



Saving Lives and Property Through Improved Interoperability

***Post-Symposium Support Report—
New Jersey Public Safety
Communications Interoperability
Conference***

Final

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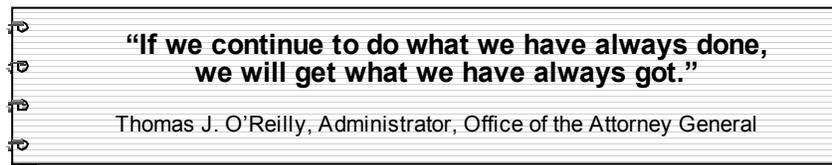
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1. INTRODUCTION

This report presents key findings, lessons learned, and next steps identified during the New Jersey Public Safety Communications Interoperability Conference in Trenton, New Jersey, on November 13, 2002. The conference was attended by approximately 300 public safety professionals and consisted of presentations and discussions that included representation from the public safety community in New Jersey and from across the Nation. The information in this report is specifically intended to help conference participants continue to coordinate their efforts to develop seamless, coordinated, and integrated public safety communications for the safe, effective, and efficient protection of life and property in New Jersey.

Background

The State of New Jersey 210th Legislature is considering establishing a State Public Safety Wireless Communications Coordinating Council in the Department of Law and Public Safety. The initial task of the proposed council will be to develop a Statewide Wireless Public Safety Strategic Plan to address interoperability. Passing this bill will be the first major step toward solving the interoperability problem recognized by New Jersey Governor James E. McGreevey and other leaders in New Jersey. In anticipation of the establishment of the council, the senior public safety officials in New Jersey determined that an effective way to initiate the process would be to bring together representatives from across the public safety community for a conference.



Understanding the need to garner support from all key public safety stakeholders for this important initiative, the Public Safety Wireless Network (PSWN) Program, New Jersey Domestic Preparedness Task Force, and New Jersey League of Municipalities worked together to present the New Jersey Public Safety Communications Interoperability Conference. The one-day conference brought more than 300 high-level government and private industry officials together to address many of the technical, political, and financial issues challenging public safety wireless communications. Conference participants included captains, lieutenants, and chiefs from local fire, police, and emergency medical services (EMS) units, as well as directors and managers from New Jersey Department of Health & Human Services, New Jersey Office of Emergency Management (OEM), New Jersey State Police (NJSP), New Jersey Department of Community Affairs, and New Jersey Department of Transportation. Appendix A lists the names of the conference speakers, who represented private industry, as well as public safety agencies from local, state, and federal governments.

A series of carefully constructed panels, presentations, and group discussions were led by conference speakers and used to facilitate dialog among all conference participants. The conference was divided into the following three sessions: Session 1—The State of

Interoperability in New Jersey, Session 2— Successful Models, and Session 3—Conference Wrap-up.

Report Methodology

Although this report closely mirrors the structure of the interoperability conference, it was not developed to record the details of every presentation given during the conference. Instead, this report provides the key concepts presented at the conference. It is divided into four separate sections that identify priority issues affecting public safety communications in New Jersey, detail trends for improving wireless communications, highlight lessons learned, and list next steps for local, state, and federal public safety stakeholder groups. The lessons learned in Section 4 are drawn from the data presented in Sections 2 and 3 and form the foundation for the next steps listed in Section 5. Figure 1 displays the flow of this report and illustrates the methodology used to establish these next steps.

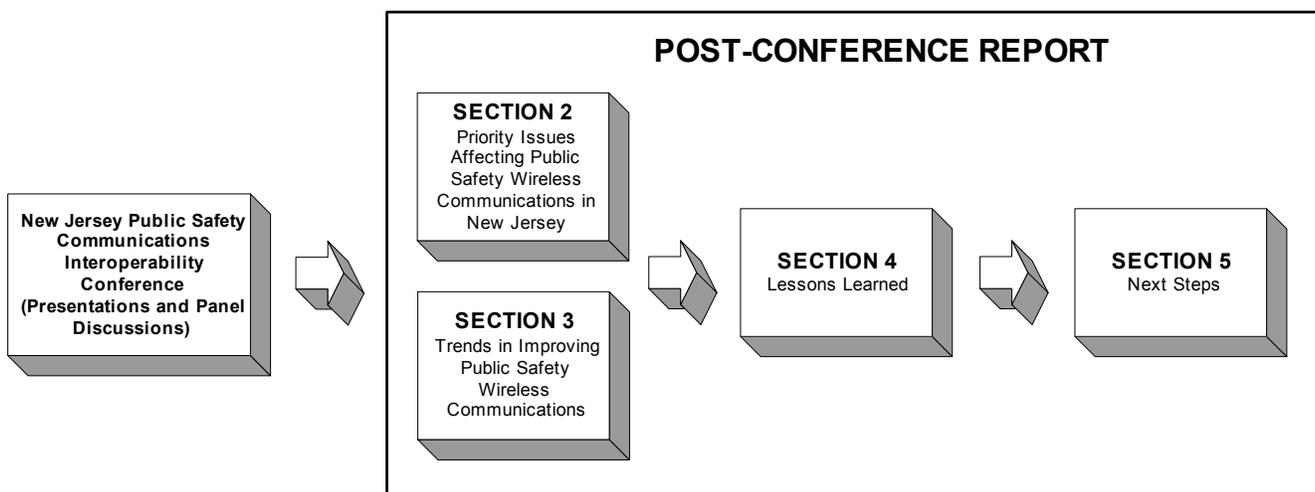


Figure 1
Report Methodology

2. PRIORITY ISSUES AFFECTING PUBLIC SAFETY WIRELESS COMMUNICATIONS IN NEW JERSEY

The State of New Jersey's public safety community has limited communications capabilities between key local, state, and federal agencies, as well as with critical private industries. This section describes the priority issues affecting public safety wireless communications in New Jersey. Specifically, this section discusses communications, command and control, network interoperability and engineering, spectrum, funding, and legislation and mandates issues presented by the one-day conference speakers. There seemed to be an informal consensus among the conference participants that these issues were the priority issues. It also became apparent that a history of a lack of leadership and coordination has played a major role in the inoperability of current wireless communications between public safety agencies.

