



Saving Lives and Property Through Improved Interoperability

***Special Services District
Interoperability Report***

Final

May 2003

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Preface

The Public Safety Wireless Network (PSWN) Program is jointly sponsored by the Department of Justice and the Department of the Treasury. Its mission is to promote effective public safety communications and to foster interoperability among local, state, federal, and tribal communications systems. With guidance from the Federal Law Enforcement Wireless Users Group and an Executive Committee that includes prominent local and state public safety officials, the program is addressing issues facing these agencies as they work to improve communications interoperability. The focus of the program's efforts is on promoting partnerships among public safety agencies, conducting case studies in several regions of the Nation, initiating pilot projects to test and refine interoperability solutions, addressing spectrum policy and funding issues important to public safety, and investigating issues associated with system security and standards and technology development.

Previous case study efforts by the PSWN Program have focused on diverse areas of the country such as San Diego and Imperial counties in California; the southwest border region of the United States; the maritime operations in and around southeast Louisiana; the greater metropolitan Washington, DC, area; and tribal nations. In these case studies, the program analyzed interoperable land mobile radio communications by examining five key issues affecting interoperability—coordination and partnerships, funding, spectrum, standards and technology, and security.

Each of these studies expanded the program's knowledge base regarding various aspects of implementing interoperable technical solutions. By working with local, state, and federal agencies, as well as tribal nations, in the case study locations, the PSWN Program gained insights for developing seamless, coordinated communications among all levels of government. With the overarching mission to assure that no man, woman, or child should ever lose his or her life because public safety responders could not communicate with each other, the PSWN Program conducted a number of activities in each of these case studies. Included were data collection, data analysis, test system development, demonstrations, pilot projects, and other initial interoperability assistance efforts, including strategic planning and outreach activities. The results provided the baseline knowledge necessary to develop best practices, innovative designs, integrated solutions, and standard operating procedures.

Because the program's baseline knowledge of interoperability impediments is based on assessments of local, state, and federal government agencies, and tribal nations, an information gap was identified relative to interoperability requirements for non-governmental and sometimes non-traditional specialized public safety providers. As a result, the program undertook an assessment of Special Services Districts (SSD). As defined for this report, an SSD is any private, military, or quasi-governmental organization that employs first responders (e.g., security guards, emergency medical technicians, or firefighters) to manage emergency incidents in a defined area.

This assessment is unique in that this is the first time the program has worked with predominately private public safety providers and organizations. The findings from this assessment will enhance previous PSWN Program studies by adding the critical dimension of SSD communications challenges.

EXECUTIVE SUMMARY

The Special Services District (SSD) Interoperability Assessment details an effort by the Public Safety Wireless Network (PSWN) Program to assess interoperability capabilities of predominately private public safety providers and organizations. The purpose of this assessment is to document the state of interoperability between SSD public safety providers and governmental or other public safety agencies supporting SSDs. For the purposes of this report, SSDs are defined as private, military, or quasi-governmental organizations that employ first responders (e.g., security guards or law enforcement officers, emergency medical technicians, or firefighters) to respond to emergency incidents in a defined area. It is important to note that other government agencies, in addition to the military, also manage public safety resources in SSDs.

The program selected a cross section of SSD service segments to include in the report. These service segments included—

- Amusement parks
- Government-contracted private fire and emergency medical services (EMS) providers
- Hospitals
- Military installations
- Nuclear power plants
- Oil refineries
- Ports of entry
- Transit
- Universities.

For the assessment, program support staff conducted research on each of these service segments, developed and distributed data collection surveys, performed on-site data collection, and analyzed the collected data. Although the amount of data collected for each SSD service segment may not be sufficiently robust to be statistically significant, the 142 survey responses received and 76 personal interviews with public safety personnel do provide a good overview of how SSDs work and communicate with other public safety organizations, predominately municipal government public safety agencies. With no prior knowledge of the existing state of interoperability between SSDs and other public safety providers, the assessment was conducted to obtain insight into whether interoperable communications is a requirement between these public safety providers.

The program generated summary results relative to all of the SSDs surveyed and specific results associated with each of the individual SSD segments. Some of the major findings include—

- The majority of SSDs were created for the protection of the community in which the SSD resides and not usually by specific regulation or mandate.
- Lack of interoperability between SSDs and local public safety agencies is not necessarily based on technology issues.

- Although most SSDs have a land mobile radio (LMR) system or use LMR equipment, commercial services are widely used as a means for communicating with other agencies.
- The majority of SSDs require some level of relationship with government public safety agencies, although not all SSDs require LMR interoperability to communicate effectively with other public safety agencies.
- The majority of SSDs view interoperability with other public safety agencies as critical and imperative, as indicated by these quotes:
 - “[Interoperability is] imperative to successful fulfillment of our mission and objectives.”
 - “[Interoperability is] critical since the transit system crosses into over 20 different jurisdictions, and people wishing to evade capture use the transit system.”
- Few SSDs have memoranda of understanding (MOU) with other public safety agencies that include specifics regarding communications.
- The majority of SSDs participate in disaster preparedness activities.
- The majority of SSDs work with other public safety agencies on emergency calls on a frequent basis.
- Many SSDs specifically cite the need and desire, as well as the advantage of, establishing interoperable communications with other public safety agencies.

Each SSD has unique needs that lead to unique requirements with regard to the provision of public safety services. As a result, each SSD has different communications requirements and different methods for meeting those requirements based on local demographics. For this report, the PSWN Program has compiled a list of general considerations for SSDs regarding interoperable communications, rather than specific recommendations that would require a much more statistically significant response from the general population of SSDs. Some of these general considerations include—

- **Initiate discussions with public safety agencies regarding response and communications issues**—SSDs with concerns about outside public safety agencies responding to their facilities should initiate discussions with those public safety agencies about response and communications issues. These discussions should center on the benefits of interoperable communications and the identification of impediments to interoperability.
- **Maintain regular interaction between public safety personnel and agencies**—It is important to keep the level of interaction between SSD and other public safety personnel regular and consistent. A standing meeting, training, or awareness event hosted by the SSD could improve the level of understanding by other public safety

agencies about hazards they may encounter at SSD facilities, and about SSD concerns regarding incident operations. One survey respondent commented, “It is important to sit agency leaders down [so we can] get to know each other.”

- **Discuss public safety capabilities and training with assisting agencies**—Public safety providers within an SSD organization are well versed in their capabilities and training. It benefits all public safety organizations that work together to understand what capabilities other organizations maintain and what level of training their personnel have received. This understanding will assist in building confidence in everyone’s abilities among all public safety personnel that may respond jointly with an SSD to an emergency.
- **Ensure that MOUs contain specific language regarding wireless communications**—MOUs should address the specifics of communications interoperability between responding agencies, including procedures and policies on when and how to link agencies together, as well as standard radio language and terminology used during incident responses. In addition, participating agencies need to agree on a common call sign methodology so that different agencies do not use the same radio call sign (e.g., Chief 1) when operating on an emergency incident.
- **Address radio protocol and terminology differences**—When establishing agreements that include interoperable communications, agencies should identify radio protocol and terminology differences. Because some agencies use a specific set of “codes” or other terminology that might not be in use by another agency, it is important to agree on how agencies from different organizations will communicate so that all entities understand what is being communicated over the radio. It is also important to discuss when and what types of information should be shared to prevent or reduce congestion on radio channels.
- **Ensure that functional drills test communication plans and communication systems thoroughly**—When functional drills or exercises are held, participants should test their communications systems and any interoperability solutions to determine their functionality. Gaps in plans, or technology problems with paths for communications, may be identified as a result. Such discoveries during drills provide an opportunity to make adjustments and corrections in a controlled environment, rather than encountering and trying to address such problems during an actual emergency.
- **Ensure that after-action evaluations include communications**—After-action reports should include an assessment of communications and interoperability during an emergency event. An after-action report should identify communications best practices and deficiencies experienced during emergency responses, as well as functional exercises.
- **Promote resource sharing on as many levels as possible**—Resource sharing, including equipment, personnel, expertise, and frequencies, is an excellent means for

solidifying relationships and conserving capital. By sharing a resource, the need for agencies to duplicate purchases of expensive resources can be avoided. In addition, resources that might otherwise be seldom used are brought into play more often, making the investment to acquire the resource more worthwhile. The bond between agencies that share resources can be very strong—sharing is one means for partnering agencies to demonstrate their care and support for each other, as well as for those whom they are charged to protect.

In addition to these considerations, the program documented best practices in use by SSDs and government agencies. These best practices detail several methods for improving communications interoperability and operational performance for both SSDs and government public safety agencies.

SSDs are integrated into every aspect of American society. They offer public safety services to citizens visiting amusement parks, commuting by rail, traveling by airplane, or living in a community with a nuclear power plant, oil refinery, or military installation. This unique assessment specifically targeted communications between SSDs and other public safety agencies in order to determine the state of interoperable communications. It is hoped that this report will raise awareness of communications interoperability for all public safety organizations, private or public, and help in improving interoperability between SSDs and other public safety agencies assisting SSDs during emergency events. Now, more than ever, coordination between various elements of the public safety community is crucial to the protection of life and property, regardless of location.

1. INTRODUCTION

Special Services Districts (SSD) are integrated into every aspect of American society. Activities as simple as visiting an amusement park, commuting by rail, or traveling by airplane involve interaction with SSDs. Further, many people live and work in communities that are adjacent to nuclear power plants, oil refineries, or military installations—all venues considered to be SSDs. The common element among these SSDs is that they maintain their own internal public safety response capability. This capability effectively provides an extra layer of public safety response in addition to existing governmental or local public safety response agencies. For the purposes of this report, SSDs are defined as private, military, or quasi-governmental organizations that employ first responders (e.g., security guards or law enforcement officers, emergency medical technicians, or firefighters) to respond to emergency incidents in a defined area. Examples of SSDs might exist in the following areas:

- Infrastructure (e.g., oil, power)
- Institutional (e.g., correctional facilities, hospitals, universities)
- Manufacturing (e.g., automobile, chemicals, electronic components)
- Military
- Private sector first responders (e.g., private fire and emergency medical services [EMS])
- Transportation (e.g., airports, rail, ports)
- Entertainment (e.g., amusement parks).

Each of these areas has SSDs with unique needs and regulatory drivers with regard to the provision of public safety services. Some SSDs contain significant hazards that may compel them to hire a complement of first responders to address these hazards. However, regardless of the size of the SSD public safety force, a large enough or catastrophic emergency event may require the assistance of other public safety agencies.

Public safety agencies, whether municipal government first responders or SSD first responders, work for different organizations but have many common responsibilities, such as the delivery of medical or safety services. In providing these services, they all use land mobile radio (LMR) systems to communicate, which is the focus of this report. Given the critical role that SSD first responders play in the outcome of emergency incidents of all types, the Public Safety Wireless Network (PSWN) Program recognized the need to learn more about SSDs, and more specifically, to examine their communications interactions with other public safety agencies.

Communications between public safety agencies at an emergency scene is a critical issue because it allows for better coordination and safer operations. Better coordination can translate into lives and property saved. The ability for one agency to communicate with another public safety agency, seamlessly and in real time, is referred to as interoperability. Because planning for and fostering interoperability between wireless networks is the mission of the PSWN Program, the program commissioned this report to gain a better understanding of interoperability between SSDs and other public safety agencies.

This report is unique in that the program is not aware of any other study that has specifically targeted communications between SSDs and other public safety agencies. It should

be noted that the program does not presume interoperability is required between SSDs and other public safety providers; that is a decision the SSDs and other public safety officials must make in the best interests of the community. However, in light of heightened security concerns at all high-profile locations, it is critical that SSDs and other public safety agencies coordinate and discuss communications issues prior to a major emergency event.

In an effort to cover a cross section of SSD segments, the program selected a variety of SSDs to include in the report. Table 1-1 provides a listing and a brief description of the SSDs targeted for the data collection.

**Table 1-1
SSD Descriptions**

Area	SSD Segment	Description
Entertainment	Amusement parks	Theme and water parks
Private sector first responders	Government-contracted private fire and EMS providers	Private fire and EMS providers contracted by local government to provide service to their citizens
Institutional	Hospitals	Facilities that provide both in- and out-patient medical care
Military	Military installations	Secured and/or gated military compounds that house the U.S. Air Force, Army, Marines, or Navy
Infrastructure	Nuclear power plants	Facilities equipped with nuclear powered turbines or reactors that generate electricity
Infrastructure	Oil refineries	Facilities that process or refine crude oil
Transportation	Ports of entry	Airports or harbors
Transportation	Transit	Trains or light railways that transport passengers in an urban environment
Institutional	Universities	Post secondary higher educational facilities such as colleges or universities

Organizations within each SSD segment were contacted and provided a survey to complete. Also, the PSWN Program identified one location in each SSD segment for on-site interviews with that SSD’s public safety personnel. The report generated from the data collected and analyzed is structured as follows:

- **Section 2, Methodology**—An overview of the approach used for data collection and analysis
- **Section 3, Guide for Reading the Special Services District Interoperability Report**—An aid to readers seeking to understand the key findings of the data collection and analysis, both in summary and in the individual SSD findings appendixes
- **Section 4, Summary Findings**—Highlights of the collected data and the important differences between the overall findings and the data specific to each service segment

- **Section 5, Considerations**—A high-level discussion of some methods to improve interoperable communications between SSDs and other public safety agencies
- **Section 6, Best Practices in Action**—A listing of best practices identified during survey data collection and on-site interviews
- **Section 7, Conclusion**—The lessons learned by the PSWN Program and the impressions that have been formed from this baseline analysis of SSDs and the state of interoperability that exists between each of these service segments and other public safety agencies
- **Appendixes A–I, SSD Findings**—Specific data gleaned from each of the service segments addressing survey topics, including demographics, services provided by the SSDs, the levels of coordination that exist between each SSD and other public safety agencies, and an overview of communications capabilities in place
- **Appendix J, Data Collection Survey**—A copy of the survey used in the data collection process
- **Appendix K, Glossary of Terms**—A list of terms used in this document
- **Appendix L, Acronyms**—A list of the acronyms used in this document.

This report is not intended to provide a characterization of each SSD because the amount of data collected for each SSD may not be sufficiently robust to be statistically significant, and the demographic diversity of responses within each SSD may not accurately reflect the SSD as a whole. Further, each SSD and the service segment it represents is diverse—one report cannot do justice to each SSD segment. However, the 142 survey responses received, 72 personal interviews conducted, and other data collected can provide a good general overview of SSDs and how they work and communicate with other public safety providers.

The intent of this report is to raise awareness of communications interoperability with all organizations that have a public safety component but whose function goes beyond the traditional view of governmental police, fire, and EMS agencies. In addition, this report includes some considerations for improving interoperability between SSDs and those public safety agencies that would most likely assist SSDs during emergency response activities.

2. METHODOLOGY

This section details the approach for the data collection and analysis accomplished for this assessment. The assessment methodology has four main parts, including—

- Research
- Data Collection Tool Development
- Outreach and Data Collection
- Analysis.

2.1 Research

Because most SSDs are private and represent organizations and industries of which the program has limited knowledge, research was required before beginning data collection. The program completed several research tasks to prepare for the assessment effort, including—

- Collected background data on the selected SSDs
- Identified and selected potential organizations to approach regarding an on-site interview
- Identified and selected trade organizations and associations that could assist with reaching the selected SSD segments.

The program used existing program contacts and Internet resources to complete these research tasks.

2.2 Data Collection Tool Development

The program developed a 23-question survey (shown in Appendix J) to serve as the primary data collection tool. The survey was designed to gather data on communications-related issues but with a focus on the operational aspects of SSDs. Specifically, the survey covered four main topic areas—

- General demographics (e.g., physical size and location, and size of population served)
- Public safety services (e.g., services provided, regulatory requirements, and number of emergency calls per year)
- Coordination with public safety agencies (e.g., details on mutual-aid agreements, disaster planning, and frequency of working with outside public safety agencies)
- Communications (e.g., LMR system type, system age, quality, and interoperability).

The program developed a mechanism through which respondents could complete the survey via the Internet or on paper. Respondents had the option of returning the completed paper survey by mail or facsimile. In addition, the program contacted organizations by telephone and

provided the respondent with the option of filling out and returning the survey at his or her convenience, or, in some cases, the program asked the respondent questions over the telephone and completed the survey for him or her.

2.3 Outreach and Data Collection

The goal of the Outreach and Data Collection effort was to obtain support from the selected industries using their respective trade association. Therefore, the data collection cannot be construed as random because the majority of respondents are members of a specific association. To ensure that the program and the survey received wide exposure to each of the SSD segments, the program completed outreach activities, including—

- Contacted at least one association or trade group for each SSD, with the exception of the military, to request assistance in reaching its membership
- Highlighted the report data collection at several SSD venues such as safety and security committee meetings, and an association conference
- Held on-site interviews with one organization from each SSD segment.

After obtaining contact information for these sources, the program collected data from October 7, 2002, to February 1, 2003, using five main methods—

- Hard-copy survey sent by U.S. mail to more than 1,000 SSD organizations. The recipients had the option of filling out the paper version or entering the data via the Web-based version.
- Trade association or PSWN Program e-mail directing the recipient to the Web-based survey.
- Telephone calls made directly to safety and security professionals at SSD organizations using trade association and/or existing PSWN Program contacts.
- Telephone calls placed directly to corporate-level safety and security professionals requesting their assistance in notifying each of their SSD sites.
- On-site interviews with SSD organizations and public safety personnel from surrounding public safety agencies.

2.4 Analysis

Regardless of how the data was originally received or collected, all survey data was entered into a Web-based database, which served as the data warehouse for all the data collected during the data collection period. Upon completion of the data collection, the data was reviewed for invalid responses and other data anomalies, which were then deleted from the database, as necessary. The “sanitized” data was then imported into a statistical software application for analysis.

To identify response trends, the data was analyzed both by individual SSD segment and in a summary manner. Because each SSD segment is unique and its public safety needs are so different, it was important to look at each segment individually to best characterize the available data.

3. GUIDE TO READING THE SPECIAL SERVICES DISTRICT INTEROPERABILITY REPORT

Before reading the findings of the program’s data collection and analysis, the reader will benefit from understanding the key areas of the summary and individual SSD findings sections. Table 3-1 illustrates the order, description, and value of each of the key areas.

**Table 3-1
Key Area Descriptions**

Key Area	Description	Value
Survey respondent demographics	Contains demographic data such as population served, physical size of property protected, and property location by region of country	Without providing specific organization names, this data helps put the collected demographic data and findings into context for each segment
Public safety services	Indicates type of public safety services provided, the number of emergency incident responses per year, and any regulations requiring emergency response personnel	This data assists the reader in comparing the types of services provided, public safety call volume, and any regulatory requirements of SSDs
Coordination with public safety agencies	Contains data on the existence of any agreements between SSDs and other public safety agencies, disaster planning activities, and how often SSDs work with other public safety entities	This data provides an overview of the relationship between SSDs and other public safety agencies. It highlights the level of emergency interaction between the SSDs and other public safety responders and the relative importance of establishing a dialog regarding interoperable communications
Communications	Gathers basic communications details including radio spectrum use, type and age of LMR system in use, as well as other communications devices used	This type of data is important in determining whether the SSDs are using LMR, the quality of their communications systems, and the quality of interoperable communications between themselves and other agencies

Section 4, Summary Findings, provides an overall view of SSDs and highlights important aspects of operational issues as well as communications concerns because operational demands can drive the need for communications interoperability. The Summary Findings section contains findings that are common to all SSDs; these findings do not appear in the individual SSD findings appendixes unless there is additional information that is of value to the reader or the specific SSD segment.

The individual SSD findings included in the appendixes highlight valuable operational and communications data. Individual SSD findings are presented in the following order:

- Amusement parks
- Government-contracted private fire and EMS providers
- Hospitals
- Military installations

- Nuclear power plants
- Oil refineries
- Ports of entry
- Transit
- Universities.

Each SSD findings appendix begins with a brief overview of the SSD and then provides findings based on the limited number of responses received from that SSD service segment. The total number of surveys received from each SSD service segment was limited, at best. The total number of surveys received is graphically depicted at the beginning of each appendix and should be kept in mind when reviewing the findings.



4. SPECIAL SERVICES DISTRICT SUMMARY FINDINGS

The summary findings portion of the report compiles all the data collected during the assessment. Although each SSD included in this assessment is unique and diverse in its own right, many of the findings regarding the provision of public safety services, the coordination with other public safety agencies, and the use of communication devices are similar.

This section summarizes the data collected and identifies important differences between overall findings and findings specific to each SSD. This section of the report is divided into six areas:

- Data collection challenges
- Survey respondent demographics
- Public safety services
- Coordination with public safety agencies
- Communications
- Summary.

The focus of the report is communications, and presenting the above topics in this order is important in understanding the need for interoperable communications. For example, demographics, existing public safety services, and coordination with public safety agencies frame the requirement for communications interoperability.

4.1 Data Collection Challenges

Successfully obtaining data was difficult because many potential respondents were tentative about releasing information to a government program with which they had no familiarity. In an attempt to ease concerns about the legitimacy of the assessment and the program, the PSWN Program Managers wrote letters to trade associations and public safety organizations representing the services segments. The data collection team provided the program's Web site address (www.pswn.gov) and explained the mission of the program and the importance of assessment. In some cases, the program provided copies of program materials for the potential respondents to review prior to completing the survey. Specific findings for the data collection include—

- **Some potential survey respondents were reluctant to complete the survey**—Some potential survey respondents indicated that while they agreed with the premise behind the assessment, they were not comfortable releasing information. In fact, several thought that legal or other negative implications might arise from providing a completed survey. In light of a variety of concerns from potential respondents, the program pursued only those individuals who expressed an interest in completing a survey.
- **Despite the difficulties encountered, the program obtained 142 valid surveys**—Even with the difficulties encountered in obtaining completed surveys, the program was successful in collecting 142 completed surveys from the more than

1,000 organizations contacted as part of the data collection effort. Figure 4-1 illustrates the number of survey responses received for each assessed SSD.

- **Some respondents were selective in answering some questions**—Not all respondents answered all of the questions on the survey. Many respondents answered only selected questions, and many did not provide reply contact information.
- **Survey responses may address only one of several public safety mission areas within an SSD**—Many surveys were completed from the perspective of only one public safety mission area, although the intent was to have the SSD provide data for all of its public safety functions. For example, a chief from one mission area (e.g., security or fire suppression) may not have provided data for other mission areas of the SSD. Data from these surveys influenced the findings included in the report and were highlighted where appropriate.

4.2 Survey Respondent Demographics

As detailed in Section 2, Methodology, the PSWN Program surveyed SSDs representing a variety of service segments. Specific demographic data on respondents includes—

- **The majority of the data was collected from ports of entry, private fire and EMS providers, and universities**—Almost 60 percent of all respondents were ports of entry (i.e., airports and harbors), government-contracted private fire and EMS providers, and universities. The distribution of responses is illustrated in Figure 4-1.

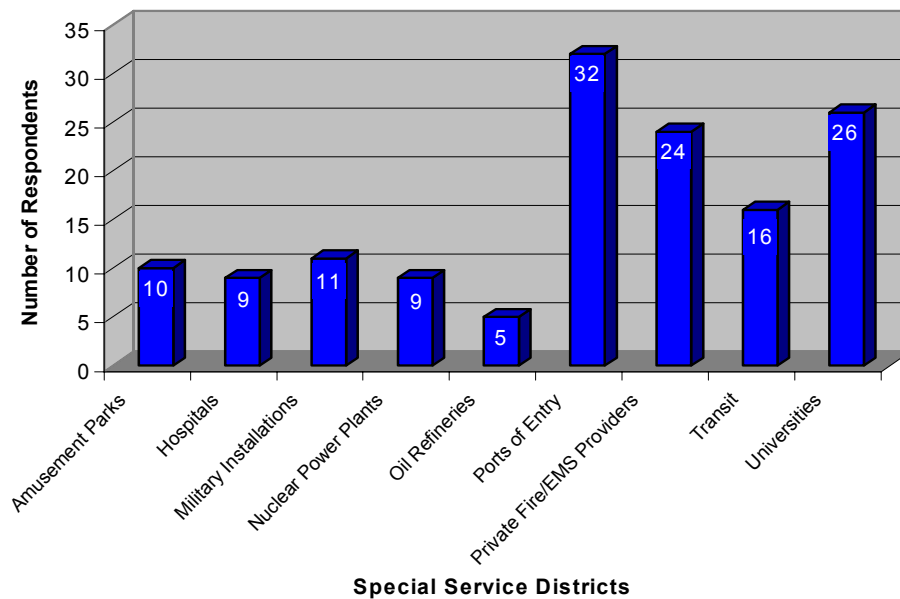


Figure 4-1
Surveys Received by SSD¹

¹ See Table 3-1 for SSD definitions.

5 square miles, and approximately 18 percent said they protected an area larger than 75 square miles.

4.3 Public Safety Services

Most SSDs provide one or more first responder services such as law enforcement or security, EMS, or fire suppression. Specific SSD segments have unique response capabilities based on organizational needs. Specific public safety service findings include—

- **The majority of SSD survey respondents provide security services and EMS**—As shown in Figure 4-3, SSD survey responses indicated that approximately 62 percent of SSDs provide security/safety/law enforcement, while 54 percent providing EMS, 34 percent providing fire protection/fire suppression, and 30 percent providing hazardous materials (HAZMAT) response or mitigation services.

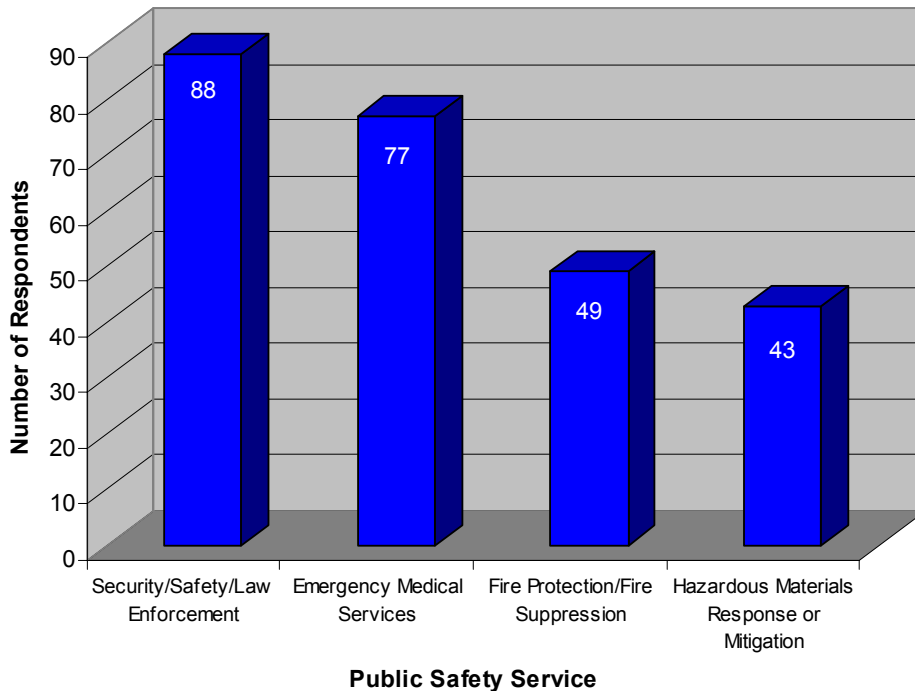


Figure 4-3
Public Safety Services at SSDs²

- **Firefighting personnel are common at several types of SSDs**—Of the assessed SSDs, airports, military installations, nuclear power plants, oil refineries, and government-contracted fire departments have the greatest concentration of firefighting personnel and equipment.

² With the exception of government-contracted private fire and EMS providers, many SSDs interpreted fire protection/fire suppression to mean existence or maintenance of sprinkler systems, and that information is included in this graph

- **Specialized public safety services are provided by certain SSDs**—Due to the nature of the work that a given SSD performs, respondents indicated that certain specialized public safety services were necessary, as illustrated in Table 4-1:

**Table 4-1
Specialized Public Safety Services at SSDs**

Specialized Public Safety Services	SSDs With Capability
Aircraft Rescue Firefighting	Airports, military installations
Canine (e.g., explosive detection)	Airports, military installations, ports of entry
Confined Space Rescue	Military installations and oil refineries
Hazardous Materials Response	Hospitals, nuclear power plants, and oil refineries
Radiological Response	Nuclear power plants
Water Rescue	Ports of entry and military installations
Weapons of Mass Destruction Response	Military installations

Private firefighting service providers did not indicate any specialized services, but it is likely that they maintain additional skills beyond basic firefighting and emergency medical response that may include confined space, HAZMAT, and technical rescue (e.g., above grade and high-angle rescue) capabilities.

