

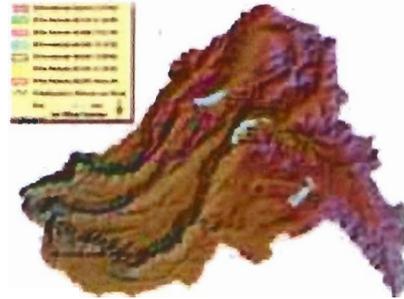


Star Fire

How Do We Make Those Maps

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Almost every evening, as part of the fire suppression effort, the **Star Fire** Incident Team requests an Infrared Scanner flight over the fire.

The mission of the US Forest Service Infrared Mapping Section is to provide accurate high-quality infrared imagery to an incident in a timely manner. Through the years this has become quite a task. As technology advances, so do infrared mapping requirements. The [National Infrared Operations Unit](#), with the assistance of the U.S. Forest Service's [Remote Sensing Applications Center](#) in Salt Lake City, Utah, are tasked to stay "up-to-date" on emerging infrared technologies and their applications for wildfire suppression and study.

The **Star Fire** Incident team is getting data collected from a [Daedalus ABS3500 System](#) (Aerial BiSpectral System). One of the aerial platforms flying this fire is a King Air B200, N107Z.



N107Z

Photo courtesy of
www.nifc.gov/hotsheet/Infrared.htm

The output is a continuous strip image from a TDU 850 Thermal Paper printer that has edge marks to locate fire in that particular

scan line and a GPS readout along the edge.



Infrared Image of Star Fire
Black spots are active fire areas, just above French Meadows Reservoir.

Total Field of View: 86° degrees
Ground Coverage: 3.5 Statue Miles at 10,000 Ft AGL
Detectability: 8" »300° Hot Spot @ 14,000 Ft AGL
Fire Location Method: Fire Pixel Enhancement
Aerial Platform: King Air B200, Citation Jet Lear 35/36

The two aerial platforms, N107Z or N80PG, are flying over the **Star Fire** after the sun sets and then landing in Lincoln, north east of Sacramento, California. A Forest Service driver is waiting and the Infrared Technicians **Tom Gough** or **Woody Smith** hand off the imagery. It is then driven to the Eldorado National Forest Supervisor's Office in Placerville, California.

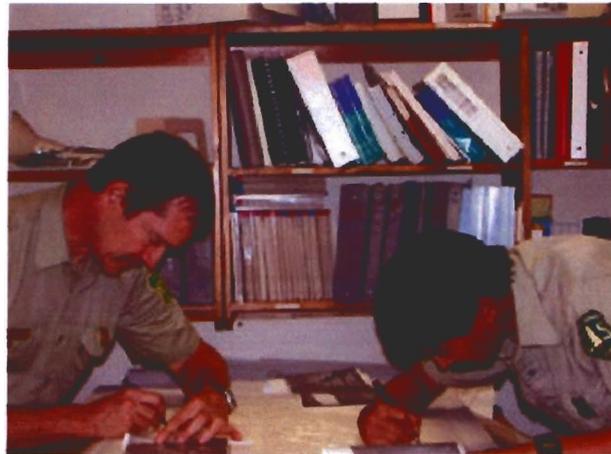


Woody Smith handing off the September 10, 2001 infrared imagery to Dave Boyer. N107Z landed at the Placerville California airport.

The imagery is delivered to **Dave Boyer**, Recreation Officer, and **Don Yasuda**, Wildlife Biologist, both of the Pacific Ranger District of the Eldorado National Forest. Dave and Don are assigned to the **Star Fire** as Infrared Interpreters.

Prior to beginning the interpretation, plots were made of Digital Ortho Quadrangles (DOQ) at 1:24000, with contours and landmark features on top. A large piece of stable-base mylar is laid down on top of the DOQ plot and registered to known locations, such as the Quadrangle boundary and section corners.

Then, using magnifying glasses and experience, the guys begin the interpretation of the Infrared imagery. Their job is to map the active fire perimeter and look for any spotting of the fire outside the perimeter.



**Dave Boyer and Don Yasuda
Interpreting the Infrared Scans of the
Star Fire**

Photo by Susan Rodman

Using landmarks such as roads and water, Dave and Don are able to figure out where the active fire perimeter is located, in relation to these features. As they figure out the perimeter they draft a line in pencil onto the mylar. The average time for interpretation has been from 30 minutes to 2 hours.

After the interpretation is complete the mylar is handed off to **Debra Tatman**, Geographic Information Systems (GIS) Coordinator of the Eldorado National Forest. Debra attaches the mylar to a backlit Altek AC31 Digitizer. Using [Environmental Systems Research Institute, Inc.'s](#) (ESRI) ArcInfo v7.21. GIS software for UNIX, the mylar is registered to the digitizing tablet based on the Forest's existing real-world coordinate tic data.

