officially dubbed "the Tarhe") is a heavy-lifting machine that is leased by the USFS.

The news media never report the ones we snuff out early, which happens all the time, and the job that we do is invaluable in controlling the situation."

Another pilot who has 22 years' experience flying tankers is Doug Baker, who flies S-2Ts out of Ukiah. He had a horrifying experience flying a TS-2A out of Ramona. "We were working Santa Ana fires in Southern California. The winds were blowing at forty to fifty miles per hour, and I was returning to base after a drop. I was on the downwind leg and turned on base with the flaps down. While in the turn to final, the flap actuator snapped and the airplane started rolling uncontrollably to the right when I was about eighty feet above the ground.

"Initially, I thought I had lost an engine. I put the props forward to flat pitch and added power. Nothing happened; the roll continued. We have Plexiglas hatches overhead, and as the plane rolled, I could see the ground through the copilot's top glass. The aircraft was probably at about one-hundred-twenty-degrees angle of bank. The S-2 has a rudder assist that I quickly turned on and put in full left rudder and full opposite aileron, which kind of gave me control again. Taking it around was not an option, as the aircraft was not really flying but was in more of a semi-controlled descent during base to final.

"It then smashed down on the runway at about a forty-five-degree nose angle to the runway. I straightened it out, taxied in and had no idea what had happened. I took it to the run-up area, ran the engines up, and they appeared to be fine. I then took it into the loading-area fuel pits and shut it down. When I exited, I noticed that the right flap was broken and was flapping in the breeze.

"Through sheer strength and the fear of dying, I had made it to the runway. To the airplane's credit, after it slammed down on the runway, it fared very well—probably because it was designed for aircraft-carrier operations. The aircraft flap system was fixed, the aircraft was carefully inspected, and it was up and flying the following day."

Jimmy Barnes was the first to fly the prototype S-2T. "I was ferrying a 1947-vintage DC-4 that had been sitting in the desert for years to North Carolina. There was water in the fuel, though, and it froze, and all four engines quit over Sherman, Texas. We had to do a four-engine-out deadstick landing! I have also had to drop loads to get out of downdrafts. Once, near Palm Desert, I was dropping near a mountain peak in high winds. My rate-of-climb indicator was pegged in the downward mode with my power levers at maximum. It stayed that way until I dropped down several thousand feet lower.

"As with most other tanker pilots at one time or another, I have accidentally flown into convection columns, which contain heat, smoke and the products of combustion. In that case, the rate of climb is usually pegged up, and you try to maintain attitude control. The Super Huey and S-2T are probably among the most potent team combinations for initial attack air support in California."

Although having both state- and federal-sponsored tanker fleets is not inexpensive for California taxpayers, it is reassuring to know that these fleets stand ready to defend citizens against the fury of the beast. Attacking fire from the air has proven to be invaluable on countless occasions, and it's obviously one of the most effective methods for combating "the big ones"!

A C-130E Hercules of Channel Islands California Air National Guard 146th Airlift Wing makes a drop on target. C-130s are among the largest tankers and can deposit huge amounts of retardant over a sizable area in one or more passes.

Acknowledgements: the author thanks Lt. Cols. Doug Hart, Terry Knight and Tom Lasser; Maj. Carl Allen; Capts. Steve Calkins, Jim Fuller, Bruce Malarky, Wayne Murray, Ken Pimlott and Rob Toups; CW3 Bob Price; Sgt. 1C Barry Linture; Doug Baker, Jimmy Barnes, Todd Deline, Marshall Graves, Les Koehler, Deen Oehl, Dave Patrick, Bob Valette, Mike

FIREFIGHTING AIRCRAFT

The Bronco

The CDF owns 14 ex-USMC OV-10A Broncos that are employed for command and control of fires. The nimble Broncos are manned by a crew of two: a pilot and an air attack officer. The aircraft have an array of radios—three VHF and three FM radios (one with UHF capability as well)—that enables them to communicate with various agencies, controllers and aircraft simultaneously. The radios all have Guard frequencies, so the Bronco may be monitoring eight different frequencies at once.

