

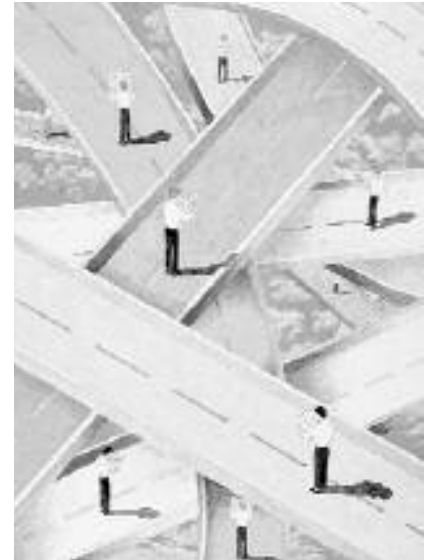
## CHAPTER 2:

# Five Key Reasons Why Public Safety Agencies Can't Talk

Historically public safety agencies have depended upon their own stand-alone communication systems. There are not only different systems for different agencies within one jurisdiction, neighboring jurisdictions maintain their own systems, too. There are approximately 2.5 million public safety first responders in the United States working for 18,000 State and local law enforcement agencies, 26,000 fire departments and over 6,000 rescue departments, plus Federal and tribal law enforcement, and other agencies such as Federal and State emergency management, transportation, and the public utilities who need to talk to one another during critical incidents.

There are five key reasons public safety agencies cannot talk—incompatible and aging communications equipment, limited and fragmented funding, limited and fragmented planning, a lack of coordination and cooperation, and inadequate and fragmented radio spectrum.

- In many jurisdictions, radio communications infrastructure and equipment can be 20 to 40 years old. Different jurisdictions use different equipment and different radio frequencies that cannot communicate with one another, just as different computer operating systems will not work together or an AM receiver will not accept an FM signal. There are limited uniform standards for technology and equipment.
- There is limited funding to update or replace expensive radio communications equipment, and different communities and levels of governments have their own funding priorities and budget cycles.
- Planning is limited and fragmented. Without adequate planning, time and money can be wasted and end results can be disappointing. Agencies, jurisdictions, and other levels of government compete for scarce dollars, inhibiting the partnership and leadership required to develop interoperability.



### *Can You Imagine?*

*Imagine that each local government designed and constructed their own streets, roads, and transportation systems without considering or coordinating with their neighbors. While this might work well for traveling within each jurisdiction, travel among jurisdictions would be a disaster. Streets would not line up, and travel from city to city would be nearly impossible.*

*With few exceptions, this analogy effectively describes the current condition of our public safety communications infrastructure. Most public safety agencies cannot directly communicate with other public safety agencies in their region, even when numerous agencies collectively respond to an emergency.*

*“One lesson learned after Hurricane Andrew and echoed during the wildfires of 1998 was that Florida’s communication systems are inadequate to ensure an appropriate and integrated response to disasters. Although we have made improvements in the past 6 years, we still need to focus on increasing our response capacities through improving equipment and ongoing training for response personnel.”*

*Phillip Lewis, Chairman,  
Governor’s Wildfire Response  
and Mitigation Review  
Committee*

- The human factor is a substantial obstacle—agencies are naturally reluctant to give up management and control of their communications systems. Interoperability requires coordination and cooperation. It requires a certain amount of shared management, control, and policies and procedures.
- There is a limited and fragmented amount of radio spectrum available to public safety.

## **Reason 1: Incompatible and aging communications equipment**

The radio communication system infrastructure and equipment—towers, control and dispatch stations, handheld and mobile radios—can be 20 to 40 years old in many jurisdictions. Antiquated systems and aging equipment mean escalating maintenance costs, reduced reliability, and obsolescence for public safety agencies. Public safety field personnel rely on their radios for assistance or back up in emergencies. Many radio systems in use today are obsolete or will become obsolete as manufacturer support is discontinued for older equipment. As systems deteriorate, field personnel are in danger and citizens are at risk, both in day-to-day and emergency operations, if they cannot exchange voice and data communications with dispatch and other field personnel.