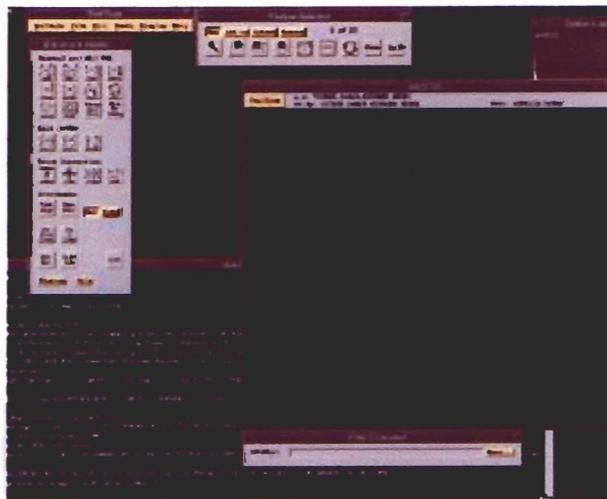
Digitizing converts the fire perimeter data on the mylar into a digital format. This is accomplished by manually tracing all the fire perimeter lines on the mylar.



Debra Tatman digitizing the **Star Fire
Infrared fire perimeter**

Photo by Susan Rodman

The new digital fire perimeter is reviewed and then acres are calculated.



**ESRI's ArcInfo software showing the
Star Fire Infrared Perimeter**

Using ESRI's ArcView 3.2 GIS Software for Window's, Dave and Don use the new perimeter data to map out the spot fires and heat sources. The most important tool, a magnifying glass.

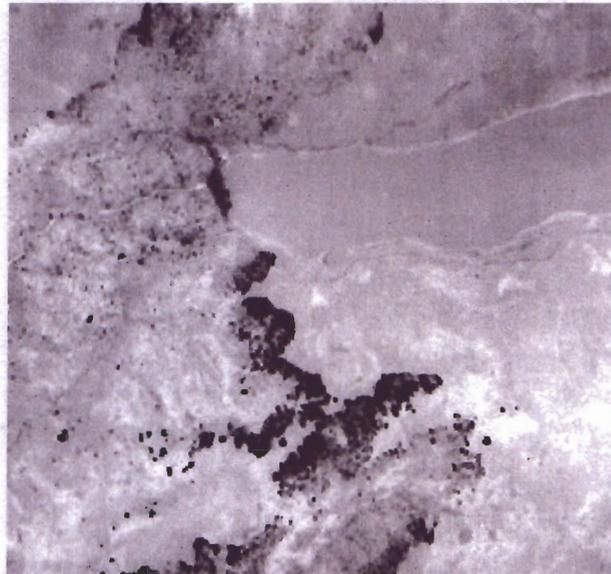


Dave and Don mapping spot fires using GIS. The most important tool is the magnifying glass.

Photo by Susan Rodman



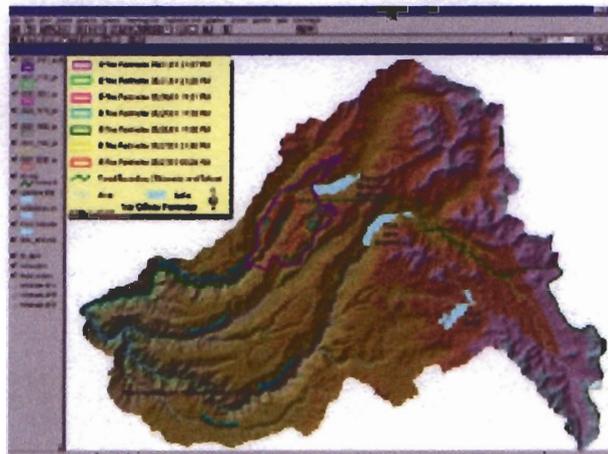
Infrared Scan of **Star Fire, August 28, 2001. Intense fire activity just to the north west of French Meadows Reservoir.**



Infrared Scan of **Star Fire, August 30, 2001. The fire is still burning just south of French Meadows Reservoir.**

Once all the interpretation, mapping, and data capture are complete, Deb electronically transfers the data to the GIS mapping unit at the Incident Command Post.

After the transfer is complete, Deb uses the data in ESRI's ArcView 3.2 for Windows. Using ESRI's Spatial Analyst, a color shaded relief map was created using 10M resolution Digital Elevation Model (DEM) data. The latest Infrared perimeter is dropped on top and a screen capture is taken.



ESRI's ArcView 3.2 Software with Spatial Analyst Extension - creating a color shaded relief map.

Several maps are created and Deb posts them daily (almost) to the **Star Fire's** Official Web Page.



Deb is posting the maps to the internet. The most important tool is the pink post-its, to keep track of fast moving information.

Photo by Dave Boyer

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