

# *WIFIRE/UCSD GIS Effort*

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# Fire is Part of the Natural Ecology

... but requires Monitoring, Prediction and Resilience

- Wildfires are critical for ecology, but volatile
- Fuel load is high due to fire suppression over the last century
- Changes in rainfall, wind, seasons, and thus wildfires, potentially induced by climate change
- Better prevention, prediction and maintenance of wildfires is needed



Disaster management of (ongoing) wildfires heavily  
*relies on understanding*  
their **Direction** and **Rate of Spread (RoS)**.

WIFIRE is funded  
by NSF 1331615



What is lacking in disaster management today is...

a **dynamic system integration** of real-time sensor networks, satellite imagery, near-real time data management tools, wildfire simulation tools, and connectivity to emergency command centers

.... before, during and after a firestorm.



WIFIRE is funded  
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# A Scalable Data-Driven Monitoring, Dynamic Prediction and Resilience Cyberinfrastructure for Wildfires

(WIFIRE)

[wifire.ucsd.edu](http://wifire.ucsd.edu)

Development of:

“cyberinfrastructure” for  
“analysis of large  
dimensional  
heterogeneous real-time  
sensed data” for fire  
resilience *before, during*  
and *after* a wildfire

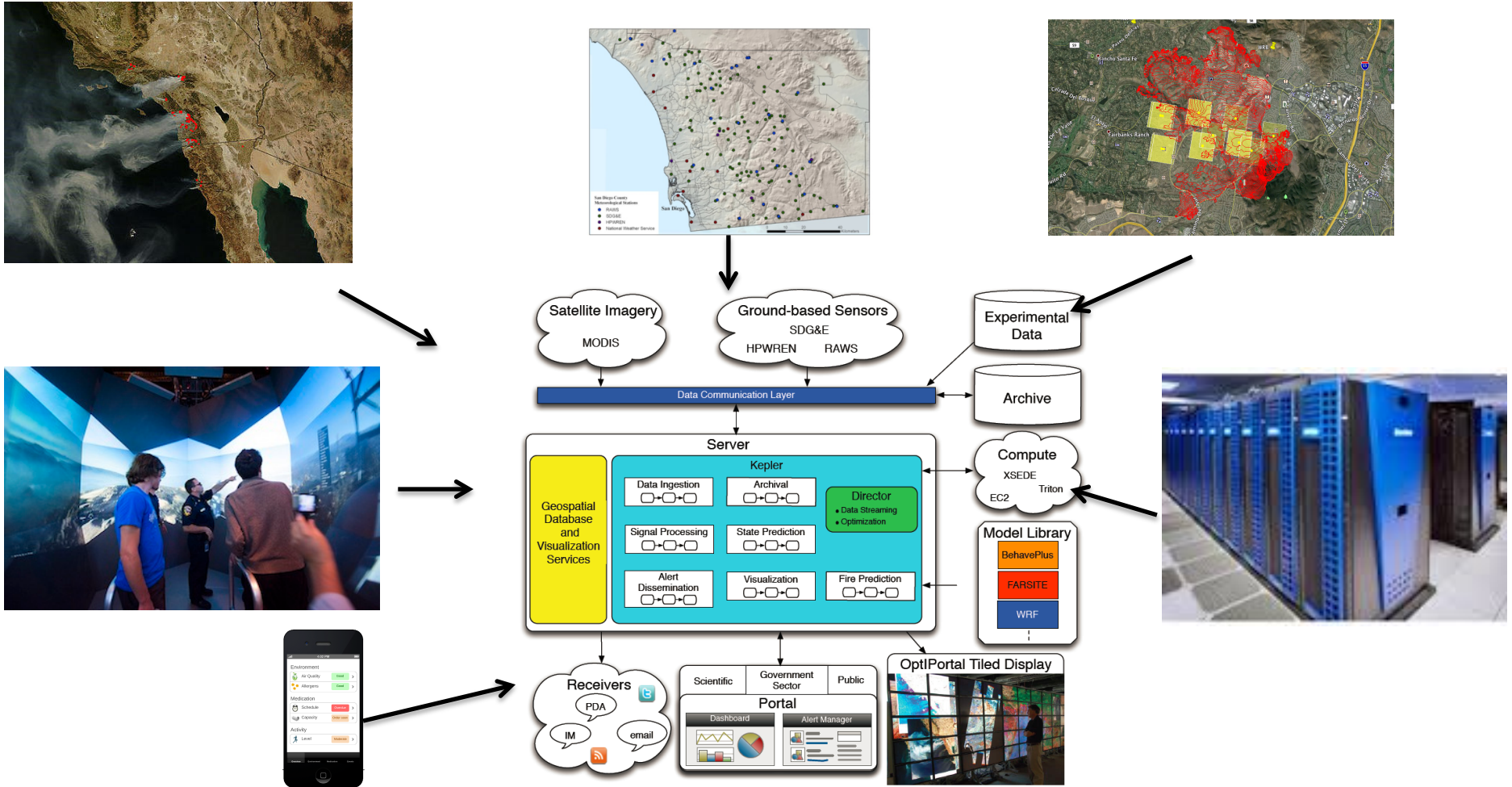


The screenshot shows the PBS NewsHour website. At the top, there are navigation links for PBS, WETA, PBS.org, Video, Programs, TV Schedules, Shop, and Donate. Below this is a menu with categories like RECENT PROGRAMS, POLITICS, ARTS, NATION, WORLD, ECONOMY, EDUCATION, TEACHERS, and THE RUNDOWN. The main content area features the PBS NewsHour logo and a science segment titled "SCIENCE" by Miles O'Brien. The segment is about firefighters using high-tech equipment to fight wildfires, with a video thumbnail showing firefighters in a control room looking at a large screen displaying a map of a wildfire.

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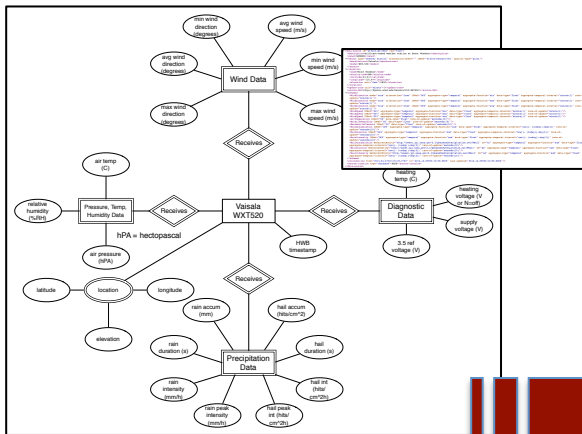


# WIFIRE: A Scalable Data-Driven Monitoring, Dynamic Prediction and Resilience Cyberinfrastructure for Wildfires



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The WIFIRE data-model federates data from multiple heterogeneous sources to providing detailed fire-related information.