Communications Issues

Most New Jersey public safety agencies are dealing with communications issues that affect their mission-critical operations. Although the entire public safety community shares most issues, some issues are agency specific. The following is a list of communications issues presented by New Jersey public safety representatives during the conference:

- Most public safety personnel lack mobile data.
- Almost no public safety agencies have encrypted communications.
- EMS and other health services agencies often lack interoperable communications with other first responders (i.e., local emergency and fire service personnel).
- Most local, state, and federal public safety personnel cannot communicate in real time with each other on the scene of emergencies.
- Most critical private industries are not included in emergency response planning and do not have methods for communicating with public safety personnel.
- Public utilities and airports often lack communications links with the surrounding local public safety community.
- Agency Incident Command Systems (ICS) are not integrated.
- First responders from different public safety agencies usually do not train together.
- Public safety spectrum is uncoordinated across jurisdictions, levels of government, and agencies.
- Many public safety agencies cannot secure new channels to relieve congestion on current channels.

- Many public safety agencies lack funding for developing, enhancing, or linking wireless networks.
- Most agencies lack redundant communications to use when primary systems fail.
- Radio users do not always fully understand how to properly use the technology options available to them with their current equipment.

Command and Control

Although some New Jersey public safety agencies have integrated emergency response plans, many do not. Most public safety agencies have not established an ICS that would help them work with other critical first response agencies. Kevin Hayden (Director, Department of Health & Senior Services) said, “ICSs are key to the effective use of current interoperability solutions.” In addition, Timothy Smith (Fire Marshal of Monmouth County) pointed out a lack of communications training in the different ICS procedures and said, “you can’t have one without the other.” However, Mr. Smith presented one successful ICS—Monmouth County’s use of county coordinators to manage communications during an emergency.

“Real-time communications are needed for first responders...meaning those who are at the incident scene within the first 20 minutes, not 2 days later.”

Bob Lee, PSWN Program Manager from the Department of Justice (DOJ)

Because most public safety agencies operate without a universally accepted ICS, agencies often infringe on each other’s responsibilities and command and control procedures. Robert Resetar (Director, St. Barnabas Health Care System at Community Medical Center) stated that agencies operating without a plan often violated interagency protocols when responding to emergency incidents. In addition, available lines of communication were not set up to prevent agencies from “stepping on each other’s toes.”

The events of September 11 highlighted the need for public safety agencies to effectively work together. Many first responders had difficulty working together at the scenes of the World Trade Center and Pentagon attacks. On that day, the New Jersey Port Authority (NJPA) helped rescue civilians from the area surrounding the attack. Because the NJPA works with federal agencies daily, they had already established federal-to-state working procedures. When the towers fell, the NJPA lost part of its 800 megahertz (MHz) system infrastructure. After their system went down, NJPA personnel relied on Nextel Direct service to help them continue their rescue efforts. The NJSP Marine Patrol, however, had to rely on face-to-face communications to coordinate with the scene commander.

Network Interoperability and Engineering

Many public safety agencies have a history of adding and upgrading communications systems independently. The lack of coordination has added to the incompatibility between the different agencies’ wireless infrastructure. For example, NJSP personnel operate on a trunked analog land mobile radio (LMR) system while some local public safety personnel operate on a

conventional analog LMR system. According to Edward Petrini (President of the New Jersey State Association of Chiefs of Police) many police agencies choose a vendor, select a frequency, and then create a pocket of communications. William Prairie (State Fire Coordinator, Middlesex County) noted that the public safety agencies in the most populated regions of the state currently have the least amount of interoperability.

“This problem has been illustrated again and again across New Jersey, where our public safety agencies are utilizing different radio equipment, representing incompatible and, in many cases, outdated technologies.”

The Honorable David Samson, Attorney General for the State of New Jersey

Although many first response agencies do not have a history of working together to plan for the future, some agencies are taking the first step. Specifically, the State of New Jersey has displayed its leadership when, in August, Governor McGreevey announced the development of the New Jersey Hospital Communications Network. This network will connect all 85 of the state’s acute care hospitals on the NJSP 800 MHz system and will interconnect with the three regional New Jersey State Emergency Operations Centers (EOC); the three regional EMS communication centers; the Department of Health & Senior Services, the New Jersey OEM; the Domestic Security Preparedness Task Force; the Department of Environmental Protection, and the New Jersey Hospital Association.

In addition, Attorney General David Samson (State of New Jersey) acknowledged the current state of communications in New Jersey and said, “As New Jersey Attorney General, two of my top priorities are fighting crime and ensuring the domestic security of the state.” Attorney General Samson went on to say that “we have developed strong public–private partnerships with key industries to protect our critical infrastructure sites...and, through our Office of Counter-Terrorism, we are improving our capacity to gather, analyze and share intelligence.” Part of the Attorney General’s speech also reinforced Louis Sasso’s, (Director of Emergency Medical Services for Robert Wood Johnson University Hospital) call for upgrading the state health care system’s wireless communications to better prepare hospitals to respond to acts of terrorism.

Many public safety agencies rely on the NJSP statewide 800 MHz system for inter- and intra-agency wireless communications. The system has grown to support 29 agencies with 17 of those agencies operating full dispatch centers; Table 1 lists the agencies supported by the NJSP statewide communications system.

