WHITE PAPER
Emergency Services

Interoperability for Emergency Services

Bridging the Gap in Communications to Help Prevent Disasters and Save Lives

Introduction: Saving Lives When Seconds Count

A major rush hour accident on a suspension bridge involves an oil tanker truck and numerous civilian vehicles. The firefighters are first on the scene and notice that the bridge is structurally damaged, but because the police are using a disparate communication system, there is no way for these groups to communicate the seriousness of the situation with each other. Police and medical services rush onto the bridge to deliver aid to the wounded as a span of the bridge gives way.

Emergency situations like this and other catastrophic events that we see or hear on newscasts every day highlight the need for split second decision making. In many instances, communications among those responding to events such as natural disasters or terrorist attacks have lacked interoperability. For example, before the second tower of the World Trade Center collapsed, the police received the radio message of the impending collapse, but the firefighters never got that message because they were using different radio communication systems.[1] As a result, an estimated 121 New York City firefighters lost their lives when the second tower crashed to the ground.[2]

Handling daily emergency communications is difficult enough under normal circumstances, but large-scale emergencies are particularly challenging because many responders are from different functional areas. The Department of Homeland Security (DHS) has identified interoperability as one of the key national priorities for first responders.[3] As a result, the DHS, the National Guard, US Northern Command, and other federal agencies have joined forces to form the Responder Interoperable Communications Focus group (RICFG) to stress the importance of establishing cross-agency partnerships to enhance coordination, planning, and response.[4] Yet even with this level of federal support and the availability of communications technologies, interoperability remains out of reach for many emergency responder organizations.

The Emergency Communications Challenge: Interoperability

Interoperability gives public safety personnel and first responders the ability to communicate across state and local agencies, on demand, and in real time.[5] Interoperability is essential in order to reduce the risks to law enforcement and emergency services personnel, alert first responders to any immediate hazards, and support decision-making at an individual level or as a collective group.

When firefighters from adjacent counties join forces to battle a structural fire, or when law enforcement agencies work together during a vehicle chase, it's vital that efforts are closely coordinated in order to reach a positive outcome.[6] Likewise, catastrophic events such as airplane crashes or forest fires require tactical communications among numerous groups of emergency response personnel. Interoperability can improve communications at these events as well as help maximize safety resources for major predictable events such as political conventions, the World Series, or for disaster relief efforts.[7]

Obstacles to Obtaining Interoperability

Unlike Hollywood's portrayal of state-of-the art public safety communications, most public service agencies can't talk to one another in times of crisis due to disparate communication systems, the lack of integration between these systems, and the funding to put interoperability in place.[8]

1 National Task Force on Interoperability, *When They Can't Talk, Lives are Lost: What Public Officials Need to Know About Interoperability,* February 2003.

2 Steadman, Martin J., *FDNY Distress Call!,* 2002. http://911research.wtc7.net/cache/wtc/attack/eves_firefighters.htm

3 *NSTAC Report to the President on Emergency Communications and Interoperability,* January 16, 2007.

4 Department of Homeland Security, *Interoperability Technology Today,* http://www.safecomprogram.gov/NR/rdonlyres/55F9DF83-2CC1-4CC5-93711E97141BA9AC/0/IO_Today_Winter2009.pdf (Winter 2009).

5 *First Responders: Much Work Remains to Improve Communications Interoperability,* http://www.gao.gov/new.items/d07301.pdf (April 2007).

6 Department of Homeland Security, *Wireless Communications Interoperability,* 2006.

7 Department of Homeland Security, SAFECOM Program, http://www.safecomprogram.gov/SAFECOM (2010).

8 National Task Force on Interoperability, *Why Can't We Talk? Working Together to Bridge the Communications Gap to Save Lives: A Guide for Public Officials,* http://www.safecomprogram.gov/NR/rdonlyres/322B4367-265C-45FB-8EEA-BD0FEBDA95A8/0/Why_cant_we_talk_NTFI_Guide.pdf (February 2003).

