Oregon Hazards Lab Wildfire Camera Network: Responsible AI for Resilience

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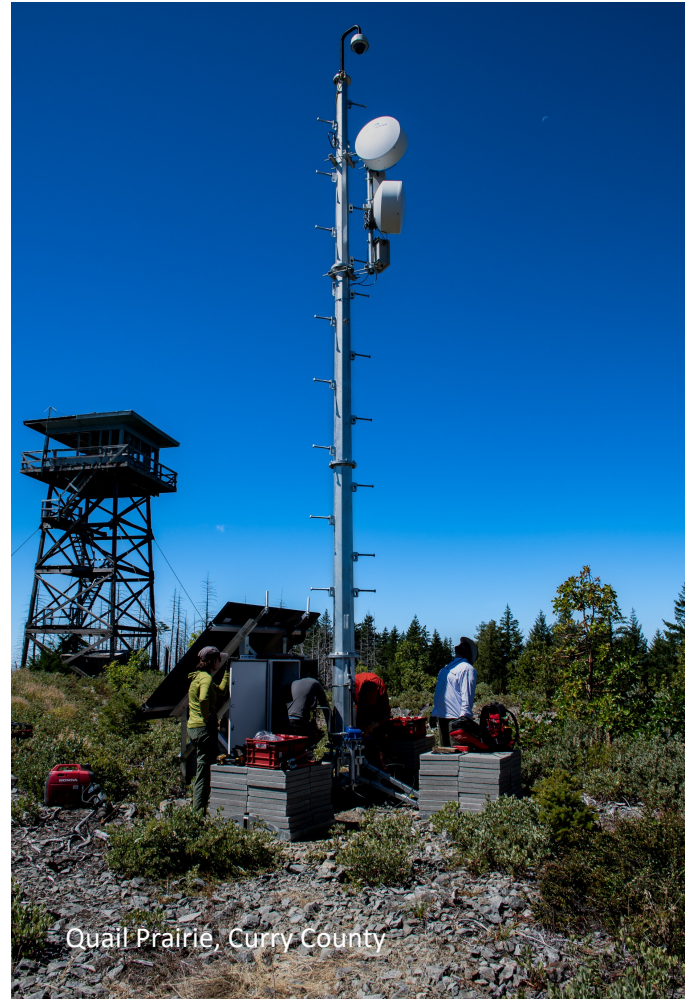Asst. Director, Oregon Hazards Lab

OHAZ Mission Statement

OHAZ uses science, technology, and community engagement to understand, detect, and mitigate multi-hazards within the Pacific Northwest.

Seismic Site TRIPT
Jordan, Oregon

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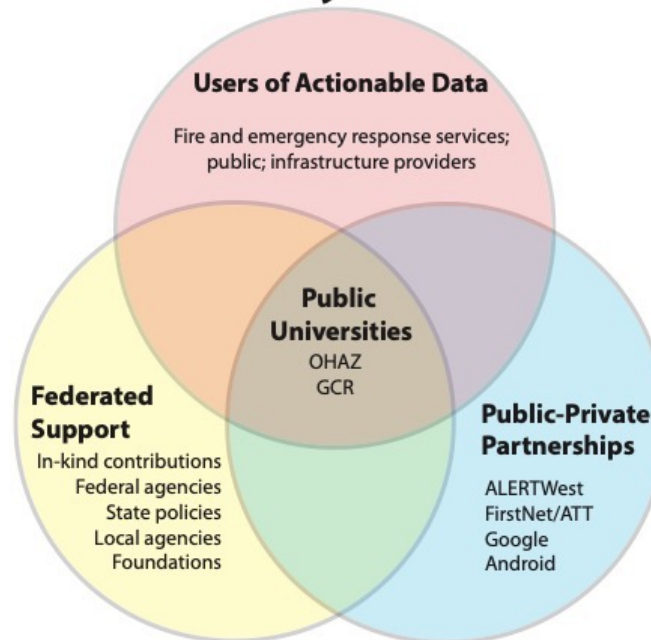Figure 1 Oregon's Public Health Hazard Vulnerability Assessment (PH-HVA)

OHA 8584 (08/2013)