Table 1
New Jersey State Police System Users

| PRIMARY DISPATCH USERS | SECONDARY USERS |
|--|---|
| <ul style="list-style-type: none"> • Atlantic City Expressway (State Police) • Department of Agriculture • Attorney General • Division of Consumer Affairs • Department of Corrections <ul style="list-style-type: none"> – Prisoner Transport – Parole Officers – Juvenile Justice • Division of Criminal Justice • Division of Taxation • Division of Gaming Enforcement • Garden State Parkway (State Police) • Department of Human Services (Police) • Department of Military and Veteran’s Affairs • Department of Transportation <ul style="list-style-type: none"> – Call Boxes – Road and Weather Information System – Emergency Services Patrols – Electrical and Maintenance Bureaus • New Jersey Turnpike (Police) • State Commission of Investigation • New Jersey Sports & Exposition Authority (Police) • Medevac <ul style="list-style-type: none"> – North Star – South Star • Society for the Prevention of Cruelty to Animals Law Enforcement | <ul style="list-style-type: none"> • New Jersey Water Supply Authority <ul style="list-style-type: none"> – Remote Monitoring • US Army CECOM <ul style="list-style-type: none"> – Special Project • Hudson County <ul style="list-style-type: none"> – Police Interoperability • US Coast Guard <ul style="list-style-type: none"> – Coordination with State Police • 21 State Offices of Emergency Management <ul style="list-style-type: none"> – Coordination with State Emergency Operation Center • Department of Health <ul style="list-style-type: none"> – Mobile Intensive Care Unit Dispatch Points – Trauma Centers – Hospitals • New Jersey Transit Corporation • Department of Environmental Protection <ul style="list-style-type: none"> – Coordination with State Police |

The New Jersey OEM has recently added users to the NJSP statewide system—all nuclear power plants, the state’s 11 hospital trauma centers, the 21 county offices of emergency management, and the Federal Bureau of Investigation (FBI) office in Newark, New Jersey. Although the system supports many different agencies, system users cannot always communicate with each other because of their unique system configurations. Lieutenant John Foglia (Assistant Communications Chief, NJSP) emphasized that the NJSP system was not truly interoperable because users could not communicate with all fire and EMS agencies because they were not on the system. Currently, not all public safety agencies can join the NJSP system because not enough channels are available to support the required system upgrade.

“The communications trunk is not big enough to integrate all systems.”

William Prairie, State Fire Coordinator, Middlesex County

Often, EMS agencies are not included in communications planning. According to Mr. Resetar, this has resulted in a lack of communication between EMS units and fire and police personnel, as well as between EMS units themselves. In fact, Mr. Resetar stated, “The only communication between six of the largest EMS communications centers...is a telephone.”

Mr. Prairie added that communications for New Jersey fire personnel were fragmented because agencies had both centralized and de-centralized communications systems. Out of 21 New Jersey counties, 13 have a centralized dispatch center, while eight do not. Fire agencies rely on three regional communications coordinators and 21 county EOCs to interoperate with the NJSP 800 MHz system. In addition, there is a lack of common channels linking field personnel with command centers.

Currently, many of the wireless communications systems are not linked together and often, public safety personnel will carry several different radios at the scene of an emergency. Some public safety agencies, however, have invested in field communications units that allow them to hand out radios during an incident response, improving interoperability between first responders. Because no one can predict where the next emergency will be, Monmouth County has several field communications units to link their public safety personnel with users on neighboring communications systems. However, this solution does not always work because agencies cannot afford to provide large numbers of radios to other public safety agencies.

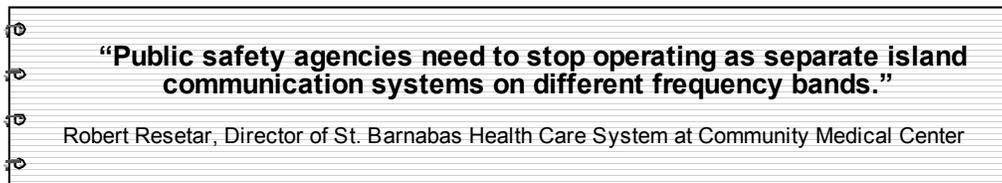
The Statewide Police Emergency Network (SPEN) was created to foster communications between different public safety agencies. Although SPEN is an existing resource, not all first responders view it as an effective method of interoperability. Lieutenant Foglia said he felt that SPEN had no leadership or funding and therefore was falling by the wayside. However, Mr. Smith insisted his county (Monmouth) still used SPEN and thought it was a good system. Table 2 lists the four SPEN channels and their associated operational uses.

Table 2
Statewide Police Emergency Network

| CHANNEL | OPERATION |
|-------------------------|--|
| SPEN 1 (154.680 MHz) | Common police frequency within New Jersey to be used for emergencies involving different agencies. The majority of police dispatch points are equipped with base stations on this frequency and on SPEN 2. Agencies with very high frequency (VHF) equipment operate this channel from mobile and portable radios at their discretion. |
| SPEN 2 (155.475 MHz) | Allocated nationally by the Federal Communications Commission (FCC) for use in emergencies and implemented in New Jersey to provide interoperability with surrounding states and federal agencies equipped with VHF radio equipment. |
| SPEN 3 (154.725 MHz) | A mobile and portable radio use only channel for use within New Jersey by police for coordination between agencies not having other common communication channels. |
| SPEN 4 (153.785 MHz) | A common channel for use by all eligible public safety agencies including police, fire, EMS, and emergency management. This channel is available to provide a tactical interface between law enforcement and non-law enforcement agencies. |

Spectrum

Local, state, and federal public safety agencies operate on six different frequency bands in the State of New Jersey. Because agencies have developed their networks without central and statewide spectrum management, each individual agency has secured available frequencies that fit their unique situation. Many agencies have not planned ahead; therefore, public safety frequencies are sprinkled across the spectrum band, and agencies cannot communicate with each other because no vendor makes a radio capable of operating on all bands from high frequency to 800 MHz.

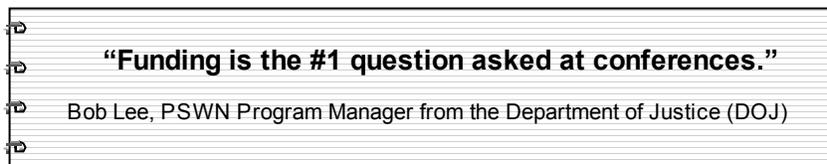


Currently, the spectrum in the most populated portion of the state, northern and southern New Jersey, is filled to capacity. The over-saturation of existing public safety frequency bands has left many agencies looking at the 700 MHz band as their only option. However, the use of the 700 MHz band is delayed due to TV broadcasters and is a legislative issue.

Funding

Many local and state public safety agencies lack the funds necessary to upgrade their current communications systems. Lieutenant Foglia underscored this issue, stating that insufficient funds were a key factor preventing true interoperability between NJSP and other emergency first responders. Building on Lieutenant Foglia’s comment, John Miller (Radio Network Administrator, Atlantic County OEM) said, “Some municipalities do not have the funds to transfer over to the New Jersey State Police 800 MHz system.”

