A Web-based, real-time alert system for secondary responders

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ABSTRACT
Devastating events have become commonplace today, debilitating organizations and society the world over. Given the number of emergency workers who must respond during a mass disaster, coordination of communications is essential. However, because forensic workers and other secondary responders are not always equipped with communication devices, a method other than an inefficient telephone chain link is needed to alert emergency workers. In light of this need for a universal alerting system during times of crisis management, the Forensic Disaster Team of the Suffolk County (NY) Medical Examiner has started using a Web-based, real-time, multi-modality alert system for forensic workers and other secondary responders. This article will look at the reasons for choosing this system and the benefits derived from it.

INTRODUCTION
In the aftermath of 9/11, there were failures of the communication system used to deploy the Disaster Mortuary Response Team, which is part of the National Disaster Medical System. In the course of responding to the events of 9/11, a group of individuals was given a list of forensic workers to contact. But the cumbersome telephone system prevented some individuals from being contacted, and resulted in key information being misinterpreted.

Given the number of emergency workers who must respond during a mass disaster, coordination of communications is essential. However, because forensic workers and other secondary responders are not always equipped with communication devices, a method other than an inefficient telephone chain link is needed to alert emergency workers. In short, there is an absolute need for a universal alerting system.

The success of any disaster response is based on organization. Command and control is a function of the Incident Command or Management System, which is mandated by the federal government. However, even the best management system will not operate without effective internal and external communications. An example of an effective alert system would be a find-me, follow-me, contact-me communications system that can integrate existing and new technologies and can route messages to work/home cellular phones, pagers, voice mail, and fax machines.

Ideally, a fail-safe emergency communication system would be used to ensure the safety of all responders. However, experiences from recent disasters have shown this is not possible. Today handheld radio transmission, telephones, and pagers are the most common channels for information transfer, but the communication protocols and equipment currently being used are being re-evaluated so that this essential function can be performed more efficiently. A manually operated phone system is the least efficient method. Effective communications relies on the successful transfer of information. Encoding, reception, or decoding issues, which can occur with traditional systems, may prevent the exchange or understanding of data. However, information is exchanged not only verbally; operating units can send and receive data, including maps, graphics, pictures, and reference material, via computers or portable fax machines.

Communications problems can be caused by a breakdown in one or more of the seven basic elements:

- **Information.** Large amounts of the data used for making decisions can overload a
system. (When it comes to disaster information, short and relevant is the rule.)

- **Encoding**, or changing information into an understandable format (federal guidelines recommend plain English). Different formats prevent proper communication. Errors can occur with written, oral, or graphic formats.

- **Transmission** can be done visually or electronically, but, in either case, the problem of frequency incompatibility exists.

- **Reception**, the means to receive messages or information, must be compatible with transmission devices. But this is not always the case.

- **Decoding** is the understanding of the encoding method. However, encoding and decoding methods vary considerably, leading to potential confusion.

- **Feedback**, the acknowledgement of the transmission and receipt of information, is dependent on all of the above elements.

- **Noise**, or interference with the communication.

The ideal alerting service would avoid these problems and have the capability to track responders down, ensuring successful communication of time-sensitive events and critical-contact information. It should also have programmable features such as address entry, audio-text message delivery capacity and automated attendant functions.

Two types of such systems exist: stand-alone, facility-based systems and Web-based systems that employ the services of an off-premises third-party facility. Each type has its advantages. The stand-alone system, which is owned and controlled by the operations facility, can be customized on-site to suit the user’s needs. Its downside is the high initial cost of hardware and software, as well as the cost of upgrades and service. The Web-based system is more cost-effective, since there are no software, service, or upgrade concerns. Charges apply only when used. The biggest disadvantage is that the service provider may not be viable.

The Suffolk County Medical Examiner’s Forensic Disaster Team is attempting to establish a more efficient emergency alert communication system. It is using a third-party, Web-based service that can provide interactive real-time notifications to wired and wireless devices, including landline phones, faxes, e-mail, Short Messaging Service (SMS) and Wireless Application Protocol (WAP) phones, PDAs, Blackberry devices and even postal mail. The system, called EnvoyXpress, is the product of Envoy Worldwide, a provider of notification services based in Bedford, Mass. EnvoyXpress is a scalable notification platform with a browser-based interface, real-time tracking capabilities and interactive, two-way response functionality.

The Forensic Disaster Team has tested and used the EnvoyXpress system several times. For instance, when meetings for the disaster team have been scheduled, all 80 members of the team have been contacted through one or more of the service’s modes of communication within 30 minutes. The few communication failures that occurred were due to changed phone numbers and pager incompatibilities. The system can instantly send preselected voice or text messages to an existing list of responders, then records whether the contact was made for record-keeping purposes pertaining to the incident. Unlike facility-based systems, the system can be accessed from any PC and IP address, and will not be hampered by limitations in range, or issues pertaining to frequency and encoding/decoding. It also establishes an automated, fully interactive voice and text communication vehicle. Because the cost is based on usage, it should be nominal.

No one method of communication will be totally reliable. However, barring the use of special communication devices, an automated multiple computer-generated system will have the best chance of alerting responders.
During response and recovery phases, there is always a chance that the existing communication infrastructure can be rendered useless or destroyed. To address this issue, emergency preparedness planners need to develop a backup last resort protocol. Currently the only safe backup is the amateur or ham shortwave radio system, but it is a complex form of delivering information. As a means of delivery of emergency communications, the diversity of equipment and varying operator proficiency may reduce its overall reliability.

**SUMMARY**

While notification technologies currently being developed will use a combination of IP, computers, and cellular phones, at present, the use of a simple cost-effective real-time system that can notify personnel by a spectrum of modes will best assure that all parties who need to be alerted are alerted in the most effective way.

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**REFERENCES**


2. Through a federal homeland security grant from the Corporation for National and Community Service, courses are available in shortwave emergency communications. Much information is available on this complex topic regarding protocol and format, antenna modeling, HF digital communications, satellite communications, and radio frequency interference.