Cow Valley Fire, 2024

X:+112.63 Y:-4.93 Z:2.4 .EDU UO.VDispatch.07-12T16:05 © Univ. Oregon 2024/07/12

Big Lookout, Baker County

Acty Mountain, Harney County

Quail Prairie, Curry County

Legislative support is unlocking a public University secret power

Community of Practice

Users of Actionable Data

Fire and emergency response services;
public; infrastructure providers

Public Universities
OHAZ
GCR

Federated Support

In-kind contributions
Federal agencies
State policies
Local agencies
Foundations

Public-Private Partnerships

ALERTWest
FirstNet/ATT
Google
Android

A community of practice (CoP) is a group of people who share a common concern, a set of problems, or an interest in a topic and who come together to fulfill both individual and group goals.

Federation of assets (e.g., land, towers, network, funding) and serving a multi-jurisdictional community quickens deployment and distributes costs

Multi-jurisdictional use

200+ accounts in OR from 50 different agencies

Federation is the secret power of public Universities
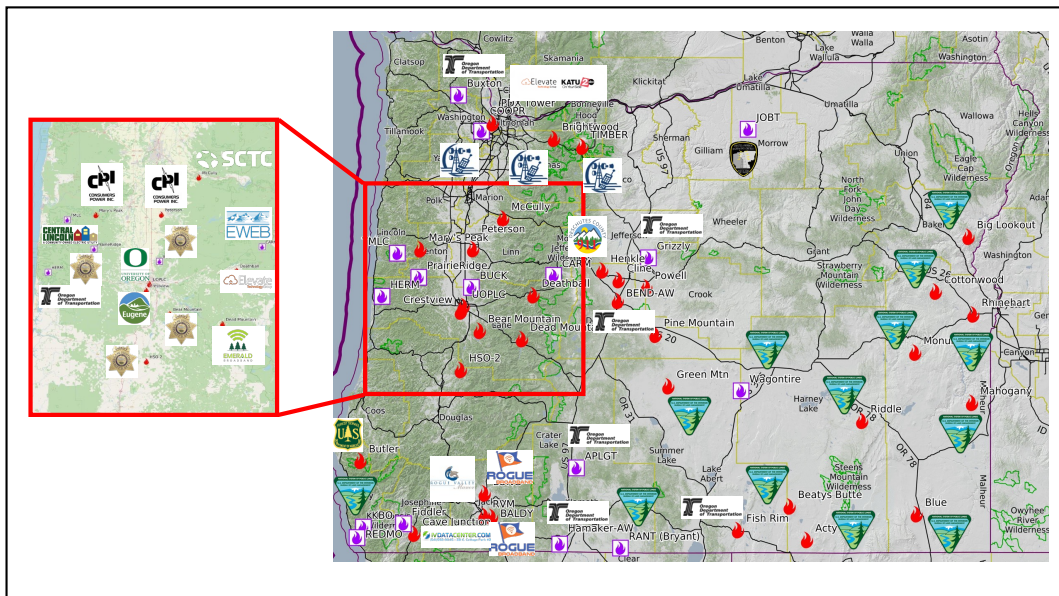
Baker County Sherriff's Office	Life Flight Network
Benton County Sheriff's Office	Linn County Sheriff's Office
BLM	Lowell Rural Fire Protection District
Burns Paiute Tribe	Malheur County Sherriff's Department
Lane Central Emergency Mgmt	McKenzie Fire and Rescue
Clackamas County Dept of Disaster Mgmt	Medford Fire Department
Clackamas Fire District	Mohawk Valley Rural Fire District
Coburg Rural Fire Protection District	Mt Hood National Forest
Confederated Tribes of Warm Springs	National Forest Fremont-Winema
Consumers Power, Inc.	NOAA
Deschutes County Sheriff's Office	Oakridge Fire Dept.
Dexter Rural Fire Protection Dist.	Oregon Department Forestry, general
Elevate Technology Group	Oregon Department Forestry, Lakeview interagency fire
Eugene Springfield Fire	Oregon Department of Forestry, Medford Unit Office
EWEB	Oregon Department of Forestry, Molalla Unit Office
Hoodland Fire District	Oregon Dept of Transportation
Illinois Valley Fire District	Oregon State Fire Marshal
Jackson County	Oregon State Police
Jackson County Fire District 3	Pleasant Hill Goshen Fire & Rescue
Josephine County Sherriff's Office	Portland General Electric
Kittitas County Fire District 7	Rogue Valley Council of Governments
Klamath County	UO
Klickitat Public Utility District	US Army Corps of Engineers
Lake County Sheriff's Office	US Forest Service
Lake Oswego Fire Dept	Vale Fire and Ambulance
Lane County Sheriff Office	West Zone AFMO
Lane Regional Air Protection Agency	