Currently, many New Jersey public safety agencies are not coordinating their funding efforts and therefore are limiting the possibility of implementing large-scale system upgrades or the addition of a new statewide system. Mr. Hayden moderated a panel discussion that talked about the “home-rule” governing structure, in which local public safety agencies and municipalities keep their money and maintain their autonomy and do not share their resources. Throughout the one-day conference, speakers and conference attendees recognized the need for leadership to help coordinate the use of limited funding resources.



When Mr. Resetar was asked about major roadblocks preventing interoperability, he responded with another question, “How are agencies supposed to obtain the necessary funding?” Mr. Resetar’s statement only highlights the lack of understanding public safety agencies have

when attempting to secure funding for new communications projects. Although agencies are unsure about how to secure funding, Timothy C. McDonough (Mayor of Hope Township and New Jersey Chairman of the League of Municipalities' Hometown Security Task Force) informed conference attendees that improving public safety wireless communications was also a top priority for localities, with most localities planning to allocate more money to solve this problem.

Stephen DeBlasio (Director of Administration and Resource Planning Division for the Federal Emergency Management Agency [FEMA]), informed conference participants that FEMA's Office of National Preparedness granted money to state agencies and allowed them to distribute the money to localities. FEMA then reviewed how the state agencies spent the granted money. Mr. DeBlasio also said that FEMA would like to work closer with New Jersey to prepare for future large-scale incidents.

Legislation and Mandates

A bill is before the New Jersey State Legislature that would establish the state Public Safety Wireless Communications Coordinating Council in the Department of Law and Public Safety. The bill includes provisions for hiring a certified spectrum coordinator and creating 11 council positions to be filled by representatives from each of the following municipality and state agencies:

- Office of the Attorney General
- NJSP
- Department of Transportation
- Department of Corrections
- Department of Environmental Protection
- Office of Information Technology
- Department of Military and Veterans' Affairs
- New Jersey Transit Corporation
- New Jersey State Fire Chiefs' Association
- New Jersey State Association of Chiefs of Police
- Sheriffs Association of New Jersey.

This pending bill does not represent legislation from the Department of Health & Human Services, which will represent the Hospital Associations, EMS, and the 22 Local Information Network & Communication System (LINC)s agencies. However, there is a need for EMS and health care personnel to interoperate with police and fire units. Therefore, these agencies want to ensure their interoperability problems are considered during the development of any wireless communications solution, and a representative from this community should be considered for council membership.

Legislation also plays a significant role in freeing up available spectrum. Public safety agencies are eyeing the 700 MHz frequency band for a possible future statewide system and although the FCC has mandated television stations vacate this band by 2007, they do not have to move if more than 15 percent of the television station's viewers are not able to receive a digital signal. Thomas O'Reilly (Administrator, Office of the New Jersey Attorney General) informed

conference participants that the governor was addressing this issue by drawing the New Jersey Legislature's attention to it, hoping they could work with the FCC to have the 700 MHz band available for public safety use before 2007.

In addition, intra-agency mandates are seen as an effective method of enforcing interoperability. However, many public safety agencies have not established interoperability mandates. For example, national EMS channels are not programmed into EMS radios because the State Department of Health has not established this mandate. Mr. Resetar commented on the politics of interoperability, saying that some NJSP radios were not programmed with outside agency frequencies—pointing out the lack of intra-agency mandates.

3. TRENDS IN IMPROVING PUBLIC SAFETY WIRELESS COMMUNICATIONS

Throughout the conference, speakers presented examples of how their agencies had improved wireless communications. Because every region or agency has unique communications requirements, each conference speaker presented a different story on how his agency has or is planning to improve wireless communications, allowing public safety agencies to better operate with one another. These stories serve as examples of how agencies are making progress, wirelessly connecting first responders and other public safety personnel in New Jersey and throughout the country. Specifically, the following stories shed light on many communications challenges currently facing the public safety community.

Planning for Interoperability

Kathy Skiles—Director of Technology Support Division, Pennsylvania State Police

The Pennsylvania State Police (PSP) believes it is important to have an interoperability strategy while developing communications plans. The following three tasks are examples of why the PSP thinks a vision for interoperability is important:

- In the mid 1980s, the Pennsylvania communications division was tasked with providing the State's Special Emergency Response Team (SERT) with a wireless communications system. SERT did not want to interoperate with other public safety agencies and insisted on communicating over a system with exclusive frequencies in a separate frequency band. Five years later, SERT came back to the Pennsylvania communication committee and requested their system be designed to link with the PSP system.
- In summer 2000, the Pennsylvania communication division encountered a similar scenario when it had to provide communications for public safety personnel working the National Governor's Conference and the Republican National Convention.
- On September 11, the PSP deployed its 37-foot mobile command post in response to the crash of Flight 93 in Somerset County, Pennsylvania. The command post provided a communications link between troopers and the command center. The troopers, however, had little direct communications with other responding agencies because the other agencies were not using the additional radios handed to them by command center personnel. Instead, most of the agency-to-agency communications occurred face to face.

Currently, PSP operates on a VHF system. If PSP personnel want to communicate with other local, state, or federal agencies operating on separate VHF systems, they must obtain a letter of concurrence before programming their radios with the requested frequencies.

The PSP take advantage of the National Emergency Police Frequency (NEPF) by programming it into all mobile and portable radios. In addition, the PSP licenses this frequency and grants authorization to use it to any Pennsylvania agency that requests the channel. Agencies that do not operate on a VHF system can interoperate with PSP system users by

installing control NEPF base stations, provided they set up a cross-patch when requested. Another important interoperability method used by PSP is the strategic placement of 35 “toolkits.” These toolkits were funded with federal highway funds and have six VHF portable radios inside for troopers to hand out at accident scenes.

