

Early Detection & Subsequent Tracking

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The FUEGO Group

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- EARLY DETECTION
- VERY WIDE AREA MAPPING (UAV TO SATELLITES)
- DEEP LEARNING ANALYSIS (FIRE & FUELS)
- IMPROVED SIMULATION => PRIORITIZATION
- ACTIONABLE INTELLIGENCE



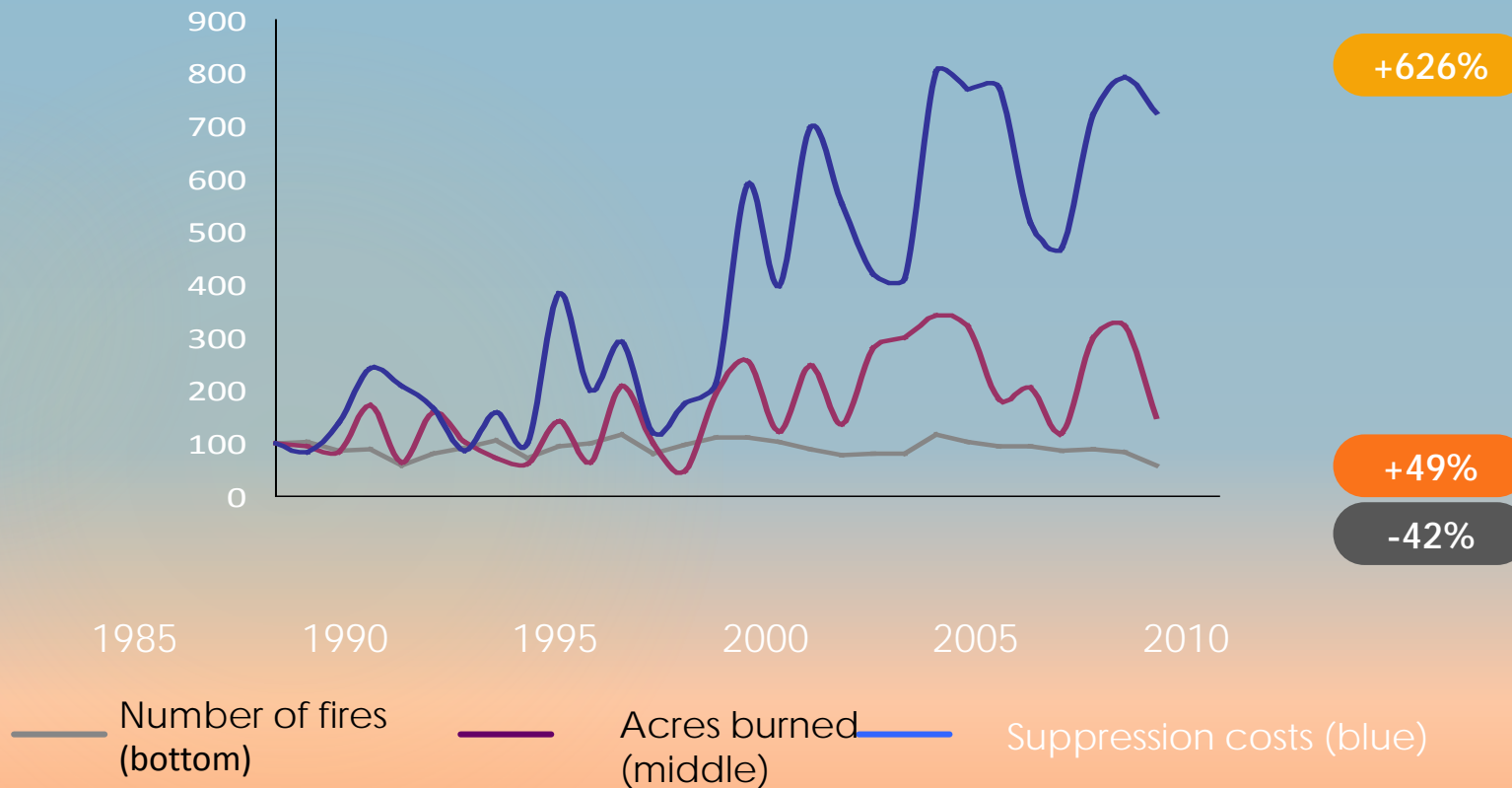
Questions Concerning Economics

The hierarchy of fire accounted and un-accounted costs to Californians :