Disparate Communication Systems

Historically, first responder communications has been significantly hampered by incompatible radio systems that include disparate networks, equipment, functions, procedures, applications and skill sets. Some police, firefighters, and EMS units have to juggle multiple different radios because each agency communicates on different systems.[9] Many existing emergency radios use different frequencies or are unable to transmit and receive in all of the public safety frequencies, further complicating communications between first responders from different jurisdictions. Additionally, public safety agencies have often acquired communications systems in the past without concern for interoperability, often resulting in incompatible systems throughout any given local jurisdiction.[10]

Technology Ownership and Communication Policies

Implementing new technologies can be a time-consuming and costly endeavor. Once an agency has selected and implemented a new communications technology, it's unlikely that they will adopt another agency's technology or share their new technology with agencies that did not invest in its acquisition. In addition, agencies typically create distinct policies that determine how their technology will be used within their jurisdiction. For example, Public Service Answering Points (PSAPs), which are responsible for answering E911/911 emergency calls, are employed differently from one jurisdiction to the next. This makes it very difficult to coordinate various agencies in a multiple jurisdiction situation with no interoperable communications systems.

Communication Systems Integration

Emergency services and public safety agencies have unique communications requirements that can inhibit integration. Although push-to-talk (PTT) and Land Mobile Radio (LMR) systems have been the backbone of emergency response for decades, LMR has a legacy of incompatibility. As a result, COMCARE reports that 100,000 US emergency response agencies cannot easily communicate with each other or the public in real time. In other cases, cell phones, personal digital assistants (PDAs) and other commercial wireless devices are used in emergency situations, but these devices are not well-suited for mission-critical communications during serious incidents.[11]

According to the National Emergency Communications Plan, there is currently no integration framework that describes disaster communications services, the community of agencies and companies that provide these services, and the procedures for integrating these services and communities.[12] A major obstacle to creating this framework is the tremendous costs and impracticality of removing legacy systems.[13]

Interoperability Funding

Currently, all levels of emergency safety organizations face limited budgets for communications improvement and replacement. Because these agencies are funded by cities, counties or states, the funding for public safety communications can vary widely from one locality to the next. As such, funding efforts to improve public safety interoperability remain a significant challenge nationwide.

Best Practices for Implementing Interoperability

While serious challenges to obtaining interoperability exist, the need for multiple public safety organizations to effectively communicate during emergency situations makes it essential to overcome these obstacles. The following best practices can help your agency move towards implementing an interoperable communications infrastructure.

Identify Specific Actions to Encourage Interoperability

A first step to improving inter-agency emergency communications is to identify specific actions that will encourage interoperability. Local organizations can improve inter-agency communications by programming existing operational channels from agencies that are geographically adjacent and that operate in the same frequency band into all agencies' radios. Organizations can also employ the FCC's newly established nationwide interoperability channels, which are designed to allow groups to communicate anywhere in the country and available in all of the public safety bands.[14] When you are prepared to implement a more complete solution, the DHS's *Methodology for Statewide Communication Interoperability Planning* (SCIP) offers clear guidelines for establishing key relationships and funding, gathering and analyzing data and developing a communications operability strategic plan.[15]

Establish State and Federal Interoperability Mandates

To overcome the challenges posed by disparate communications systems and technology ownership issues, individual public safety agencies must look to state and federal agencies to improve collaboration across organizational and jurisdictional boundaries. While guidelines for interoperability are useful, organizations at all levels should actively support and seek state and federal mandates for the rapid adoption of interoperable emergency communications infrastructures.

To accelerate interoperability and collaboration among public safety organizations across regions, the federal government must integrate the efforts of local, state, regional, and private-sector agencies into a national response system that enables immediate support for local communities in the event of a disaster. This could be accomplished by setting standards that would migrate systems over time into a common, open architecture that is compatible with industry standards and that could use commercial technologies to provide responders with state-of-the-art systems.

Federal agencies already have some interoperability mandates in place, but these mandates still face funding challenges. The Federal Communications Commission (FCC) and other federal government agencies have issued multiple mandates that require major changes to radio system infrastructure and subscriber hardware across the United States.[16]

9 Ibid.

10 *First Responders: Much Work Remains to Improve Communications Interoperability,* http://www.gao.gov/new.items/d07301.pdf (April 2007).

