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ShakeAlert and AlertWildfire: Science for Public Safety

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The Really Big One

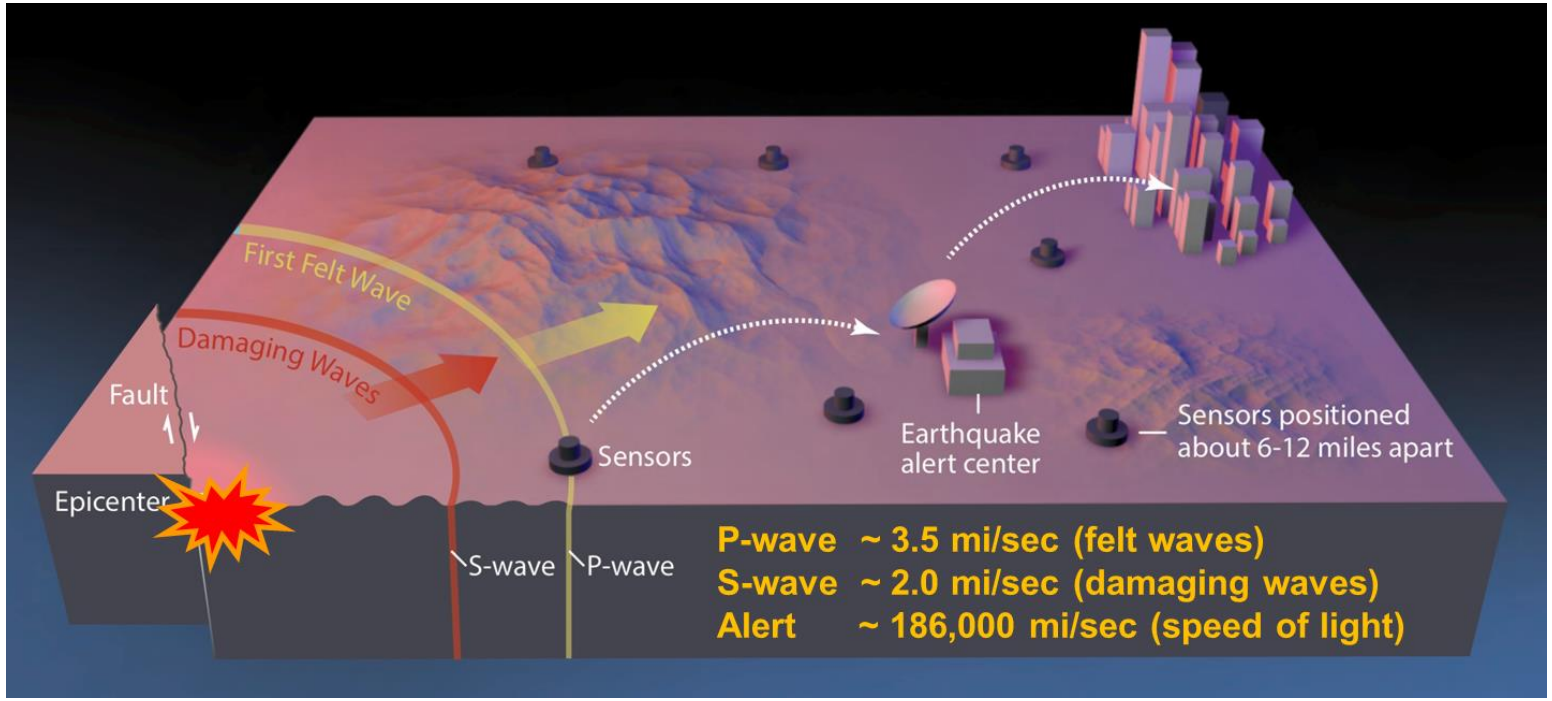
Earthquake & Tsunami, Japan

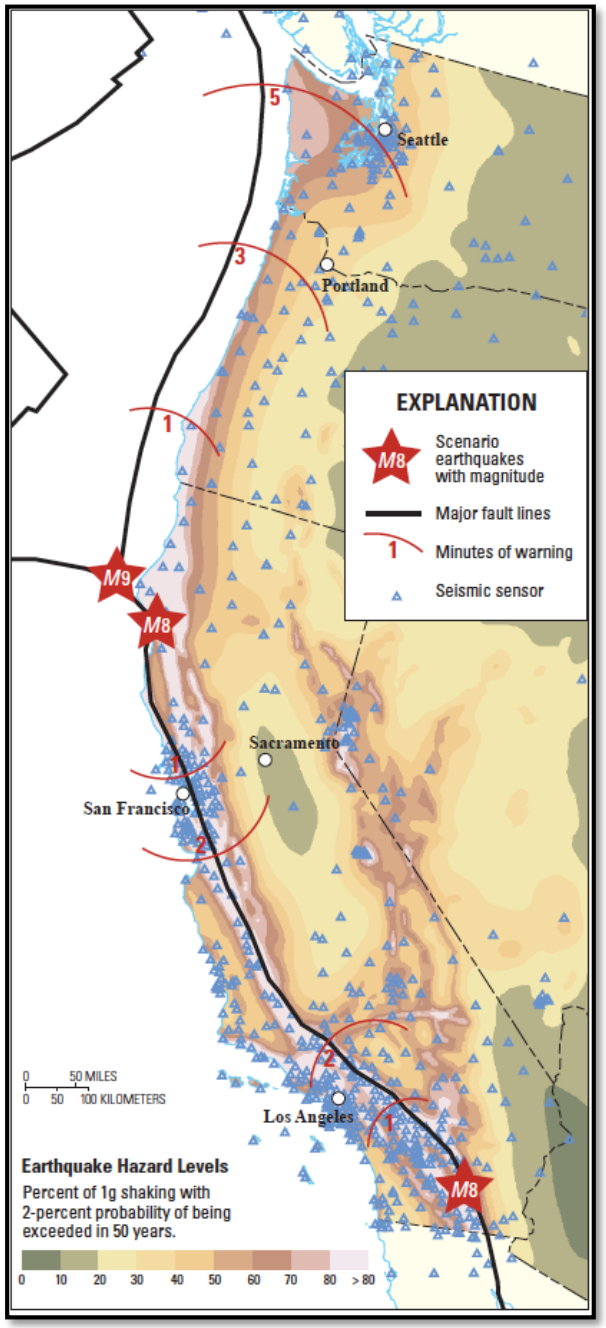
The Really Frequent Ones

Eagle Creek Wildfire, Cascades Locks, OR

ShakeAlert – What is it?

- ShakeAlert is the name of the West Coast Earthquake Early Warning System (EEW)
- Developed by USGS, Caltech, UC Berkeley, University of Washington, University of Oregon