Data



Monitoring  
Visualization  
Fire Modeling

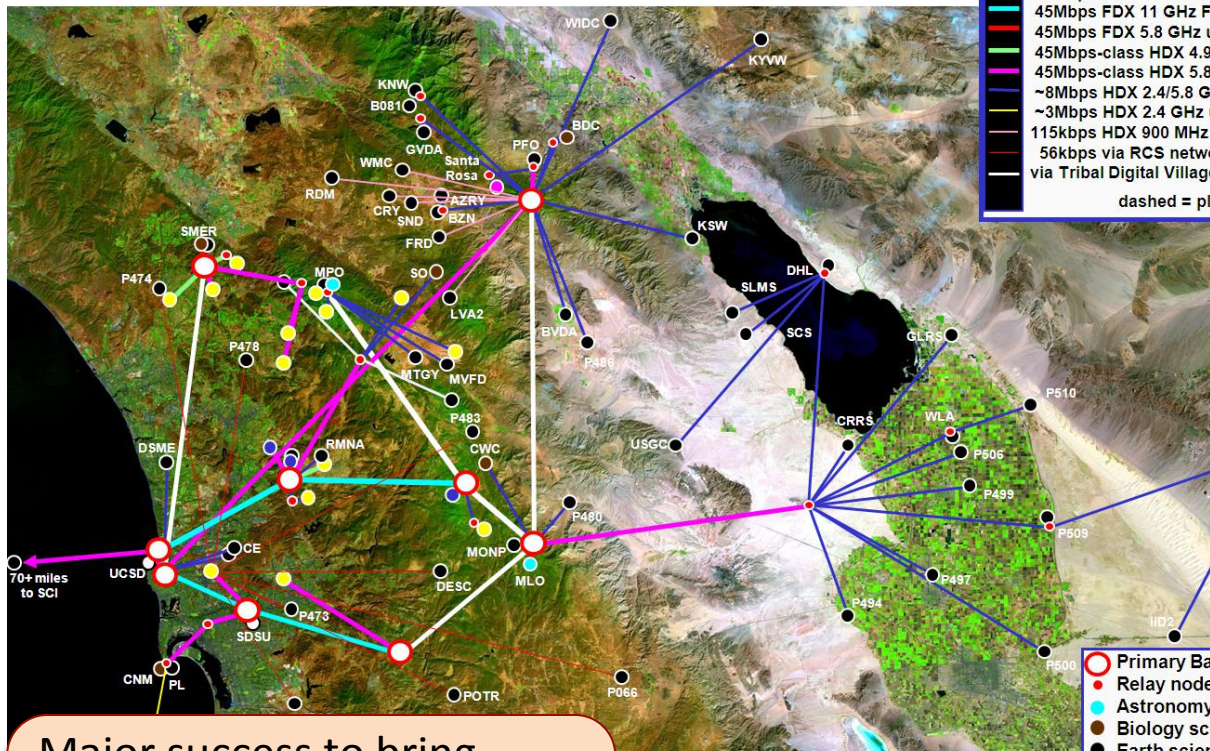
IDI supported the currently operational **florian** server hosted at SDSC to enable programmable access to the data catalog.

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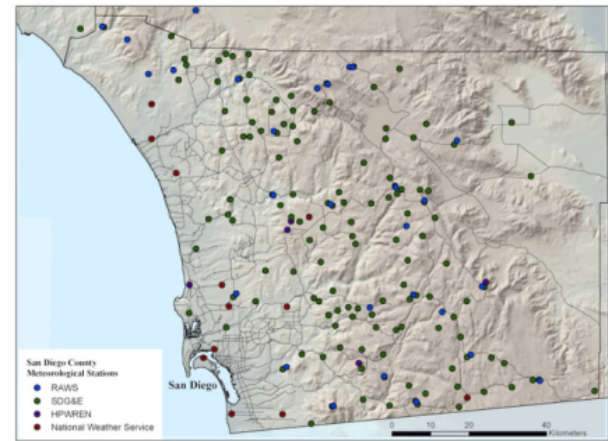
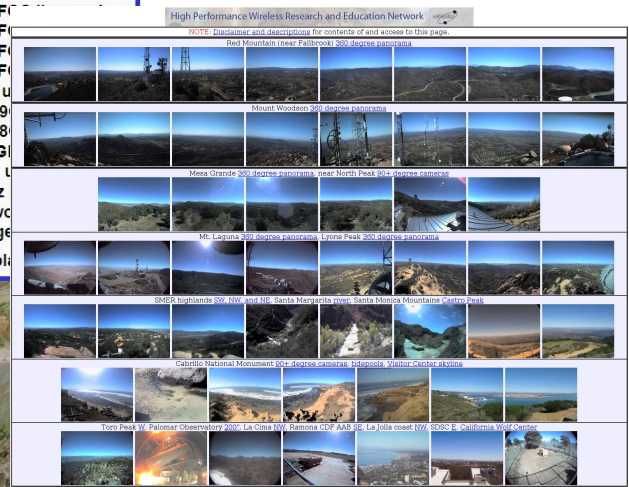


# High Performance Wireless Research and Education Network

HPWREN topology – January 2012



Major success to bring internet to incident command in the field. Used in over 20 fires over time.



