

# The pitfalls of mass alerting systems using cellular SMS/text messaging.

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[Note: this article uses the word terminal to refer to the portable, wireless-messaging device.]

As a result of the increased concern for the safety of faculty and students in campus environments brought about by a number of violent events on campuses in the last few years, many campuses are implementing or considering various forms of emergency mass alerting capability to warn and advise when such an event occurs.

In consequence, a number of different emergency mass alerting methods have been promoted and a large number of misconceptions have arisen and poor systems installed through hurried implementation projects.

The varied solutions promoted fall roughly into two camps. Firstly there are the text-based, individually-addressed, pre-subscribed type systems that enable individuals to register for the receipt of text messages sent to cellular phones and other wireless e-mail or messaging devices. Secondly, there are the wide-area, public notification type systems that distribute text or voice messages, or activate non-specific audible warning devices that are spread about the public areas of a campus or in areas where large numbers of people congregate such as lecture halls, classrooms, cafeterias, etc. In addition to the above, there are some computer network based systems that send messages to computer screens throughout a campus network by e-mail or screen pop-up.

Each of the above systems has its pros and cons, however it is my opinion that reliance on the individually-addressed, SMS or text-message based systems as the primary, and sometimes only means of alert, is dangerous. These systems and their proponents are engendering a false sense of security and making promises about their efficacy that are doomed to lead to disaster if these systems are implemented as the sole and primary source of emergency alerts.

Cellular-based text messaging systems are not real time and are essentially one-to-one communications systems making them too slow and unreliable for the delivery of emergency messages in a timely and useful manner to a large number of recipients in a small area. Because

the originator of a text message is not communicating directly with the recipient of the message, but is sending the message into a network—unsupervised by the originator—which manages the delivery based on unknown criteria and system priorities, it can take from several minutes to several hours or even days to send a single message to a large number of recipients.

One message sent to 1,000 recipients, for example, requires 1,000 individual transmissions to be managed by the network. Whilst very large numbers of text messages are sent daily to phones throughout the world and to a certain extent arrive reasonably soon after having been initiated, cellular-based SMS/Text systems rely on the recipients of that message traffic being geographically dispersed. When messages are generated to be sent to a large number of recipients in a relatively small geographical area, such as on a university campus, it is extremely unlikely that the network capacity, even when spread across a number of carriers, would be sufficient to deliver those messages quickly enough for the information to be acted on a timely manner or for the system to be regarded as a reliable means of alert.

Tests of such systems that have been carried out on campuses have shown that it can take up to several hours for a single message to be delivered to all subscribers, and testing that has been carried out has been done so under ideal conditions. In a test scenario, because there is no actual emergency, the message does not generate the escalation of respondent traffic that a real emergency message would which would further impact on network congestion.

Apart from network capacity issues with respect to the initial message transmission, once emergency messages start to arrive on phones, the networks will quickly become saturated with texts and voice calls initiated by the subscribers calling friends and family. The networks are likely to, and have—in a number of such emergency situations—crash under the volume of traffic!

At any one time a large number of phones in a campus environment are also likely to be switched off or diverted to prevent disturbance in lectures and this exacerbates the congestion problem as networks try to resend unacknowledged messages.

Random receipt of the initial alert messages may generate panic as some people receive them and start to escalate the seriousness of the alert. And because any follow up messages are extremely unlikely to

get through at all, this leaves people in a vacuum of information which is an ideal environment for rumor and panic to take hold.

A technology promoted by some proponents, called cell broadcast, might seem to solve some of these issues however cell broadcast has a number of problems. Firstly it is not available on all phones or implemented by all network carriers. Secondly it is a scatter-gun approach with geographical control only by cell site or region, and is not able to distinguish between different types of subscribers within a given area so it cannot tell between a student on campus and a person on the highway a mile away. Lastly it still relies on the availability of the networks and if, following an initial alert, the networks become saturated with voice and text traffic and crash, cell broadcast will crash with them.

Wireless mass-alert systems based on non-public broadcast systems are able to generate mass alerts over a very wide area almost instantaneously and follow up information can be delivered as fast as it becomes available to keep people informed of changes to the alert situation. Even public wide-area broadcast systems are much faster and more reliable than cellular-based systems for delivery of a large number of messages quickly as they are, by nature, one-to-many broadcast systems which do not rely on a connection being established with every terminal device.

Using broadcast systems such as local-area or wide-area paging networks, initial alert messages can be delivered extremely quickly and follow up messages delivered as a situation unfolds. Messages can also be tailored to allow different advisories to be sent to different parts of a campus according to the developing situation and direct people to take different actions depending on the situation as it applies in each area.

If preferred, such systems can be used to send discrete messages to persons with responsibility for large numbers of people e.g. to a lecturer in a lecture hall who can manage the orderly dissemination of the information.

Wireless-broadcast technology has the added advantage of being able to individually address terminal devices as well as address them in groups or zones, providing significant flexibility and control over the way information is disseminated and allowing continuous new and updated information to be delivered in a timely fashion.

It is my opinion that whilst SMS/text-based message systems may have a place they should be used as, at best, a secondary means of disseminating an alert whilst broadcast systems be relied upon as the primary means.

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