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U.S.

High-Tech Planes, Supercomputers and Helitankers Help Fight Wildfires

California fire crews abandon hand-drawn maps for up-to-date information on phones to track and extinguish blazes faster

By Erin Ailworth / Photographs by Stuart W. Palley for The Wall Street Journal

Dec. 7, 2019 5:30 am ET

LOS PADRES NATIONAL FOREST, Calif.—Smoke from the Cave Fire billowed over Santa Barbara as Steve Gazdik sat in an infrared- and radar-equipped airplane flying above the 3,000-acre blaze.

With the help of a camera on the plane's nose, Mr. Gazdik zoomed in on the fire on his laptop computer, looking for still-burning embers via infrared. He then charted the fire's edges, matching them to geographic features via Google Earth and transmitting the resulting information to decision makers on the ground.

"It's a geek's delight, airborne," said Mark Zaller, chief technology officer for Courtney Aviation, which operates the plane. The aircraft is part of a multicounty program in Southern California backed by \$4.5 million in state funds that is putting state-of-the-art technology to work fighting increasingly dangerous wildfires.

The three-month-old program marks a big change for firefighting agencies whose tactics have traditionally been low-tech. They hope the new capabilities will help them rein in damage during California's lengthening fire season by sending personnel to the right locations faster to control or extinguish a blaze.

"It gives us, as decision makers, an opportunity to take the limited number of resources that are coming in and focus them," said Brian Fennessy, chief of the Orange County Fire Authority.

The program, along with a wet winter and some favorable winds, has played a role in a fairly mild 2019 fire season. None of the more than 5,600 wildfires logged by Cal Fire, the state fire-protection agency, has caused mass casualties or damage like last year's Camp Fire, which destroyed the town of Paradise and killed 85 people.



The Cave Fire raged near Santa Barbara on Nov. 25 in the Los Padres National Forest and Painted Cave areas.

Once the plane is airborne over a blaze, the technologies typically allow firefighters to create a complete map within several minutes.

Previously the process took an entire day, as fire crews drew maps by hand or compiled information from GPS devices they carried.



Gus Johnson examines an image of the Getty Fire burn scar in Los Angeles during a demonstration of the Orange County Fire Authority's infrared sensor and imagery system.

The push to adopt such technologies took off in 2015, when Los Angeles Fire Department Chief Ralph Terrazas was perusing Southwest Airlines' in-flight magazine and read about a supercomputer that could predict the path of a wildfire.

Eager to find out if it could help his department, Chief Terrazas visited the San Diego Supercomputer Center, part of the University of California, San Diego, where thousands of computer processors stand in rows of black racks.

He met Ilkay Altintas, head of the WIFIRE Lab, where the supercomputer he read about combines real-time weather data, topography and information about the dryness of brush to

model, within minutes, how a wildfire might spread and at what speed.

Dr. Altintas needed funding so she could collect more data for her lab's fire model. Chief Terrazas promised his department could provide data in exchange for near-real-time maps his firefighters could use to figure out where blazes are headed.

Today, LAFD and other agencies routinely call on the supercomputer center to work in conjunction with the mapping plane. The plane, operated by Courtney Aviation, is part of a program backed by the state funding.



Red fire retardant lined the hills around the burn scar of the Getty Fire in Los Angeles last month.

The effort often comes together at the Southern California Wildfire Fusion Center, a sort of war room housed in a downtown Los Angeles fire station, where TVs are tuned to the Weather Channel and local newscasts.

There, personnel can tap the supercomputer for a model that projects how a fire would spread in 30-minute increments. That model can later be combined with the perimeter map drawn by the mapping plane to become more precise. The information is delivered to firefighters via cellphones.

SHARE YOUR THOUGHTS

How confident are you in this technology to help control wildfires? Why? Join the conversation below.

LAFD Capt. Tim Werle said the new system was particularly helpful during October's 8,799-acre Saddle Ridge Fire in the San Fernando Valley.

"We were running our models, and they were pretty spot-on," he said. The information helped determine where to deploy fire crews and helped local leaders devise evacuation plans.

A separate program funded by Southern California Edison has beefed up the Orange County Fire Authority's ability to fight blazes from the air at night using a "helitanker." The device,

operated by Coulson Aviation USA, can carry 1,000 gallons of water, or roughly three times the capacity of a typical water-dropping helicopter, and refill without landing.

On a recent evening, pilot Toni Lindschinger boarded a reconnaissance helicopter that accompanies the helitanker. He donned military-grade night-vision goggles that give him and his team the ability to fly after dark and hover safely over large bodies of water during a refill.



Toni Lindschinger fastened his seatbelt before a nighttime training flight over Orange County last month.

The night-vision goggles turned the blackened landscape shades of green, allowing a view of individual trees and bushes on the hillsides, as well as waves on a lake as the helitanker

dipped close to the shoreline and used an orange snorkel pump to fill its tank in less than a minute.

Being able to hover over any body of water means the team doesn't have to land and wait for a refill, giving it extra time at night, when winds typically die down and temperatures ease—an ideal time to try to get a handle on a blaze.

Joel Lane, a contracted aerial supervisor working for the Orange County Fire Authority, pointed to a small brush fire in the Santiago Canyon area of Orange County, which was knocked out in a few hours with the help of the helitanker and other aircraft.

If those aircraft plus additional air resources had been called in for a second day—by which time the fire could have grown—he estimates they would have cost upward of \$300,000.

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The hangar at Fullerton Municipal Airport used by Coulson Aviation. It is under contract for a nighttime helicopter water-dropping program.

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