Research <http://anr.ucsd.edu>

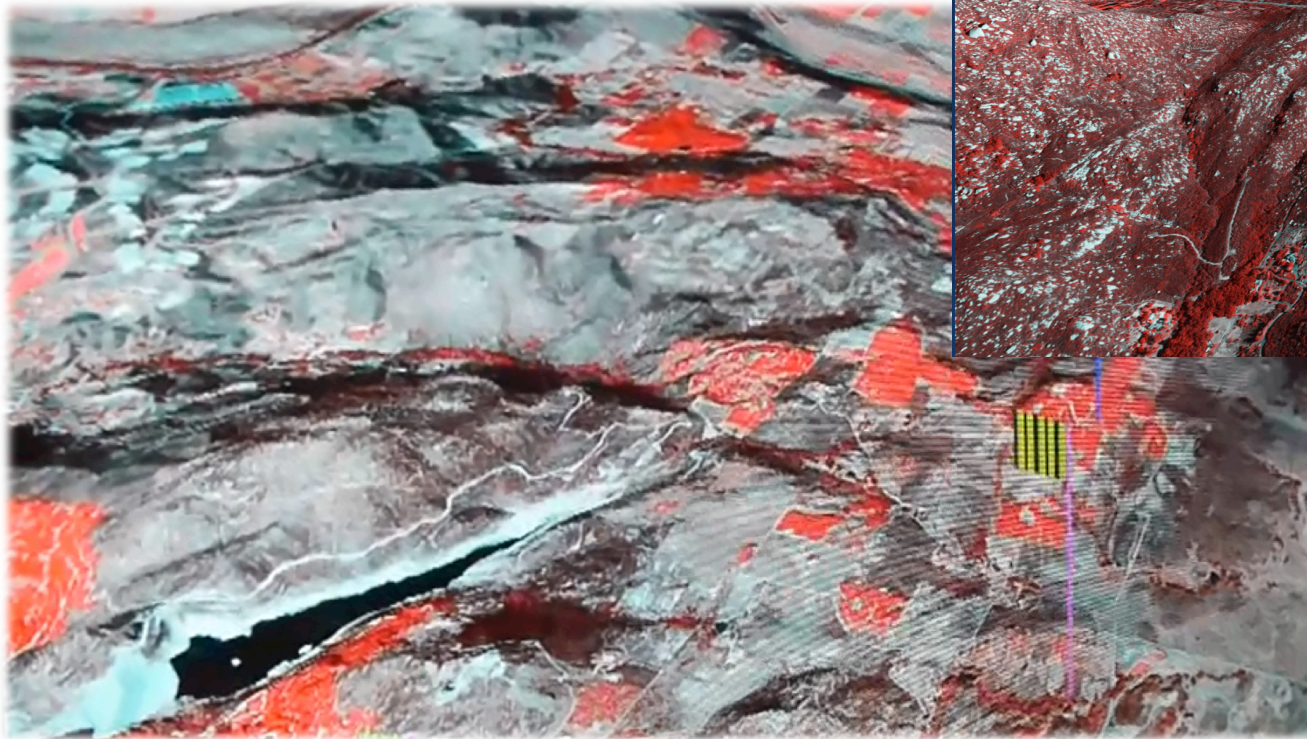
WIFIRE is funded by NSF 1331615



# Terrain Visualization

## Post-fire burn map

- SDG&E