wireless RERC

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WIRELESS EMERGENCY COMMUNICATIONS (WEC) PROJECT[1]

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BACKGROUND

The Wireless RERC regularly conducts a Survey of User Needs; results show that people with disabilities are significant users of wireless products. In 2009, 77% of those surveyed indicated that wireless devices were very important in their daily lives. Therefore, emergency communications via wireless devices is becoming more critical to people with disabilities. With examination of the next generation Emergency Alert System (EAS) and the introduction of the Commercial Mobile Alert System (CMAS) on the horizon, the Federal Communications Commission has also recognized the importance of creating a "sound emergency communications system which also includes the needs of people with disabilities." Between 2007 and 2009 the WEC project conducted twelve field tests and two focus groups to examine the accessibility and effectiveness of the EAS and CMAS alerts to wireless devices. The 120 test participants were as diverse in their sensory limitations as they were in their technical skill level, ranging from those who were fully deaf to hard-of-hearing and those who were fully blind to low vision. Technical acuity ranged from savvy users to infrequent users of wireless technology.

The EAS message format was used in the first nine tests as follows; "The National Weather Service has issued a Tornado Warning for Test County until 10:15 am." The SMS message was limited to 160 characters and contained a hyperlink to a web page containing the alert's full content, formatted for accessibility and mobile viewing. The CMAS message format was used in the three CMAS tests as follows; "Tornado warning for Atlanta until 3 pm EST. Take shelter. NWS." The CMAS messages were limited to 90 characters with the EAS Attention Signal and vibration cadence as specified in FCC 47 CFR Part 10, and did not include a hyperlink. In both EAS and CMAS tests, the mobile devices were loaded with client software capable of presenting alert content with accommodations for blind / low vision (text-to-speech) and hearing impaired users (specific vibrating cadences). Three to four simulated emergency alerts were sent to each participant's mobile phone. Each participant was shadowed by an observer to monitor for system failure and log usability problems. Before and after each test, participants completed a survey to gather data on their experience with the system. Each field trial concluded with a focus group discussion.

Two focus groups were conducted to assess if American Sign Language (ASL) video enhanced the understanding of textual CMAS alerts for people who are deaf. Participants were conversant in ASL and comfortable reading English. They were presented with conventional text alerts, as well as text alerts coupled with video clips presenting an ASL translation.

[1] The WEC project is part of the Wireless RERC at the Georgia Institute of Technology. All phases of this project were conducted under Institutional Review Board (IRB) procedures. IRBs are governed by Title 45 CFR Part 46.

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RESULTS

The majority of participants in both the EAS trials (95%) and the CMAS trials (85%) currently receive alerts via the television.

Results of the **EAS tests pre and post questionnaires** concerning emergency information.
How do you currently receive emergency alerts? --- 95% TV, 44% Radio, 27% NWR
For confirmation of emergency information: Turn on --- 92% TV, 42% Radio, 23% NWR
Results of the **CMAS tests pre and post questionnaires** concerning emergency information.
For confirmation of emergency information: Turn on --- 100% TV, 67% Radio, 11% NWR

However, it is important to note that when asked "What would improve your ability to receive emergency alerts and information?" many answered, receiving them on their personal mobile devices would be preferential. 90% of EAS and 93% of CMAS trial participants would be interested in a mobile phone alerting service. Discussions with the participants revealed that though television is the prevalent method, it is not the preferred method because the information is not consistently accessible (lacks video description, captions and/or ASL interpreters), especially, when emergency information is relayed by news reporters.

In the **EAS tests,** more than 83% of all participants stated the wireless emergency alerting system was an improvement over other methods they currently use to receive emergency warnings and alerts. Of deaf and hard of hearing participants, 72% regarded the alerting of the accessible client software as an improvement. The low satisfaction of the SMS and Web system with this population appears to be due in part to the accessibility features of the mobile devices that they were given as not being sufficient in addressing their particular accessibility needs. Of blind and low vision participants, the percentage shoots back up to 83%.

In the **CMAS tests,** again, 83% of visually impaired participants found the accessible CMAS system to be an improvement over their current source of emergency alerts. Of participants with hearing impairments, 70% found the CMAS alerts to be an improvement. Though the numbers don't reveal it, based on the qualitative comments received during post-test discussion, generally speaking, the EAS trials received higher rates of approval because more detailed information could be provided in the alerts, versus the very limited information allowed by the 90 character restriction and hyperlink prohibition prescribed by CMAS rules.

Participants of the **ASL focus group** all agreed that ASL video alerts would be a useful tool for people that are deaf and literate in ASL. Some participants felt that the combination of the text and ASL together gave them a fuller understanding of the message than either on its own. One somewhat surprising result of the evaluation was the difficulty of understanding some phrases typically used in NWS alerts, such as "take cover" or "low-lying area"; these idiomatic expressions do not translate well into Deaf English or into ASL, therefore the word choice used in text or ASL alerts should be carefully considered and vetted amongst this population.

CONCLUSIONS

By better understanding the importance of inclusive and accessible technological solutions, valuable response time to special needs populations, especially people with disabilities can result in more efficient use of public safety and emergency management personnel during natural and manmade disasters. Evaluations suggest that while television and radio are critical for confirmation, mobile devices offer an opportunity to improve dissemination of emergency alerts to disabled populations. Testing of various prototypical solutions to make these alerts more accessible show that simple accommodations can be made that greatly increase the accessibility of these alerts. As government and industry move forward in rolling out next-generation alerting systems such as CMAS, the needs of citizens with disabilities must be taken into account in the design and evaluation of such systems. Tens of millions of Americans are affected by some form of disability and it is essential that they have equal access to emergency information.

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