



**Public warning on the university campus:
Getting smart about how we warn.**

*A white paper on public notification
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Executive summary

The world is a more dangerous place today than it was yesterday – we can and should be prepared.

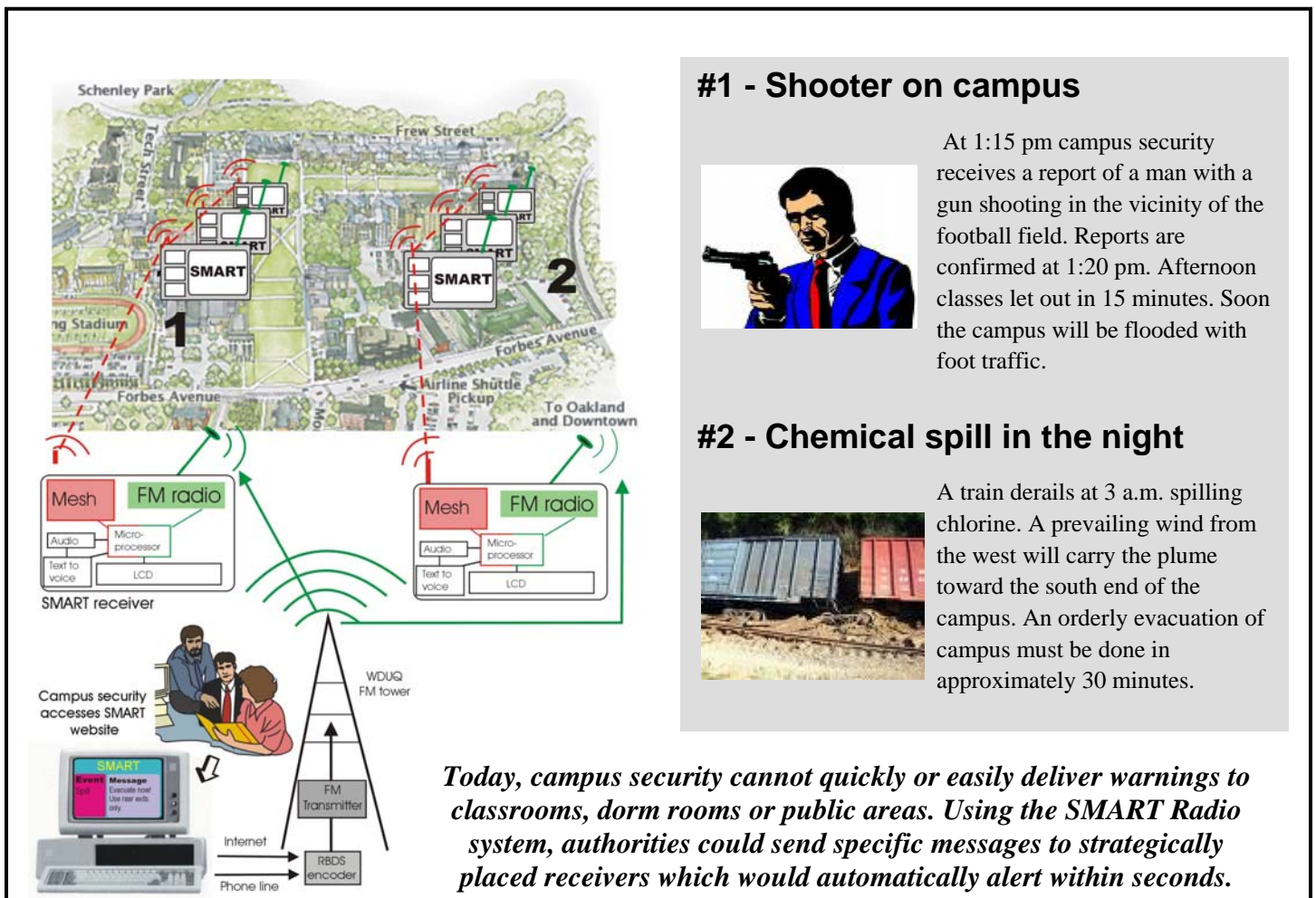
- Global climate change, flu pandemics, acts of terrorism and war demand that our universities prepare for crisis. Hurricane Katrina exposed the government's inability to get emergency information to the public when power and phone systems fail.
- Universities and other institutions can and should embrace the responsibility of managing their own emergency warning systems
- It is more effective to use public warning technology, than to adapt consumer technology to perform public warning.