and HPWREN weather data



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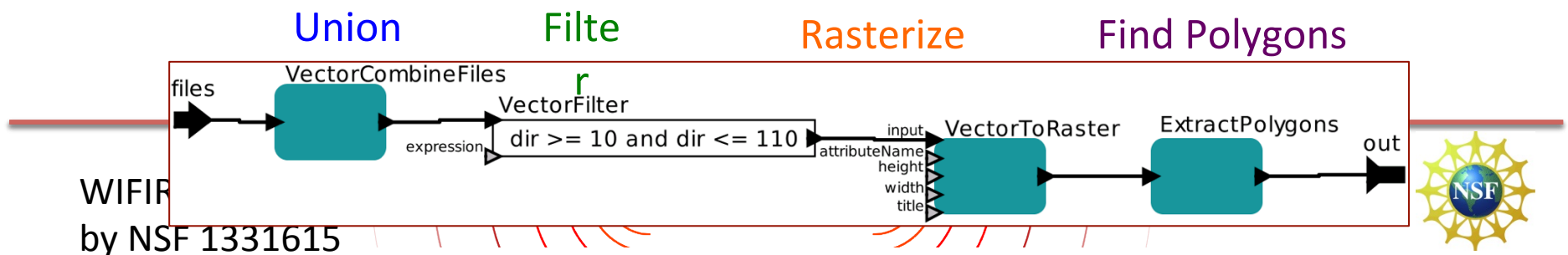
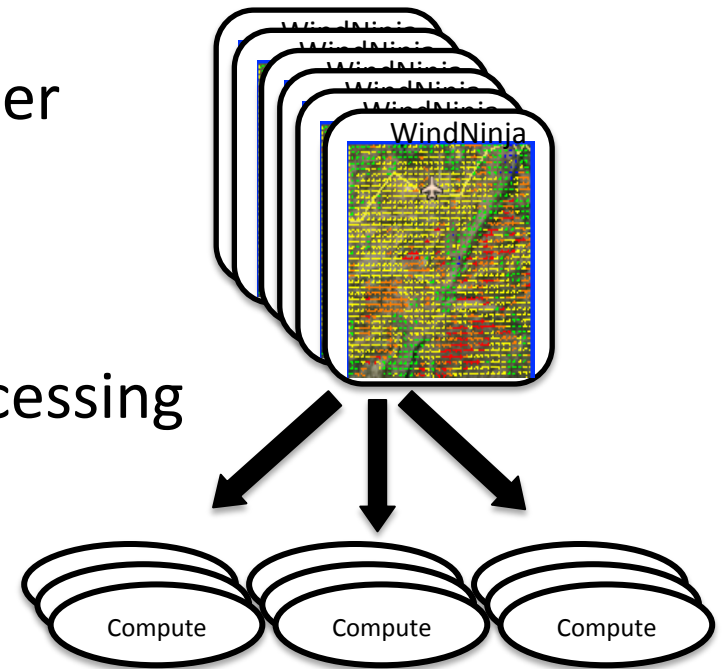