- Warning times from seconds to minutes





September 19, 2017, Mexico City
M7.1 deep focus earthquake

Applications

Valuable seconds to tens of seconds warning for…

- People
  - move to safety
    drop, cover, hold-on
  - mental preparation
- Things
  - automated controls
  - slow, stop transportation
  - isolate sensitive systems and processes
- Situation awareness
  - Real-time operational picture
  - Take actions before infrastructure is affected







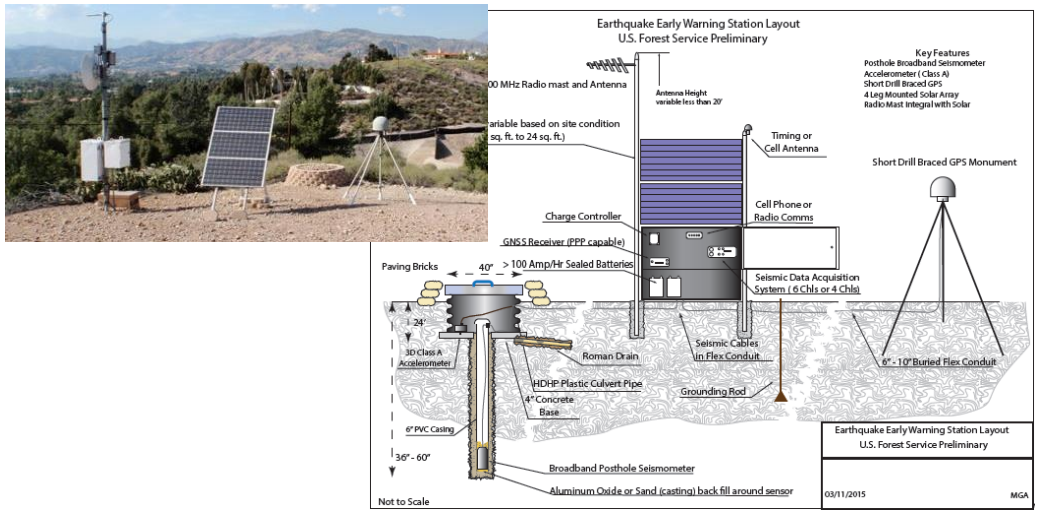
ShakeAlert:

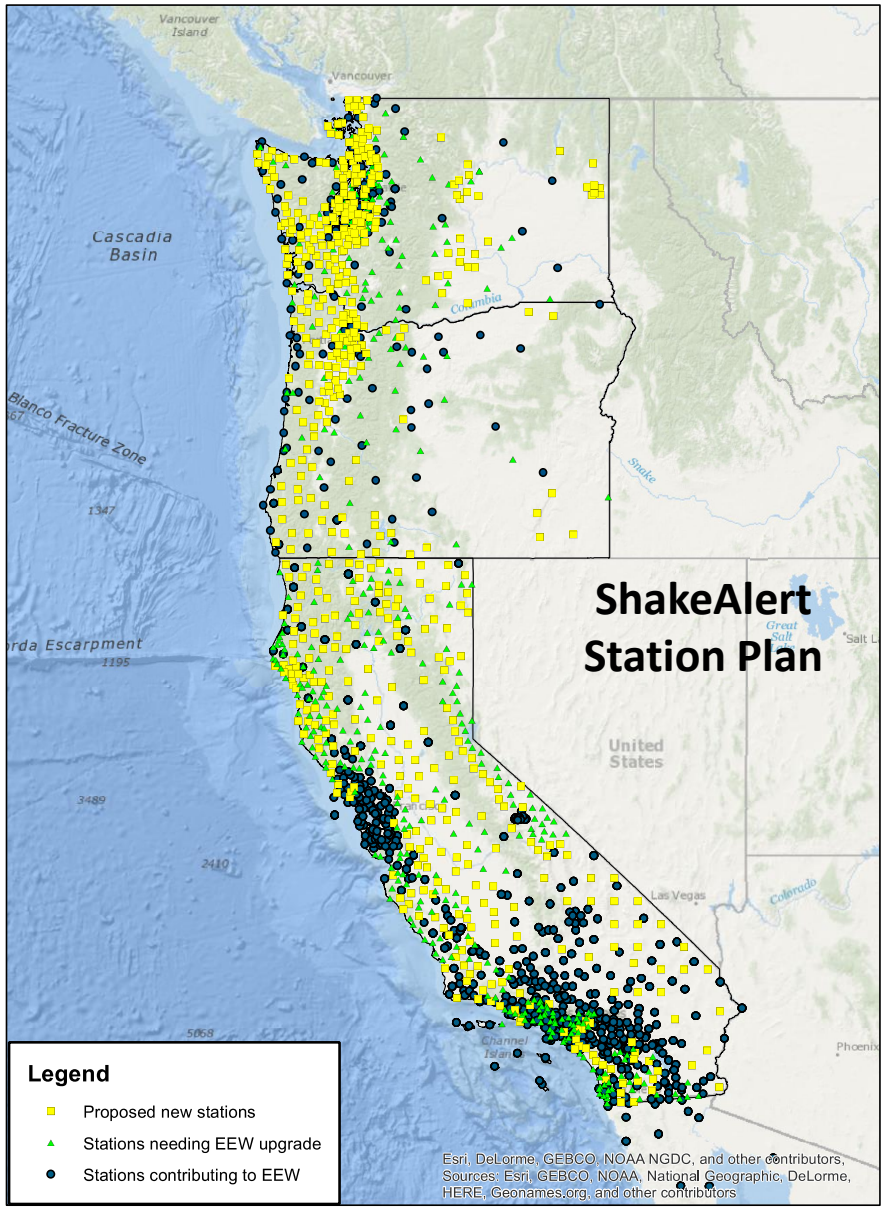
Network buildout in Oregon still below threshold for public alerting

Scotts Mills, Marion Co.

