



2006 National Interoperability Baseline Survey

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EXECUTIVE SUMMARY

In May 2006, the Department of Homeland Security (DHS) announced plans to conduct a landmark study of public safety wireless communications interoperability in the Nation. Commissioned as part of the ongoing efforts of the SAFECOM program to improve public safety wireless communications, and building upon past work in this subject area, this study brings a new scope and breadth to the subject matter. Specifically, this study is unique in its:

- ***Inclusiveness of first responder groups.*** This study surveyed both fire response/emergency medical services (EMS) and law enforcement agencies in all 50 states and the District of Columbia.
- ***Size of sample.*** The survey was issued to about 22,400 agencies nationwide. The size of our respondent pool, 6,819 agencies, allows findings to be reported at a 99-percent confidence level and ± 1.46 -point confidence interval, based on the national population of first responders. Figure ES-1 presents a comparison of the distribution of first responder disciplines in the national population and in our baseline respondent pool. Figure ES-1 presents a comparison of the distribution of first responder disciplines in the national population and in our baseline respondent pool.
- ***Comprehensive definition of interoperability.*** Although interoperability studies have often focused on equipment and some planning, this survey used, as its foundation, the SAFECOM Interoperability Continuum (Figure 1, page 1). The Continuum accounts for the elements of governance, policy, technology, training, and usage that are required for building and sustaining the capacity to interoperate. Each element was divided into component sub-elements, for which specific questions were devised.
- ***Scaled measurement of interoperability.*** Each Continuum-based question employed a response scale that defined early, moderate, full, or advanced stages of development (see sidebar for definitions).
- ***Recognition that the capacity for interoperability may vary among different responders.*** First responders interviewed while developing this project agreed that the ability to interoperate may vary according to what agencies are involved in incident response. This study accounted for three “levels” of interoperability. These levels include interoperability across disciplines (i.e., between law enforcement and fire response within the same jurisdiction), across jurisdictions (i.e., between agencies of the same discipline across local jurisdictions), and between agencies of the same discipline across state and local government.

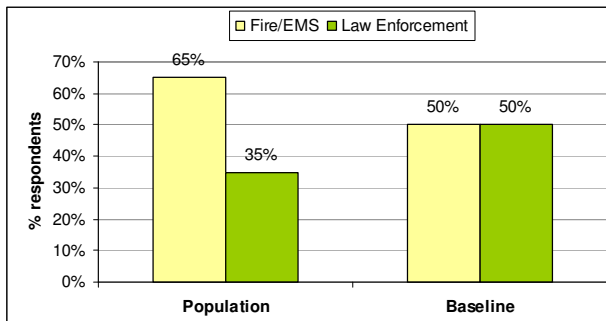


Figure ES-1—Comparison by Discipline

Definitions

Early—Little or no activity in the sub-element
Moderate—Some progress in the sub-element
Full—Substantially complete progress in the sub-element
Advanced—Efforts to sustain and assure continuous improvement of interoperability into the future.

All these points combine to create a report with greater measurement precision and statistical confidence than any studies on this issue to date. The major findings are summarized below:

- ***About two-thirds of agencies report using interoperability to some degree in their operations.*** According to our frequency of use and familiarity question, which addresses how often and in what situations interoperability are used, about one-third of agencies use interoperability

primarily for out-of-the-ordinary events, and another third interoperate both for out-of-the-ordinary events and in their day-to-day operations.

- ***Technology and some governance sub-elements response results demonstrated the highest stages of development on the Continuum.*** SAFECOM's survey findings indicate the Nation as a whole falls largely into the early stages for most of the Continuum-based sub-elements, with two notable exceptions. Under the technology element, a full third or more of agencies fall into the full stage. In addition, the governance element contained the only question (decision making groups) in which a majority of agencies indicate progress that equates to the moderate stage of development.
- ***The smallest agencies, as a group, tend to be at earlier stages of development than larger agencies.*** For any given sub-element question, agencies serving small populations (2,500 or fewer residents) are more likely than agencies serving more than 2,500 to indicate progress that equates to early development. Conversely, those agencies serving large populations (more than 25,000) are more likely than are other agencies to respond in the moderate, full, and advanced stages. This same pattern is evident when evaluating individual disciplines by size, although there are a few topics for which this pattern does not hold for fire response/EMS agencies.
- ***Fire response/EMS and law enforcement agencies tend to show the same level of development in most areas of the Continuum.*** Conversations with law enforcement and fire response/EMS personnel during survey development uncovered many operational differences between the two disciplines, leading to a hypothesis that they would differ significantly in their development of interoperability capabilities. However, differences between the disciplines were fewer and less dramatic than anticipated. Of the 32 Continuum-based questions in the survey, only one-quarter showed statistically significant differences between the two disciplines.
- ***Cross-discipline and cross-jurisdiction interoperability tends to be at a more advanced stage than state-local interoperability.*** Agencies reported more progress in achieving interoperability across disciplines and across jurisdictions; interoperability between state and local government agencies tended to be in the early stages.
- ***Agencies that operate on large, shared systems tend to be at more advanced stages of development than those that operate on stand-alone systems.*** Agencies that use a multi-agency, multi-jurisdictional shared communications system are more likely than the survey population as a whole to be in moderate, full, or advanced stages of development. Agencies that own and operate their own systems are more likely than the survey population as a whole to be in the early stage.

Agency size also plays a role in shared system participation. The smallest agencies are more likely (43 percent) than larger agencies (34 percent) to be part of a large shared system. Conversely, agencies serving populations greater than 10,000 or more have a greater likelihood than smaller agencies of operating on stand-alone systems (26 percent versus 17 percent). This makes sense, in that larger jurisdictions are likely to be better funded and capable of procuring their own communications systems.

However, this finding is also somewhat counter-intuitive—if small agencies are more likely to be on large shared systems, they should also more likely be in more advanced stages of the Continuum. Further analysis shows that while small agencies on shared systems appear to have an advantage over those on stand-alone systems, they are not as advanced as the larger agencies on the shared systems. Both size and system appear to contribute to the stage of development.

- ***Five significant predictors of frequency of use and familiarity emerge from the analysis.*** A logistical regression analysis of the data shows that a high score on five questions—approaches, implementation, exercises, command and control, and standard operating procedures (SOPs)—significantly predicts a high score in frequency of use and familiarity, across the three interoperability levels. However, identifying these five questions as particularly related to usage does not imply that the other Continuum sub-elements are unimportant.

Although the other Continuum-based questions are not statistically significant predictors of high interoperability use, the subjects they address do play a role in the pursuit of interoperable communications. Additional logistical regression analysis also identified statistically significant relationships with the five “predictor” sub-elements identified above that involved decision making groups, agreements, funding for capital investments, and strategic planning.

Taken together, these findings indicate that the capacity for interoperability is a complex issue that is likely affected by many variables. Nonetheless, these findings can provide important insights to policy makers and public safety officials on how interoperability is being addressed and by what types of agencies. The findings can be used to inform and tailor further plans to provide the education, incentives, and planning needed to continue improving interoperability capabilities across the Nation.

I. INTRODUCTION

In May 2006, the Department of Homeland Security (DHS) announced plans to conduct a landmark *National Interoperability Baseline Survey*. Commissioned as part of the ongoing efforts of the SAFECOM program within DHS, the study represents the first comprehensive effort to survey public safety first responder agencies across law enforcement, fire response, and emergency medical services (EMS) disciplines in all 50 states and the District of Columbia.

Purpose

The goal of the *National Interoperability Baseline Survey* is to create a national and statistically valid snapshot of the capacity for and use of interoperability. The study plan engaged the public safety community to develop a descriptive and measurable definition of interoperable communications and a robust measurement methodology. In contrast to other studies on interoperability conducted over the past 10 years, this study is designed to assess the five critical elements—governance; policies, practices, and procedures; technology; training and exercises; and usage—that determine an organization’s capacity for interoperability. These five critical elements of interoperability, as codified by the SAFECOM program in 2004 and published as the “Interoperability Continuum” (see Figure 1), were developed in partnership with the public safety community and used as a starting point in the development of the survey questions for this study (see Section II: Methodology).

This study provides data that will contribute to the following overall objectives:

- Determine the capacity for interoperable communications among law enforcement and fire response/EMS agencies across the Nation.
- Establish a process and mechanism to make it possible for agencies to regularly measure communications interoperability.
- Help emergency response officials make better-informed decisions about how to most effectively allocate resources for improving communications interoperability.
- Guide and measure the effectiveness of future communications interoperability improvement efforts that local, tribal, state, and Federal emergency response organizations execute.

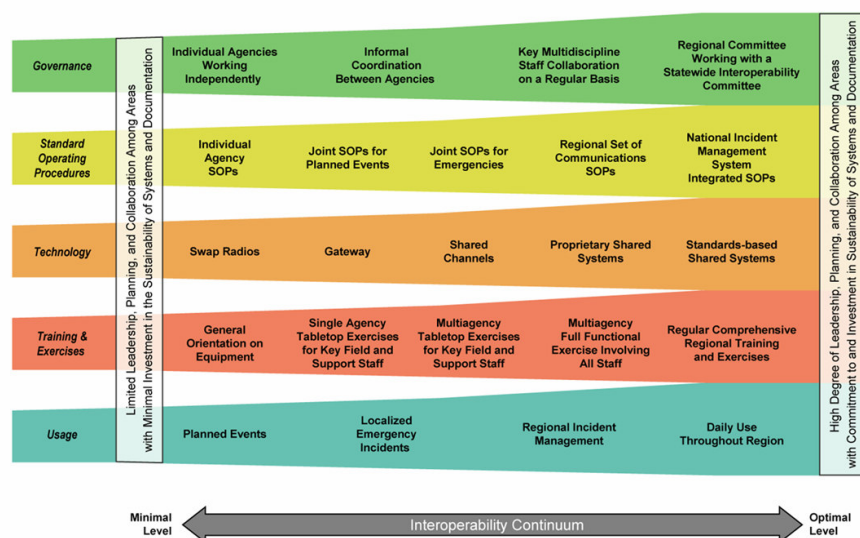


Figure 1—SAFECOM Interoperability Continuum

Background

Communications interoperability refers to the ability of first responders to communicate on demand, in real time, when needed, and as authorized. When interoperability is fully available, police, firefighters, and emergency medical personnel are able to talk to each other seamlessly to coordinate efforts during a routine incident, disaster situation, or special event.

Ten years ago, interoperability was considered an issue for radio technicians. Citizens, politicians, and the media assumed radios worked automatically and instantaneously as depicted in Hollywood movies and television. First responders in the field learned to work around the interoperability problem, as best they could, and depended on their own tenacity and creativity to bridge the communications gaps. However, in 1996, leaders in the public safety community and wireless industry came together in a special advisory committee sponsored by the Federal Communications Commission (FCC) to understand shortfalls in public safety wireless communications. They published a report¹ that noted the critical need for improvements to communications interoperability for public safety agencies operating at all levels of government across the Nation.

As a result of this report, two key studies were performed. In 1998, the National Institute of Justice (NIJ) published *State and Local Law Enforcement Wireless Communications and Interoperability*². This report provided the first quantitative data on interoperability from state and local law enforcement agencies nationwide. The next year, the Public Safety Wireless Network (PSWN) Program published the results of a similar survey in *PSWN Program's Analysis of Fire and EMS Communications Interoperability*³. That survey centered on the firefighting and EMS agencies. Both studies focused on the first responders' current and planned use of communications equipment and their experience with interoperability. Based on these findings and advances in the wireless industry, the public safety community and Federal Government began investing millions of dollars to address the problem of communications interoperability. Some efforts were technical, some were financial, and some were related to fostering coordination and partnerships across levels of government.

Public Safety Interoperability Challenges and Issues

- 60,000+ public safety agencies with more than 2.5 million personnel
- Multiple disciplines (e.g., Law Enforcement, Fire Response, Emergency Medical Services)
- Multiple tiers of government (e.g., township, city, county/parish, state)
- Technology differences (e.g., multiple system manufacturers, different communication modes, varied frequency bands)
- Operational differences between public safety disciplines
- Differences in rural versus urban mission operations

While these efforts achieved some success, longstanding obstacles to interoperability—including turf battles, lack of funding and political will for the development of shared radio communications systems, lack of common standards, and shortfalls in spectrum available to public safety—continued to hamper public safety communications. Over the years, as these obstacles were addressed, lack of interoperability continued to result in the unnecessary loss of lives and property. As the *9/11 Commission Report* stated, many of the first responders that responded to the attacks in New York City “lacked access to a [common] radio channel on which the Port Authority police evacuation order was given.”⁴ As the catastrophic events of September 11, 2001 showed the entire Nation, direct correlation exists between effective communications interoperability and first responders' ability to save lives. These shortfalls in the ability of public safety agencies to communicate with each other heightened the political and public will to

¹ *Final Report of the Public Safety Wireless Advisory Committee (PSWAC Final Report)*, September 11, 1996.

² *State and Local Law Enforcement Wireless Communications and Interoperability: A Quantitative Analysis*. National Institute of Justice. January 1998.

³ *PSWN Program's Analysis of Fire and EMS Communications Interoperability*. Public Safety Wireless Network Program. April 1999.

⁴ *9/11 Commission Report*, released July 22, 2004, p. 323.

increase funding and coordination at the highest levels of the Federal Government. To coordinate interoperability efforts across the government, OMB formed the SAFECOM program as part of the President's electronic government initiative in 2001. DHS assumed management of SAFECOM in 2003. SAFECOM provides research, development, testing and evaluation, guidance, tools, and templates on communications-related issues to local, tribal, state, and Federal emergency response agencies.

In addition, starting in 2002, several national associations representing elected and appointed public safety officials formed the National Taskforce on Interoperability. According to the Task Force's final report published in February 2003, the public safety community agreed on the following key interoperability issues: incompatible and aging communications equipment, limited and fragmented budget cycles and funding, limited and fragmented planning and coordination, limited and fragmented radio spectrum, and limited equipment standards.

In August and September 2005, the ramifications of the lack of communications interoperability were once more brought to national attention in the aftermath of Hurricane Katrina. The massive damage to communications infrastructure alone wreaked havoc on the ability of any single agency to coordinate its own relief efforts in the Gulf Coast area. Establishing simple internal *operability* compounded problems with achieving *interoperability* with other agencies. The House of Representatives report on the response to Katrina⁵ noted, "There was no voice radio contact with surrounding parishes or state and Federal agencies. Lives were put at risk and it created a direct operational impact on their ability to maintain control of a rapidly deteriorating situation within the city, carry out rescue efforts and control the evacuation of those who had failed to heed the call for evacuation." In addition, the report identified breakdowns in short- and long-term planning, in delays to system upgrades, as well as problems inherent in command and control when many levels of government are coordinating response. As the Task Force on Interoperability had revealed three years earlier, the reasons for the wholesale lack of interoperability around the Nation were numerous and complex, and continued to cause problems for the first responders in the field.

⁵ *A Failure of Initiative: The Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina*. Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, February 2006.

Approach

To better understand the Nation's capacity for and use of interoperability, SAFECOM developed a five-phase approach to accomplish the *National Interoperability Baseline Survey* (see Figure 2).

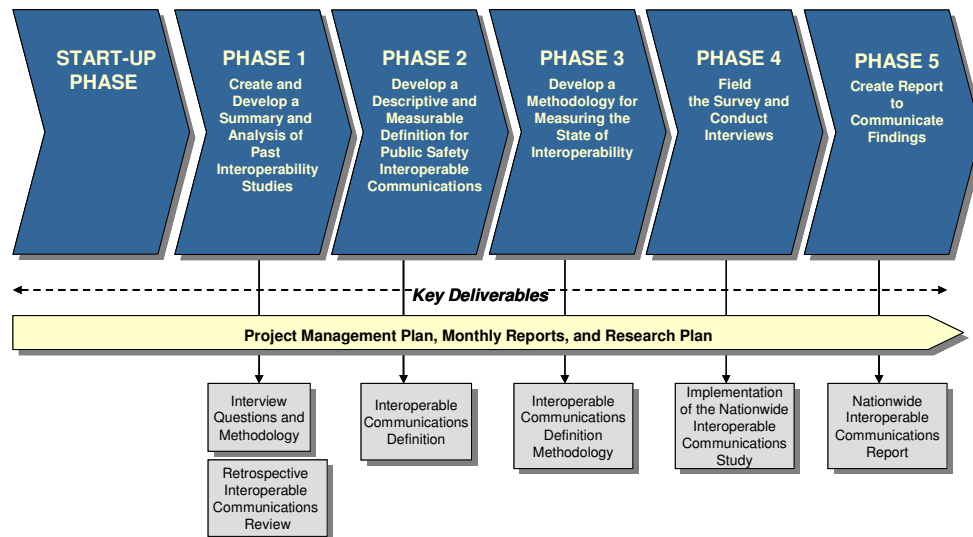


Figure 2—Phased Approach for the National Interoperability Baseline Survey

During Phase 1, SAFECOM summarized findings from past interoperability studies; developed an extensive list of the issues, obstacles, and factors that affect public safety in achieving interoperability; and compiled this information into a comprehensive and retrospective interoperability communications review.

During Phase 2, SAFECOM used the existing Interoperability Continuum as a starting point, and developed a more descriptive and measurable definition of interoperability for the public safety community. This definition was composed of 13 sub-elements of interoperability (aligned to the 5 critical elements), and codified into an Interoperability Continuum Measurement Tool (see Appendix A), which was designed as a foundation for the development of the survey instrument in Phase 3.

During Phase 3, SAFECOM identified the potential respondents that would receive the survey; researched various sampling methodologies and models; refined the characteristics for each sub-element in the Interoperability Continuum Measurement Tool to provide objective, complete, and mutually exclusive stages of interoperability; and developed the Interoperable Communications Survey Instrument, based on the refined Phase 2 Interoperability Continuum Measurement Tool.

During Phase 4, SAFECOM published the Survey Instrument through the required Office of Management and Budget (OMB) review process; conducted the survey among public safety agencies from across the Nation; and conducted 36 site visits in 9 regional areas to collect supplemental information to provide a practical interoperability perspective from the first responders in the field.

During Phase 5, SAFECOM analyzed and compiled the data from the survey and the site visits to the project reports.

Contents of the Report

This report presents an overall snapshot of interoperability across the Nation. Because this study is based on the SAFECOM Continuum, the report provides an independent assessment of each element and sub-element from the Continuum, rather than trying to reduce the findings to a single interoperability “score.” In addition, because it is a national report, the findings are analyzed for the Nation as a whole and for demographic groups such as public safety disciplines and populations served. However, no attempt is made to compare any region (e.g., state, city, or Urban Area Security Initiative (UASI) area) with another. Finally, as a baseline of the capacity for interoperability, this report does not presume to evaluate current or past interoperability programs or grants, or to provide a listing of user requirements or equipment in use nationwide.

The report includes a brief explanation of the purpose of the study, a detailed description of the methodology employed in the study, a section on the overall findings that describes response patterns that emerged across all questions and demographic groups, and a presentation of the key findings, which are organized into the five critical elements. In addition, the report contains an analysis of how the Continuum elements cluster together to predict usage, a snapshot of equipment and solutions in use across the Nation, and the results of a separate survey of state homeland security directors.

II. METHODOLOGY

The SAFECOM Interoperability Baseline Survey was conducted online between May 22, 2006, and July 31, 2006. Before the release of the survey, however, significant work was required to identify the sample, complete the survey itself, and develop the online tool that would be used to administer it. Figure 3 depicts the process followed to complete the survey project.



Figure 3—SAFECOM Interoperability Survey Methodology

Identify Stakeholder Entities

In the Statement of Work (SOW) for the Interoperability Baseline Survey, SAFECOM identified law enforcement, fire response, and EMS as the intended targets for this project. While SAFECOM recognized that other parties play a critical role in emergency response, they were not to be included in this particular study. As survey design progressed, however, SAFECOM and the Practitioner Working Group (PWG) determined that the perspective of state homeland security directors would be valuable to the project. Thus, the following groups were identified as the appropriate survey population—

- Law Enforcement
- Fire Response
- EMS
- State Homeland Security Directors.

SAFECOM then purchased the Fire Response/EMS and Law Enforcement editions of the National Public Safety Database to obtain the sampling frame, contact information, and demographic information for these groups.