# Geospatial Workflows for Fire Modeling

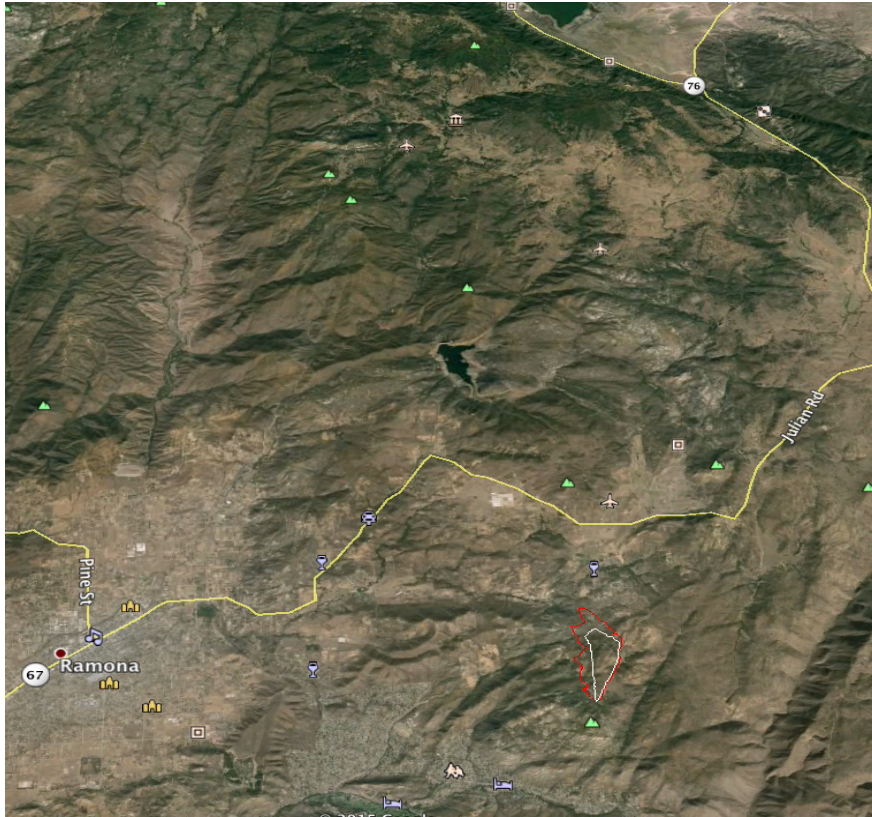
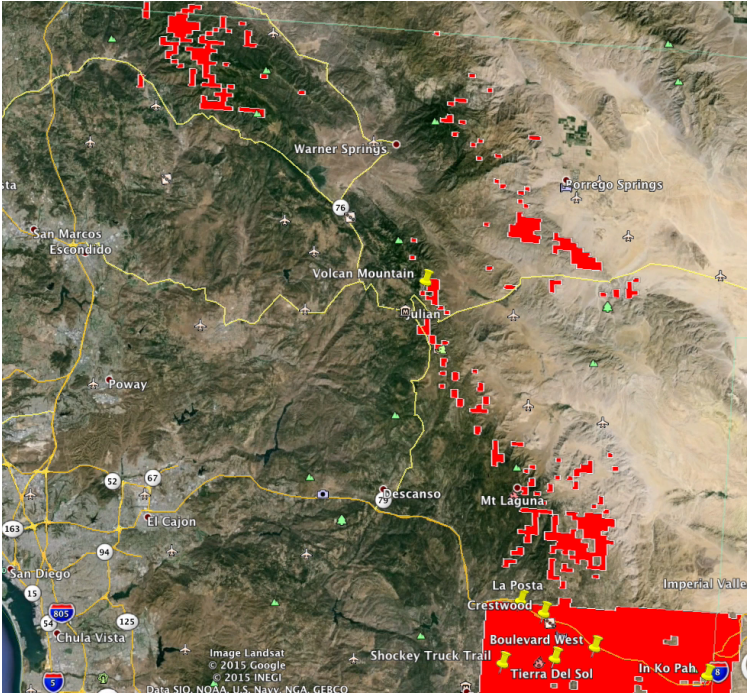
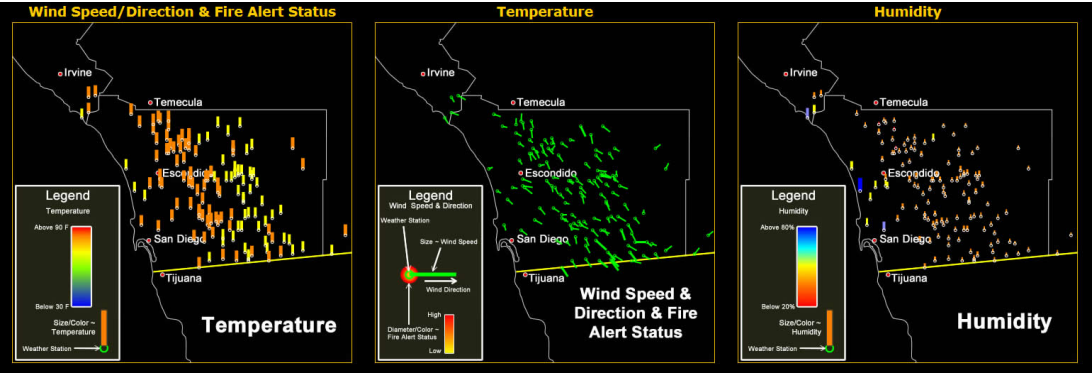
Kepler is an open source environment for combining and automating Cyberinfrastructure components

[www.kepler-project.org](http://www.kepler-project.org)

- Read real-time and archived weather station measurements
- **GIS components to pre- and post-process data**
- Execute fire models and signal processing steps
- **Parallel execution**
- Provenance for execution history