- **The airport, military, nuclear, and oil industries require certain on-site public safety services**—The Federal Aviation Administration (FAA), Department of Defense, Nuclear Regulatory Commission (NRC), and Environmental Protection Agency provide regulatory oversight of the airport and military installation service segments, and the nuclear power plant and oil refinery industries, respectively. These regulatory agencies require that a certain level of public safety response capabilities be available on site at the service segment locations under their purview. The majority of the remaining SSD service segments provide public safety services to, as one respondent stated, “protect the safety and health of customers and employees...”
- **Emergency call demand is highest for private fire and EMS**—Private fire and EMS providers have the highest call volumes of all SSDs because they often protect entire governmental jurisdictions (e.g., cities, towns, and counties) that cover large areas and population centers. High call demand at other SSDs is tied primarily to large daily populations, such as at airports, large amusement parks, and on metropolitan transit systems.
- **The majority of SSD public safety personnel respond to emergency events outside their SSD boundaries**—Approximately 56 percent of the SSDs completing a survey respond to calls outside their primary SSD boundaries. The SSDs most active in responding outside their primary areas are private fire and EMS providers, military installations, ports of entry, transit, and universities.
- **Funds supporting public safety operations vary by SSD**—The majority of SSDs in the assessment are private organizations that use funds generated from the sale of

services or products to support public safety services. In the case of organizations that are strictly government (e.g., military and state universities) or quasi-governmental (e.g., airports and transit), they may use a combination of funds received from local taxes, federal programs, or other sources.

4.4 Coordination With Public Safety Agencies

An SSD's need to coordinate with other public safety agencies depends on many factors, including the nature of the emergency event and existing public safety capabilities. Many SSDs have diverse and robust public safety capabilities, but based on the data collected as part of this study, few SSDs are totally self sufficient. This is especially true for incidents for which they may not have planned that require massive public safety resources. Specific findings regarding coordination between SSDs and public safety agencies include—

- **Coordination is required with many agencies**—A given SSD may be physically located in multiple jurisdictions, requiring coordination with many agencies. For example, transit agencies have track and stations located in many different governmental jurisdictions. One transit agency respondent indicated that the agency was required to interface with more than 25 different cities and counties on a regular basis.
- **SSDs predominantly operate with local agencies**—Ninety-three percent of survey responses indicate that SSDs respond to emergency incidents with local governmental public safety agencies.
- **SSDs operate with other agencies or jurisdictions on emergency incidents on a frequent basis**—Seventeen percent of survey responses indicate that SSDs respond to emergency incidents with other agencies more than 50 percent of the time. Figure 4-4 provides a detailed breakdown of the percentage of SSD calls that include interaction with other agencies. For example, approximately 50 percent of the participating SSDs operate with other public safety agencies between 1 and 10 percent of the time.
- **Agency working relationships improve with understanding**—Several SSDs indicated that the ability to work with other public safety agencies, especially government agencies improved as insights were shared between agencies. In several cases, current and former government public safety personnel working for and with SSDs have an understanding of government operations and personnel that makes for improved relations.
- **SSDs request emergency assistance via 911**—Given that SSDs are primarily private organizations and are not typically networked into the local agencies' facility receiving 911 calls (i.e., public safety answering point [PSAP]), with possibly the exception of private fire/EMS providers, they almost exclusively use 911 to request local government public safety assistance. Some SSDs have direct dial or "ring-down" to the local PSAP but most dial 911 or a 7- or 10-digit emergency number to request emergency assistance.

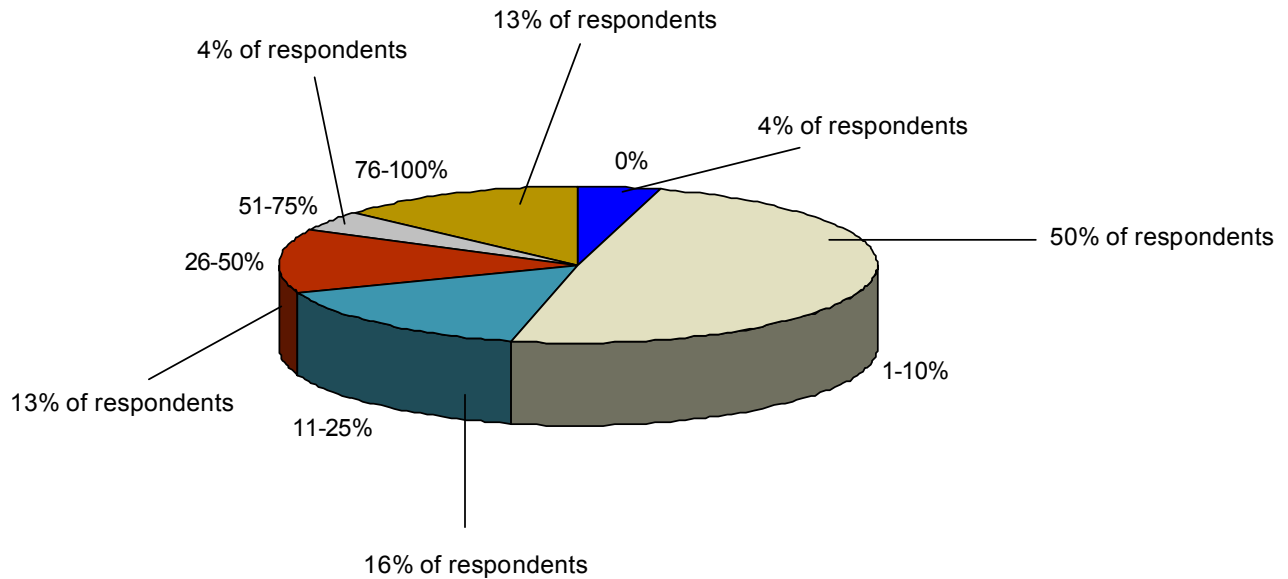
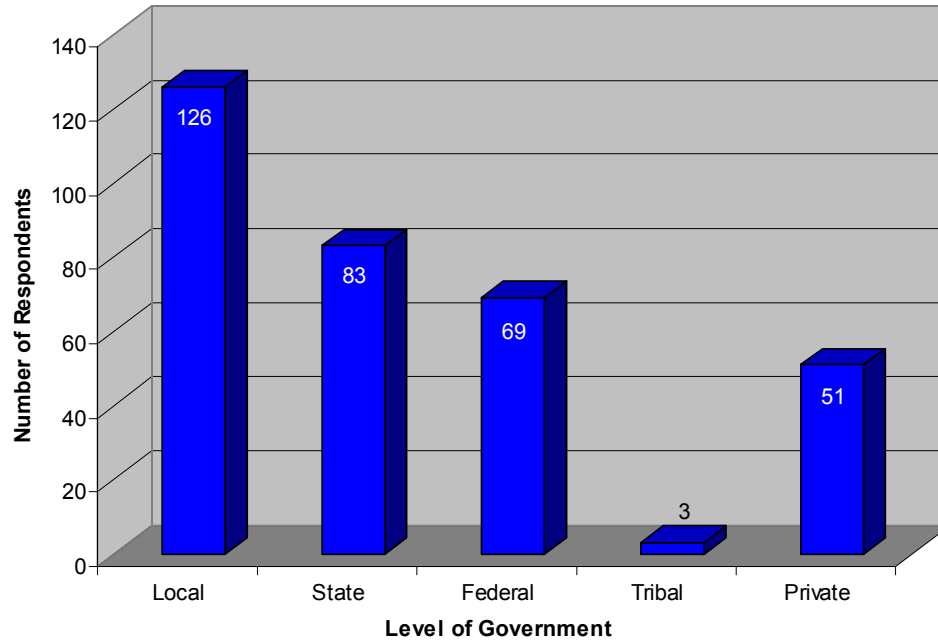


Figure 4-4
Percentage of Total Emergency Calls on Which SSDs Operate with Other Agencies

- **SSDs actively participate in various disaster planning efforts with other agencies**—Seventy-five percent of the respondent SSDs participate in strategic or table-top exercises, and 83 percent participate in functional exercises.
- **The majority of SSDs coordinate disaster planning activities with local agencies**—Eighty-eight percent of disaster planning activities between SSDs and government occur with local agencies, as indicated in Figure 4-5. SSD coordination with state and Federal Government agencies is less prevalent, and such coordination is rare with tribal governments. However, several SSDs from each segment indicated that they accomplished disaster planning with federal agencies.
- **SSDs have predominantly established written or verbal memoranda of understanding (MOU) with local government agencies regarding emergency response issues**—Seventy-three percent of participating SSDs have established MOUs with local agencies, 39 percent with state agencies, 23 percent with federal agencies, and less than 1 percent with tribal agencies.
- **Airports and nuclear power plant SSDs maintain the majority of MOUs with federal agencies**—More than 90 percent of MOUs with federal agencies are maintained by airport and nuclear power plant operations, presumably to address regulatory compliance with the FAA and NRC, respectively.



**Figure 4-5
Disaster Planning by Level of Government**

- **SSDs shared some thoughts on the relationship between private and public safety providers, including—**
 - “[The] mentality is to prevent interaction, not to enable it....”
 - “Turf issues are a major concern when establishing interoperable communications....”
 - “Local agencies would not allow access to their frequencies...”
 - “A good proactive working relationship with outside agencies is the key to the overall success of the public safety mission.”
 - “There is much resentment between local agencies and the private sector.”
 - “The county and the school (university) have a good relationship and are willing to help each other when necessary.”
 - “[We] have good ongoing communications, know all the players on each side, and maintain good relations.”
 - “Having well-trained personnel is... important.”

4.5 Communications

Communication devices, such as handheld or mobile radios, are critical tools for public safety personnel and are often referred to as “life lines.” LMR provides public safety personnel with a necessary link to a dispatch center or other public safety personnel to relay important and often life-saving information. Findings regarding communications and SSDs include—

- **Almost all SSD emergency personnel use LMR—**Nearly 100 percent of the SSDs that responded to the survey use portable or mobile radios on a daily basis for public

safety operations. SSD operations at amusement parks, hospitals, transit agencies, and others predominately use portable radios.

- **Two-thirds of SSD LMR systems are less than 10 years old**—Sixty-six percent of LMR systems in use by the participating SSDs are less than 10 years old, with approximately half of those being less than 5 years old. Detailed findings are shown in Figure 4-6.

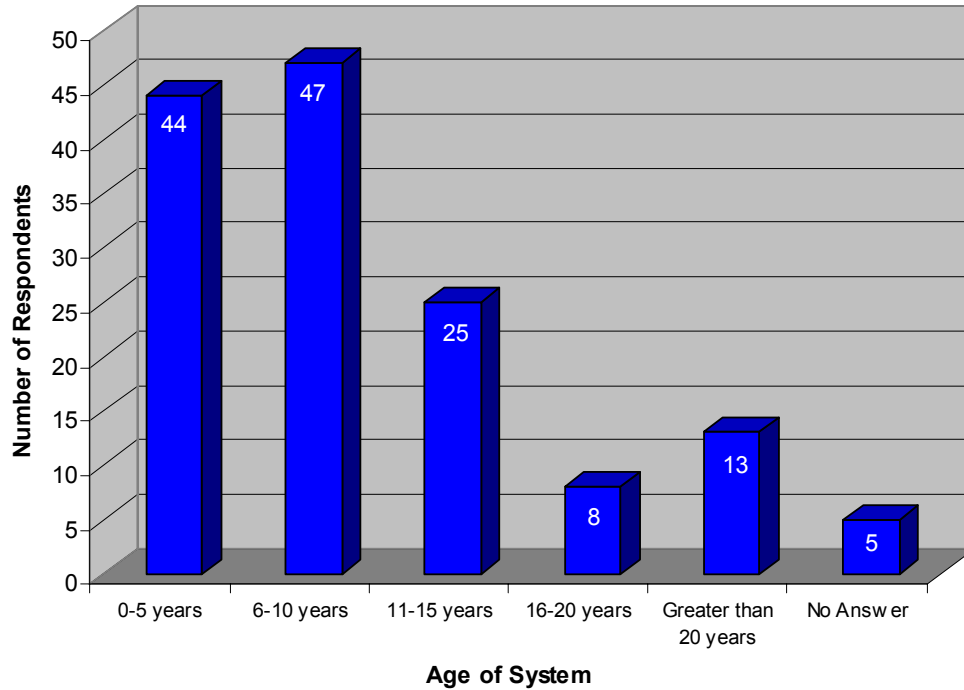


Figure 4-6
Age of SSD Systems

- **Transit agencies maintain the oldest LMR systems**—Transit agencies make up almost 50 percent of the participating SSDs that operate LMR systems more than 20 years old.
- **The majority of LMR systems operate in the conventional and analog modes**—Approximately 58 percent of the participating SSDs operate in the conventional mode and, of those, 98 percent operate in an analog mode. Detailed findings are shown in Figure 4-7.

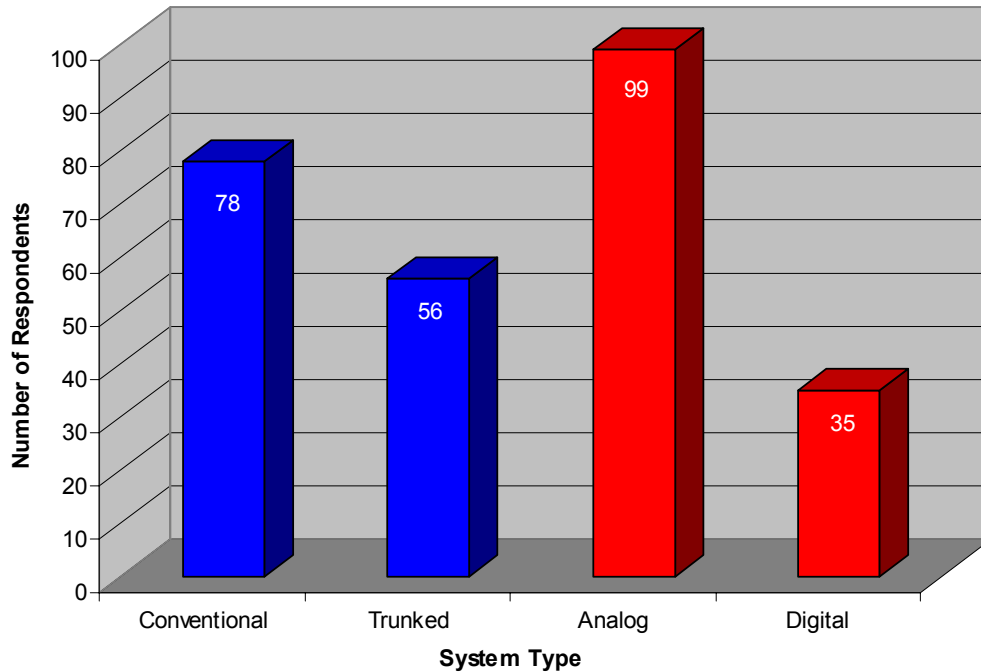


Figure 4-7
LMR System Technologies

- The quality of communications systems is mostly good—as illustrated in Figure 4-8; 55 percent of survey respondents indicated that their communications systems were good. However, almost 30 percent rated their communications systems as fair or poor.

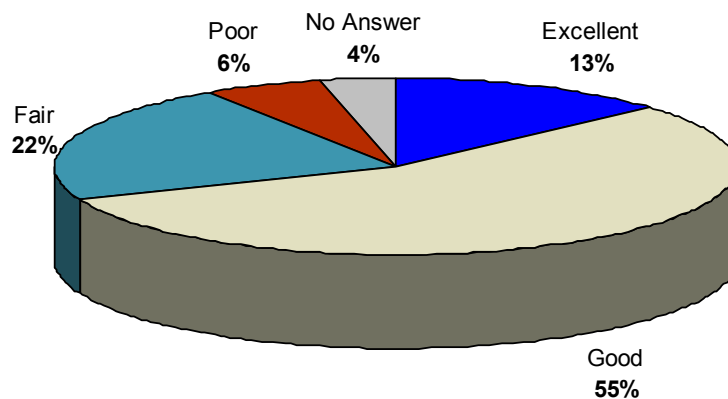


Figure 4-8
Quality of Communications Systems

- **SSDs’ communications systems meet mission requirements**—Eighty-three percent of participating SSDs indicated that their LMR systems met their mission requirements.

- **Airports and harbors were the most likely to operate using shared LMR communications systems**—Eleven of the 27 respondents from airports or harbors indicated that they predominately operate using city or county systems.
- **Lack of funding was cited as an issue**—The survey did not explicitly solicit funding information; however, a limited number of respondents commented that they would like to address interoperability obstacles but that funding was not available to do so.
- **A lack of available spectrum may be a hindrance in some areas of the country**—Although the subject of spectrum was not included in the survey, several on-site interview respondents indicated that the ability to obtain spectrum was difficult or impossible in some cases. Most of these individuals were from large metropolitan areas of the country. Availability of spectrum, however, did not appear to be an issue for most of the respondents whose SSD was located in more suburban or rural areas.
- **The majority of SSDs use ultra high frequency (UHF) spectrum**—Fifty-three percent of the participating SSDs’ radio systems use UHF spectrum, with approximately half using spectrum between 450 and 512 megahertz (MHz) and the other half in the 806–824/851–869 MHz band. Remaining SSDs operate in various other bands, as illustrated in Figure 4-9.

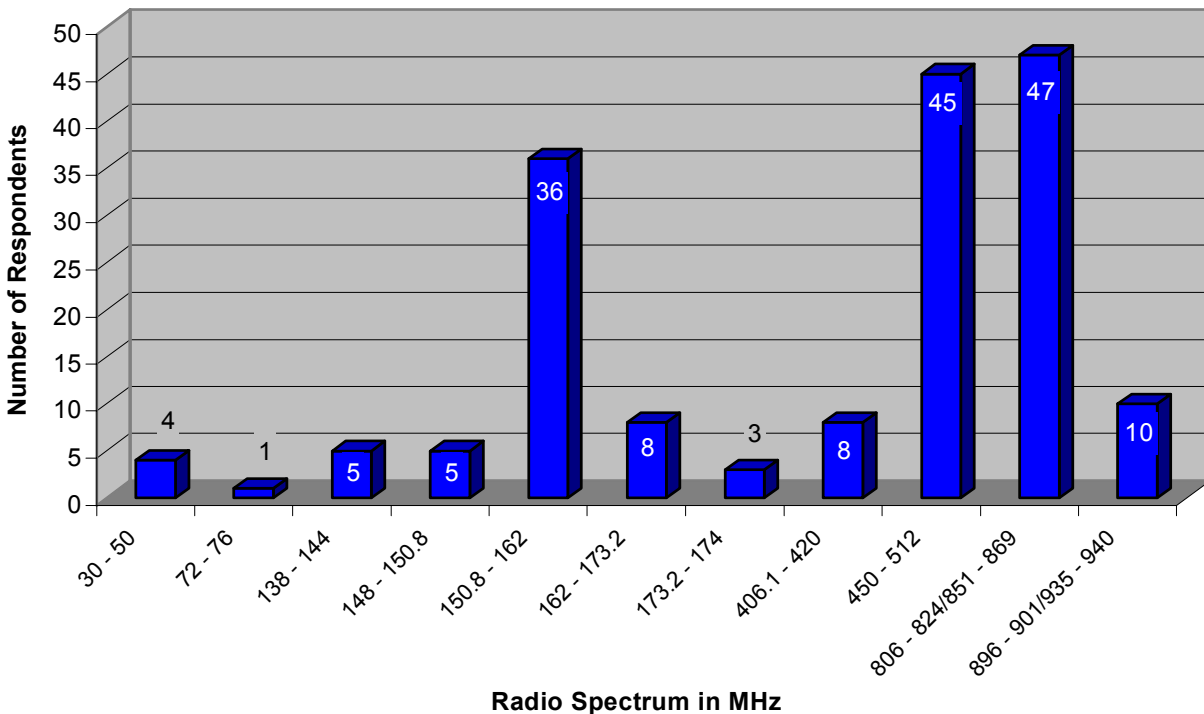


Figure 4-9
Radio Spectrum Use by SSDs

- **Many SSDs have access to multiple radio systems and/or multiple bands**—Of the 142 survey responses, SSDs reported having access to 172 radio systems.

Government-contracted private fire/EMS providers have access to the most bands or systems, followed closely by military installations and ports of entry.

- **Few SSDs use secure communications**—Approximately 13 percent of the SSDs responding to the survey operate in a secure or encrypted communications environment. Seventy-two percent of those using encrypted communications comprise a portion of a military installation, port of entry, or university.
- **Poor coverage is the main concern of SSDs**—Twelve percent of respondents indicated that poor coverage was the main system problem they encountered. Concerns regarding interference, equipment problems, and channel congestion were shared as well.
- **Use of commercial services is prevalent among all SSDs**—Every participating SSD uses some type of commercial service to communicate. Eighty-one percent use cellular telephone, and 72 percent use paging services.
- **Satellite telephone use is limited**—Only 8 percent of participating SSDs indicated the availability or use of satellite telephone services to support their operations.
- **Use of mutual-aid frequencies is common to establish LMR-to-LMR communications interoperability**—Forty-two percent of participating SSDs accomplish LMR-to-LMR communications interoperability with other agencies using mutual-aid frequencies. Many other methods of establishing interoperability using LMR are illustrated in Figure 4-10.
- **The majority of SSDs use telephones to relay information from agency to agency**—Many of the participating SSDs use either landline or cellular telephone to communicate with other public safety agencies prior to or during emergency events.
- **SSDs did not indicate reasons for lack of LMR-to-LMR communications interoperability with outside agencies**—Fewer than 10 percent of survey responses provide any detail on why SSDs cannot communicate directly with other public safety agencies using their LMR devices.
- **More than half of respondents indicated that the quality of communications was only fair or poor among public safety personnel during functional exercises**—Almost 50 percent of respondents indicated that communications with other agencies during drills was only fair or poor. Only 6 percent indicated communications were excellent. Almost 75 percent of military installations indicated that their communications with other agencies during drills was fair or poor. Overall findings are illustrated in Figure 4-11.

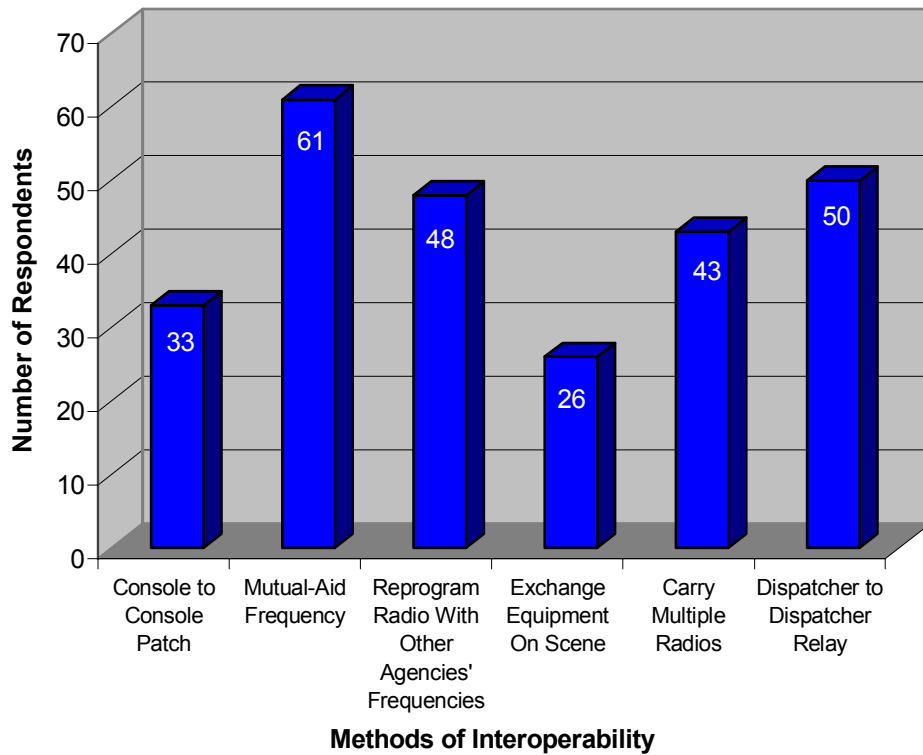


Figure 4-10
LMR-to-LMR Interoperable Communications Methods in Use

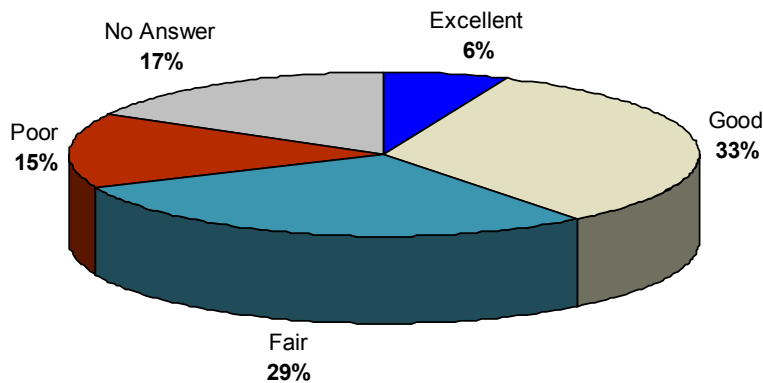


Figure 4-11
Quality of Communications During Functional Drills

- **Several SSDs, with low call volume, saw a benefit to LMR communications interoperability but did not require it**—A few comments received indicated that SSD organizations with low call volume did not need LMR communications interoperability with other public safety agencies but saw value in being able to establish interoperable communications. Comments included—

- “I would consider it an added benefit; however, due to the low frequency of response from outside agencies, landline communications are sufficient for our operation.”
- “It is critical to communicate with outside agencies but there isn’t much need for it given low call volume.”
- **Several SSDs referenced the events of September 11, 2001, and the importance of communications interoperability**—Comments regarding interoperable communications and the September 11 events included—
 - “It’s absolutely critical (especially post 9/11)....”
 - “The need to communicate with other agencies in our area would be invaluable. We need resources to be readily available to us in the event of a terrorist event.”
- **SSDs view interoperability with other public safety agencies, especially government entities, as “critical,” “important,” and “imperative”**—Half of the survey respondents made an extra effort to provide specific comments and thoughts on being able to communicate directly using LMR with other public safety personnel. Examples of these comments included—
 - “It provides the most direct, real-time, and safest form of communications. There is no need for third- and fourth-party intervention from people that aren’t on the scene.”
 - “Imperative to successful fulfillment of our mission and objectives.”
 - “LMR communications is the key. Without effective trustworthy communications life safety is compromised.”
 - “Critical since the transit system crosses into over 20 different jurisdictions and people wishing to evade capture use the transit system.”
 - “...would enhance apprehension of suspects....”
 - “A public safety standard for all public safety agencies....”
 - “...will provide for a faster more coordinated response.”

4.6 Summary

SSDs play a prominent role in the delivery of emergency services in the United States. This report examines selected SSDs across a diverse range of demographics, including different service segments represented, different public safety services provided, and different population targets and territories protected. Although each service segment is responsible for protecting people and assets within its specific boundaries, many also provide some form of emergency service to their surrounding communities. The SSDs included in this report represent 9 service segments in 36 states and the District of Columbia, and provide such safety and security services as fire protection, law enforcement, and EMS.

The age and types of LMR systems in use by SSDs is as varied as the SSDs themselves. The majority of the radio systems in use are less than 10 years old and are owned by the participating SSDs. In addition to LMR, SSDs rely heavily on other means of communications such as landline telephones, cellular telephones, and pagers. Data indicate that SSDs appear to be working with other public safety responders in planning for disasters, with most expending the effort to participate in functional drill exercises. Data also indicates that on average, SSDs

respond to calls for emergency services on a daily basis, with most operating with other public safety agencies. Not surprisingly, the SSDs operate predominantly with local public safety providers but also have intersections with state and federal government agencies, as well as other public safety support organizations, like hospitals.

SSDs desire the establishment of communications interoperability with local public safety agencies. Factors influencing this desire include the number of calls to which some of the larger SSDs respond; the corresponding number of daily interactions they have with other public safety agencies; and the fact that the SSDs rate the quality of communications during functional exercises as only fair to poor. Further, SSDs deem interoperable communications “critical” and “imperative.” It appears, however, that many SSDs are relying on landline telephone and dispatcher-to-dispatcher relay to converse with their neighboring governmental public safety providers during emergency incident responses. Feedback from SSDs indicates that the barriers to communications interoperability may be more organizational and cultural than technology based. From the data collected, two themes are most evident: many SSDs provide the same service or services as other public safety agencies, and SSDs see a distinct benefit to establishing communications interoperability with other public safety counterparts.

5. CONSIDERATIONS

For this assessment, the project team collected both operational and basic technical data on LMR systems in use by SSDs. It is important to look at technical data, operational capabilities, and operational issues to determine the need to address any impediments to communications interoperability. Each geographic area in which an SSD is located may have unique characteristics that require a specific interoperability solution. The intent of this report is to characterize the operating environment in which SSDs provide public safety services; to assess the state of communications interoperability that exists between SSDs and neighboring public safety agencies; and, at a high level, to learn about the impediments to establishing interoperable communications.

The main concern of any public safety agency is its ability to deliver service to the community, citizens, or patrons it serves. The ability to deliver service may be enhanced with the establishment of interoperable communications with other public safety agencies. There are many issues to consider when determining whether an SSD and other public safety organizations should expend the effort to address interoperable communications impediments. The following are a few questions that might help an SSD evaluate the need for communications interoperability with other public safety agencies—

- Does the SSD have internal public safety resources and expertise to mitigate all types of emergency calls (e.g., law enforcement, fire, EMS, and HAZMAT)?
- Does the SSD have unique public safety resources or expertise that benefits neighboring public safety agencies?
- Does the SSD have unique hazards on site (e.g., chemicals, explosives, or fuel storage)?
- Could the SSD become a target of terrorist activities?

