

A Firewatch Cobra Helicopter is shown on a tarmac at sunset. The helicopter is white with orange and black accents. The background is a hazy, orange-tinted sky over a landscape with mountains in the distance.

Mapping Wildland Fire with the US Forest Service Firewatch Cobra Helicopter

ESRI International Users Conference

GIS in Wildland Fire Management

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www.firewatchcobra.com

Demo Video

The Program

- Operated by the Forest Service
- Originally an experimental program, now an invaluable resource to fires of all magnitudes
- A national resource
- Two crews
 - Redding, California
 - Boise, Idaho
- Each four person crew works together for the entire fire season
 - DynCorp International provides a pilot, mechanic, and GIS technician under a service contract with the USDA.
 - ATGS (Air Tactical Group Supervisor) provided by the Forest Service



The Helicopter

- Former US Army Bell AH-1 helicopters
- Enhanced performance due to the removal of about 1,000 pounds of weaponry and capstan wiring
- Custom bubble windows increase visibility



Aircraft Data Collection

- Avalex AMS 7102
Digital Map System
- FLIR Star Safire 3
Multiple Gimbal
mounted EO/IR
System payloads



FLIR Systems

- Forward Looking Infrared
- Infrared sensors
- Sony® digital low-light color camera
- Georeferencing laser range finder, used to lock onto a point on the ground while the coordinates are displayed on the monitor to later create point shapefiles
- Long range spotter scope
- Laser illuminator
- Geographically referencing internal navigation system

FLIR Still Images





- **Avalex AMS 7102 Mapping Systems**
- **Georeferenced moving map**
- **Works in conjunction with FLIR System**
- **Front seat : 15" display monitor**
- **Pilot : 9" display monitor**
- **Can also display aviation traffic**
- **Creates ArcMap shapefiles with flight following, with mouse click created maps, or with the FLIR camera**

Ground Data Retrieval

- Data Van
- Specially outfitted Dodge® Sprinter
- BMS® microwave antenna can receive signal up to 25 miles, line of sight
- Suitcase with a handheld antenna can receive signal up to 3 miles, line of sight
- Doubles as a mobile office for GIS and video needs



GIS Technician

Products offered:

- Shapefiles for perimeter maps
- Point files
- JPG's of maps
- Still images produced by FLIR ball
- Video collected with FLIR ball and Avalex mapping system

GIS Technician

Projection

- Firewatch Cobra collects data in WGS 84
 - Each fire team selects a projection
 - USFS Fires : NAD 27 or NAD 83 UTM Zones
 - CalFire (formerly California Department of Forestry) Fires: NAD 27 or NAD 83 Teale Albers

GIS Technician

Correction

- “Hot Dogs” or “Bow Ties”
- Limited Visibility
- Restriction of movement

GIS Technician

Manipulation

- X Tools Pro
 - Convert Polylines to Polygons
 - Allows two perimeters collected to be merged into one

GIS Technician

Calculations

X Tools Pro

- Acreage
- Perimeter Distance
- Growth : Real and Projected

GIS Technician

JPG Presentation

- Color Map Utility
- Adding USGS 7.5 minute Quads
- NAIP images
- Basic map elements
- Time, Date, Fire, Contact Information

Fire Team

- Provide shapefiles for fire maps

GIS Technician



Delivery

Work with each fire's assigned GIS team

- Email - Primary
- Hand Deliver
- Website

Changes over the years



- With the addition of skilled GIS Technicians, the program gained:
 - More product to offer the incident
 - Greater use of ArcMap functions

Video and Website

- Avalex video can be modified prior to delivery
- Website allows for remote uploading of video, shapefiles, finished maps, and still images from the FLIR by anyone on either crew



Conclusion