OV-10A Bronco

Bronco driver Les Koehler has flown air attack aircraft since 1990. He started in the O-2A and later changed to the OV-10A. He has 2,200 hours flying air attack aircraft, 500 of them in the Bronco. When asked about flying the aircraft, he replied, "As a pilot, I am responsible for making sure the air attack officer can see the tankers so they may be directed to the appropriate drop locations. I must also keep the air attack officer in a good viewing position so he or she can monitor other aircraft, such as helicopters. The Bronco is very stable in rough air, and with our power, the envelope of operation is good. Turbine engines are very well suited to higher altitudes, and with the tandem seating, I can orbit in either a left- or right-hand pattern, which was not an option in the O-2. The Bronco is very agile and handles well."

Capt. Steve Calkins is a CDF Ryan Air Attack Base air attack officer in the CDF Riverside Range Unit of the Sierra South region. He has been in the CDF for 32 years and has manned the Bronco for four years. When asked about his job, he said, "I like the Bronco because it gets us there fast, and the visibility is fantastic. Aircraft are very effective against fires, and I feel that we are doing something good during missions. We can usually prevent small fires from turning into large ones, and compared with fire engines on the ground, we get to see the big picture. You can see what the fire is doing, have a broad effect on the end result and some input into the big game plan."

Super Hueys

California helitack ("helicopter" plus "attack" equals "helitack") operations first began in the early 1970s. At two CDF bases, Ryan and Bear Valley, the Super Hueys (designated as Bell 205-A1 machines) have a detachable tank installed on the bottom that contains an attached water-sucking snorkel. The 13-foot-long snorkel has a pump attached on the distal end, and the Huey simply locates a water source near a fire and hovers over it while dipping the snorkel into the water, which is then sucked into the 360-gallon tank.

Bell 205 A1 Super Huey

The tank has a two-door system, and the doors can be opened individually or together. The tank also has attachments that allow it to be connected to a fire hydrant. A pair of small, 15-gallon tanks contains concentrated foam, which the pilot injects into the water after the main tank has been filled. The foam greatly enhances the flame-snuffing capability because it does not evaporate nearly as fast as water, and this gives the water retardant-like characteristics. To minimize aircraft weight for high-density-altitude operations, 325-gallon buckets may be used in lieu of the snorkel/tank system.

Vic Wierzba is a CDF Super Huey pilot and a veteran of the war in Vietnam, where he flew Hueys for the U.S. Army. He has flown worldwide and has even worked for Air America. He has logged more than 11,000 helicopter hours and has worked for the CDF since 1994. When asked about flying the Huey and about firefighting, he said, "You always need to be 'heads up' when fighting fires; you must leave yourself an 'out.' We use the helicopter to rescue individuals who are lost, such as hikers, or perhaps for someone who is hurt or ill in the wilderness. We don't use a hoist, but we have two rescuers in the back of the heli plus a crew chief and a rescue supervisor. A rescuer can be lowered by rope a maximum of 200 feet to reach the victim. If required, we will send down a second rescuer with a litter. The rescuer and litter are attached to the rope, and the victim and rescuers are carried a short distance to a landing area where we can load them inside or transfer them to an ambulance.

"We fly the aircraft low and around steep, rugged terrain that can be turbulent. We also fly at high-density altitudes, and we frequently operate near maximum gross weights—variables that make this type of flying dangerous. We are providing a valuable service to the community, saving lives and property, and that is rewarding. Just a few weeks ago, we short-haul rescued a paraglider pilot who had crashed in the mountains in an area inaccessible to ground crews. Our job is both challenging and interesting."