If an SSD answers yes to any of these questions, that SSD should consider discussing communications interoperability with public safety agencies that may support emergency responses to their location. In addition, neighboring municipal or other public safety agencies should ask themselves whether they have an SSD within their jurisdiction or service area, and whether such a presence may require their agency's personnel to respond with the SSD public safety providers to emergency calls. If so, the other public safety agencies should consider discussing communications interoperability with the SSD public safety providers.

From an SSD's perspective, there are several primary considerations for accomplishing the goal of improved interoperable communications between SSDs and other public safety agencies. These considerations are based on information collected as part of this assessment and include—

- **Initiate discussions with public safety agencies regarding response and communications issues**—SSDs with concerns about outside public safety agencies

responding to their facilities should initiate discussions with those public safety agencies about response and communications issues. These discussions should center on the benefits of interoperable communications and the identification of impediments to interoperability.

- **Maintain regular interaction between public safety personnel and agencies**—It is important to keep the level of interaction between SSD and other public safety personnel regular and consistent. A standing meeting, training, or awareness event hosted by the SSD could improve the level of understanding by other public safety agencies about hazards they may encounter at SSD facilities, and about SSD concerns regarding incident operations. One survey respondent commented, “It is important to sit agency leaders down [so we can] get to know each other.”
- **Discuss public safety capabilities and training with assisting agencies**—Public safety providers within an SSD organization are well versed in their capabilities and training. It benefits all public safety organizations that work together to understand what capabilities other organizations maintain and what level of training their personnel have received. This understanding will assist in building confidence in everyone’s abilities among all public safety personnel that may respond jointly with an SSD to an emergency.
- **Ensure that MOUs contain specific language regarding wireless communications**—MOUs should address the specifics of communications interoperability between responding agencies, including procedures and policies on when and how to link agencies together, as well as standard radio language and terminology used during incident responses. In addition, participating agencies need to agree on a common call sign methodology so that different agencies do not use the same radio call sign (e.g., Chief 1) when operating on an emergency incident.
- **Address radio protocol and terminology differences**—When establishing agreements that include interoperable communications, agencies should identify radio protocol and terminology differences. Because some agencies use a specific set of “codes” or other terminology that might not be in use by another agency, it is important to agree on how agencies from different organizations will communicate so that all entities understand what is being communicated over the radio. It is also important to discuss when and what types of information should be shared to prevent or reduce congestion on radio channels.
- **Ensure that functional drills test communication plans and communication systems thoroughly**—When functional drills or exercises are held, participants should test their communications systems and any interoperability solutions to determine their functionality. Gaps in plans, or technology problems with paths for communications, may be identified as a result. Such discoveries during drills provide an opportunity to make adjustments and corrections in a controlled environment, rather than encountering and trying to address such problems during an actual emergency.

- **Ensure that after-action evaluations include communications**—After-action reports should include an assessment of communications and interoperability during an emergency event. An after-action report should identify communications best practices and deficiencies experienced during emergency responses, as well as functional exercises.
- **Promote resource sharing on as many levels as possible**—Resource sharing, including equipment, personnel, expertise, and frequencies, is an excellent means for solidifying relationships and conserving capital. By sharing a resource, the need for agencies to duplicate purchases of expensive resources can be avoided. In addition, resources that might otherwise be seldom used are brought into play more often, making the investment to acquire the resource more worthwhile. The bond between agencies that share resources can be very strong—sharing is one means for partnering agencies to demonstrate their care and support for each other, as well as for those whom they are charged to protect.

Based on the data collected for this assessment, coordination and partnerships between SSDs and other public safety agencies require the most attention. In light of this finding, the considerations listed above primarily focus on that key interoperability impediment. Other considerations focus on the remaining barriers to interoperability (i.e., funding, spectrum, standards and technology, and security) and include—

- **Partner with other agencies to address the lack of funding**—It costs money to plan for, purchase, and implement technology solutions that establish interagency communications where none previously existed, or where improvements are needed. SSDs can benefit from discussing funding opportunities, including grants, with other public safety agencies in their area. The PSWN Program has addressed issues of communications planning and funding matters in two of its publications, the *How-To Guide for Managing the Radio System Life Cycle* and the *How-To Guide for Funding State and Local Public Safety Wireless Networks*.
- **SSDs should become active in efforts to achieve more open architecture and design standards for LMR equipment**—Standards and technology differences between SSD public safety providers and other public safety agencies may be adversely impacting interoperability. Without standards, organizations have limited options to purchase equipment that can be interoperable from multiple vendors. The public safety community, SSDs included, needs to support efforts to require vendors to design and manufacture equipment that meets the requirements of public safety. These requirements need to include the mandate that different vendors provide systems that are inherently interoperable.
- **Plan and share frequencies with other public safety agencies**—A lack of available spectrum may be a hindrance in some areas of the country. SSD public safety agencies may best address this need by establishing frequency sharing agreements

with other public safety agencies in the area or by participating in regional frequency planning efforts.

- **Develop procedures to communicate with secure communications systems—** Although only a limited number of SSDs use secure communications, it is imperative that any agency that uses secure communications work with other public safety agencies on developing policies and procedures for communicating without secure voice. It is important to preplan what type of information can be shared in an unsecured environment prior to the need to establish interoperable communications with other agencies during emergency incidents.
- **Determine the need for secure communications—** Many SSDs may not have a requirement for secure voice but they should evaluate what type of information is being shared over the air now and assess the risk of continuing to operate in an unsecured mode. The PSWN Program has prepared reports on communications security, such as *Design Phase Risk Assessment Methodology for the Digital Land Mobile Radio System*, and its companion piece, the *Digital Trunked Radio System Design-Phase Security Risk Assessment Report*. The information in these resources may include significant considerations for SSD public safety agencies and are available through the PSWN Program Web site, www.pswn.gov.

Implementing many of these considerations does not require technical knowledge of radio system architecture. It will, however, require sustained efforts by SSD organizations to bridge the organizational, operational, and cultural differences between public safety agencies that essentially serve the same constituency, people in need.

6. BEST PRACTICES IN ACTION

Several best practices were identified during the survey data collection and on-site interviews with SSDs and surrounding government agencies. These best practices have positively impacted interoperable communications and the working relationships between SSDs and other public safety agencies. Some of the best practices or suggestions for improving communications interoperability are limited in detail because they came from survey responses rather than interviews. Best practices include—

- **Private organization use of a government radio system improves coordination—**Several examples demonstrate that when SSDs use government radio systems, the ability to deliver public safety services dramatically improves. After migrating to a new LMR system, one metropolitan police department allowed local nongovernment security operations to use its legacy radio system to share real-time reports of illegal activities. The police monitor this radio system, and as a result, they obtain immediate reports of crimes in progress. In one other case, a large city that promotes fee-sharing use of its radio system with many government agencies in the region also extends the use of its system to public safety personnel from several private organizations within its response area.
- **Shared radio communications responsibilities develop strong relationships—**One SSD visited by the program has a unique public–private arrangement regarding responsibilities for the trunked radio system in the region. Both private and public entities own infrastructure in that regional system. An SSD provides the trunking controller for the entire system, which is used by both public and private public safety agencies in the area. In addition, the SSD routinely maintains and repairs all components of the system (i.e., public or private) to ensure quality system performance. The government organization takes a proactive role in coordinating the use of the system by all public safety agencies in the region.
- **Proper planning and training improves public safety response—**Several comments were made regarding the importance of agencies planning and holding joint functional exercises to improve operational efficiencies and coordination. Some of these comments from survey respondents include—
 - A best practice is to “ensure that all personnel have continued training and are tested for proficiency regarding how to operate all communications equipment....”
 - “Regular drills with local public safety helps improve local public safety’s knowledge and layout of the park.”
 - “Proper planning is key....mutual-aid frequency planning paid off as the agencies were able to communicate with one another...” during a tornado event in the area.
- **Regular meetings between public safety agencies improve interoperable communications—**Two of the on-site interview locations that the program visited had an impressive cohesiveness to their public safety operations, public or private. These locations had two characteristics in common; they have established

interoperable communications between public and private first responders, and they conduct regular public safety meetings. In both cases, one agency hosts a monthly meeting with all public safety agencies in the region to share intelligence and operational concerns, as well as to discuss ways to improve coordination on emergency incidents.

- **Communications redundancy and frequency sharing is important to maintain uninterrupted communications**—One survey respondent explained that having agreements with other public safety agencies for sharing system resources and frequencies was important in the event that one or more systems failed due to weather or other circumstances. Another comment stated, “The best lesson we and other agencies learned is to open up each other’s frequencies for mutual use.”
- **A check list/flip file card system helps speed interoperable communications**—A government PSAP that the PSWN Program visited during the assessment was instituting a flip file card system, similar to those that dispatchers use as a part of some nationally recognized emergency medical dispatch systems. This flip file is provided as a tool for dispatchers to use when interoperability is required between multiple agencies. Given that the agency’s dispatchers do not routinely enable the technology required to provide officers with interagency radio communications, the flip file is available as a ready reference to guide them through the process of establishing interoperable communications.
- **Formation of a regional interoperability committee improves public safety communications and reduces response times**—While conducting data collection for the assessment, the PSWN Program identified a grassroots effort by two jurisdictions’ communications managers that grew into a regional interoperability project encompassing more than 18 jurisdictions and a private institution. To improve communications and reduce response times of field personnel, public safety agencies from the participating jurisdictions and the private institution banded together to seek solutions to provide seamless and coordinated voice and data communications. Together, the group has addressed issues such as authority, responsibility, continuity, and funding through MOUs and government resolutions.

The common theme among all of these best practices is a spirit of cooperation and partnership. They are the result of the development of positive relationships between representatives from many public safety agencies including traditional government public safety agencies and SSDs.

7. CONCLUSION

SSDs are a part of many different segments of business and society, and are components of many areas of the national landscape. Whereas the SSDs included in this report are primarily private organizations, there are several examples of government-operated SSDs as well. Along with the military, different levels of government may operate hospitals and universities, to name a few.

Private industry's role in the protection of life and property of American citizens should not be underestimated, and therefore, its role in protecting its employees, customers, and assets also should not be diminished. It is clear from the data presented in this report that SSDs fulfill a critical role in the provision of public safety services. More importantly, SSDs frequently operate with other public safety agencies. It is apparent that there is a lack of interoperability between SSDs and other public safety agencies and that this gap may be due mainly to a lack of familiarity and understanding, and not technology barriers.

Most SSDs are not totally self-contained with regard to their ability to address all of their public safety needs. Just like many public safety agencies in the United States, few SSD public safety agencies are staffed with the resources and personnel needed to manage large emergency events. Although such incidents occur only rarely, SSD agencies should acknowledge the role that other public safety agencies will play as the secondary responders. Likewise, those public safety agencies that may serve as secondary responders to SSDs should be aware of potential incidents and be concerned with establishing the ability to operate efficiently on the scene of such events with SSD public safety personnel.

SSDs and other public safety agencies operate with each other on a regular basis. Although SSDs and other public safety providers work for different organizations, they share a similar mission: to care for those in need. In the end, both SSD and other public safety personnel would benefit from leveraging each other's expertise and knowledge to better manage emergency incidents. Many of the SSDs included in this report contain substantial hazards and/or protect substantial populations within their boundaries on a regular basis, and therefore, SSDs and their neighboring public safety agencies must realize that improved communications interoperability will enable them to more efficiently and safely serve those in need.

APPENDIX A—AMUSEMENT PARKS FINDINGS



APPENDIX A—AMUSEMENT PARKS FINDINGS

According to the amusement park industry, there are approximately 450 amusement parks in the United States. There are many different types of facilities, including theme parks, waterparks, zoos, and more. Each amusement park is unique in size, staff, operating schedule (e.g., part year versus year round), rides, and attendance. For U.S.-based parks, the amusement industry estimated 324 million people visited parks in 2002, generating \$9.9 billion in revenue.

For the purposes of this study, the program made an effort to collect data relative to public safety-type functions from approximately 200 theme parks and waterparks. Public safety issues are a concern for all businesses; however, with the arrival of hundreds of people at the smaller parks to many thousands at the larger parks, the likelihood of injuries, sicknesses, and criminal activity increases dramatically each day at amusement facilities. In light of this situation, amusement parks often can require coordination between park public safety providers and public safety agencies responding to calls at the park. In fact, a recent news article highlighted the need for coordination between parks and local public safety agencies. A local public safety agency had concerns regarding the specific location of an amusement park in its jurisdiction and felt that it might become a target for terrorist activities. Given the park's location and heightened awareness of new threats, park officials held a mass casualty drill that involved the release of chemicals that primarily affected amusement park patrons. Although the park officials were unable to identify interoperable communications issues because this exercise was a "table-top" drill, they plan on conducting functional exercises in the future to help address all issues that might result from a large emergency event.

A.1 Survey Respondent Demographics

As indicated in Section 2, Methodology, the Public Safety Wireless Network Program used a variety of methods to obtain survey data from amusement parks in the United States. The program contacted approximately 200 parks and obtained survey data from 10. This effort included personal on-site interviews at one amusement park. This data accounts for approximately 7 percent of all assessment responses. Specific demographic data on respondents includes—

- **Data was obtained from eight states**—As indicated in Figure A-1, data was obtained from 10 parks located in 8 states in all 4 regions of the United States.
- **The majority of respondent parks protect an area smaller than 1 square mile**—Eight of 10 responding parks protect an area smaller than a square mile, with other parks protecting areas of 2–5 square miles and 26–75 square miles.
- **Daily park populations for the majority of respondents are between 10,001 and 50,000**—Seven of 10 responding parks have average daily populations between 10,001 and 50,000 people, with 2 parks hosting 2,501–10,000, and 1 hosting more than 50,000 people per day.

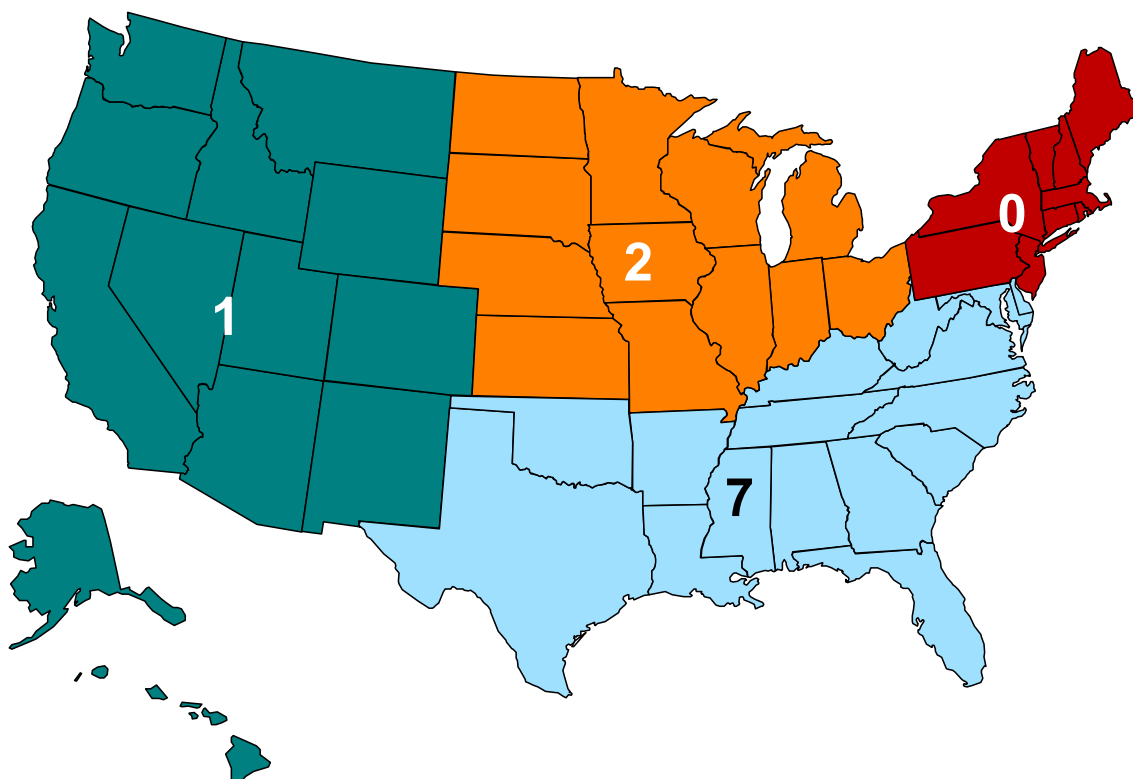


Figure A-1
Number of Surveys Received by Region

A.2 Public Safety Services

This section examines the type of public safety services provided by park personnel. Most amusement parks provide some type of first responder service that often includes a security and basic first aid components. There are also some additional capabilities as indicated in Figure A-2. Specific public safety services findings include—

- **Ninety percent of respondents provide security and emergency medical services (EMS)**—Nine out of 10 parks provide security and EMS.
- **Few parks have on-site firefighting capabilities**—Only 1 of the 10 parks responding to the survey provides on-site firefighting services. Although 50 percent of respondents indicated that they provided fire suppression/fire protection services at parks, it was apparent from survey responses that “fire suppression/fire protection” was assumed to include sprinkler systems. The intent of the survey question was actually targeted at capturing firefighting capabilities that use fire apparatus (e.g., fire engines) and firefighters on site.

- **Some parks tie hazardous materials (HAZMAT) capabilities to daily operations**—Three of 10 parks indicated that they had HAZMAT response capabilities. It appears that the parks that have this capability have water park operations, and therefore, have a need to maintain certain on-site knowledge to address chemicals used to support water quality guidelines or regulations.

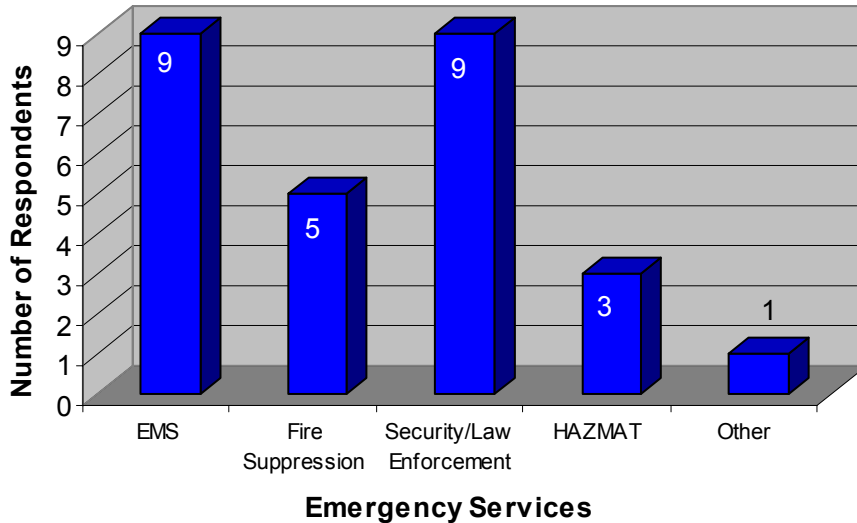


Figure A-2
Type of Emergency Services Provided by Amusement Parks¹

- **The role of first responders is changing**—It was apparent from the on-site park visit during the data collection process that the security component has been playing a more visible role in recent times, as indicated by more vigorous inspections of attendees at park entrances.
- **The majority of the parks respond to 500 or fewer emergency calls per year**—Seven of 10 (70 percent) survey respondents respond to 500 or fewer calls per year, with the other 3 parks responding to between 1,001 and 10,000 calls per year.
- **The severity of emergency calls is usually minor**—Several of the survey interviewees indicated that the severity of emergency calls was minor, with EMS calls demanding the majority of their attention. EMS calls primarily included minor injuries and heat-related sicknesses, especially in the elderly. Security-related calls usually included minor infractions like attempting to enter the park without a ticket.

A.3 Coordination With Public Safety Agencies

Because very few amusement parks in the United States have an EMS transport or firefighting capability, and because most parks do not have a commissioned law enforcement

¹ Fire suppression refers to firefighting response personnel. Many parks indicated that they provided fire suppression services but specifically stated that they meant fire protection systems (e.g., sprinklers). Fire protection systems data was excluded from the tabulation represented in the figure.

officer on site, it is more likely than not that park first responders need to coordinate with public safety agencies from local government. This section explores the level of coordination between parks and public safety agencies. Specific findings regarding coordination among public safety agencies include—

- **The majority of parks are not required to plan with local public safety**—Four of 10 respondents indicated that there were local, state, or federal regulations that required them to work or plan with other public safety agencies. However, three of these four respondents indicated that the requirements were driven by code compliance (e.g., state fire code) issues and not response planning. One respondent indicated that his park was required by the state to have a written agreement with an EMS transport agency.
- **All park respondents participate in disaster planning exercises with government agencies**—Respondents from every park indicated that they worked with local agencies. Fifty percent said they worked with state agencies, and one park worked with federal agencies for disaster planning efforts. In addition, two parks work with private organizations such as hospitals, as indicated in Figure A-3.

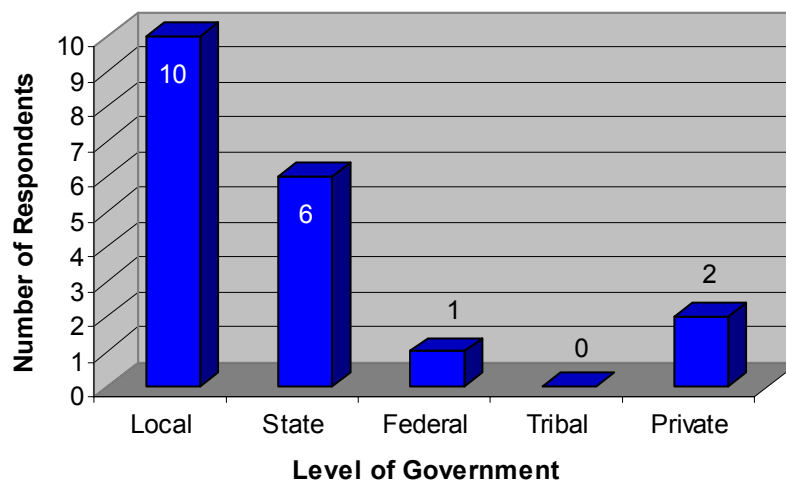


Figure A-3
Disaster Planning by Level of Government

- **Disaster planning efforts include strategic planning, table-top, and functional exercises**—Park survey respondents conduct a variety of disaster planning efforts, with 80 percent holding functional exercises.
- **The parks’ primary means of requesting emergency assistance is 911**—All respondents indicated that they use 911 to request assistance from local public safety agencies. These calls are most likely made from the park’s dispatch center and not by personnel in the field. One park uses off-duty law enforcement personnel from the local police agency, and if additional law enforcement resources are required, they use their department-provided radio to request assistance from their dispatch center.

- **Many parks maintain mutual-aid agreements with local public safety agencies—**Six of the 10 parks responding to the survey have mutual-aid agreements with local public safety agencies, and 2 parks have agreements with the state.
- **Few park public safety responders respond to emergency incidents outside the park—**Only 2 of the 10 respondents indicated that park personnel left the park to render aid on a regular basis for incidents outside park grounds and stated that it was usually for EMS-related incidents.
- **Requirements to operate with another jurisdiction are limited—**Seven of 10 respondents indicated that they had a need to work with an outside agency on less than 25 percent of their calls, with 2 of those parks indicating that they did not work with outside agencies at all. On the other hand, two of the respondents work with outside agencies at least 76 percent of the time.

A.4 Communications

This section provides some insight into the communications devices in use at parks and the level of radio communications between park personnel and local public safety providers. Specific findings on communications include—

- **Commercial services use is common—**Among survey respondents, park public safety personnel use a variety of commercial services communications devices to supplement or enhance their communications. Eight parks use cellular telephones, and five parks use pagers.
- **Half of the land mobile radio (LMR) systems are 5 years old or less—**Half of the respondents indicated that the system they used was less than 5 years old, while four respondents indicated they were using systems between 6–15 years, and one respondent was using a system that was more than 20 years old.
- **The quality of communications during functional exercises is mixed—**Seven respondents indicated that communications during exercises with other agencies was good, fair, or poor, with only one indicating a rating of excellent, as indicated in Figure A-4.
- **Parks desire communications interoperability—**Of the eight respondents that provided their thoughts on being able to communicate with government public safety personnel, seven indicated that it would be nice to have that capability. However, they further stipulated that given the types of emergencies to which they respond, interoperability was not critical and the use of landline telephone to communicate from park dispatch to government dispatch was adequate. One interviewee who was a first responder in the park but also worked full time for a local public safety agency indicated that the severity of the calls to which they respond do not require communications with local public safety personnel. Some of the methods of interoperability currently established are detailed in Figure A-5.

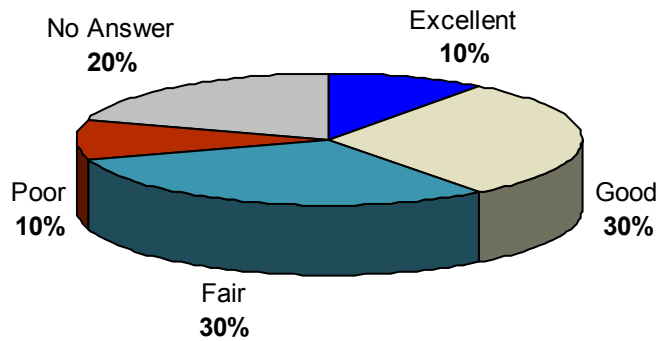


Figure A-4
Quality of Communications During Functional Drills

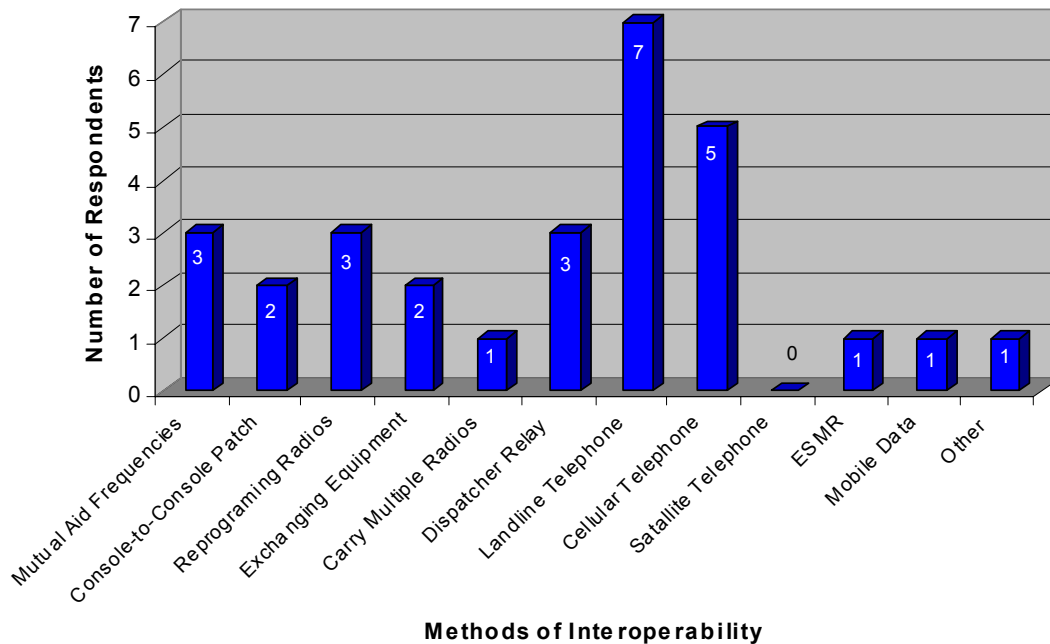


Figure A-5
Methods of Interoperability Established by Respondents

A.5 Summary

As indicated by survey respondents and interviews, parks provide for the basic safety and security needs of patrons and staff. When asked the basis for creating their public safety functions, the parks were clear that they provided these services, as one respondent wrote, “to provide a safe and secure environment for employees and guests of our park....”

Parks maintain a security and first-aid component and when appropriate, HAZMAT expertise on site. To their credit, all parks that responded to the survey work with local public

safety agencies on disaster planning efforts. Public safety communications capabilities appear to be very good, with the quality of most communications rated as good and the age of most LMR systems reported as 5 years or less.

The need for communications interoperability may not be critical on a day-to-day basis given the nature and volume of calls at parks. However, these parks' public safety capabilities do not address the transportation of patients, the need for firefighting capabilities, or the need for police officers with arrest powers. The need to communicate with local public safety officials providing these services may be important during a large emergency event. The quality of existing communications between parks and the local agencies is weak, as supported by survey responses that indicate that 9 of 10 respondents rated communications as fair, good, or poor when holding functional exercises with local public safety.

Each park should work with public safety agencies to examine its individual circumstances with regard to establishing communications interoperability. However, the ability to properly mitigate a large incident may be predicated on the park's ability to communicate with local public safety officials. Few government public safety agencies have the same familiarity with the layout and intricacies of park accessibility as do park first responders. Pairing park personnel with government personnel may suffice to address interoperability shortfalls but it is important for all government or park public safety providers to discuss communications and emergency response issues prior to an event.