Station Buildout

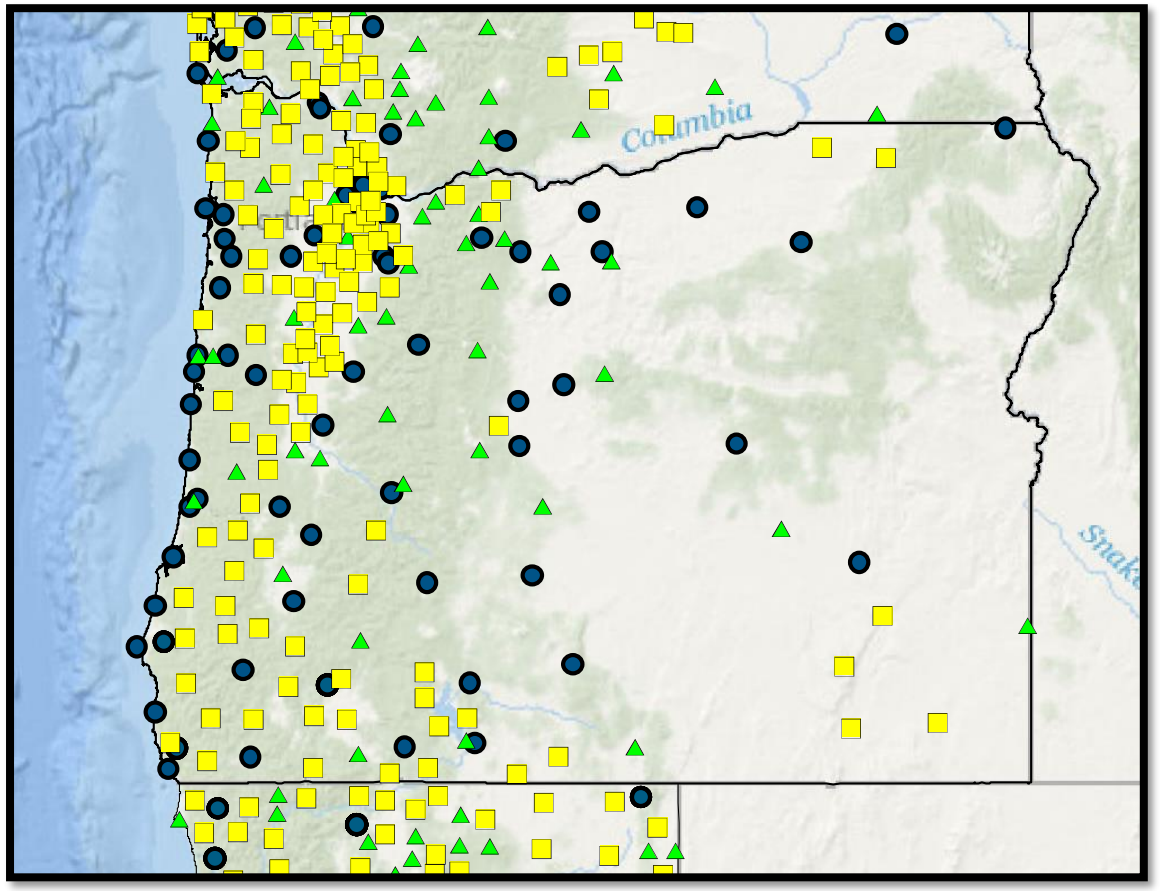
- 1,600 stations planned in CA/OR/WA
- ~650 currently contributing
- Priority on metro areas (CA)
- Buildout in Oregon depends on investment