Agency interoperability was the driving force behind Pennsylvania’s statewide 800 MHz radio project initiative. This system will allow PSP personnel to use one radio to communicate with more than 23 commonwealth agencies and several counties. Now that the system is nearing completion, internal and external talk group identification is becoming critical. The following methods are being used to identify and establish talk groups:

- Analyzing how agencies handle intra-agency communications and considering linking them through a regionwide talk group.
- Analyzing which agencies communicate with each other on a regular basis and developing talk groups for those functional needs. Agencies may be given unique codes allowing their radios to download all required talk groups when they sign on.
- Analyzing which federal agencies need to communicate with PSP and where.
- Analyzing which commonly used frequencies provide increased interoperability with outside public safety agencies.

In addition, Pennsylvania is currently starting to address communications needs between PSP and county communications centers, as well as with neighboring states.

Developing Strategies for Interoperability

Michael Bennett—Maryland State Police

Maryland operates a 32-channel low-band communications system and uses JPS ACU-1000 switches to provide interoperable communications between fire, police, and EMS personnel. The state predicts that the low-band system will not survive over the next 10 years because of operational and technical problems, such as the discontinuation of parts making them hard to find. Local and state agencies have several strategies for improving communications between Maryland’s public safety personnel—

- Combining and upgrading older systems and preparing to migrate to a 700 MHz system within the next 10–15 years.
- Developing a wireless network, allowing remote access during emergencies requiring evacuations. The state would like to have the option to control the system from any point in the network. Maryland is currently working with Project SAFECOM to start the system development process.
- Shifting to an 800 MHz trunked system (public safety agencies in the Baltimore area only). Most public safety personnel in the City of Baltimore have already migrated to a new 800 MHz system.

Developing a Request for Proposals

Thomas Cowper—New York State Police

In New York, the communications infrastructure for many local and state agencies is obsolete and dysfunctional, making it difficult to find replacement parts. Therefore, the state police have developed a request for proposals (RFP) for the Statewide Wireless Network (SWN), which will accommodate interagency and intergovernmental communications, minimize the required number of new towers, accommodate local needs, and be affordable for taxpayers. The New York State Office for Technology is working under the following mission statement while attempting to stand up the SWN:

“Develop and implement an integrated statewide wireless radio network to provide a common communications platform for state public safety and public service agencies, and enhance interoperability. The network will include local governments at their option. The SWN will encourage partnerships with local governments to enhance communications functionality and achieve economies in network buildout.”

Most New York state agencies are currently system stakeholders, and almost all counties have expressed interest in the future system that will support voice and data, automatic vehicle location, encryption, computer-aided dispatch, and digital imaging. The RFP was developed to mitigate stakeholder risks by—

- Leveraging existing resources (i.e., existing network infrastructure)
- Assigning vendor ownership for system design, implementation, and operation
- Giving preference to governmental sites during system design
- Requiring training programs
- Requiring technology refresh
- Establishing a payment upon performance plan
- Creating state and local partnerships.

Proposals are due January 1, 2003, with contract approval and negotiations to be completed the following summer. After project award, the vendor will be given one year for system design and three years to complete installation.

Developing System Requirements and Selecting a Vendor

Lieutenant Colonel Craig Allen—Illinois State Police

After Illinois decided first responders needed better wireless communications, the Illinois Statewide Radio Communications Committee (ISTAR) hired consultants to study the state's communications requirements. The following agencies are members of ISTAR:

- Illinois Central Management Services (Chair)
- Illinois Department of Corrections
- Illinois Department of Natural Resources
- Illinois Department of Transportation
- Illinois Emergency Management Agency

- Illinois Secretary of State’s Office
- Illinois State Police
- Illinois Universities.

The consultants eventually recommended Illinois build a new trunked network, costing \$200 million. However, in 1997, the state did not have the money to fund a communications project that large, so the communications team decided to attend communications symposiums in Boston, Massachusetts; Harrisburg, Pennsylvania; and Lansing, Michigan; to educate themselves on how to build a coalition and develop a comprehensive RFP, which would help them push the project forward.

The team eventually decided to host a communications symposium in Chicago during September 1998, formally kicking off the state’s campaign for improving wireless communications between public safety personnel. The Chicago Symposium included panel discussions by representatives from police, fire, and sheriff’s agencies. In addition, another panel was formed to discuss funding alternatives and included a State Representative and a representative from the Bureau of the Budget. The symposium was critical in helping the project team obtain buy-in from police, sheriff, and fire agencies for a statewide interoperability system.

In 1999, \$25 million in ILLINOIS FIRST funding was made available to Illinois State Police (ISP) for equipment purchases only. Because ISP received the funding, the ISP communications team led the RFP development effort, using the methods recommended by the PSWN Program. The project team formed five working committees with more than 150 employees to create RFP requirements in the following areas:

- Operational Requirements
- Technology
- Interoperability
- Procurement Preparation
- Transition.

Eventually, the ISP team developed an RFP with the following contractual language, emphasizing the importance of the system’s ability to meet future interoperability requirements:

“The primary purpose and scope of the Contract is for the State to lease a statewide, digital voice radio network, and purchase radios and control consoles, for the ISP. However, the System must have the capability of being expanded consistent with the Public Safety Wireless Network “PSWN” model for possible use by other federal, state, and local agencies.”

Two vendors bid on the project and the state used a “triple blind evaluation” to protect themselves from future lawsuits and audits. Both vendor proposals were reviewed by the ISP project team, ISTAR committee members, and a third-party consultant, all using the same evaluation tools. All three teams selected the same vendor, and that vendor was awarded the project.

Once system installation is complete, the new system will be available to local, state, and federal agencies, and will be owned and operated by the vendor, which must meet pre-negotiated level-of-service standards. The state will slowly migrate to the new system and will eventually pay a monthly access fee. The future system's governing board is currently being designed. Illinois wants to ensure that all user groups are represented on the board, including police, fire, and EMS agencies.

Planning a System Upgrade and Facing the Spectrum Challenge

Joseph Saiia—Director of Public Safety, Burlington County, New Jersey

In 1975, the Board of Chosen Freeholders of Burlington County, New Jersey, assembled a committee to fund a 500 MHz system that provided coverage throughout most of the county. In addition, a central communications center was created to provide some interoperability. The freeholders also bought radios for police, fire, and EMS personnel to use on the new system.