The radio communication systems used by various agencies and jurisdictions are often at different stages of their life cycle. Some jurisdictions may expect their existing communications system to meet their needs for another 10 years, while others may have recently implemented new systems that they expect will meet their needs for the next 20 years. Others are barely functioning and in need of immediate replacement.

Different jurisdictions use different equipment and different radio frequencies that cannot communicate with one another, just as different computer operating systems will not work together or an AM receiver will not accept an FM signal. Some of the newer digital radio communication systems will not even communicate on the same radio frequency because of proprietary software (software that is unique to a manufacturer and incompatible with other manufactured systems) that prevents communica-



*“In virtually every major city and county in the United States, no interoperable communications system exists to support police, fire departments, and county, State, regional, and Federal response personnel during a major emergency. Radio frequencies are not available to support the post-incident communication demands that will be placed on them, and most cities have no redundant systems to use as backups. Portable radios will not work in high-rise buildings unless the buildings are equipped with repeater systems. Most U.S. cities have separate command-and-control functions for their police and fire departments, and little to no coordination exists between the two organizations. Furthermore, with few exceptions, first-responder commanders do not have access to secure radios, telephones, or video-conferencing capabilities that can support communications with county, State, and Federal emergency preparedness officials or National Guard leaders.”*

*America Still Unprepared, America Still in Danger,  
Council on Foreign Relations, October 24, 2002.*

tion. There are limited uniform standards for technology and equipment. Standards development must incorporate user input and encourage the development of compatible equipment.

There are interim solutions to the problem of incompatible equipment. Boulder County, Colorado, is using the ACU-1000, a gateway or interface between radio communication systems that use different equipment or frequencies, to connect disparate radio systems. The Boulder County Drug Task Force is a partnership of Denver area agencies, an area of seven counties and many municipalities, all working to reduce the drug problem. The agency radio systems are attached to the switching system of the ACU-1000. The dispatch center has a computer program that allows point and click "patching" or connection of various agencies. More than one patch group can be connected simultaneously to seven operations. The system was also successfully employed during the Colorado wildfire situation, where it was used to patch together two fire departments using different radio systems.

## **Reason 2: Limited and fragmented funding**

There is limited funding to replace and update expensive communications equipment, and different communities and levels of government

## Technology is only one of the tools

Interoperability requires more than equipment—critical incident management, training, and operational policies and procedures that govern interoperable communication systems need to be in place as well. To achieve the unified response required in critical incidents, there must be an active effort from all—from the public safety service providers to the State and local elected and appointed officials—to break down traditional jurisdictional boundaries and change the collective culture of operating in isolation. But it requires more—without disciplined management and training, the best radio communication systems will not provide interoperability. Public safety service providers need standard policies and procedures and training on radio equipment, including drills on mutual aid in critical incidents.

True interoperability must comprise a comprehensive strategy that combines radio communication systems, radio training and drills, common terminology, standard operational procedures, and a unified incident command when the situation warrants it.

have their own funding schedules and budget priorities. Regulations in one jurisdiction may conflict with those in another. Instead of combining dollars, funding is usually stovepiped to meet individual agency or jurisdiction needs. With few exceptions, public safety agencies have historically developed systems based on individual needs when planning a radio communication system. Spending decisions are based on old strategies that did not consider the need for interoperability. Requesting additional money to change radio communication systems is difficult as local, State, and Federal governments face budget shortfalls. As any public official knows, there are many important interests competing for scarce dollars. Short-term strategies to incrementally improve existing radio communication systems with limited resources need to be explored and developed.