Using Technology That Meet Emergency Needs

SMART Radio is derived from marrying the alerting ability of NOAA weather radios with the data transmission ability of commercial radio broadcasters. This allows a single entity, such as a university or chemical plant, to issue specific warnings to selected receivers during a crisis.

- Campus security logs onto a secure website to select sets of receivers and messages
- Targeted receivers in classrooms, hallways, dorm rooms etc... automatically alert.
- Transmission via commercial FM towers eliminates vulnerability from phone and power system failures

SMART Radio Scenarios



Public Warning: One Door at a Time

Historically, disasters have inspired efforts to prevent future tragedies. Public notification serves as a critical link in the chain of crisis communications and is essential to minimizing loss during an emergency.

In the world of public warning technology, the status quo has been slow to change. As British troops marched on the village of Concord, Massachusetts in 1775, two Colonial riders galloped ahead with the most famous civil warning in our country's history: "The British are coming." Today an evacuation of Concord would likely be conducted by fireman and policemen, Paul Revere style, knocking door-to-door. Nothing exceeds having a first responder at the site, but this method messaging is slow and technologically outdated.



There are two federally-operated civil warning radio networks used to alert the public. The Emergency Alert System (EAS, formerly the Emergency Broadcast System) provides warnings to the public by interruption of commercial television and radio broadcasts. The National Oceanographic and Atmospheric Administration's NOAA Weather Radio (NWR) network informs via 1000 towers transmitting on the weather band. Both of these government-operated systems alert large populations with pre-programmed messages in large geographic regions. No public-operated system provides private institutions the ability to target their own receivers with their own messages.

Universities Must Alert the Campus, but How?

The tragic events at Virginia Tech in April demand that universities take a close look at how they manage public warning. Emergencies do not occur on schedule, so being prepared means having a system in place that can respond immediately. To begin with, a university confronts many of the same questions that a public authority has to answer:

- How do I do get critical information to everyone in my community quickly and with a sense of urgency?.
- How do I alert when the target audience is at work, play and school in multiple facilities spread over a large area?
- Who operates the system? Is it scalable? Can it be customized to my needs?
- Is it a one-way or two-way communications?
- Is it encrypted and secure?
- Is there redundancy within the system? When phone, internet and power systems fail, will my system be up and running? Is my system, the "last man standing"?
- Can my system integrate with other systems?

First, let's look at what is available and how it is being used.

Existing Methods

Alerting methods in practice now have varying degrees of utility, but each has limitations. Key challenges are speed of dissemination, specificity of content and audience targeting.

Current Alerting Methods	Limitations and Issues
NOAA Alert broadcasts (NWR)	Pre-defined, non-customizable messages; Recipient groups are high-level geographic aggregates i.e counties – can't alert small groups
Emergency Alert System (EAS) Commercial AM/FM or TV	Commercial broadcasting entities are voluntary participants in the system; Content may be modified, inaccurate or incomplete; Receiving devices (radios/TVs) don't wake up if powered off.
Reverse 911 telephone calling	Receivers are designed for consumer use; does not alert with urgency. Complicated by unlisted numbers, answering machines, downed phone service, phones on silent or off (increasing issue for cell-only households), expense and delay of pyramid calling infrastructure
Sirens	Non-content - no information or advice; Limited range of audibility; Costly maintenance (many aging siren systems installed in 1960's)
Door knocking	Labor intensive, hands-on, requires last-minute organization, exposes personnel, slow to execute
Newspapers/ Printed media	Time delay; Hand delivery area may be compromised by risk.

A warning system for a university must penetrate a diverse range of living and educational activities and settings. Some universities are embedded in an urban landscape and others are self-contained. Some have contracts for government work and others are hotbeds of medical research. To fulfill the responsibility to warn, an effective system must penetrate locker rooms, laboratories, concert halls dorm rooms, classrooms, workplaces, cafeterias, pools, and other locations unique to each campus. In the end, careful consideration must be given to who does not get warned and why.

