

EXTREME SITUATIONS

Structured Coordination is Key to Success

STORY BY SCOTT M. SPANGLER

People do not like surprises, especially when they involve dire consequences. When dealing with fires, floods, earthquakes, tsunamis, mudslides, tornados, hurricanes or the spreading contamination of a hazardous material, structured, reliable and coordinated communication among the responding emergency services is the antidote for confusion.

In disaster films, last-minute, seat-of-the-pants heroics with an airplane or exotic technology often save the day. In reality, aircraft play important roles in many emergency situations, but their technology is off-the-shelf and the heroics are a planned and practiced team effort.

California is home to more than its fair share of disasters. Just ask any of the nearly 18 million people who live in the greater Los Angeles area, five counties covering 4,850 square miles. LA County accounts for 10 million people (a quarter of the state's population) and 4,061 square miles. Los Angeles is the largest of the county's 88 cities, with 3.8 million people living within

the city's 498.3-square-mile administrative limit.

When bad things happen, help from above comes first from the air operations units of the Los Angeles Fire Department or the LA County Fire Department. When something really bad happens, like an earthquake or, more frequently, a fire turning dry brown hills black, the response involves the appropriate agencies, such as county and city police departments, Cal Fire, the U.S. Forestry Service and military aviation units.

Fire is a good model for any aviation response to an emergency because it involves diverse agencies battling a fluid situation. What might seem like moths haphazardly flitting around the flames actually is a layered, controlled response, a well-practiced symphony of standard operating procedures played on everyday instruments.

Cal Fire, or CDF (short for the California Department of Forestry and Fire Protection), has developed

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A Los Angeles Fire Department Bell 412 on its way to work.

Photo courtesy of the Los Angeles Fire Department

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A Cal Fire S-2T aircraft fights a fire in San Diego County last summer. Each of Cal Fire's 23 S-2Ts carries 1,200 gallons of fire retardant.

Photo by Wes Schultz, Cal Fire

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many of the procedures that define aerial firefighting since it first hired four modified N3N crop dusters in 1953. It quickly stepped up to more capable World War II aircraft. By the 1970s, its contract fleet of modified warriors numbered 14 TBMs, five F7Fs, a PBY and a B-17. To ease the maintenance challenge, Cal Fire began replacing them with Navy S-2As in the mid-1970s, and it traded up to the larger S-2E/G in the 1990s.

Arizona's Marsh Aviation turned them into the S-2T by replacing the Navy issue R-1830 with the TPE331 turboprop. A standard cockpit configuration includes the Bendix/King KX 155 and Technisonic TFM-138 high-band FM, said Marty Buno, a 14-year Cal Fire veteran and its chief of maintenance. Flown by a single pilot, each of the 23 (with one kept in reserve) S-2Ts carries 1,200 gallons of fire retardant.

Cal Fire contracted its first heli-

copter in 1960. Growing a year-round need, it built its own fleet in 1981. Today, Cal Fire pilots fly 11 (with two kept in reserve) "Super Hueys," UH-1Hs modified with a bigger engine, transmission and blades, as well as a more robust tail rotor system. In addition to firefighting, helicopter missions include crew transport, medevac, prescribed burns using a HeliTorch system, re-seeding, infrared mapping and other non-fire missions. Similar to the S-2Ts, they communicate with KX 155s and high-band FM, according to Buno.

An air tactical group supervisor (ATGS) orbits above the helicopters and air tankers like a forward air controller, coordinating their firefighting efforts to meet the needs of the fire commander and other ground units. ATGSs flew in contract Cessna 182s and 210s until Cal Fire put its S-2As on the line when it created a dedicated air tactical fleet of Cessna O-2s. The O-2s gave way to 14 OV-10s (one kept in reserve).

The ATGS "basically has six ways to communicate within the aircraft," Buno said, and the Wulfsberg C-5000, with 350 programmable channels, controls all of the air-to-air and air-to-ground frequencies. Typically, the ATGS turns off the KX 155 the pilot uses and works the frequencies assigned to the ground units he is supporting and the tankers and/or helicopters at his command. For the most part, Buno said, the ATGS keeps track of aircraft and drop coordinates with handwritten notes on a kneeboard.

Cal Fire's fleet flies from 13 air attack and nine helitack bases, which put aircraft within 20 minutes of a fire anywhere in the state. The maintenance crew numbers 80, with seven avionics technicians. All experienced Cal Fire vets, they work for the contractor that provides maintenance and the fixed-wing pilots, now DynCorp International.

McClellan Field is Cal Fire's main base, site of all helicopter maintenance and the fixed-wing, phased-

maintenance program's "200- and 400-hour heavy checks," Buno said. Mechanics perform the 100- and 300-hour checks in the field.

The avionics technicians all are at McClellan, where they are installing automatic flight-following equipment in every aircraft. A real-time, satellite-based system, it tracks location, speed, heading, altitude and flight history, then displays it on any computer with an Internet connection.

Training is another Cal Fire responsibility, including the annual interagency session, which prepares military crews for the fire season. Rotary-wing Navy, Marine and National Guard crews work with their military helicopter manager, a CDF firefighter who flies with each of them. Plugged into the ship's communications system, he communicates with the ATGS and helps guide the pilot.