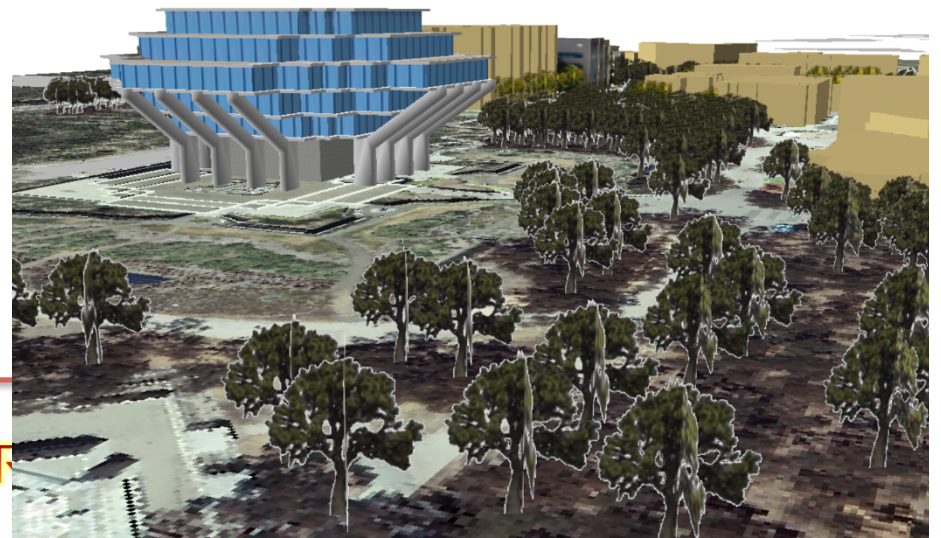
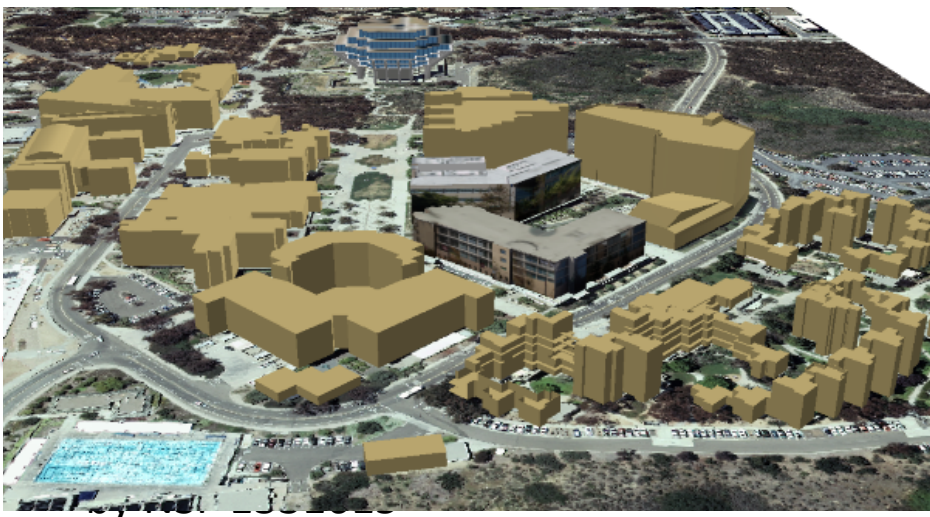
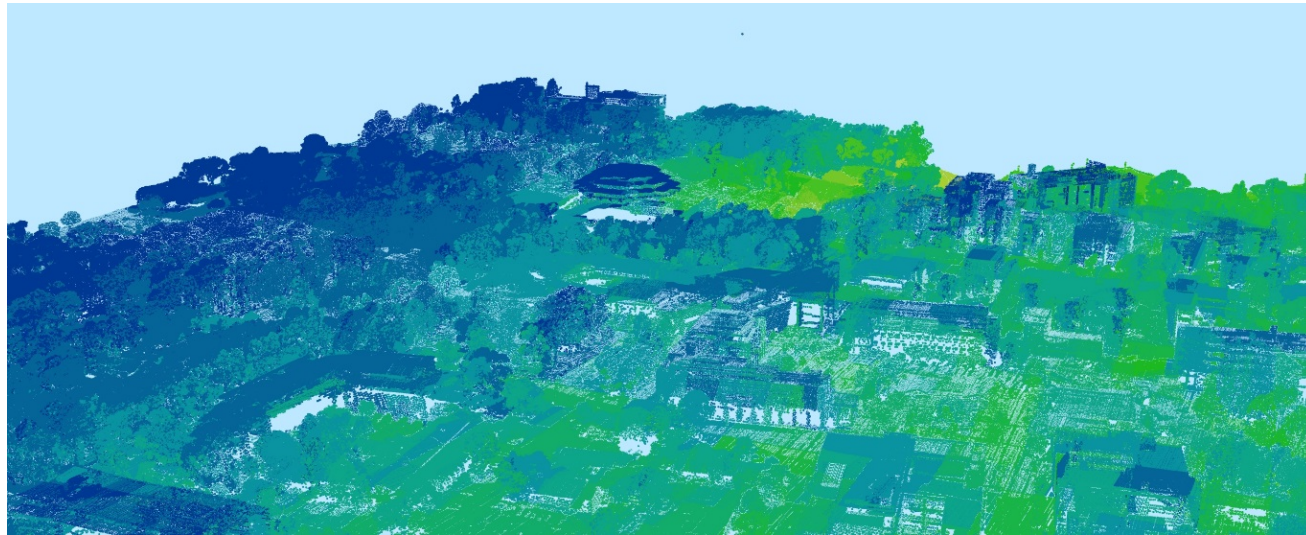
# Workflow Outputs