Determine Sampling Methodology

SAFECOM decided to use a stratified random sample approach, with the strata determined by a geographic factor. Other methodologies considered included random nationwide sampling, stratified sampling, and cluster sampling. Stratified random sampling was favored because it would contribute to statistical validity (i.e., the confidence with which survey findings could be generalized to the entire population) and, because it would be structured to ensure that all areas of the country were included in the sample, it would support acceptance of the findings within the public safety community.

SAFECOM next addressed the sampling model, e.g., what geographic unit would serve as the basis for sampling. Options included the United States as a whole, geographic regions (e.g., Federal Emergency Management Agency (FEMA) regions), states, and jurisdictions, with further sampling by jurisdiction size. In each of these options, law enforcement and fire response/EMS agencies were to be sampled separately as distinct populations. The discussions focused on the potential tradeoffs between what conclusions the specific sampling models could and could not support, the sample sizes (and related burden) they would create, and the likelihood that a particular geographic area (state or city) would be included.

SAFECOM decided to sample at the state level to ensure a national sample that had good geographic distribution. The original sample was based on a 95-percent confidence level and a ± 5 -point confidence interval,⁶ and assumed a 50-percent response rate. Applying those criteria at the state level resulted in a

⁶ The **confidence level** is expressed as a percentage, and represents how often the true percentage of the population in question that would pick an answer lies within the confidence interval. The **confidence interval** is the plus-or-

sample population of 36,749 first responder agencies. Consultation with OMB during the Paperwork Reduction Act (PRA) review resulted in a higher confidence interval—7.5 points—and, therefore, a smaller (and less burdensome) sample of 22,416 first responder organizations.

Design Surveys

Continuum-Based Questions. Several methods were used to develop a survey instrument from the interoperable communications constructs. These methods included extensive use of the Phase 2 Interoperability Continuum Measurement Tool (see Appendix A) and related characteristics, a facilitator-lead subject matter expert (SME) meeting, and several follow-on SME discussions (including with the SAFECOM PWG). The content generated during all of these deliberations was crafted using best practices for survey design, resulting in a survey instrument that provided respondents with clear, unambiguous, and complete questions and response scales.

The constructs included 5 elements and 13 sub-elements of interoperability. Each sub-element was re-crafted as a survey question, with some split into two questions in those cases where more specificity was needed (e.g., Funding became Funding for Capital Investments and Funding for Operating Costs). To capture differences in interoperability with different parties, most topics⁷ were measured on three interoperability “levels”: interoperability with other disciplines, interoperability with other jurisdictions, and interoperability between levels of government. These levels are defined as follows:

- **With Other Disciplines**—Interoperable wireless communications with another first responder organization of a different discipline within the same jurisdiction (e.g., within a county, fire department A can communicate with police department A).
- **With Other Jurisdictions**—Interoperable wireless communications with other organizations of the same discipline outside the jurisdiction, but at the same level of government (e.g., sheriff’s deputies in one county can communicate with a responding deputy from a bordering county). All non-state governments (including municipal, tribal, county, and special districts) were considered a local level of government. Special agencies, such as campus and airport or harbor departments, were also considered “local” for purposes of this survey. This definition also includes state-to-state communications.
- **Between State and Local Government**—Interoperable wireless communications with other organizations of the same discipline at a different level of government (e.g., local investigators can communicate with state police).

For each question, a response scale was developed that included four progressive stages: early, moderate, full, and advanced. The stages were used to ensure that response scales were consistent across survey questions in measuring interoperability approaches. The stages were defined as follows:

- **Early**—Little or no activity in the sub-element
- **Moderate**—Some progress in the sub-element
- **Full**—Substantially complete progress in the sub-element
- **Advanced**—Efforts to sustain and assure continuous improvement of interoperability into the future.

minus figure that indicates the range of response that the surveyor can be “sure” the entire population would have picked if it had been surveyed.

⁷ Some sub-elements, such as funding and training, do not lend themselves to measurement across interoperability levels.

To avoid prejudicing responses, these labels did not appear in the survey. Survey respondents were instructed that their interoperability approach must satisfy all of the elements in one level of response before they could appropriately select the next higher level of response. In addition, “Other” and “Don’t Know” were added to the scales to allow respondents to select responses that best fit their situation.

Finally, follow-on questions were devised for some of the questions to gather more operational detail. For instance, the question on decision making groups was followed by a “select-all-that-apply” question on the nature of the respondent’s most important interoperability decision making group. These supplemental questions provided interesting nuances and insights on the basic approaches to interoperability.

Equipment Questions. In addition to the Continuum-based questions, several questions were developed to capture separate findings about the nature and kinds of communications interoperability equipment that public safety agencies use. These questions were structured as Yes/No or select-all-that-apply. They focused on the specific types of wireless communications solutions used by public safety organizations, the characteristics of the primary wireless system used by the agency, and specific needs for radio frequency (RF) spectrum. They do not correspond to the Interoperability Continuum and are not organized according to interoperability levels.

State Homeland Security Survey. A separate survey was developed for the state homeland security directors. The questions focused on the specific governance roles and responsibilities of these survey respondents, and addressed these sub-elements: decision making groups, interoperability funding, and strategic planning. The structure of the questions was the same as that in the first responder survey described above.

Final Review. Both surveys were reviewed extensively by SAFECOM, its PWG, and other public safety experts. Some of the content was revised accordingly, including designing the survey tool to include definitions of important concepts and phrases with the survey questions.

The OMB PRA review resulted in additional questions on the planned or current use of mutual-aid channels, broadband data access, and 700 megahertz (MHz) implementations. Most significantly, two Continuum-based questions about leadership were deleted. It was agreed that asking leaders of first responder agencies questions about leadership could be awkward and would not necessarily yield objective responses.

Appendices B and C, respectively, contain copies of the first responder and homeland security director surveys.

Develop Data Collection Instrument

The survey was posted online using a ColdFusion Web application server with a Microsoft SQL Server relational database. The survey program was developed and tested to ensure Section 508 compatibility for user accessibility, as well as cross-browser compatibility. It was also designed to collect data one question at a time, thus allowing respondents to complete it over multiple sittings in case they were interrupted or needed information from another party. A progress bar appeared on each screen to indicate how much of the survey had been completed.

Publicize Surveys

An extensive outreach campaign was designed and conducted to alert first responders to the survey, its purpose, and its timeline. SAFECOM issued a press release and placed tailored, bylined articles about the survey in trade publications read by law enforcement, fire response, and EMS personnel. Targeted trade publications in which coverage was secured included *Mission Critical Magazine*, *Fire Chief*, *Mobile*

Radio Technology, and *Public Safety Communications Magazine*. Nationally recognized public safety officials representing fire response, law enforcement, and EMS authored these pieces. Coverage of the survey was also secured on the Web sites of *Fire Rescue Magazine*, *Law Officer Magazine*, *Journal of Emergency Medical Services*, and the National Association of State EMS Directors. In addition, DHS Secretary Michael Chertoff promoted the survey in one of his speeches,⁸ and senior SAFECOM officials Dr. David Boyd and Anthony Frater addressed the survey in speeches and in interviews with several public safety publications.

Finally, an e-mail was sent to approximately 200 heads of state chapters or affiliates of the International Association of Fire Chiefs, International Association of Chiefs of Police, National Sheriff's Association, and National Association of State Emergency Medical Services Directors. The e-mail contained information about the survey, and asked the directors to forward that information to their state members via listservs or e-mail bulletins.

Administer Surveys

On May 10, 2006, an introduction letter, signed by Secretary Chertoff, was sent to all agencies in the survey sample. The purpose of the letter was to introduce the survey, and explain that the recipient had been asked to participate and would receive a postcard with a username and password. The postcard was issued a few days later.

A reminder letter was sent to those agencies that had not yet responded to the survey at the three-week mark. On June 23, 2006, the survey administration period was extended another month, and a call center engaged to contact non-respondents and to urge them to take the survey.

Conduct Field Visit Interviews and SME Review

The research plan also included face-to-face interviews with police and fire chiefs throughout the Nation. These interviews were designed to gather insights and contextual comments on the survey findings.

To ensure that the interviews covered a variety of geographic and demographic areas, SAFECOM selected the following nine regional areas in which to conduct on-site interviews:

- Charleston, South Carolina
- Denver, Colorado
- Los Angeles County, California
- Madison, Wisconsin
- Oklahoma City, Oklahoma
- Phoenix, Arizona
- Richmond, Virginia
- Seattle, Washington
- Suffolk County, New York.

Demographic data from each area were analyzed to select a group of interview candidates that represented various-sized agencies across all disciplines.

Following the completion of the online survey, the responses for each question were collated, and interview questions were drafted to elicit comment on them. The questions were designed to be open-ended and encourage interviewees to think from the perspective of public safety as a whole.

Each designated region was assigned one site visit team to administer the interviews. The site visit teams comprised two or three members—one SME to lead each interview and one or two note takers. Each site visit team member was required to attend a general training session that covered effective interviewing

⁸ http://www.dhs.gov/xnews/speeches/speech_0281.shtm

skills. The training addressed interview styles, listening skills, and communications between the interviewer and note takers to ensure that all important information would be captured. On average, four one-hour interviews were conducted during each site visit. The interviews were conducted during August 2006. The baseline team also conducted a supplemental interview at the Association of Public-Safety Communications Officials–International (APCO) Conference in Orlando, Florida.

Following the analysis of the field interviews, a SME review was held on October 3, 2006. SMEs included staff with broad backgrounds in firefighting/EMS and law enforcement, as well as staff from the John F. Kennedy School of Government at Harvard University. They reviewed question by question the findings, as well as site visit themes (items that were raised in at least three separate field visit interviews). All comments that achieved consensus were recorded and are included in this report as SME input.

Analyze Survey Data

Before any of the actual results of the survey could be determined, preliminary analysis of the respondents was conducted to assess the number and type of respondents, and the extent to which each had completed the survey. This analysis allowed SAFECOM to determine whether weighting techniques would be needed to bring the responses in line with the public safety population as a whole, and to purge the data set of substantially incomplete responses. In the end, it was determined that weighting was not necessary, and only a small portion of survey responses were purged.

Weighting Analysis. Of the 22,416 agencies that received the invitation to participate in the survey, 7,541 provided some level of response. The first analysis performed was to determine whether this group of respondents appropriately represented the overall population of first responders and whether weighting of the data would be required. If the groups within the survey respondent population were determined to be in different proportions than those within the nationwide first responder population, responses of the over-represented groups would “over influence” the total sample and therefore the findings themselves. Weighting procedures would then be applied to correct for the influence of a disproportionate number of respondents.

As discussed above, the Baseline Survey sample was based on two strata: state and discipline. It was therefore logical to determine the need for weighting based on these two variables.

To determine whether weighting was necessary, the distribution of states within the population (i.e., each state’s contribution to the total population) was compared with the distribution of states within the sample obtained (each state’s contribution to the total number of survey respondents). Weighting would have been necessary if these distributions were different to an important extent. The determination was made by creating a cross-tabulated table and employing a Cramer’s V test of association.

A common measure of statistically significant differences, chi-square, was not relied on because the first responder populations and baseline sample sizes were relatively large. If chi-square were used, it was likely that the significant differences observed would not reflect important differences, but chance occurrences. The Cramer’s V test, on the other hand, measures the strength of an observed relationship, and could be used to decide whether or not differences between the population and sample should be considered important differences.

The possible values for Cramer’s V range from 0 to 1, where 0 represents no relationship and 1 represents a perfect relationship. The Cramer’s V value for the state population/baseline sample was .142, suggesting a relatively weak relationship. Therefore, the decision was made not to weight the sample by state.

The second stratum in the sample was first responder's discipline. As can be seen in Figure 4, the proportion of fire response/EMS agencies in the national population is almost twice that of law enforcement agencies. The respondents in the baseline sample are split almost exactly equally by discipline. This is clearly disproportionate compared with the population. However, the decision was made not to weight on the basis of discipline for two reasons. First, because there are only two categories on which weighting would be applied (i.e., fire response/EMS versus law enforcement), the resulting weights would be a coarse correction of the resulting sample proportions. Second, the differences between the two disciplines can be better illustrated by presenting the un-weighted total sample, and then presenting each discipline sample separately. Potential implications of this response pattern are discussed in Section III, Overall Findings.

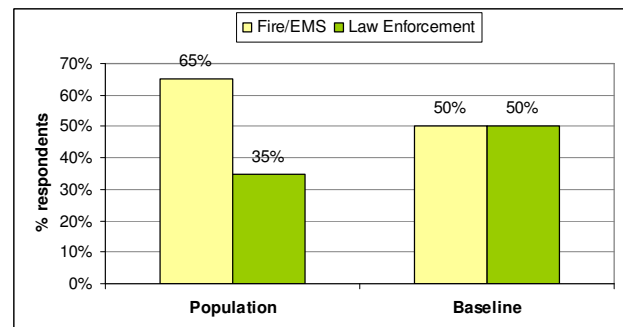


Figure 4—Comparison by Discipline

Missing Values Analysis. A missing values analysis determined that a sizable number of agencies failed to answer many of the 32 Continuum-based questions (see Figure 5). Those that failed to answer at least 90 percent of these questions were purged from the data set. This resulted in a total data set containing 6,819 agencies, which represents a 30 percent survey response rate. A sample of this size has a 99 percent confidence level and ± 1.46 point confidence interval (based on the national population of first responders).

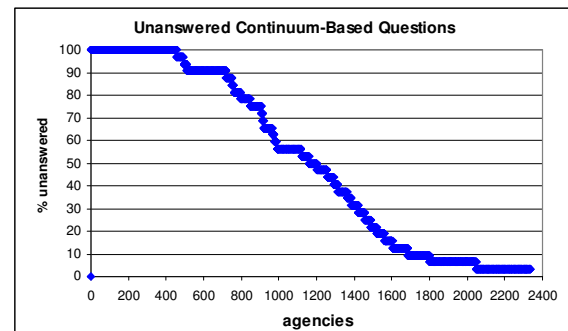


Figure 5—Missing Values

Broken down by discipline, the fire response/EMS sample (3,389) has a 99 percent confidence level and ± 2.11 point confidence interval when compared with the national population of fire response/EMS agencies. The law enforcement sample (3,430) has a 99 percent confidence level and ± 1.99 point confidence interval when compared with the national population of law enforcement agencies.

Basic descriptive and inferential statistics were used to compile the findings in this report. Statistical significance was assessed at the .001 level because of the large number of agencies responding to the survey. Within this framework, findings were deemed statistically significant if they displayed a residuals value greater than 2. Tables highlighting statistically significant findings are presented in Appendix D.

Non-Response Bias Analysis. In assessing the results of any survey, researchers must consider the possibility that non-respondents may differ significantly from respondents in areas critical to the issue under study. These potential differences can affect the confidence with which survey findings can be applied to the broader population. To address this concern, SAFECOM followed up its survey effort with a non-response bias analysis (NRBA) to determine whether any differences inherent to interoperability existed between responding and non-responding agencies.

A condensed version of the survey was created for this stage of the project. Regression analyses were conducted on the survey data to identify four sub-elements that were strongly predictive of actual use of

interoperability, and those questions were formatted into a faxable survey document. A random sample of 1,190 agencies was selected from the pool of non-responding agencies, and the agencies were asked whether they would participate in an abbreviated version of the survey. Those who agreed received the survey by fax and were asked to return their responses by fax. An insufficient number of agencies responded to this effort, and analysis of potential differences was therefore not possible.

III. OVERALL FINDINGS

Overall findings for this report fall into two categories: demographic findings concerning the respondents themselves, and overall patterns of how specific demographic groups within the sample responded to questions.

Demographic Analysis of Respondents

Agency size and discipline were two primary areas of analytical interest for this report, so the survey sample was examined from these perspectives. The number of agencies in the country and the number in the study sample are both extremely skewed toward jurisdictions with small populations. Conversely, the number of agencies representing very large jurisdictions is extremely low. Five size categories were developed that allowed a roughly equal distribution of respondents. These categories allowed for cross-tabulation analyses, which are sensitive to large discrepancies in the size of groups. As can be seen in Figure 6, the percentage of agencies in each of the size categories is fairly consistent between the national population and the survey sample.

Two significant differences emerged from an examination of population served by discipline (see Figure 7). Although the two disciplines constituted equal proportions of the survey respondents, fire response/EMS agencies were more common in the smallest jurisdictions, and law enforcement agencies were more common in the largest jurisdictions.

Baseline Findings

An overview of the data from the Continuum-based questions revealed that the capacity for interoperability varies among the Continuum elements. A review of previous studies on interoperability showed that those studies focused more on technology and governance issues than on operations. The SAFECOM survey findings support the concept that technology and governance may have received more attention from public safety groups. First responder agencies showed the highest levels of development in the area of technology, followed by certain sub-elements under governance. For the other elements of the Interoperability Continuum, a preponderance of agencies is in the early development stage. This pattern holds true only when all agencies are assessed together.

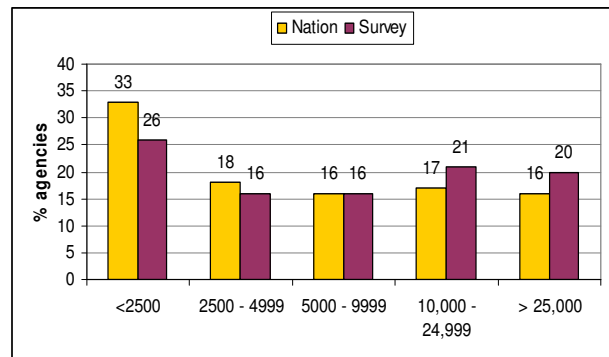


Figure 6—Population Served

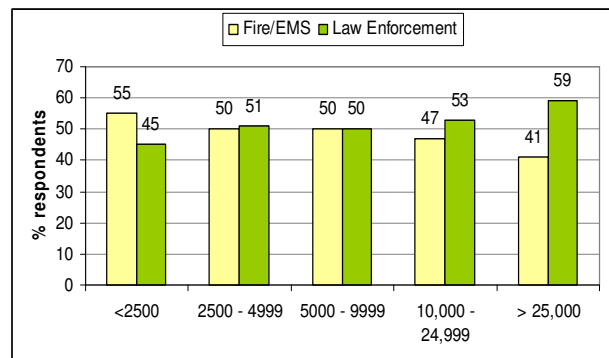


Figure 7—Population Served by Discipline

Data were next examined to identify differences between the sizes of organizations identified above and by discipline, as well as by interoperability level and type of wireless system used. Those overall findings are described below.

- ***About two-thirds of agencies report using interoperability to some degree in their operations.*** According to our Frequency of Use and Familiarity question, which addresses how often and in what situations interoperability is used, about one-third of agencies use interoperability primarily for out-of-the-ordinary events, and another third interoperate in their day-to-day operations.
- ***Technology and some governance sub-elements response results demonstrated the highest stages of development on the Continuum.*** A review of previous studies on interoperability showed greater emphasis on technology and governance issues than on operations. SAFECOM's survey findings support the concept that technology and governance have received more attention from public safety groups. Technology was the only element in which a plurality of agencies appears to have achieved full development. Governance contained the only question in which a majority of agencies indicate progress that equates to the moderate level of development. Data from the other elements of the Interoperability Continuum indicate early development.
- ***The smallest agencies, as a group, tend to be at earlier stages of development than larger agencies.*** As described above, agencies serving smaller populations dominate the sample. Chi-square analysis and adjusted standardized residuals indicated statistically significant findings that, across the Continuum, agencies serving the smallest populations (fewer than 2,500 residents) are more likely than agencies serving larger populations to fall in the early stage of development. The proportions of the two groups who respond in the early development stage, for any given question, differ by 5 to 17 percentage points.

This analysis also found that agencies serving larger populations tend to fall more in the moderate, full, and advanced stages. This same pattern exists when evaluating discipline by size, although there are a few topics for which this pattern does not hold for fire response/EMS agencies. The cause of this interesting pattern remains to be explained, although it could be driven by need. Agencies in smaller jurisdictions may simply not need to interoperate with other agencies as much as those in larger jurisdictions.