In 1995, Burlington County recognized that the current system needed to be improved. Police personnel developed a needs assessment report and presented it to the freeholders, who eventually decided to fund the \$32 million system upgrade project. Fortunately for Burlington County, it was not difficult to secure funding.

The Burlington County Public Safety Integrated Communications Network upgrade project lasted six years. The design process was extensive because the county was trying to develop a system that could meet the needs of several different public safety agencies. The upgraded system had to provide coverage throughout the largest county in the state, including some in-building coverage. Most importantly, the upgraded system had to give police, fire, and EMS personnel the capability of communicating with each other while carrying only one portable radio.

Spectrum quickly became the largest roadblock, preventing the county from beginning the system upgrade project. Burlington County had to find additional spectrum for its improved system, and after searching for available frequencies, the system planners concluded that the new regulatory environment left narrowband channels as their only option.

Because of the new spectrum environment, the county had to redesign its system for narrowband operation. This quickly changed the complexity of the project, but made the vendor selection process simple because only one vendor offered the communications equipment Burlington County required. The upgrade produced a system composed of four simulcast trunked digital networks, with 18 antenna locations, supporting 3,500 subscriber units.

Today, the upgraded system provides complete intra-county interoperability between 28 law enforcement agencies, 78 fire companies, and 42 EMS squads. System planners are now looking into establishing links with other public safety agencies. The county currently uses SPEN as a last resort, when interoperability is critical with other agency first responders.

Now that the system is in place, Burlington County is improving its ICS. Although the technology is currently available for county police, fire, and EMS personnel to talk with one

another, an effective ICS and appropriate training is required to help these public safety agencies communicate and work together.

Building a New System with Funding Limitations

James Rosenberg—County Administrator, Morris County, New Jersey

In 1997, Morris County public safety leaders considered the current county communications system to be outdated and decided to conduct a survey to learn what wireless users needed and desired in a new communications system. The results of the survey were conclusive, and in 1998, the leaders decided to hire consultants to help them design a system that would meet the communications needs of first responders in their county.

Fortunately, frequencies were available in Morris County’s public safety spectrum, and in 1999, the county applied for and received the necessary frequencies to build a new system. The county plans to eventually leave VHF highband and lowband and to use those vacated frequencies to interoperate with all VHF system users in the county.

In addition to creating VHF highband and lowband interoperability channels, Morris County will also place SPEN radios in all public safety vehicles, allowing public safety personnel to communicate with state agencies. Eventually, the new 22-channel trunked ultra high frequency system will provide interoperability throughout the county and will be used by 16 county agencies and six towns. Figure 2 is a timeline of critical events for the Morris County Communications project.

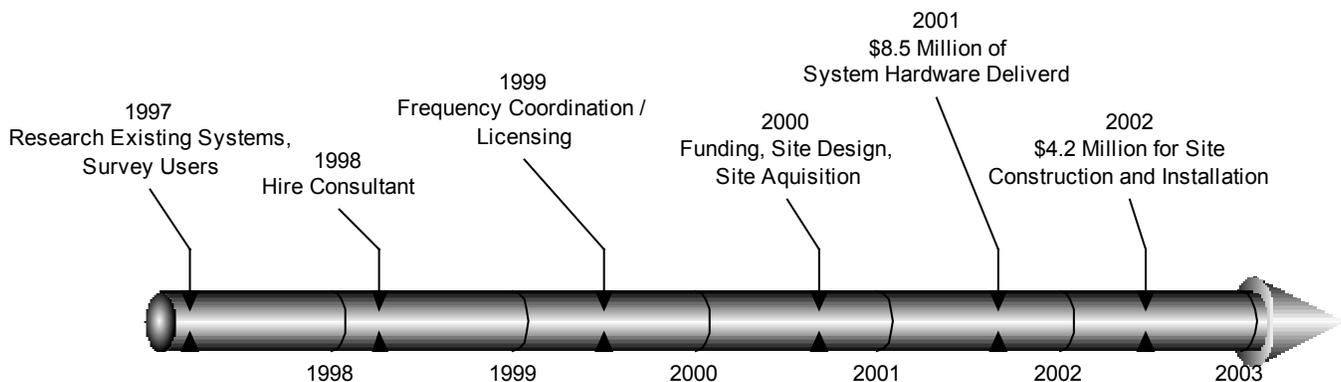


Figure 2
Morris County Communications System Project Timeline

Morris County leaders funded the new system with incremental payments. In 2000, they initially obtained funding for the system design and site acquisition, knowing they would need more money in the future. After deciding on the final system design, the county saved money by allowing \$8.5 million worth of equipment to be delivered early. In 2002, the county paid \$4.2 million for the site construction and equipment installation at nine locations.

Combining Like Systems

John Miller—Radio Network Administrator of Atlantic County Office of Emergency Management

Atlantic County public safety personnel serve a mostly rural community. Initially, three site owners operated their systems independently from each other until the county decided to link them together to create an 800 MHz trunked system. Although the new combined system will improve communications in the county, not all agencies will be able to join because of a lack of funding. In addition, Atlantic County has coordinated its communications planning efforts with the NJSP. Together, they have installed repeaters, improving communications between the two agencies.

Working Together

Curt Munro—San Diego County Sheriff's Department

Public safety agencies in the San Diego region united and combined their funding and spectrum resources to create the San Diego–Imperial County Regional Communications System (RCS). RCS is an 800 MHz trunked system with more than 150 channels, covering nearly 9,000 square miles and providing communications to police, fire, and EMS personnel. Public safety agencies were consulted during communications planning, as were non-public safety agencies including school districts. By combining their resources, RCS users have benefited from the following:

- Interoperability
- Improved user safety
- Increased efficiency of diminishing resources
- Enhanced wireless coverage
- Enhanced disaster communications capability
- Economies of scale and scope.

All partnering jurisdictions approved a “Participating Agency Agreement” and decided that an RCS Board of Directors would be created to administer the system. Member agency representatives choose the RCS Board of Directors, which is composed of eight members representing the police, fire, EMS, and public service agencies; no elected officials are on the board.

