

# Cell Broadcast Technology for Emergency Alert Notifications

Reach Many or Millions.  
It's About Time.



**CellCastTechnologies**

The Global Authority On Location-Based Communications Solutions

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## 1 EMERGENCY ALERTS IN THE PALM OF YOUR HAND

When a freight train derailment near Minot, North Dakota, in 2002 spilled anhydrous ammonia and sent up a cloud of poison gas, a public warning over radio was not broadcast for nearly 90 minutes. The designated emergency announcement station's single employee on duty could not be reached because phone lines were jammed by residents calling in. Authorities tried activating the radio's Emergency Alert System, but the EAS failed. ***What if Minot citizens could have received an emergency message on their cell phones warning them of this toxic danger and appropriate directives to safety?***

When residents of coastal Texas were ordered to evacuate their homes as Hurricane Rita barreled up the Gulf of Mexico in 2005, they had nowhere to go. Escape routes were clogged for days as millions of Houston-area residents, 50 miles farther from danger, fled the storm when they heard the broadcast EAS, rather than waiting for appropriate notification after the citizens in greater danger were safely evacuated. ***What if coastal residents could have received on their cell phones an early evacuation notice targeted just to them? What if all evacuees could have been notified of alternative traffic routes and available fuel locations while they were en route to safety?***

When the students at Virginia Tech left for class the morning of April 17<sup>th</sup>, they had no way to know they could be heading into danger. ***What if campus security could notify everyone on campus and within a five-mile radius in less than two minutes to return home?***

**What technology offers government officials and emergency managers a safe and simple system to reach millions of citizens with a warning message and to reach smaller geographic areas with a specific alert – and to reach them when the cellular networks are in full overload?** While there may be no single “magic bullet” solution, studies and currently operating national communications systems prove that cell broadcast technology is a valuable solution for immediate and cost-effective deployment.

Modern communications comes in many forms, all of which should be utilized in disaster management as part of an overall emergency alert plan for citizens. This report focuses on cell broadcast technology and how it fits the purpose in alerting the public.

## 2 THE CELL BROADCAST FUNCTION

**Cell broadcast is an integrated open system that allows emergency officials one-touch notification to cell phones with guarantee of covering all carriers.** Cell broadcast technology enables a government entity to securely transmit an emergency alert of natural or manmade disasters to cell phones in an affected area within two minutes, regardless of the size of the area and regardless of the subscriber's carrier.

The cell broadcast alert causes the cell phone to sound a ring and to display a warning message on the screen. The message is relayed with greater efficiency than a two-way call or a SMS text message without overloading the network, as frequently occurs in disasters when thousands of concerned citizens and emergency managers are attempting to place cell phone calls. **Cell broadcast is a more advanced technology than SMS text messaging.**

- Cell broadcast is already resident in most network infrastructure and in most phones, so there is no need to build any towers, lay any cable, write any software, or replace terminals. Once the wireless carriers have agreed to support cell broadcast, all that is required is then the subscribers activate the functionality, opting in to the alert notification service.

- The receiver is already in the back pocket or purse of a very high number of citizens. The citizen purchases this device at his own cost and keeps the battery charged up every night. In addition, he promptly repairs a broken device and updates to a more capable device at his own expense about every two years.
- Cell broadcast is not affected by traffic load. Therefore it will operate during a disaster, when load spikes tend to crash networks. Also it creates no significant load of its own, so it would not add to the problem.
- Cell broadcast is geo-scalable. A message can reach hundreds of millions of people, even across continents, within a matter of minutes.
- Cell broadcast is geo-specific. Messages can be directed at only those citizens in an area requiring notification. For example, government disaster managers can avoid panic and road jamming by notifying priority neighborhoods of an emergency evacuation while reassuring unaffected neighborhoods that they are safer to stay in their homes, reducing gridlock.
- Channels can be designated to enable closed user groups as well as public alerting. Cell broadcast can be used for government-to-citizen alerts and for closed government-to-government messaging.

