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Accomplishments of Sandia National Laboratories in the Integrated Public Alerting and Warning System Project

The Federal Emergency Management Agency (FEMA) selected Sandia as their Information Management Architect for the Integrated Public Alert and Warning System (IPAWS). The goal of IPAWS is to expand the legacy Emergency Alert System (EAS) through the use of modern technology to reach the public directly and in a timely manner regardless of location through all modern media devices available to the public.

(Photo credit: William Koplitz, FEMA Public Affairs)

Issue

One of the most painful lessons of Hurricane Katrina was learning that the biggest gap in national emergency response capabilities occurred in information sharing and communications. In response, a Presidential Executive Order was issued to establish common alerting and warning protocols and procedures to enable the secure delivery of coordinated messages to the American people through as many communication pathways as possible. Department of Homeland Security Secretary Michael Chertoff defined 5 goals for the protection of the American people, including one that states: "Build a nimble, effective emergency response system and a culture of preparedness……we will fully implement the Executive Order on alerts, establishing a capability to reach 85 percent of the listening public within 10 minutes."

Sandia National Laboratories was brought into the Integrated Public Alerting and Warning System (IPAWS) project by the Federal Emergency Management Agency (FEMA) as an honest broker. As a leading national laboratory under the U.S. Department of Energy/ National Nuclear Security Administration, Sandia understood the technology to be integrated into IPAWS without having a product or service to sell.

Prior to IPAWS, FEMA's emergency alert system, known as the Emergency Alert System (EAS), had been in place since 1994, replacing the Emergency Broadcast System launched in 1963. The EAS enables the President to transmit a national alert to citizens, and it allows state and local government officials to send messages during non-Federal emergencies.

The mission of IPAWS—to send one message over more channels, to more people at all times and places—is well aligned with Sandia's national security mission and technical competence. Sandia's involvement in IPAWS was consistent with the role of a Federally Funded Research and Development Center (FFRDC) and the Homeland Security Act of 2002. Sandia has a long history in the design and development of command, communication, and control systems.

Sandia's IPAWS Accomplishments

In general, Sandia's role in IPAWS had two components: (1) serve as a knowledgeable, independent system architect and standards developer, and (2) engineer the deployment of a pilot system in Louisiana, Mississippi, and Alabama in time to help with the 2007 hurricane season. Sandia's tasks (outlined in the SOW) included:

- Technology and IPAWS architecture;
- Standards development,
- Initial IPAWS infrastructure deployment, and
- Project management and reporting tasks.

IPAWS has to work with public and private sectors to integrate warning systems to effectively communicate alerts via TV, radio, telephone, internet/computer, cell phone, and other personal communications devices. IPAWS also would allow:

- The President (or designated Federal officials) to communicate to the American people before, during, and after a crisis;
- The President and authorized federal government officials to gain situational awareness from state and local emergency operations centers;
- Effective communications to state and territory agencies, governors, tribal councils, and other alert and warning stakeholders; and
- State and local emergency managers to send messages to residents during non-federal emergencies.

Sandia's accomplishments in IPAWS consisted of:

- **Architecture Concept Development:** Based on vendor-neutral, open standards, Sandia developed a data-centric information-sharing architecture that is scalable and employs graded security. The architecture allows data exchange using policy- (or rule-) based concepts to allow event-driven information to get to the appropriate community of people at the

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right time. This architecture was developed to satisfy Executive Order No.13407 requirements.

