

WHITE PAPER

# Continuity of Emergency Response Communications



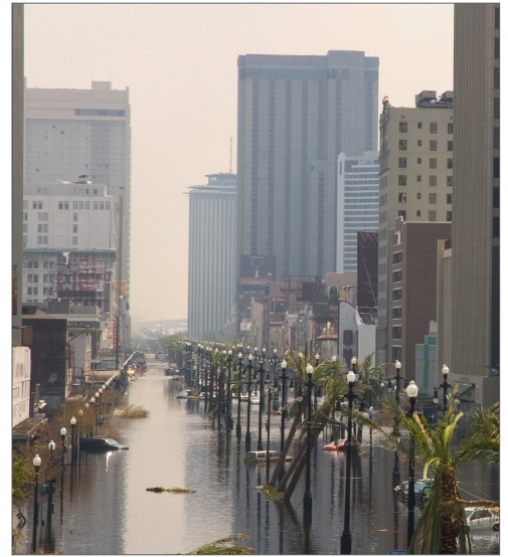
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## Executive Summary

Although the federal government plays an important role in any major civil emergency, much of the responsibility for responding falls on local authorities and organizations, and the ability to communicate within and between agencies is key. In times of crisis, however, the ability to communicate is often damaged. Restoring it is a key part of disaster response management.

Elements to consider include establishing redundant modes of communication in the event primary channels fail, provisions for working over temporary wireless links, and ensuring that first-line responders and support workers can communicate.

A mobile VPN, designed to be reliable during times of intermittent connectivity, and capable of preserving connections while switching them automatically, allows responders to focus on saving lives. These reliable connections allow government workers to perform their essential roles, assist the response effort and keep government running through recovery.



## The Criticality of Communications

The U.S. Federal Emergency Management Agency (FEMA) defines a disaster as *"an occurrence of a severity and magnitude that results in deaths, injuries and property damage, of such magnitude that the event cannot be managed through the routine procedures and resources of government."* Effective disaster response involves multiple organizations working together to save lives and keep community resources functioning. Timely access to information is critical, and the continuing availability of telecommunications resources is vital.

However, in every disaster, communication failures have been uncovered as a central problem for public safety agencies. To cite some examples:

- **Inability to Communicate:** The 9/11 Commission's report found that the inability to communicate is a systemic problem in disasters. The sites in New York, northern Virginia and Pennsylvania were very different, but the problem was common to all three. This was cited as evidence that communications among public safety agencies at local, state and federal levels is a critical issue.

- **Damaged Infrastructures:** In the wake of hurricane Katrina, central transmission systems, repeaters, and cell phones were inoperable. Many emergency operations centers along the Gulf Coast were destroyed or made useless.

In Waveland, Mississippi, all command-and-control communications were destroyed, even though the city had taken the precaution of staging resources at various public buildings. Some smaller public-safety agencies in Louisiana and Mississippi lost their entire infrastructure, including buildings and communications equipment.

The resulting inability of law-enforcement agencies throughout the Gulf Coast to communicate was frequently cited as the most critical problem for public-safety response following the storm. Many officers found they had no way to locate other officers, and there were few means to communicate among agencies. As a result, the response was uncoordinated.

- **International Commonality:** Internationally, before the 2008 earthquake in Sichuan, China, the region had a well-developed, fixed and mobile network. Afterward, nearly all of the available networks were damaged. Some towns lost contact with the outside world for days. The paralyzed communication network prevented the organization of disaster relief.

## The Lesson of Local Responsibility

In the wake of the 9-11 attacks, hurricane Katrina and other high-profile disasters, emergency response structures and directives for continuity of operations at the federal level have become codified. All federal departments are required to perform Continuity of Operations Planning, with specific steps so that agencies can continue to perform essential functions in emergency situations.

These are Federal directives, however. While there are legal structures that allow for delivering Federal support to state and local jurisdictions, timing and logistics dictate that the first response to a disaster typically falls on local emergency services. A variety of agencies at the local, state and federal levels then become involved, including neighboring agencies under mutual-aid agreements and in some cases, private partners or contractors. One of the lessons learned in the aftermath of hurricane Katrina is that following a major disaster, local jurisdictions must be ready to handle more of the burden. This involves developing their own plans for response.