The system should also penetrate beyond the physical campus. Key administrators and commuting students who live or work off campus should know when there is an emergency on campus. Most importantly, delivering a warning is all about accuracy with urgency. When the message is late, lackadaisical or leaves someone out, the goal is not realized.

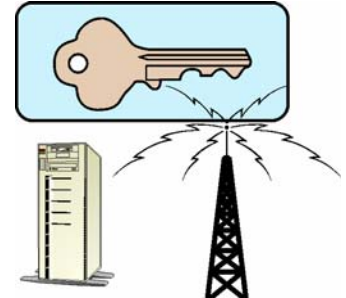
Use Public Warning Technology to Warn the Public

The current fad has been the use of telephones and computers to get warnings out quickly. E-mails and cell calls are partly effective, but it is a case of a square peg in a round hole. Both are limited by their form factors, by the fact that they are designed for consumer use – not emergency warning. Unread emails are impotent and phone calls do not have an inherent sense of urgency. Many students turn off their cell phones while in class. Effectiveness further decreases during night time hours when phones and computers are turned off. How do we alert those without cell phones? Finally, power failures and call overloads (signature events in many emergencies) bring both systems to their knees. Consumer technology is not designed to fulfill a public warning role and does not fulfill the obligation. To live up to the responsibility to protect and warn, we need to look beyond emails and phone calls. What options remain?

The Original Wireless Messenger

In the past 20 years, advancements in radio technology have yielded a combination of capabilities that can be particularly effective in public warning. Over-the-air transmission of digital data allows receivers to be targeted individually or in groups. Auto alerting receivers equipped with battery back-up, like NOAA weather radios, alert with a sense of urgency and are ready 24/7.

- Commercial broadcast towers broadcast data to intelligent receivers that automatically alert.
- Radio transmission is independent of phone, and internet pipelines.
- Any combination of receivers can receive warnings and automatically alert within seconds.
- Receivers act like emergency devices flashing and beeping while delivering the message in text and voice.



The SMART Solution

The **Scalable Mesh Alert Radio Transmission (SMART** Radio for short) allows campus security to:

- Communicate warnings to everyone on campus and off campus
- Penetrate difficult reception areas
- Provide 2-way communication within the university campus
- Issue pre-programmed and custom messages
- Target messages to groups of people or buildings in mobile or fixed locations
- Uses an open architecture integrating with other systems including NOAA
- Secure access to SMART website, data is encrypted eliminating abuse of the system

SMART radio technology emerged from the development of NOAA weather radios. SMART maximizes alerting technology and introduces the ability to focus on a target audience within any-sized geographic landscape. This technology is enhanced by the additional layer of a mesh network for 2-way communications. By placing SMART receivers strategically on a university campus, students and staff in dorms, classrooms, offices, common areas and outdoors can be warned and/or make a call for help.

SMART radio system benefits for universities

- University owns and operates the system
- Penetrates university population on and off campus
- Secure log on and encryption for message authentication
- Selection of any subset of radios in an expandable database
- Use of existing commercial radio bandwidth backed up by campus radio station



SMART technology uses commercially available FM bandwidth to deliver messages over an existing broadcast infrastructure already covering over 90% of the nation. Secured websites for message creation and release provide a secure, robust, easy-to-use platform for information sharing and interagency coordination, without burdening IT organizations.

The SMART radio's design will be compliant with newly released standards for Public Alert radios, including battery back-up, audible alarms, voice and text messaging, periodic testing, bi-lingual text and connection to handicapped devices. Sima was a member of the panel that defined the new Public Alert standard, approved in 2004, and the first to produce devices that meet this requirement. SMART Radio was successfully tested by the SOSSEC initiative, under the auspices of the U.S. Army Arsenal in Picatinny, NJ.

Conclusion

The importance of improving the ability of a university to effectively notify selected segments of the campus community should not be underestimated. The SMART system is unique in that it:

- Uses public warning technology to perform public warning.
- Survives phone and power system failures
- Integrates NOAA and university system in receivers
- Open architecture allows integration with other systems
- Provides 2-way (call for help) ability within university campus.