- 1) Suppression Costs
- 2) Property -> Insurance rate increase
- 3) Public Utility Infrastructure -> rate increases
- 4) Eco-system
- 5) Lost business
- 6) Human suffering and lives lost
- 7) Accelerating Climate Change

The financial and environmental impact of wildfires in the US has increased dramatically over the last 30 years

- ▶ The impact of wildfires in the US (rebased, 1985=100)



Even though the US has seen 42% fewer wildfires in 2013 as compared to 1985, acres burned have increased significantly, and costs have risen over 600%

Reasons include:

1. A build-up of fuels resulting in part from past fire suppression policies
2. A warming climate, including drought in the West
3. to fire-prone public landsThe development of homes adjacent

California Wildfires Drive Up Insurance Costs For Homeowners

👤 Cody Drabbie

Wednesday, September 17, 2014 | Sacramento, CA | 🔗 [Permalink](#)



File Photo / AP

Donna Hoffman and her husband have lived in El Cajon for 18 years. In that time, the most they paid for homeowners insurance was about \$2,300 per year.



Last year's renewal notice came as a surprise. Facing the need to cover the growing risk after recent wildfires in the inland San Diego community, their insurer sent notice that their homeowners insurance premium would rise jump \$4,000. The Hoffmans negotiated for a higher deductible to maintain the lower premium. Even with that, the policy renewal notice for this year went up to \$7,200.

"I can't justify that kind of increase," Hoffman said. "I'm doing anything I can possibly do at this point. I'm ready to move. I'm really upset by the \$5,000 increase just for the insurance. That's scary, next year it could be \$10,000."

Just like the Hoffmans, many California homeowners living in high fire risk communities are feeling burned by insurance companies. Premiums cost more. Deductibles are higher. Carriers are sending out non-renewal notices to swaths of Sierra foothill towns. The cost of living near California forests is leaving some homeowners feeling trapped.

Big Data Predicts Bigger Fires

Jerry Davies, an insurance industry consultant on the board of the California Fire Safe Council, says insurance companies are changing the way they do business in the state with the help of sophisticated computer models that predict fire behavior.

Tower & UAV Enhanced FUEGO "E-FUEGO"