- ***Fire response/EMS and law enforcement agencies tend to show the same level of development across most areas of the Continuum.*** The hypothesis that law enforcement and fire response/EMS agencies are so different operationally that the study would discover many statistical differences in their approach to interoperability was not demonstrated as dramatically as had been anticipated. Of the 32 Continuum-based questions in the survey, only one-quarter showed statistically significant differences between the two disciplines.
- ***Cross-discipline and cross-jurisdiction interoperability tends to be at a more advanced stage than state-local interoperability.*** Many of the Continuum sub-elements were measured along three scales of use: across disciplines, across jurisdictions, and between state and local government. First responders reported more progress in interoperability across disciplines and across jurisdictions; interoperability between state and local government had a greater tendency to be in the early stages. Again, this may be driven by need—state and local agencies may not work together frequently enough to encourage more advanced approaches to interoperability. It is also consistent with findings from previous studies.
- ***Agencies that operate on large, shared systems tend to be at more advanced stages of development than those that operate on stand-alone systems.*** Agencies that use a multi-agency,

multi-jurisdictional, shared communications system are more likely than the survey population as a whole to be in moderate, full, or advanced stages of development. Agencies that own and operate their own systems are more likely than the population as a whole to be in the early stage. There are also significant demographic findings associated with the type of system used. The smallest agencies are more likely (43 percent) than larger agencies (34 percent) to be part of a large shared system. Conversely, agencies serving 10,000 residents or more have a greater likelihood than smaller agencies of operating on stand-alone systems (26 percent versus 17 percent). This difference makes intuitive sense, in that larger jurisdictions are likely to be better funded and capable of procuring their own communications system.

However, this finding is also somewhat counter-intuitive—the size effect described above (small agencies more likely to be in early stages of development) should be somewhat offset by the likelihood of small agencies participating in large shared systems, and thus to appear in the moderate and full stages. Further analysis shows that while small agencies on larger shared systems do display more advanced stages of development compared with small agencies on stand-alone systems, they are not as advanced as the larger agencies on the shared systems. Both size and system appear to contribute to the stage of development across the Continuum.

- ***Five significant predictors of frequency of use and familiarity emerge from analysis.*** The results of a logistical regression analysis show approaches, implementation, exercises, command and control, and standard operating procedures (SOPs) predict a high score in frequency of use and familiarity across all three interoperability levels.

Although the other Continuum-based questions are not statistically significant predictors of high interoperability use, the subjects they address contribute to interoperability. Additional logistical regression analysis identified statistically significant relationships with the five “predictor” sub-elements identified above that involved decision making groups, agreements, funding for capital investments, and strategic planning.

These findings illustrate the challenges inherent in trying to define a simple “baseline” of interoperability. No one-dimensional scale can adequately define the current state of interoperability in the Nation, or the progress left to be made, because the capacity for interoperability is a complex issue that involves technological, political, operational, and human variables. However, this study does provide a landmark measurement of many of the elements of interoperability, and provides valuable data. As such, the report requires careful and deliberate reading, and the use and applicability of its findings depend on the policy interest or public service objective. For instance, when seeking to understand the public safety implications of the Nation’s current capacity for interoperability, readers should consider that those agencies serving the largest population centers show more progress toward interoperability than those serving small populations. When assessing the interoperability capacity of agencies apart from considerations of population served, readers may want to note that these survey results may have a slightly optimistic bias: had responses been more proportionate among the disciplines (see Figure 4), it is possible that a greater proportion of responses per question could have fallen in the early category⁹.

Caveats aside, these findings provide an unprecedented array of data to public safety and policy officials who want a multi-dimensional understanding of the capacity of public safety agencies to communicate and respond together. They can inform the process of tailoring future plans to provide the education, incentives, and planning needed to continue improving interoperability capabilities across the Nation.

⁹ Cross-tabulation analyses show the fire response/EMS agencies were more prevalent among agencies serving the smallest populations and, as noted in this section, agencies serving smaller populations are more likely to provide responses in the early stage.

IV. QUESTION-LEVEL FINDINGS

Findings for specific survey questions are discussed in this section. The findings are organized by element and sub-element. Each section for a sub-element question contains a bar graph showing the entire distribution of responses by interoperability stage and interoperability level. The bars are clustered, left to right, to correspond with responses in the early, moderate, full, and advanced stages defined for each question. The graphs do not display the “don’t know” and “other” responses because the percentages for each were uniformly low. Those data are provided in Appendix D.

Universal findings based on size and wireless system type reported in Section III are not repeated in this section. However, statistically significant differences between disciplines that are unique to specific questions *are* described here.

Governance

The governance element includes the up-front planning and agreements that public safety leaders must address to ensure that their systems will interoperate. This element is essential or foundational to interoperability because governance decisions drive the conception, design, and implementation of interoperable capability. Interoperable communications cannot emerge on their own, nor can any single agency implement interoperability, without this collective leadership and support. Public safety officials who participated in working groups to define interoperability recognized this when they ranked governance as the most important of the five elements on the Interoperability Continuum. A report published in February 2003 by the National Task Force on Interoperability¹⁰ cites five key obstacles to interoperability, two of which (limited and fragmented budget cycles and funding, and limited and fragmented planning and coordination) are governance issues. Moreover, the Government Accounting Office (GAO) has reported that, “The single greatest barrier to addressing the decades-old problems of interoperable communications has been the lack of effective, collaborative interdisciplinary and intergovernmental planning.”¹¹

Governance: Decision Making Groups

“Decision Making Groups” are the groups of public safety practitioners and leaders who bring together their expertise to improve public safety communications interoperability. Decision making groups are often foundational to public safety communications planning: achieving interoperability can be a complicated process, and agencies must discuss the issues involved together if they hope to move beyond ad hoc solutions. As the response stages progress from early to advanced stages, the formality, structure, and inclusiveness of these groups increase.

Definition

A “formal” decision making group is one with a published agreement that designates its authority, mission, and responsibilities.

¹⁰ *Why Can’t We Talk? Working Together to Bridge the Communications Gap to Save Lives*. National Task Force on Interoperability, February 2003.

¹¹ *Catastrophic Disasters: Enhanced Leadership, Capabilities, and Accountability Controls will Improve the Effectiveness of the Nation’s Preparedness, Response, and Recovery System*. General Accounting Office, GAO-06.618, September 2006, p. 42.

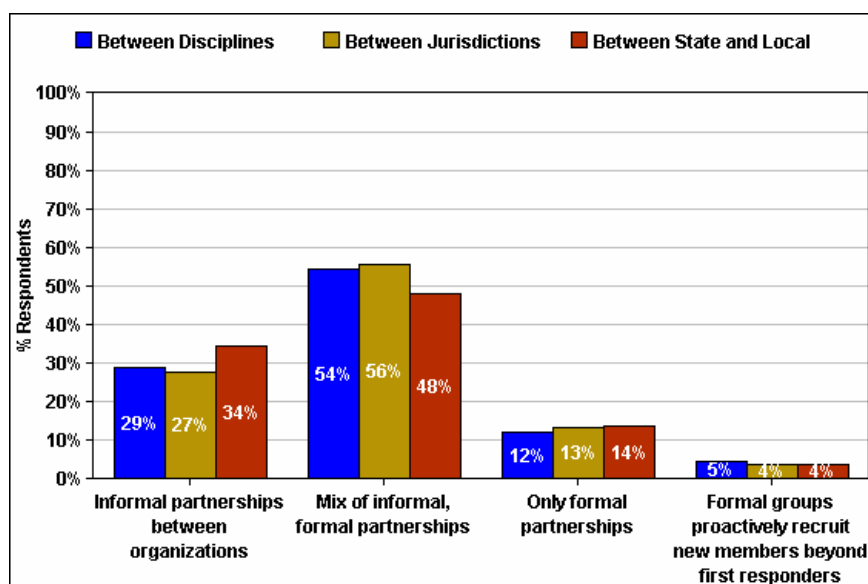


Figure 8—Decision Making Groups

Findings regarding decision making groups included:

- This is the only sub-element in the survey in which a majority of agencies fall into the moderate stage. More than half of the agencies report participating in a mix of formal and informal decision making groups, with membership that crosses disciplines and crosses jurisdictions. Slightly fewer, 48 percent, include state-level membership. (See Figure 8.)
- Across all interoperability levels, about 13 percent of agencies have only formal group structures.
- The formal groups in which agencies do participate have the following characteristics:¹²
 - Make recommendations on interoperability—65 percent.
 - Meet regularly—58 percent.
 - Take action on its own decisions—54 percent.
 - Have governance structure in place with rules—51 percent.
 - Send information to all members—49 percent.
 - Send information to public safety leaders outside the group as appropriate—48 percent.
 - Have consistent membership—46 percent.
 - Send information to political leaders outside the group as appropriate—34 percent.

¹² Respondents could select as many characteristics as applied; therefore, these data do not total to 100 percent.

- One significant difference emerged between disciplines for decision making groups, and that was limited to groups including cross-discipline membership. Fire response/EMS agencies are far more likely to participate in formal groups that proactively recruit new members beyond first responders. This places them in the advanced stage. Law enforcement respondents were slightly more likely to report in the moderate stage. (See Figure 9.)

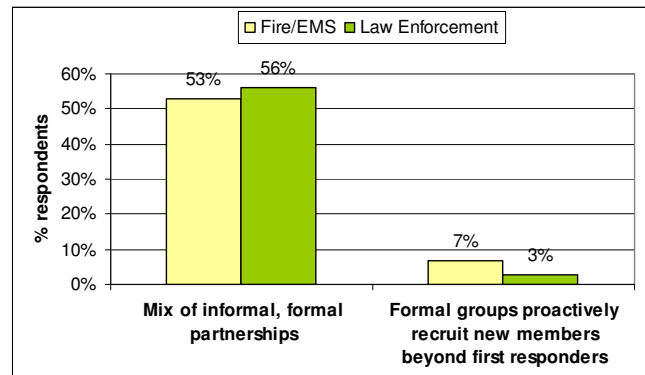


Figure 9—Decision Making Groups by Discipline—Cross-Discipline Membership

As noted above, this sub-element is the single one in which most agencies fall into the moderate stage. Agencies have taken steps to formalize the processes by which they work together to ensure interoperability. In recent years SAFECOM has promoted regional interoperability methodologies, and has tailored Federal grant guidance to include incentives for regional planning. Thus the development of at least some formal groups may be in response to that. Public safety officials interviewed provided some acknowledgement that the grant process did drive more participation in these groups, but also cited several other benefits: establishing ongoing dialogue with other organizations on interoperability, promoting new initiatives, and sharing guidance on grants and funding, as well as forming the relationships needed to obtain grants for regional interoperability.

Even so, some funding obstacles continue to work against some agencies, particularly smaller ones, from participating in these groups. Smaller agencies noted that it is difficult to spare the staff and resources to send people to participate in meetings. At least one interviewee cited city government opposition to participation, even when public safety groups themselves wanted to participate, owing to fear that participation would cede city control of city funds.

This question also showed the most dramatic instance of one discipline completely outdistancing the other in the advanced stage. SMEs reviewing these findings were not surprised to see fire response/EMS more likely to report in the advanced stage in this instance than law enforcement. One of the distinguishing characteristics of the advanced stage is reaching out to groups beyond traditional first responders, and it was agreed the fire response/EMS are often in contact with a wide variety of groups in their response efforts.

Governance: Agreements

“Agreements” are mechanisms approved to ensure the availability and proper use of communications interoperability solutions for public safety. These may include agreements to share frequencies, to share dispatch services, or to maintain and distribute radio caches. As the response stages progress from early to advanced stages, the formality of the agreements and number of agencies with which they are in place increases.

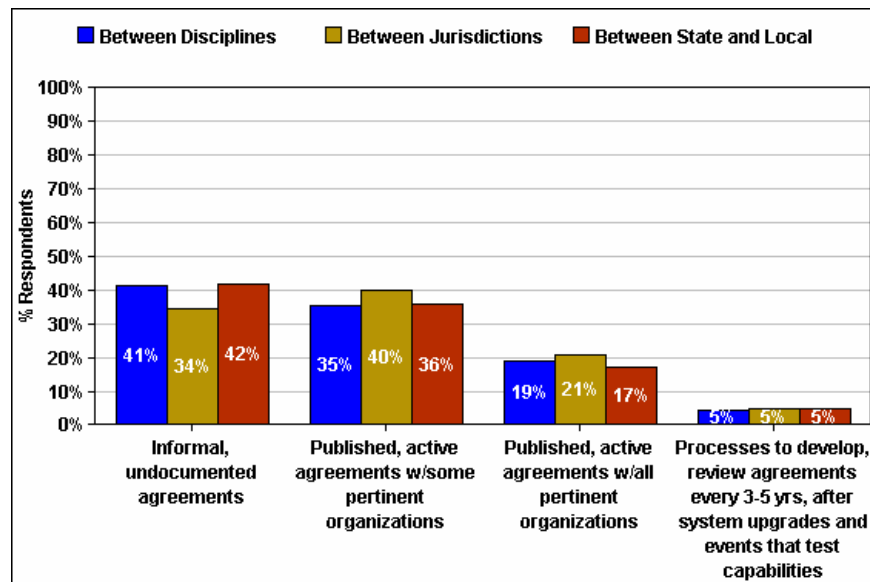


Figure 10—Agreements

Findings regarding agreements included:

- There is a roughly even distribution between the early (informal, undocumented agreements) and moderate (published, active agreements with some pertinent organizations) stages. This pattern holds for all three interoperability levels. The percentages of agencies that have formal agreements with all pertinent organizations are considerably smaller. (See Figure 10.)
- Only when reviewing cross-jurisdiction agreements do statistically significant differences emerge between disciplines. There, fire response/EMS responses were more likely to indicate full and advanced levels of development for cross-jurisdiction agreements. (See Figure 11). Conversely, law enforcement agencies are more likely to be in the early stage of development.

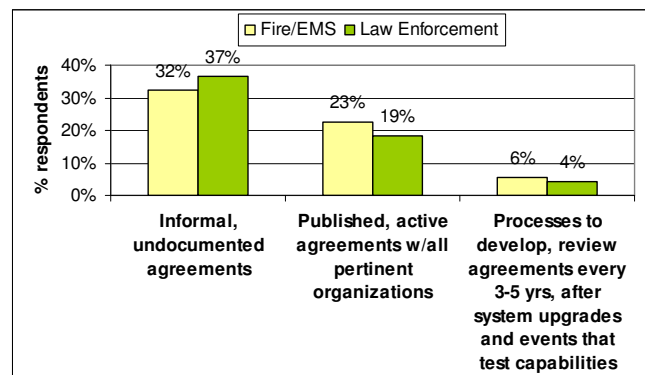


Figure 11—Agreements by Discipline—Cross Jurisdiction

Agencies interviewed in the field offered differing perspectives on the findings. Few were surprised at the number of agencies that operate without formal interoperability agreements. There was also a sense

that small agencies in particular tended to work more informally. Crafting formal agreements requires significant time and resources, so agencies need strong incentives to do so. If agencies can interoperate adequately with informal agreements, they will likely do so. Additionally, political and turf issues can interfere with the formation of agreements, while sovereignty issues often emerged as obstacles for tribal agencies. Finally, some agencies also specified that although they do have formal mutual aid agreements with other agencies, those agreements do not necessarily address communications.

Concerning the differences between disciplines, SMEs noted that there are different drivers for agreements between the fire response/EMS and law enforcement disciplines. Law enforcement is organized along political jurisdictions, and much of its operations across jurisdictional lines are codified in local law. Fire response/EMS agencies, on the other hand, are not organized according to political jurisdictions, and their cooperation is consequently not codified in law. They would thus have a greater need to establish agreements for working across political jurisdictions.

Governance: Funding for Capital Investments

“Funding for Capital Investments” addresses the levels and reliability of funding available to acquire one-time capital investments, such as equipment and radios (as opposed to funding for recurring operating costs). As the response stages progress from early to advanced stages, funding becomes more consistent, sufficient, and reliable.

Funding questions were asked from the perspective of the responding agency only, as opposed to across the three interoperability levels, because it was not expected that any one agency would have insight into other agencies’ budget situations.

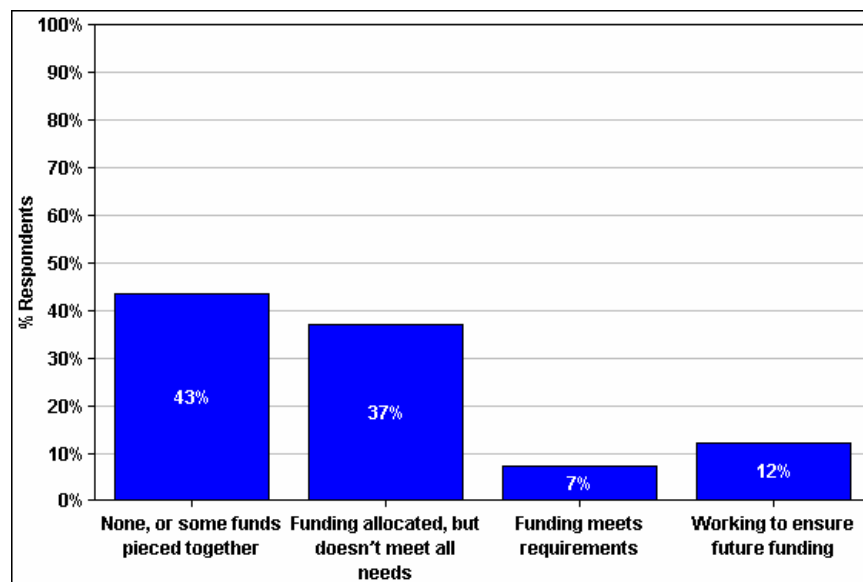


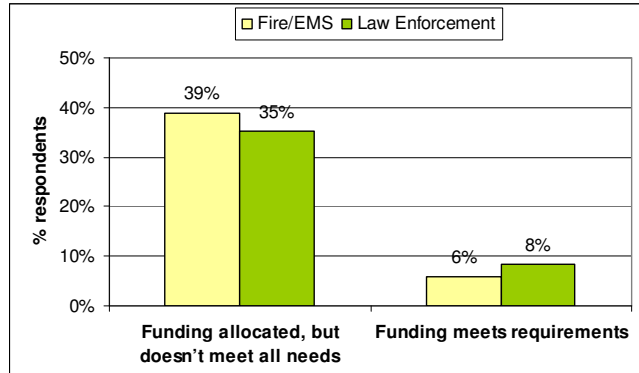
Figure 12—Funding for Capital Investments

Findings regarding funding for capital investments included:

- In keeping with the 2003 finding that “limited and fragmented funding” is a key obstacle to interoperability,¹³ a plurality (43 percent) have no funding or have been able only to piece some funding together. Another 37 percent note that they do have some funding allocated, but that it does not meet their needs. Only 7 percent of agencies report that their funding for capital investments meets current requirements. (See Figure 12.)
- The smallest agencies, those serving populations of fewer than 2,500, are particularly hard hit on funding for capital investments costs. 55 percent of these agencies report having no or minimal funding, compared with 39 percent of agencies serving populations greater than 2,500.
- Agencies were asked whether they shared capital investment costs with other first responder agencies. The results are shown below, with percentages based on the number of respondents who answered any one of the questions.

¹³ *Why Can't We Talk? Working Together to Bridge the Communications Gap to Save Lives*. National Task Force on Interoperability, February 2003.

- My organization shares capital investment costs with other first responder disciplines—60 percent.
 - My organization shares capital investment costs with other jurisdictions—41 percent.
 - My organization shares capital investment costs with other levels of government—46 percent.
- Fire response/EMS are slightly more likely to report having a partial degree of dedicated funding, whereas law enforcement shows a slight edge in reporting full levels of funding. (See Figure 13.)



**Figure 13—
Funding for Capital Investments by Discipline**

Few of the agencies directly interviewed were surprised by the large number of agencies without dedicated funding for either capital expenses or maintenance. “We fight for it every year,” said one police chief. Lack of funding as an obstacle has been documented in previous studies. Funding issues affect not only equipment, but agencies’ ability to participate in decision making groups and exercises, both of which require more staff time. Interestingly, grant money was seen as a mixed blessing. On one hand, it was considered the best source of funds. On the other, small local agencies claimed that such funds tended not to trickle down to them. Agencies also recognized that their chances of getting DHS grants would be next to nothing if they did not create partnerships. Thus, there was some recognition that governance groups could serve to help in obtaining grant funds.

Governance: Funding for Operating Costs

“Funding for Operating Costs” addresses the levels and reliability of funding available to cover recurring operating costs for interoperability equipment (as opposed to funding available for one-time capital costs). As the response stages progress from early to advanced stages, funding becomes more consistent and reliable beyond the current budget cycle.