The mix of aircraft fighting a large fire can span aviation history, from modern military cargo planes and fire department helicopters to the veterans flying for Cal Fire and the U.S. Forest Service. To keep them safely segregated, a fire traffic area, with specific entry and exit routes and reporting points, surrounds the blaze, said Glenn Smith, a Los Angeles Fire Department helicopter pilot with 17 years of service.

The helicopters fly in the first layer, which tops out at 500 feet above the ground. Air tankers maneuver between 500 and 1,000 feet above the ground and orbit between 1,000 and 1,500 feet. Above them all is the air tactical group supervisor, "a guy from Cal Fire in an OV-10, a Forest Service guy in a King Air 200" or, for smaller fires, a member of the LA Fire Department or LA County Fire Department in a Bell JetRanger.

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“When you’re 12 miles from the fire, you call the ATGS on the appropriate frequency and give your position and ETA at the reporting point,” Smith said.

If the ATGS doesn’t immediately respond, aircraft orbit seven miles out until cleared into the fire traffic area. Frequencies are set by a communications plan determined by the scope of the fire and the aerial armada fighting the fire. It’s part of the daily briefing on multi-day fires, and “sometimes they change the frequencies during the middle of the fire,” Smith said, because another one bursts to life nearby, creating another fire traffic area.

In addition to firefighting, the separate city and county fire department air units perform similar missions, including medevac, mountain, fire and water search and rescue, and transporting crews and equipment, each addressed by specific standard operating procedures. Surrounding the city, the county covers everything from the mountains to Santa Catalina Island, 25 miles south of Long Beach.

Consequently, “we do a lot of inter-agency training to stay on pace with the latest procedures,” Smith said. Not only does this incorporate new and better ways of doing things when assisting another agency that is leading the response to an emergency, but it also keeps them “in tune with their operating procedures.”

Both the city and county launched their air units with the bubble-domed Bell 47 of MASH fame, with the county taking off in 1957 and the LAFD in 1962.

Today, the LA County Fire Department flies four twin-engine Bell 412s, three twin-engine Sikorsky

S-70 (the civilian H-60) Firehawks and a single-engine Bell 206B JetRanger, used for command, mapping, forward-looking infrared, photography and helicopter coordinator duties.

Maintained by staff mechanics and technicians, all are equipped with 30-million-candlepower Night-Sun lights, and all but the JetRanger have external hoists. The 412s have belly-mounted, 350-gallon water tanks, and the Firehawks carry 1,000 gallons.

The LAFD fleet at Station 90 numbers three Bell 412s and two twin-engine AgustaWestland AW-139s, all equipped with hoists and water tanks, a Bell 206B JetRanger and a Bell 206L LongRanger. All of them are based at Van Nuys Airport in the heart of the San Fernando Valley, home to LAFD’s air operations center. Here, mechanics and technicians, who work LA’s general services department, maintain all city aircraft, including 17 police helicopters and the roughly half-dozen Department of Water and Power aircraft.

The police and fire air units “have different missions,” Smith said, but “they overlap every once and awhile, and we interact with them for tactical planning: who’s going to do what during an earthquake, or whatever the emergency happens to be. Water and Power has a big mission. They patrol all the power lines and aqueducts that feed Los Angeles, often as far out as Nevada, (and are involved with) surveys and repairs.”

LAFD Air Operations keeps pace with technology. Looking back 17 years, “when I started, some of the radios had crystals in them,” Smith said, explaining the work involved to set up necessary frequencies and Loran for navigation.

“Now, we’ve got GPS and programmable digital radios, and a sat-

ellite-based, Internet tracking system that shows each helicopter’s position on street or topographical maps,” he said. “If we’re back in the mountains and need to make an emergency landing, they can follow that satellite track right to us.”

The avionics are off-the-shelf equipment from Garmin, Bendix/King and Honeywell, which “came standard in the AW-139s,” Smith said. Each aviation agency has its own air-to-air “Victor” frequency in the aviation spectrum.

“If LA County comes to assist us, they contact us on our Victor frequency, and we operate on that. If we go to a fire with LA County, we’ll call them on their Victor frequency,” Smith said.

Communication with ground units, including LAFD dispatch, takes place on 800 MHz “tactical” frequencies, “what we call Tac 9, Tac 12, Tac 17, whatever tactics frequency we’re on,” he said.

Other agencies use 400 MHz or 500 MHz tactical frequencies, Smith said, adding that the programmable Wulfsberg radio in each helicopter starts at 118 MHz, the bottom of the aviation spectrum, and runs through 800 MHz, “so you can dial in ATIS on 118.45” and communicate with all the tactical units on the ground. In addition, LAFD helicopters have FLIR and a video system that downlinks standard and high-definition images.

Communication is critical to any emergency response, but seeing it in real-time removes another element of surprise. Whether it’s a fire or “something big, like an earthquake, (the video feed) gives the command post a real-time view of what’s going on,” Smith said, which enables a better response than might be possible by “listening on a radio and trying to piece things together on a map.” □