Integrated Public Alert and Warning System (IPAWS)

Alerting the Whole Community: Removing Barriers to Alerting Accessibility

FEMA

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THE CHALLENGE

When implementing an alert and warning system that aims to reach everyone in the whole community, it's important to remember the wide diversity of needs and preferences of people when it comes to receiving information. It is quite possible that nearly 25%[1] of the U.S. population may need some form of assistance or accommodation to receive emergency alerts.

Consider the following[2]:

- Approximately 40.5 million Americans are over the age of 65 ("older adults")
- Approximately 54 million Americans have disabilities
    - 5 percent of children 5 to 17 have disabilities
    - 10 percent of people 18 to 64 have disabilities
    - 38 percent of adults 65 and older have disabilities
- Approximately 25.2 million of people in the United States have Limited English Proficiency (LEP)

Ensuring this significant portion of our population receives emergency alerts along with the rest of the whole community is one of the missions of the Federal Emergency Management Agency's (FEMA's) Integrated Public Alert and Warning System (IPAWS). With a clearly stated vision of providing "timely Alert and Warning to the American People in the preservation of life and property," and a goal of making alert and warning "more effective," IPAWS is cognizant of *accessibility* of the systems used to deliver alerts and warnings to the US public. The information needed to save lives and property cannot be wholly effective if it is not accessible by the whole community.

This paper serves to demonstrate how IPAWS addresses the challenges of reaching the whole community, including the 25% of our population who might need assistance. It offers compelling evidence that, while IPAWS doesn't solve all of the challenges, it can certainly mitigate them – particularly with greater stakeholder engagement and public awareness.

[1] Based on census data, adjusted to remove duplication.

[2] http://quickfacts.census.gov/qfd/states/00000.html, accessed 4/26/2012

How are Alerts Received?

A key idea of IPAWS is that there is no single way to alert everyone at the same time. Not everyone will be watching TV or listening to the radio when a tornado approaches. Not everyone will hear the sirens. Not everyone owns a weather radio. Clearly, the only way to reach the whole community is to cover as many pathways of communication as possible.

But what about people with access and functional needs? Are they likely to receive alert and warning messages through mainstream communication pathways?

In a nationwide survey of people with disabilities conducted from November 2012 - January 2013, the Rehabilitation Engineering Research Center for Wireless technologies (Wireless RERC), a leader on issues and solutions related to accessibility and usability of mobile wireless devices and services, reported that the following media was used by those with access and functional needs to receive, verify, and share public alerts[3] in ranking order:

1. Television
2. Text Message
3. Email
4. Phone Call (mobile or Landline)
5. Sirens
6. Radio
7. Observation
8. Internet News
9. NOAA Weather Radio
10. Social Media (Emergency Management)/Direct Contact with someone nearby
11. Social media (Personal Network)
12. Smartphone App
13. Instant Message/Chat
14. TTY

Compared to a similar study[4] conducted from November 2010 – January 2011, **text messaging moved up the ranking order from 6th to 2nd place** as a method of receiving emergency alerts.

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[3] Morris, John, Ph.D., Wireless RERC Presentation for the International Technology and Persons with Disabilities Conference, *Social Media, Public Emergencies and Disability*. May 13, 2013.

[4] Wireless RERC. Emergency Communications and People with Disabilities: 9-1-1 Communication, Public Alerts, and Social Media, Summary Report from the 2010-2011 Emergency Communications Survey. June 2011. http://www.wirelessrerc.org/content/publications/emergency-communications-survey-full-report-june-2011

How Does IPAWS Help?

One doesn't need an engineering degree to understand the basics of how IPAWS works to accommodate multiple modes of delivery, including those that support accessibility. FEMA has built a system that acts as a message "gateway" for alerts and warnings. It's called IPAWS-OPEN ("Open Platform for Emergency Networks"). In the event of an emergency, an authorized alerting agency (State, territorial, tribal, local, or Federal) will use a software program as an alert origination tool to create a geo-targeted alert. The alert will be sent first to the IPAWS-OPEN system which will automatically check the message to ensure it originated from an authorized alerting authority. IPAWS-OPEN then delivers the alert simultaneously to a variety of public alerting systems, which in turn deliver it to modes of communication the public uses. The entire process occurs almost instantaneously.

Because the message is pushed to the public through multiple pathways, it helps ensure everyone has access to the information through one system or another.

Introducing Wireless Emergency Alerts…

One of the newest pathways for sending information through IPAWS-OPEN is Wireless Emergency Alerts (formerly known as Commercial Mobile Alert System, or CMAS), a system designed to send short, attention-getting alerts to mobile devices. WEA results from collaboration between wireless carriers, their regulators in the Federal Communications Commission (FCC), and FEMA. WEA was technically launched in April of 2012, and is currently being rolled out throughout the nation. WEA is an "opt out" rather than "opt in" initiative. Most new mobile devices are set to receive the alerts, and the public does not need to sign up.

