

Unmanned aircraft is latest firefighting tool

NASA teams up with CAL FIRE, USFS

By Daniel Berlant, communications specialist, Communications, Sacramento Headquarters

In late October the devastating Esperanza Fire in Riverside County destroyed 34 homes, burned more than 40,000 acres and took the lives of five firefighters from the United State Forest Service (USFS).

Unnoticed by many who were fighting the fire on the ground was a significant piece of new fire technology, the Altair Unmanned Aircraft System (UAS).

Built and operated by General Atomics Aeronautical Systems of San Diego, the Altair Unmanned Aircraft System is a high-altitude aircraft that is controlled on the ground and generally used for scientific and commercial research missions.

The Altair is the same type of aircraft as the more-famous Predator B, an unmanned aircraft used by the United States Air Force for surveillance and reconnaissance.

Operating at an altitude of 43,000 feet, the aircraft soared over the Esperanza fire during a 16-hour period delivering real-time thermal infrared data to incident commanders via a satellite communications link.

Featuring an 86-foot wingspan and 3,000-pound fuel capacity, Altair can fly above 52,000 feet and remain airborne for more than 30 hours. The aircraft is configured with a fault-tolerant dual-architecture flight control system, triple-redundant avionics and a Honeywell turboprop engine for high reliability.

According to NASA, an Airborne Science & Technology Lab sen-

sor on the Altair provided useful imagery on the Esperanza Fire. The rapid-response fire mapping mission was conducted using the Autonomous Modular Sensor (AMS) on the Altair on October 28-29, 2006.



Airborne Science & Technology Lab staff mobilized October 27

to upload the sensor system and the aircraft was flown the following day. Numerous infrared images were collected, processed aboard the aircraft, and broadcast in near real-time via satellite for dissemination to the fire community.

Just as the military aircraft is able to fly undetected at high altitudes, the Altair was able to fly above and out of the path of air-tankers and helicopters battling the fire below. Another advantage is that the Altair can fly at night while other firefighting aircraft are grounded.

Some 100 visible and infrared images were generated along

with more than 20 data files that included the fire's perimeter. The Incident Command Team on the Esperanza Fire used the thermal imagery and derived products to study the fire overnight. Most importantly, they used the tech-

nology to help prepare maps to assist in the planning efforts for the Incident

A high-tech infrared imaging sensor in its underbelly pod, the Altair unmanned aircraft flew repeated passes over the Esperanza fire to aid firefighting efforts. Photo courtesy of General Atomics Aeronautical Systems.

Action Plan which was distributed the next day at the team's morning briefing.

"As a fire department and especially a wildland one, we're going to look at the technology that's out there," said CAL FIRE/Riverside County Fire Captain Julie Hutchinson. "The sooner we get information to the ground forces and fire managers, that makes a difference. That's a huge thing for us."

Being able to help firefighters on the ground better understand both the movement and location of the fire is an important result from this new tool.

The window of opportunity to

support fire mapping efforts for the Esperanza Fire came only days after the aircraft's manufacturers -- along with NASA and the USFS -- had completed the Western States Fire Mission.

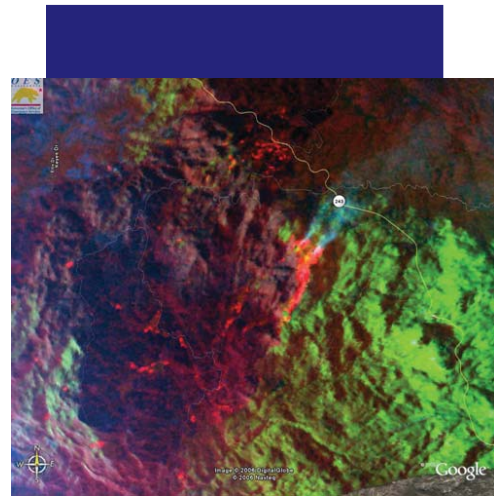
The mission was designed to evaluate the use of an Unmanned Aircraft System with advanced imaging systems and to help improve fire mapping capabilities as well as information on fire-related atmospheric changes. Carrying a payload of instruments for imaging wildfire conditions and measuring trace gases from biomass burning, the Altair UAS operated over the Mojave Desert and Yosemite National Park in California during the course of the Western States Fire Mission. This resulted in the setting of several new records for Altair, including an endurance of 23 hours and altitude of 48,000 feet with scientific instruments on board.

Altair, a high-altitude version

of Predator B, was designed specifically for scientific and commercial research missions that require high-altitude endurance, reliability and increased payload capacity.

It was built in partnership with NASA's Dryden Flight Research Center for its Environmental Research Aircraft and Sensor Technology (ERAST) program. The aircraft has logged nearly 500 flight hours since it began service in 2003 and is currently operational with NASA, National Oceanic & Atmospheric Administration (NOAA) and the USFS.

The flight project was sponsored and funded by NASA's Science Mission Directorate. The team consisted of specialists from NASA's Ames Research Center, NASA's Dryden Flight Research Center, the National Interagency Fire Center, USFS Remote Sensing Laboratory, California Governor's Office of Emergency



Images taken by the Altair over the Esperanza Fire. NASA Ames Earth Science image.

Services, and General Atomics Aeronautical Systems Inc.

With the everyday advancement of technology, the California Department of Forestry and Fire Protection is continually exploring opportunities to partner with federal agencies to develop cutting edge firefighting technology.

CAL FIRE Lifeguards?



Photos courtesy of CAL FIRE / Pismo Beach Fire

Did you know CAL FIRE / Pismo Beach Fire Department in San Luis Obispo County hires approximately 25 seasonal lifeguards and operates a junior lifeguard program. Another example of CAL FIRE providing a variety of services to protect California.