The State of Minnesota is saving money by combining funding as it is developing interoperable radio communication systems. In the 1980s, when Minneapolis and St. Paul experienced rapid population growth, new suburban law enforcement, fire, and EMS agencies were finding it difficult, and in some cases impossible, to find radio channels they could license for their two-way systems. Public safety professionals urged the legislature to develop a radio system that could utilize new spectrum bands that were being made available to public safety by the Federal Communications Commission and, at the same time, improve the ability of separate agencies to talk to one another.

The legislature authorized a planning commission that met for several years, developing a plan for an integrated region-wide radio system and, ultimately, passing legislation to create the Metropolitan Radio Board. At the time the Board was created, both the State of Minnesota and Hennepin County were planning separate upgrades of their outmoded radio systems. The separate legacy systems were, in effect, "silos" that could not easily communicate with outside entities. With passage of the legislation, the legislature hoped to encourage the idea of a shared infrastructure that would improve the ability to talk between agencies and, at the same time, provide significant economies of scale.

Minnesota's new 800 MHz radio system participants include the State of Minnesota's State Patrol, the Minnesota Department of Transportation (MnDOT), and the Department of Natural Resources; the Metropolitan Council, including Metro Transit and Metro Mobility; Hennepin and Carver Counties; and the cities of Minneapolis and Richfield among others. MnDOT—the lead agency for the State's two-way radios—financed half the cost, partly through general obligation bonds, and partly with monies from the State's trunk highway fund. The other half of the capital costs have come from the Metropolitan

Radio Board, through revenue bonds issued on its behalf by the Metropolitan Council. The debt service is provided by 4 cents—a part of the 9-1-1 surtax—collected monthly on all wired and wireless telephone lines statewide. Planning is underway to design and build the second phase of the system, which entails extension to the remainder of the metro area. Another effort is planned in the coming session of the legislature to expand the system statewide and to review the governance structure.

### **Reason 3: Limited and fragmented planning**

Planning for interoperability is limited and fragmented. Funding budgeted for the planning effort, a critical element of the process of developing interoperability, is still scarce. Without adequate planning, time and money can be wasted and end results can be disappointing. Agencies and jurisdictions, and different levels of government compete for scarce dollars, inhibiting the partnership and leadership required to develop interoperability.

The strength of the interoperability effort in Indiana was based on strong partnership, leadership, and coordinated planning. Indiana's State Police Superintendent was a strong advocate of a statewide, integrated public safety communication system that any public safety agency could use. His goal was to bring together every public safety agency—local, State, and Federal; fire, EMS, law enforcement, emergency management, and transportation—in Indiana so they could communicate with one another. To build support and coordinate planning for the proposed integrated communications system, the major statewide law enforcement associations and the Federal Bureau of Investigation (FBI) came together to form the Integrated Law Enforcement Council (ILEC). Subsequently, the statewide organizations representing the fire service, EMS, and counties, cities, and towns came on board. This council became the major conduit for communication and planning between the local, State, and Federal governments. To bring together over 475 cities and towns, 92 counties, and innumerable townships to share a common vision required a massive communication effort. Over the first 4 years of the effort, the ILEC held 4 governor's summits, numerous regional meetings, and focus groups. It conducted a survey of the public safety agencies and published a newsletter for all of the constituents of its members and for the members of the General Assembly and Congress. The first implementation of Project Hoosier SAFE-T, as the initiative is known, was with demonstration projects in three areas of the State. This played a critical proof of concept role in the planning process.

In 1999, the Indiana General Assembly created the Integrated Public Safety Commission (IPSC), which serves as the governance body for Project Hoosier SAFE-T. Today, IPSC has begun the 4-year phased construction of its interoperable radio communication system. The first implementation in Johnson County has every public safety agency from the volunteer fire department to the sheriff's department to the Indiana State Police and Department of Natural Resources on the new system. As the system is implemented, communication is ongoing with the local, State, and Federal agencies that are interested in coming on the system. The local agencies are involved with the planning of the system design and have input into the location of the towers in their areas to maximize the system's benefit to them.

