Wireless Emergency Communications:
Accessible Alerts for People with Disabilities

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Why Wireless?

• Mobile wireless applications can increase independence and quality of life for people with disabilities.

• Applications that serve people with disabilities will also be attractive to the general population.

• Lower cost of new models of wireless devices is enabling diffusion to all users, including people with disabilities.

• Federal Communications Commission 2005
  • Amends rules to ensure that people with disabilities have access to public warnings.
  • Substantive filings push access to Emergency Alert System notifications.
Between 2001-07:

- Access to wireless technology increased from 72% to 85%
- Everyday use increased from 40% to 65%
- Importance to individual increased from 60% to 77%

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Wireless Produce Use

“84% use wireless products”

- Most important features
  - voice: 78%
  - e-911: 45%
  - text: 43%
  - email: 41%
  - Internet: 35%

- 70% use everyday
- 24% have difficulty
Wireless Emergency Communications Objectives

- Ensure critical, specific and accessible emergency alerts are reaching people with disabilities, utilizing the most optimal means and methods.
  - Examine technology approaches to transmit specific alerts and warnings to wireless devices.
  - Develop prototypes of promising technology approaches to deliver alerts in accessible formats.
  - Field test working prototypes.
  - Generate recommendations to the FCC on feasible approaches to ensure accessible alerts.
Methodology

• Administer 4 field tests to examine accessibility and effectiveness of alerts to wireless devices.
  ▪ Administer pre-test and post-test questionnaire to users.
  ▪ Wrap-up with focus group session to discuss user experience during the test.
  ▪ Tabulate quantitative and qualitative data for reports, presentations and filings before the FCC.

• Final field test 5 will be based on recommended refinements by users.
A Pre-test Question

“How do you currently receive emergency alerts?”

- TV
- Radio
- E-mail
- Telephone
- Mobile Phone
- Friends & Family
- Sirens
- Personal Alerting Device
- Other

Majority of participants receive emergency alerts through traditional media outlets and/or low tech systems
Field Test 1 & 2

• Field Test one:
  ▪ 3 groups of blind/visually impaired users: technical savvy, mixed ability, infrequent users.
  ▪ Supplied mobile phones with custom software featuring an audio-oriented interface and text-to-speech reading of emergency alerts for the visually impaired.
  ▪ Series of 3 text messages (SMS) with increasing audio intensity sent to each device.

• Field Test two:
  ▪ Replicated field test one: users were visually and hearing impaired.
  ▪ Included, a vibrating cadence attention signal to differentiate incoming alerts from regular text messages for the Deaf and hard-of-hearing.
Post-field test revealed that 94% of participants found the WEC emergency alert software an improvement.

**Specific comments -- Pro:**
- Very convenient way to receive alerts.
- Would be able to react to the alert quicker.
- I’m not always around TV, friends or family.
- Hard to get emergency information when you are blind and outside.

**Specific comments – Constructive:**
- Provide cues for blind or visually impaired to replay the message.
- Have the ability to speed-up or slow down the voice/message.
- Allow speech output to be adjustable by volume and/or pitch.
- Continued or “looped” alert message until phone is answered/alert receive.
Field Test Two: Post test Findings

Post-field test revealed that 81% of test participants found the WEC emergency alert software an improvement.

Specific comments -- Pro:
- Liked the “override” feature that interrupts current phone activity.
- This format [would] reach and protect more people with disabilities.
- I am alerted if I am not at home or in front of the TV.
- I live alone and this would be very helpful to me.

Specific comments – Constructive:
- Provide a prompt to repeat the message.
- Create an interface with a lamp or bed to awaken people who are Deaf/HoH while they are sleeping and/or signal service animals.
- Allow multiple zip code subscriptions through one account.
- Emergency message should be a blinking text message in a distinctive color.
Proposed Technical Approach

Development of a “gateway” to convert emergency alerts and warnings to SMS messages and audio feeds in accessible formats deliverable to mobile devices

Goal of “gateway” system

APTS Television
provides DEAS signal

Devices
receive, decode, deliver emergency messages in accessible format

Method

HDTV receiver card
receives CAP data

Networks
send to wireless devices

Software
converts data to SMS sent via

Internet
to wireless provider networks
Actual Technical Model

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“Gateway” system
  Internet feeds
  National Weather Service
  Digital signal

Wireless network

Software
  Short Message Service

Devices

GPRS modem
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• Present findings to the FCC regarding results of field tests to support equal access to critical information via appropriate wireless warning systems

  ▪ How to provide accessible emergency alerts
  ▪ How to ensure next-generation digitally-based alerts are developed to give equal access to alerts
  ▪ EAS improvements that incorporate existing FCC disability access rules and ensure timely accessible notifications
More FCC Rulemakings

- Commercial Mobile Alert System (CMAS)
  - First Report and Order adopted April 9th 2008
    - Adoption of a common audio attention signal
    - Adoption of existing 8-second EAS signal
    - Adoption of common vibration cadence
    - Clear instructions including labels identifying mobile devices suitable for persons with audio and visual disabilities
    - 90 character text limit of CMAS alert
    - Adding trailer to alerts
PROJECT COLLABORATORS

- **Staff:** Frank Lucia, Salimah Major, Ed Price, Jeremy Johnson, Laurel Yancey, Ben Lippincott, GRAs

- **Panel of Experts:** Broadcasters; universities; Blind and low vision; deaf and hard-of-hearing; emergency public safety personnel and trainers

- **Other Rehabilitation Engineering Research Centers**
  Technology related
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