UNIVERSITY OF OREGON

Senator Fred Girod
Representative Paul Holvey
Subcommittee on Capital Construction
Joint Committee on Ways and Means
Oregon State Legislature
May 2, 2019

RE: **External Validation of ALERTWildfire**

From: Prof. Doug Toomey, University of Oregon

The ALERTWildfire system is used extensively in Nevada and California, where the system is more fully built out. Since 2016, the ALERTWildfire technology has been involved in over 500 fires in that region, resulting in testimonials and news articles. A few of these are provided below to provide external validation of the benefit of the system.

QUOTES FROM EXTERNAL USERS

BLM: Paul Petersen, Nevada State Fire Management Officer (and early funder)

"Whenever we get a report of a fire, we're able to turn the camera to whatever that location is, confirm it and if the fire's higher than what the response level dictates for that day, we can also adjust that response level from our dispatch centers."
https://www.kunr.org/post/blm-utilizing-mountaintop-cameras-help-combat-wildfires#stream/0

"The cameras are strategically sited to provide a landscape overview," Petersen said, adding all have on-demand time-lapse to allow playback through different time periods.

"This cameras network gives fire managers a real time picture of what is happening from both a weather and fire-behavior standpoint," he said.
https://www.reviewjournal.com/local/local-nevada/high-tech-cameras-watch-for-fires-atop-nevada-mountains/

USFS: Mac Heller, dispatch manager, Camino joint USFS-CalFIRE ECC

"If the cameras only show a little fire activity, we'll send a smaller response," he said. "If a fire is actually taking off, moving very quickly, then we can increase the response as well. We'll know in 20-30 seconds and that is the beauty of it."
https://www.unr.edu/nevada-today/news/2018/alertwildfire

Heller notes the cameras can be used in multiple ways. "We are using them to monitor burning projects for prescribed fires, as well as detecting wildland fires," he says. "When we get a smoke report, we use a camera to look at the area of the report and then use computer-aided dispatch for a wildland high, medium, or low dispatch plan." A wildland high dispatch means two air tankers, an air attack and lead planes, a helicopter, six to eight engine companies, a couple of hand crews, a bulldozer, and water tenders, Heller says. "A wildland high dispatch puts a lot of assets at risk," he adds. "With monitoring by camera, we can tell what the smoke column is doing and maybe drop the dispatch down to an engine, a patrol unit, and a chief officer."

https://www.fireapparatusmagazine.com/articles/2017/01/petrillo-wildland-fire-camera-system.html

CalFIRE/REDCOM: Aaron Abbott, Exec. Director

"This was the perfect example of how these fire cameras are supposed to work," said Aaron Abbott, Executive Director of REDCOM, the countywide dispatch center for fire emergencies. "We'll never know if this fire would have gotten out of control and burned several hundred acres, or even more. But we know that it didn't. CAL FIRE was able to put the right resources on it and the right incident command and it was controlled quickly." https://sonomacounty.ca.gov/Water-Agency/Press-Releases/Cameras-Highlighted-in-Detection-and-Suppression-of-Wildland/

CalFIRE: Chief Ben Nicholls,

CAL FIRE Chief Ben Nicholls said the cameras helped locate the fire and saved time and resources in sending firefighters and equipment to the correct location. "This was critical in terms of saving time by not committing resources to the wrong location and being out of position," he said. "It was the perfect case scenario for the use of these cameras to locate fires."

COMPARISON OF ALERTWILDFIRE WITH ENVIROVISION

COUNTY OF MARIN - NEWS RELEASES - FIRE CAMERA NETWORK (COUNTY OF MARIN, 12/18/2018)

Link: https://www.marincounty.org/main/county-press-releases/press-releases/2018/fire-cameras-121818

Key Points:
- MCFD worked with Sonoma and Napa counties, Pacific Gas & Electric Company and ALERTWildfire.org to create a comprehensive camera network that covers locations in three counties.
- AlertWildfire cameras replaced EnviroVision cameras

Quotes:
- *"**There were some limitations to the old system [EnviroVision]**, such as only receiving updated photos from the cameras every 15 minutes and having the cameras locked to show only one direction," said MCFD Deputy Chief Mark Brown. **"The current system [AlertWildfire] allows us to move the cameras to the location of our choice and provides new images to the public every 20-30 seconds. This is a major upgrade, and the imagery is pretty amazing."***
- *"Expanding the network is a goal because response time and fire location accuracy are critical to suppression efforts. It is most often the first few hours of a wildfire when the most devastation occurs. **These cameras really enhance the quick detection and intelligence gathering we need to help preserve life and property."***

Deputy Chief Mark Brown, Marin FD, highlights (below) how EnviroVision's software never beat 911 in its 4 years of operations

Link: https://www.marinij.com/2018/12/26/marins-new-fire-cameras-link-to-statewide-system/

Marin's former camera system, developed by EnviroVision Solutions, was supposed to use mathematical algorithms to detect smoke, but Brown said that feature never panned out. "The background work to make that detection system work was super intensive and required constant work," Brown said. "We never had an instance in the four years we were using the cameras where they detected a fire prior to a human being."

