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Requirements and Challenges of All Hazards Campus Emergency Alert and Communication Systems

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Introduction



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- ◆ U.S. colleges and universities are potential risks for disasters.
- ◆ Campuses feature a high concentration of young people and valuable open infrastructure protected by minimal security.
- ◆ In Florida alone, on any given weekday, more than half a million students attend 39 public colleges.
- ◆ A reliable telecommunication facility is a key component to mitigate the effects of crises
- ◆ **In 2005-2006, we conducted a study on campus alert capabilities.**
- ◆ **In February 2006, we organized a demo of current technologies for campus emergency alerts.**
- ◆ Full report can be found at:

<http://ec.creol.ucf.edu/>

<http://LLIS.dhs.gov>

Our Study



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- ◆ Included a site visit, interview, survey, demo and evaluation.
- ◆ We selected the following three sites for the study:
 - **University A:** 1,700 acres, 117 buildings, more than 40,000 students.
 - **University B:** Rural area, a small student population, spread over a wide, wooded area (1,600 acres of land). No adequate telecommunication facilities (unlike other metropolitan universities/colleges).
 - **College C:** Large community college with a total of more than 150,000 students. It has eight campuses. Two of them have more than 50,000 students each.

Our Study



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- ◆ **Three important scenarios** have the most stringent demands on campus communication tools
 - (1) To reach and inform a large population of students and teachers across the campus and surrounding area in a short period of time.
 - (2) To reach and instruct people in multiple areas with different instructions that could change rapidly.
 - (3) To provide very basic communication under extreme situations, such as a power outage and downed telephone service.

- ◆ **The requirements for the best alert systems:**
 - (1) Cover both outdoor and indoor areas
 - (2) Have the shortest activation time, are easy to set up and have voice message capability
 - (3) Are easy to maintain and manage
 - (4) Have a manual system backup
 - (5) Have battery backup
 - (6) Are cost-effective
 - (7) Are able to accommodate disabled persons

Best Possible Systems on Current Market



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- Siren or horn, message board
- FM or weather radio, handheld TV
- Telephones, Satellite or cellular mobile phones
- Wireless LAN, PDA and notebook
- TV in hallway and FM or weather radio
- Fire alarm intercom system
- E-mail, Internet, etc

Key results



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- ◆ **Siren (one siren for a 1700 campus):**
 - **Pros:** Cheap, cover a large area, good for alert but not to communicate
 - **Cons:** Limited indoor use, many uncovered spots, very poor voice intelligibility, frequent tests required, confusing tone messages
 - **Ways to improve:** Silent test, network of sirens, indoor radio extension and hot spot coverage

- ◆ **Weather radio and FM radio**
 - **Pros:** Cheap, cover a large area, good for specific message
 - **Cons:** must tune in, not for specific location, less than 5% students carry FM RX on campus
 - **Ways to improve:** Use sub-channel for all radio stations, pre-registered receivers with location information

Key results



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◆ **Phone Tree (eg. Reverse 911)**

- **Pros:** Calls to each phone, location specific, get acknowledgement
- **Cons:** Expensive, data base management, limited by trunk capacity (exchanger or cell tower capacity)
- **Ways to improve:** Good for small scale of mass notification (i.e., for all emergency team members)

◆ **Hosted systems (3N, SWN, etc).**

- **Pros:** E-mails, SMS, fax, calls all in one
- **Cons:** Could be expensive, registration required, limited by trunk capacity, hard to stop the flood of calls
- **Ways to improve:** Legislative change, prioritize calls

Key Recommendations



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- ◆ ***Key Recommendations (limited funds):***
 - Carefully examine a siren/audio system for main campuses, combine with campus FM to establish a basic alert system for **scenarios (1) [inform as many students and as quick as possible in] and (3) [basic alerts when power down and telephone outage.]**
 - Implement a high-speed reverse 911 system to provide very basic service to all 39 universities & colleges for **scenario (2) [group call to particular location and specific instruction]**.
 - Endorse a host-based service. This will enhance the capability to meet all requirements.
 - Second tier service: email, phone hotlines, Web sites, campus TV & WLAN, etc.
 - **Well designed voice intelligible systems (MadahCom)**

Conclusions



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- ◆ We examined existing systems of massive notification for open and dynamic campus environment.
- ◆ Mixed siren/FM, massive call systems, voice intelligent system, and existing communications tools on campus must be considered.
- ◆ Human factors must be considered. We did a survey to determine typical behaviors of campus residents.
- ◆ Campuses urgently need to develop a standard procedure for campus emergency alerts.
- ◆ Mistakes and poor judgment can be avoided if we have well defined procedures on hand before an incident happens. When an incident is developing, it is often very difficult to make a good, sound and well-considered decision.
- ◆ Full report can be found at
<http://ec.creol.ucf.edu/>
<http://LLIS.dhs.gov>

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 - Reverse 911, Database System,
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 - MadahCom