11 *Why Can't We Talk: Working Together to Bridge the Communications Gap to Save Lives, A Guide for Public Officials,* February 2005.

12 Department of Homeland Security, *National Emergency Communications Plan,* July 2008.

13 Ibid.

14 Federal Communications Commission, Public safety and Homeland Security Bureau. *National Interoperability Channels,* http://www.fcc.gov/pshs/techtopics/techtopics12.html#fn1 (January 2010).

15 Department of Homeland Security and SAFECOM, *Methodology for Statewide Communication Interoperability Planning.* http://www.safecomprogram.gov/SAFECOM/library/interoperabilitycasestudies/1223_statewidecommunications.htm (2005).

16 Ibid.

Look for Guidance from State and Federal Agencies

Federal and state organizations have developed recommendations to help agencies at all levels to institute interoperability projects. The DHS's Office of Emergency Communications (OEC) offers guidance and information on initiatives for improving communication interoperability, including locally driven, multi-jurisdictional, Statewide Communication Interoperability Plans (SCIPs) that identify short- and long-term initiatives for improving communications interoperability.[17] The OEC has also made recommendations and set milestones to guide emergency responders and relevant government officials in the development of National Emergency Communications Plan (NECP) to address national emergency communications deficiencies.[18]

Identify How Interoperability will be Funded

Funding interoperability can become a major political issue. Public officials must take the initiative to educate their constituents about the importance of reliable, interoperable, robust public safety radio communication systems. Since legislators at all government levels are considering public safety communications and interoperability as critical issues, they will also need to make this an emerging political concern with their constituents in order to gain community support.

State and local funding for interoperability projects is available through grants from federal agencies. The American Recovery and Reinvestment Act (ARRA) contains a number of opportunities for agencies to get assistance in making technology and equipment purchases directed toward the goal of enhancing public safety.[19] There are currently a number of funding sources available that address the needs of emergency services, public safety, and law enforcement agencies including preparedness grants from the DHS; the Interoperable Emergency Communications Grant Program. Public Safety Interoperable Communications (PSIC) Grants are available to 56 US states and territories and are available to public safety agencies for one-time grants to enhance interoperable capabilities. (A list of federal grants is available in this document's appendix.)

Work with a Leading Interoperability Solutions Provider

In the process of undertaking an interoperability initiative, agencies should engage the services of an interoperability solutions provider that has a national presence in helping organizations handle emergencies. Because public safety organizations are often called upon to interact with a variety of other agencies from across the government spectrum, the ideal interoperability provider should have experience with emergency communications services at all levels, whether those are local, county, state or federal.

It is critical to work with a time-tested, stable and reliable interoperability solutions provider with deep financial resources so they can weather storms and be there for you down the road. For example, a vendor with a national push-to-talk coverage area, large 3G network, high capacity and multiple layers of redundancy provides services to maintain reliability during emergencies. In addition, an experienced provider with expertise in all areas of communication can offer solutions to integrate disparate technologies. For example, an Interoperability and Communications System (IPICS) solution includes servers, software, phone clients, operational views, and policy engines which can be customized for unique environments.

An interoperability provider must have the capability to enable the support of local response teams via national IP network. It's now possible for disparate communication technologies to achieve interoperability through wired, wireless, and satellite networks using IP (Internet protocol) standards-based technology with 99.9 percent uptime. This open-based protocol means agencies with an existing IP network don't need to make large technology investments to enable interoperability. Voice over Internet Protocol (VoIP) advanced communications systems offer the flexibility that first responders need to transmit voice conversations over a data network such as the Internet or a private network. As a result, VoIP communications can help agencies achieve greater efficiency and deliver more effective emergency care throughout a disaster situation.

Interoperability in Action:

Verizon works closely with public safety organizations to help them meet their interoperability objectives. Recently, a state public safety agency wanted the ability to geographically pinpoint accidents and other disasters. They also wanted to have real-time information available to all first responders during periods of severe weather, such as major snow storms, that would impact the state's turnpike system and roadways. Unfortunately, a tragic mining disaster had brought public attention to the lack of interoperable communications between the various response teams.