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# Creating a Virtual UCSD with Disparate Data



# To summarize:

Effective systems for real-time acquisition and analysis of wildfire big data can make a huge impact on **wildfire resilience**.

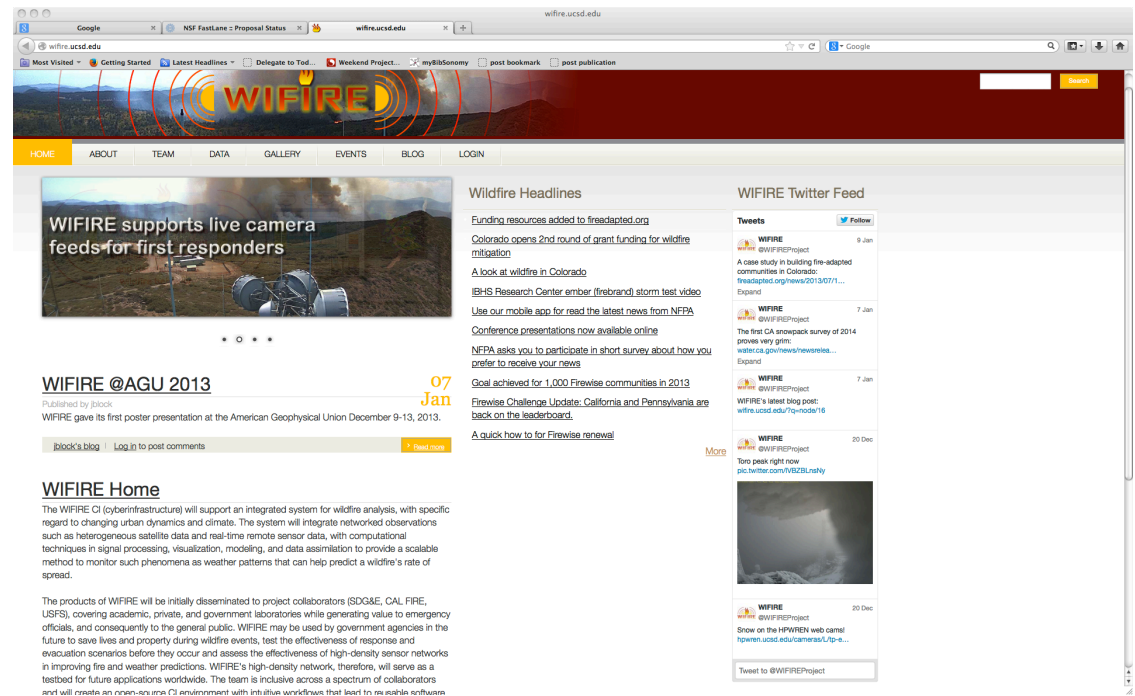
WIFIRE is on the web!

- Website:

<http://wifire.ucsd.edu>

- Twitter:

@WIFIREProject



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