Cell broadcast is working successfully in Asia, Europe, and the Mediterranean region. The United Nations, its International Telecommunications Union, and other international governing bodies are already developing global harmonization standards for emergency cell broadcast warnings. The World Health organization is planning to use it for pandemic alerts. **It is imperative that the United States Government and U.S. carriers immediately implement this latest, most advanced technology to keep pace with these global communications initiatives.**

### 3 CELL BROADCAST BROKER™ MANAGEMENT SYSTEM

Cell broadcast technology has been in existence for fifteen years. It has never been implemented, in part, because there has been no way to authenticate and deliver a secure message and because alerts would have to be sent via each carrier to reach all cell phone subscribers. However, cell broadcast can now be used safely and effectively in a multi-carrier world because there is a management system that is safe, that protects the carriers, that offers government officials and emergency managers a way to alert people in a secure manner while eliminating their risk, and that meets the condition of using existing infrastructure.

The Cell Broadcast Broker™ (CBB), proprietary technology developed by a U.S. company, CellCast Technologies, manages the entire process, from message authentication to delivery of emergency alerts. The CBB allows a single message to be sent by a government official or emergency manager to every activated handset in a designated area, regardless of the subscriber's carrier. The CBB is a management tool that accesses established protocols to assure the networks it is safe to grant access and that provides emergency managers a simple means to access all cell towers, carriers, and their subscribers with one action and without any knowledge of network configurations.

- CBB is the only technology that can deliver a single message and guarantee it arrives in a timely manner.
- CBB is the only messaging technology that is hack-proof and spoof-proof, and that can authenticate the message, sender and content of message, thereby protecting the carrier and the emergency manager's areas of responsibility and generating the confidence of citizens. Normal SMS text messaging can easily be used to send malicious false warnings.
- CBB allows messages to be repeated periodically to alert subscribers as they enter an affected area.
- The CBB dramatically reduces risk on the part of both the emergency managers and the networks.

For example, four national carriers and several regional carriers serve New York City-area subscribers. Countless more serve subscribers coming to New York from around the world – at least 20% of the city’s daily population. In the case of an emergency, authorities would instruct the broker to send a message – and all activated phones in the affected area would receive the message regardless of the carrier that provides the service. Because cell broadcast allows for multi-lingual simultaneous transmission of messages, the handset owner can receive the message in the language of choice. One emergency manager sends one message and all subscribers in the area receive the alert within minutes.

Without a CBB, separate alerts must be sent with special instructions according to the unique parameters of each wireless carrier, increasing the opportunity for error and delay and significantly reducing the ability to reach those who have come to New York from around the world, who are subscribers to non-US carriers.

The CBB implements three critical activities. First, it is responsible for checking the “authenticity” of the content providers, or message senders. It makes sure that the telecommunications link from the police headquarters or government institution is secure and that the originating terminal and user are authorized to send a message.

Next, the proposed message (the proposal) is scrutinized against national law, local jurisdiction and local mutual agreements. An administrator called the “gatekeeper” is responsible for coding the broker according to these directives.

Finally, the CBB checks the contract with the network and that the particular message meets the criteria of the network concerned. In this way the network keeps close control of who can say what, when, where and how over the network. Where appropriate, one network can have a different policy than another.

## 4 SOLUTION FOR NATIONAL PUBLIC SAFETY

History shows that the telecommunications industry has been unwilling to implement the proven technology of cell broadcasting because of its inability to track and bill end customers. To date, they cannot see how the function can benefit them financially.

It will require political will to persuade the industry that cell broadcast is a national public safety issue, not a marketing feature. **Regulators should consider an exchange for carriers’ acceptance of the technology and willingness to participate nationally. Relief from an obsolete tax or provision of corporate tax credits to encourage deployment of the system could provide adequate incentives** for the industry to offer this public safety benefit within a reasonable timeframe.