In response to these and other disasters, the state's governor made emergency communications a top priority and implemented a pilot program using Verizon's IP Interoperability and Communications System (IPICS). As part of the implementation, wireless communications routers were introduced into remote locations, transforming cell phones into push-to-talk radios. Verizon's optic system enabled the use of VoIP to connect the state's legacy radio systems into the interoperable radio project. This system has already proven itself when a snow storm stranded motorists for hours on a major turnpike. Emergency responders were able to reach motorists and coordinate efforts until the situation was resolved.

The Verizon Communications Interoperability Solution used an IP-based platform that integrated radio as well as voice, data and wireless networks so the necessary agencies could operate as a single network. This enabled police, fire and other public safety personnel to communicate directly with one another by radio, phone or e-mail during an emergency—even if they are using incompatible communications systems.

17 Ibid

18 *National Emergency Communications Plan*, http://www.dhs.gov/xlibrary/assets/national_emergency_communications_plan.pdf (July 2008).

19 Wyllie, Doug, *Finding Money for Communications Interoperability Purchases,* EMSGrantsHelp.com, http://www.emsgrantshelp.com/news/507544-Finding-the-Money-for-Communications-Interoperability-Purchases/ (July 8, 2009).

Conclusion

Interoperability greatly improves communications with other first responders and enables efficient collaboration in the name of public safety. Although challenges to interoperability, including legacy radio systems, disparity between agencies, technology ownership, and funding, must initially be overcome by local agencies, state and federal mandates are required to achieve regional and national interoperability. To ensure successful interoperability solutions, agencies should engage the services of an interoperability solutions provider with a national presence. An ideal vendor has extensive experience integrating current voice, data and wireless emergency communications technologies, and building on existing infrastructures. Working with a trusted technology vendor can put agencies on the road to interoperability and accelerate positive outcomes for the citizens they protect.

With Verizon's proven experience and expertise in the emergency services arena, Verizon is the ideal partner to help you design & implement an interoperability solution to support your public safety mission. For information, visit www.verizonbusiness.com/solutions/government/state_local/emergencies/ and contact your Verizon Account Manager.

Appendix:

Federal government funding agencies:

- Department of Homeland Security—more than $2.7 billion for preparedness grants in the 2010 fiscal year. [http://www.fema.gov/government/grant/index.shtm]
- Interoperable Emergency Communications Grant Program—$48 million to all eligible states and US territories. [http://www.fema.gov/government/grant/iecgp/index.shtm]
- Firefighter Assistance Grants—$210 million available through FEMA. [http://www.firegrantsupport.com/content/html/afg/]
- Staffing for Adequate Fire and Emergency Response (SAFER)—$190 million to fire departments and volunteer fire departments. [http://www.firegrantsupport.com/content/html/safer/]
- COPS Interoperable Communication Technology Program—has already awarded more than $250 million to 65 communities to improve their interoperable communications systems [http://www.cops.usdoj.gov/default.asp?Item=1268]
- Urban Area Security Initiative (UASI) Grant Program—$15 million available through this FEMA program to non-profit organizations that are at high risk of terrorist attacks and located in one of the UASI-eligible Urban Areas. [http://www.fema.gov/government/grant/uasi/index.shtm]
- Public Safety Interoperable Communications (PSIC) Grants—has awarded $968.4 million to 56 US states and territories and is available to public safety agencies. The PSIC Grant Program is a one-time grant opportunity to enhance interoperable capabilities with respect to voice, data, and/or video and encourage the use of innovative cost- and spectrum-efficient technology solutions. The National Telecommunications and Information Administration (NTIA) oversees the program. [http://www.ntia.doc.gov/psic/index.html]
- Office of Justice Programs (OJP)—these funds can be used to purchase various public safety and law enforcement solutions that enhance mobility, improve interoperability, and support collaborations among governments and emergency management services. [http://www.ojp.usdoj.gov/ProgramPlan/toc.htm]
- Rural Law Enforcement competitive grants—these monies provide $125 million in funding to help rural law enforcement agencies combat crime, especially drug-related crime. [https://www.cfda.gov/index?s=program&mode=form&tab=step1&id=ebc963e993bbf43b12fd48ff51fe0bdc&cck=1&au=&ck=]