Funding questions were asked from the perspective of the responding agency only (as opposed to collectively across the three interoperability levels) because it was not expected that any one agency would have insight into other agencies’ budget situations.

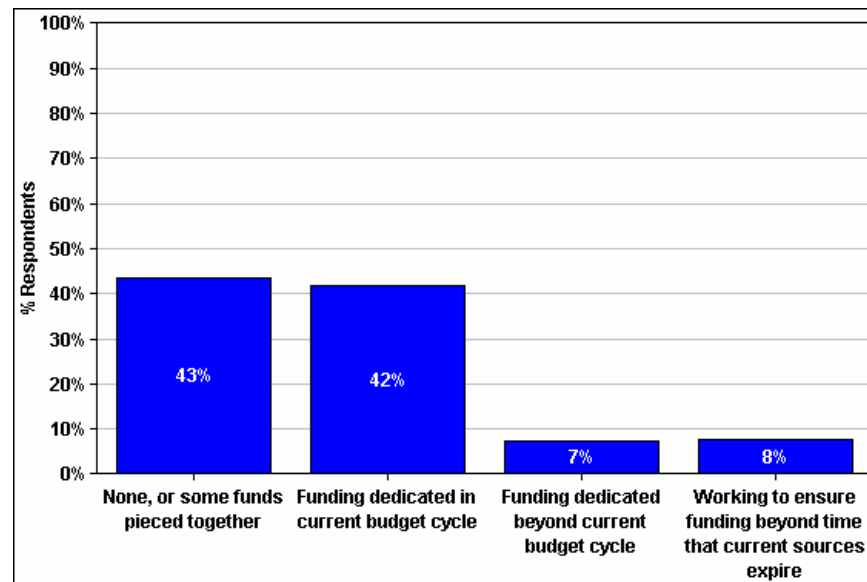


Figure 14—Funding for Operating Costs

Findings regarding funding for operating costs included:

- Only 7 percent of agencies report that they have funding dedicated for operating costs beyond the current budget cycle. The plurality (43 percent) has no dedicated funding or has been able to piece some funding together. Another 42 percent note that they some funding dedicated in the current budget cycle. (See Figure 14.)
- The smallest agencies, those serving populations of fewer than 2,500, are particularly hard hit on funding for operating costs. Fifty-four percent of them provided responses that equate to the early stage, compared with 39 percent of agencies serving populations greater than 2,500.
- Agencies were asked whether they shared operating costs with other first responders. The results are shown below, with percentages based on the number of respondents who answered any one of the questions:
 - My organization shares operating costs with other first responder disciplines—60 percent.
 - My organization shares operating costs with other jurisdictions—41 percent.
 - My organization shares operating costs with other levels of government—45 percent.
- There are no significant differences between disciplines for this question.

Governance: Strategic Planning

“Strategic Planning” refers to disciplined and documented efforts to produce fundamental decisions and processes designed to improve interagency communications in the future. As the response stages progress from early to advanced, strategic planning efforts draw closer to completion and are accepted by a greater number of participants.

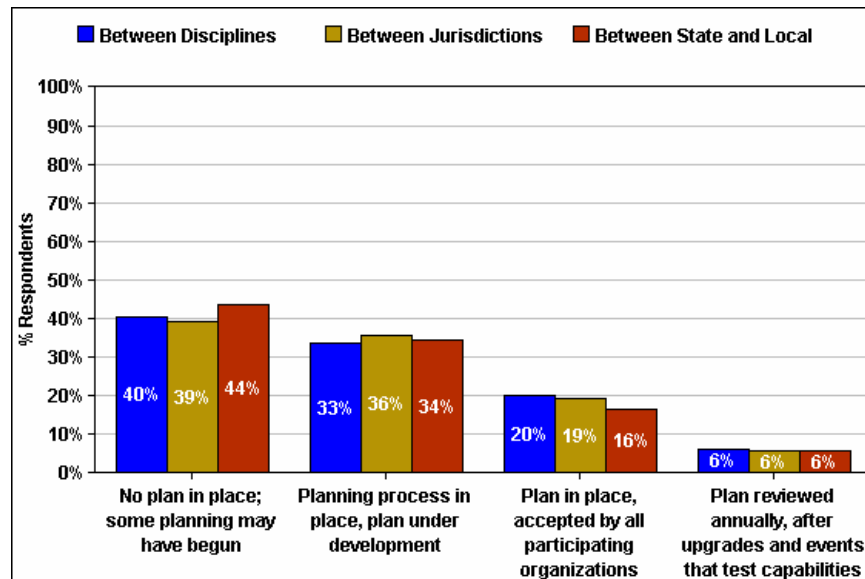


Figure 15—Strategic Planning

Findings regarding strategic planning included:

- Strategic plans for interoperability are the exception rather than the norm. Only 20 percent of agencies have strategic plans to ensure interoperability across disciplines, and 19 percent have plans to ensure interoperability across jurisdictions. For state-local interoperability, that proportion falls slightly, to 16 percent. (See Figure 15). Note that this is in contrast to results from the state homeland security directors; 11 of the 31 respondents report that a statewide plan that includes local governments is in place (see Section VII).
- For all levels of interoperability, the plurality says it has no strategic plans in place or, at most, some planning efforts may have begun.
- This is one area in which the prevalence of small agencies tends to push the overall results into the early stage. When looking only at agencies serving populations of *more than 2,500*, the number of agencies with some planning process in place across jurisdictions (moderate) slightly outnumber those with no such planning (early).
- There are no significant differences between disciplines for this question.

Policies, Practices, and Procedures

Policies, practices, and procedures are the accepted practices by which interoperable communications are engaged and used in incident response. A shared understanding of these practices is, of course, essential to smooth and continuous communications.

Policies, Practices, and Procedures: Standard Operating Procedures (SOPs)

Standard Operating Procedures (SOPs) are the methods that guide end users' facilitation of interoperability solutions and management of operational processes. As the response stages progress from early to advanced, policies are formalized and established for a greater variety of events.

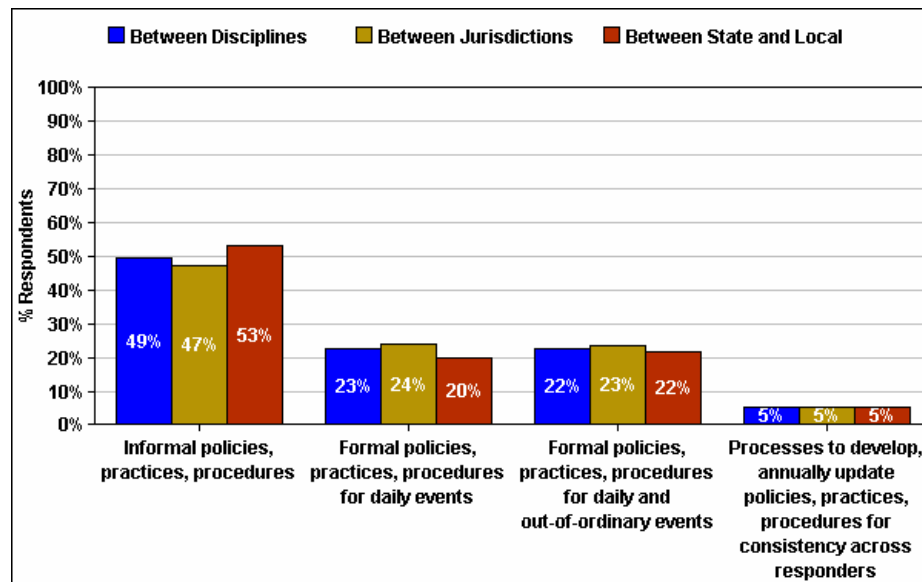


Figure 16—Standard Operating Procedures (SOPs)

Findings regarding SOPs included:

- Among all of the interoperability sub-elements, SOPs is one of three that displays a preponderance of agencies in the early stage. About half of all agencies either do not use SOPs or rely on informal SOPs to support interoperable communications. This pattern holds true across discipline (49 percent), across jurisdiction (47 percent), and across state-local government (53 percent). (See Figure 16.) This holds even when controlling for size by removing the smallest agencies from consideration—more than 45 percent of the remaining agencies report in the early stage.
- About 20 to 24 percent of agencies rely on formal policies to guide use of interoperable communications during planned and day-to-day events. Another 22 to 23 percent rely on these policies to guide use of interoperable communications in all situations, whether day-to-day or out-of-the-ordinary. These findings are also consistent across interoperability levels.
- There are no significant differences between disciplines for this question.

Definitions

A “formal” policy or procedure is one that is published and active.

“Daily” events include vehicle pursuit and multiple station response.

“Out-of-the-ordinary” events include mass casualties and flipped tanker on highway.

Given the low incidence of formalization for SOPs, it is perhaps not surprising that field interviewees had difficulty commenting on this finding, other than to confirm that it seemed plausible. As with agreements, it may be that the time and resources required to document, reach agreement on, and implement SOPs is cost-prohibitive. Agencies that rarely engage complex response events can pass along instructions and practices by word of mouth. It may be that the largest agencies, which handle larger events and coordinate the actions of larger staffs, benefit most from the effort of establishing SOPs. Nonetheless, advancing past the early stage has its rewards—this is one sub-element identified in which progress beyond the early stage is correlated with the full and advanced stages in frequency of use and familiarity—that is, with regular use of interoperability in all types of situations.

Policies, Practices, and Procedures: Command and Control

Command and control describes protocols put in place to manage the public safety communications environment during collective incident response. As the response stages progress from early to advanced, policies are formalized and established for a greater variety of events.

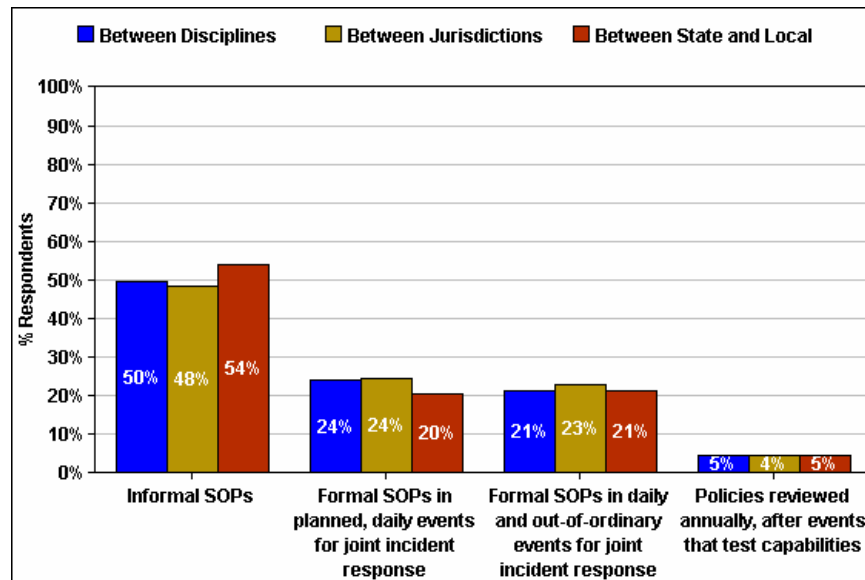


Figure 17—Command and Control

Findings regarding command and control procedures included:

- Command and control is one of three sub-elements with the highest occurrence of responses in the early stage. About half of all agencies either do not use command and control SOPs or rely on informal command and control procedures to support interoperable communications. This pattern holds true across discipline (50 percent), across jurisdiction (48 percent), and across state-local government (54 percent). (See Figure 17.) As with SOPs, this finding holds even when controlling for size by removing the smallest agencies from consideration—the responses of more than 46 percent of the remaining agencies indicate early development.
- About 20 to 24 percent of agencies rely on formal policies to guide use of interoperable communications during planned and day-to-day events. Another 22 to 23 percent (depending on the specific interoperability level in question) rely on these policies to guide use of interoperable communications in all situations, whether day-to-day or out-of-the-ordinary.

Definitions

A “formal” command and control policy or procedure is one that is published and active.

“Daily” events include vehicle pursuit, multiple station response, etc.

“Out-of-ordinary” events include mass casualties, flipped tanker on highway, etc.

- Seventy-four percent of those that do have formal command and control SOPs in place indicated that those procedures were National Incident Management System (NIMS)-compliant.¹⁴
- There are no significant differences between disciplines for this question.

¹⁴ The NIMS program provides a unified approach to incident management. Details on what is required of local governments for NIMS compliance in 2006 can be found at:
http://www.fema.gov/pdf/emergency/nims/nims_tribal_local_compliance_activities.pdf

Technology

Technology is a key element of interoperability. The radios of first responders are their communications lifeline—if the radios cannot interoperate, the first responders cannot interoperate. “Incompatible and aging communications equipment” was one of five key obstacles to interoperability cited in the 2003 National Task Force on Interoperability report.

Perhaps because technological issues have been placed at the forefront of interoperability problems, technology displays the highest level of development of any of the elements in the Continuum. Both approaches and implementation have the highest number of responses in the full stage—about one in three—of any of the questions in the survey. Nonetheless, responses to the funding questions, as well as anecdotal comments submitted by survey respondents, indicate that for many agencies, funding still poses a formidable obstacle to deploying needed systems and equipment.

Technology: Approaches

“Approaches” focuses on the technology deployed in the field that can be implemented to establish interoperability. As the response stages progress from early to advanced, the technological solutions that make up these interoperability approaches become more robust and, at the same time, integrate into more long-term elements. These features are evident in the move from temporary solutions, such as radio swaps, to more permanent infrastructure-based solutions, such as shared systems.

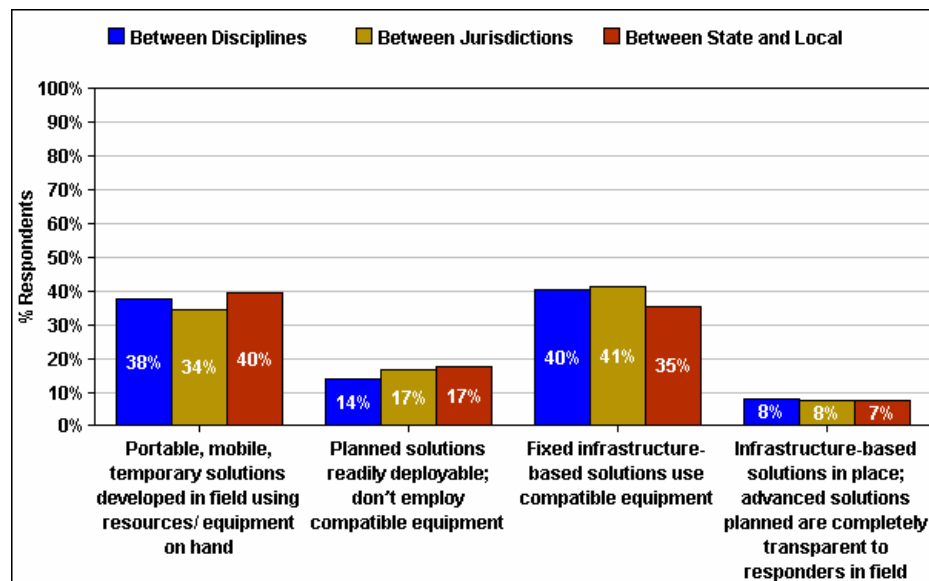


Figure 18—Approaches

Findings regarding approaches included:

- An interesting bimodal distribution of responses occurs between the early and full stages, with a smaller minority falling into the moderate stage. For establishing communications across disciplines, 38 percent of agencies use an approach in the early stage (e.g., radio swaps) while 40 percent use approaches in the full stage (e.g., fixed infrastructure). For cross-jurisdiction communications, the respective proportions are 34 percent and 41 percent, while for state-local communications, the respective values are 40 percent and 35 percent. Generally, half that percentage or less uses an approach in the moderate stage. (See Figure 18.)

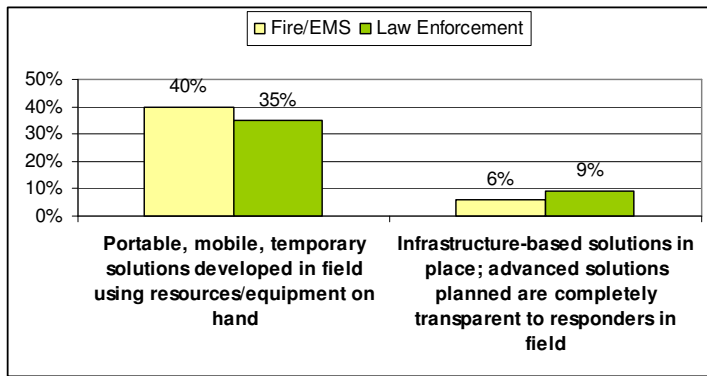


Figure 19—Approaches by Discipline for Cross-Discipline Communications

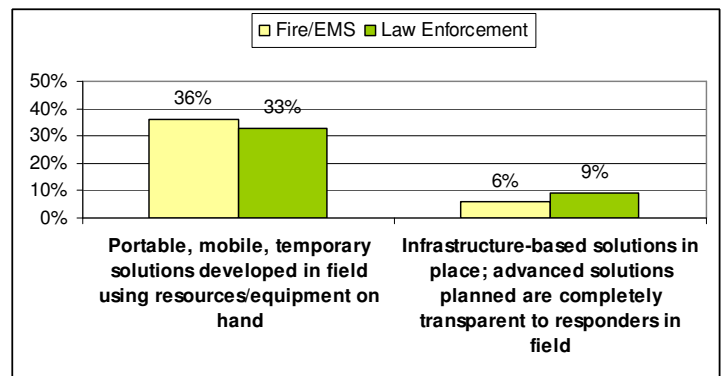


Figure 20—Approaches by Discipline for Cross-Jurisdiction Communications

The findings are roughly the same for both firefighting/EMS and law enforcement groups. However, there are two points of departure from normal response patterns. Firefighting/EMS agencies respondents were more likely to report technical approaches in the early stage, both in cross-discipline and cross-jurisdictional communications. Conversely, law enforcement agencies were slightly more likely to employ approaches in the advanced stage. (See Figures 19 and 20.)

Technology: Implementation

“Implementation” concentrates on the manner and ease with which interoperability solutions are activated. As the response stages progress from early to advanced, the implementation of these solutions becomes easier, more seamless, and incorporates more natural control measures. The transition is characterized by a move from improvised solutions to solutions that are available as authorized and without any external intervention.

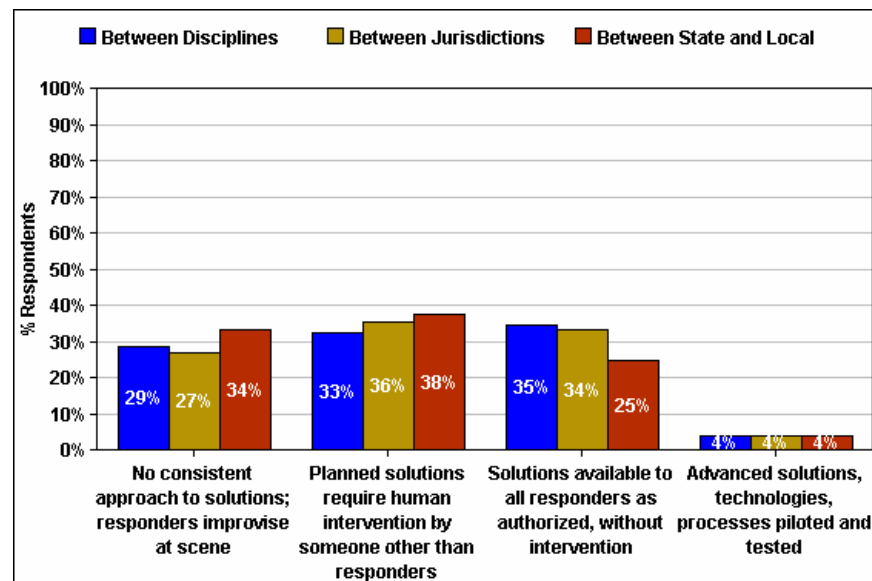


Figure 21—Implementation

Findings regarding implementation included:

- Although approach and implementation are somewhat linked (e.g., an agency that has access to a fixed system [approach] will probably not have to improvise a solution at the scene [implementation]), the response patterns for the two differ. Under approach, the majority of responses fall about equally in the early and full stages. In implementation, they fall under moderate and full stages for communications between disciplines and jurisdictions, and under the early and moderate stages for local-state communications. For establishing communications across disciplines, 33 percent of agencies use an approach in the moderate stage (e.g., connections through a dispatcher), and 35 percent use an approach in the full stage (solutions that allow immediate access to other responders, without third-party intervention). For cross-jurisdiction communications, the respective proportions are 36 percent and 34 percent. For state-local communications, however, 34 percent fall in the early stage (e.g., responders must improvise a solution on the scene), and 38 percent are in the moderate stage. (See Figure 21.)
- There are no significant differences between disciplines for this question.