The solution touted by some industry leaders, SMS text messaging, is an incomplete, insecure and unreliable technology for emergency alerts. Its usage for mass, geo-targeted, secure and timely emergency notification has been discouraged by major national and international standards groups and governments. **Regulators must realize that the technology and the methodology exist today in cell broadcast, and can be serving citizens immediately.**

The time, effort, and – most importantly – allocated government dollars should be spent putting the processes in place for implementation and establishing the rules of engagement rather than suffering through the development or retrofitting of technology and needless redundant research. **We should not be wasting time and jeopardizing national public safety when an easy and viable path to prevention is available and operating today.**

The Warnings, Alerts, and Response Network (WARN) Act required the Federal Government to expand the methods for transmitting emergency alert messages beyond audio alerts delivered on radio and television stations. Cell broadcast technology supports the Federal Emergency Management Agency's (FEMA) Integrated Public Alert and Warning System goal of delivering targeted and coordinated alerts and warnings over more media devices to more people, anywhere and at anytime.

Cell broadcast technology is a strong, viable and immediate communications solution, which can be put in place to better alert U.S. citizens.

Cell broadcast provides relief to the wireless services and capacity of all carriers in an emergency situation. It is an existing function of handsets that we are failing to use today and thus endangering our own ability to achieve national security and public safety.

**In our pursuit to protect United States citizens, we must avoid several areas of congestion - network congestion, regulatory and legal congestion, lack of wireless carrier support, sluggish timelines and political congestion.**

The industry and regulators must work together to find mutual benefits or to incent through regulatory freedoms for deployment of cell broadcast.

Cell broadcast works today. It can save lives today. Cell broadcast fits the purpose of the CMSAAC Committee.

## 5 CELL BROADCAST KEY ADVANTAGES

- 1) **Cell broadcast exists today.** It's currently operable worldwide and in Wisconsin.
- 2) **Cell broadcast will work in disasters and will not cause network congestion or overload.** Emergency alerts are transmitted on a dedicated channel that is independent of normal usage.
- 3) **Cell broadcast is Geo-specific and Geo-scalable.** Cell broadcasting is a tool to reach any individual cell or to create any size of groups of cell for a message. It can coordinate a layered evacuation.
- 4) **Cell broadcast is authenticated.** Cell broadcast is protected from spammers, spoofers or cyber-terrorists.
- 5) **Cell broadcast reaches 100% of at-risk population with cell phones.** Emergency alert will reach anyone with a cell phone regardless of subscriber or location of subscription.
- 6) **Channels can be designated for first responders.** This can reduce emergency response time and increase coordination of first responders.
- 7) **Cell broadcast allows 64,000 channels of information with transmission in several languages simultaneously.**

## 6 MISCONCEPTIONS ABOUT CELL BROADCAST

1. Handset battery drain. International studies have shown that while there is a small impact on idle current drain when the features is switched on, the overall contribution of this current is very small and is an insignificant factor, particularly when compared to the number of new programming and features being added to handsets (Axelsson and Novak, University of Linkoping, June 2007, [http://staffwww.itn.liu.se/~davgu/CB\\_thesis.pdf](http://staffwww.itn.liu.se/~davgu/CB_thesis.pdf))
2. WARN Act requires FCC Commercial Mobile Service Alert Advisory Committee (CMSAAC) to set standards before any community conducts trials of new technologies. This is not true. Cell broadcast is already implemented in Wisconsin, and New York City Mayor's Office is completing an evaluation.
3. Costly investment to activate service. Cell broadcast is already resident in most network infrastructure and in most phones, so there is no need to build towers, lay cable, write software or replace terminals.
4. It does not work with IS95 CDMA. Cell broadcast does work with CDMA technology.
5. Technology is unproven. Cell broadcast is working successfully in Europe, Asia and the Mediterranean. It is implemented in Wisconsin through a partnership with FEMA and Einstein Wireless.