The RCS Board of Directors was also given control over system users. When a new agency wants to join RCS, the board votes and if allowed, the new agency joins as an equity partner or as a customer that pays a monthly fee to use the system. Currently, 191 agencies and 11 dispatch centers receive RCS service. If new agencies want to improve the system to meet their added system requirements, they must fund the system upgrade themselves. However, the upgraded portion will be fully integrated and managed by the RCS Board of Directors.

Looking back, system planners agree that the communications design team did not correctly project future system capacity requirements. Now, the board is overseeing a system expansion project that will improve capacity and expand coverage at a cost of \$18 million. The

RCS Board of Directors is also planning for the future and is looking into slowly transitioning to a digital Project 25 compliant system within the next 10 years.

Working with the Federal Government

Marcus Arroyo—Federal Security Director for the Transportation Security Administration

Joseph Clark—Telecommunications Systems Analyst for the Board of Public Utilities

Stephen DeBlasio—Director of Administration and Resource Planning Division, FEMA

Several federal agencies require communications with state and local first responders. For example, aviation accidents often require communications between local public safety personnel, the airport, and the FBI. In addition, local first responders must be capable of communicating with public utilities, when a disaster occurs.

After the 1993 attack on the World Trade Center, FEMA recognized a communications problem existed between responding agencies and decided to plan for future attacks by staging resources, including portable radios and mobile communications vehicles, close to the towers. On September 11, FEMA's planning efforts allowed them to hand out federal radios to several public safety agencies, including the New York National Guard and FBI.

Currently, FEMA is investigating the possibility of developing secure communications, including secure video conferencing, between federal and state agencies. FEMA is also taking steps toward improving its Time Phased Force Deployment Data system, helping local agencies better decide what supplies they need and when they need them.

Analyzing Emergency Response

Carlos Kirjner—Partner, McKinsey and Company

McKinsey and Company developed a report that reviewed the New York City Fire Department's (FDNY) response to the September 11 attack on the World Trade Center. McKinsey consultants interviewed more than 100 FDNY responders, read hundreds of interview transcripts, reviewed more than 60 hours of FDNY communication tapes, and interviewed more than 100 external experts. The report made the following observations about the FDNY's communications and command and control on September 11:

- Incident command was effectively established by FDNY.
- Command and control was impaired by collapses.
- In-building communications were sporadic.
- Communications in tunnels were deficient.
- Chiefs in the lobbies had very limited external information.
- EMS dispatchers were overwhelmed.
- Communications were very limited between NYPD commanders and FDNY senior chiefs.

Together with 50 senior FDNY personnel, McKinsey then developed lessons learned, some of which pertain to communications and command and control; some of these lessons learned are incorporated into this report's lessons learned and are included in Section 4. The report is available at the following website: http://www.nyc.gov/html/fdny/html/mck_report/toc.html.

4. LESSONS LEARNED

The New Jersey conference allowed public safety personnel to present their expertise and experiences. Often, they shared a common view. This section highlights the key lessons learned that could help improve New Jersey public safety wireless communications in the future. These lessons learned are not all-inclusive but do represent some of the most common themes and best practices.

Leadership and Coordination

- State leadership is essential for improving interoperable communications between all local, state, and federal public safety agencies.
- Lead agencies must listen to large and small agencies concerns, ensuring all mission-critical requirements are considered.
- All relevant stakeholders—small and large public safety agencies—should be represented in a communications system’s leadership council.
- Outreach and communications efforts may be necessary to achieve buy-in from key stakeholders.
- Councils and committees can serve as useful forums for initiating and managing wireless projects.

System Planning and Vendor Selection

- Public safety system developers should include all relevant public safety agencies in the planning process, including those not normally involved in the effort. Several specific agencies should be included in New Jersey’s planning process—
 - EMS
 - Health Services and Hospitals
 - Board of Public Utilities
 - Federal Aviation Administration.
- Long-term planning, taking place over several years, is required to migrate public safety agencies from current communications systems to new and improved systems.
- Partnerships and formal agreements are critical for building shared systems and for developing network-to-network interoperability links.
- A thorough, standardized, and rigorous vendor selection process is required to mitigate future inspection, audit, and lawsuit difficulties.

Command and Control

- Local, state, and federal public safety agencies should coordinate their ICSs in preparation for regional or national operations.
- Agencies should coordinate and standardize ICS and communications training.
- EOCs are critical for effective large-scale incident management.
- Critical private industries should be included in emergency evacuation and response training, as should other agencies not normally involved (i.e., the public school system).
- EOCs should be included during public safety training and exercises.

Network Interoperability and Engineering

- Radio users must understand technology to take advantage of interoperability links and advanced features.
- Multiple modes of communication and communications path diversity are essential for redundancy and reliability.
- Capacity and coverage should always be primary technical requirements when designing a system.
- Agencies need to participate in routine testing for shared systems (i.e., SPEN).
- Deployable communication kits and mobile communications vehicles can be useful but are not feasible for wide-scale emergency response interoperability.
- When linking disparate networks, the first step should be to link dispatch centers.
- A regional approach may be the best method for assessing and improving interoperability in New Jersey.
- Mobile data and encrypted communications are an increasingly important operational requirement.

Spectrum

- Coordinating spectrum management could help improve system interoperability.
- New Federal Government mandates may increase spectrum availability (i.e., 700 MHz band).
- A full-time spectrum coordinator is needed to guide public safety spectrum management in New Jersey.

Funding

- Agencies should coordinate their funding efforts and attempt to share systems to maximize use of their limited resources.
- Agencies must be creative when searching for funding and should consider the following strategies:
 - Apply for incremental funding, breaking the total allotment into several smaller amounts distributed over a period of time
 - Request funding from FEMA
 - Request funding from local freeholders.

Legislation and Mandates

- Agency and statewide mandates are seen as a useful way to help enforce change.
- Public safety agencies must work with the State Legislature, the Federal Government, and the FCC to solve spectrum availability problems (i.e., 700 MHz band).
- The state may need to establish statewide technology standards for public safety agencies to use when developing or upgrading systems.
- Legislation for the state's communications council should include all relevant stakeholders at the local, state, and federal level, including EMS agencies.

5. NEXT STEPS

This section presents the next steps that the New Jersey public safety community can take to continue their efforts to improve their wireless communications networks. The activities listed below are derived from the comments made by the conference participants and reflect the information contained in the previous sections of this report. The next steps are segmented by audience. Although the goals of local and county, state, and federal stakeholders are consistent, their expected roles and activities are different.