It is estimated that more than 90% of people in the United States are mobile subscribers.[5] Obviously, this level of connectivity represents an opportunity for an unprecedented range of alert and warning capabilities.

[5] http://arstechnica.com/telecom/news/2010/03/wireless-survey-91-of-americans-have-cell-phones.ars

Cellular Broadcast

The easiest way to understand the functionality of WEA is to think of it as a "broadcast." WEA's short, text-like alerts are sent to the public through Cell Broadcast (CB) technology. Unlike Short Message Service (SMS), which sends text messages back and forth between your device and other devices of your choosing, CB technology uses cell towers in a particular location to "broadcast" a message to WEA equipped phones within range of the towers. Imagine it like a radio-broadcast for cell-phones: much like a radio can tune in to receive the signal from a particular station, a WEA equipped cell-phone is always "tuned in" to receive WEA messages.

Does WEA Help Serve the Whole Community?

Are mobile notifications, like the WEA messages, relevant to people with functional and access needs? In a word, yes. There is no doubt that wireless technology carries enormous potential as an "assistive technology" that enhances communication and information sharing for *everyone*. A wireless device (i.e. Smartphone) is considered an assistive technology device, as important as a wheelchair may be for people with mobility needs. Consider the following:

- **People with Access and Functional Needs:** It is a common misconception that people with access and functional needs, especially people who are blind, deaf, or paralyzed, do not use cellphones. Beginning in 2001 the Wireless RERC has conducted a periodic Survey of User Needs to determine the level of wireless product use among people with disabilities, encompassing more than 1600 respondents. The 2012 survey showed that 92% of respondents with disabilities use wireless devices (53% smartphones and 32% feature phones). An earlier analysis revealed that 65% used wireless every day, and more than 77% of survey respondents indicated that wireless devices were very important in their daily life.[6]

- **Older Adults:** People over the age of 65 should not automatically be lumped into a technophobe category. In a 2010 survey of Americans, over the age of 18, researchers at the Pew Research Center found that 68% of adults between the ages of 66-74 owned a cell phone, and 48% of adults over the age of 75 owned a cell phone.[7] Cell phone technology has the ability to address many needs of this group of people, both

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[6] Wireless RERC. *SUNspot – Use of Wireless Devices by People with Disabilities*, Volume 2013, Number 01 – January 2013. http://www.wirelessrerc.org/sites/default/files/publications/SUNspot_2013-01_Wireless_Devices_and_People_with_Disabilities_Final%5B1%5D.pdf.

[7] http://pewinternet.org/Reports/2011/Generations-and-gadgets/Overview.aspx

now and moving forward, as a means of accessing information and maintaining independence.

- **Limited English Proficiency:** As a communication device, cell phones provide considerable value to LEP populations. Not only are mobile devices used to communicate within their respective communities, the growing body of translation tools available make newer phones an indispensable tool for LEP individuals seeking access to the world around them.

The bottom line is that people with access and functional needs and/or limited English proficiency use their mobile devices not just as a lifeline in case of an emergency, but as an assistive technology that can expand independence and access to the world of communication. In fact, according to the National Research Council's Committee on Public Response to Alerts and Warnings on Mobile devices, the prevalence of wireless devices in communities of people with functional and access needs "is the same, if not higher, than the general community at large."[8] The increasing affordability of wireless technology, along ever-evolving capabilities for translation, captioning, vibration, tones, and text-to-speech mean that CMAS/WEA as a system has the potential far greater reach among people with access and functional needs than one might expect.

Additionally, CMAS/WEA uses unique tones and vibrations to bring attention to a Wireless Emergency Alert (WEA). Thus individuals, including those with access and functional needs who own a wireless capable device, will be able to:

a. hear a different audible beep for emergency alerts
b. see a written alert message with up to 90 characters, and
c. feel a unique vibration notifying them of the emergency alert.

[8] National Research Council. "5 Communicating with At-Risk Populations." *Public Response to Alerts and Warnings on Mobile Devices: Summary of a Workshop on Current Knowledge and Research Gaps*. Washington, DC: The National Academies Press, 2011. 1. Print, p38. Accessed online at: http://www.nap.edu/openbook.php?record_id=13076&page=38

A growing array of assistive applications can also be downloaded to further expand the assistive capabilities of mobile devices. For example, current apps available for download may provide:

a. a light or visual flash when emergency alerts come through their phone
b. a text-to-speech app to hear the emergency alert, and
c. or allow text to be converted to American Sign Language.

The Emergency Alert System

The Emergency Alert System (EAS), another IPAWS program, also helps ensure the whole community is alerted in an emergency. The backbone of EAS is a vast network of radio and television stations across the country. Per the Wireless RERC study, television is the **TOP** media used by those with access and functional needs to receive and verify public alerts.[9] Radio is ranked sixth of the sixteen methods studied.

