Pano AI
Actionable Intelligence For Wildfire Management
Demo Day – October 19th, 2021

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About the Need & Opportunity

This pilot project is intended to demonstrate the viability of terrain viewing cameras and machine learning algorithms to support utility wildfire resilience with **early identification and ongoing situational awareness of wildfire threats**.
About the Technology

Pano’s Rapid Detect platform uses continuously rotating ultra-HD mountaintop cameras, AI, and intuitive software to improve wildfire situational awareness. Using the Pano 360 web interface, multiple users can simultaneously view 360-degree live panoramic imagery, respond to AI-generated smoke alerts, and triangulate a fire’s location.
Project Phases

**PHASE 1**
Use Case Identification, Metrics Definition & User Onboarding

- **June 14 - July 31**
  - 1. Utility workshops to assess current methods of wildfire detection and monitoring
  - 2. User workflow & training module development, designed to address identified pain points in detection and monitoring
  - 3. Alignment on key success metrics based on identified pain points

**PHASE 2**
System Testing & Evaluation

- **August 1 - October 6**
  - 1. System operations / demonstration (ongoing use of Pano system)
  - 2. Feedback collection & progress tracking (user interviews/surveys, data logging, etc.)
  - 3. Program management & metrics read-outs (weekly check-ins to review progress and results)

**PHASE 3**
Read-out And Next Steps

- **October 6 through end of fire season**
  - 1. Performance evaluation (synthesis of data/feedback collected, analysis to inform key takeaways)
  - 2. EPRI demo day & final results read-out, including potential for system scalability
  - 1. Next steps (continued use and evaluation through end of fire season for participating utilities)

**Key question to answer**

- **PHASE 1**
  What pain points exist in current situational awareness processes and how can the Pano tool address these?

- **PHASE 2**
  How well does the Pano system do at addressing these pain points?

- **PHASE 3**
  What are the final results, and what are the implications for how the Pano system can support utility situational awareness more broadly?
An Overview of Pano’s 2021 Pilot Deployments

23 Pano Stations across four states were deployed this fire season.
Example Pano Station Deployments

 Cloverdale, California Deployment

 Portland, Oregon Deployment

 Aspen, Colorado Deployment
Rapid Deployment Occurred Across Multiple States

Illustrative timeline

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<th>W1</th>
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<td>- System testing &amp; configuration</td>
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<td>User onboarding</td>
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Pilot Evaluation Metrics

Time to detection:
- Time to detection histogram of Pano detections
- For each incident that has smoke visible in Pano’s stations, time to detection by Pano relative to:
  - Smoke visible in camera
  - Earliest known detection time
  - IRWIN alerts used by utilities

Accuracy of detection:
- Demonstrate accuracy of detection for wildfires caught during the 2021 fire season

Incident intelligence:
- Number of page views of Pano incidents
- Time per user spent on Pano 360
- Qualitative - other intelligence derived from Pano feed

Software functionality:
- Triangulation accuracy
- Intuitiveness of the platform
- Ongoing improvements to functionality and performance based on partner feedback
Key Software Functionality Evaluated

Automated smoke detection and alerting

Multi-camera incident location triangulation

Utility infrastructure overlay
Key Software Functionality Co-Developed
Weekly feedback sessions with PG&E, PGE, and EPRI resulted in new features deployed during the pilot

Feature 1:
Deployed - Bearing scale on the image player that shows the compass direction

Feature 2:
Deployed: Viewshed compass widget that updates in real time as the full screen player change's view

Feature 3:
Email incident updates to provide additional situational awareness.
Key Software Functionality Co-Developed
Weekly feedback sessions with PG&E, PGE, and EPRI resulted in new features deployed during the pilot

Feature 4:
Map view widget on top of the full screen player, which shows the map viewshed in context to the 360 imagery

Feature 5:
Incident Timelapse, 3-hr lookback, and click-able player scrubber

Feature 6:
Incident Details and Station Details header update
Time to Detection by Pano Relative to Visible Smoke

Pano AI Production Model, Test Set - October 2021
Pano’s False Positive Rate

The false positive rate significantly decreased throughout the pilot as Pano’s AI model learned from previous false positive data collected from our 23 Station Deployments.

**False Positive Rate By Model Version / Time Period**

*Accuracy rate of Pano email + text alerts to utilities was 90%+ throughout the pilot*

Example of false notifications included: Geysers, Industrial Smoke, Prescribed Burns, etc.
Accuracy of Detection: The Round Fire Example

Labor Day, Pano AI detected, provided real time visibility, accurate location information and timely situational updates for the Round Fire.

The Round Fire, a RV fire that eventually spread to vegetation, was called in at 1:15pm and detected by Pano AI at 1:14pm.
Pano 360 Application: Pilot User Groups

During the Summer 2021 Pilot season, Pano 360 has been used by Utility and Government groups

**Electric and Water Utilities**

- Aspen FPD
- Clackamas FPD
- Big Sky FPD
- Felton FPD
- Hoodland FPD
- Napa FD
- Scotts Valley FPD
- Sonoma FPD
- South Lake County FPD
- Woodside FPD
- CALFIRE
- ODF - Bullrun Fed Lands
- USFS (Colorado, Oregon, California, Montana)

**Fire Agencies**

- Gallatin County, MT
- Gresham County, OR
- LA County, CA
- Pitkin County, CO
- Madison County, MT
- Santa Clara County, CA
- San Mateo County, CA
- Santa Cruz County, CA
- Sonoma County, CA

**Government**

- City of Aspen
- City of San Bruno
- City of Malibu
- Redwood City
- City of Portland
- USDA
- CaliforniaParks
Our Team

Utility Representatives:
Yen Ha (PG&E) - Sr. Business Process Analyst, Wildfire Safety Operations
Jay Landstrom (PGE) - Sr. Manager, Wildfire Analytics R&D

Pano Representatives:
Sonia Kastner - CEO
Arvind Satyam - Chief Commercial Officer
Stephen Murdock - Director, Business Development

EPRI Representative:
Doug Dorr - Program Manager & Erik Steeb I.E. Leadership

Thought Leadership Contributors:
Ben Almario, Damien Inglin and James Ridgway (PG&E)
Sandra Johnson and Darren Karnes (Excel Energy)
Anthony James (SCE)