Field interviews uncovered a range of opinions on the role of technology in ensuring interoperability. On the one hand, its critical nature is acknowledged—without radios, as without spectrum, there is no communication and thus no interoperability. This is confirmed in our analysis that shows that when approaches and implementation move past the early stage—that is, when they become more formal, and first responders can rely on existing equipment and planned solutions rather than fashioning ad hoc

communications—the likelihood that agencies use interoperability more frequently increases. But several agencies also cautioned against relying on technology exclusively. The human dimension is critical—even with good equipment, interoperability is hampered without good working relationships and governance, or without a clear understanding of how the equipment works and how command and control is planned.

Agencies also indicated a preference for what the survey defined as full and advanced technology features. When asked how they defined interoperability, several agencies noted that seamlessness or ease of use were critical. Anything else, including human intervention, could consume needed time. As one police chief noted, “When you need it, you need it now.” Similarly, there was consensus that shared systems were among the best solutions because of their seamless nature. Interviewees noted that this kind of seamlessness does not always occur on the ground, and that a variety of approaches are used to achieve interoperability.

Technology: Maintenance and Support

Maintenance and support addresses the reliability and performance of the interoperable communications. As the response stages progress from early to advanced, the maintenance and support plans increase the level of reliability and availability.

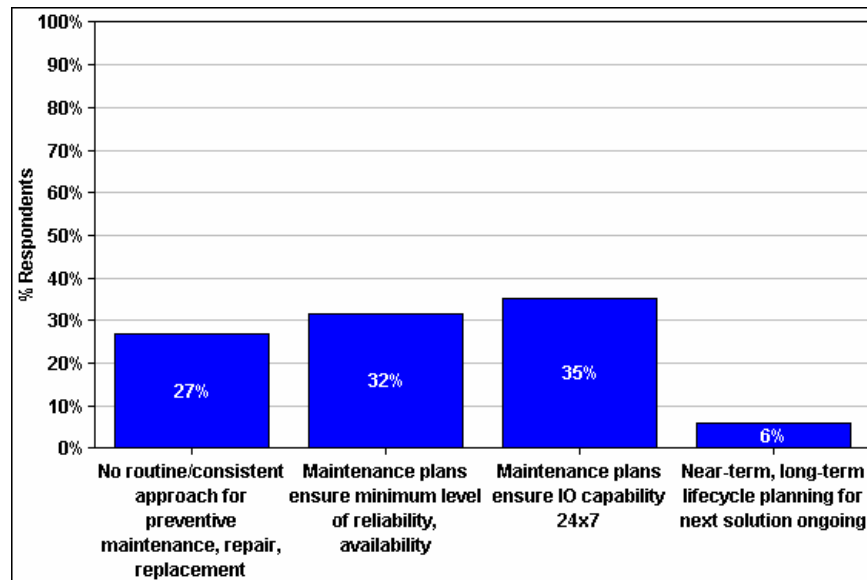


Figure 22—Maintenance and Support

Findings regarding maintenance and support included:

- Maintenance and support findings are fairly evenly spread, with a slightly greater likelihood that agencies fall in the full stage. Some 27 percent of agencies report having no routine maintenance plan, 32 percent have plans that ensure some level of reliability, and 35 percent have a plan that provides 24/7 support for interoperability equipment. (See Figure 22.)
- The smallest agencies show an almost reverse pattern of findings, 36 percent in the early stage and only 27 percent in full.
- Some differences in operational funding appear between disciplines. Fire response/EMS is more likely to report early-stage maintenance plans, while law enforcement agencies have a slight edge in reporting advanced plans. (See Figure 23.)

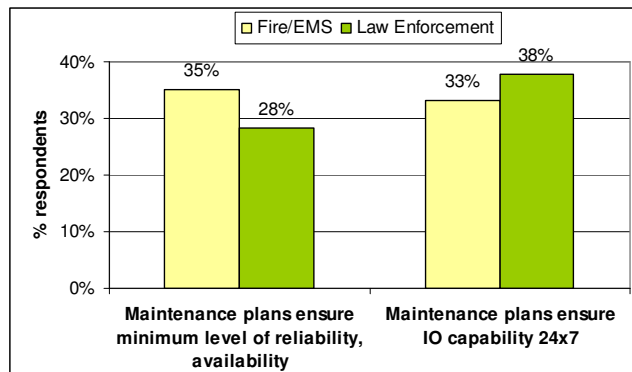


Figure 23—Maintenance and Support by Discipline

Training and Exercises

Training and exercises are essential to ensuring that personnel know how to set up and deploy interoperable communications at an incident. Often, training is needed simply to ensure that personnel are *aware* of the interoperability solutions available to them.

Training and Exercises: Training for Support Personnel

Training for support personnel addresses interoperability training for personnel who support the firefighters, emergency medical technicians (EMTs), and police officers in the field. These personnel often play a direct role in establishing and maintaining interoperable communications. During discussions with public safety agencies during Phase 2 of this study, first responders noted an especially urgent need for training. This is because training tends to be a near-term need and is often more difficult to arrange. As the response stages progress from early to advanced, training becomes more formalized and more of the support personnel who need this training receive it.

Definitions

“Support personnel” includes administrators, dispatchers, and other personnel who provide direct communications support to personnel in the field.

“Formal” training includes a lesson plan and an assessment of student performance.

“Informal” training does not include a lesson plan or student assessment. Both types of training may occur on the job.

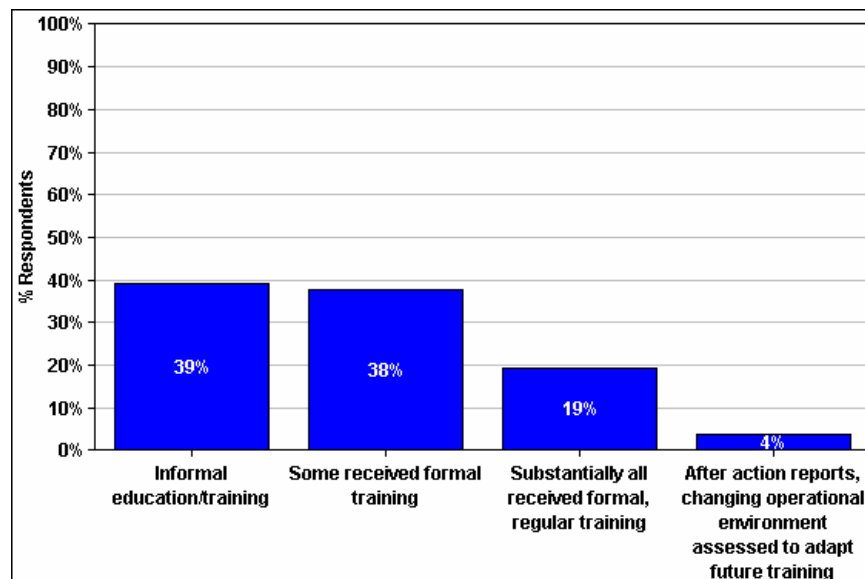


Figure 24—Training for Support Personnel

Findings regarding training for support personnel included:

- Nearly two in five agencies (39 percent) report that their support personnel have received, at most, informal training on interoperability. A similar number (38 percent) report that some of their personnel have received formal training. About one in five agencies (19 percent) report that substantially all personnel have received formal training. (See Figure 24.)
- The smallest agencies appear to face particular challenges. Almost half (47 percent) report that their support personnel have received, at most, informal training on interoperability. If they are

removed from the sample, the modal development stage for the rest of the group, by a very slight margin, moves into moderate.

- There are no significant differences between disciplines for this question.

Interoperability training comes in several guises. On-the-job training, whether formal or informal, can be the most common training in dispatch centers. Where solutions require dispatcher intervention, dispatchers often get the practice they need during the course of their duties. However, there was agreement that some level of formal training is needed whenever new communications equipment is installed.

Training and Exercises: Training for Field Personnel

Training for field personnel addresses interoperability training for firefighters, EMTs, and police officers in the field. Depending on the technology approach used to obtain interoperability, field personnel may play a direct or indirect role in establishing and maintaining interoperable communications. As the response stages progress from early to advanced, training becomes more formalized and more of the field personnel who need this training receive it.

Definitions

“Field Personnel” includes firefighters, EMTs, and law enforcement personnel who respond at the scene.

“Formal” training includes a lesson plan and an assessment of student performance, while “informal” training does not. Both types of training may occur on the job.

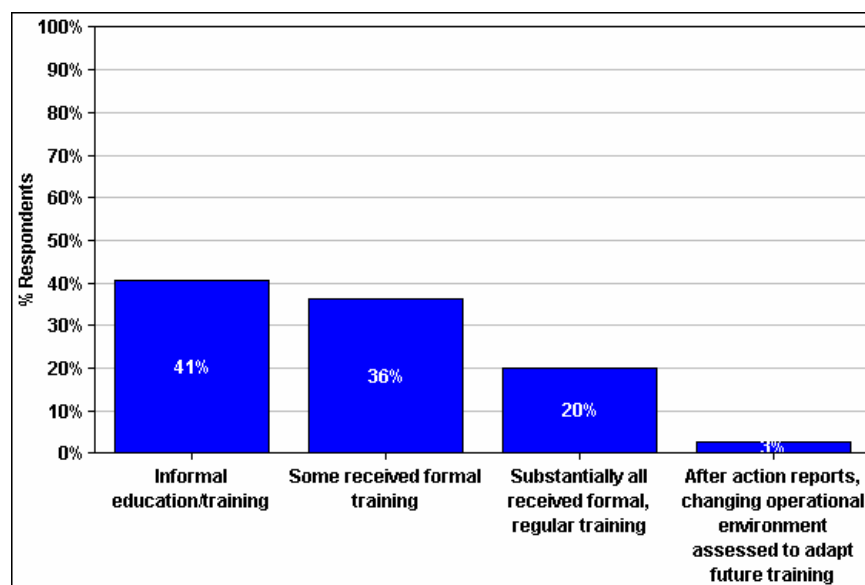


Figure 25—Training for Field Personnel

Findings regarding training for field personnel included:

- Agencies report similar patterns for training field personnel in interoperability compared to those for support personnel. Two in five agencies (41 percent) report that their field personnel have received, at most, informal training on interoperability. A slightly smaller number (36 percent) report that some of their personnel have received formal training. One in five agencies (20 percent) report that substantially all field personnel have received formal training. (See Figure 25.)
- There are no significant findings between disciplines for this question.

Many field sites noted that field personnel are trained on communications and interoperability when they start the job, and perhaps once a year thereafter. Law enforcement agencies often have so much required annual training (e.g., weapons training) that they have little time left for discretionary training in interoperability. As with support personnel, there was general agreement that new training must be provided when new communications systems are installed.

Training and Exercises: Exercises

Exercises include a variety of activities that allow users to practice scenarios that involve interoperable communications. They uncover strengths and weaknesses of interoperability solutions and procedures. As the response stages progress from early to advanced, exercises demand more effort and participation.

Exercise planning conferences or workshops are conducted to discuss, develop, and finalize the exercise goals and objectives, the exercise plan (including scenario descriptions), as well as the schedule/timeline of events, venue locations, controller/evaluator roles, and other logistical information. This planning process involves exercise SMEs and the public safety first responders from multiple disciplines or multiple jurisdictions, depending on the scope of the exercise. In general, there are two types of exercises: 1) functional/tabletop exercise (simulated); and 2) full-scale exercise (performed in the field).

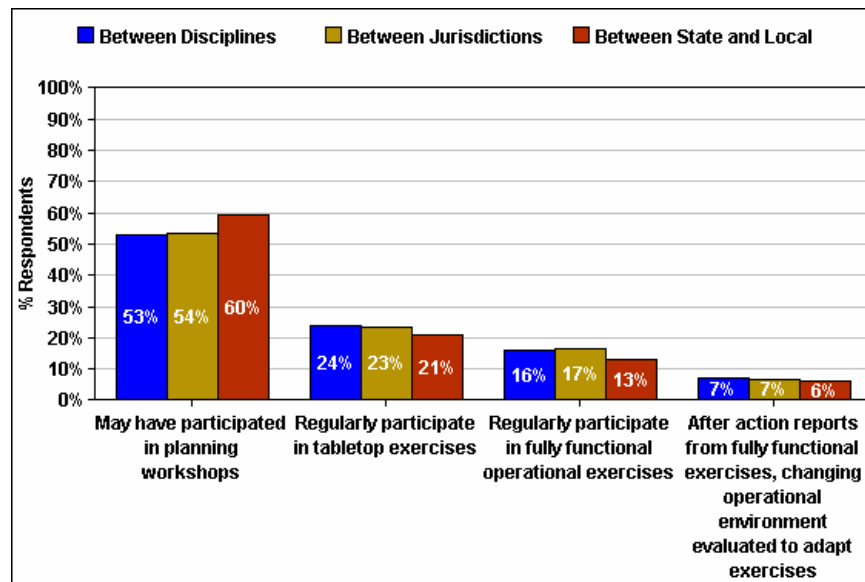


Figure 26—Exercises

Findings regarding exercises included:

- Of all the Continuum sub-elements, exercises has the highest percentage of responses in the early stage. Exercises are more time-consuming and resource-intensive than training, so it is perhaps not surprising that participation in various levels of exercises is less pervasive than interoperability training. (See Figure 26.) As with SOPs and command and control, this is a finding that cannot be attributed strictly to the prevalence of small agencies in the sample: when the smallest agencies are removed from consideration, a full 49 percent of remaining agencies still fall in the early stage.
- Eighty-four percent of agencies that have conducted some sort of exercise say that their exercises are NIMS-compliant.¹⁵

¹⁵ The NIMS program provides a unified response to incident management. Details on what is required of local governments for NIMS compliance in 2006 can be found at: http://www.fema.gov/pdf/emergency/nims/nims_tribal_local_compliance_activities.pdf

- Differences between disciplines appear solely in exercises that involve both state and local agencies. In these, fire response/EMS agencies are slightly more likely to report, at most, early-stage planning. Conversely, law enforcement is more likely to report regular participation in tabletop exercises involving state and local governments. (See Figure 27.)

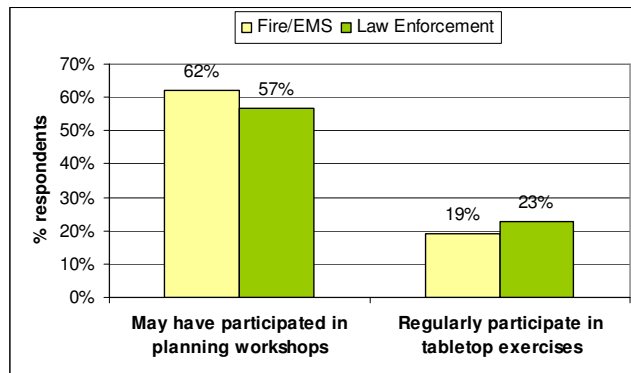


Figure 27—Exercises Between State and Local Agencies—by Discipline

Exercises allow groups of public safety agencies to test and practice with their communications equipment and procedures in a variety of simulated events. They can uncover unanticipated issues and provide valuable lessons for response. Exercises can consist of small efforts limited to a few local first responders, or they can extend to the Top Officials (TOPOFF) exercises conducted by DHS that involve locations, governments, first responders, and hospitals across the Nation.

Field agencies recognize the value of conducting exercises; however, note that they are resource-intensive. Staff members sent to planning meetings as well as to the exercises themselves are not available for duty, and must be backfilled. Overtime costs are often incurred. Some field respondents who had taken part in exercise planning activities were not sure whether interoperability was always tested in the exercises plans. Exercises certainly appear to be a predictor of frequent use of interoperability usage. It is not clear that exercises lead to interoperability; however, it may be that those agencies that are more likely to need and use interoperability are the ones who attend exercises.

Usage: Frequency of Use and Familiarity

Frequency of use and familiarity addresses the actual use of interoperable communications. As the response stages progress from early to advanced, usage becomes more pervasive in all types of operations and events (from day-to-day to out-of-the-ordinary).

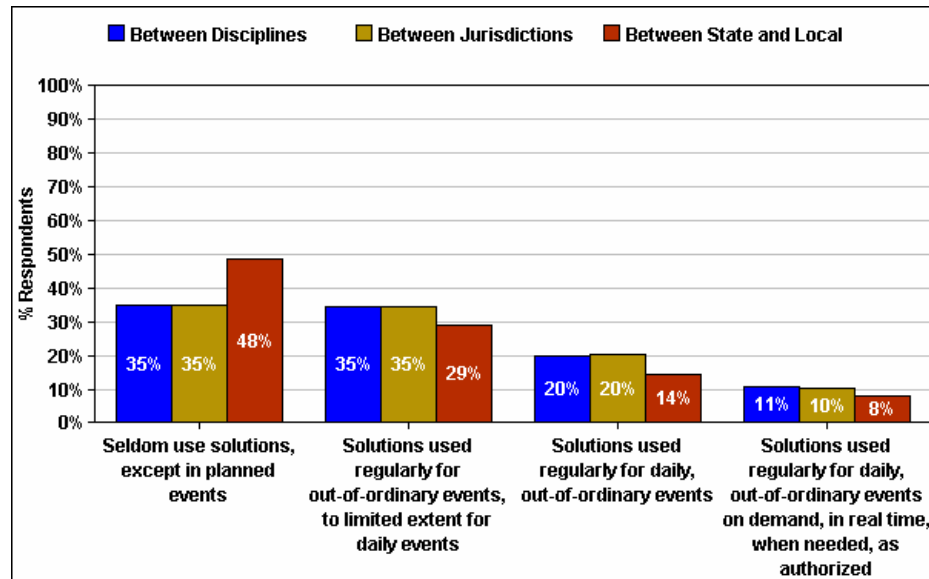


Figure 28—Frequency of Use and Familiarity

Findings regarding frequency of use and familiarity included:

- Usage shows some sharp distinctions between interlocal communications (cross-discipline and cross-jurisdiction) and state-local communications. For interlocal communications, the levels of response are the same for the early and moderate stages (35 percent each), with 20 percent in the full stage. However, when looking at communications between state and local agencies, responses are skewed more toward the early stage. Almost half (48 percent) of the responses of agencies place them in the early stage, with only 29 percent in moderate and 14 percent in full. (See Figure 28.)
- The responses of the smallest agencies do exert some downward pressure on the overall findings, at least for cross-discipline and cross-jurisdiction communications. In both instances, if the agencies serving populations under 2,500 are removed from this sample, the most highly reported stage changes, by a slight margin, to moderate.
- Agencies were also asked to indicate with which Federal agencies they interoperated. The results are listed below, with percentages based on the number of respondents who answered any one of the questions:
 - Department of Homeland Security—57 percent
 - Department of Justice—54 percent
 - Department of Agriculture—39 percent
 - Department of the Interior—21 percent
 - Department of Defense—12 percent

- Department of Energy—5 percent
 - Other Federal Departments—27 percent
- There are no differences between disciplines for these questions.

Overall, about 65 percent of agencies report that they interoperate with some degree of regularity at the cross-discipline or cross-jurisdiction level. The frequency of interaction between state and local agencies is somewhat lower, but in keeping with historical trends. Both the PSWN Program *Fire and EMS Communications Interoperability* study (1999) and the National Institute of Justice *State and Local Law Enforcement Wireless Communications and Interoperability* study (1998) echo the finding that local fire response/EMS and law enforcement interoperate with local agencies much more commonly than they do with state agencies.

Field agencies were asked to comment on how their operations would change if all barriers to interoperability were removed. While a few agencies thought little would change (citing either lack of a need to interoperate or satisfaction with current operations and tools for interoperability), many saw benefits. Several expected improved interoperability would lead to faster response time—removing intermediary communications and ensuring that all responders could communicate to the incident commander. Various agencies also provided examples of interoperability improving response, from enhancing the safety of ambulance crews in high-crime areas to the prevention of secondary accidents at incidents. Others noted that reduced barriers to interoperability would lead to greater trust and improved working relationships between neighboring agencies—an interesting comment, given that an often-cited barrier to interoperability specifically is lack of working relations. These agencies are suggesting that simply working more regularly together could overcome barriers that tend to inhibit agencies from working together. Finally, many agencies who could not cite a specific need for interoperability nonetheless noted that assured access to any other agency would improve their “peace of mind” in the course of their duties.