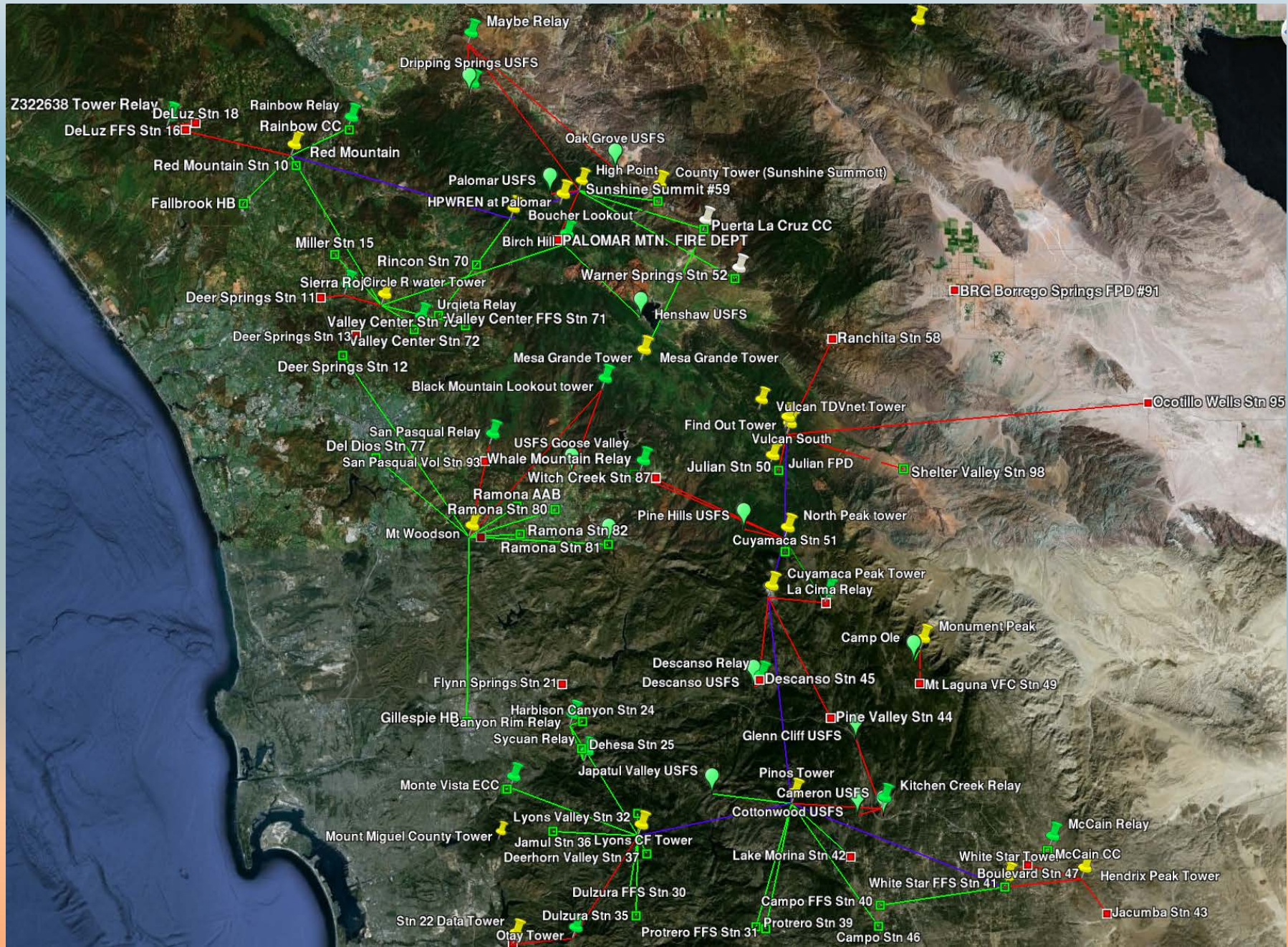
Sensors at many altitudes



Early Smoke Detection 58 Camera Installations

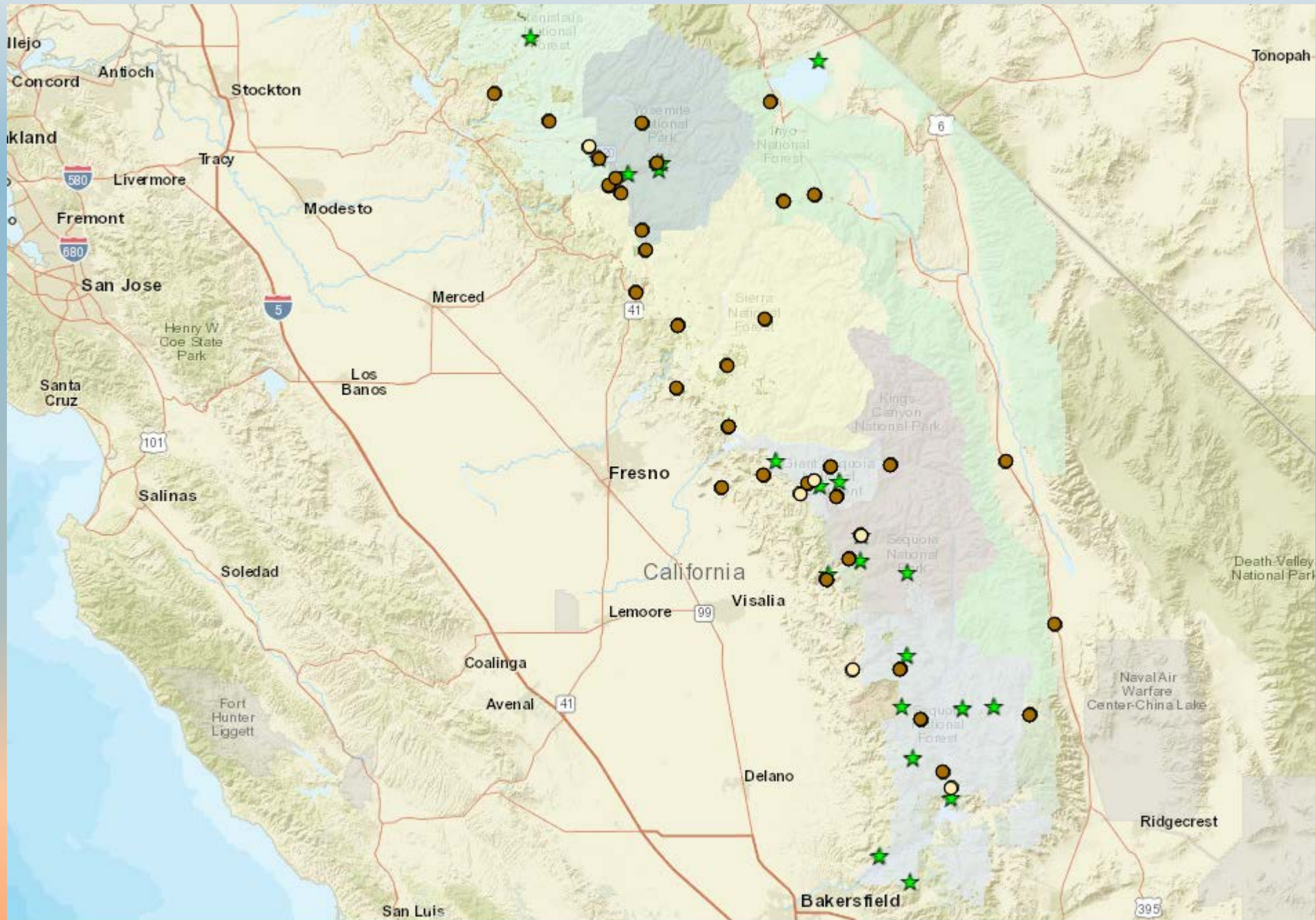
- UC San Diego, HPWREN System
- Univ. Nevada Reno Seismology Lab, Alert Tahoe
- USGS, Sierra Wildland Fire Reporting System