Well Coordinated Effort

- OHAZ is facilitating multi-jurisdictional coordination of communities in Oregon
- Oregon is the only state in the nation with such a committee
- ID and WA participate and may form their own
- Influencing regional policy on one of the most vexing problems of our time

OREGON WILDFIRE DETECTION NETWORK 2023
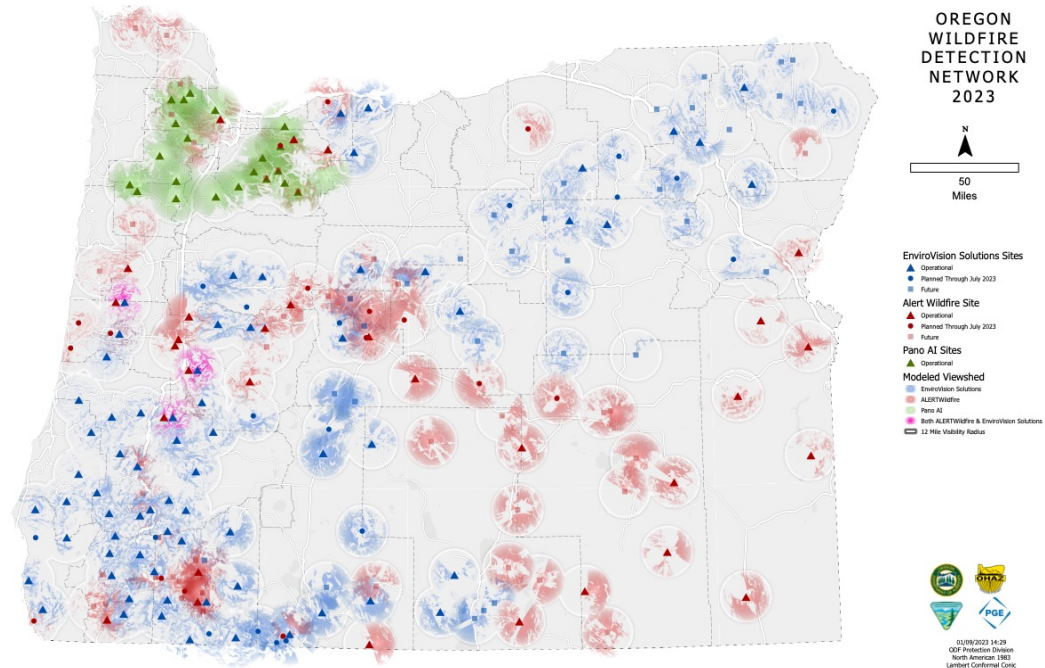
Oregon Wildfire Detection Camera Interoperability Committee
Co-chaired by OHAZ and Oregon Department of Forestry

Committee composition: Governor's Office, Public Safety Agencies, Fire Agencies, Emergency Managers, United States Forest Service, Bureau of Land Management, Statewide Interoperability Coordinator, Oregon Hazards Lab @ University of Oregon, Tribal Representation

# OHAZ—ALERTWest Public Private Partnership

Wildfire Camera system

- Universities own and operate camera networks and supporting cyberinfrastructure
- Partners with ALERTWest via a Software as a Service (SaaS) agreement
- ALERTWest uses data from University's system to:
  - Detect "anomalies" using AI
  - Human-in-the-loop verifies anomaly and location (or rejects)
  - Alert fire and emergency response community