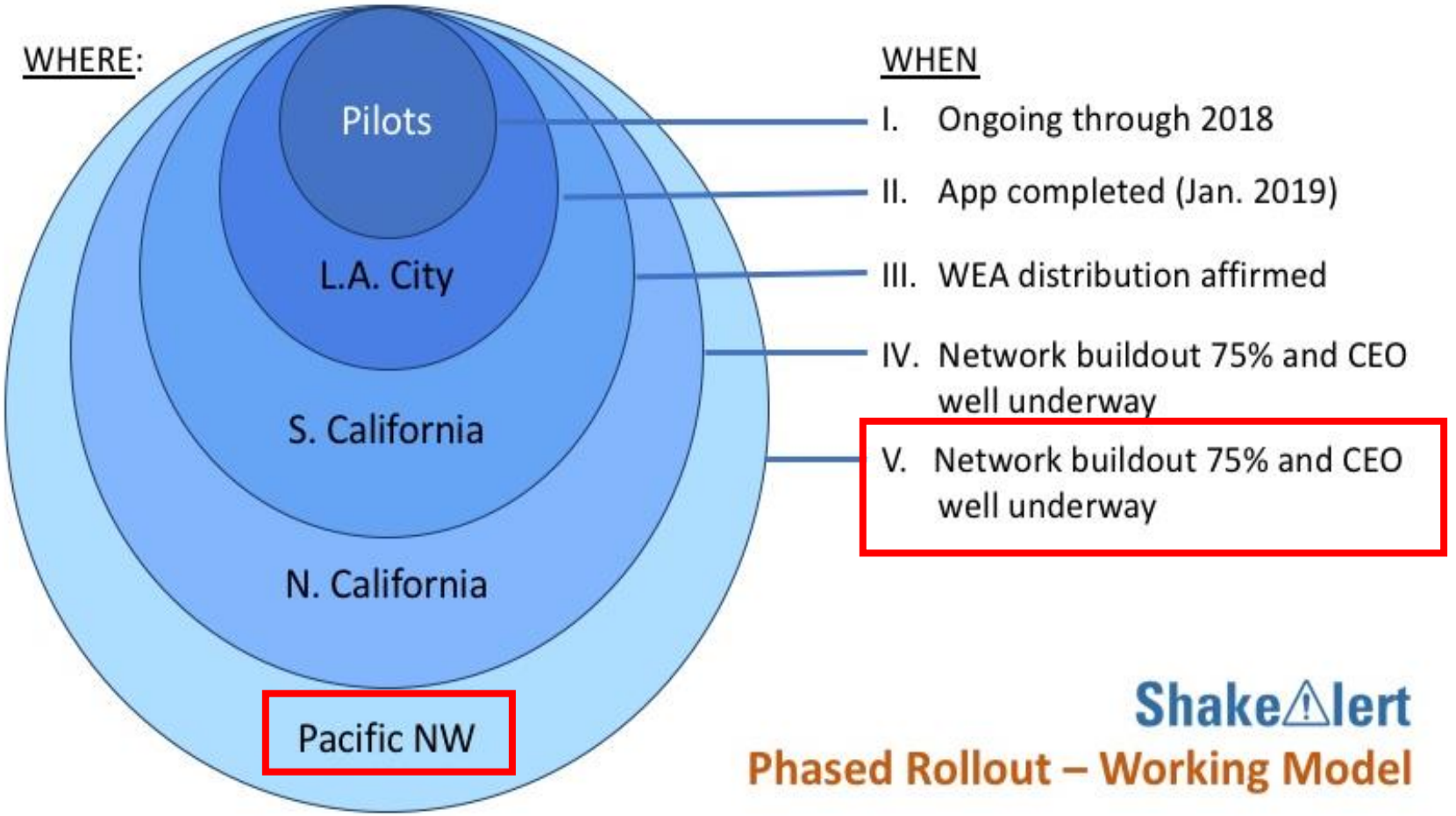
Building out the ShakeAlert Network in Oregon

- There are currently 110 seismic stations in Oregon contributing to ShakeAlert
- 125 additional stations are needed to be 100% operational for earthquake early warning
- Oregon is currently at ~50% of buildout
- 75% minimum required for public alerting



When will ShakeAlerts be available to public?