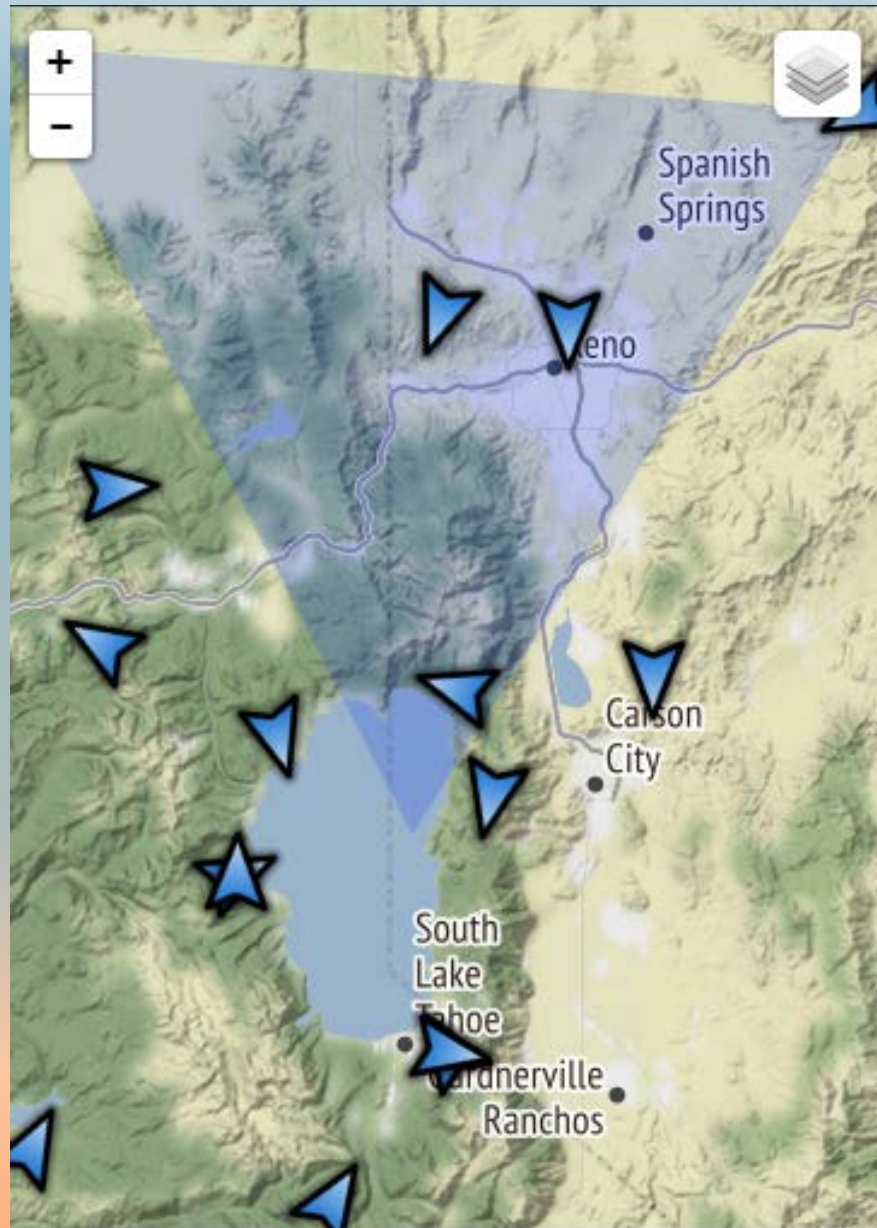
Univ. of California San Diego HPWREN (High Performance Wireless Research & Education Network)