Stoofs

The CDF has a variety of former U.S. Navy Grumman S-2 Trackers employed as medium tankers that were originally designed to hunt and kill Soviet submarines during the Cold War. The S-2 fleet consists of former TS-2As, S-2D, E and S-2Gs. The nickname "Stoof" is simply derived from combining the S, the 2 and the F to form a word: Stoof. The TS-2As still have reciprocating engines,

TS-2A Tracker

though the other models have had turboprops installed and are known as S-2Ts. The last TS-2As will be retired within a couple of years in favor of the more powerful and versatile S-2T. All have a crew of one.

The internal retardant tank has four drop doors (two on each side) and four separate bays. The retardant can be released using various door combinations and sequencing timers, if desired. The S-2T can hold one and a half times more retardant than the TS-2A.

CH-54 (S-64) Skycrane

CH-47D Chinook

Mike Venable is a Stoof pilot based at Ryan Air Attack Base who has piloted or copiloted PBYs, C-119s, DC-4s and C-130s under contract for the USFS, and he also flew the OV-10 before changing to the S-2. He has logged 12,000 hours, including 800 hours in the S-2.

Mike said, "You need to have a good understanding of how fire behaves, and what drives a fire up-slope or down; you need to know the wind, heat, convection, smoke, etc. Once on scene, you must assess the situation and determine which is the best place to make the first drop. We always put safety first by planning a way out when we work a fire. With a full load of retardant in the TS-2A, single-engine operation is marginal, and we are always ready to pickle the load in the event of an engine loss. When we make drops at low altitudes, we fly one-hundred-percent visual and heads up. We always try to avoid smoke, especially the thick stuff.

C-130E Hercules

"The nature of what we do is hazardous. We fly out of uncontrolled airports and integrate with general aviation aircraft. When you arrive on scene, there may be a gaggle of helicopters below, four or five fixed-winged aircraft above, other tankers, Air Attacks and media helicopters. You need to make sure you fit into a groove in the big plan.

HH-60G Pave Hawk

"The S-2 can operate from the smaller bases and runways, and this places them closer to fires than some of the larger tankers. That means our drop repetition is greater and helps us put the fire out faster. Sometimes we can make drops where the big tankers cannot because of the terrain. You have to fly the S-2 hands-on all the time. The job is fun, exciting and different, and you get to accomplish something good for the taxpayer!"

Fire Guardians

During large fires, California's Army and Air National Guard are important players. Some of the planes they use include the C-130E Hercules, CH-47D Chinooks, HH-60G Pave Hawk and UH-60A Blackhawks. The C-130E, with the modular airborne firefighting system (MAFFS), can deliver a huge mass of retardant through a pair of big tubes out the rear cargo area. The Chinooks, Pave Hawks and Blackhawks use Bambi water buckets, and they can also carry CDF helitack crews and more people than Hueys can. The Blackhawk can carry two sizes of Bambi buckets: the 660- and 780-gallon.

CW3 Bob Price is a California Army National Guard UH-60A pilot based at Los Alamitos AAF, California, who serves with the 40th Infantry Division (mechanized)/1-140th Aviation. When asked about firefighting in the Blackhawk, he replied, "We will go all over the state, and we are instrumental in helping out the CDF when called upon."

PB4Y

Beech Baron

USFS

The USFS has a small fleet of aircraft that includes Aero Commanders (Air Attack) and Beech Barons (lead planes). However, they fund the larger tankers for the heavy-duty work. Large tankers include the PBY, PB4Y, C-54, P-2, P-3, KC-97, C-130, DC-4, DC-6 and DC-7. Smaller contracted planes are the CL-415 Super Scooper and single-engine air tankers (SEATs). Contracted helicopters include Bell 206 Jet Rangers, Bell 212 Hueys, S-61s and S-64 (CH-54) Skycranes. The USFS also has smokejumpers who are trained to leap from USFS-owned DC-3s, Sherpas and Twin Otters—the fastest way to get many firefighters to the scene.