Use case scenarios

- Public
- Emergency Response

https://alertwest.live — public view
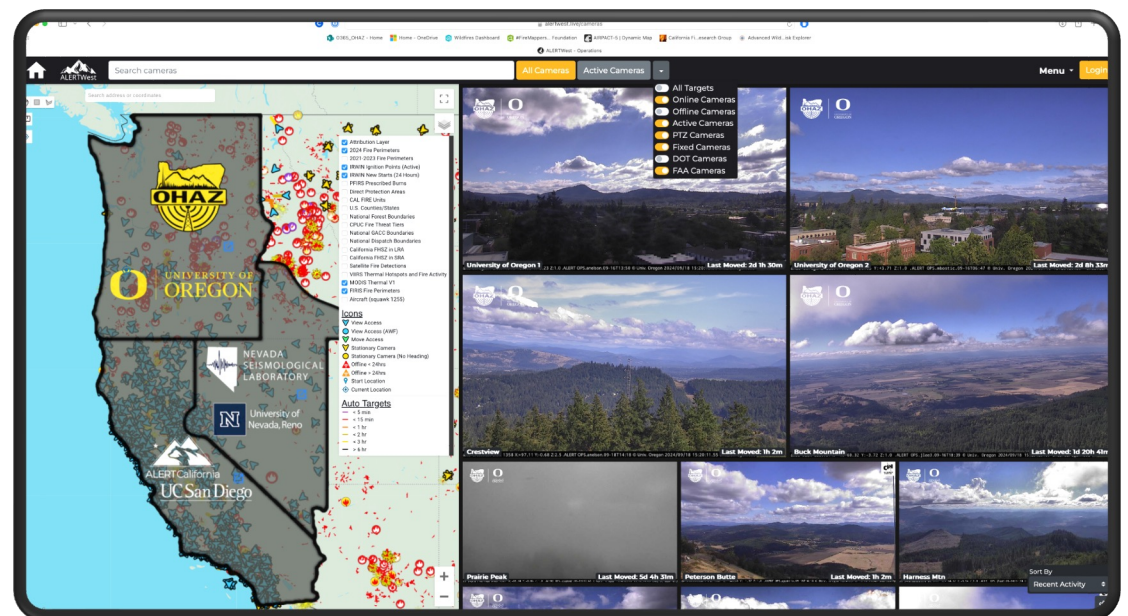
Use Case Scenarios: Public

Public has access to

- Map and GIS layers provide fire related data
- Tile sets of available cameras

Enhances

- Improved situational awareness
- Develops a culture of wildfire preparedness

Sept. 19, 2024 — Baldy Mountain, Jackson, Oregon

Use Case Scenarios: Public

https://alertwest.live — public view

Public has access to

- Live view and timelapse
- Panoramic (360°) view

Live view & timelapse

- Refreshed every ~10s
- Allows video timelapse (1 min to 24 hours)