Intel is a
force
multiplier

Sierra Wildland Fire Reporting System (SWFRS)





Automated Smoke Detection

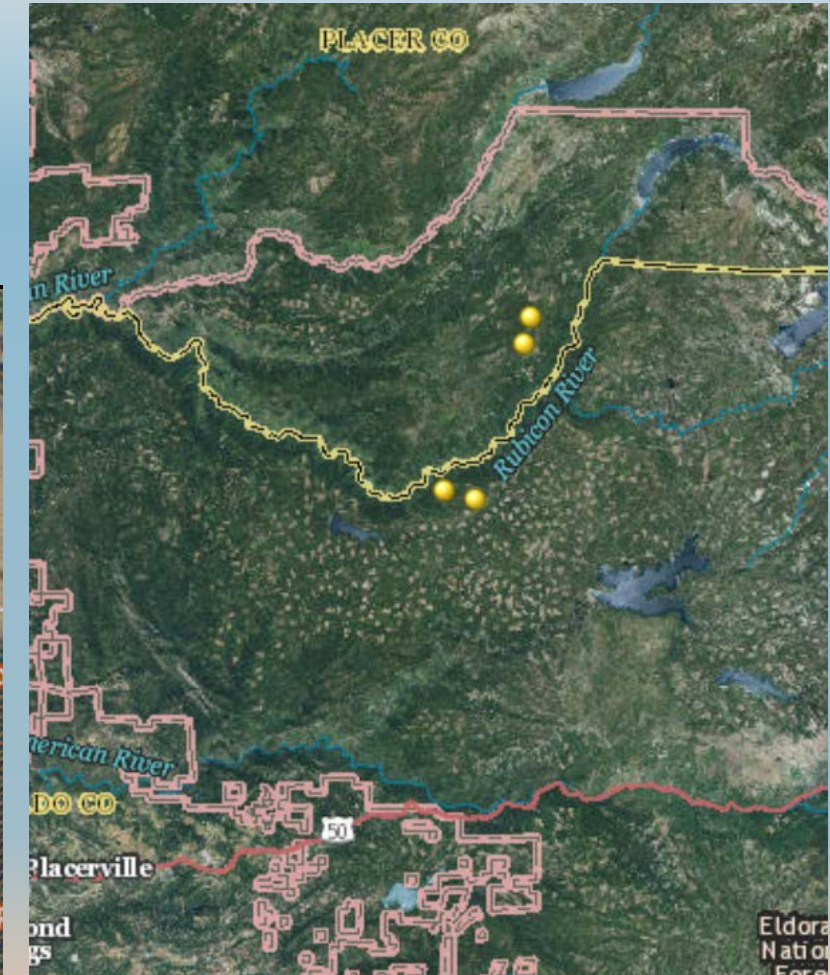
(UC Berkeley Computer Vision Program)

- ▶ Work of Dr. Stella Yu, Nathan Heidt (Grad), and Will Cramer (Under Grad)



Fusion and Cross-cueing of Satellite, Airborne, & Ground Sensor Data / Human-in-the-Loop

- Smoke Detect Image Chip
- Satellite Drop on Air Photo
- Probability of real fire
- Lat/Long, Time/duration of appearance
- Rate of Spread
- Current data 3 surrounding RAWs



Intel is a force multiplier

Stratospheric, Unlimited Duration, Unmanned Vehicle

- Continuous station-keeping where threat is greatest
- Patrol large areas or track fire movement
- Real-Time, High Resolution, Day/Night Mapping and Fire Characterization
- Data transmitted direct to the Fireline



- ✓ Initial Flight, 4-6 month after funding.
- ✓ Flight above the NAS.
- ✓ Balloon carries initial flight aloft.
- ✓ Well along path to FAA BVLOS approval for decent (for different mission).
- ✓ Payload: a light weight variant of Fire Finder