**APPENDIX B—GOVERNMENT-CONTRACTED PRIVATE FIRE AND
EMS PROVIDER FINDINGS**

APPENDIX B—GOVERNMENT-CONTRACTED PRIVATE FIRE AND EMERGENCY MEDICAL SERVICES PROVIDER FINDINGS

Private fire and emergency medical services (EMS) providers to government are unique with regard to the other special service districts (SSD) assessed as part of this study—unique in that private fire and EMS providers are usually contracted by the government to provide services traditionally provided by the government.

Private fire providers are sometimes referred to as “brigades” rather than departments and have a presence beyond providing contracted service to the government. Private fire brigades are found in many different types of industries including many that were part of this study. Because the provision of fire suppression services to communities has inherently been a government-provided function, private fire providers are not as common in the United States as private EMS providers. However, research indicates that there are private fire providers operating under government contract to provide service in at least 10 states in the United States to several million people. It is important to note that many private fire providers also provide EMS service at various certification levels.

As stated, private EMS providers are much more common in the United States than private fire providers. Private EMS may commonly be referred to as private ambulances without regard to the level of service provided (e.g., advanced life support, basic life support). There are a few large private EMS providers based in the United States with operations in various parts of the country. There are also many small providers that appear to be more locally based. Both private fire and EMS operations appear to be more common in the western United States, with a concentration in the southwest.

Private fire and EMS providers included in this part of the study provide service to large and small communities, and their ability to communicate with other public safety agencies is paramount. Because the private fire and EMS provider is providing service in place of the government, its operational and communications needs are no different than if it were a government operation.

B.1 Survey Respondent Demographics

For the purposes of this study, the Public Safety Wireless Network Program made an effort to collect data from private fire and EMS providers to government from several hundred companies and locations in the United States and received surveys from 24 providers. There do not appear to be many companies that provide private fire and EMS in the United States. Therefore, many completed surveys were from the same company but from different geographic locations.

This data collection effort included personal on-site interviews at 1 private fire and EMS operation and 23 completed surveys. This data accounts for approximately 17 percent of all assessment responses. Specific demographic data on respondents includes—

- **Data was obtained from 11 states**—Of the 20 respondents who provided location data, providers are located in 11 states from all 4 regions of the United States, as indicated in Figure B-1.

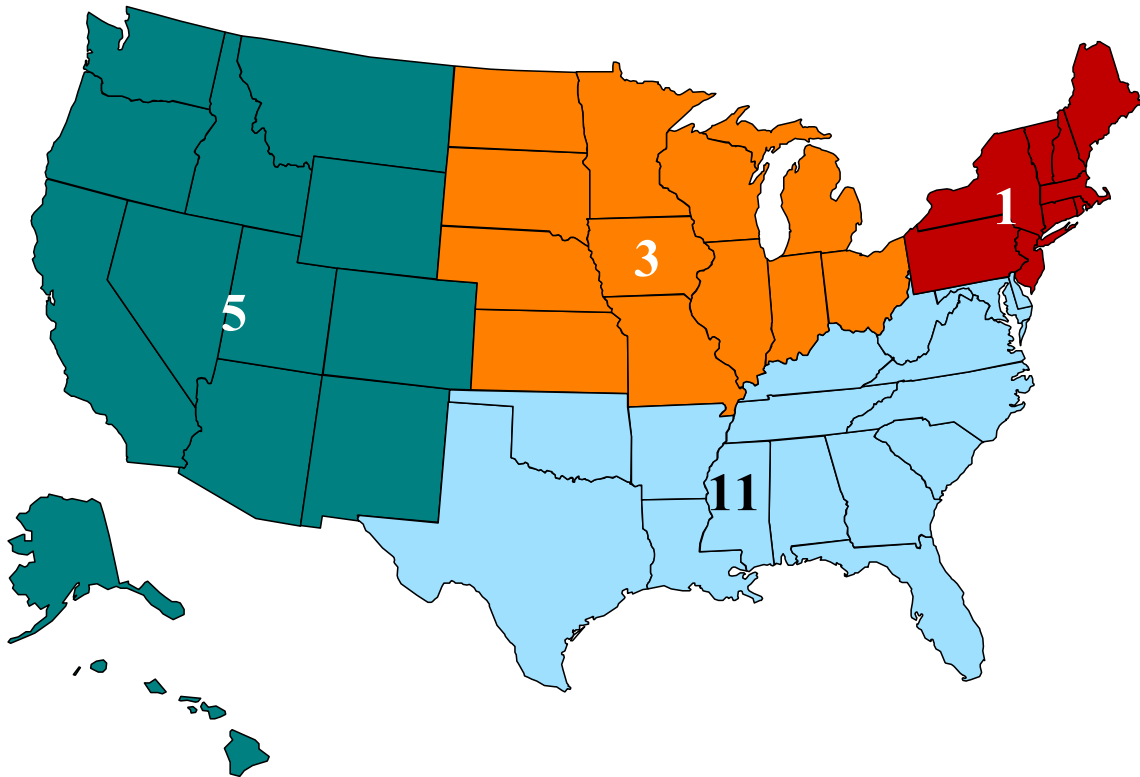


Figure B-1
Number of Surveys Received by Region

- **Many responding providers operate in an area larger than 26 square miles**—Sixteen of 24 responding providers (67 percent) operate in an area large than 26 square miles. Nine of those 16 operate in an area large than 75 square miles. Only seven providers operate in an area between 2–26 square miles.
- **The majority of respondents provide service to populations greater than 50,000**—Eighteen of 24 responding providers (78 percent) protect an average daily population greater than 50,000, with 3 providers serving populations between 10,001 and 50,000, and 3 providers serving fewer than 10,000 people daily. Several of these providers serve populations up to 1 million.

B.2 Public Safety Services

The specifics regarding the provision of fire and EMS to government is based on the details included in the contracted arrangement between the municipality and the private public safety provider. As indicated earlier, the provision of contracted fire-related services to government municipalities is not as common as EMS. In most cases though, private fire

providers also have some EMS expertise. EMS contracted personnel usually do not provide any firefighting services, however. Specific public safety services findings include—

- **Nearly all respondents were EMS providers**—All but one respondent classified themselves as EMS providers regardless of whether they were primarily EMS providers, as shown in Figure B-2.

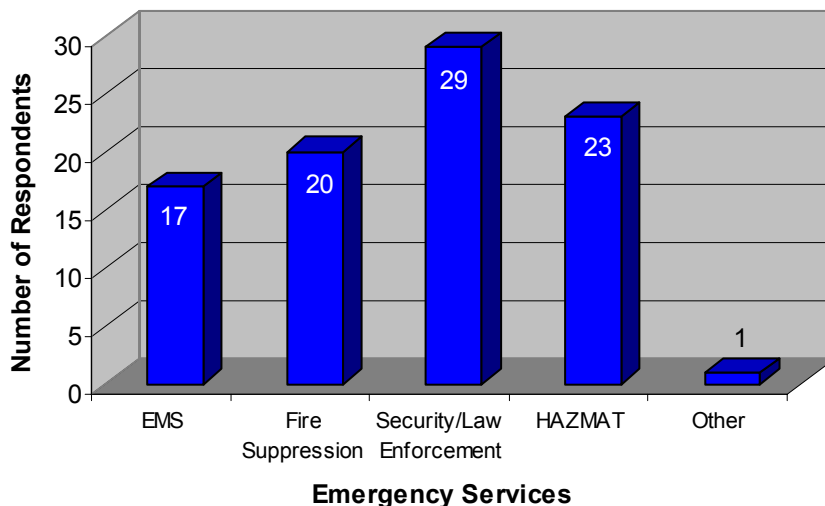


Figure B-2
Emergency Services Provided by Participating Private Fire and EMS Providers to Government

- **Several respondents also provide fire suppression services**—Seven of 24 respondents (29 percent) indicated that they provided fire protection/fire suppression services. Additional services that may be provided include hazardous materials response, public education, fire prevention activities (e.g., inspections), and vehicle extrication.
- **The majority of the providers respond to more than 10,000 emergency calls per year**—Sixteen of 24 respondents (67 percent) indicated that they responded to more than 10,000 calls per year. One provider received between 5,000–10,000 calls per year while the remaining 6 providers responded to fewer than 5,000 calls annually.

B.3 Coordination With Public Safety Agencies

The ability for private fire and EMS responders to coordinate with other public safety agencies is critical. Because private fire and EMS providers to government work on behalf of the government, their ability to communicate with other agencies is as important as government-to-government communication. Specific findings regarding coordination among public safety agencies include—

- **Half of the respondents have requirements to work with government public safety**—Exactly half (12 of 24) of the respondents indicated that they had

requirements to work with government public safety agencies. Many respondents indicated that contracts included specific language that required them to work with public safety agencies.

- **Disaster planning exercises are conducted with government agencies at all levels**—Twenty-two of the 23 respondents (95 percent) who answered this question indicated that they participated in disaster planning exercises with the government. Of the 22 respondents that participate in disaster exercises, 20 (83 percent) work with local agencies, 12 (50 percent) work with state agencies, and 11 (46 percent) work with federal agencies. There are also 14 providers (58 percent) that participate in disaster exercises with private organizations, such as hospitals. This data is detailed in Figure B-3.

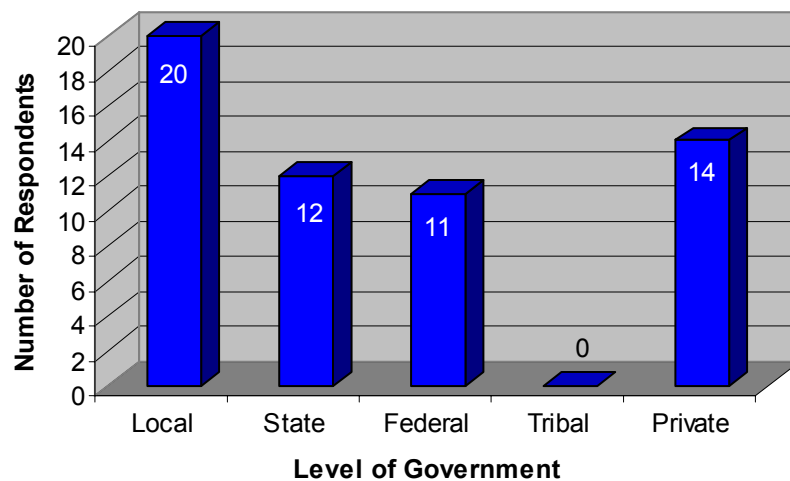


Figure B-3
Disaster Planning by Level of Government

- **Various disaster planning efforts are prevalent**—The majority of the respondents participate in various disaster planning activities including strategic planning, table-top exercises, and functional drills. Nineteen of 24 respondents (79 percent) participated in table-top exercises while 21 of 24 respondents (88 percent) participated in strategic planning and functional drills.
- **The majority of respondents maintain mutual-aid agreements with government agencies**—Nineteen of 24 respondents (79 percent) indicated having mutual-aid agreements with government agencies. Of these, 16 have agreements with local agencies, 6 have agreements with state agencies, and 4 have agreements with federal agencies. The majority of the mutual-aid agreements involve sharing mutual-aid frequencies between agencies.
- **Respondents have established communications with all levels of government via various methods**—Eighteen of 24 respondents (75 percent) have established communications with local government agencies while almost half have established

communications with state agencies and fewer than a third with federal agencies. Methods for communicating with government agencies vary, with the most commonly used methods being the use of mutual-aid frequencies and landline telephones. Figure B-4 details the findings.

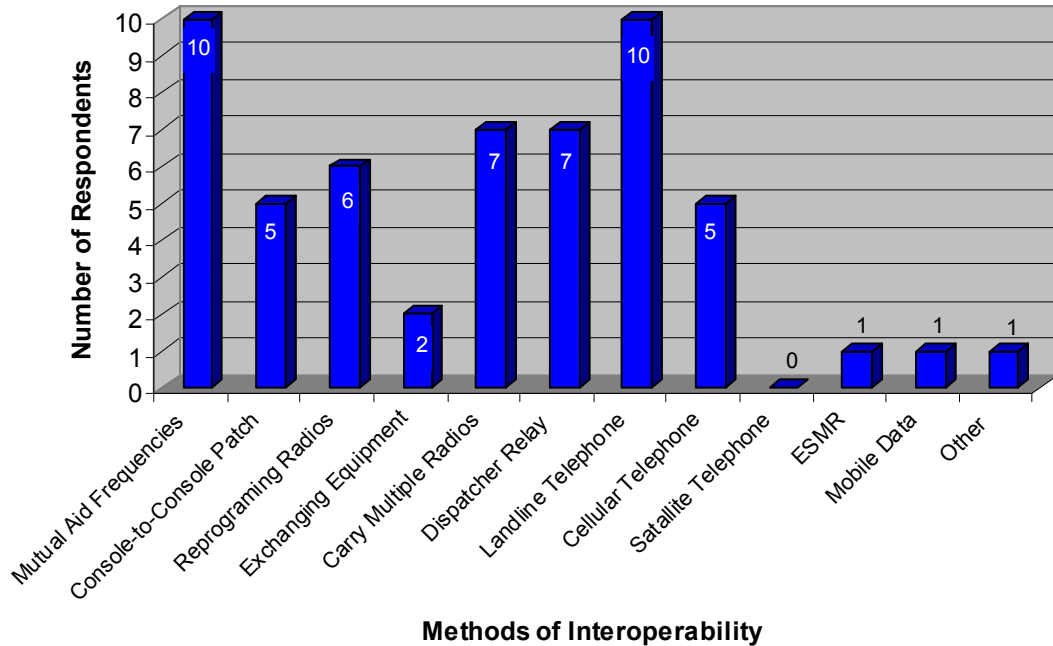


Figure B-4
Methods of Interoperability Established by Respondents

- **Requirements to operate with another jurisdiction vary by provider**—The number of emergency calls requiring interaction with another agency varies by respondent. Ten of 24 (41 percent) survey respondents indicated that they operated with another agency on only 1–10 percent of emergency calls.

B.4 Communications

As indicated earlier, communications are as important to private first responders as government first responders. However, many times, private first responders operate from their own communications systems. Specific findings on communications include—

- **Commercial services are used extensively**—Pagers, cellular telephones, and landline telephones are used by many of the respondents. Other commercial communications devices used include enhanced special mobile radios and mobile data.
- **The majority of land mobile radio (LMR) systems are owned by private fire and EMS**—Sixteen of 24 respondents (66 percent) indicated that they own their LMR systems, with the majority of the remainder leasing system use.

- **The quality of communications during functional exercises was rated good to fair**—Eighteen of 24 respondents (75 percent) indicated that communications during exercises with other agencies was good to fair, as shown in Figure B-5. Three respondents indicated poor communications during functional drills.

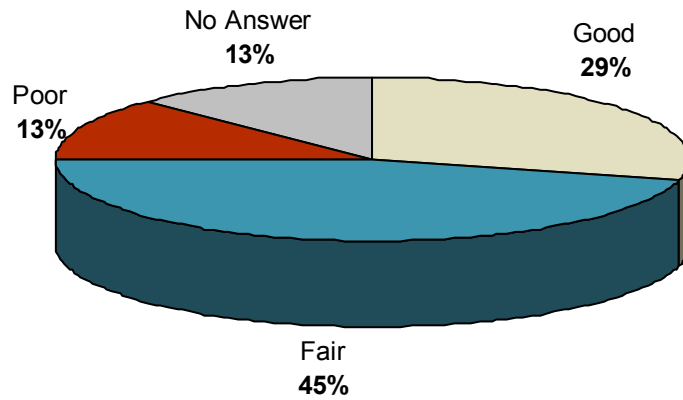


Figure B-5
Quality of Communications During Functional Drills

B.5 Summary

Private fire and EMS providers to government are unique with regard to the other SSDs included in this report. They are unique in that the area they protect is identical to that of a municipal public safety agency. Therefore, their communications needs and need for interoperability is similar to that of government. They face some challenges with regard to interoperability with government because they often use their own radio system rather than the government radio system that exists in the jurisdiction in which they provide contracted service.

Private fire and EMS providers to government provide services for government on a contracted basis. The contracts dictate a host of requirements, including what services to provide and the expectations on response time from the time the call is received to the time a unit arrives on the scene of the emergency. The contracts may also mandate certain communications requirements.

Private fire and EMS providers view the inability to establish interoperability with government agencies as more of a turf issue than a technology issue. Several comments addressed a lack of a cohesive working relationship between private and government first responders. A political or turf barrier between any two public safety entities that impedes or compromises the ability to deliver service to the community should be resolved. Citizen's lives and the lives of firefighters and emergency medical technicians may depend on it.

APPENDIX C—HOSPITALS FINDINGS

APPENDIX C—HOSPITALS FINDINGS

According to the American Hospital Association (AHA), there are approximately 5,800 healthcare facilities in the United States classified as “registered” hospitals. This includes private, local, state, and federal hospitals that provide a variety of services, including emergency care, public health, mental health, outpatient, and other more specialized services. In addition to the 5,800 registered hospitals, there are hundreds more that do not meet the AHA’s registration criteria. In registered hospitals, there are nearly 1 million staffed, patient beds and more than 35.6 million admissions every year. The expenses to run these facilities and continue treatment for the patients in the beds exceed \$400 billion yearly.

Along with AHA, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) plays an important oversight role—it is the primary accrediting body for hospitals. The JCAHO is an independent, not-for-profit organization, whose main purpose is to evaluate and recommend guidelines for improving the quality and safety of healthcare facilities, including hospitals’ emergency response capabilities.

Because of the nature of a hospital’s business, public safety issues are obviously of major concern. In addition to caring for and ensuring the safety of sick patients, a hospital’s public safety efforts must also consider the constant traffic flow of visitors. As front-line responders in the event of disasters, hospitals are working to upgrade their disaster readiness to respond to nuclear, biological, and chemical emergencies as well. According to AHA, these upgrades will require an investment of more than \$11 billion to meet public expectations. The following findings indicate the status of hospital communications and interoperability between hospital first responders and outside public safety agencies.

C.1 Survey Respondent Demographics

The Public Safety Wireless Network (PSWN) Program used a variety of methods to obtain public safety-related data from registered U.S. hospitals, without discriminating among the types of medical services that they provide. The program directly contacted approximately 250 hospitals and used associations and industry contacts to contact approximately 5,250 hospitals. Survey responses were obtained from nine hospitals. This data accounts for almost 6 percent of all study responses. The PSWN Program also conducted one personal on-site data-gathering effort. Most of the survey respondents are private, not-for-profit organizations; only one is government owned (by the state). Specific demographic data on respondents includes—

- **Data was obtained from at least four states, representing three regions**—As indicated in Figure C-1, the seven respondents who indicated their location were from four states and represented three different regions of the United States.
- **The daily hospital population for the majority of respondents exceeds 10,000, with many serving more than 50,000**—Of the 5 hospitals that serve more than 10,001 people, 4 of them serve more than 50,000 people. Three of 9 respondents have an average daily population between 501 and 10,000 people.

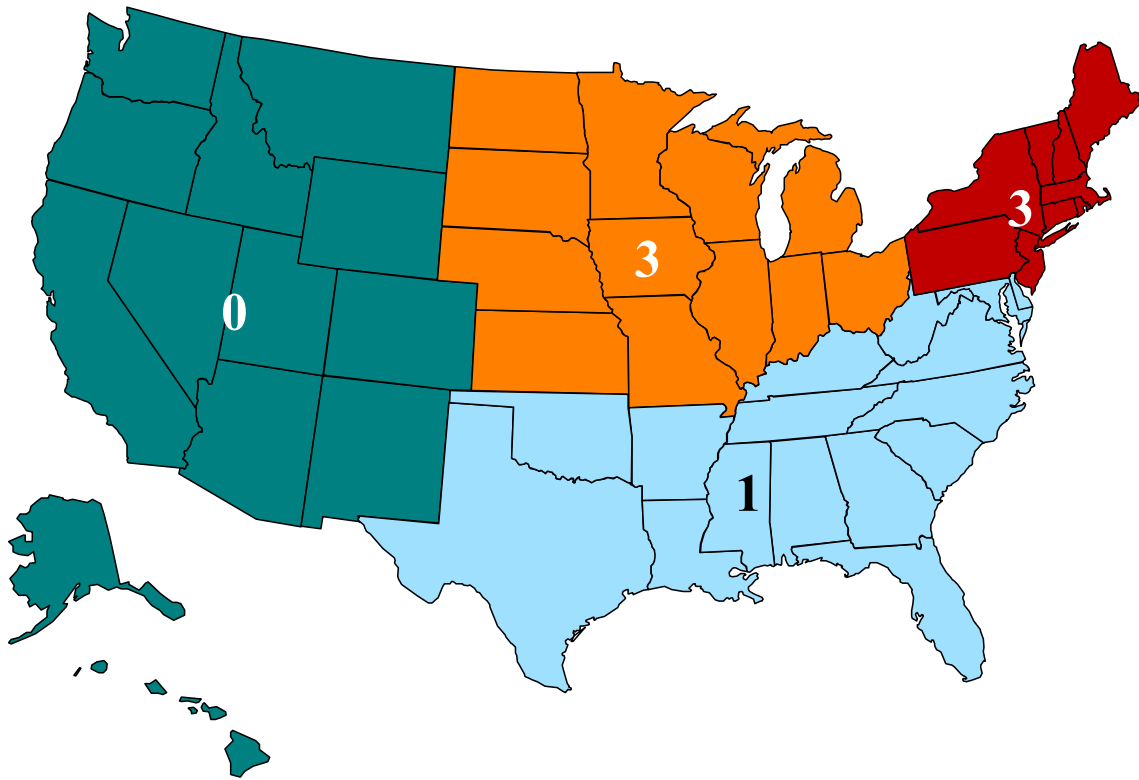


Figure C-1
Number of Surveys Received by Region

- **The majority of surveys were completed by security directors**—Four of seven (57 percent) of surveys were completed by security directors.

C.2 Public Safety Services

Most hospitals' public safety functions are primarily focused on providing emergency medical services (EMS) support and protecting patients' rights, staff, and visitors, and generally making the facility a safe environment. Some hospitals also maintain an active EMS response component that includes ambulance and medivac helicopter services. Hospitals typically rely on local fire departments to provide expertise and support for fire suppression and hazardous materials response. Specific public safety services findings include—

- **Security is the predominant in-house public safety function**—Eight of nine respondents to this inquiry reported having security/safety/law enforcement available on site. The typical hospital security force is a relatively small staff that actively covers the facility 24 hours a day, every day of the year. Public safety services provided by hospitals are detailed in Figure C-2.
- **A small percentage of hospitals provide fire protection/suppression services**—Only two respondents provide fire protection services.

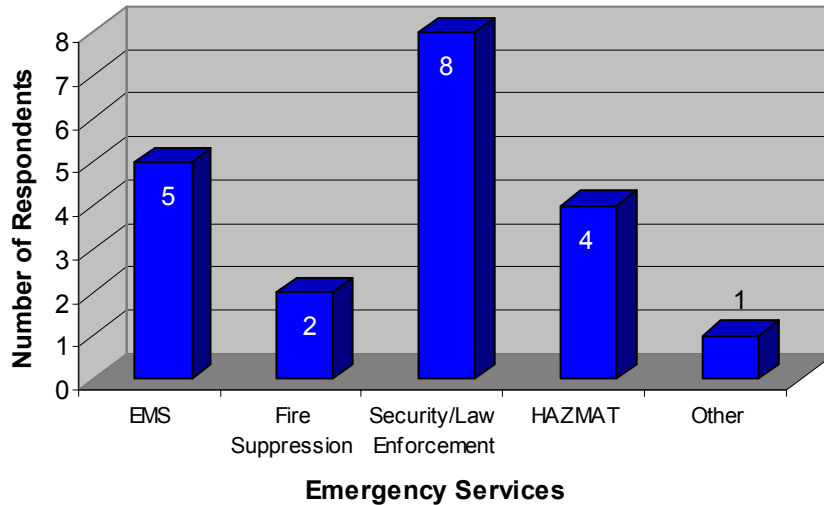


Figure C-2
Type of Emergency Services Provided by Hospitals

- **Fewer than half provide hazardous materials (HAZMAT) response**—While many hospitals participate in the planning and care of persons exposed to HAZMAT and protection of exposed employees, only four of nine respondents indicated the existence of on-site HAZMAT response or mitigation service. One respondent said it had such services because it was “a regional trauma center” and must adhere to state and federal requirements.
- **About half respond to fewer than 500 emergency calls per year**—Five of 9 of the respondents respond to 500 or fewer emergency calls per year. Of the other 4 respondents to this question, 1 hospital responds to 1,001–2,500 calls per year, 1 responds to 2,501–5,000 per year, and 2 respond to more than 10,000 emergency calls per year. Hospital-based EMS, such as ambulances and helicopters, are included in the above call volumes.

C.3 Coordination With Public Safety Agencies

The PSWN Program found that the majority of hospital public safety personnel could benefit from interoperability with the local police and fire departments. It should be noted that most hospital emergency departments coordinate and communicate with local EMS agencies on a daily basis to address patient needs. Most noted that it would be helpful in emergency situations to speed response and provide a direct method of communication. However, some respondents also noted that other methods, such as a direct landline to the local dispatch center, were nearly as quick and as effective as land mobile radio (LMR) interoperability. Also, interoperability with federal entities was not identified as a pressing need. Specific findings include—

- **The majority of hospitals are required to work or plan with outlying public safety agencies**—Almost 78 percent of respondents, or seven of nine, said they must meet local, state, or federal mandates directing them to plan with other public safety

agencies. Three of the responding hospitals pointed to state regulations, one of which indicated that the state outlined the hospital’s role with respect to disaster services and EMS. Four respondents cited JCAHO compliance, including planning internal and external emergency preparedness, disaster response, and a JCAHO requirement that a “system of community interoperability” be established.

- **Disaster planning is widespread with state and local entities and limited with federal entities**—Among nine respondents, eight of them plan with local agencies, eight have exercises with state agencies, one works with a tribal organization, and only one respondent drills with the Federal Government. Six of the respondents work with other private organizations, such as other hospitals.
- **Mutual-aid agreements are prevalent with state and local entities and uncommon with federal entities**—Six responding hospitals said they maintained mutual-aid agreements with governmental public safety agencies, with three indicating that they did not have any mutual-aid agreements at all. Of the six respondents that have mutual agreements, all of them have agreements with local public safety agencies, five have them with state agencies, and one has an agreement with the Federal Government.
- **Drills involve a mix of exercises, with functional drills being most widely used**—All nine respondents indicated they held functional drills, seven used strategic planning, and five respondents held table-tops. Disaster exercises involve mainly local and state level agencies, as indicated in Figure C-3.

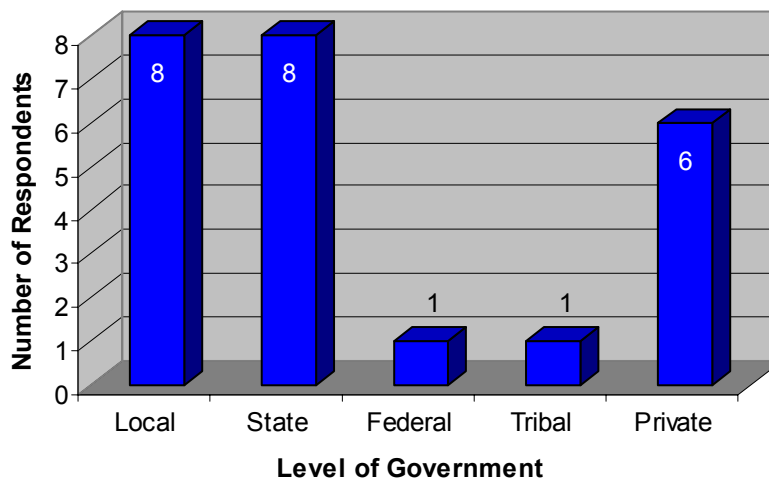


Figure C-3
Disaster Planning by Level of Government

- **Quality of communications is generally good during functional drills**—Five of nine respondents said communications was good between public safety agencies, two said it was fair, and two indicated poor communications during functional exercises. Details are indicated in Figure C-4.