Panoramic view

- Generated every ~2 minutes

Enhances

- Understanding of conditions, threat, and severity
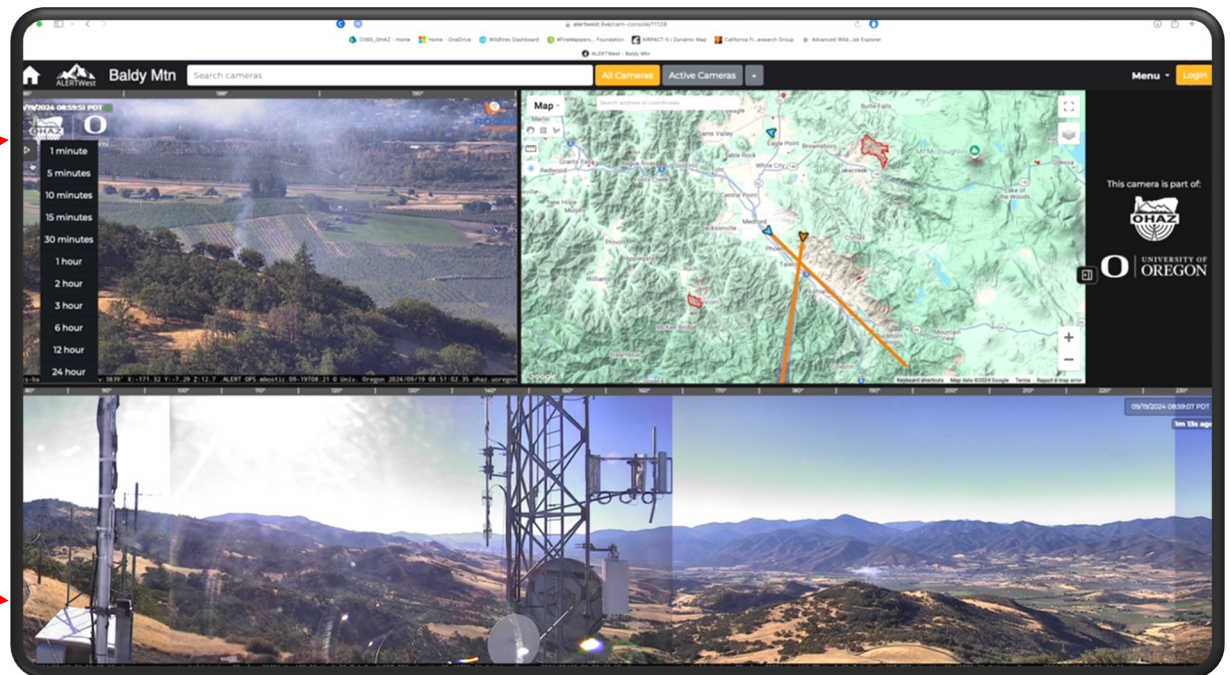
Sept. 19, 2024 — Baldy Mountain, Jackson, Oregon

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Use Case Scenarios: Public

- API allows integration into:
  - OEM State of Oregon Fire Dashboard
  - Watch Duty
- Effective outreach to news and forecasts

Use Case Scenarios: Fire and Emergency Response

Account Access Unlocks Features

- Fire and emergency response personnel receive credentialed logins
- Provides advanced tools for fire professionals
- Access to alerts
- Command and control of cameras
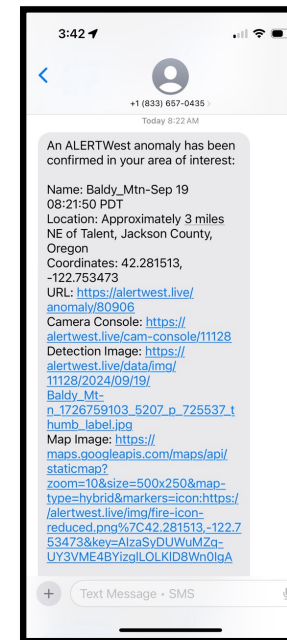- GIS layers and measurements

AI-enabled alerting

- Several modes of delivery
- Options to set geographic regions and when to receive alerts
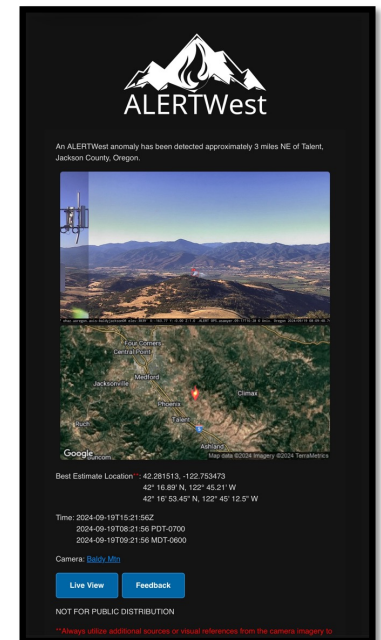
Fire Intelligence Platform