V. RELATIONSHIPS BETWEEN CONTINUUM SUB-ELEMENTS

The basic statistical findings described in the preceding sections provided a foundation to delve further into potential relationships between the sub-elements of the Continuum. The outcome measure, or dependent variable, used for these inferential analyses was frequency of use and familiarity. This is the only question on the survey that assesses the actual degree of interoperability; all the others assess the extent of the capability and activities associated with it. Analysis was conducted not only in relation to this outcome measure (see the Primary Relationships section below), but among the other variables as well (see the Secondary Relationships section below).

Logistical regression was used to determine which of the other Continuum-based questions collectively predict a high assessment on frequency of use and familiarity. To assess “high” scores in that sub-element, the standard four-point, early through advanced scale was converted to a two-point scale, with “high” interoperability use defined by the full and advanced categories, and low interoperability use defined by the early and moderate categories. By contrast, the other predictor variables were converted into a two-point scale by defining high capacity for interoperability as moderate, full, and advanced, and low capacity as early. These predictor variables were dichotomized differently because the majority of the sample fell within the early stage across most of the predictor items, so that variance, and thus predictive power, was maximized by setting the early stage against all others (moderate, full, and advanced). In short, this pattern of separate dichotomies could demonstrate how merely moving beyond the early stage in the predictor variables could predict “high” levels of interoperability use.

It should be noted that “predictive” does not mean “causal.” It means that collectively conducting a combination of certain activities is *likely* to be associated with the specified outcome.

Primary Relationships

The results of the first logistical regression analysis show that a high score in five questions significantly predicts (at the .001 level) a high score in frequency of use and familiarity, across the three interoperability levels. (All predictor variables conform to the interoperability level—other disciplines, other jurisdictions, state/local government—of the outcome variable with which they are listed.) Further, an “odds ratio” statistic indicates the relative strength of the predictive value of each, with a value of 1.000 indicating equal odds, and higher values indicating an increasing likelihood that a high score for that variable is related to a high score in frequency of use and familiarity. It is interesting to note that the relative strengths of the predictor variables are the same for other disciplines and other jurisdictions, but change for state/local government. (See Table 1.)

**Table 1—
Continuum Sub-elements Predictive of Frequency of Use**

Frequency of Use and Familiarity—With Other Disciplines		Frequency of Use and Familiarity—With Other Jurisdictions		Frequency of Use and Familiarity—Between State/Local Government	
Approaches	2.205	Approaches	2.177	Exercises	2.440
Implementation	1.993	Implementation	2.099	Approaches	1.843
Exercises	1.896	Exercises	1.975	Implementation	1.840
Command and Control	1.422	Command and Control	1.620	Command and Control	1.700
Standard Operating Procedures	1.398	Standard Operating Procedures	1.430	Standard Operating Procedures	1.630

Secondary Relationships

Although the other Continuum-based questions are not statistically significant predictors of high interoperability use, they are still important in the pursuit of interoperable communications. For example, SMEs reviewing the findings posited that governance issues are foundational to attaining interoperability even if, on their own, they are insufficient predictors of *high* interoperability use. To test that view, several hypotheses were developed on how the remaining elements would be related to the primary “predictor” sub-elements identified above. The same approach to logistical regression described above was used to identify statistically significant relationships involving:

- Decision Making Groups
- Agreements
- Funding for Capital Investments
- Strategic Planning.

The specific hypotheses and sub-elements found to have significant relationships (at the .001 level) are shown below. Only those hypotheses that predict at least 10 percent of the variance were judged to be supported. (See Table 2.)

**Table 2—
Hypotheses Concerning Secondary Relationships**

Hypothesis	Result
SOP —Decision making groups and agreements are involved in the development of joint SOPs for planned events or for emergencies because they assist the sharing of information across disciplines and jurisdictions.	Hypothesis supported. Decision making groups and agreements appear as significant predictors in all interoperability levels and across some interoperability levels. ¹⁶
Technology Approaches —Decision making groups, strategic planning, and funding for capital investments are related to technology approaches because they help multiple agencies work together to define a vision for how they want to interoperate, and because funding is necessary for purchasing technology.	Hypothesis mostly supported. Hypothesis supported for cross-discipline and state/local interoperability, and partially confirmed for cross-jurisdiction interoperability (where decision-making groups did not show a statistically significant relationship).
Command and Control —Decision making groups and agreements are involved in the development of command and control SOPs for planned events or for emergencies because they assist the sharing of information across disciplines and jurisdictions.	Hypothesis supported in part. Hypothesis supported for cross-discipline interoperability only.
Technology Implementation —Strategic planning and capital funding are related to technology implementation because a vision is necessary for a new system or upgrade, and funding is necessary to acquire and implement it.	Hypothesis not supported. Hypothesis not supported at any interoperability level.
Exercises —Decision making groups and strategic planning are related to exercises because they build the necessary relationships and momentum.	Hypothesis not supported. Hypothesis not supported at any interoperability level.

¹⁶ It is interesting to note that this is the only hypothesis in which a sub-element (i.e., agreements) was a significant predictor across interoperability levels. This is understandable, given the nature of agreements—they should cross disciplines and jurisdictions, and state and local governments.

VI. EQUIPMENT, SPECTRUM, AND FREQUENCY FINDINGS

The Baseline Survey concluded with a series of questions about respondents' primary wireless equipment, infrastructure, and spectrum used for communications interoperability.

Types of Primary Wireless Systems

The majority of agencies participate in some sort of shared communications system. Forty-two percent of respondents use a shared system that serves several agencies within their jurisdiction, and another 37 percent participate on larger, multi-agency, multi-jurisdictional shared systems. Primary wireless communications systems described as “independently owned and operated and used exclusively by our department” represent 21 percent of responding agencies. (See Figure 29.)

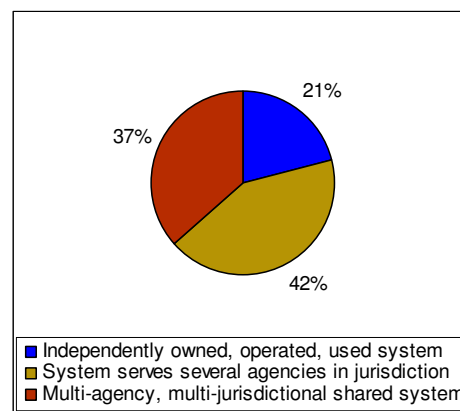


Figure 29—Primary Wireless System

Mode of Operation

Analog-based wireless communications systems are still the most common mode of operation for first responder agencies. Fifty-eight percent of the responding agencies indicated that their primary mode of operation is analog, while 42 percent of the respondents are using the digital mode, either exclusively or in concert with analog. (See Figure 30.)

Although analog mode has been the standard in public safety communications, more agencies in recent years have been replacing or upgrading these systems with digital equipment. Digital systems provide greater spectrum efficiency, have greater versatility for transmitting information over a variety of infrastructure, and allow for more effective monitoring, adjustment, and control of the overall system.

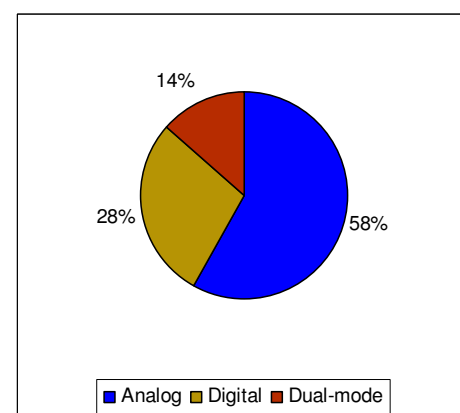


Figure 30—Mode of Operation

However, it is somewhat surprising that only 14 percent of agencies use dual mode (digital/analog) as their primary mode of operation. Because digital wireless communications systems can usually accommodate dual mode operation with appropriate programming, a higher number would have been expected. Given the large number of agencies that are using only analog mode, it seems highly likely that digital users would need to communicate with analog-only users. Furthermore, it is easier for a digital user to establish interoperability with an analog user than the reverse because analog mode requires use of a signal translating device (e.g., gateway) to communicate with digital users.

Primary System Architecture

Almost three-quarters of communications systems used for interoperability are based on conventional (non-trunked) system architecture. Twenty-seven percent of agencies indicated their primary wireless system is based on trunked system architecture. (See Figure 31.)

Because trunked systems provide greater spectrum efficiency by routing users to an open channel¹⁷, more first responder agencies have been replacing, or upgrading to, trunked systems. However, although trunking alleviates channel congestion, it does not necessarily solve interoperability problems. It may even introduce interoperability problems if the systems are based on proprietary technology. Consequently, a variety of interoperability solutions (e.g., gateways) is required and has been deployed by agencies to overcome the differences between the two types of systems.

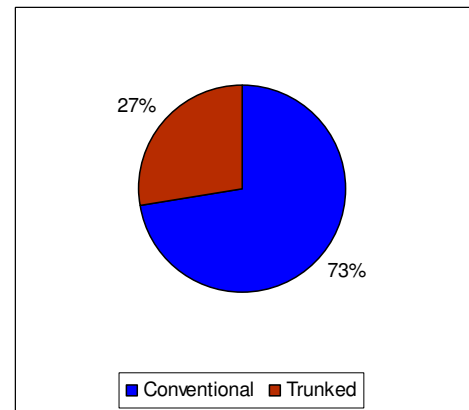


Figure 31—Architecture of Primary Wireless System

Age and Replacement Plans for Primary Wireless Systems

Among the responding agencies, roughly one-third of the agencies have systems that are either 2 to 5 years old, and another third (35 percent) indicated their primary wireless systems are more than 10 years old. (See Figure 32.) The technology choices and interoperability problems of agencies vary with system age, and agencies do not purchase wireless radio systems as frequently as other IT technologies because wireless systems typically have a lifespan of 10 to 25 years.

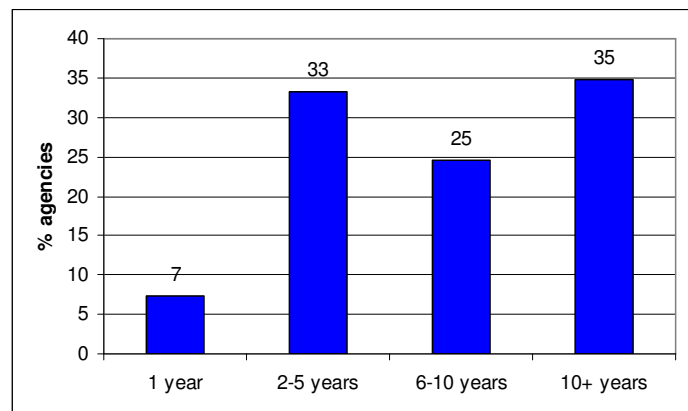


Figure 32—Age of Primary Wireless System

¹⁷ Conventional and trunked radio systems differ in how they access spectrum. Conventional systems users select a frequency and remain on that frequency for the duration of the conversation. Trunked systems continuously scan a given band of spectrum to automatically locate available frequencies for users. During pauses or other periods when no voice traffic is transmitted over a given frequency, that frequency can be assigned to other users, and the system will locate new frequencies as needed for any given conversation. This allows trunked systems, in most situations, to use spectrum more efficiently than conventional systems.

Almost half of agencies plan to replace their systems in the 2- to-5-year time frame, with another quarter looking to replace them in 6 to 10 years. (See Figure 33.)

With 87 percent of respondents planning upgrades in the next 10 years, the time is ripe to merge and strengthen systems. Typically, digital and trunking technologies are more prevalent in newer systems. As the current systems of agencies age, radio manufacturers are reducing technical support for analog systems, and agencies have been having greater difficulty finding parts and diagnosing problems for these older systems. Because most wireless systems are likely to be analog, many replacements should be expected in the upcoming years. Agencies preparing to replace systems can consider many options, including subscribing to an existing shared system in the area or working with others to create a shared system with greater capability and shared costs.

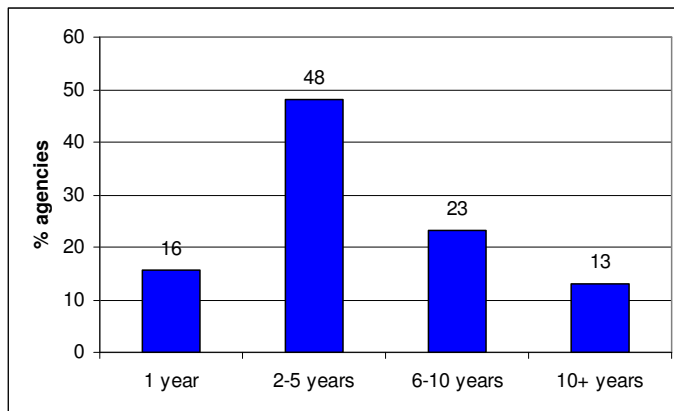
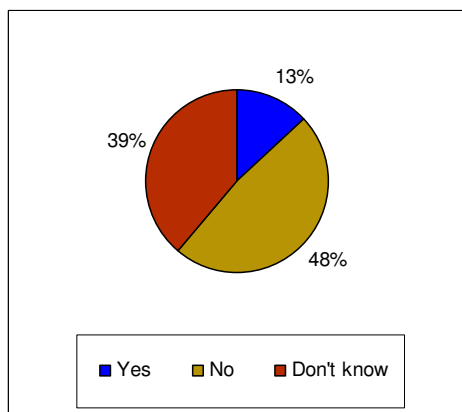
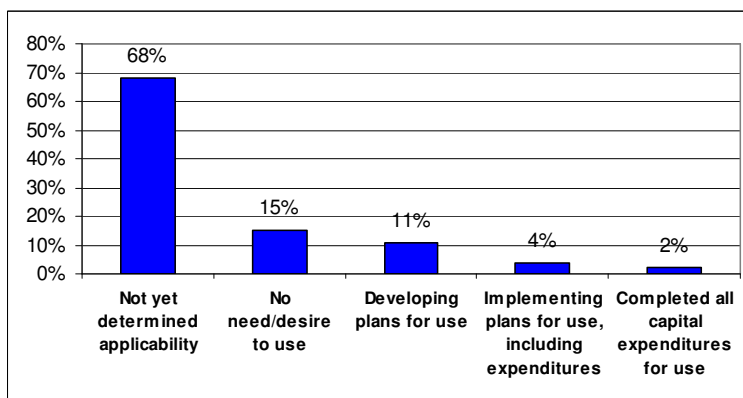


Figure 33—Time Frame to Replace or Upgrade Primary Wireless System



**Figure 34
Use of 700 MHz Spectrum**



**Figure 35
Planned Use of 700 MHz Spectrum**

700 MHz Spectrum

Television broadcasters are scheduled to vacate analog broadcast channels in the 700 MHz band, and some of those channels have been reserved for public safety use. These channels are needed to relieve much of the congestion in public safety bands. Still, only 13 percent of first responder agencies currently use or plan to use this spectrum (located between 764 and 776 MHz), and almost one-half say they do not currently use it nor plan to use it. (See Figure 34.) The availability of this spectrum may be a factor in the responses to this question because broadcasters currently occupying the band are not required to cease operations until early 2009. This delay has created an element of uncertainty in the planning process for new 700 MHz public safety systems. In a related question, 68 percent indicated that their organization has not yet determined the applicability of this spectrum for their use. Of the responding agencies, 15 percent indicated no need or desire to use 700 MHz frequencies. (See Figure 35.)

Equipment, Solutions, and Spectrum

Of the responding agencies, 97 percent use portable radios as their primary device to achieve interoperability. Because public safety missions typically revolve around communications between responders in the field, this finding is not surprising. However, the vast majority of responding agencies indicated they also use commercial wireless telephones, wireless personal digital assistants (PDAs), or regular landline telephones/faxes to achieve interoperability. This demonstrates that first responders tend to use portable devices that are convenient and readily available in real time. For example, police officers prefer easy access to contact lists that typically are accessed using commercial wireless telephones and PDAs. The importance of portability is reinforced by the fact that mobile (vehicle-mounted) solutions were listed by only 7 percent of respondents. (See Table 3.)

Table 3—Equipment Used for Interoperability

Equipment Currently Used	% Agencies
Portable	97
PDA	79
Commercial Wireless Phone	68
Phone/FAX	65
Pagers	48
Mobile Laptop	27
Global Positioning System (GPS)	22
Mobile Data Terminal (MDT)	20
Amateur Radio	13
Satellite Phone	9
Mobile	7
Voice Over IP	6
Aircraft/Helicopter Radio	5
Citizens Band Radio	4
Other	3

Table 4 indicates that agencies use a variety of solutions to achieve interoperability. Shared channels or talk groups and radio reprogramming are the most commonly used solutions. This result is not surprising because first responder agencies typically use existing features and operating procedures on their primary wireless system to achieve interoperability. Six percent of responding agencies indicated the use of National Public Safety Planning Commission (NPSPAC) channels as an interoperability solution. NPSPAC channels are typically preprogrammed on trunked radios, but not on conventional ones. The relatively low percentage of agencies employing these channels could reflect the prevalence of conventional systems in the field (see Figure 31) or indicate problems in programming or a lack of visibility for this solution. Another interesting finding is that very few agencies indicated the use of deployable solutions to achieve interoperability. Specifically, of the responding agencies, only 4 percent and 3 percent, respectively, indicated the use of a deployable gateway switch or deployable site infrastructure to achieve interoperability. These findings are in keeping with comments from field interviews that note a preference for seamless solutions as opposed to solutions that may be complex and time-consuming to establish.

Table 4—Solutions Used for Interoperability

Solutions Currently Used	% Agencies
Shared Channels/Talk Groups	53
Radio Reprogramming	47
Other Emergency Channels	42
Radio Exchange	42
Mobile Command Center	41
Shared System	30
Channel/Console Patch	27
Radio Cache	12
NPSPAC Channels	6
IP-Based System	5
Fixed Gateway Switch	5
Deployable Gateway Switch	4
Deployable Site Infrastructure	3

Of the responding agencies, more than half operate high band very high frequency (VHF) systems for their primary system. In general, these systems use older analog technology to cover large geographic areas while deploying less infrastructure than required by systems that operate in higher spectrum bands. In addition, approximately one-quarter of public safety agencies use newer 800 MHz systems. Nineteen percent of agencies use low band ultra high frequency (UHF) frequencies, which include systems operating on frequencies in the 450–512 MHz range. (See Table 5.)

Table 5—Frequencies Used for Interoperability

Primary System/Network Frequencies	% Agencies
High Band VHF	62
800 MHz	25
Low Band UHF	19
Low Band VHF	9
Low Band UHF TV Sharing	7
Federal Band UHF	2
Other Bands	4

Of the responding agencies, over half indicated that they currently have sufficient spectrum to support mutual aid channels, while just 41 percent indicated that they have sufficient spectrum to support mutual aid channels for future operations. Additionally, nearly half of respondents indicated that they presently have sufficient spectrum for voice transmissions, and 39 percent that they have sufficient spectrum for future voice operations. Only 21 percent of respondents indicated that they currently have sufficient spectrum for sending text messages, and a similar number, 19 percent, responded that they have sufficient spectrum to support future needs for text messages. Spectrum—both current and future availability—supporting broadband applications (e.g., sending photographs or e-mail) is deemed less sufficient. (See Table 6.)

Table 6—Sufficiency of Spectrum for Interoperability

Sufficient Spectrum	% Agencies	
	Currently	In Future
Mutual Aid Channels	55	41
Voice	49	39
Text Message	21	19
Broadband	19	18

VII. HOMELAND SECURITY DIRECTOR SURVEY FINDINGS

Each state, plus the District of Columbia, has a homeland security director. Specific responsibilities and titles vary significantly from state to state because there is no federally mandated description of duties or tasks for these officials. Nonetheless, what they do have in common is a statewide perspective, which allows them to provide a broader view of emergency response than might be gleaned from individual fire response/EMS and law enforcement agencies. Therefore, a separate survey was developed for homeland security directors to add dimension to the initial study.