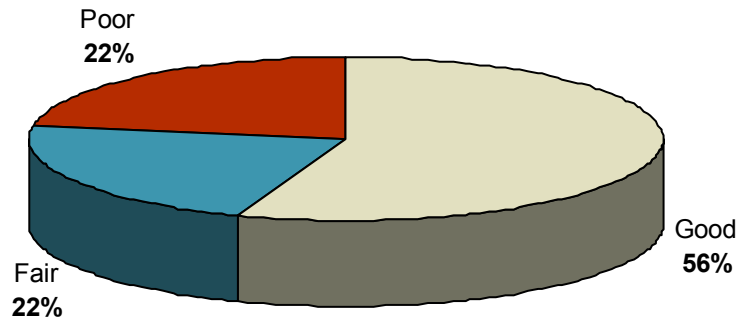


Figure C-4
Quality of Communications During Functional Drills

- All responding hospitals operate and communicate with local governments during emergency response efforts; few work or communicate with the Federal Government**—All nine operate with local government agencies, while six work with state, and two operate with the Federal Government. In addition, four respondents operate with private organizations. Among the respondents, seven have established communications with their local government partners, but only one has done so with the state, and none have done so with the Federal Government. Two of the four respondents that operate with private organizations have established communications.
- Use of 911 is the most prevalent way to request emergency assistance**—Among the nine respondents to this question, four indicated they use 911 to request assistance from local public safety agencies. One hospital is connected to local police via a direct line and has a “code blue” procedure that dials directly into the local fire communications center for an ambulance dispatch. Two respondents said they use LMR radios to request assistance, with one of them indicating that hospital personnel use LMR when the need was “immediate.”
- Few respond to calls outside their response area**—Only two indicated that their public safety personnel left the hospital service area to provide aid, while seven said they did not respond to calls outside their response areas. Of the two that responded outside their areas, one indicated that it was for EMS-related incidents, including hospital based ambulance and medivac helicopter services, and the other said it was typically in response to requests from local police.
- Operating with other public safety agencies varies**—Hospital public safety type work with other public safety agencies varies. Four of nine respondents (44 percent) indicated that only 1–10 percent of emergency calls required assistance from another agency while the other three respondents (33 percent) indicated that 76–100 percent of emergency calls required assistance.

C.4 Communications

Hospital personnel use an assortment of communications devices in their public safety efforts and to communicate with incoming EMS units. Typically, a hospital's emergency department maintains a host of LMR equipment to converse with ambulances that are transporting patients to their facility. It should be noted that some hospitals use radios specially engineered to prevent any harmful interference in the building. Specific findings include—

- **LMR portable or mobile radio use is widespread**—All nine respondents said they use LMR communications to support public safety operations.
- **Use of commercial services is prevalent, but there is no clear-cut preference for cellular, pager, or landline services**—Six of eight respondents reported using pager, cellular, and landline services to augment or supplement their emergency response communications. Many respondents said they used landline connections to request emergency assistance.
- **The majority of systems are owned by the hospital and include repeaters**—All nine of the respondents own their systems, with seven of them reporting that their systems included infrastructure such as repeaters.
- **Various methods of interoperability have been established**—Hospitals have established various methods of communication with government agencies, as indicated by Figure C-5.

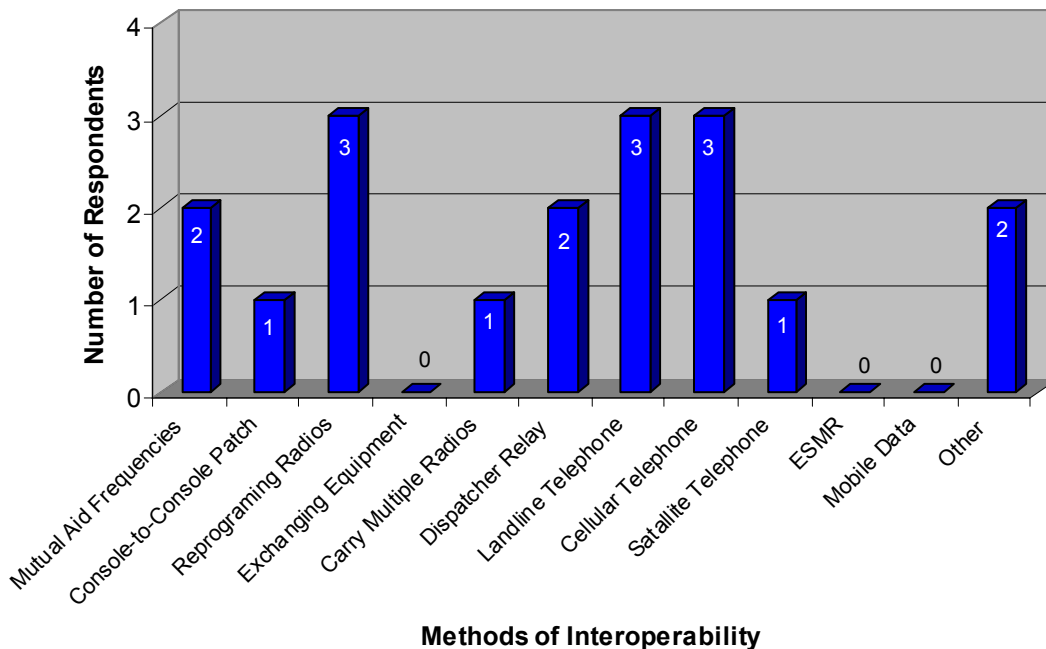


Figure C-5
Methods of Interoperability Established by Respondents

C.5 Summary

Hospital public safety entities primarily focus on protecting their patients and staff, and generally making the facility a safe environment for visitors. Based on the survey data collected, the most prevalent in-house public safety functions are security and EMS, with nearly all respondents indicating they provided both services. Coordination and communications among hospitals and various local public safety agencies are good, with a majority of survey respondents maintaining mutual-aid agreements with state and local governments.

A hospital's communications equipment typically consists of an in-house LMR system and use of a commercial device such as a pager or cellular telephone. Occasionally, other hospital groups, such as maintenance, may share the LMR system. Security force members rely on their communications to call for backup, inform dispatch of their location or incidents, and generally to serve as a "lifeline" in case of emergencies.

The PSWN Program research found that the hospital public safety personnel could benefit from interoperability with the local police and ambulance. Most respondents noted that it would be helpful in emergency situations to speed response and provide a direct method of communication. However, some respondents also noted that other methods, such as a direct landline to the local dispatch center, were nearly as quick and as effective as LMR interoperability.

APPENDIX D—MILITARY INSTALLATIONS FINDINGS



APPENDIX D—MILITARY INSTALLATIONS FINDINGS

Today, there are more than 400 military installations in the continental United States representing the U.S. Air Force, Army, Marine Corps, and Navy. A variety of facilities comprise these installations, including forts, posts, shipyards, airbases, hospitals, depots, armories, research centers, laboratories, and proving grounds, among others.

Regardless of the branch of service, national security interests dictate that two common goals be met—

- **Maintain military readiness**—Military personnel perform drills and exercises to maintain fighting ability and to move troops and war machines in a precision fashion. Rapid deployment and aggressive tactics can trigger the need for emergency services, and drills work to prevent these occurrences whenever possible.
- **Acquire cutting-edge weaponry**—Often, weapons research and development includes the use of such hazardous materials as live ordnance, special propellants, and strong chemicals, all designed to create reactions, cause destruction, and inflict damage. The accompanying dangers are a serious concern and require the need for emergency services.

In meeting the demands for safety and security posed by efforts to maintain national security, the armed forces provide public safety protection for military personnel, their families, contractors, and other civilians. Their public safety mission is to keep them safe from crime, fires, illnesses, injuries, or contamination from any of the industrial processes used to make and store weapons. This assessment considers the special demands placed on the protectors of our Nation’s military infrastructure and examines the level of interoperability available between public safety providers “on post” and their counterparts beyond the perimeter.

D.1 Survey Respondent Demographics

Approximately 10 percent of all U.S. military installations were polled for participation in the SSD interoperability assessment. Eleven installations responded to the request for information and answered questions regarding the roles they play in providing public safety services, both on and off post. Specific demographic data on respondents includes—

- **Data was obtained from installations in 10 states**—As indicated in Figure D-1, data was reported from 11 military installations located in 10 states. These states are spread across all four major regions of the country.

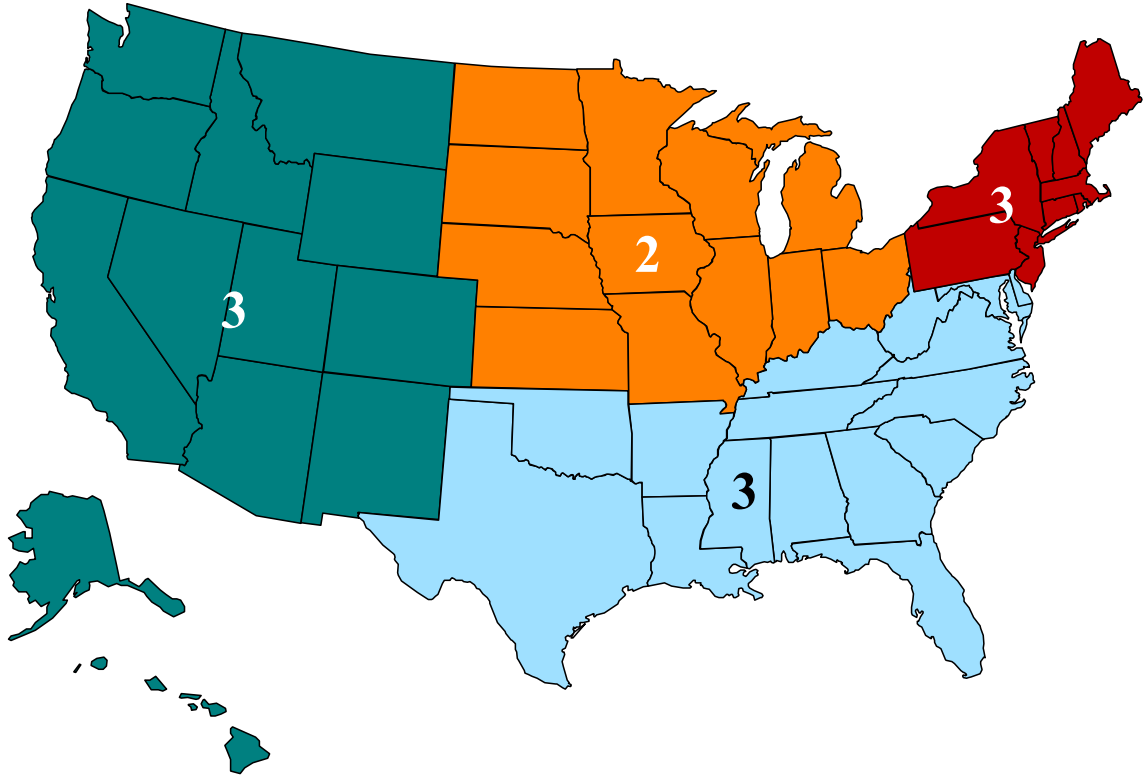


Figure D-1
Number of Surveys Received By Region

- **Respondents represented firefighting capabilities in three branches of military service**—Of 11 respondents, 4 were from army installations, 4 were from air force bases, and 3 were from naval bases. There were no respondents representing the Marine Corps. All of the respondents were from fire agencies located on the installations.
- **Department of Defense (DoD) regulations are the primary drivers in the establishment of public safety services**—DoD outlines the minimum level of protection that installations must provide. DoD regulations address such issues as minimum staffing to perform safety and security work, service levels to be provided, and the authority to perform their missions. Some installations reported additional requirements defined by their branch of service. Four army installations indicated they conform to U.S. Army regulations in addition to the DoD minimums, and one naval installation indicated that it must meet additional requirements imposed by the U.S. Navy.
- **Other regulations impact military public safety**—In addition to military regulations, other regulations must be met by these agencies, including rules, regulations, or standards issued by—
 - **Federal Aviation Administration**—Airport fire protection and aircraft rescue requirements, mutual-aid agreements, and disaster preparedness planning

- **National Fire Protection Association**—Aircraft Rescue and Firefighter (ARFF) training standards, Structural Firefighter training standards, and building codes
- **Occupational Safety and Health Administration**—Employee safety standards, hazardous materials training standards, and confined space rescue training and entry standards.

D.2 Public Safety Services

Each responding installation provides some form of public safety service beyond protecting its perimeters and controlling access. As reported, there are an array of services that military installations offer to protect lives and property. Specific findings include—

- **Military installations are protected by on-site public safety services**—Every military installation reported it provided some of the traditional public safety services normally found in most communities, as indicated in Figure D-2. In addition to some form of security/law enforcement, the majority of military installations provide public safety services such as firefighting, hazardous materials (HAZMAT) response and mitigation, emergency medical services (EMS), and other public safety services, including confined space rescue, ARFF, marine rescue, and prison security.

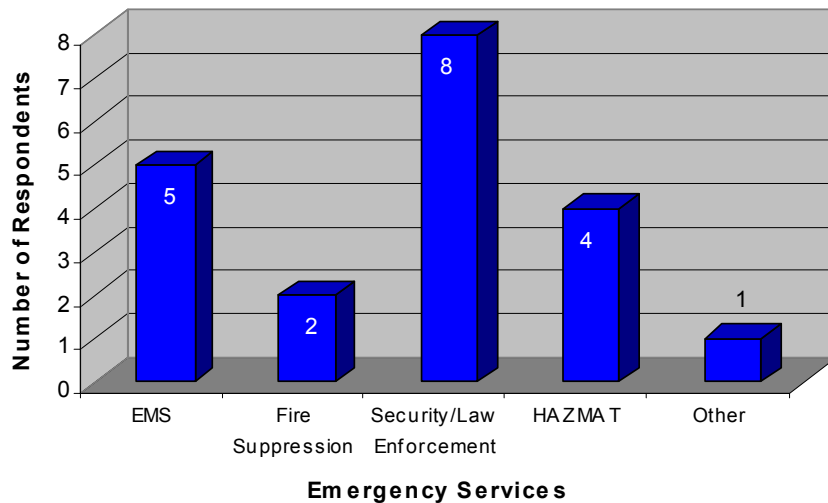


Figure D-2
Type of Emergency Services Provided by Military Installations

- **Military installations may protect nonmilitary assets**—In a few cases, survey respondents provide some form of public safety service to nonmilitary functions at their locations, including a collocated civilian airfield and a federal prison.
- **Demands for public safety services vary at military installations**—Military firefighting agencies respond to emergency calls both within and outside of the installation. Six of 11 respondents reported that they answered up to 1,000 public safety calls annually, with the remaining 5 installations responding to up to 5,000 public safety calls annually.

D.3 Coordination With Public Safety Agencies

While military installations offer a wide variety of public safety services, they work closely with local, state, and federal public safety agencies operating beyond their perimeter. While a few installations reported that they were able to handle internal demands without the assistance of outside agencies, most military installations reported that they participated in activities such as mutual aid, disaster drills, and strategic planning with neighboring jurisdictions. Specific findings confirm the value of coordination and communications, and include—

- **Responding installations actively provide and receive mutual aid**—All the military installations participating in the assessment reported they had mutual-aid agreements in place. Ten of 11 have such agreements with local agencies, 6 of 11 have agreements with state agencies, and 3 have agreements with federal agencies. One installation has mutual-aid agreements in place with its local volunteer fire companies. Eight of 11 (73 percent) responding installations reported they called outside agencies onto their property for assistance, such as for significant aircraft emergencies. This was often accomplished by telephoning the mutual-aid agency or by making radio contact. Mutual-aid responses typically are made by special request, or in some circumstances, automatic aid could be activated.
- **Communications requirements are among common issues addressed in mutual-aid agreements**—Mutual aid agreements cover such issues as—
 - Implementation of an incident command system
 - Interagency communications using frequencies licensed to other agencies
 - Access to the military radio systems for on-base responses
 - Circumstances in which the installation’s public safety resources will respond to incidents off base.

The latter issue was covered in three-fourths of the mutual-aid agreements. Just over half of the responding installations reported their agreements also outlined circumstances in which off-base resources would be called to assist military personnel.

- **Military installations provide a variety of services to mutual-aid agencies**—Specifically cited were—
 - Structural firefighting forces
 - Wildfire suppression
 - Crash-fire-rescue response to aircraft emergencies
 - HAZMAT response teams for releases, spills, and suspected weapons of mass destruction events
 - Technical rescue operations
 - Fire and rescue assistance for vehicle accidents
 - Calls for specialized apparatus, such as for aerial ladders or ARFF vehicles
 - Fire investigation at federal properties in other jurisdictions
 - EMS responses
 - Explosive ordnance disposal

- ARFF response to bulk petroleum fires, fuel tanker accidents, or accidents with large fires along nearby interstate highways.
- **Military installations respond to emergency incidents with multiple levels of government**—Ten of 11 installations (90 percent) respond with local public safety agencies to emergency calls during the year. At least one-third of installations respond to emergency calls with state public safety, federal, or private agencies. However, the majority of installations indicated that only 1–10 percent of emergency calls on their installations required outside assistance.
- **Military installations build interoperable communications into mutual-aid operations**—To assure interoperable communications during responses that require assistance from government public safety agencies, installations take different approaches to accomplish interoperability. Some methods of interoperability used by military installations include—
 - Allow outside agencies to use military radio frequencies for on-base incidents
 - Program radios with neighboring jurisdiction’s radio frequencies for mutual-aid communications whether the incident was on or off base
 - Program radios with the regionally designated interagency mutual-aid frequencies to assure incident communications.
- **Military installations are active in disaster preparedness activities**—All of the responding installations reported they were involved in disaster planning or disaster exercises. All of the respondents participate in strategic planning and functional drills, while 9 of 11 (82 percent) participate in table-top exercises. All of the responding installations reported they worked with local government on disaster preparedness. Seven of the 11 (64 percent) reported they worked with state- and federal-level agencies. Additionally, two of the installations work with private organizations, such as hospitals, during disaster exercises, as indicated in Figure D-3.

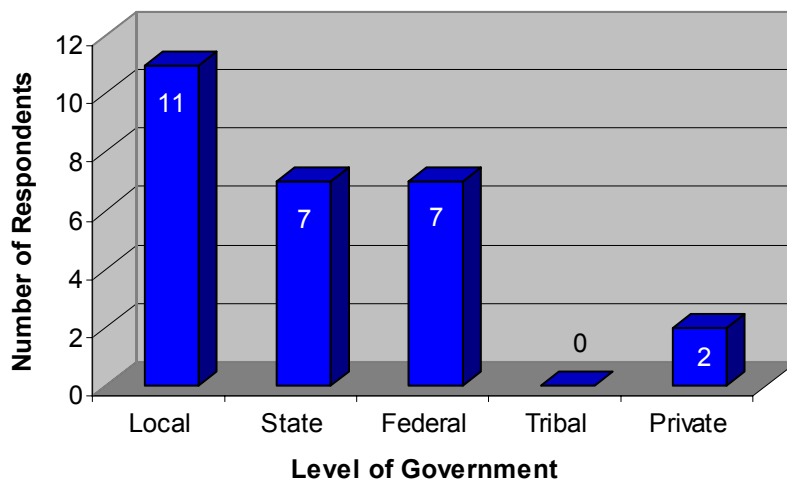


Figure D-3
Disaster Planning by Level of Government

D.4 Communications

Military installations use a variety of communications methods and devices to accomplish their missions. This section focuses on the means that military public safety providers use to communicate to meet their needs, whether for intra-agency or interagency messages. Specific findings include—

- **Commercial services are commonly used**—All of the responding installations use portable and mobile radios to transmit messages and receive information. The next most common means of communication was the cellular telephone, with 10 of 11 installations using cellular telephones. More than half of the participating installations reported the use of pagers to communicate with personnel.
- **Responding installations use military and civilian frequency bands to accomplish their radio communications**—Military installations use a variety of bands including very high frequency (VHF), ultra high frequency (UHF), and 800 megahertz to communicate.
- **Military installations must comply with the narrowband mandate**—All federal agencies, not just the military, are required to use equipment that is capable of narrowband use by 2005 for VHF equipment and 2008 for UHF equipment.
- **Military installations have established interoperable communications in some form with other emergency response agencies**—All but one of the responding installations have established interoperability in some form with their local government counterparts. Six of 11 installations have interoperable communications with state-level agencies, and 5 of 11 responding installations have established interoperability with other federal agencies. Additionally, 4 of 11 of the responding agencies have established interoperable communications with private organizations. Figure D-4 details the various methods of interoperable communication used.
- **The Quality of communications between public safety personnel is reported as a problem during disaster drills**—Because functional drills involve the deployment of staff and resources to simulate an emergency response to a given situation, the installations were queried about the quality of the communications between the participating drill agencies. Eight installations rated drill communications as poor to fair, as indicated by Figure D-5. Only three installations reported drill communications were good to excellent in quality.

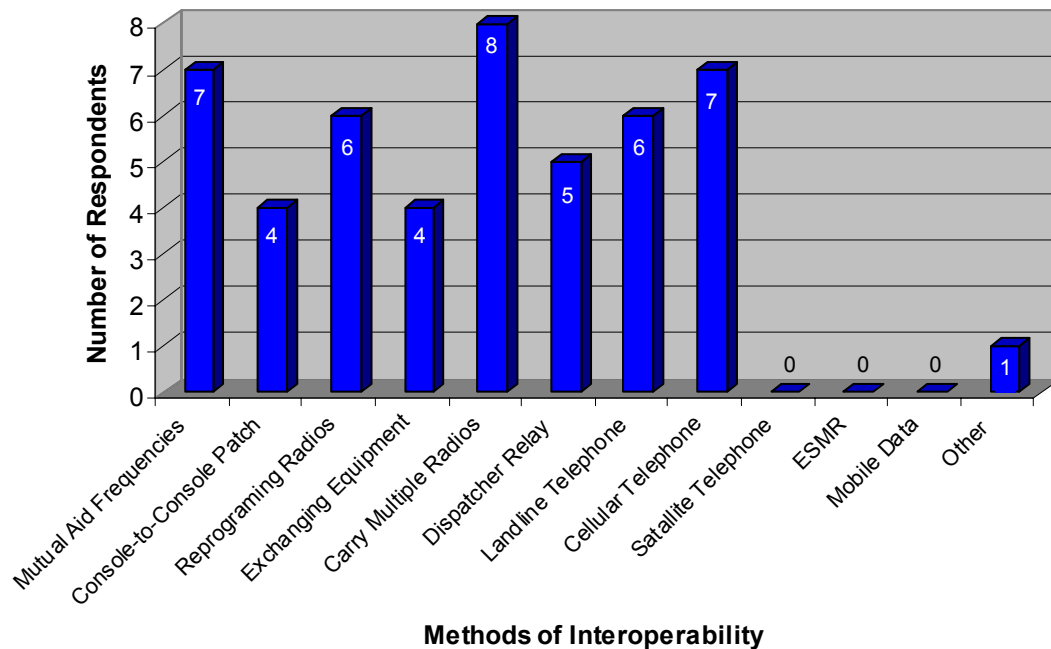


Figure D-4
Methods of Interoperability Established by Respondents

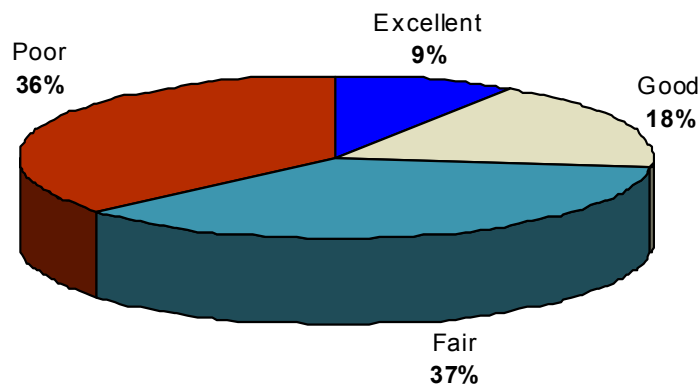


Figure D-5
Quality of Communications During Functional Drills

- **Installations indicated that interoperable communications with other agencies was important**—Each of the military installations were asked about their thoughts on being able to communicate directly using wireless communications with other public safety providers. Five installations expressed their views on the importance of interoperable communications; several are quoted below—
 - “Interoperable communications provided the best means of meeting the needs of those we protect.”

- “The ability to communicate directly is critical to the successful outcome of an incident. It enhances firefighter safety to a great extent. A proactive relationship with outside agencies is a key to the overall success of the public safety mission.”
- “Direct communications have been far better than the old method of relaying messages through the 911 Communications Center.” One installation purchased radios with the ability to access the frequencies of their mutual-aid partnering agencies using a different spectral band. “This greatly enhanced our ability to communicate with each other.”

D.5 Summary

Military installations have substantial responsibility for protecting the lives and assets of our armed forces but they also stand ready to assist neighboring jurisdictions. To their credit, these providers also want to exceed the expectations of their branches of service in order to act as good neighbors to the communities around them. To do this, public safety providers at military installations participate in mutual-aid agreements. They recognize the value in preparing for disasters and are active participants in developing plans, testing plans, and drilling with live resources to assure they can respond effectively when the actual emergency occurs. Military installations recognize the value of interoperable communications in all of these areas and have addressed the need for better interagency communications to some extent.

APPENDIX E—NUCLEAR POWER PLANTS FINDINGS

APPENDIX E—NUCLEAR POWER PLANTS FINDINGS

The United States is the world’s largest supplier of commercial nuclear power. As of May 31, 2002, there were 66 nuclear power plants across the United States housing more than 100 reactors. There are two basic types of reactors in the United States—pressurized water reactors that generate 65,100 net megawatts and boiling water reactors that generate 32,300 net megawatts of electric power. Together, they provide about 20 percent of the Nation’s electricity. The majority of the plants in the United States are funded through revenue generated by the sale of generated power. In some cases, limited funding is provided through local, state, and federal grants.

E.1 Survey Respondent Demographics

As indicated in Section 2, Methodology, the Public Safety Wireless Network (PSWN) Program used a variety of methods to obtain survey data from nuclear power plants in the United States. The program contacted all 66 nuclear power plants and obtained survey data from 9 plants. This effort included on-site interviews at one facility. This data accounts for approximately 6 percent of the overall study responses. Specific demographic data on respondents includes—

- **Data was obtained from six different states**—Data was obtained from nine plants, eight of which provided contact information. As illustrated in Figure E-1, these eight are located in six different states across all four major regions of the United States.

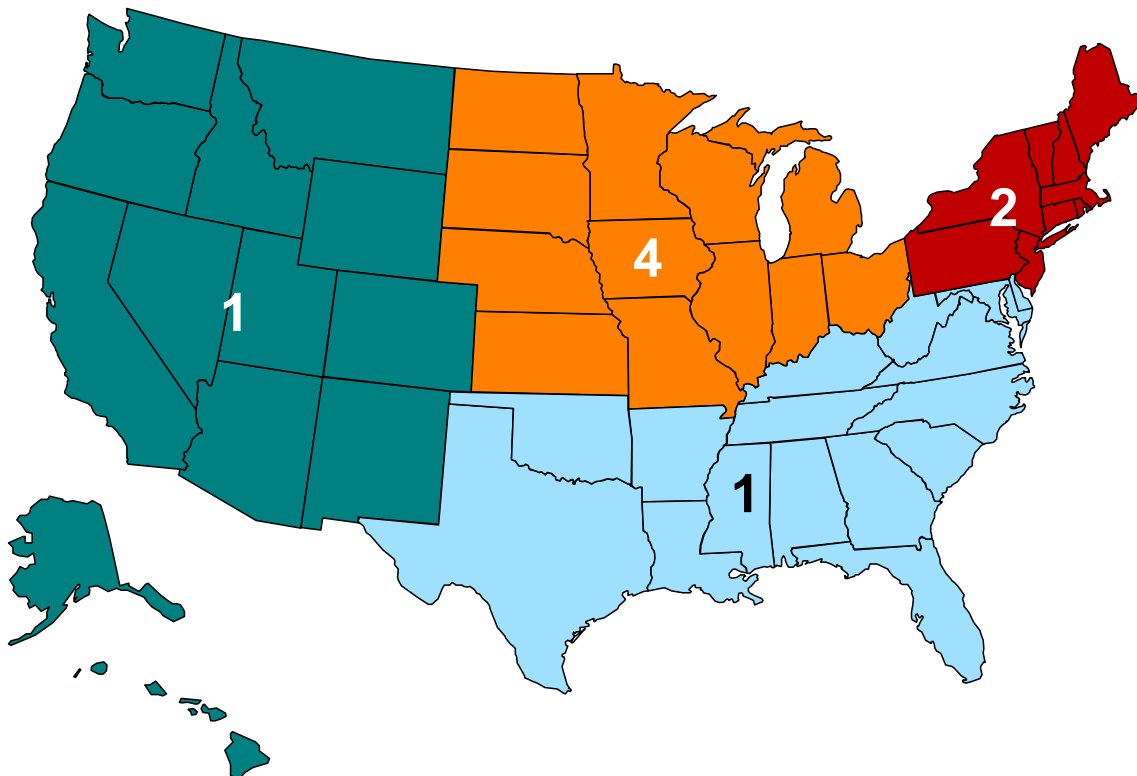


Figure E-1
Number of Surveys Received by Region

- **The areas protected by plant public safety personnel vary in size**—Respondents protect areas from smaller than 1 square mile to larger than 17 square miles.
- **The majority of respondents protect a population of fewer than 2,500**—Seven of 9 respondents indicated that they protected a population of 2,500 or fewer people. On-site interviews indicated that emergency response personnel at nuclear power plants typically provide services only to employees on the plant site.

E.2 Public Safety Services

Nuclear power generating stations are required by Nuclear Regulatory Commission (NRC) regulations to have specific plans in place to address all emergency preparedness issues to include security, fire, and community planning. Because of the critical nature of nuclear power plant operations, these positions are staffed 24 hours per day, 7 days per week. This section examines the type of public safety services provided by plant personnel. Specific public safety services findings include—

- **Many of the respondents provide security or emergency management services**—Four of the nine respondents provide security services. Two other respondents did not indicate that they specifically provided security services, but they indicated having emergency management services or command-and-control like services available as shown in Figure E-2.

