



# Pacific Northwest NATIONAL LABORATORY

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Managing complex emergencies, from acute incidents to long-term events, demands new approaches to collaboration and decision support. Precision Information Environments will improve the way people interact with each other and with information throughout the emergency managements lifecycle, from planning to response, recovery and mitigation.

## Precision Information Environments

Unforeseen events, such as the Hudson Bay incident, medium duration events, as in large wildfires, or long term events, such as continuing droughts, require collaborative response efforts. Those on the front line often can get overloaded as multiple agencies provide critical information and tools for support. Not all disasters or events that need support are unforeseen. Some are planned events, like a sporting event, while some give a modest amount of advance warning, such as a hurricane. Whether planned or unexpected, a tighter collection of cooperative methods and data sources can address these challenges and the face of event response.

Researchers at Pacific Northwest National Laboratory are developing future work environments for the emergency management community. These Precision Information Environments (PIEs) will provide tailored access to information and decision support capabilities in a system that supports the multiple user roles, contexts, and phases of emergency management, planning, and response. A Precision Information Environment will provide analytic and simulation capabilities through novel interactions that transform the way stakeholders – from first responders to policy makers -- engage with each other and with information. These new approaches will result in multi-data type, multi-use environments based on a common hardware and software architecture.

### PIE PROTOTYPES

#### Activity Awareness

- ▶ Designed and tailored around specific Emergency Management needs for data aggregation and communication
- ▶ Ingests large-scale data from a variety of sources, including online media or enterprise databases
- ▶ Analyzes unstructured text, automatically detecting relationships in data
- ▶ Identifies trends and depicts their change over time
- ▶ Depicts and filters spatial references in data, giving users insight into geographic patterns
- ▶ Tailors the level of complexity and content to a user's needs, activities, and level of interest based on a unique user modeling and recommendation system.
- ▶ Promotes situation awareness by illustrating a snapshot of the current status of events, activities, tasks, and communications and presenting it to an emergency response professional in a way that's easy to understand.



U.S. DEPARTMENT OF  
**ENERGY**

## Livewall

Emergency Operations Centers (EOCs) across organizations and jurisdictions need to communicate regularly during routine and emergency events. However, most collaboration technologies – such as phone, email, shared status boards, or desktop videoconferencing – are typically poor substitutes for face-to-face coordination.



The LiveWall system improves cross-EOC coordination by giving EOCs a life-size, always-on, digital “portal” into other locations.

In contrast to typical telepresence systems, LiveWall provides a continuous live feed of other facilities, enables “walk up” conversations, and requires no special meeting codes or fees. It simply provides a real-time, digital window into another EOC, together with a simple interface for choosing which other EOCs to view and the ability to lock down a feed for private discussions.

See a video of the LiveWall at:  
<http://vimeo.com/25094355>.

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## Situation Mapper

Emergency responders routinely perform “windshield assessments” in the field by communicating current status of events, emergency situations and critical infrastructure up to dispatch and Emergency Operation Centers. These assessments are typically done manually and communicated in person.

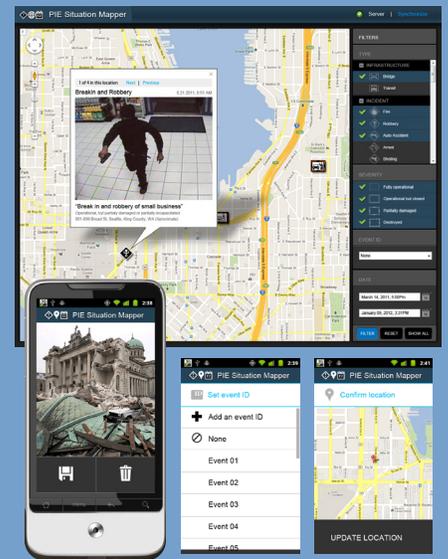
The Situation Awareness Mapper (SA Mapper) application allows the responder to perform these assessments digitally and in real time using mobile devices already in use in the field. With SA Mapper, any trusted agent (who may be affiliated with the fire department, police department, or other response agency) can contribute images and data to support the larger emergency operations situational awareness.

The system consists of an Android application, cloud-based repository, and website. The Android application is used to take a geo-tagged photo in the field, attach relevant metadata to create a record, and submit the record to the cloud-based repository. The records then become immediately available to stakeholders and analysts. A website includes some thin analytics where the records can be displayed on a map, in an image gallery, or as a spreadsheet. Alternatively, the records can be imported into existing situational awareness tools like the PIE Activity Awareness application.

SA Mapper enables timely communication between field agents collecting data and centralized analysts and decision makers.

### The Situation Awareness Mapper application allows:

- ▶ Easy image capture and metadata tagging using a mobile application.
- ▶ Central data collection and access using a cloud-based repository.
- ▶ Mapping and easy geo-analysis of incident images.
- ▶ Timely communication between field agents and centralized analysts.



## ABOUT PNNL

Interdisciplinary teams at Pacific Northwest National Laboratory address many of America’s most pressing issues in energy, the environment and national security through advances in basic and applied science. PNNL employs 4,600 staff, has an annual budget of nearly \$1 billion, and has been managed for the U.S. Department of Energy by Ohio-based Battelle since the laboratory’s inception in 1965.

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