Leaburg Canal, Lane Co.



- **Phase 1 (2018)** will be for pilots only. A media plan will be carried out leading up to the Oct announcement of Phase 1, and a public education and training campaign will begin.
- **Subsequent Phases begin when technical/CEO milestones** are reached. Timing depends on advances in WEA and cell phone apps (various developers), and is beyond USGS control.
- **Public alerting to L.A. City** would begin in Phase 2, with thresholds of M ≥ 5 and MMI ≥ 4
- This would most likely involve a **cell phone app** scalability test, starting with 50,000 L.A. City employees and – if that works – **scale up to the 4M residents of the City of LA**.

State-wide coordination will lead the way to ShakeAlerts!

Diamond Lake, Douglas Co.

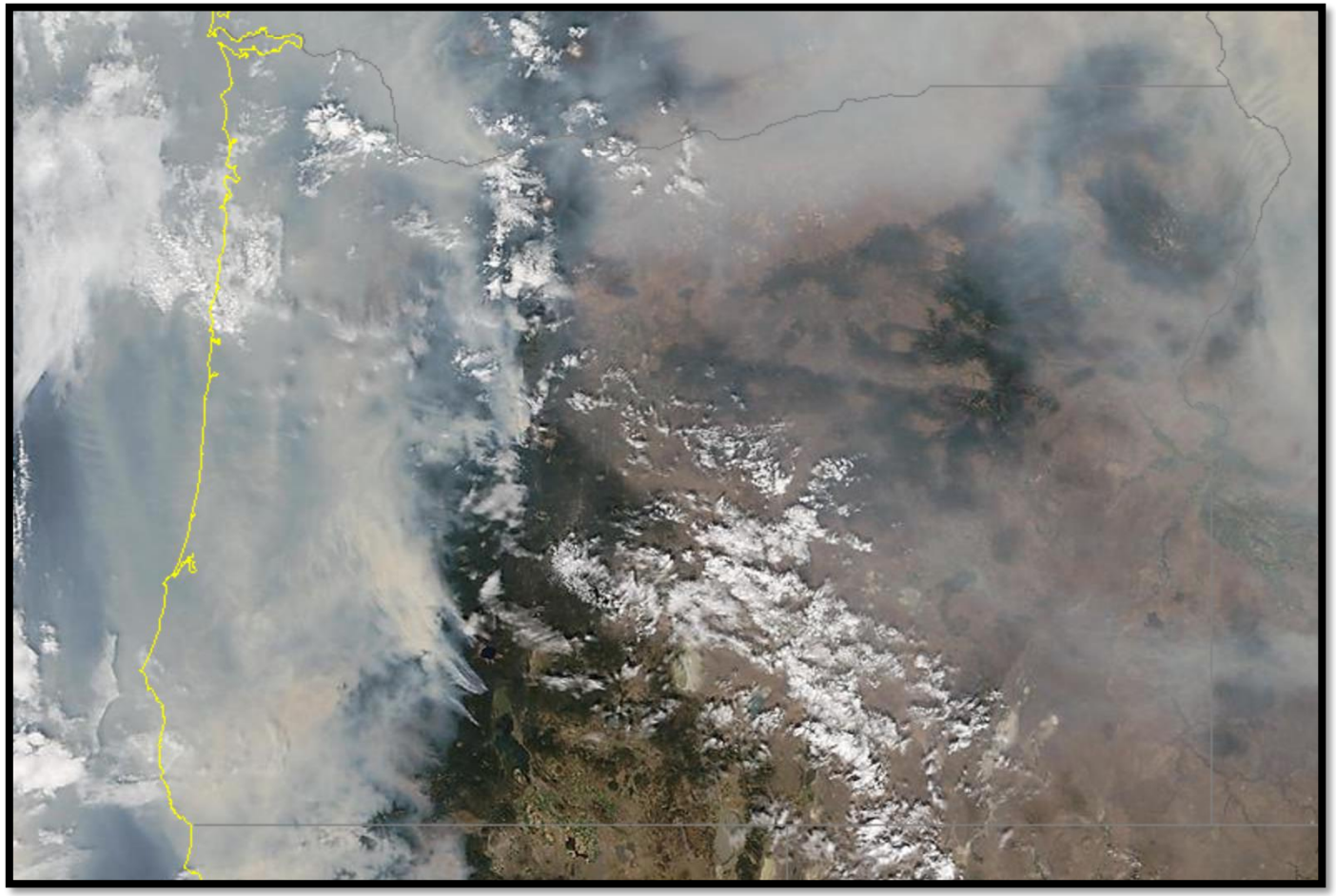
Examples of state-wide coordination

- State of Oregon: Purchased 30 high-quality sensors at 15 sites from NSF
- Governor's Office: ensuring alignment of messaging and goals across ShakeAlert, PNSN@UO, state agencies and regional stakeholders
- ODOT: Intergovernmental agreement that allows UO & PNSN to operate on ODOT property and utilize ODOT telemetry
- DOGAMI provided UO funds from strong motion program to support station buildout; *leverages USGS support for installation, operations and maintenance*
- OEM, UO and others working together to develop communication, education, and outreach (CEO) program for our state
- EWEB provided UO funds for station buildout
- Pilot Projects developed with UO include EWEB, ODOT, UO, RH2 Engineering, RVCOG, Syn Apps, K-16 (UO, PSU, Linfield College, Beaverton School District)
- Oregon Committee on CEO, ~30 stakeholders from across all sectors

AlertWildfire and ShakeAlert:

A multi-hazards platform that increases state resilience

Satellite image of smoke blanketing Oregon



September 5, 2017

Benefits of linking ShakeAlert and AlertWildfire programs

- **Hardens** telemetry of **ShakeAlert**, improving state resiliency
- Wireless, IP-based high-speed backbone **supports a multi-hazards system**; not a one-off alerting/detection system
- **Leverages funding sources** that can save state tax dollars