CAMERAS NEAR CAMP FIRE DID RECORD IN EARLY STAGES: CAL FIRE

Link: https://www.actionnewsnow.com/content/news/Cameras-Near-Camp-Fire-Did-Record-in-Early-Stages-Cal-Fire-503497561.html

Key Points:
- News article points out that EnivroVision camera, recorded the Camp Fire.
- However, Cal Fire says the [EnviroVision] cameras did record the fire **but did not set off an alert** when it started.
- Cal Fire had the alarm feature turned off. **They reasoned that the cameras set off too many false alarms when they detected any movement like a tree swaying in the wind.**

NEWS OF NORTH BAY VIDEO: PEPPERWOOD RESERVE

Well done video of installation and how cameras will be used:

https://newsofthenorthbay.com/2019/01/critical-fire-camera-goes-up/

CALIFORNIA'S NEXT GOVERNOR HOPES TO GET THE JUMP ON FIRES BY EXPANDING THE STATE'S HIGH-TECH EARLY WARNING CAMERA SYSTEM (CNBC, 11/16/2018)

Link: https://www.cnbc.com/2018/11/16/california-hopes-high-tech-cameras-can-help-stop-fires-before-they-grow.html

Key Points:
- California Gov. Gavin Newsom's high-tech plan to fight wildfires, which he outlined during the campaign, is now getting renewed attention, with the state facing longer and more devastating fire seasons.
- Some experts have called the project a "game-changer."
- PG&E, the parent company of the Pacific Gas & Electric utility unit, is expected to become a major player in the early warning camera expansion, CNBC has learned.

Quotes:

*"**I can't speak highly enough about these cameras**, and it really was an easy decision to make to invest in them," said Caroline Winn, **chief operating officer for SDG&E.** "It really has been*

a game-changer in terms of raising our situational awareness and helping us to mitigate the risk of wildfires."

"***PG&E spokeswoman*** *Mayra Tostado tells CNBC the utility has a goal of having **600 cameras by 2022**, covering roughly 90 percent of its service territory. The San Francisco-based utility already has funded some of the camera technology in the North Bay region.*"

ALERTWILDFIRE PARTNERS WITH GEOLINKS TO DEPLOY FIRE DETECTION AND PREVENTION SYSTEMS ACROSS CALIFORNIA (BUSINESS WIRE, 11/29/2018)

Link: https://www.businesswire.com/news/home/20181129005106/en/ALERTWildfire-Partners-GeoLinks-Deploy-Fire-Detection-Prevention

Key Points:
- The public-private partnership is actively deploying Wildfire Detection, Prevention, and Situational Awareness Systems across a coalition of utility and county assets to enable fire detection and predictive modeling

Quotes:
- *"With ample endorsement from the United States Forest Service (USFS), the Bureau of Land Management (BLM), California's new Governor-elect Gavin Newsom, and a multitude of utilities and state counties, the project demonstrates the future and next step in advanced firefighting and suppression."*

What Utilities Can Do to Strengthen the Grid (Wall Street Jounal, 1/22/2019)

Link: https://www.wsj.com/articles/what-utilities-can-do-to-strengthen-the-grid-11548170957?emailToken=56793af3cda20070ec6d27595c3392cczN97eWErjeKQVaozajC9v1D/PzgyO0bj9xQ/yKnsYeAwyubSUukNerkPdmbDqJAtjKuPUswLL2P+IaGoJE7ZTi/uhoAGVYQTqm1mq6SdWVs%3D&reflink=article_email_share

Key Points:
- Utilities in the West have built camera networks that help them monitor the remote parts of their service territories. The cameras are often installed on telecommunications towers atop high peaks, and when they spot a fire, they can triangulate to give utilities and firefighting agencies a precise location.

Quotes:
- "You know what you're dealing with immediately," said Brian D'Agostino, director of fire science and climate adaptation for San Diego Gas & Electric. (SDGE is an early adopter and Brian would be able to provide comment on the usefulness of cameras)

MESSAGE FROM LOUIS FOX, DIRECTOR OF CENIC.

The following message was sent in the aftermath of the Camp Fire.

About CENIC: *CENIC connects California to the world —* advancing education and research statewide by providing the world-class computing network essential for innovation, collaboration, and economic growth. Established in 1997, this nonprofit organization operates the **California Research and Education Network (CalREN)**, a high-capacity computer network with more than 8,000 miles of optical fiber. The network serves over 20 million users across California, including the vast majority of K-20 students together with educators, researchers, and individuals at other vital public-serving institutions.