## **Reason 4: Lack of coordination and cooperation**

The human factor is a substantial obstacle—agencies are naturally reluctant to give up management and control of their communications systems. Interoperability requires coordination and cooperation. It requires a certain amount of shared management, control, and policies and procedures. There is no one solution for every jurisdiction, but jurisdictions should consider altering the current pattern of spending in isolation. Public officials can consider sharing costs and benefits with another jurisdiction or consider sharing infrastructure such as radio towers.

The Capital Wireless Integrated Network (CapWIN) is a multi-State, multijurisdictional wireless public safety system. This partnership of communities and agencies serving Washington, D.C., Maryland, and Virginia, is working together to develop an Integrated Mobile Wireless Public Safety and Transportation Network that will enable public safety and transportation officials from over 40 local, State, and Federal agencies to communicate with one another in real time. CapWIN will provide firefighters, law enforcement, transportation officials, and other authorized emergency personnel with wireless access to multiple government databases during critical incidents, giving first responders and other public safety officials pertinent information to make critical decisions.

The strength of CapWIN is the partnerships that have developed and the sense that agencies have to work together for the greater good of their citizens. Partnerships must be formed to share resources. Public safety agencies must change the way they have done business in the past and work together to meet the challenges of the future.

## Reason 5: Limited and fragmented radio spectrum

There is a limited and fragmented amount of radio spectrum available to public safety. Radio spectrum is electronic real estate—the complete range of frequencies and channels that can be used for radio communications. Spectrum is the “highway” over which voice, data, and image communications travel. Radio spectrum, one of our Nation’s most valuable resources, is a finite resource—what exists today is all there ever will be. Public safety shares radio spectrum with television and radio broadcasters, government users, and other commercial consumers, who require spectrum for everything from garage door openers to cell phones. The Federal Communications Commission (FCC) has allocated certain frequencies to public safety, but it is inadequate and scattered across the spectrum, making it difficult for different agencies and jurisdictions to communicate. Initially, almost all public safety spectrum assignments were confined to the low frequency range, but as technology advanced and improved, transmission at higher frequencies became possible and the FCC assigned additional frequency bands to public safety. The result—public safety operates in 10 separate bands, which has added capacity, but which has also caused the fragmentation that characterizes the public safety spectrum today.

Public safety has changed, and emerging technologies that require the use of additional spectrum can assist in making them more responsive to the needs of the public they serve. New applications are quickly being viewed as critical to the public safety mission and are used for a wide variety of activities, such as geographic positioning, continuous vehicle location, report transmission, electronic messaging, and access to data repositories (e.g., National Crime Information Center). With these technologies, public safety can have real-time access to and transmit building plans, mug shots, fingerprints, and photos of accidents, injured persons, and crime scenes. Use of these technologies not only enhances the capability of individual units and agencies, it assists in activities in which interoperability is key, coordinating the activities of multiple agencies or personnel.

As technology advances and improves, more and more electronic devices, both public and private, require spectrum in order to operate. As a result, spectrum is becoming more scarce and more valuable, and is eagerly sought by competing private and government interests.

*Today's public safety*

*agencies operate in*

*assigned frequencies*

*across 10 or more*

*different bands of radio*

*spectrum.*

## Spectrum "101"

- Radio spectrum is a finite resource. It is the electromagnetic real estate in the sky. What exists today is all there will ever be. It cannot be created or increased. What exists must be re-allocated and better managed.
- There is an inadequate amount of radio spectrum dedicated to public safety.
- The limited amount of radio spectrum allocated to public safety is subject to interference from commercial wireless services, radio and TV broadcasters, and from our Mexican and Canadian neighbors.
- The radio spectrum allocated to public safety is not contiguous. Narrow frequency bands for public safety are scattered throughout a wide spectrum range, which severely limits the ability of public safety to communicate across agencies and jurisdictions.
- The ability to harness radio spectrum is limited by technology. In most cases, industry, not public safety, set the standards for equipment and software. Their needs, not those of public safety, drive research and development.

## Public Safety Radio Spectrum Bands