- Provides fire professionals vital visual information to inform and scale response
- Enables monitoring of fire behavior through containment
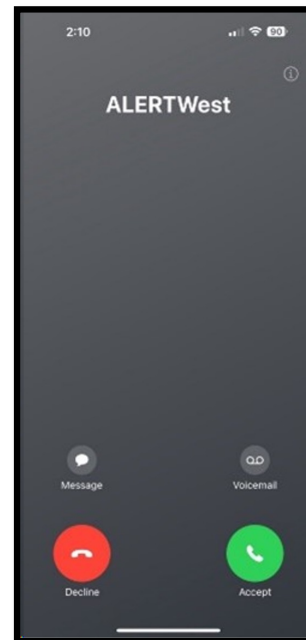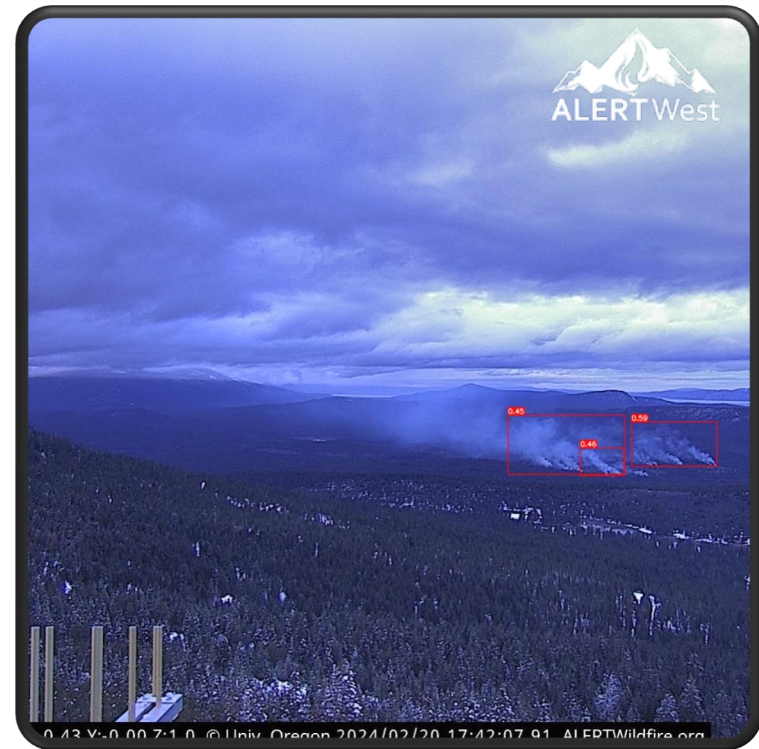

Phone

Text

E-mail

Use Case Scenarios: Fire and Emergency Response

How ALERTWest AI work

- Cameras capture 360° panorama
- AI checks for potential anomalies
- Ops team verifies anomaly & confirms location
- Alerts sent to dispatchers after verification

AI continually improving

- Only 0.00125% of images generate alerts
- AI retrained in operating environment
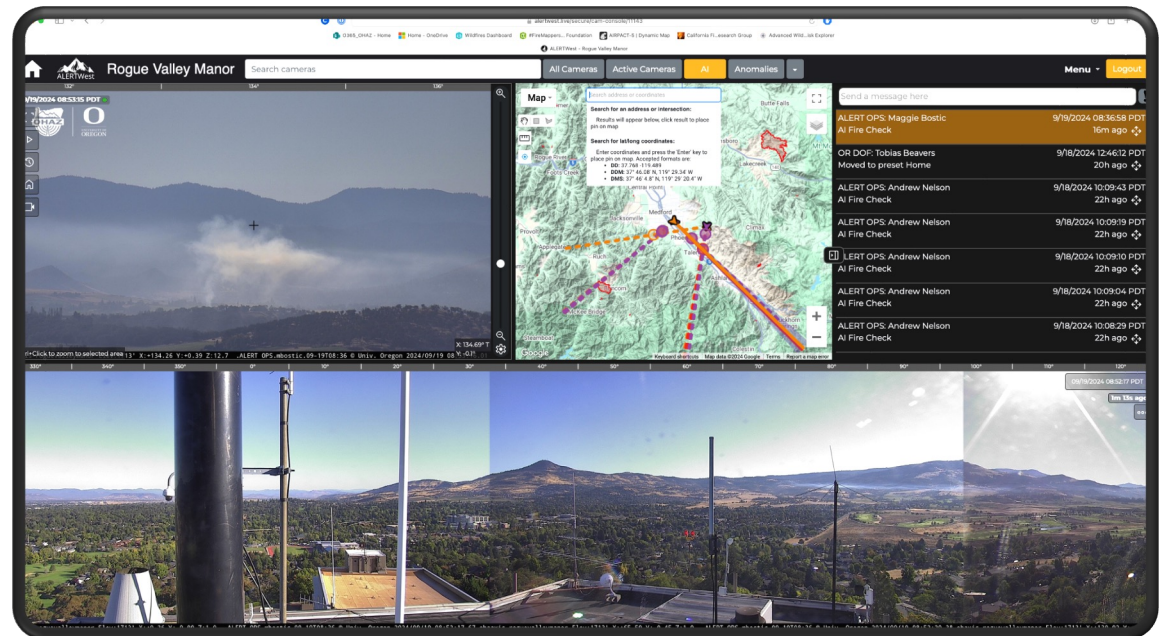
Use Case Scenarios: Fire and Emergency Response