From: Louis Fox <lfox@cenic.org>
Subject: [Cenic-board-assistants] Wildfire update: CENIC associates
Date: November 18, 2018 at 9:13:42 AM PST

Dear Board Colleagues,

Thank you to those among you who have sent notes, publicly and privately. I've shared these messages with the CENIC staff, particularly the NOC staff who are working assiduously with our commercial partners to restore services to critical community anchor institutions, which are often central sites for first responders and for communities during emergency situations. We will certainly do our part (albeit a small one in contrast to the enormity of these disasters) and I write to again enlist your help, particularly those of you who have been in contact with your colleagues.

I write with some updates and a request to those of you who are in touch with colleagues in affected areas.

We have lists of those **CENIC associates who have lost service** and those who have lost diverse circuits. For now, we are focusing on the former.   Here the list (what we know of as of today; we will continue to update these lists):

Butte County Library - lost total connectivity

CSU Channel Islands - outage began 11/16
Modoc COE - lost total connectivity
Modoc County Library - lost total connectivity
Oxnard Public Library - lost total connectivity, outage began 11/16
Pepperdine University - lost total connectivity to main campus
Ventura County CCD Office - lost total connectivity

The NOC staff are currently gathering traffic data and contact information and will begin calling sites tomorrow. Where our demarcation point is a County Office of Education or a CC District Office, these calls will provide us additional information about sites aggregated behind the COEs or CCDs.

If you have been in touch with colleagues at any of the sites above (or those "behind" them, i.e., where the COE or CCD is the network aggregator), would you please let Stanley Han, our NOC leader, know any details, so that our staff may factor these into our response(s). Stan's email is above.

Given that the time to restore services can be lengthy where fiber has burnt, I have been in contact with our colleagues at GeoLinks to see where their existing infrastructure might be leveraged in the near term to restore some level of services. **GeoLinks has generously offered to assist with temporary services** (most at <100Mbps, but some service is better than none), free of charge, donating both the service and their support efforts, using their existing towers and links. If you should be one of the board members (or your colleagues) who follow up with Stanley Han (as above), I have shared the list with him and he can fill you in on the details.

Lastly, and this is a more forward-looking, but urgent, effort, given the increased frequency and severity of these wildfires: our collaboration with colleagues (UCSD, SDSC, Scripps, UN Reno, U Oregon, Cal OES and CalFire, GeoLinks, key utilities, and the Legislature) to deploy appropriate technology and fire telemetry statewide is moving expeditiously. The CalREN/CENIC role is largely for backhaul to SDSC and other research sites for the truly remarkable and absolutely critical predictive analytics they have been providing to first responders, community leaders, and community members, and via our extensive settlement-free peering infrastructure to key research clouds like Amazon and Google. I've attached a brief overview of the project, which has been shared widely. There is longer narrative that I will share at our upcoming board meeting (or before, if you request it).

Please do not hesitate to contact me or Stan with any other information or need, regardless of day/time. Email or text for me (text: 406.600.8101) are probably best. There will be much to do in the days and weeks ahead to assist our fellow Californians whose lives have been swept up in this tragedy.
Louis

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ShakeAlert is live for institutional users in Oregon; state-wide coordination leads the way to public rollout.

Public and private partners are working together to improve seismic monitoring and implement an onshore public earthquake early warning system on the west coast, known as ShakeAlert.

Alerts will provide seconds to minutes of warning of impending ground shaking, allowing individuals to carry out pre-determined actions for safety and, through automation, industry, utilities, and transportation sectors will be able to power down or protect critical operations.

Legend
- Proposed new stations
- Stations needing EEW upgrade
- Stations contributing to EEW