## Coordinating Response and Recovery

Response to such a disaster includes but is not limited to the following efforts, both short-term and long-term, which require continuous communication support:

- **Search and Rescue:** Search-and-rescue and emergency medical response, often in an environment where phone lines are down and communication service is disrupted
- **Civil Order:** Preserving civil order (such as preventing looting) and ensuring public safety at a time when everyday dispatch systems may be overloaded or inoperable
- **Supply Distribution:** Distributing food, water and other supplies at relief centers, coordinating and tracking inventory and shipments, and dispatching security for those centers
- **Social Services:** Providing social-support services for dealing with displaced families and psychological trauma, including scheduling visits and tracking progress
- **Relief Coordination:** Coordinating the efforts of relief workers and cleanup crews by communicating and tracking schedules and supply inventory
- **Public Services:** Maintaining continuity of essential public services by giving government workers access to information systems
- **Transportation:** Rebuilding transportation and other public infrastructure, establishing temporary housing, and supporting the efforts of contractors through access to databases for planning and permitting, as well as mapping and GIS systems



## Dealing with the Dimensions of Disasters

In an emergency, disparate, multiple government agencies and private-sector organizations must suddenly cooperate with an immediate, coordinated and effective response to create order out of chaos, meet human needs and speed recovery. Yet, agencies face the special challenge of extremely high expectations for a rapid response, amid daunting and unpredictable conditions.

Roads may be impassable, telecommunication lines down, other communications infrastructure compromised. Government organizations might themselves have damaged offices and even if offices are fully functional, workers might not be able to get to them. This was the case during Katrina, when large numbers of people were displaced, including government employees. In some cases, staff was prevented from getting to work because emergency management officials had closed off areas. In others, workers were available, but they had to function entirely on their own, without any supporting resources.

In order to assist with response, government workers need access to databases and other information. If the primary data center is down or fiber lines severed, those resources might be in a secondary data center. If offices are damaged, remote workers might have to work at home or from wherever they can, using a completely different form of network access. After the initial response and throughout recovery, government functions such as planning, issuing permits, renewing licenses and the myriad of other tasks must go on.

## Mobilizing Communications Capability

Wireless communication capability is invaluable because in the event that wired networks are crippled, it can be quickly deployed. Through portable equipment, the ability to send and receive wireless voice and data can be established anywhere. Telecom carriers have emergency communication vehicles that use a satellite link to establish communications at the onset of a recovery effort, both to assist in restoring networks and to provide emergency communications for responders.

Self-contained mobile cellular sites can be deployed to replace fixed sites that are damaged or to add additional carrying capacity, using satellite uplinks if necessary when connections to the terrestrial network are unavailable.

FEMA also maintains Mobile Emergency Response Support detachments in strategic locations throughout the U.S., with large tractor/trailers that serve as command and communication facilities for FEMA officials or local response teams. Such large vehicles, however, were found to be incapable of maneuvering through damaged areas, as was found during the response to Katrina. More maneuverable Quick Reaction System vehicles with four-wheel drive include a satellite terminal, cellular telephones, laptop computers, generators and other communication equipment for a faster response. Similar systems are available through commercial providers.

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## A Need for Redundancy

During post-event analysis of the Sichuan earthquake, officials noted that there were areas where mobile signals couldn't get through, but optical cable connections were still working. In other areas, the fixed network was totally severed but wireless connections were still available. This underscores the importance of establishing emergency communication mechanisms beforehand that combine wired, wireless and satellite connections.

Post-Katrina, nearly all forms of communication were down, and those that were still functioning such as Louisiana State Police radio were effectively inoperable because they were overloaded with users. Here again, the lesson is that there is a crucial need for redundant communications systems.

Wireless communication technology is a critical component because it is able to operate independent of wired networks that are especially vulnerable. In addition to its value for providing redundancy, it enhances the response effort as well, through the ability to send data directly to command posts. Wireless links also allow transmission of mapping data or database-search results to aid the emergency response, and can also carry Voice-Over-IP (VOIP) traffic as a primary or secondary voice communication technology. A wide variety of such technologies can be brought to bear, as in the response to the Northridge earthquake which included computers, cellular phones, GIS databases, satellite communications and teleconferencing capabilities.