Operations center

- Trained professionals
- Staffed 24/7

Ops uses PTZ and multiple views to:

- Evaluate anomaly
- Locate anomaly
- Make sure it is a new anomaly
  - Repeated alerts are suppressed to maintain high quality of information
- Reject non-fire events

Alerts sent after professional verifies

Sept. 19, 2024 — Baldy Mountain, Jackson, Oregon
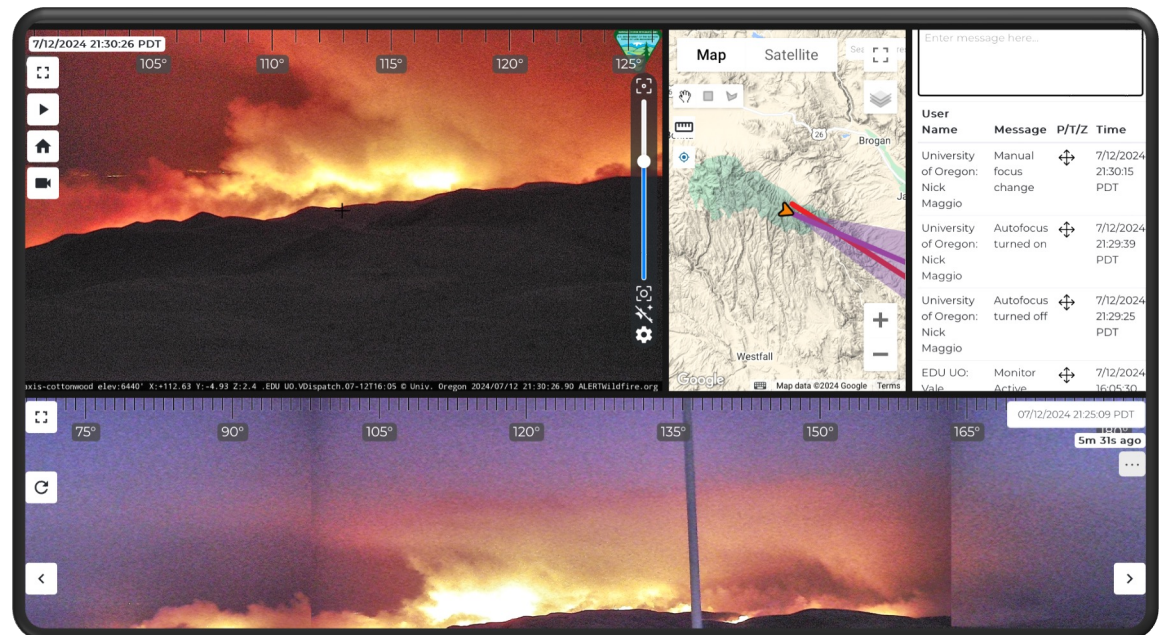
Use Case Scenarios: Fire and Emergency Response

Post Detection Monitoring

- Fire Behavior & Spread
- Weather

Operational Intelligence

- Integrated data feeds
- GIS tools

July 12, 2024 — Cottonwood Mtn, Malheur, Oregon

Future Directions of Responsible AI for Resilience

Predictive Modeling

- Forecasts of smoke
- Fire behavior

Expand Measurements

- Air chemical sensors
- Wind speed and humidity

Leverage Statewide Network

- Over 300 points of presence in Oregon
- Real-time transport of data