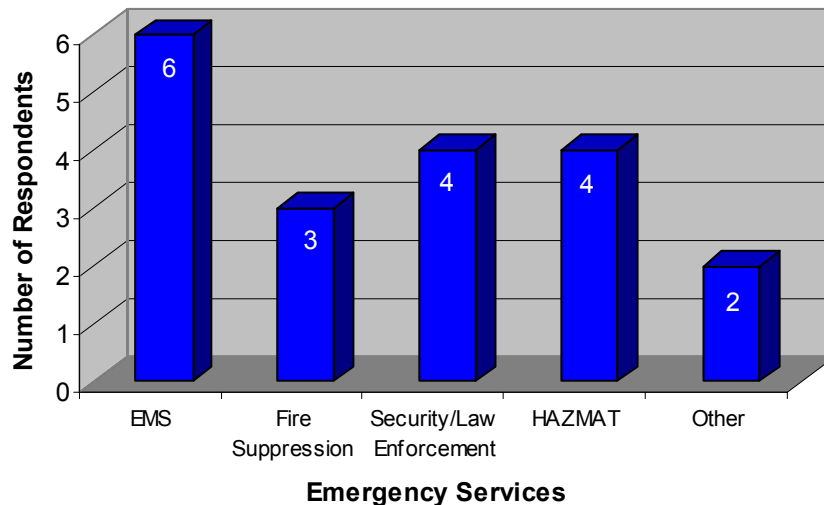


Figure E-2
Type of Emergency Services Provided by Nuclear Power Plants

- **Power plants support additional public safety-type capabilities**—Four of nine respondents provide emergency medical services (EMS) and hazardous materials (HAZMAT) response services while three of nine provide fire suppression services for the plants. Although fewer than half of the respondents indicated that these specific services are available, on-site interviews suggested that most power plants

have some form of basic fire suppression service and basic emergency medical care. The interviews also revealed that fire suppression teams often double as a basic HAZMAT mitigation team or radiological mitigation team. These services cannot be considered full fire, EMS, or HAZMAT mitigation services because assistance from outside sources is usually required in the case of an emergency.

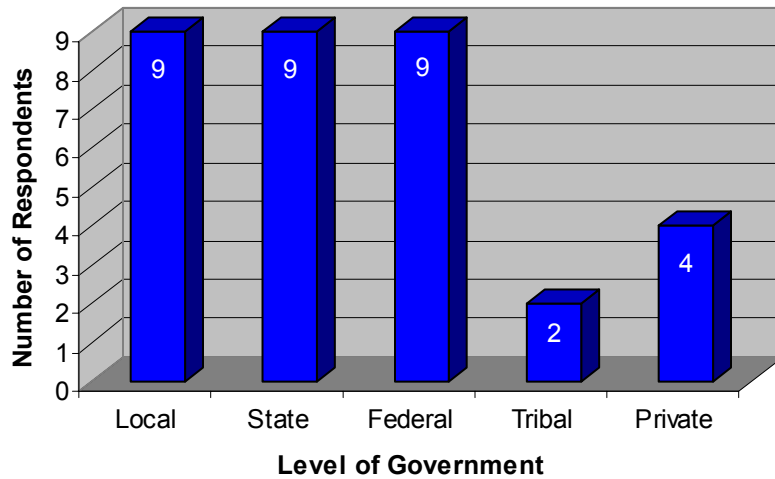
- **Plant public safety personnel respond to 500 or fewer emergency calls per year**—Plant public safety personnel respond to emergency calls within the plant from plant employees only. Nine of the responding agencies received 500 or fewer emergency calls per year.

E.3 Coordination With Public Safety Agencies

This section explores the level of coordination between nuclear power plants and government public safety agencies. NRC regulations require a certain amount of coordination between the plant and local government emergency planners and/or the local emergency planning committee. Specific findings regarding coordination with public safety agencies include—

- **Operations with external agencies are very limited**—Most respondents indicated that less than 10 percent of calls for service required assistance from outside agencies. On-site interviews revealed that as few as 1–2 percent of calls for service required assistance. Even when assistance was called in, those calls were generally made for precautionary reasons.
- **Respondents operate with all levels of government**—During emergency responses, all nine respondents indicated that they operated with local and state government agencies, and eight of nine respondents operated with Federal Government agencies. Two respondents also have operational needs with tribal agencies, and two operate with private organizations, such as hospitals.
- **Most plants have mutual-aid agreements with all levels of government**—Eight of nine respondents have mutual-aid agreements with government public safety agencies at the local, state, federal, and tribal levels. These agreements generally cover response by governmental public safety agencies into the power plant.
- **Few plants respond to incidents outside the plant response area**—Most plant public safety components do not respond to calls outside of the plant campus, which is their primary response area. The one component that does respond to incidents outside of its response area described its services as “storm damage mitigation and restoration, police assistance, fire assistance, and environmental cleanup.”
- **Disaster planning exercises occur regularly with all levels of government**—All nine respondents participate in disaster planning exercises with government agencies, indicated by Figure E-3. Two respondents also conduct disaster planning with tribal nations while four conducted disaster planning exercises with private organizations. Seven respondents indicated that they participate in strategic planning and table-top

exercises, while all nine respondents participate in functional drills. On-site interviews confirmed that disaster planning and exercises were conducted regularly.



**Figure E-3
Disaster Planning by Level of Government**

- **Plant public safety personnel required to plan emergency safety responses—** Most of the respondents indicated there were regulatory requirements mandating them to work or plan with other public safety agencies. By regulations, there are four levels of response, each requiring a specific level of communication with those involved, such as plant staff, public safety respondents, and the general community. Although these regulations require interoperability between plant public safety personnel and local government agencies, they do not specify the method of communication.
- **Initial requests for assistance are usually accomplished via landline telephone—** The majority of requests for government assistance by campus personnel are through a landline telephone by either dialing 911 or by using a direct line. Some agencies use a combination of landline and radio communication to request assistance. However, none of the agencies use radio communication as a primary method for requesting assistance.

E.4 Communications

This section examines the communications equipment used by nuclear power plant personnel and characterizes the level of radio communications available to the personnel for public safety purposes. Specific findings on communications include—

- **Commercial services are often used—**Eight of nine respondents use pagers, cellular telephones, and landline telephones for communication. Five of nine use Nextel telephones. Three plants also use satellite telephones. Commercial services are so readily used for communication that one respondent even suggested that

“interoperability [would be] easier to achieve using commercial technologies such as Nextel.”

- **The majority of plants have established communications with government agencies**—All of the respondents have established communications with local, state, and federal agencies, as shown in Figure E-4. Although two respondents indicated that they had operational needs to communicate with tribal nations, only one respondent had established some form of communications with tribal agencies.

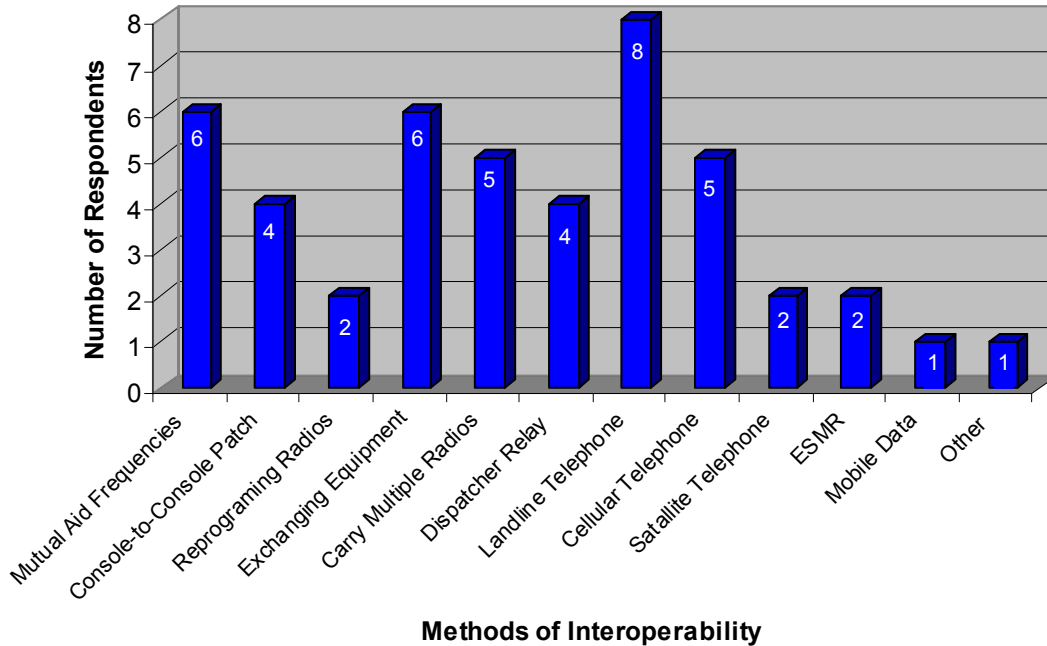


Figure E-4
Methods of Interoperability Established by Respondents

- **Quality of communications during functional drills is generally good to excellent**—Seven of nine respondents indicated that the communications between public safety personnel during these functional drills was either good or excellent, as shown in Figure E-5. Only one respondent indicated fair communications, and one indicated poor communications.

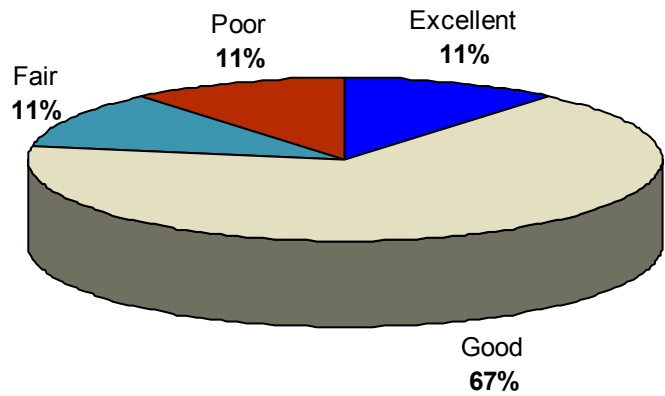


Figure E-5
Quality of Communications During Functional Drills

E.5 Summary

Due to the nature of its work, the nuclear power plant industry has unique public safety concerns. Historically, nuclear power has been a topic for debate as a source of power, and the industry is very interested in protecting its business and maintaining its image. The PSWN Program found that overall, nuclear power plants have addressed interoperability concerns beyond those that are required by law. In fact, based on personal interviews at one plant, the nuclear industry takes emergency preparedness issues seriously—so seriously that this plant purchased communications equipment to specifically address the lack of interoperability it had with the local municipal fire department. Nuclear power plants rarely require assistance from government agencies, but in a case where assistance would be required, the incident would likely be a major emergency and would require the attention of multiple agencies at multiple levels of government. Plants are required to maintain a plan of action during such emergencies and to perform emergency exercise drills regularly.

APPENDIX F—OIL REFINERIES FINDINGS



APPENDIX F—OIL REFINERIES FINDINGS

According to the U.S. Department of Energy’s (DOE) Energy Information Administration, oil refineries exist in 32 of the 50 states, including Alaska and Hawaii. Approximately 60 companies operate the Nation’s refineries, which number more than 130, according to the December 23, 2002, issue of *Oil and Gas Journal*, a trade publication for the petroleum and natural gas industries.

The American Petroleum Institute (API), the largest trade association representing oil refinery operators in the United States, states that parent corporations regard most refineries as individual business units, and that as such, there are varying approaches to safety and security measures. Some firms have established baseline protective measures for all of their refineries; others place the responsibility for all safety and security decisions and programs on their refinery operators.

On-the-job injuries, product losses, equipment damages—each of these concerns can lead to reduction in profits, economic hardship for refinery employee and community families, and threats to the environment. Refinery operators recognize the vital role that safety and security play in the successful operation of their plants and as the most significant contributions they can make to the communities in which they operate as responsible corporate citizens.

The following findings provide a status report on the state of interoperability between safety and security providers at some of the Nation’s oil refineries and their public safety counterparts beyond the fence.

F.1 Survey Respondent Demographics

As reported earlier in Section 2, Methodology, the Public Safety Wireless Network Program used a variety of means to contact oil refinery operators and elicit their participation in the special services district interoperability assessment. The program contacted more than 100 of the country’s refinery operators, but received a response from just 5 refineries. Data represented in this section was obtained through survey responses and on-site interviews with refinery safety and security personnel. Specific demographic data includes—

- **Data was obtained from four states**—As indicated in Figure F-1, of the respondents who provided their location, data was obtained from refineries in four states in the mid-western and southern United States.

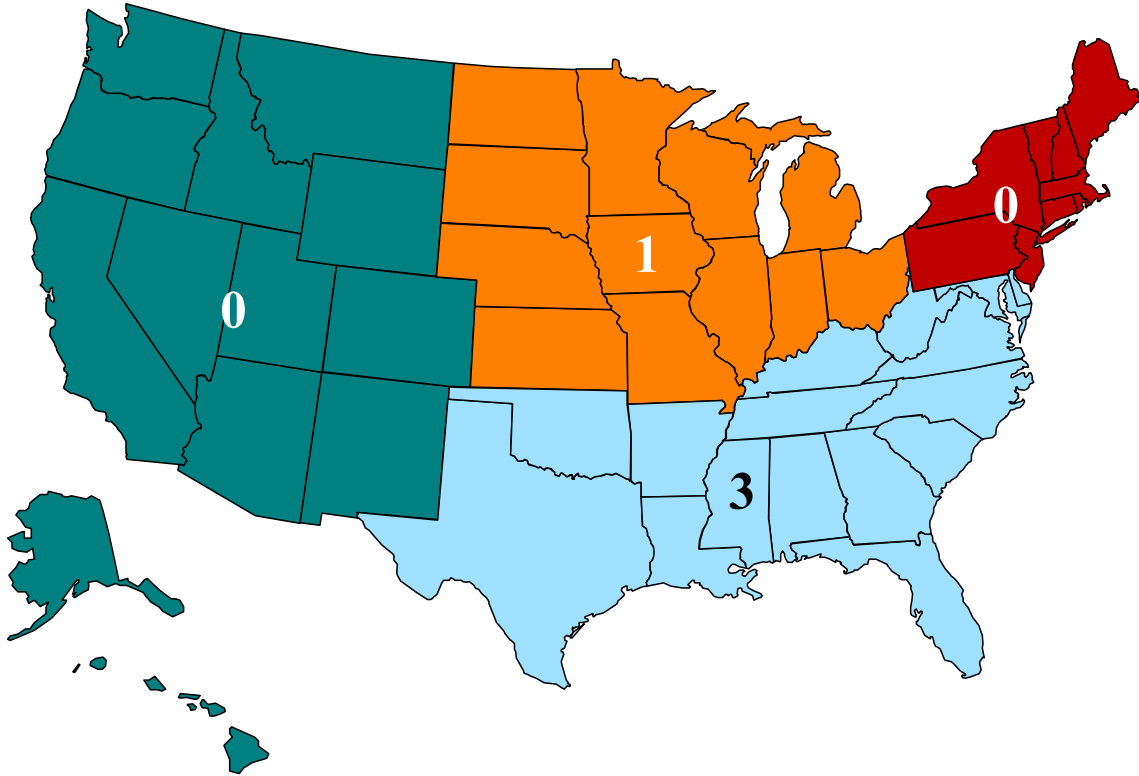


Figure F-1
Number of Surveys Received by Region

- **Oil refinery public safety agencies protect large areas**—Of the five responding refineries, two protect an area larger than 75 square miles. One refinery covers almost 8 square miles, and another covers an area between 2 and 5 square miles.

F.2 Public Safety Services

Refinery operators understand that there are regulatory requirements that must be, and other standards that should be, followed to assure safe work places and environmental responsibility in their communities. In addition to these regulations, refineries must adhere to the provisions of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). As a part of the Superfund Amendments & Reauthorization Act Title III requirement, CERCLA mandates that refinery operators work with the Local Emergency Planning Committee (LEPC) to mitigate hazards, prepare for emergency response, and plan for community evacuations where refineries are located. Refineries that operate fire brigades also work to meet Occupational Safety and Health Administration Standard 1910.165 regarding the competencies of their firefighters and use National Fire Protection Association standards for their firefighter training.

In addition to the practices most commonly found in any physical plant protection operation, such as access control, perimeter security, and first-aid training, oil refineries require that all persons entering a refinery (i.e., employees, contractors, or visitors) attend a safety briefing prior to passing into the facility. By learning from peer refinery operators in foreign countries, they have gained greater understanding of the risks of operating in politically unstable

or hostile environments, and adopted some of the practices designed to mitigate those dangers. Even the terrorist attacks of September 11, 2001, have influenced safety and security at U.S. oil refineries. Trends seen by the API at its member organizations indicate that commonly, refineries are now—

- Mandating employee background investigations for new hires
- Requiring 48 hours advanced notice of intent to dock by incoming tankers, supply ships, and other vessels
- Executing disaster preparedness exercises with the participation of public safety agencies
- Voluntarily performing vulnerability assessments or conducting site assessments in partnership with the DOE.

Other types of public safety contingencies are provided behind the fence at oil refineries in the United States are depicted in Figure F-2. Specific public safety services finding include—

- **Oil refineries provide varying forms of security for their facilities**—While every refinery establishes gate security to control access to their facilities, one refinery reported that its security forces handled law enforcement matters on company property.

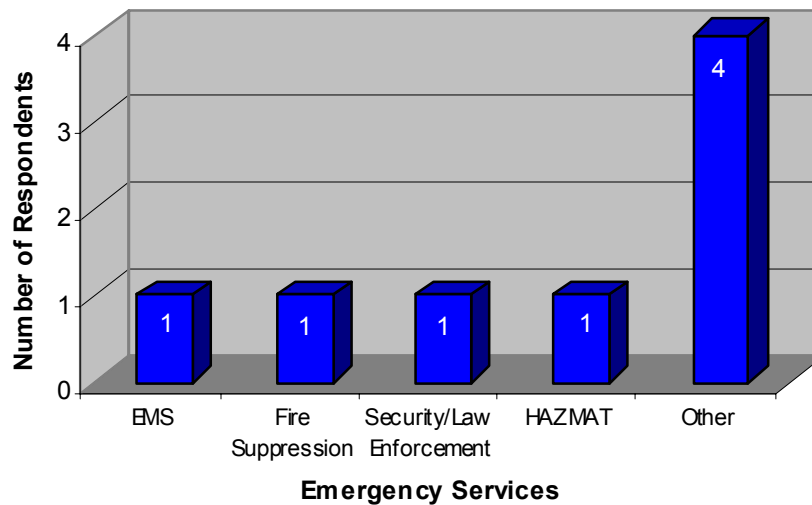


Figure F-2
Emergency Services Provided by Participating Oil Refineries

- **Fire protection may be automated or handled by firefighting staff**—Oil refineries are all equipped with an array of fire detection and protection features, many of which, such as alarm systems, foam injection systems, and deluge systems, can be automatically triggered by the presence of smoke or heat. One refinery reported

staffing a fire brigade on site with a combination of front-line, full-time firefighters, and part-time, trained refinery employees who supplemented the brigade's response to larger incidents.

- **Hazardous materials (HAZMAT) incidents may be handled by refinery or off-site response teams**—Although only one refinery indicated having a specific HAZMAT team, several of the other respondents have staff trained to specifically address crude oil spills, handle isolation, and conduct cleanup activities.
- **Oil refineries may deploy other specialized public safety services**—Two of the respondent refineries reported that they had staff trained and equipped to handle confined space entries and rescues. One refinery reported that it provide emergency medical services at its facility, while another refinery indicated having some form of first responder care but did not provide specific details.
- **The majority of refineries handle 500 or fewer emergencies annually**—All 5 reporting refineries handle fewer than 500 emergency responses annually.

F.3 Coordination With Public Safety Agencies

There are inherent dangers in operating an oil refinery (e.g., fires). According to the API, the long history of the processes involved, the predictability of the materials used in these processes, and the measures taken to preserve the stability of the baseline materials used have allowed refineries to become well-established and grounded in their efforts to manage risks. Still, refinery operators understand the benefits of coordinating their safety and security efforts with government public safety agencies. Specific findings in this area include—

- **Primary access to government public safety providers is via landline telephone**—Four of the five responding refineries use landline telephone as their primary means for summoning governmental assistance for on-site emergencies. The refineries with fire brigades reported that in case of fire, their firefighters could directly call for assistance of off-site fire departments via radio.
- **Most refineries have limited emergency interaction with other agencies**—Four of five (80 percent) refineries work with other agencies on less than 10 percent of their emergency responses. One refinery reported that it worked with other agencies or organizations on up to 50 percent of its responses.
- **Some refineries maintain formal mutual-aid agreements with government**—Three of the refineries reported that they had negotiated mutual-aid agreements with government agencies. All three have agreements with local agencies, but only one maintains agreements with state agencies. Two of the three agreements specifically address responses from refinery safety/security personnel outside the refinery compound. A lack of formal mutual-aid agreements does not necessarily preclude refineries from assisting government agencies, or the reverse.
- **Three of the responding refineries respond to off-site emergencies**—The primary reason for calling refinery resources into surrounding jurisdictions was to assist in fire

suppression. One refinery reported that while it had trained firefighters on staff, that its personnel did not have structural firefighting capabilities. Their role was to provide additional water and equipment to assist municipal firefighters. Another refinery stated that it was called off site to respond with its special petroleum firefighting resources, such as apparatus built to dispense high volumes of firefighting foam, or to bring bulk quantities of firefighting foam to large incidents.

- **Oil refinery operators participate in disaster preparedness activities with government agencies**—All five of the responding refineries reported that they took part in preparing or exercising disaster plans with government agencies to include LEPCs. All of the respondents work with primarily local government; however, only three of five work with state and federal authorities on preparedness activities, such as exercises. All of the refineries reported that they also had roles in strategic planning and table-top and functional exercises. The data is detailed in Figure F-3.

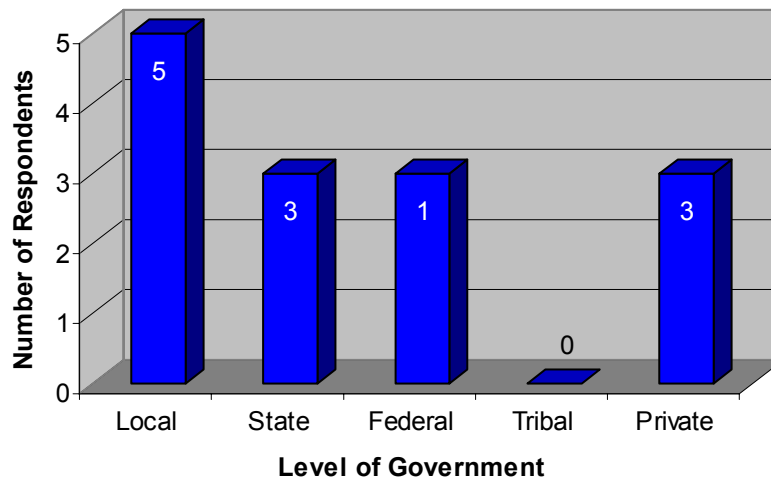


Figure F-3
Disaster Planning by Level of Government

F.4 Communications

Refinery operators participating in the assessment cited a variety of devices used by their safety and security providers. It is typical for safety and security personnel to use land mobile radio in the course of their duties, according to four of the five reporting refineries. Other means of communications were also cited. The assessment also sought to gain greater understanding of the role of interoperability in the oil refinery industry when communications with government counterparts were necessary. Specific findings in assessing communications capabilities include—

- **Commercial services play a significant role in communications**—Three of the five refineries reporting cited paging as a common means for their safety and security staff to stay informed of incidents at their facilities. Two of five participating refineries reported that they use commercial services including—

- Cellular telephones
 - Landline telephones
 - Satellite telephones
 - Mobile data terminals.
- **Quality of communications is good to excellent**—While their own radio systems were described as good to excellent and as providing the type of quality service that their needs demanded, participating refinery operators did not have the same regard for communicating with other agencies. During functional drills, participating refineries reported that radio communications with other agencies were only of good to fair quality, as shown in Figure F-4.

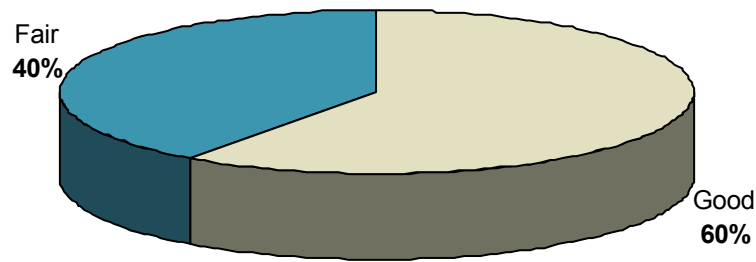
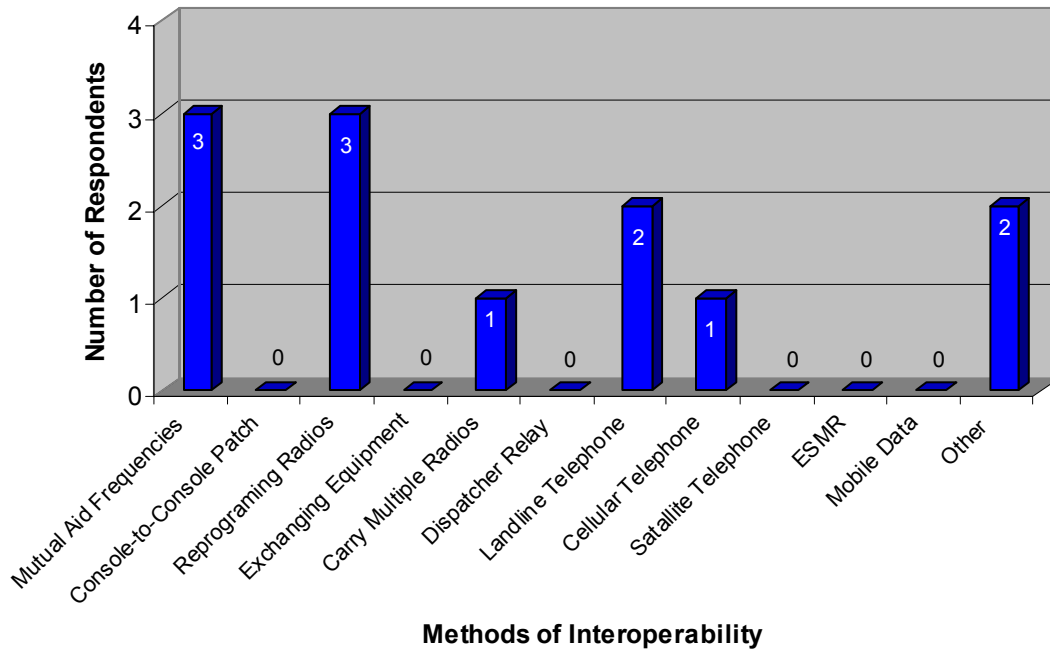


Figure F-4
Quality of Communications During Functional Drills

- **Varying approaches are used to provide for interoperable communications**—Local and state agencies have interoperable communications in some form with three of the five responding refineries, while one refinery has interoperability with federal agencies. Two of the participating refineries have interoperable communications with other private organizations. Insufficient data was collected to determine which of the methods used to attain interoperability was more or less effective than the others, which could impact the satisfaction of interagency communications needs during functional disaster drills. Various methods of interoperability are detailed in Figure F-5.



**Figure F-5
Methods of Interoperability Established by Respondents**

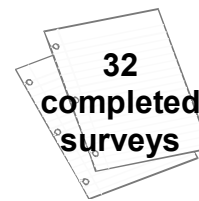
F.5 Summary

Oil refineries are hazardous work environments that involve processes that require the careful attention of employees, contractors, and visitors on site in order to avoid accidents. The participating refineries recognize their legal responsibility to meeting the requirements of rules, regulations, and laws that affect their industry. They also recognize their corporate responsibility to protect the people and assets found within the confines of their plants, as well as those that surround them in the communities in which they are located. One refinery operator pointed out that “unless competent teams managed their oil spills, they could lose safety, good will, esteem, profit, and a record of compliance with the law.”

The participating refineries see the value in working with government to prepare for emergencies, to share resources that may help reduce losses on site and off site, and to ensure they have the ability to respond to incidents in which lives or the environment are threatened. The responding oil refineries are active in exercising emergency plans with government agencies and acknowledge that during such exercises, interagency communications are only fair to good, at best.

By maintaining relationships with government agencies, LEPC groups, and other private organizations, refinery operators are seen by traditional public safety agencies as partners in providing emergency service and protecting the public. This status should provide oil refinery operators with the opportunity to open dialog with their area governmental public safety agencies. Together, they should evaluate the state of interoperability between refinery safety and security forces and their public safety counterparts. With the results of such an evaluation, they can plan for better approaches to assure satisfactory interagency communications, not just for drills, but for the actual emergency to which they may all be called to respond.