The interoperability survey for the state homeland security directors focused on governance at the state level. The questions were derived from those on the first responders' survey and are structured similarly, but rephrased to address statewide, rather than agency-focused, efforts.

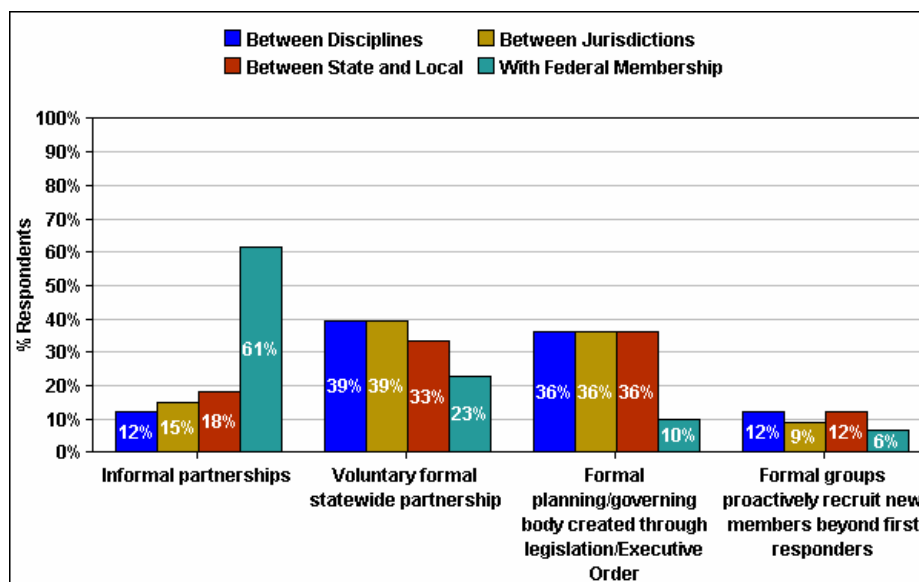
Thirty-three of the 51 homeland security directors responded to the interoperability survey. This is a 65-percent response rate, and a 95-percent confidence level with a confidence interval of ± 10 points. Even though this response rate is relatively high, the confidence interval is large. Therefore, it is appropriate to consider these findings to be representative of only those states participating in this survey.

Governance: Decision Making Groups

Whereas the survey for first responders asked the types of decision making groups in which individual agencies participated, the homeland security director survey asks what types of groups exist within the state to address interoperability. As the response categories progress from early to advanced, the scope of the groups increases from localized to statewide, and the sponsorship increases until groups are founded by executive order or legislation.

The question about decision making groups was asked for four interoperability levels:

- **With fire response/EMS/law enforcement membership (with other disciplines)**
- **With local government membership (with other jurisdictions)**
- **With state and local government membership**
- **With Federal Government membership**



**Figure 36—
Decision Making Groups Within States**

The response pattern for the first three of these levels is very similar, with virtually equal numbers of respondents, more than 70 percent, falling in the moderate and full categories combined. (The moderate stage represents formal, voluntary statewide groups, and the full stage represents groups created through legislation or executive order.) (See Figure 36.)

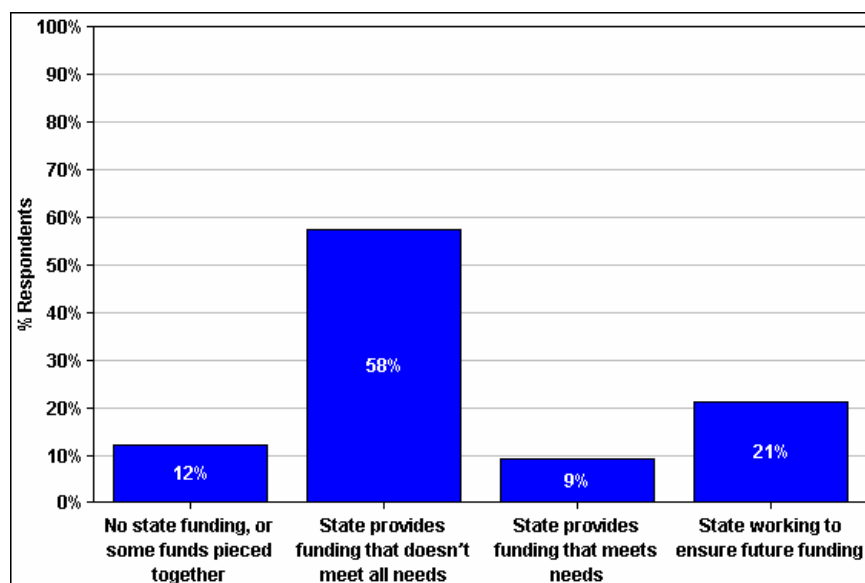
The responses for decision making groups with Federal Government membership show significantly less development. A full 61 percent of the responses are in the early stage, meaning that the Federal Government is included primarily in informal partnerships.

The formal groups in which agencies do participate have the following characteristics:¹⁸

- Makes recommendations concerning interoperability—82 percent.
- Has consistent membership—73 percent.
- Sends information to public safety leaders outside the group as appropriate—73 percent.
- Meets regularly—70 percent.
- Sends information to political leaders outside the group as appropriate—67 percent.
- Sends information to all members—64 percent.
- Takes action on its own decisions—64 percent.
- Has governance structure in place with rules—61 percent.

Governance: Funding for Capital Investments

Funding for capital investments addresses the degree to which state governments provide capital funding for investments in interoperability.



**Figure 37—
State-Level Funding for Capital Investments**

The majority of respondents—58 percent—indicated that their state provides some funding for capital investments, but in an amount that does not meet all the interoperability requirements. One-fifth

¹⁸ Respondents could select as many characteristics as apply, so data do not total to 100 percent.

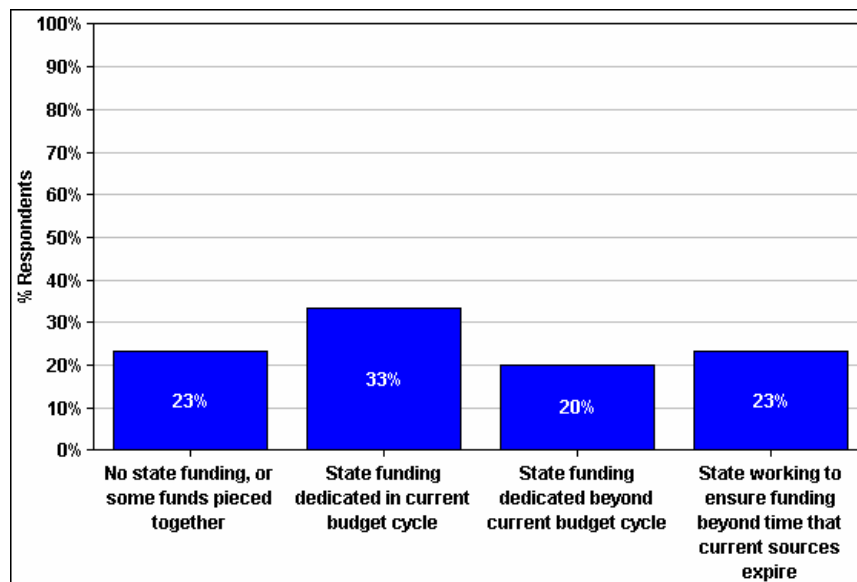
indicated that not only does their state funding meet all the requirements, but their states are working to ensure future funding. (See Figure 37.)

State homeland security directors were also asked whether they shared capital investment costs with certain partners. The results are shown below¹⁹:

- My state shares capital investment costs with local governments—82 percent.
- My state shares capital investment costs with private entities—24 percent.
- My state shares capital investment costs with other states—18 percent.

Governance: Funding for Operating Costs

Funding for operating costs addresses the degree to which state governments provide operating funds for interoperability.



**Figure 38—
State-Level Funding for Operating Costs**

The plurality of respondents indicated that their states have provided dedicated funding or commitments for operating costs in the current budget year. Responses in the other response categories were virtually equal, and approximately 10 percent lower. (See Figure 38.)

Participants were asked whether their states shared interoperability operating costs with certain partners. The results are shown below²⁰:

- My state shares operating costs with local governments—82 percent.
- My state shares operating costs with private entities—21 percent.
- My state shares operating costs with other states—12 percent.

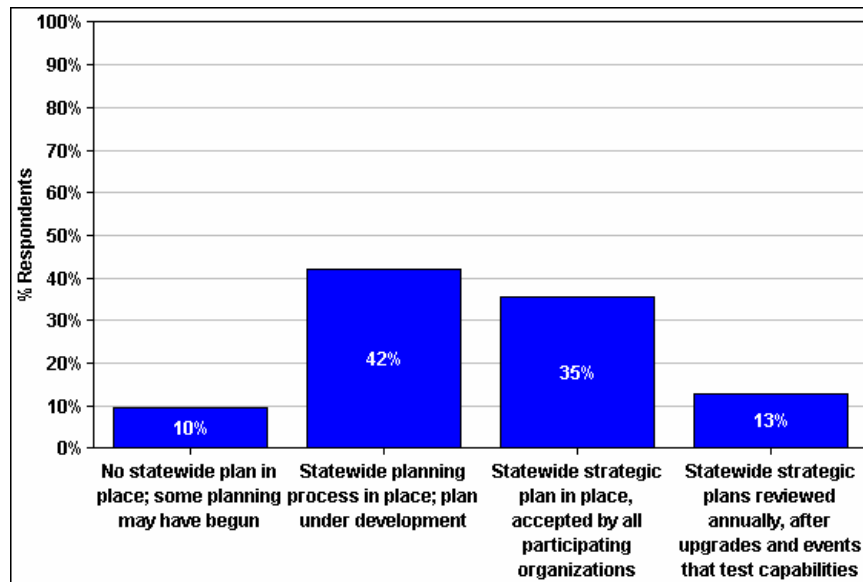
As can be seen, the level of funds sharing is virtually the same for capital investments and operating costs.

¹⁹ Respondents could select as many characteristics as apply, so these data do not total 100 percent.

²⁰ Respondents could select as many characteristics as apply, so these data do not total 100 percent.

Governance: Strategic Planning

Strategic planning addresses the extent of effort taken to develop a statewide plan for interoperability.



**Figure 39—
State-Level Strategic Planning**

A plurality of respondents (42 percent) indicates that their states have a statewide interoperability strategic planning process in place and plans under development. (See Figure 39.) It should be noted that 34 percent of local first responder agencies reporting have a strategic planning process in place that included both state and local government participation (refer to Figure 15).

APPENDIX A—INTEROPERABILITY CONTINUUM MEASUREMENT TOOL

<i>Elements</i>	<i>Sub-Elements</i>	<i>Early Development</i>	<i>Moderate Development</i>	<i>Full Development</i>	<i>Advanced Development</i>
Governance	• Leadership	Government leaders are aware of interoperability needs to support protection of citizens and safety of first responders	Government leaders understand the importance of interoperability and provide some political and fiscal support	Government leaders demonstrate that interoperability is a political and fiscal priority and begin to coordinate across jurisdictions	Government leaders serve as interoperability advocates and act to ensure long-term political and fiscal support
	• Decision Making Groups	No inter-agency partnerships or forums in place	Informal partnerships or forums to address common interests, operations, and technology	Formal interoperability planning and governing bodies with defined missions, responsibilities, and authorities in place	Proactive recruiting of new participants to include cross governmental membership and type of responder
	• Agreements	Unofficial, informal agreements in practice	Some of the necessary agreements (e.g., MOU/MOA/MAA, Ordinance, Executive Order, IGA, and Legislation) in place to address multi-organization communications	All necessary agreements (e.g., MOU/MOA/MAA, Ordinance, Executive Order, IGA, and Legislation) in place to address multi-organization communications	Institutionalized processes to develop and review agreements at least every 3-5 years and after significant events and upgrades
	• Interoperability Funding	Limited and fragmented funding dedicated to multi-organization communications	Long-term planning begins for partially funded multi-organization communications	Acquisition of long-term funding for multi-organization communications	Multiple organizations and standing committees working to strategically acquire and manage sustained interoperability and maintenance funding
	• Strategic Planning	No interoperability strategic plan or strategy in place	Strategic planning process in place and plan under development	Formal strategic plan in place and accepted by all participating stakeholders	Institutionalized processes to review strategic plans on an annual basis and after significant events or upgrades
Standard Operating Procedures	• Policies, Practices, and Procedures	Informal policies, practices, or procedures	Some formal policies, practices, or procedures	All necessary formal policies, practices, and procedures	Processes to develop and regularly review policies, practices, and procedures for consistency across participants
	• Command and Control	Some elements of formal command and control policies in practice	Formal command and control policies in practice, but not consistent with command and control policies of all other necessary organizations	NIMS-compliant command and control policies in practice consistent with all necessary organizations	Annual review of command and control policies to assure continued compliance with NIMS and evaluation of command and control after significant events
Technology	• Approaches	Implementation of portable, mobile, or temporary solutions (ad hoc or COTS)	Communications requirements exceed ad hoc capabilities, steps being taken toward permanent solutions	Permanent infrastructure based solutions using mutually accepted standards	Strategic, coordinated communications plans in place to guide technical improvements that lead to seamless networks
	• Implementation	Ad hoc solutions	Planned solutions that require human intervention	Solutions available 24x7 without any intervention	Research and testing of advanced solutions, technologies, and processes
	• Maintenance and Support	Ad hoc maintenance and equipment support	Plans developed plus staff and funding available to address maintenance and equipment support requirements	Multiple organizations' staff share maintenance and equipment support roles for jointly funded infrastructure through formal agreements	Near-term and long-term system life cycle planning (e.g., planning, acquisition, implementation...) and staffing
Training and Exercises	• Operator Training	No formal training in achieving interoperability	Some organizations train regularly in using equipment and applying policies, practices, and procedures	All necessary organizations participate in planned, regular training using equipment, policies, practices, and procedures, command and control, and NIMS	Organizations evaluate training after action reports and the changing operational environment to adapt future training to address gaps and needs
	• Exercises	Some command and staff across organizations participate in workshops oriented to interoperability	All necessary organizations participate in tabletop exercises; including NIMS; planned and on a regular cycle	All necessary organizations participate in fully-functional operational exercises, including NIMS on a planned and regular cycle	Organizations evaluate after action reports from the exercises and the changing operational environment to adapt exercises to address gaps and operational needs
Usage	• Frequency of Use and Familiarity	First responders seldom use solutions unless advanced planning is possible (e.g., special event)	First responders use solutions regularly for emergency events, and in a limited fashion for day-to-day communications	First responders use solutions regularly and easily for all day-to-day, task force, and mutual aid events	Regular use of seamless solutions has expanded to include state, federal, and private responders

APPENDIX B—INTEROPERABILITY BASELINE SURVEY

INTEROPERABLE WIRELESS COMMUNICATIONS SURVEY

Interoperable wireless communications save lives by allowing public safety personnel from different organizations or jurisdictions to communicate on demand, in real time, as authorized. SAFECOM, a federal program of the Department of Homeland Security established to improve public safety communications, invites you to participate in this survey. Your knowledge will help us understand and improve the state of interoperability across the Nation. All responses will be reported in the aggregate and **none** will be reported individually.

This survey includes questions on governance, standard operating procedures, technology, training and exercises, and usage. The survey should take approximately 25 minutes to complete.

Completing the Survey

After you have reviewed this document, please return to the web site to enter your responses. You may send the URL and password on your postcard to other members of your organization and ask them to complete specific questions. Please advise individuals, however, **not to overwrite** data entered by someone else.

Question Formats

Several questions in the survey address interoperability at three levels – with other disciplines (“disciplines” include law enforcement, fire, and emergency medical services), with other jurisdictions, and between state and local government. These levels are defined below, followed by an illustration of a completed question.

- **With Other Disciplines**—Interoperable wireless communications with **another first responder organization of a different discipline within the same jurisdiction** (e.g., within a county, fire department A can communicate with police department A)
- **With Other Jurisdictions**—Interoperable wireless communications with other organizations of the **same discipline outside the jurisdiction**, but at the **same level of government** (e.g., sheriff’s deputies in one county can communicate with a responding deputy from a bordering county). All local governments (including municipal, tribal, county, and special districts) are considered the same level of government. Special agencies such as campus and airport or harbor departments are also considered at the “local” government level for purposes of this survey. This definition also includes state-to-state communication.
- **Between State and Local Government**—Interoperable wireless communications with other organizations of the **same discipline at a different level of government** (e.g., local investigators can communicate with state police).

Sample Question and Response: The following image illustrates how the questions are presented:

10. For each row, select the response that best describes the methods used to achieve interoperability ...

	There is a consistent approach to solutions; first responders must improvise an interoperability solution at the scene	Planned interoperability solutions require human intervention by someone other than first responders (e.g., must get patch through dispatcher)	Interoperability solutions are available to all first responders as authorized, without any intervention	Advanced interoperability solutions, technologies, and processes are piloted and tested	Don't Know	Other
...with other disciplines?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...with other jurisdictions?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...between state and local government?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please note the following:

- Select one response per row (not per column)
- Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Thank you for your assistance. If you have any questions or technical difficulties, please email SAFECOM at baseline@dhs.gov.

Primary Wireless Communications System

Please answer all questions from the perspective of your agency, regardless of whether it participates in or owns a shared system.

1. Which of the following best describes your organization's PRIMARY wireless communications system?

- ☐ Independently owned and operated communications system used exclusively by our department
- ☐ Part of a communications system that serves several public safety and/or public service organizations in our jurisdiction
- ☐ Part of a multi-agency, multi-jurisdictional shared communications system
- ☐ Other
- ☐ Don't know

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Governance—Decision Making Groups

2. For each row select the response that best describes your organization's involvement in decision-making groups that address interoperability...

	My organization participates, at most, in informal partnerships between organizations	My organization participates in a mix of informal and formal <u>partnerships</u>	My organization participates exclusively in formal <u>partnerships</u>	My organization's formal groups proactively recruit new participants, including responders beyond first responders	Don't know	Other
...with cross-discipline membership?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...with cross-jurisdiction membership?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...with local and state government membership?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Formal Partnership: A group or governing body with a published agreement that designates its authority, mission, and responsibilities

With Cross-Discipline Membership: Membership with another first responder organization of a different discipline within the same jurisdiction

With Cross-Jurisdiction Membership: Membership with other organizations of the same discipline outside the jurisdiction, but at the same level of government

With Local and State Government Membership: Membership with other organizations of the same discipline at a different level of government

Governance—Decision Making Groups (con't)

2a. Please check all items that apply to your **most important** interoperability decision-making group:

Please check ALL that apply

- | | |
|--|--|
| <input type="checkbox"/> Meets regularly | <input type="checkbox"/> Has consistent membership |
| <input type="checkbox"/> Has governance structure in place with rules | <input type="checkbox"/> Sends information to all members |
| <input type="checkbox"/> Sends information to public safety leaders outside the group as appropriate | <input type="checkbox"/> Sends information to political leaders outside the group as appropriate |
| <input type="checkbox"/> Makes recommendations concerning interoperability | <input type="checkbox"/> Takes action on its own decisions |

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Governance—Agreements						
3. For each row select the response that best describes the agreements your organization has made to ensure interoperability...						
	There are, at most, informal, undocumented agreements in practice that enable interoperability	There are <u>published and active agreements</u> with some of the organizations with whom we provide response	There are <u>published and active agreements</u> with all of the organizations with whom we provide response	There are established processes to develop and review agreements at least every 3–5 years, and after system upgrades and events that test organization capabilities	Don't know	Other
...with other disciplines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...with other jurisdictions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...between state and local government?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Published and Active Agreements

Memoranda of Understanding, Executive Orders, Intergovernmental agreements, etc.

With Other Disciplines: Membership with another first responder organization of a different discipline within the same jurisdiction

With Other Jurisdictions: Membership with other organizations of the same discipline outside the jurisdiction, but at the same level of government

Between State and Local Government: Membership with other organizations of the same discipline at a different level of government

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Governance—Funding for Capital Investments

4. Select the response that best describes interoperability capital investment funding (i.e., whether you own the system or subscribe to one)...

	No funding for interoperability <u>capital investments</u> exists or some funds may be pieced together	Funding allocated for <u>capital investments</u> does not meet all needs	Funding for <u>capital investments</u> meets interoperability requirements	Work is ongoing to ensure funding of future interoperability <u>capital investments</u>	Don't know	Other
...within your organization?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Capital Investments: Equipment and other one-time costs

Governance—Funding for Capital Investments (con't)

4a. Does your organization share capital investment costs with any of these partners?