## Reliability and Continuity of Connections

In the aftermath of a disaster, communications might require a patchwork of disparate connection types, access methods, mobile devices and communication networks, using a combination of surviving links and hastily deployed portable capabilities. Coverage might be spotty, with some cell towers and access points without power or rendered inoperable. In these situations, roaming workers who are using mobile computing devices often encounter application or device instability. They may need to switch connections constantly based on whatever wireless network is locally available, or connect via unfamiliar methods such as satellite links. Networks might be overloaded with traffic, and not all of it essential to the primary task at hand whether that is saving lives, restoring order, or distributing relief supplies.

Public safety agencies have long used mobile VPNs for overall reliability, to maintain continuous connections and application sessions, and to seamlessly switch between disparate wireless networks. These allow emergency response workers in dynamic situations to use computing devices effectively, while keeping their primary focus on saving lives and protecting property.

In a disaster scenario, large numbers of government workers might be forced to “go mobile” and make major use of wireless technologies to protect and serve their citizens, and keep government functioning. More widespread use of mobile VPNs among these workers can play a central and enabling role in maintaining consistent communications.

These solutions also maintain security at the highest standard currently available in the U.S. for non-military use, and can be configured to prioritize application access based on available bandwidth, criticality of the situation, the role of the worker, and other parameters.

## Planning to Communicate

Based on the lessons learned from past experiences, the following are prudent measures to follow in preserving and re-establishing communications capability in the event of a disaster:

- **Communication Capabilities:** Make communication capability an integral part of disaster response and recovery plans. Develop contingency plans for not just intra-agency communications, but also ensuring that you can communicate with key suppliers, vendors and other agencies that will be part of the response and recovery effort.
- **Reliable Connections:** Take steps to prepare workers to connect reliably, continuously and as effortlessly as possible. Verify that current remote-access solutions have full mobile VPN capabilities. They must deliver reliable performance for applications in conditions of intermittent connectivity, and requirements to switch among disparate and possibly unfamiliar connection types.

- **Limited Complexities:** Ensure that emergency communication measures require as little support as possible. Prepare ahead of time for the possibility that your telecommunications and IT experts may not be available, reachable, or able to assist effectively in an emergency situation. A mobile VPN handles the complexities of establishing and switching connections and makes mobile computing seamless, so workers can focus on saving lives and other primary services.
- **Redundant Channels:** Establish redundant communications and secondary communications channels. Prepare for the possibility that surviving communications channels might be overloaded. Plan for redundant voice (radio/cell phone/voice-over-IP/satellite phone) and redundant data connections (wireline/wireless LAN/cellular data/satellite). If new capabilities will be needed, deploy and test to be sure devices can connect and connections will failover.
- **Collaboration Tools:** Consider real-time collaboration technologies. Individuals might not be able to meet due to damaged transportation infrastructure or time pressures. Consider audio or video conferencing capabilities via Web technologies as part of the communications strategy, both for communicating and for sharing documents quickly.
- **Alternate Works Sites:** Prepare for alternate work sites. Employees may need to work from alternate sites, such as temporary headquarters, portable field offices or from home, possibly for extended periods of time. Evaluate current employee use of virtual private network connections, anticipate the increase in demand under various disaster scenarios, and ensure that employees are ready to use them. Redundant network-access options (dial-up, DSL, cable, cellular WWAN, satellite) that can be accessed without user invention increase the likelihood of connection.



## Conclusion

During a disaster, the ability to communicate is often compromised in the wake of the event; yet re- establishing reliable communications is central to an effective and coordinated response.

Multiple, redundant communication channels, augmented by portable wireless equipment and made reliable by a pre-deployed mobile VPN provides a robust emergency communications capability.

A mobile VPN can play a central role in keeping first responders and the workers who support them connected, in order to effectively coordinate the collective efforts of response, relief and recovery.

## Learn More

For more information about best practices in mobility deployments, please visit [www.netmotionwireless.com](http://www.netmotionwireless.com)

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## About NetMotion Wireless

NetMotion Wireless develops productivity and management solutions for organizations with mobile workforces to secure and optimize their investment in wireless data networking. NetMotion Wireless customers include more than 1,900 of the world's most respected organizations across multiple industries including utilities, healthcare, communications, public safety, government, transportation, field service and many others. NetMotion Wireless is one of The 50 Fastest Growing Wireless Companies in the country and has earned over 25 industry awards for outstanding technology. Founded in 2001, NetMotion Wireless is headquartered in Seattle, Washington with offices located in North America and Europe.