APPENDIX G—PORTS OF ENTRY FINDINGS



APPENDIX G—PORTS OF ENTRY FINDINGS

In electing to assess key U.S. ports of entry, the Public Safety Wireless Network (PSWN) Program has focused on the status of interoperability and emergency response planning within the airport and harbor industries. These sectors are being highlighted mainly because of their complex set of public safety interfaces. For example, the typical airport or port operation has regular interactions with internal groups, several federal departments, state and local levels of government, non-governmental organizations, and industry stakeholders. In the event of a large-scale emergency, these ports of entry may be required to simultaneously interact with all of their public safety partners responding to the scene.

While airports and harbor operations are distinct entities, the PSWN Program notes many similarities in their emergency response planning and communications needs. One key disparity worth noting, however, is that because of the presence of the general public, the majority of airports are required to have a more robust set of public safety capabilities, particularly in terms of security. However, the interest in harbor security and the evaluation of materials that pass through harbors is garnering additional scrutiny from various local, state, and federal agencies.

According to a recent U.S. Department of Transportation's Bureau of Transportation report, there are approximately 19,000 airports in the United States, including 429 commercial airports. The U.S. public port industry is much smaller but includes more than 100 public port authorities. Along with maritime functions, port authority activities may also include airports (in fact, 13 U.S. port authorities also manage airports), bridges, tunnels, commuter rail systems, and industrial parks.

G.1 Survey Respondent Demographics

The PSWN Program contacted about 115 ports of entry and obtained data from 32 entities. This effort included one on-site interview with a port authority that manages an airport and harbor operation. The data represents about 21 percent of all study responses. Specific demographic data on ports of entry respondents includes—

- **Data was obtained from at least 14 states**—Three U.S. regions and at least 14 states are represented in the survey data as indicated in Figure G-1.

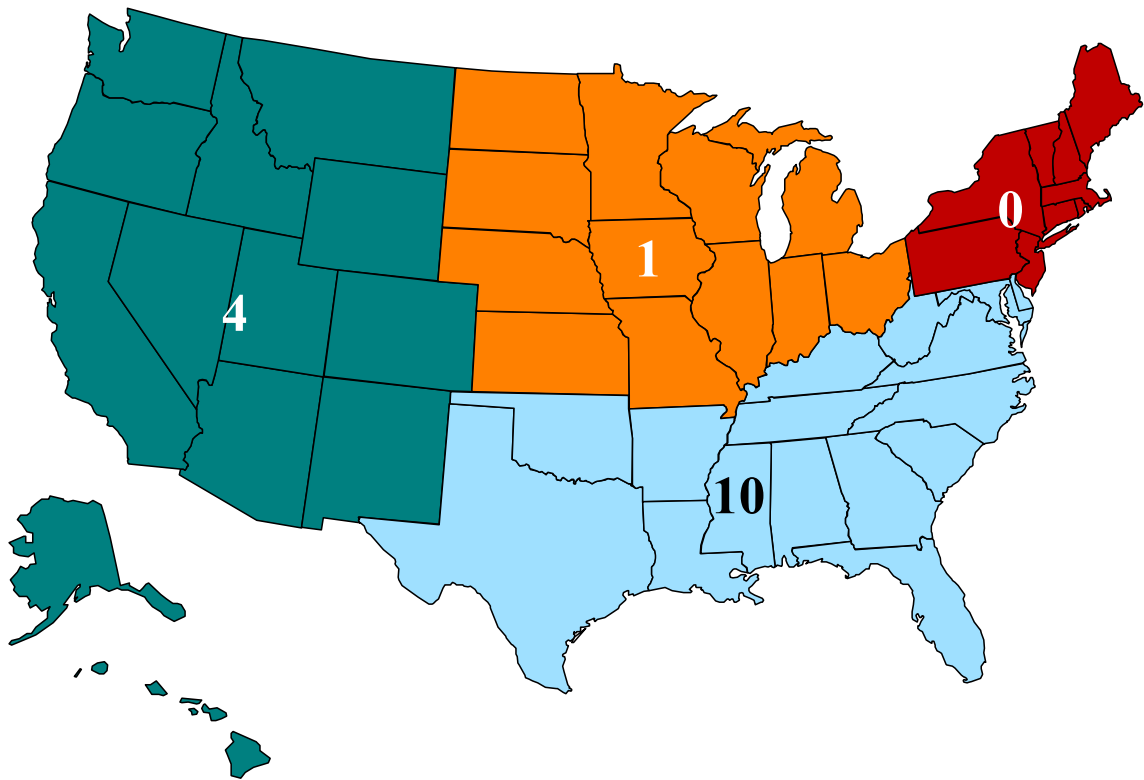


Figure G-1
Number of Surveys Received by Region

- **Most respondents serve an area smaller than 5 square miles**—Of the 32 ports of entry that responded to this inquiry, 21 (66 percent) protect an area that is smaller than 5 square miles. Of those 21, 14 respondents protected an area between 2–5 square miles. Among the 12 respondents that serve areas larger than 5 square miles, 5 serve 6–10 square miles, 4 serve 11–25 square miles, and 2 serve 26–75 square miles.
- **Responses were gathered from airports, harbors, and port authorities**—Only a portion of the 32 completed surveys provide enough detail to determine whether their organizations are airports and port operations, or a combination. However, the respondents represented small airports, large international airports, and at least nine respondents had port responsibilities.
- **The daily population for most ports of entry is less than 10,000**—Twenty respondents serve fewer than 10,000 people per day; among the other 13 respondents, 7 serve more than 50,000. Not surprisingly, airports typically serve more people than harbor operations. Among the 15 airport respondents, almost half (7) said their daily population exceeded 10,000. In contrast, 7 of the 9 harbor respondents (78 percent) said they served fewer than 10,000 people per day.

G.2 Public Safety Services

Data collected by the PSWN Program indicates that most ports of entry provide at least one public safety service, with a majority of them providing several, as indicated in Figure G-2. Many indicated that they provided such services to satisfy operations and security/safety regulations. Findings regarding the provision of public safety at ports of entry include—

- **Security is the most prevalent in-house public safety function**—Twenty-nine respondents (91 percent) indicated having security/safety/law enforcement available on site. Several airport respondents said they provide such services to comply with various Federal Aviation Administration (FAA) guidelines. They most frequently cited Federal Aviation Regulation (FAR) 139, which covers airport safety and security operations, as well as police response times. FAR 139 also requires airports to implement emergency response plans.
- **More than half of respondents provide on-site emergency medical services (EMS)**—Seventeen responding ports of entry (53 percent) said they had in-house EMS services.

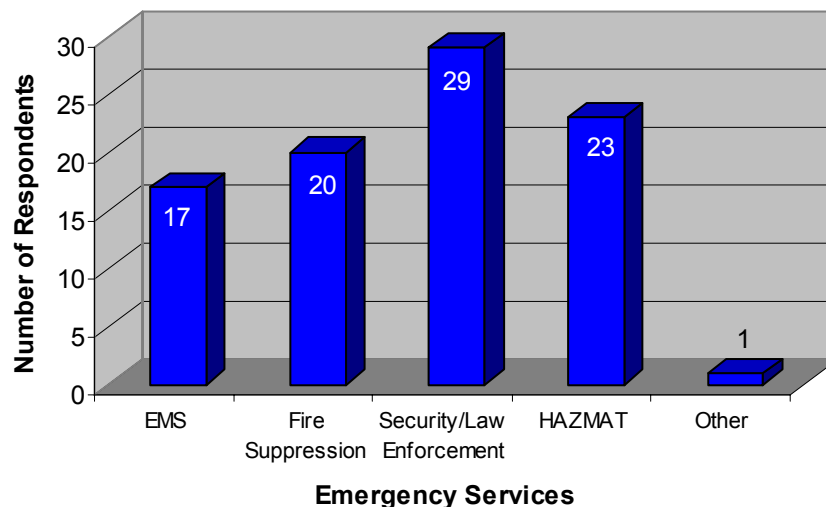


Figure G-2
Emergency Services Provided by Participating Ports of Entry

- **Most provide in-house fire protection/suppression and hazardous materials (HAZMAT) response**—Twenty (63 percent) indicated that they provided fire protection, while 23 (72 percent) said they had in-house HAZMAT response capabilities. One respondent indicated boat/marine rescue and aircraft firefighting capabilities.
- **The majority respond to fewer than 2,500 calls per year**—Eighteen of 32 respondents respond to fewer than 2,500 emergency calls per year, and more than half of those respond to fewer than 500 calls annually.

G.3 Coordination With Public Safety Agencies

Coordination is good among ports of entry and their local, state, and federal public safety agencies but some remarked that interoperability was not needed on a daily basis. Along with technical and funding hurdles to achieving interoperability, respondents also cited “turf wars” between neighboring jurisdictions. However, many agreed on the need for interoperability for large-scale incidents that would draw responses from a mix of local jurisdictions and all levels of government. Specific findings include—

- **Most ports of entry are required to work or plan with other public safety agencies**—Twenty-four respondents (75 percent) said there were regulatory mandates for planning/working with local, state, and federal agencies. For airport respondents, the most frequently cited requirements were FAA regulations for mutual-aid agreements, emergency response drills, and safety/security. Harbor operations cited U.S. Coast Guard, the Occupational Safety and Health Administration, and U.S. Border Patrol regulations. Both airports and harbors also mentioned numerous state and local requirements. Despite operational requirements to work with government agencies, the percentage of calls that require that port of entries work with other public safety agencies varies by agency. Five of the 30 (16 percent) agencies that answered this question indicate they worked with other public safety agencies on at least 76 percent of their emergency calls.
- **Disaster planning is commonplace between ports of entry and all levels of government; planning is less prevalent with private entities**—Thirty respondents (94 percent) said they participated in disaster planning with government public safety organizations. Twenty-nine of the 30 indicated they drilled with local government entities, 23 with the state, and 26 with the Federal Government, as indicated in Figure G-3. Only 13 respondents said they participated with private entities such as hospitals.

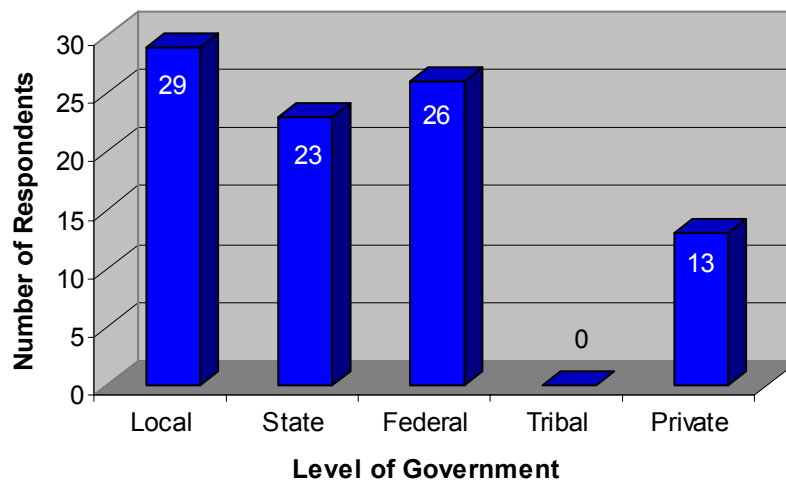


Figure G-3
Disaster Planning by Level of Government

- **Almost all have mutual-aid agreements with local government; fewer with state and federal governments**—Among the 28 respondents that indicated they had some type of mutual or automatic agreements with public safety agencies, 27 had agreements with local government, 14 with state, and 13 with the Federal Government.
- **Functional drills and table-top exercises are more widely used than strategic planning**—Twenty-nine respondents (91 percent) indicated they participated in functional drills and table-tops, while 18 said they conducted strategic planning with governmental public safety organizations.
- **Communication during functional drills is of relatively good quality**—Among the 29 respondents to this inquiry, 11 described communications as good, 10 as fair, and 3 as excellent. The other 5 respondents deemed it of poor quality, as shown in Figure G-4.

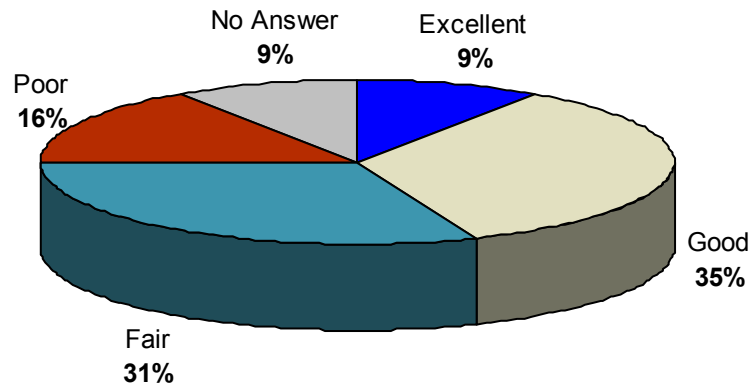


Figure G-4
Quality of Communications During Functional Drills

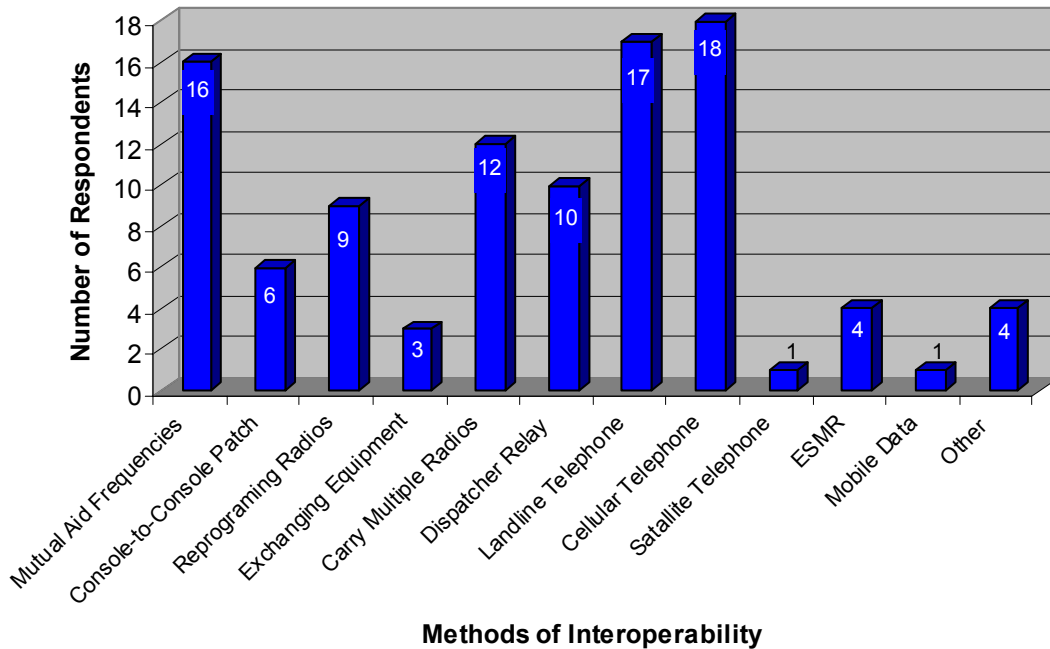
- **Most work with all levels of government on emergency incidents**—Twenty-nine respondents (91 percent) said they operated with local government on emergency response efforts, 20 (63 percent) indicated they worked with the state, and 24 (75 percent) operated with the Federal Government. Eight respondents cited operations with private organizations, including one with a private EMS provider.
- **The majority of ports of entry have established communications with local government for emergency response efforts; fewer than half have done so with state and federal governments**—Twenty-eight of 32 respondents (88 percent) have established communications with the local government agencies that they operate with on emergency incidents. Twelve said they had communications with the states and 16 with the Federal Government.
- **Many respond to calls outside their service areas and can provide multiple public safety services**—About half of respondents, or 16, indicated they provided public safety services outside of their response area, with several of them providing

more than one service if requested to do so. Among the most frequently cited services were fire response and rescue and law enforcement/security assistance, both with six responses each. Other services provided include response to aircraft incidents and HAZMAT.

G.4 Communications

Communications is crucial for maintaining smooth and effective operations and ensuring passenger and cargo safety. Based on the data collected, each port of entry has instituted some form of wireless communications for public safety personnel. Most own their radio communications system, while others share with the city or county system. Specific findings include—

- **Commercial services usage is widespread; the most frequently used of these services is mobile data**—Only five ports of entry indicated use of technologies such as mobile data, satellite telephone, and wireless Internet services. Among them, mobile data service is the most frequently used—three respondents are using it. One respondent said his organization had launched a wireless camera pilot project to support safety and security operations.
- **Cellular use is widespread for communicating with government entities during incidents**—Twenty-eight of 32 respondents (88 percent) said they used cellular telephone or paging services, while 27 of 32 (84 percent) indicated use of pagers for communications. Of those 28 respondents, 18 ports of entry claimed they used cellular service to communicate with the governmental agencies that they operated with on emergency incidents. Seventeen said they used landline connections, 16 of 32 (50 percent) indicated they used mutual-aid frequencies, 10 of 32 (31 percent) used dispatch relay, and 9 of 32 (28 percent) said they reprogrammed their radios with the other agencies' frequencies. Other methods of communication are detailed in Figure G-5.



**Figure G-5
Methods of Interoperability Established by Respondents**

- **Numerous ports of entry are using enhanced special mobile radios (ESMR) (e.g., Nextel)**—Fourteen of 32 respondents (44 percent) indicated they used ESMR to augment or enhance their public safety communications functions.
- **The majority of ports of entry own their communications system; others lease from neighboring systems**—Eighteen of 32 respondents (56 percent) said they owned their system while the remaining 12 respondents said they leased capacity from a city, regional, or county-owned system.

G.5 Summary

U.S. ports of entry are committed to establishing safe operating environments. Nearly all respondents indicated they provided on-site security/law enforcement services and operated with their local government public safety agencies on emergency response efforts and planning. In addition, while numerous regulatory mandates govern the provision of public safety services on site, many ports of entry emphasized the benefits of doing so for the protection of their passengers, visitors, employees, and cargo. When asked what the basis was for creating their public safety functions, several respondents cited “security and safety functions.”

Their level of on-site public safety service, however, may differ depending on the location and nature of the operations. For example, because most airports have more interaction with the public, they generally offer a more robust suite of on-site public safety services than harbor operations. Data collected by the PSWN Program reveals a major difference in the provision of on-site EMS at U.S. ports of entry; almost all airports provide such services, whereas fewer than half of harbor operations do so. Further, geography tends to be a major

determining factor for the airport sector. For example, those airports located on or near a body of water must assure that their fire department's capabilities include water rescue, whether provided on site or by a local public safety agency. Inland airports generally do not require such capabilities.

Communications is critical for the smooth operation of the facility but also plays an important role in the ability of personnel to coordinate emergency response efforts. Based on the data collected, communications is generally good among U.S. ports of entry and their local, state, and federal public safety partners. All respondents use portable/mobile radio for emergency response communications, with a large percentage of them operating in the 800 megahertz band. Most survey respondents indicated that they owned their system, while many others operated on a county or city-owned system. While many agreed that direct and redundant communications should be available in the event of mass casualty incidents or large-scale emergencies, some did not see a need for day-to-day interoperability with local, state, and federal agencies.

APPENDIX H—TRANSIT FINDINGS

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According to the American Public Transportation Association, there are approximately 45 transit agencies in the United States that can be classified as light rail or commuter rail agency operations (hereafter referred to as “rail transit”). Rail transit services are typically found in densely populated urban areas, such as Atlanta, New York City, Chicago, and Philadelphia. However, rail transit operations are also located in less densely populated areas such as Buffalo, New York; and Pompano Beach, Florida. This mode of rail travel uses more than 8,000 miles of track and has about 1,800 stations for its passengers in the United States.

The vast majority of Americans who regularly use rail transit for transportation do so to commute to work daily. Other uses typically include school and educational activities, shopping trips, social visits to family and friends, and travel to medical appointments.¹ Overall, Americans traveled more than 10 billion passenger trip miles in fiscal year 2000² on rail transit systems. In all cases, the purpose of rail transit systems is to provide a safe and secure transportation environment for its passengers.

In an effort to collect data from as many rail transit systems as possible, the Public Safety Wireless Network (PSWN) Program contacted 45 rail transit systems in the United States. Ultimately, 16 rail transit agencies completed the program’s survey.

H.1 Survey Respondent Demographics

As indicated in the Section 2, Methodology, the PSWN Program used a variety of methods to obtain survey data from transit agencies in the United States. The majority of data was collected through the survey and personal on-site interviews arranged with two transit agencies. This data accounts for approximately 11 percent of all study responses. Specific demographic data on respondents includes—

- **Data was obtained from transit agencies in nine states and the District of Columbia**—Of the 13 agencies that provided their location information, data was obtained from 10 states in 3 regions of the United States, as indicated in Figure H-1.
- **The majority of agencies protect an area larger than 75 square miles**—Eleven of 16 agencies (69 percent) reported that they protected track and rail covering an area between 75–1,500 square miles. Three agencies cover an area smaller than 75 square miles, and the remaining 2 agencies cover more than 1,500 square miles.
- **Daily ridership for the majority of agencies is greater than 50,000**—Nine of 16 (56 percent) agencies have average daily ridership greater than 50,000, with 4 agencies between 470,000–750,000 and 3 agencies between 1–3.5 million.

¹ Statistics from the Public Transportation Partnership for Tomorrow [(PT)²]

² Statistics from the American Public Transportation Association, Fiscal Year 2000

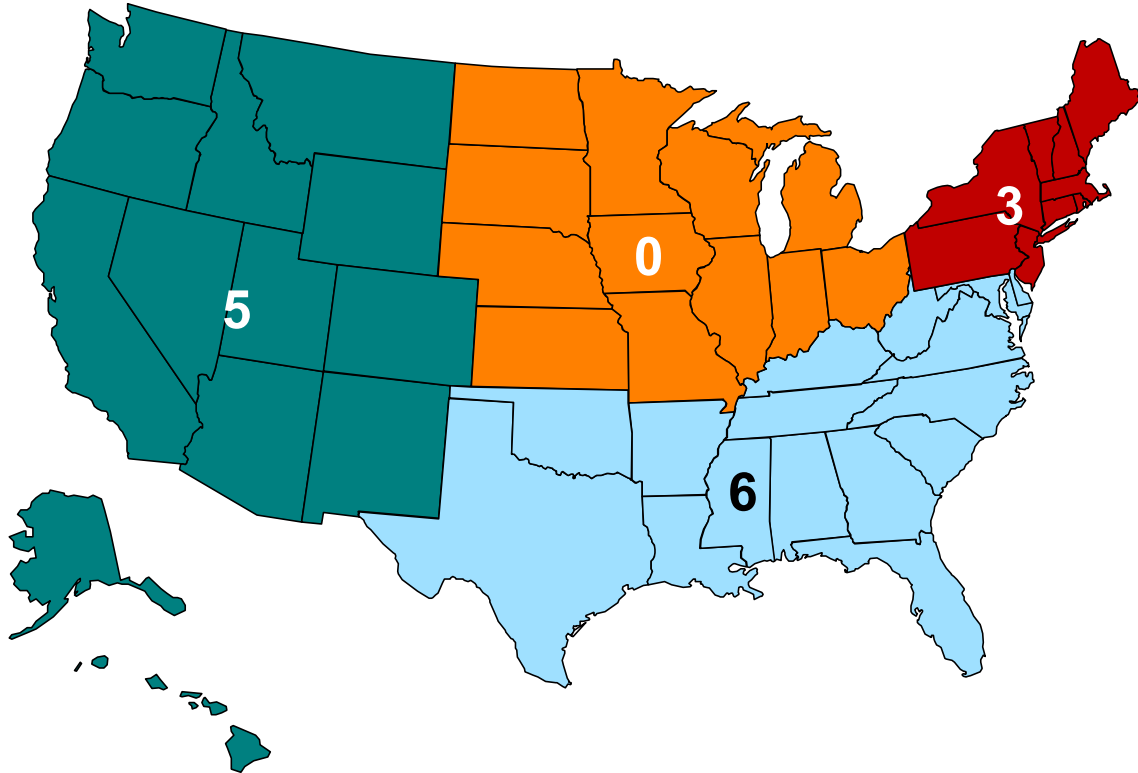


Figure H-1
Number of Surveys Received by Region

H.2 Public Safety Services

Most transit agencies provide some type of first responder service that includes a security component and also specialized tactical operations as indicated in Figure H-2. Although these services may be rather limited, these agencies also possess some additional capabilities. This section examines the type of public safety services provided by transit agency personnel. Specific public safety services findings include—

- **First responder services focus on security and law enforcement**—Ten of 16 responding agencies (63 percent) indicated having security, safety, or law enforcement services. However, none of the transit agencies responding to this survey provided either fire protection/fire suppression or emergency medical services (EMS).
- **Security/law enforcement capabilities differ among agencies**—The survey did not capture the skill or training level of law enforcement or security staff. However, on-site interviews indicate that commissioned law enforcement officers at transit agencies may have police powers beyond those of local law enforcement because transit police have multijurisdictional responsibilities.

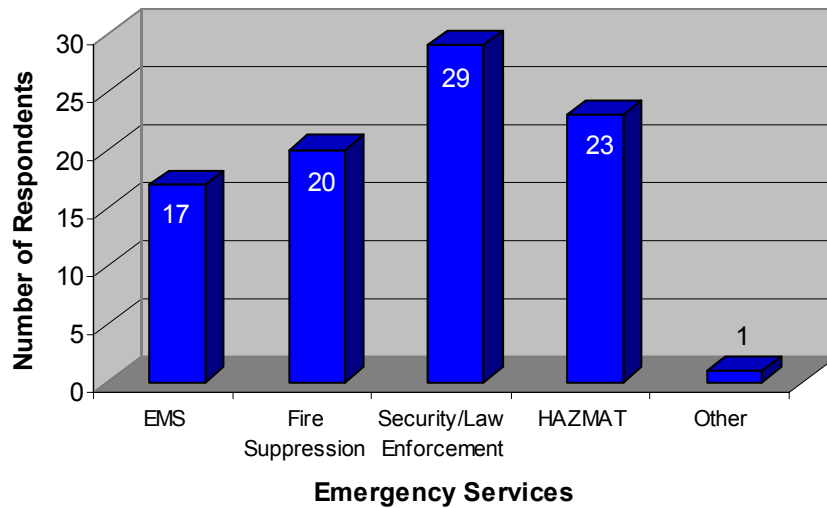


Figure H-2
Emergency Services Provided by Participating Transit Agencies

- **Other types of emergency response services are provided**—One agency indicated that it provided emergency evacuation, specialized rescue and tactical operations, and hazardous materials response and mitigation. In some cases, as in-person interviews revealed, these tactical services were sometimes shared with nearby agencies.
- **The number of emergency calls varies widely**—Fifteen of 16 responding agencies (94 percent) reported their annual number of emergency calls for service. The number of calls varies from fewer than 500 to more than 50,000 calls annually.

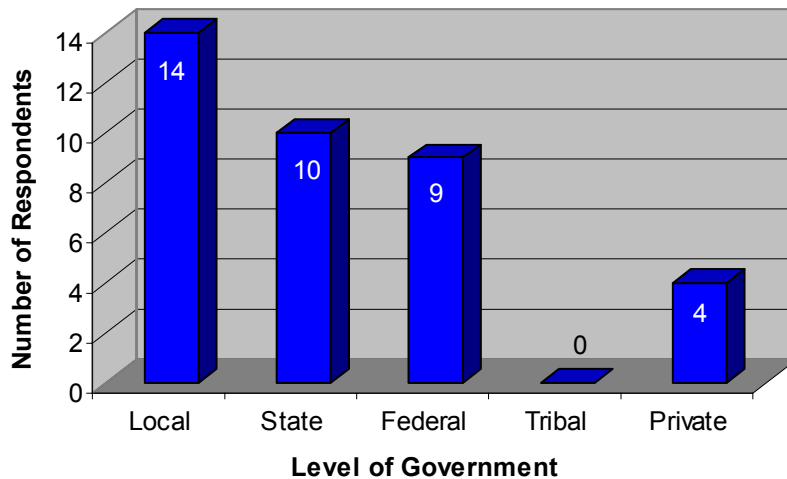
H.3 Coordination With Public Safety Agencies

Coordination with governmental public safety agencies is important to transit agency security and law enforcement personnel for a number of reasons. The nature of the industry typically finds the transit agency property (i.e., tracks, stations, and parking lots) and riders traversing the jurisdictions of many law enforcement agencies. Because transit agencies do not offer a fire or EMS component, it is important that these services, as well as law enforcement services, be coordinated with other agencies to provide for the safety of the riding public. In addition, the heightened awareness of the need for security since September 11, 2001, adds to the importance of coordinating services—especially for mutual-aid and emergency situations. This section explores the level of coordination between transit agencies and public safety agencies. Specific findings regarding coordinating with public safety agencies include—

- **The majority are required to cooperate with other public safety agencies**—Thirteen of 16 responding agencies (81 percent) indicated that there were local, state, or federal regulatory codes that required them to work or plan with other public safety agencies. Of the 13, 8 cited specific regulatory codes, 2 indicated local usage requirements, and 1 respondent cited federal reimbursement requirements tied to the use of the Incident Command System. Although most transit agencies are required to

cooperate with government agencies, the operational requirements vary by agency. Some respondents required assistance from other agencies for 76–100 percent of emergency calls, while others do not require assistance for any of their emergency calls.