- Pulls together technical and human resources within the state to improve coordination and response.

Blue Mountain, Malheur Co.

Microwave proved to be the most reliable technology in the Spring Fire.

LESSON 5: MICROWAVE'S SUPERIOR RUGGEDNESS AND RELIABILITY DEMONSTRATED.

LESSON 3: LIMITS OF CELLULAR NETWORKS DURING A FIRE.

LESSON 4: LIMITS OF FIBER AND COPPER DURING A FIRE.

AlertWildfire: What can it do?

- discover/locate/confirm fire ignition
- quickly scale fire resources up or down appropriately
- monitor fire behavior through containment
- during firestorms, help evacuations through enhanced situational awareness
- ensure contained fires are monitored appropriately through their demise.

www.alertwildfire.org/oregon/

www.alertwildfire.org

AlertWildfire: What can it do?

2018 Holy Fire, Santiago Peak, Orange S. Cal.
Helping to protect communications infrastructure

west camera

east camera

UC San Diego

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Summary

- ShakeAlert
  - Good progress since 2014
  - State investments accelerated network growth
  - UO facilitating state-wide coordination
  - ShakeAlerts will be available in Oregon when:
    - Network is at least 75% complete
    - Communication, Education, and Outreach is well underway
- AlertWildfire
  - Hardens telemetry of ShakeAlert
  - Diversify sources of funding for hazards detection and monitoring
  - Benefit to other stakeholders (ODF, DFPA, CFPA, counties, utilities)

Pine Mountain, Deschutes Co.

AlertWildfire: Sponsors and Partners are diverse

- **Federal agencies** (BLM, National Forest Service, National Science Foundation)
- **Utilities**; 267 existing or soon to be installed cameras by private sector funding
  - **SDGE**, 16 cameras installed Sep 2017
  - **SoCal Edison** (Pilot project**: $10-15M**, 160 cameras and support)
  - **PG&E** (Pilot project: 9 cameras this year, add 100 after pilot)
  - **Central Lincoln County PUD** (pilot project)
- **Counties**, adopting or replacing existing systems with AlertWildfire
  - Sonoma, Marin, Napa, Lane Co.
- Private stakeholders and communities

Steens/Wildhorse Mountain, Harney Co.