## Airborne Fire Mapping Dr. Philip J. Riggan: 951 203 7519

# USDA Forest Service Pacific Southwest Research Station

163

# www.fireimaging.com

805



## The PSW FireMapper: A resource for forest and fire imaging

Fire spread and intensity
Aerial retardant application and effectiveness
Postfire resource assessment
Mapping forest mortality and fuels

163

# www.fireimaging.com

805



Cedar Fire, San Diego County, California, midday, 26 October 2003 As viewed by the PSW FireMapper thermal-imaging radiometer



#### Cedar Fire, San Diego County, California, 26 October 2003 As viewed by the PSW FireMapper thermal-imaging radiometer



#### Cedar Fire, San Diego County, California, 26 October 2003 As viewed by the PSW FireMapper thermal-imaging radiometer



Ground-surface temperatures at 11:34 am (pass 2).

#### Esperanza Fire, Riverside County, California, 26 October 2006 As viewed by the PSW FireMapper thermal-imaging radiometer



Color-coded ground-surface temperatures as viewed from the northwest along four flight lines between 11:17 and 11:43 PST. Fire was actively spreading to the southwest under Santa Ana winds. Note the broken appearance of the head of the fire at lower right where it encountered young vegetation. FireMapper is now deployed for active-fire mapping aboard Forest Service aircraft N127Z and may be ordered through the Southern Operations Coordination Center.

Esperanza Fire, Riverside County, California, 26 October 2006 As viewed by the PSW FireMapper thermal-imaging radiometer with winds simulated by the NCAR Coupled Atmosphere Wildland Fire Environment model



Color-coded ground-surface temperatures as viewed from the south along four flight lines between 11:17 and 11:43 PST. Fire was actively spreading to the southwest under Santa Ana winds. Simulated winds show the typical high speeds and easterly flow associated with Santa Ana events in Banning Pass. The fire was apparently affected by high-velocity winds and turbulence associated with the southern edge of the main flow.



#### 600 C 📄 400 C 📄 200 C 📄 75 C 📄 74 C 🗐 0 C 📟

## 2006 Esperanza Fire, Riverside County, California

As viewed by the Forest Service FireMapper (top) and NASA Moderate Resolution Imaging Spectrometer (bottom).







Esperanza Fire, Riverside County, California, 28 October 2006 As viewed by the PSW FireMapper system . Color-composite imagery in red, near-IR, & thermal-IR light (mapped to red, green, & blue) provides *high-resolution mapping for postfire assessments*.



Esperanza Fire, Riverside County, California, 28 October 2006 As viewed by the PSW FireMapper system. *Analysis of unburned vegetation.* 



Esperanza Fire, Riverside County, California, 28 October 2006 As viewed by the PSW FireMapper system. *Analysis of dark, sun-warmed ash.* 



Esperanza Fire, Riverside County, California, 28 October 2006 As viewed by the PSW FireMapper system. *Analysis of ash from low-intensity burning and low mass fuels.* 



## The FireMapper thermal-imaging radiometer





•An advanced-technology, multi-channel infrared imaging system designed specifically for fire monitoring.

•Deployed by PSW aboard Forest Service aircraft N127Z.

•N127Z is a shared resource of PSW and FHP with support from R5 and R2.

•Data will be transmitted by satellite communications and posted in near-real time.

Images are interpreted, geo-referenced to a map base, and posted to the Internet at <u>WWW.fireimaging.com</u>.

#### USDA FOREST SERVICE

#### **Pacific Southwest Research Station**

Fire Science: Wildfire Monitoring and Prediction

#### Fire Imaging

Freeway Fire, Orange County, CA, 15 November 2008, 14:12 to 14:45 PST



Downloads and links: Shapefile Google Maps Google Earth GeoTiff .jpg .kml Concurrent weather Southern California vegetation age

33.90



PSW Research Station 800 Buchanan St. West Annex Bldg. Albany, CA 94710-0011 510 559 6300 Surface temperatures as estimated from radiance measured at 8-12 micrometers wavelength in the thermal infrared by the PSW FireMapper imaging system. A color scale is shown at lower right. Warmer tones (red, orange, yellow) represent recent and active combustion; areas of light gray if shown are cooling ash or warm bare ground; low temperatures of unburned vegetation and cool ground are shown in darker gray. Large reaches of higher temperature are typically associated with heavy fuel loading.



#### Archive Imagery Fire mapping

Resource mapping California Mexico Yellowstone NP

More about fire imaging Instrument specifications For further information



000	http://fireimaging.com/fires/2008/california/free	eway/320/Grid.html	
< >	+ 🛃 http://fireimaging.com/fires/2008/california/freeway/320/Grid.html	C Qr Google	
http://firei	imaging.com/fires/200		÷
Fire Imaging	- Emanual Fire Orange County CA		

Fire Imaging: Freeway Fire, Orange County, CA

Ground surface temperatures as viewed from above at 8-12 micrometers wavelength (in the thermal infrared) on 15 November 2008, between 14:12 and 14:45 PST.

Map projection is UTM NAD83.

Cursor position shown in Longitude & Latitude; click to save cursor coordinates in text box





Corral Fire, Los Angeles County, California,10:35, 24 November 2007 As viewed by the PSW FireMapper® thermal-imaging radiometer





Shapefile when added into ArcMap.



Shapefile in ArcMap, after following simple instructions to import symbology.



Shapefile in ArcMap, after following simple instructions to import symbology, on topo.



2008 Freeway Fire: Fire and retardant viewed by the PSW FireMapper 2.0 14:02:00 15 November 2008



2008 Freeway Fire: Fire and retardant viewed by the PSW FireMapper 2.0 14:02 15 November 2008



2008 Freeway Fire: Fire and retardant viewed by the PSW FireMapper 2.0 14:32:00 15 November 2008



### 2002 Troy Fire Pass 3: 13:30:04



### 2002 Troy Fire Pass 12: 14:05:59



2002 Troy Fire Pass 18: 14:25:11



### 2002 Troy Fire Pass 21: 14:39:10



### 2002 Troy Fire Pass 26: 14:52:45

## **USDA Forest Service**

N127Z

163

www.fireimaging.com 951 203 7519

805



52