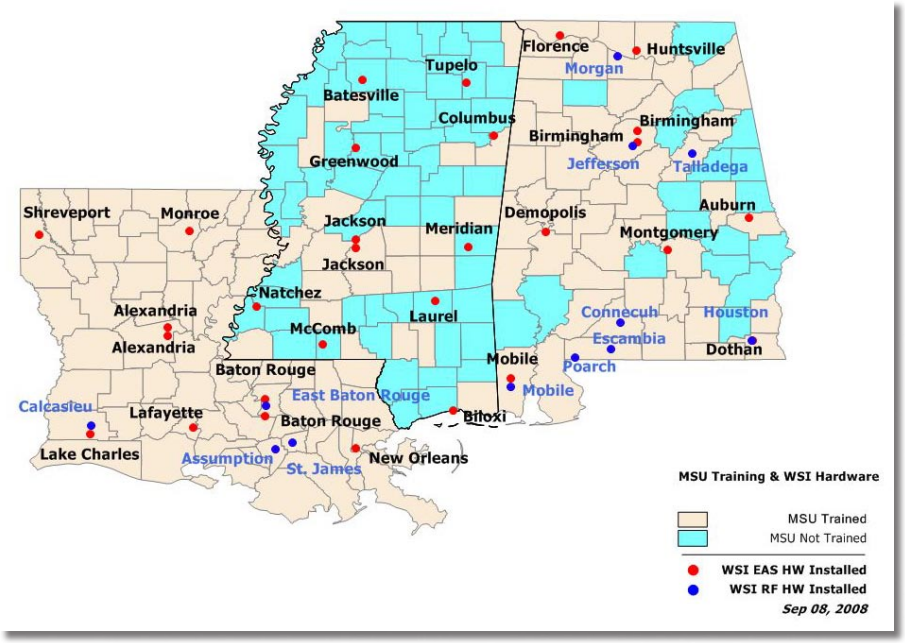
- **Advancement of Standards:** Sandia provided neutral-party input to develop standards by working with the Organization for the Advancement of Structured Information Standards (OASIS). Advocating the use of standards, Sandia provided a real case study using the alert and warning example. At FEMA's request, a Sandia employee participated and contributed on the Commercial Mobile Service Alert Advisory Committee (CMSAAC) technical sub-committee. Sandia also participated in the CAP 1.1 standard development that FEMA intends to adopt.
- **Spiral 0 Pilot Deployment:** Sandia engineered implementation of the Spiral 0 pilot deployment. This deployment was an upgrade to the Web Alert and Relay Network (WARN). The pilot deployment, sometimes referred to as WARN2, provided broader and deeper notification. The expanded breadth was increased geographical coverage to the county/parish level in Louisiana, Mississippi, and Alabama. The depth was improved by providing emergency telephone messages in three languages; opt-in text messages by email, cell phone, or pager; and deaf and hard of hearing notification. Sandia's worked included: the Emergency Telephone Notification (ETN) used by Mississippi's governor for Hurricane Dean; Opt-In demonstrated for Secretary of the Dept. of Homeland Security Michael Chertoff, Alabama's governor and Congressional delegation; the ETN tested with over 250,000 calls; over 700 American Sign Language (ASL) alerts generated, Sandia worked with vendors to train Emergency Operation Center (EOC) personnel in 138 counties/parishes; and Sandia developed working relationship with state EOCs and county/parish EOCs. The capability of this pilot and the lessons learned have become important elements in influencing the next phase of the FEMA public alerting and warning program and are documented in Sandia's final report, "IPAWS WARN2 Pilot Final Report", SAND2008-1362, February 2008. Much of this work included sub-contracts to commercial vendors specified by FEMA.
- **Prototype Secure Routers:** Sandia developed the technology for a High-Assurance Secure Policy-oriented Object Router (HA-SPOR) and demonstrated its concept in November 2007.

Making A Difference

Sandia's work with IPAWS made an important difference to safeguard the U.S. and the public by demonstrating:

- Electronic delivery of emergency alerts to the public utilizing commercially available services,
- New capabilities to meet public alerting gaps in the current EAS system,
- The promise of a national public/private emergency alert communication system,
- Ability to communicate emergency alerts quickly to an increased number of individuals during various times of the day, and
- Many venues are needed to effectively alert and warn the public.

Sandia remains committed to the U.S. Department of Homeland Security, FEMA, and the IPAWS mission. Sandia remains available to serve the role of knowledge-able, unbiased systems integrator for projects such as IPAWS.



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