## COMPARISON OF EMERGENCY NOTIFICATION ALTERNATIVES

	<b>Safe &amp; Secure</b>	<b>Reach 100% of population</b>	<b>Geo Specific</b>	<b>Existing equipment</b>	<b>Database Free</b>	<b>Timely</b>
<b>Cell Broadcast</b>	<b>YES</b>	<b>NO</b> But there is a very high penetration of mobiles	<b>YES</b>	<b>YES</b>	<b>YES</b>	<b>YES</b> Millions can receive message in 20secs.
<b>Landline Dial Up</b>	<b>NO</b> Anyone can make phone calls	<b>NO</b> Can't reach visitors or travellers	<b>YES</b>	<b>YES</b>	<b>NO</b>	<b>NO</b> Speed limited by number of phone lines
<b>Wireless Dial Up</b>	<b>NO</b> Anyone can make phone calls	<b>NO</b> But there is a very high penetration of mobiles	<b>NO</b> You only know where person registered	<b>YES</b>	<b>NO</b>	<b>NO</b> Speed limited by number of phone lines
<b>SMS</b>	<b>NO</b> Anyone can send an SMS	<b>NO</b> But there is a very high penetration of mobiles	<b>NO</b> You only know where person registered	<b>YES</b>	<b>NO</b>	<b>NO</b> Speed limited by network capacity
<b>Email</b>	<b>NO</b> Anyone can send an email	<b>NO</b> But there is a very high penetration of email	<b>NO</b> Emails can be retrieved from anywhere	<b>YES</b>	<b>NO</b>	<b>NO</b> You cannot control when emails retrieved
<b>Fax</b>	<b>NO</b> Anyone can send an email	<b>NO</b> Not many people have fax	<b>YES</b>	<b>YES</b>	<b>NO</b>	<b>NO</b> Speed limited by number of phone lines
<b>TV/Radio</b>	<b>YES</b>	<b>NO</b> Can't reach travellers	<b>NO</b>	<b>YES</b>	<b>YES</b>	<b>YES</b>
<b>Signage</b>	<b>YES</b>	<b>NO</b> Not everyone is in sight of a sign	<b>YES</b>	<b>YES</b>	<b>YES</b>	<b>YES</b>



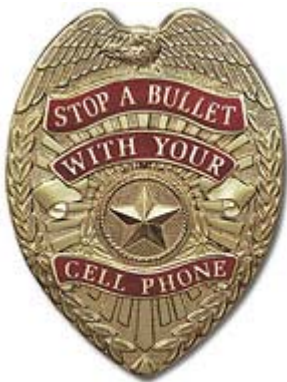
July 2, 2007

## Murder, She Texted: Wireless Messaging Used to Fight Crime

 By LI YUAN  
 July 2, 2007; Page B1

Three weeks ago, when police in The Hague in the Netherlands got a report that a boat had been stolen, they sent out a text message about the case to residents who had signed up to receive neighborhood crime alerts on their cellphones.

An hour later, a woman bicycling along a canal who got the message notified police via a phone call that she saw a boat that met the description. The boat was found and the thief arrested. "They're the eyes on the street," says a spokesperson for The Hague's police department.



Hill Holiday

 Ad for the tips program of the  
 Boston Police Department

Text messaging, a form of wireless communication that's gaining traction in the U.S., is turning into an effective crime-fighting tool around the world. Police agencies from Beijing to Boston are encouraging citizens to use it to report crime or inform on criminals.


In China, about a dozen cities have established text-message crime-reporting systems. Residents are encouraged through government announcements to use it when calling police could endanger their safety -- situations such as kidnapping, theft on buses or burglaries at home. In late 2005, a man in Hefei, capital of Anhui province in Eastern China, text messaged the police, "I was kidnapped..." Within 30 minutes, the police found him at a public bathhouse and arrested the two kidnappers.

Even the U.S., which had lagged in adopting text messaging, is catching up in using it to combat crime. In June, the Boston Police Department launched a new "Text a Tip" program to increase cooperation with police among young people, who are heavy text-message users, says Commissioner Ed Davis. Text messaging provides them a more discreet way to communicate with police than phone calling, he says.

Under the program, witnesses can text the word "TIP" to the number 27463 (CRIME). They will receive automated messages that ask specific questions regarding crime categories, physical description of suspects, weapon types and other useful details. Witnesses can provide the information by replying to the messages. Cellphone numbers are completely blocked to ensure anonymity, says a spokeswoman.

In the six days following the program's launch, the department received tips from 50 witnesses, on

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alleged crimes ranging from drug dealing to homicide. The police declined to confirm if any tip has helped them in solving any case.