Local and County Public Safety Community

- Expand partnerships between all relevant local first responders
- Investigate how to more effectively manage and share spectrum resources
- Develop an integrated ICS and training plan with all appropriate first responders
- Continue to support the state's effort to achieve statewide interoperability
- Fully leverage existing interoperability resources (i.e., SPEN)
- Research the need for new interoperability solutions
- Investigate intra-agency interoperability mandates.

State Public Safety Community

- Assume a greater leadership role in coordinating and developing interoperable wireless communications among all public safety agencies operating within the state
- Continue outreach to local and county, state, and federal public safety agencies
- Work with the state legislature to establish the State Public Safety Wireless Communications Coordinating Council
- Include all relevant local, state, and federal stakeholders in the statewide strategic planning process
- Leverage existing partnerships to meet specific needs (e.g., partnership with the PSWN Program)
- Develop new partnerships as opportunities and needs develop (e.g., opportunity to work with the Stevens Institute of Technology)
- Work with the state legislature and the FCC to solve the 700 MHz problem
- Investigate how to share resources in a manner consistent with "home-rule"
- Investigate potential intra-agency and statewide interoperability mandates.

Federal Public Safety Community

- Continue to support regional and statewide wireless interoperability efforts
- Participate in efforts to improve communications between Federal Government and state and local public safety personnel in New Jersey.

Non-Traditional Response Agencies

- Continue to install the New Jersey Hospital Associations' 800 MHz radio system and develop testing and troubleshooting procedures
- Develop a statewide strategic plan for the Office of Emergency Medical Services, EMS, and New Jersey First Aid Council
- Establish a County Health and LINC's task force to implement a statewide county health agency strategic network
- Develop a LINC's Advisory Council to process health officers' information statewide.

APPENDIX A—CONFERENCE SPEAKERS

Lieutenant Colonel Craig Allen, *Illinois State Police*
Marcus Arroyo, *Federal Security Director, Transportation Security Administration*
James Barsuglia, *Telecommunication Analyst I, New Jersey State Police*
Michael E. Bennett (Retired), *Maryland State Police*
Jerry Clark, *Bureau Chief, Office of Fire Prevention & Control, State of New York*
Joseph Costa, *Telecommunications Systems Analyst, Board of Public Utilities*
Captain Thomas Cowper, *New York State Police, New York Statewide Wireless Network*
Stephen DeBlasio, *Director of Administration and Resource Planning Division, Federal Emergency Management Agency*
Henry DeGeneste, *Vice President, Global Security, Prudential Financial Inc*
Charles Dowd, *Deputy Inspector, Commanding Officer of the Communications Division, New York City Police Department*
Chief William Dukes, *Mount Laurel Fire Department and Vice President, Career Fire Chiefs' Association*
Lieutenant John Foglia, *Assistant Communication Chief, New Jersey State Police*
Theodore Goldfarb, *Deputy Chief, New York City Fire Department 8th Division, Staten Island*
Frank Goodstein, *Chairperson, New Jersey State First Aid Council Emergency Medical Services Disaster Mobilization Team*
Kevin Hayden, *Director, Department of Health & Senior Services*
Chief Peter E. Hayden, *Assistant Chief of Operations, FDNY*
Carlos Kirjner, *Partner, McKinsey and Company, New York, New York*
Clifton R. Lacey MD, *Commissioner, New Jersey Department of Health & Senior Services*
Robert E. Lee, Jr., *PSWN Program Manager, Department of Justice*
Steve Long, *Chief Information Officer, New Jersey Department of Law and Public Safety*
Frederick Madden, *Acting Superintendent, New Jersey State Police*
Timothy C. McDonough, *Mayor of Hope Township, New Jersey Chairman, League of Municipalities' Hometown Security Task Force*
Sergeant Anthony Melia, *Frequency Coordinator, Essex Sheriff's Office, Essex County*
John Miller, *Radio Network Administrator, Atlantic County Office of Emergency Management*
Adam Montella, *General Manager, Port Authority of NY/NJ, Emergency Management Operations & Emergency Management*
Curt Munro, *San Diego County Sheriff's Department*
Thomas J. O'Reilly, *Administrator, Office of the Attorney General*
Lawrence Petrillo, *Director of Fire Safety, Department of Community Affairs*
Chief Edward K. Petrini, *President, New Jersey State Association of Chiefs of Police*
William Prairie, *State Fire Coordinator, Middlesex County*
Robert Resetar, *Director, St. Barnabas Health Care System at Community Medical Center*
James Rosenberg, *County Administrator of Morris County*
Joseph Saiia, *Director of Public Safety, Burlington County*
David Samson, *Attorney General, State of New Jersey*

Louis Sasso, *Director of Emergency Medical Services, Robert Wood Johnson Univ. Hospital*
Kathy Skiles, *Director of Technology Support Division, Pennsylvania State Police*
Timothy Smith, *Fire Marshal of Monmouth County*
Judith Teller, *State Chief Information Officer, State of New Jersey*

APPENDIX B—ACRONYMS

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| EMS | Emergency Medical Service |
| EOC | Emergency Operations Center |
| FBI | Federal Bureau of Investigation |
| FCC | Federal Communications Commission |
| FDNY | New York Fire Department |
| FEMA | Federal Emergency Management Agency |
| ICS | Incident Command System |
| ISP | Illinois State Police |
| ISTAR | Illinois Statewide Radio Communications Committee |
| LINC | Local Information Network & Communication System |
| LMR | Land Mobile Radio |
| MHz | Megahertz |
| NEPF | National Emergency Police Frequency |
| NJPA | New Jersey Port Authority |
| NJSP | New Jersey State Police |
| PSP | Pennsylvania State Police |
| PSWN | Public Safety Wireless Network |
| OEM | Office of Emergency Management |
| RCS | Regional Communications System |
| RFP | Request for Proposal |
| SERT | Special Emergency Response Team |
| SPEN | Statewide Police Emergency Network |
| SWN | Statewide Wireless Network |
| VHF | Very High Frequency |