2019 Updates:

- ShakeAlert, the earthquake early warning system being developed by the U.S. Geological Survey (USGS) and West Coast colleagues, recently received a significant increase in federal funding.
- The **FY18 omnibus** spending package passed by Congress and signed by the President in March allocates **$12.9 million** for continued development and a phased rollout of the system and **$10 million** for capital costs associated with earthquake sensors buildout and system infrastructure. The omnibus action more than doubles the funding for ShakeAlert by making a significant investment in the necessary seismic network infrastructure that supports the alert system.
- UO and ShakeAlert plan a phased rollout. UO will continue to seek public and private financial support.
- The Oregon Department of Geology and Mineral Industries (DOGAMI**)**, via the state's seismic instrumentation fund, provided the UO ~$174K to accelerate network build-out. USGS provides UO funds to install, operate, and maintain these critical sites.
- UO, on behalf of the Pacific Northwest Seismic Network (PNSN) and the Oregon Dept. of Transportation (ODOT), expanded an Inter-Governmental Agreement to use state data transport and physical infrastructure for ShakeAlert and ALERTWildfire.
- The Oregon Committee for ShakeAlert Communication, Education, and Outreach (ORCCEO) continues to facilitate Oregon's rollout and usage of the ShakeAlert program.
- USGS awarded an additional $110K to support Technical User Working Group and Emergency Management Coordinator positions within Oregon. These efforts are closely coordinated with Oregon Office of Emergency Management (OEM), ORCCEO, and DOGAMI.
- **Governor Kate Brown has directed the State Resilience Office to implement a statewide emergency warning system by 2023 that ties multi-hazard events: earthquake, wildland fires, landslides, and flooding events into one alerting and monitoring system.**
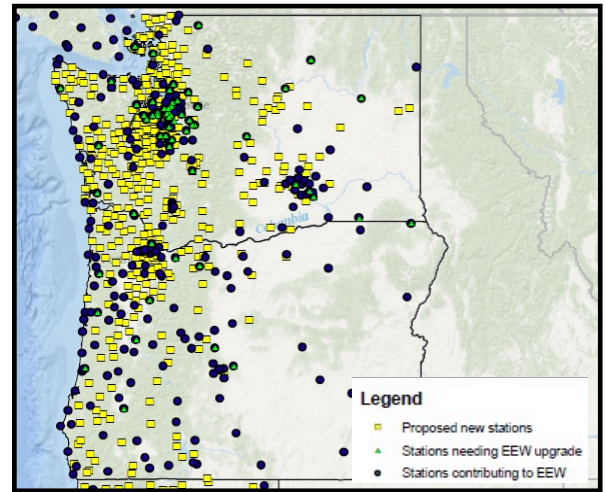
BACKGROUND: For nearly 30 years, the University of Oregon, through Earth Sciences faculty and associated technicians, has been responsible for maintaining and monitoring sensors and stations located in Oregon. The Pacific Northwest, lying in the Cascadia Subduction Zone, has the potential for some of the most violent earthquakes. Yet it lacks a fully instrumented earthquake early warning system—a common place safety precaution in other places that have as much seismic activity. ShakeAlert will monitor the San Andreas Fault in California, the Cascadia Subduction Zone, and numerous other crustal faults.

What will be the impact of State of Oregon funds, if awarded in 2019?

Governor Brown's resiliency agenda calls for a system that addresses multiple hazards in Oregon. The impact of this funding will accelerate ShakeAlert, and grow a multi-purpose hazard monitoring program.

- Funding will complete the ShakeAlert system in Oregon, thereby allowing public alerts to be issued
- Strengthen the data communications platform, ensuring functionality during disasters
- Accelerate growth of the ALERTWildfire monitoring platform throughout Oregon
- Ongoing **federal** support for long-term operations and maintenance via ShakeAlert is critical

What is ALERTWildfire?

ALERTWildfire is a consortium of three universities — The University of Nevada, Reno (UNR), University of California San Diego (UCSD), and the University of Oregon (UO) — providing access to state-of-the-art Pan-Tilt-Zoom (PTZ) fire cameras and associated tools to help firefighters and first responders: (1) discover, locate, and confirm fire ignition, (2) quickly scale fire resources up or down appropriately, (3) monitor fire behavior through containment, (4) during firestorms, help evacuations through enhanced situational awareness, (5) ensure contained fires are monitored appropriately through their demise.

Figure 1 - ShakeAlert implementation sites

ShakeAlert Communication, Education, and Outreach Updates:

Projects in Oregon, partners are using ShakeAlert:

o Southern Oregon's **Rogue Valley Council of Governments (RVCOG)** is pioneering the first region-based pilot, with focus on coordination across multiple sectors in alert socialization.
o **EWEB**, is operating a live system at the Leaburg canal.
o **Oregon Department of Transportation (ODOT)** is working toward automating bridge closures along coast and Portland.
o **RH2 engineering** is assisting multiple water municipalities. Their first live system is in Grants Pass, and more will go live in 2019 (Albany, Gresham, Oregon City).
o **Syn-Apps** is developing a custom module that would allow their Revolution alerting software to automatically receive alerts from USGS via ShakeAlert. Syn-Apps currently integrates with National Weather Service, AMBER Alerts, & IPAWS EAS CAP feeds to deliver federal alerts.
o The ShakeAlert Oregon Committee for ShakeAlert Communication, Education, and Outreach (ORCCEO), is providing input unique to State of Oregon needs.
o In 2017 the USGS formed the ShakeAlert Communication, Education, and Outreach (CEO) Plan, which extends into September of 2019. Inputs from ORCCEO on partner priorities, concerns, and needs drove the plan's content.

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