Police in some cities around the world have used text messaging as a rudimentary crime fighting tool for years. In 2001, Amsterdam police began a so-called "text message bomb" program to curb cellphone theft. After thefts were reported, the police would bombard the stolen phone every few minutes with messages saying, "This cellphone was stolen. Bring it back to the police." The annoyance made the stolen cellphones virtually unusable and, therefore, less attractive to thieves, says a spokesman for the Amsterdam police department. Local news reports suggest that the program did put a dent in such crimes.

Last year, police in The Hague started using text messaging to send out mass alerts when fighting serious crime. After a 2005 murder case went unsolved for months, police sent out text messages to about 6,000 cellphone numbers that were believed to be in use near the murder scene, asking for potential witness tips. The case remains unsolved.

The police used the tactic again in another murder case in 2006 and although it again failed to generate a useful tip, they will continue to use it in the future, says a spokesperson for The Hague police department. Each time, they first get permission from the district attorney, as the people who are being contacted aren't voluntary participants.

Crime-fighting organizations, private and governmental, also have begun to use text messaging to alert people about missing persons or suspects on the loose. Thousands of text messages are sent, for example, as part of "AMBER Alerts," urgent bulletins that are broadcast throughout a region to catch child abductors soon after they strike. The program operates only in the U.S. and the alerts are sent to law-enforcement officials and people who sign up for the program.

What's unclear is how far police agencies will go in using text messaging. Currently, messages in most U.S. anticrime programs are "opt-in," meaning they are sent only to people who sign up to participate. Technologically, it would be possible for police to broadcast text alerts to practically every cellphone in a neighborhood or region regardless of whether they opted in or not. But doing that would raise numerous thorny issues regarding privacy and cost.

"People have to elect to do it. Otherwise it could be deemed spam," says Joe Farren, a spokesman for CTIA -- The Wireless Association, a trade body for the wireless industry.

The cost of the transmission is typically borne by consumers who pay a small fee every time they open a text message, usually about 10 cents. The nationwide emergency alert system in the Netherlands, however, is government-sponsored and phone users don't pay for those messages.

Interest is growing among police and safety agencies in several countries in using text messaging as a general emergency warning system. In the past two years, the Netherlands has been testing a nationwide text-warning system by using a technology called cell broadcasting. It allows operators to broadcast uniform text warnings to all phone users in a defined region. Because the technology uses the maintenance system of wireless networks, it won't jam up systems that handle the commercial traffic. The advantage of cell broadcasting messages is that unlike traditional sirens, which only alert people of emergency situations, it also tells people what the situation is about and gives evacuation instructions, says an official at the ministry of interior affairs.

In Washington, D.C., Westchester, N.Y., and some other regions, residents can register to receive

text alerts ranging from severe weather to neighborhood crime activities on their cellphones. The alerts are sent by emergency agencies. Some states and the Federal Communications Commission also are looking at ways to broadcast terrorism, crime and natural disaster alerts.

Einstein Wireless, a small rural operator in Wisconsin, is offering an emergency broadcasting text-message service in cooperation with the Department of Homeland Security and the Federal Emergency Management Agency. In California, Lt. Gov. John Garamendi proposed to the state senate in May a statewide emergency alert system that will include broadcasting text messages to any cellphone in the area in which an emergency situation has occurred. The FCC has formed an advisory group looking into a nation-wide emergency alert system that could use text messaging in similar ways.

But the privacy and cost issues related to this type of alert system could prove challenging. The text-message bomb program in Amsterdam was dropped in 2004 after wireless carriers in the Netherlands became reluctant to cooperate with the police. "It cost too much and there wasn't enough in it for them," says the spokesman for the Amsterdam police department.

Discussions in California and at the FCC are still in early stages. Officials haven't decided which technology they will use or who will pay for the text-message programs. Operators of cellphone services want to ensure they're cleared of potential liabilities, such as privacy intrusion.

Officials also are trying to determine under what circumstances mass alerts should be sent out and which agency should make those decisions. Mr. Farren, the CTIA spokesman, said his organization supports the creation of a nationwide emergency-alert system. But the system is voluntary under a congressional bill so carriers can decide whether or not they'll participate, he says.

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