Cobra Attack Helicopters Retooled To Fight Fire

Stan Kubota

The wildland fire community has a brand new, high-tech work mate.

It's an innovative, specially designed helicopter that boasts everything from sophisticated lasers to real-time video and state-of-the-art remote sensing programs.

Called "Firewatch," two of these former U.S. Army Bell 209 AH-1 Cobra attack helicopters have been equipped for experimental use on fires in the Pacific Southwest Region. All of the helicopter's weapons systems have been removed and it has been rebuilt and rewired to support wildland fire incident management with:

- The ability to provide critical real-time video to fire managers on the ground;
- Powerful, high-resolution color cameras—capable of reading a license plate at more than half a mile;
- Specialized low-light cameras;
- Sophisticated lasers that, during flight, have georeferencing capability to points on the ground. The turret can hold the sensors on a specific geographic location and presents the location coordinates at the top of the video screen; and
- Special infrared capability that can see through smoke.

"The technology is amazing," said former Forest Service Chief Dale Bosworth, who watched a demonstration of Firewatch's capabilities last summer. Photo: courtesy Dan Megna.

Two of these former Army Cobra attack helicopters have been equipped for experimental use on fires in the Pacific Southwest Region.

"The technology is amazing," said former Forest Service Chief Dale Bosworth, who watched a demonstration of Firewatch's capabilities last summer. "I wish we would have had this when I was fighting fires. The big deal is the real-time information. Most of the time, you get somebody describing to you what's out there. But the only way you can see what's going on—especially with the smoke—is with something like this."

Bottom line: these enhanced capabilities are also simultaneously providing more cost-effective decision-making on wildland fire incidents.

Assist ATGS

These Firewatch helicopter systems assist the air tactical group supervisor (ATGS) in directing aircraft

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(Editor's Note: Many actual product names are noted in this article. As always, the use of trade, firm, or corporation names in Fire Management Today *is for the information and convenience of the reader. Such use does not constitute an official endorsement of any product or service by the U.S. Department of Agriculture. Individual authors are responsible for the technical accuracy of the material presented in* Fire Management Today.*)*

over an incident as they gather and transmit real-time information to enhance operational efficiency and tactical decisionmaking for incident management.

This multifunctional platform (aircraft) is equipped with six aviation-rated radios (3 VHF FM and 3 VHF AM) that help support the ATGS mission of aerial supervision over incidents.

To enhance ATGS and pilot visibility, the Firewatch ship's cockpit windows have been "bubbled out" (see photo). The ATGS sits in the front seat with both horizontal—and vertical—views.

This Firewatch-transformed Cobra helicopter also provides enhanced performance due to the removal of about 1,000 lbs of weaponry and capstan wiring. Thus, because of its unique windows—not to mention video capabilities—and agility and maneuverability, this new helicopter platform is extremely proficient for the detailed viewing of fires.

A forward looking infrared (FLIR) Systems Star Safire 3 turret serves as the heart of this helicopter's remote sensing equipment. (This special infrared capability allows the image of a fire's perimeter to be viewed regardless of smoke.) This exceptional system includes:

- Infrared sensors,
- Sony digital low-light color camera,
- Georeferencing laser range finder,
- Long range spotter scope,
- Laser illuminator, and
- A geographically referencing inertial navigation system. (This system allows the turret to know its location in space at all times. It also instantly adjusts for the aircraft's pitch rolls and yaws—ensuring that the georeferencing laser always maintains split-second accuracy.)

Instant Referencing

Infrared sensors on the FLIR turret allow the system operator to see heat images as video displayed on the 15-inch (38-cm) monitor in the front seat. The pilot has a 9-inch (23-cm) display in the rear seat. To enhance pilot situational awareness over fires, a Max-Viz 3–5 micron wavelength sensor is also mounted above the pilot.

> This helicopter's enhanced capabilities provide more cost-effective decisionmaking on wildland fire incidents.

An Avalex moving map system allows the ATGS instant referencing to identify aircraft location. At the same time, other aviation traffic can be displayed on the map or GPS through information being fed through a Ryan Traffic Collision Avoidance Display (TCAD). The Avalex map system is capable of producing ESRI (geographic information system [GIS] and mapping software company) files by recording the aircraft flight path, or by tracing a perimeter with the FLIR Systems turret.

> Infrared sensors on the turret allow the system operator to see heat images as video displayed on the front seat monitor, regardless of smoke or haze.

Map files are delivered from this helicopter to GIS personnel at the incident base—by removable drive—for incident action plan maps and geographic area command center intelligence. The pilot has a Garmin 530 GPS as a flight planning and navigation system.

A specially equipped data recovery van/vehicle is the disseminator and projector of the aircraft's information. Video and cockpit audio can be transmitted to an incident base camp via a broadcast microwave downlink system. The transmission range to the data van is—line-of-sight—up to 25 miles (40 km).

A portable microwave receiver—with a 3-mile (5-km) range—is also carried on board the helicopter for delivery to people on the fireline. An Avalex DVD recorder can be used to record the FLIR images and cockpit audio. The DVD can then be delivered to the incident for analysis.

This helicopter's ability to operate locally and land in remote areas near an incident also provides the opportunity for aerial supervisors to meet directly with incident staff. Eye-to-eye discussion and delivery of intelligence can be an invaluable strategic asset.

More Cost Savings

One Bell Model 209 Cobra Firewatch helicopter gives the services normally provided to incidents by two or more aircraft—for the cost of one. Normally, an aerial supervisory aircraft is ordered for

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an incident and then more aircraft are ordered to provide remote sensing information—aircraft equipped with infrared sensor and mapping capability.

Even though intelligence gathering missions do not normally require the commitment of an aircraft for a full day, often times, full day costs are nonetheless incurred. Firewatch is staffed and operated by a fully qualified ATGS who can provide aerial supervisory relief coverage between intelligence gathering missions—consequently reducing the requirement for a relief ATGS.

Smoke inversion can limit fixed-wing aircraft operations on wildland fire while helicopter operations usually continue. Firewatch can further reduce incident costs by also fulfilling helicopter coordinator duties—with no aircraft availability costs charged to the incident. (Operational cost of the Firewatch aircraft to the incident is $1,350 per flight hour.)

The Cobra helicopter is also equipped with a factory "environmental control unit" for crew comfort and temperature regulation. The aircraft's typical fuel cycle flight time is 3 hours.

Maintenance, pilot, fuel support and data van operation services are primarily provided by Dallas, TX-based DynCorp International L.L.C.

After former Forest Service Chief Boswell viewed Firewatch's demonstration, he said he could envision other potential uses for this helicopter, including search and rescue operations, work on other disasters, and homeland security. ■

This former U.S. Army Bell 209 AH-1 helicopter—now known as "Firewatch"—has been specially equipped for experimental use on Pacific Southwest Region fires. This ship boasts everything from sophisticated lasers to real-time video and state-of-the-art remote sensing programs. Photo: courtesy Dan Megna.