- **Most have agreements with governmental public safety agencies**—Eleven of 16 responding agencies (69 percent) indicated that they had mutual-aid or automatic-aid agreements (verbal or written) with governmental public safety agencies. In addition, half of the respondents have agreements with both local and state agencies. One agency did not provide an answer.
- **Many transit agencies respond to calls outside their own response area**—Of the 15 that responded to the question, 10 indicated that they responded to calls outside of their response area. Agencies reported response to a variety of types of calls including mutual aid, specific requests from neighboring agencies, as-needed response to calls by citizens and other law enforcement agencies, and calls for use of specialized transit-owned equipment or services (e.g., K-9 patrol).
- **Transit agencies are active participants in disaster planning and other exercises with governmental public safety providers**—Fourteen of 16 respondents (88 percent) reported disaster planning exercises with local government. In addition, 10 of 16 (63 percent) reported participating with state agencies and 9 of 16 (56 percent) with federal agencies in disaster planning and emergency exercises. Details are presented in Figure H-3.



**Figure H-3
Disaster Planning by Level of Government**

H.4 Communications

Most transit agency communications is achieved through the use of land mobile radio (LMR) equipment, and in many cases, the transit systems own their radio systems. However,

some systems are shared with local or state governments. Specific findings on communications include—

- **Other types of communications devices are used by transit agencies personnel—** Transit agency law enforcement agencies use other types of communications equipment to augment their LMR communications. Nearly all indicated that they used pagers in the performance of their duties. Agencies reported high use of cellular telephones, landline telephones, and enhanced specialized mobile radio (ESMR) (e.g., Nextel). Also used, but to a lesser degree, were mobile data terminals and satellite telephones.
- **The majority of systems are 20 years or older and are being replaced—**Four of the six agencies (66 percent) with systems older than 20 years are planning to replace their system, most within the next 2 years.
- **Transit agencies have established several methods of communication with other public safety agencies—**Landline telephones and cellular telephones are most commonly used as a means for communicating with other public safety agencies. Other methods of interoperability are detailed in Figure H-4.

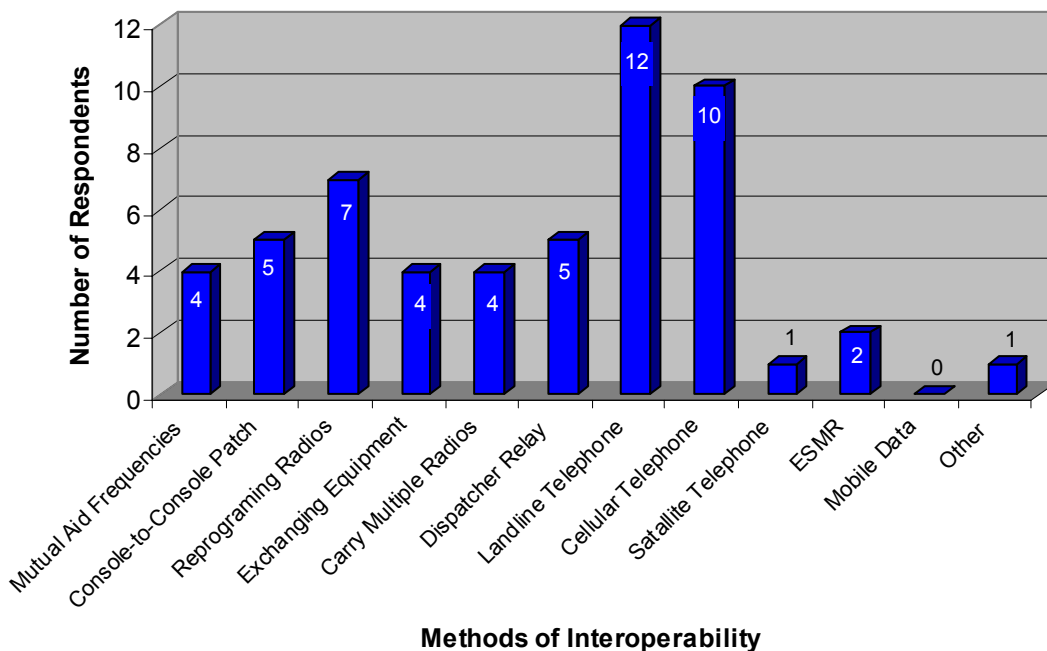


Figure H-4
Methods of Interoperability Established by Respondents

- **Generally, radio communications are of fair to poor quality with public safety personnel during functional drills—**Nine of 16 responding agencies reported fair to poor quality of communications during functional drills with governmental public safety agencies, and 5 of 16 reported good to fair communications under these same conditions. Two agencies did not provide an answer. This data is detailed in Figure H-5.

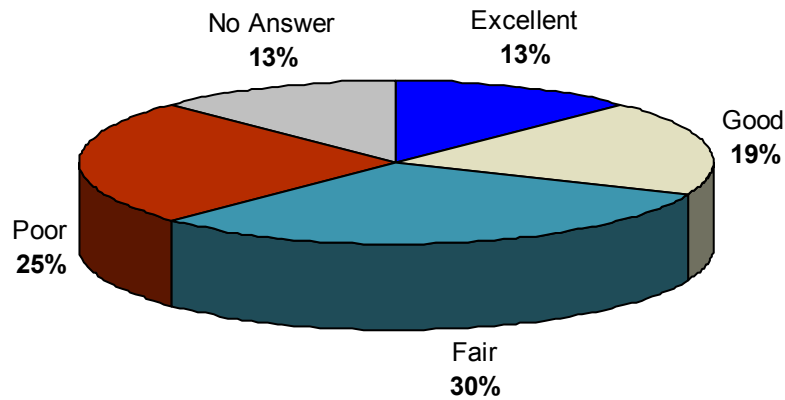


Figure H-5
Quality of Communications During Functional Drills

H.5 Summary

Rail transit is an important component of the public transportation landscape in America today. It is used for passenger service within and between metropolitan and suburban areas, and it crosses geopolitical boundaries. One common feature among rail transit systems is that they provide passenger rail service, and the agency providing that service must also provide another service—that of safety for its passengers.

The PSWN Program found that some transit agencies do not have a security division but rely instead on local law enforcement. Many rail transit agencies, however, do have a law enforcement agency or security division. Most have agreements in place with local law enforcement and provide cooperative policing with governmental first responder agencies. In those cases where a transit agency does have a law enforcement agency, it may need to be multijurisdictional or even have statewide authority. Many agencies have specialized enforcement units, and some agencies are accredited.

As part of the law enforcement activity of these agencies, most of these transit law enforcement departments also use wireless communications, most typically LMR, on a daily basis for interagency communication and communication with other governmental agencies. This is the same type of communications used by traditional governmental law enforcement agencies. Because much of the training, equipment, and background of transit and governmental public safety may be similar, a framework exists to enable interoperability between these agencies.

APPENDIX I—UNIVERSITIES FINDINGS

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According to the National Center for Education Statistics in their Integrated Postsecondary Education Data System Web site (<http://www.nces.ed.gov/ipeds/cool/Search.asp>), there are 655 listings for 4-year public institutions and 2,037 listings for 4-year private institutions. The number for private institutions is much higher because, in addition to academic institutions, this number includes specialty institutions such as art, design, medicine, and law schools. Because this assessment only considers academic institutions, the list was further refined for a more accurate number. Roughly 1,000 private institutions in the United States fit the profile targeted by this assessment.

I.1 Survey Respondent Demographics

As indicated in the Section 2, Methodology, the Public Safety Wireless Network (PSWN) Program used a variety of methods to obtain survey data from colleges and universities in the United States. The program contacted approximately 78 schools and obtained survey data from 26 schools, including personal on-site interviews at 1 university. This data accounts for approximately 18 percent of all study responses. Specific demographic data on respondents includes—

- **Data was obtained from 16 states**—As indicated in Figure I-1, data was obtained from 26 schools, 24 of which provided contact information. These 24 schools are located in 16 different states from all 4 regions of the United States.

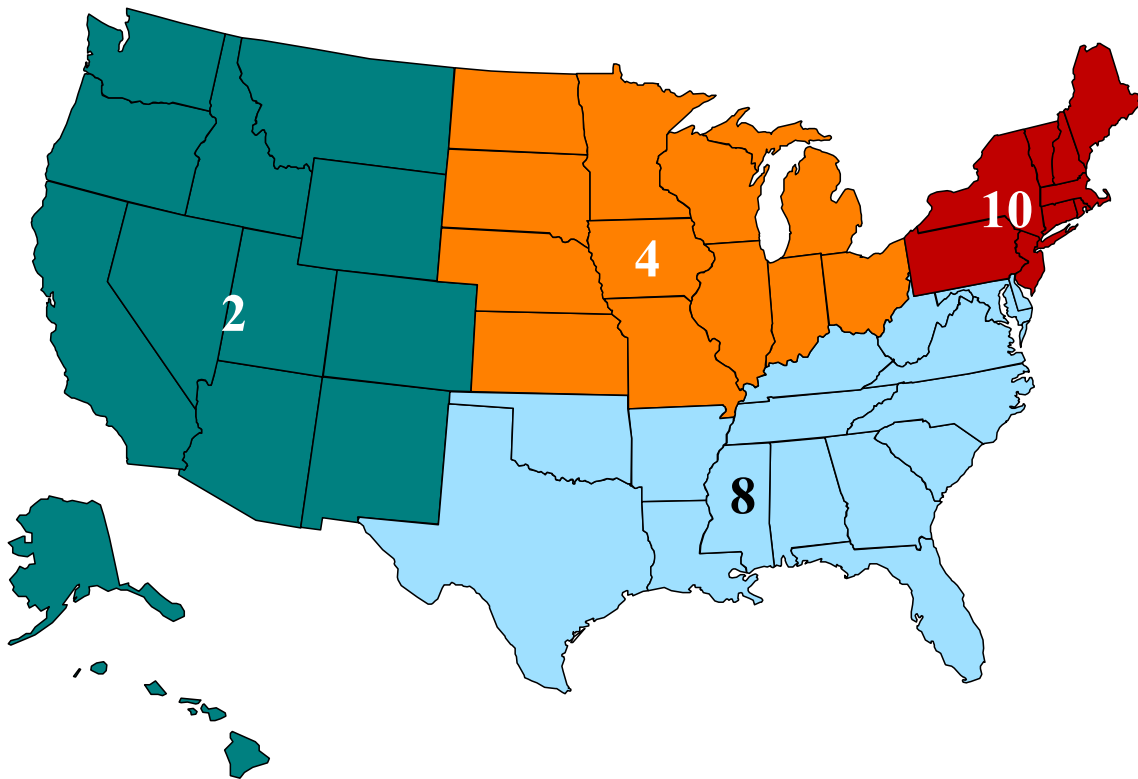


Figure I-1
Number of Surveys Received by Region

- **Respondents protect areas similar in population density to U.S. suburban neighborhoods**—An average U.S. suburban neighborhood has a population of approximately 2,000 people per square mile.¹ More than 88 percent of responding agencies protect an area smaller than 10 square miles, but half of the respondents protect a population between 10,001 and 50,000, yielding a population density of between 1,000 to 5,000 people per square mile—higher than the average U.S. suburban neighborhood. On-site interviews suggest that population density on campus may be even higher than indicated in the survey data. Although universities cover a wide area, the majority of the population, at any given time, is located on only a small portion of the campus.

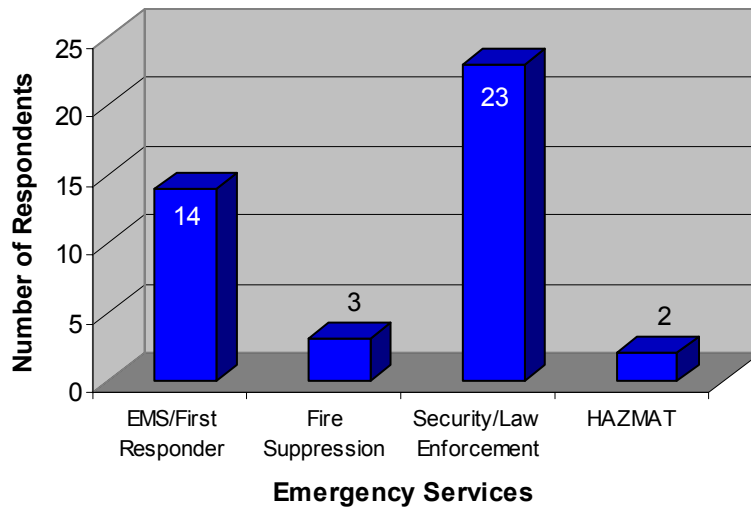
I.2 Public Safety Services

There is no known legislation requiring the creation of public safety agencies for private universities and colleges. However, private universities and colleges have a vested interest in protecting their campus, students, faculty, and visitors, and as a result, have created on-campus public safety agencies to perform these duties.

Most college or university campuses provide some type security/law enforcement staff, and many have some emergency medical services (EMS) capabilities. There are also some additional capabilities as indicated in Figure I-2. This section examines the type of public safety services provided by campus personnel. Specific public safety services findings include—

- **The majority of respondents provide security/law enforcement functions**—Twenty-three of 26 schools surveyed have security/law enforcement services. Many of the campus law enforcement services have commissioned officers through special agreements and partnerships with the state and/or local law enforcement agency.
- **Some campuses have EMS**—About half of schools surveyed have some form of EMS. However, on-site interviews revealed that these EMS units were not likely to be dedicated services, but rather were either basic EMS or an EMS affiliated with a school hospital system that also provided services to the general community.
- **Few schools provide on-site fire suppression or hazardous materials (HAZMAT) mitigation capabilities**—Only 3 of the 26 schools surveyed provided on-site firefighting services, and only 2 provided HAZMAT mitigation services. Many schools, especially research universities, use hazardous materials on campus and require HAZMAT services during an emergency. Interviews indicated that most schools had a fire alarm system and an emergency management plan; however, fire suppression and HAZMAT mitigation services were often provided by the local jurisdiction.

¹ Information provided by <http://www.demographia.com/db-ua90anal.htm>.



**Figure I-2
Emergency Services Provided by Participating Colleges and Universities**

- **Number of emergency calls per year varies**—The number of emergency calls campus public safety agencies receive varies by school from a few hundred to upwards of 67,000 calls a year. The population density of the school and surrounding community causes variance in number of calls.

I.3 Communications

Communications devices are essential to campus public safety personnel, assisting them to adequately perform their daily duties. This section examines communications equipment used by campus personnel and characterizes the level of radio communications available at university and colleges across the United States. Specific findings on communications include—

- **Commercial services use is common**—Public safety personnel on campus use a variety of commercial services, with cellular telephone and landline services being the most common—used by 21 of 26 respondents (21 percent). Landline telephones and pagers were also commonly used.
- **Communications during functional drills are fair to good**—Of the 20 respondents that conducted disaster planning exercises with government agencies, 12 conducted functional drills. For the majority of those who conducted functional drills, the communications between agencies were fair to good, as shown in Figure I-3. Results from on-site interviews indicate that although the quality of communications might be fair to good, the communications systems and emergency communication plans may not have been tested thoroughly during functional drills. For example, during drills, universities relied on resources, such as cellular telephones, that might not be available during a real emergency.

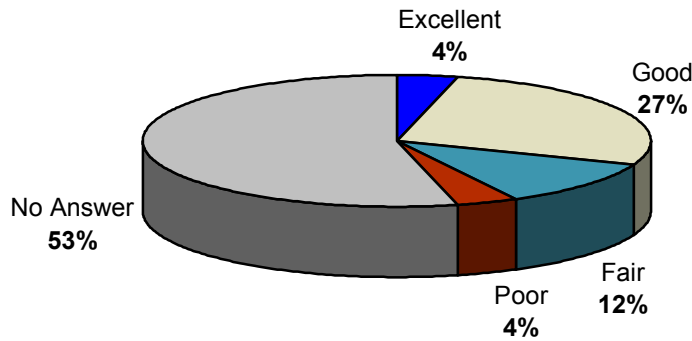
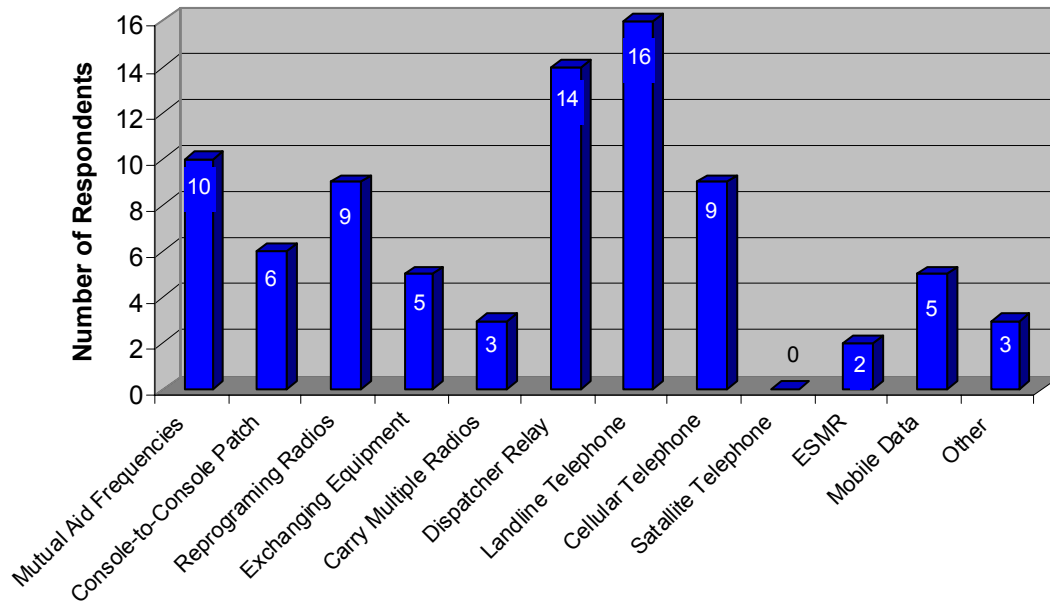


Figure I-3
Quality of Communications During Functional Drills

I.4 Coordination With Public Safety Agencies

Coordination between university and college public safety personnel and government public safety personnel is almost inevitable. Very few schools have the complete and fully qualified suite of public safety capabilities, such as fire suppression and EMS, required to prevent and manage all emergency events. Without these capabilities, a densely populated campus must lean on local government agencies for assistance. This section explores the level of coordination between the schools and public safety agencies. Specific findings regarding coordinating with public safety agencies include—

- **Campuses are not required to plan communications efforts with government public safety**—Twelve of 26 respondents (46 percent) indicated that there were local, state, or federal regulations that required them to work or plan with other public safety agencies. However, the regulations listed by respondents did not involve emergency planning. The regulations included special acts or amendments created by the state and/or local governments to enable commissioned officers to be employed by a private organization or regulations requiring campus law enforcement agencies to generate a yearly report similar to that of their government counterparts.
- **The majority of communication are conducted with local agencies**—Of the 24 respondents that indicated having operational requirements with local agencies, 21 had established communications with the local agencies. Few schools indicated having operational requirements with state or federal government agencies, although a few schools had established communications with state or federal agencies. Three schools indicated having no communications with any other agency. Various methods for communicating with government agencies are show in Figure I-4.



Methods of Interoperability

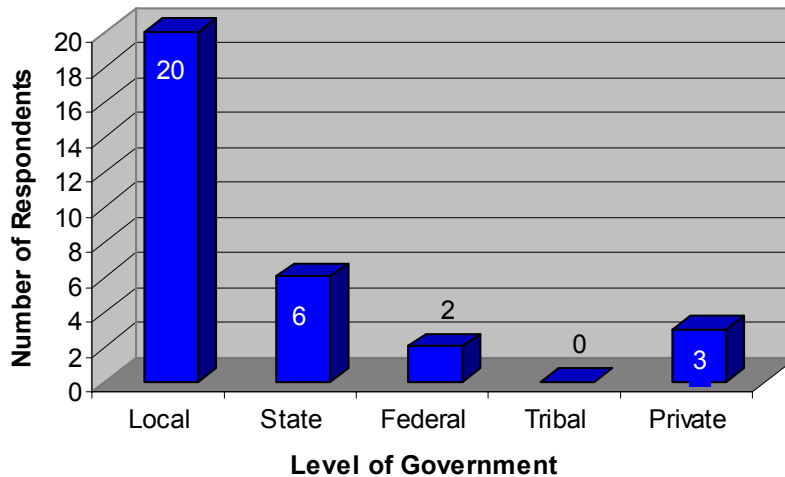
Figure I-4

Methods of Interoperability Established by Respondents

- **Mutual-aid agreements are maintained with local and/or state agencies**—All of the mutual-aid agreements established by campus public safety agencies were with local or state government agencies. Twenty of 26 respondents (77 percent) maintained agreements with local agencies, and 6 of 26 respondents maintained agreements with federal agencies.
- **More than half of campus agencies respond outside their campus response area**—The response areas for university or college public safety agencies are generally areas in and around the school campus. However, 14 of 26 (54 percent) respondents indicated that they had established agreements to provide support outside of their response area. On-campus interviews indicated that even though many campus agencies had these agreements, most agencies did not provide support outside their response area unless the incident involved the school directly or they were asked to do so by local agencies.
- **Initial requests for governmental assistance are often accomplished via landline telephone**—The majority of requests for government public safety assistance by campus personnel are made through a landline telephone by either dialing 911 or by a direct line to the local Public Safety Answering Point. Some agencies use both radio and landline telephones depending on the situation, and others only use radio contact to request assistance. Figure I-5 provides a breakdown of the data.
- **Local government assistance is infrequent**—Although most campus public safety agencies do require local government assistance, the request does not occur frequently. Seventeen of 26 respondents (65 percent) indicated that less than

10 percent of their emergency calls required outside assistance. Information gathered through telephone conversations with campus public safety agencies revealed that smaller schools with only security services tended to require more government assistance. However, only 1 of the 26 respondents indicated that assistance from government agencies was required more than 50 percent of the time.

- Disaster planning efforts include strategic planning, table-top, and functional exercises**—Twenty of the 26 respondents (77 percent) indicated that they practiced disaster planning exercises with governmental public safety agencies, most of whom were local and state level agencies. Three schools indicated having disaster planning efforts with private organizations such as hospitals. The number of respondents participating in each type of disaster planning exercise and with whom they participate is detailed in Figure I-5.



**Figure I-5
Disaster Planning by Level of Government**

- Sworn on-campus officers have better working relationships with government public safety officers**—Data collected from on-site interviews and telephone interviews indicated that universities and colleges that employ sworn police officers had a better working relationship with their governmental counterparts than schools that only employed security officers. Sworn campus officers have similar training backgrounds as local government officers and, therefore, have a similar position toward the importance of interoperability and interoperability solutions.

I.5 Summary

The PSWN Program found that in general, private universities and colleges have taken the responsibility to address interoperability concerns regarding public safety. Although not all private universities and colleges are “for profit,” they are in the “business” of education and have a vested interest in protecting their students, faculty, facilities, visitors, and other assets from injury or damage. Universities and colleges build their businesses by gathering together

educated minds and encouraging academic pursuits, as well as being centers for fellowship and higher learning. In these settings, population densities can reach as high as, and in many cases, higher than the average U.S. suburban neighborhood. Without full public safety resources available, campus personnel cannot provide adequate protection. They must work together with local government agencies to ensure safety and security to the campus community.

APPENDIX J—DATA COLLECTION SURVEY

APPENDIX J—DATA COLLECTION SURVEY

Survey is posted as a separate file on the Public Safety Wireless Network Program Web site at <http://www.pswn.gov/libmain.cfm>. Search for the file using “Special Services.”

APPENDIX K—GLOSSARY

APPENDIX K—GLOSSARY

Term	Definition
Above-Grade, High-Angle Rescue	An operation conducted to free someone from a position above ground level, such as on a cliff or a window washer platform
Analog System	In an analog system, voice signals are sent over the air in an unaltered form. Voice communications are heard in the same time frame in which they were communicated. No compression or digitizing of voice occurs
Call Volume	The number of emergency calls for service to which an agency responds
Confined-Space Rescue	An operation to free someone from an enclosed or close-quartered location such as a trench or a sewer pipe
Conventional System	In conventional radio systems, frequencies are dedicated to specific channels. A single frequency (or duplex frequency pair) equates to only one usable channel. When this channel is in use, new users must listen and wait for current users to complete their conversation before the channel can be used
Disaster Preparedness Activities	Actions taken to prepare for, mitigate, respond to, or recover from natural or manmade disasters, such as earthquakes or fires
Digital System	In digital radio systems, voice is converted to a digital format before being sent over the air. When the digital signal reaches the receiving radio, it is converted back to analog so that it is intelligible to the human ear
Emergency Call	A call that requires dispatching resources to mitigate a given situation
Encrypted Communication	Methods used to scramble communications (voice or data) to assure privacy between the parties involved and to prevent others from listening
Enhanced Specialized Mobile Radio (ESMR)	ESMR combines cellular type telephone capabilities with two-way radio features. Nextel is the most widely known commercial provider of ESMR services
Functional Exercise	The simulation of an emergency including implementation of plans, movement of personnel, and a call-up of resources to test execution of the roles and responsibilities of an agency under pressure
Interoperability	The ability to establish over-the-air communications with two or more participating agencies
Landline Telephone	A telephone that uses physical telephone lines (i.e., is <i>not</i> wireless)
Land Mobile Radio (LMR)	The Federal Communications Commission defines LMR as a regularly interacting group of base, mobile, and associated control and fixed relay stations intended to provide communications over a single area of operation. LMR systems are designed using conventional or trunked technology, or a hybrid of the two
Megahertz (MHz)	A MHz is 1 million Hertz. The Hertz is the unit used to describe electromagnetic frequency
Memorandum of Understanding (MOU)	A written or oral agreement between two or more parties outlining specifics of their working relationship that may include policies or procedures for joint operations. For example, an MOU might be created to address sharing radio frequencies

Term	Definition
Mobile Data Terminal (MDT)	An MDT is a "dumb" computer terminal mounted in a vehicle that is linked via radio to a mainframe processor. MDTs have limited functionality in that they do not have processing capabilities and are generally used for access to federal, state, or local databases housed in centralized mainframe computers. MDTs are capable of line messaging, status reports, and low-level reports
Mobile Radio	A radio unit permanently mounted in a vehicle
Mutual-Aid Agreement	A written or oral agreement between two or more parties outlining the assistance that each participating agency can provide to the others, the means of requesting assistance, and the circumstances under which assistance will be provided
Mutual-Aid Frequency	A radio frequency common to two or more agencies for use in coordinating resources when the agencies are responding to an incident together
Narrowband	A descriptive term for the use of 12.5 kilohertz (kHz) of bandwidth per channel as opposed to the old standard of 25 kHz of bandwidth
Portable Radio	A radio unit that is "handheld" and can be transported
Repeater	A transceiver device used to relay radio signals among radio system users. It "takes in" transmissions on one frequency and retransmits "out" the same transmission on a different frequency. The term "talk in" then always refers to "talking into the repeater" from the field, and the term "talk out" always refers to transmission through the repeater "out" to field users
Reprogram Radio	A technique used for achieving interoperability by reprogramming field user radio with the appropriate channels/frequencies in order to communicate with intended users. The radio must have the exact capabilities of the intended system in order to achieve this function
Response Area	The area in which an agency provides service
Satellite Telephone	A communications device that uses satellites to transmit information
Special Services District (SSD)	A specific space or property for which safety and security are provided by a combined effort of private and government forces and resources
Strategic Planning	The process of assembling leaders to address potential disaster scenarios, assess strengths and limitations to handle them, deciding how to assure response goals can be met, and assigning roles and responsibilities to address specific concerns
Table-top Exercise	A slow speed disaster response scenario designed to elicit discussion, examine plans, and resolve problems at a management level
Trunked System	A system that automatically and dynamically allocates a small number of radio frequencies to many users. A tighter, more efficient range of the total frequency spectrum can be used because the frequencies are released when there is no transmission traffic
Ultra High Frequency (UHF)	The portion of the electromagnetic spectrum ranging from 300 MHz to 3 gigahertz
Very High Frequency (VHF)	The portion of the electromagnetic spectrum ranging from 30 to 300 MHz

Term	Definition
Wireless Data Communications	Means of transmitting and receiving data information through a wireless network

APPENDIX L—ACRONYMS

APPENDIX L—ACRONYMS

AHA	American Hospital Association
API	American Petroleum Institute
ARFF	Aircraft Rescue and Firefighter
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
DoD	Department of Defense
DOE	Department of Energy
EMS	Emergency Medical Service
ESMR	Enhanced Special Mobile Radio
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
HAZMAT	Hazardous Materials
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
kHz	Kilohertz
LEPC	Local Emergency Planning Committee
LMR	Land Mobile Radio
MDT	Mobile Data Terminal
MHz	Megahertz
MOU	Memorandum of Understanding
NRC	Nuclear Regulatory Commission
PSAP	Public Safety Answering Point
PSWN	Public Safety Wireless Network
SSD	Special Service District
UHF	Ultra High Frequency
VHF	Very High Frequency