FEMA and their EAS partners, including broadcasters, have been strengthening the nation's EAS system. More primary entry point stations have been added, other infrastructure enhancements have been made, and the first-ever nationwide EAS test has been conducted.

Other IPAWS Accessibility Opportunities

The IPAWS program invites a wide variety of other accessibility products and services to participate in the national effort to make alerts more accessible. This is made possible because of common standards used for creating and disseminating alert information through IPAWS. By adopting standards, developers of accessibility products and services can modify their products and services so end-users will receive alerts issued through the IPAWS system.

At a FEMA workshop in April 2012, several companies provided models and examples of the possibilities by showing how their accessibility products and services can work within the IPAWS environment. Marcie Roth, Director of FEMA's Office of Disability Integration and Coordination (ODIC) was enthusiastic. She said, "I am excited about our industry partners and that they have been taking a good hard look at what it will take to make this work for everyone. It shows that they see it as the opportunity it really is."

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[9] Morris, John, Ph.D., Wireless RERC Presentation for the International Technology and Persons with Disabilities Conference, *Social Media, Public Emergencies and Disability*. May 13, 2013.

- A company called Signtel displayed systems for alerts in simultaneous voice, text, lip reading and sign language for use with electronic billboards, large monitors, laptops, and mobile devices. They pointed out that during a typical Emergency Alert System (EAS) activation, people are generally attentive and responsive. However, they said, when a person who is deaf or hard of hearing sees the activity surrounding an EAS activation without knowing what it was, confusion and fear can result.

- AlertUS Technologies displayed their system being used for a variety of visual notification methods such as alerting beacons, digital signage, monitors, and special devices. They talked about their deployment at Gallaudet University, the DC-based school focused on higher education for deaf and hard of hearing students.

- DeafLink can deliver alerts to persons who use American Sign Language (ASL) and who are Braille readers. The company's CEO, Kay Chiodo, said they've learned through practical experience that accessible technology can work for alerting, preparedness education and outreach.

- Serene Innovations showed a wireless notification solution that can use shakers, bed shakers, door-knockers, flashers, sound detection systems, and loud speakers to get attention.

- MobiLaps showed a technology that can use web browsers for alerts.

While these were impressive technologies, people who can benefit from these technologies still need to know about them. It is our hope that public safety organizations and national associations that represent people with disabilities and others with access and functional needs (including people with limited English proficiency) will pay attention so they can help spread the word and look for opportunities to use these types of accessibility devices.

EDUCATING THE PUBLIC

IPAWS in itself does not solve the challenge of making alerts accessible to the whole community. The public must be made aware of the existence of the system, the seriousness of the messages they'll receive through IPAWS, required follow-up response to protect life and property, and system limitations.

The key to releasing the powerful potential of IPAWS and creating a well-educated whole community lies in still more stakeholder involvement, along with increased outreach. The effort will require special efforts to reach people with access and functional needs, limited English proficiency, and older adults. Both public and private sector partners need to work together to ensure the American people understand the functions of the public alert and warning system and how to access, use, and respond to information from public safety officials.

Help in a variety of forms will be needed from the many organizations that represent the diverse interests of the whole community. Among other things, these organizations can offer input into approaches that will help IPAWS serve their interests. They'll also be needed to help spread the word within their communities about IPAWS and what it can do.

Nationwide engagement by state and local public safety, emergency management and otherwise, will be necessary to help create awareness and recommend approaches for realizing the potential.

Organizations that serve people with disabilities and access or functional needs, or those with limited English proficiency, should become well informed on IPAWS and its capabilities. Through the use of standards and common alerting protocols, the private sector can chose to modify existing systems and/or create new technologies or systems that incorporate accessible technologies. Where product modifications have been made (i.e. mobile carriers via CMAS/WEA), industry can educate customers about capabilities that serve people with access or functional needs.

CONCLUSION

IPAWS provides public safety officials with a tremendous opportunity to communicate emergency alerts more effectively to the 25% of the American population with access or functional needs, limited English proficiency, or older adults. This is made clear by the ability of IPAWS to facilitate communications to all types of systems and tools, including the recently-launched Wireless Emergency Alerts (WEA) program. Progress to date does not guarantee the whole community will receive all alerts, but clearly more people can be alerted through IPAWS.

Now is the time to take the steps necessary to increase outreach and remove the final barriers to accessible information within WEA. Creative thought, collaboration, and cooperation are still required among stakeholders and industry partners to help serve the 25% of the American population who historically have had a difficult time receiving timely alerts and warnings.

For more information on IPAWS
Please contact the
IPAWS Program Management Office

E-Mail
ipaws@dhs.gov

Web Site
http://www.fema.gov/ipaws