Please check ALL that apply

- ☐ With other first responder disciplines ☐ With other jurisdictions
- ☐ With other levels of government

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Governance—Funding for Operating Costs

5. Select the response that best describes funding of operating costs for your interoperability...

	No funding is <u>dedicated</u> to operating costs or some funds may be pieced together	Funding or commitments for <u>operating costs</u> are <u>dedicated</u> in the current budget cycle	Funding or commitments for <u>operating costs</u> are <u>dedicated</u> beyond the current budget cycle	Work is ongoing to ensure funding for interoperability <u>operating costs</u> beyond the time that current sources expire	Don't know	Other
...within your organization?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Operating Costs: Operations and maintenance, leases, staffing, etc.

Dedicated: Funding specifically included in the budget for interoperability

Governance—Funding for Operating Costs (con't)

5a. Does your organization share interoperability operating costs with any of these partners?

Please check ALL that apply

- | | |
|---|---|
| <input type="checkbox"/> With other first responder disciplines | <input type="checkbox"/> With other jurisdictions |
| <input type="checkbox"/> With other levels of government | |

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Governance—Strategic Planning						
6. For each row select the response that best describes the strategic planning efforts to ensure your organization has interoperability...						
	No interoperability strategic plan is in place; some preliminary planning may have begun	Strategic planning process is in place and a plan is under development	Strategic plan is in place and accepted by all participating organizations	Strategic plan is reviewed annually and after system upgrades and events that test our organization's capabilities	Don't know	Other
...with other disciplines?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...with other jurisdictions?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...between state and local government?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

With Other Disciplines: Membership with another first responder organization of a different discipline within the same jurisdiction

With Other Jurisdictions: Membership with other organizations of the same discipline outside the jurisdiction, but at the same level of government

Between State and Local Government: Membership with other organizations of the same discipline at a different level of government

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Policies, Practices, and Procedures—Standard Operating Procedures						
7. For each row select the response that best describes the direction used by your organization to implement interoperable communications...						
	At most, informal policies, practices, and procedures are in place	Formal policies, practices, and procedures are in place to ensure interoperability during planned and <u>day-to-day events</u>	Formal policies, practices, and procedures are in place to ensure interoperability during <u>day-to-day events</u> and <u>out-of-the-ordinary events</u>	Processes exist to develop and annually review policies, practices, and procedures for consistency across responders	Don't know	Other
...with other disciplines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...with other jurisdictions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...between state and local government?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Formal: Published and active

Day-to-day events: Vehicle pursuit, multiple station response, etc.

Out-of-the-ordinary events: Mass casualties, flipped tanker on highway, etc.

With Other Disciplines: Membership with another first responder organization of a different discipline within the same jurisdiction

With Other Jurisdictions: Membership with other organizations of the same discipline outside the jurisdiction, but at the same level of government

Between State and Local Government: Membership with other organizations of the same discipline at a different level of government

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Policies, Practices, and Procedures—Command and Control

8. For each row select the response that best describes the direction provided to first responders to implement interoperable communications...

	At most, informal command and control standard operating procedures (SOP) concerning interoperability are in place	Formal command and control SOPs address interoperability in planned and <u>day-to-day events</u> for joint incident response	Formal command and control SOPs address interoperability during <u>day-to-day events</u> as well as <u>out-of-the-ordinary events</u> for joint incident response	Interoperability command and control policies are reviewed annually and after events that test organization capabilities	Don't know	Other
...with other disciplines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...with other jurisdictions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...between state and local government?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Formal: Published and active

Day-to-day events: Vehicle pursuit, multiple station response, etc.

Out-of-the-ordinary events: Mass casualties, flipped tanker on highway, etc.

With Other Disciplines: Membership with another first responder organization of a different discipline within the same jurisdiction

With Other Jurisdictions: Membership with other organizations of the same discipline outside the jurisdiction, but at the same level of government

Between State and Local Government: Membership with other organizations of the same discipline at a different level of government

Policies, Practices, and Procedures—Command and Control (con't)

8a. Are your organization's interoperability command and control policies National Incident Management System (NIMS)-compliant?

- ☐ Yes
- ☐ No
- ☐ Don't know

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Technology—Approaches						
9. For each row select the response that best describes the technology solutions used for interoperability...						
	Portable, mobile, or temporary solutions are developed in the field by first responders using resources and/or equipment on hand (such as radio swaps)	Planned solutions are readily deployable, but do not employ compatible equipment (such as channel patches)	Fixed infrastructure-based solutions are employed that use compatible equipment (such as shared system or channels)	Infrastructure-based solutions are in place and advanced solutions are planned that are completely transparent to responders in the field	Don't know	Other
...with other disciplines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...with other jurisdictions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...between state and local government?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

With Other Disciplines: Membership with another first responder organization of a different discipline within the same jurisdiction

With Other Jurisdictions: Membership with other organizations of the same discipline outside the jurisdiction, but at the same level of government

Between State and Local Government: Membership with other organizations of the same discipline at a different level of government

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Technology—Implementation						
<p>10. For each row select the response that best describes the methods used to achieve interoperability...</p>						
	There is no consistent approach to solutions; first responders must improvise an interoperability solution at the scene	Planned interoperability solutions require human intervention by someone other than first responders (e.g., must get patch through dispatcher)	Interoperability solutions are available to all first responders as authorized, without any intervention	Advanced interoperability solutions, technologies, and processes are piloted and tested	Don't know	Other
...with other disciplines?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...with other jurisdictions?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...between state and local government?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

With Other Disciplines: Membership with another first responder organization of a different discipline within the same jurisdiction

With Other Jurisdictions: Membership with other organizations of the same discipline outside the jurisdiction, but at the same level of government

Between State and Local Government: Membership with other organizations of the same discipline at a different level of government

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Technology—Maintenance and Support						
11. Select the response that best describes how interoperability equipment or systems are maintained...						
	No routine maintenance or consistent approach exists for preventive maintenance, repair, and replacement	Maintenance plans ensure a minimum level of reliability and availability	Maintenance plans ensure the capability to interoperate 24x7	Near-term and long-term <u>lifecycle planning</u> for the next solution is ongoing	Don't know	Other
...within your organization?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Lifecycle Planning: Execution of planning, design, acquisition, implementation, and operations/maintenance of equipment

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Training and Exercises—Training for Support Personnel

12. Select the response that best describes the nature of the training given to support personnel regarding interoperability.

	Support personnel have received, at most, <u>informal interoperability education or training</u>	Some support personnel have received <u>formal interoperability training</u>	Substantially all support personnel have received <u>formal and regular interoperability training</u>	Organizations assess after action reports, along with the changing operational environment, to adapt future interoperability training to address gaps and needs	Don't know	Other
...within your organization?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Support Personnel: Administrators, dispatchers, maintenance personnel, etc.

Informal Training: Training with no lesson plans or assessment of student performance; may be on-the-job training.

Formal Training: Training that includes a lesson plan and an assessment of student performance or change or behavior; may be in a classroom or on the job.

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Training and Exercises—Training for Field Personnel

13. Select the response that best describes the nature of the training given to field personnel regarding interoperability...

	Field personnel have received, at most, <u>informal interoperability education or training</u>	Some field personnel have received <u>formal interoperability training</u>	Substantially all field personnel have received <u>formal and regular interoperability training</u>	Organizations assess after action reports, along with the changing operational environment, to adapt future interoperability training to address gaps and needs	Don't know	Other
...within your organization?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Field Personnel: Law enforcement officers, firefighters, EMTs, etc.

Informal Training: Training with no lesson plans or assessment of student performance; may be on-the-job training.

Formal Training: Training that includes a lesson plan and an assessment of student performance or change or behavior; may be in a classroom or on the job.

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Training and Exercises—Exercises

14. For each row select the response that best describes the exercises conducted to prepare for situations that would require interoperable communications...

	My organization may have participated in planning workshops oriented toward interoperability	My organization regularly participates in tabletop exercises that incorporate interoperable communications	My organization regularly participates in fully functional operational exercises that include interoperable communications	My organization evaluates after action reports from fully functional exercises, along with the changing operational environment, to adapt exercises to address gaps and needs	Don't know	Other
...with other disciplines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...with other jurisdictions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...between state and local government?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

With Other Disciplines: Membership with another first responder organization of a different discipline within the same jurisdiction

With Other jurisdictions: Membership with other organizations of the same discipline outside the jurisdiction, but at the same level of government

Between State and Local Government: Membership with other organizations of the same discipline at a different level of government

Training and Exercises—Exercises (con't)

14a. Are your organization's interoperability exercises based on procedures that are National Incident Management System (NIMS)-compliant?

- ☐ Yes
- ☐ No
- ☐ Don't know

Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.

Usage—Frequency of Use and Familiarity						
15. For each row select the response that best describes how often and easily interoperability is used...						
	My organization seldom uses interoperability solutions, except for events that can be planned ahead of time	My organization uses solutions regularly for out-of-the-ordinary events and to a limited extent for day-to-day communications	My organization uses solutions regularly for day-to-day and out-of-the-ordinary events	My organization uses solutions regularly for all day-to-day and out-of-the-ordinary events on demand, in real time, when needed, as authorized	Don't know	Other
...with other disciplines?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...with other jurisdictions?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...between state and local government?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

With Other Disciplines: Membership with another first responder organization of a different discipline within the same jurisdiction

With Other Jurisdictions: Membership with other organizations of the same discipline outside the jurisdiction, but at the same level of government

Between State and Local Government: Membership with other organizations of the same discipline at a different level of government

Communications with Federal Agencies

16. Please check all Federal Government responders with which your first responders interoperate:

Please check ALL that apply

- | | |
|--|--|
| <input type="checkbox"/> Department of Agriculture
(e.g., Forest Service) | <input type="checkbox"/> Department of Defense |
| <input type="checkbox"/> Department of Energy | <input type="checkbox"/> Department of Homeland Security (e.g., Bureau of Customs and Border Protection, Bureau of Immigration and Customs Enforcement, U.S. Coast Guard, Federal Emergency Management Agency, Federal Protective Service, U.S. Secret Service) |
| <input type="checkbox"/> Department of the Interior
(e.g., Bureau of Land Management, National Park Service) | <input type="checkbox"/> Department of Justice (e.g., Bureau of Alcohol, Tobacco, Firearms, and Explosives; Drug Enforcement Administration; Federal Bureau of Investigation; U.S. Marshals Service) |
| <input type="checkbox"/> Other Federal Agencies | |

Equipment

Please answer all questions from the perspective of your agency, regardless of whether it participates in or owns a shared system.

17. Which of the following wireless communications equipment do you use currently for INTEROPERABILITY?

Please check ALL that apply

- | | |
|--|--|
| <input type="checkbox"/> Portable (handheld radio) | <input type="checkbox"/> Wireless Personal Digital Assistant (PDA) |
| <input type="checkbox"/> Commercial service wireless phone | <input type="checkbox"/> Wireless IP-based device |
| <input type="checkbox"/> One-way/two-way pagers | <input type="checkbox"/> Citizens band radio |
| <input type="checkbox"/> Amateur radio | <input type="checkbox"/> Telephone/FAX line |
| <input type="checkbox"/> Satellite phone | <input type="checkbox"/> Global positioning service (GPS) device |
| <input type="checkbox"/> Mobile data terminal (MDT) | <input type="checkbox"/> Mobile laptop computer |
| <input type="checkbox"/> Mobile (vehicle-mounted radio) | <input type="checkbox"/> Fixed wing aircraft/helicopter radio |
| | <input type="checkbox"/> Other |

18. Which of the following wireless solutions do you currently use to support INTEROPERABILITY?

Please check ALL that apply

- | | |
|---|---|
| <input type="checkbox"/> Radio exchange | <input type="checkbox"/> Radio cache |
| <input type="checkbox"/> Radio reprogramming | <input type="checkbox"/> Deployable gateway switch |
| <input type="checkbox"/> Fixed gateway switch | <input type="checkbox"/> Channel/console patch |
| <input type="checkbox"/> Mobile command center | <input type="checkbox"/> Deployable site infrastructure (e.g., Cell on Wheels) |
| <input type="checkbox"/> Shared channels/talkgroups | <input type="checkbox"/> Shared system (conventional or trunked) |
| <input type="checkbox"/> IP-based system | <input type="checkbox"/> National Public Safety Planning Advisory Committee (NPSPAC) channels |
| <input type="checkbox"/> Other agreed upon emergency channels | |

19. Does your organization currently have sufficient spectrum for the following interoperability needs?

Voice	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know	<input type="checkbox"/> Not Applicable
Text Message	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know	<input type="checkbox"/> Not Applicable
Broadband (e.g., photos, video, database access)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know	<input type="checkbox"/> Not Applicable
Mutual-aid channels	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know	<input type="checkbox"/> Not Applicable

20. Does your organization have sufficient spectrum for your foreseeable (i.e., next five years) interoperability needs?

Voice	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know	<input type="checkbox"/> Not Applicable
Text Message	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know	<input type="checkbox"/> Not Applicable
Broadband (e.g., photos, video, database access)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know	<input type="checkbox"/> Not Applicable
Mutual-aid channels	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know	<input type="checkbox"/> Not Applicable

21. Does your organization currently use or plan to use spectrum between 764 MHz and 776 MHz that is cleared for public safety use?

☐ Yes
 ☐ No
 ☐ Don't Know

22. Which best describes your organization's use of spectrum between 764 MHz and 776 MHz?

- ☐ My organization has not yet determined the applicability for the 700 MHz spectrum.
- ☐ My organization does not have a need or desire to use the 700 MHz spectrum.
- ☐ My organization is developing plans to determine how these additional 700 MHz frequencies would best be used.
- ☐ My organization is implementing plans to use the 700 MHz spectrum, including undertaking expenditures for this purpose.
- ☐ My organization has completed all foreseeable capital expenditures necessary to use the 700 MHz spectrum.

Equipment

Please answer the following questions about your primary wireless communications system, regardless of whether it is used for interoperability or not.

23. What radio frequencies does your PRIMARY system or network use?

Please check ALL that apply

- | | |
|---|--|
| <input type="checkbox"/> Low band VHF (25–50 MHz) | <input type="checkbox"/> Low band UHF TV sharing (470–512 MHz) |
| <input type="checkbox"/> High band VHF (150–174 MHz) | <input type="checkbox"/> 800 MHz (806–869 MHz) |
| <input type="checkbox"/> Federal band UHF (406–420 MHz) | <input type="checkbox"/> Other frequency bands |
| <input type="checkbox"/> Low band UHF (450–470 MHz) | <input type="checkbox"/> Does not apply |

24. What best describes the network architecture of your PRIMARY wireless communications system?

- ☐ Conventional (not trunked)
- ☐ Trunked
- ☐ Don't know

25. What best describes the frequency modulation of your PRIMARY wireless communications system?

- ☐ Analog
- ☐ Digital
- ☐ Dual-mode
- ☐ Other
- ☐ Don't know

26. How old is your PRIMARY wireless communications system?

- ☐ 1 Year
- ☐ 2-5 Years
- ☐ 6-10 Years
- ☐ More than 10 Years
- ☐ Don't know

27. Does your agency have plans to replace or substantially upgrade its PRIMARY wireless communications system within the next ten years?

- ☐ Yes
- ☐ No
- ☐ Don't know

28. When will your organization replace or substantially upgrade its PRIMARY wireless communications system?

- ☐ Within 1 Year
- ☐ Within 2-5 Years
- ☐ Within 6-10 Years
- ☐ More than 10 Years
- ☐ Don't know

Comments

29. Please provide any comments you may have on the use of interoperability in your organization.

APPENDIX C—INTEROPERABILITY BASELINE SURVEY FOR HOMELAND SECURITY DIRECTORS

INTEROPERABLE WIRELESS COMMUNICATIONS SURVEY

Interoperable wireless communications save lives by allowing public safety personnel from different organizations or jurisdictions to communicate on demand, in real time, as authorized. SAFECOM, a federal program of the Department of Homeland Security established to improve public safety communications, invites you to participate in this survey. Your knowledge will help us understand and improve the state of interoperability across the Nation. Your responses will be aggregated with responses from other homeland security directors and will **not** be reported individually. The survey should take approximately 5 minutes to complete.

Completing the Survey

You may also send the URL and password on your postcard to other members of your organization and ask them to complete specific questions. Please advise individuals, however, not to **overwrite** data entered by someone else.

Sample Question and Response: The following image illustrates how the questions are presented:

1. For each row, select the response that best describes the types of decision-making groups in your state that address interoperability...

	At most, informal partnerships address interoperability in my state	My state has a voluntary formal <u>statewide interoperability partnership</u>	My state has created a formal interoperability planning and governing body through legislation or Executive Order	My state's formal groups proactively recruit new participants, including responders beyond first responders	Don't know	Other
...with Fire/EMS/Law Enforcement membership?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...with local government membership?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...with local and state government membership?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...with Federal Government membership?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please note the following:

- Select one response per row (not per column)
- Reading left to right, the first four responses are progressive. For example, to select the fourth response, an agency must have met or surpassed all of the attributes in the first three responses.
-

Thank you for your assistance. If you have any questions or technical difficulties, please email SAFECOM at baseline@dhs.gov.

Decision Making Groups

1. For each row, select the response that best describes the types of decision-making groups in your state that address interoperability...

	At most, informal partnerships address interoperability in my state	My state has a voluntary formal <u>statewide interoperability partnership</u>	My state has created a formal interoperability planning and governing body through legislation or Executive Order	My state's formal groups proactively recruit new participants, including responders beyond first responders	Don't know	Other
...with Fire/EMS/Law Enforcement membership?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...with local government membership?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...with local and state government membership?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...with Federal Government membership?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Formal Partnership: A group or governing body with a published agreement that designates its authority, mission, and responsibilities

Decision Making Groups (con't)

1a. Please check all items that apply to your **most important** interoperability decision-making group:

- | | |
|--|--|
| <input type="checkbox"/> Meets regularly | <input type="checkbox"/> Has consistent membership |
| <input type="checkbox"/> Has governance structure in place with rules | <input type="checkbox"/> Sends information to all members |
| <input type="checkbox"/> Sends information to public safety leaders outside the group as appropriate | <input type="checkbox"/> Sends information to political leaders outside the group as appropriate |
| <input type="checkbox"/> Makes recommendations concerning interoperability | <input type="checkbox"/> Takes action on its own decisions |

Funding for Capital Investments

2. Select the response that best describes interoperability capital investments funding...

	My state provides no funding for interoperability <u>capital investments</u> , or some funds may be pieced together	My state provides funding that does not meet all needs for <u>capital investments</u> to meet interoperability requirements	My state provides funding that meets the needs for <u>capital investments</u> to meet interoperability requirements	My state is working to ensure funding of future interoperability <u>capital investments</u>	Don't know	Other
...in your state?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Capital Investments: Equipment and other one-time costs

Funding for Capital Investments (con't)

2a. Does your state share capital investment costs with any of these partners?

Please check ALL that apply

☐

With local governments

☐

With other states

☐

With private entities

Funding for Operating Costs

3. Select the response that best describes funding of operating costs for your interoperability....

	My state dedicates no funds to <u>operating cost</u> or some funds may be pieced together	My state has provided <u>dedicated</u> funding or commitments for <u>operating costs</u> in the current budget cycle	My state has provided <u>dedicated</u> funding or commitments for <u>operating costs</u> beyond the current budget cycle	My state is working to ensure funding for interoperability <u>operating costs</u> beyond the time that current sources expire	Don't know	Other
...in your state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Operating Costs: Operations and maintenance, leases, staffing, etc.

Dedicated: Funding specifically included in the budget for interoperability

Funding for Operating Costs (con't)

3a. Does your state share interoperability operating costs with any of these partners?

Please check ALL that apply

☐ With local governments

☐ With other states

☐ With private entities

Strategic Planning

4. Select the response that best describes the strategic planning efforts to ensure interoperability...

	No <u>statewide</u> interoperability strategic plan is in place; some preliminary planning may have begun	<u>Statewide</u> strategic planning process is in place and a plan is under development	<u>Statewide</u> strategic plan is in place and accepted by all participating organizations	<u>Statewide</u> strategic plans are reviewed annually and after system upgrades and events that test our state's capabilities	Don't know	Other
...in your state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Statewide: Includes both state and local governments across the state

APPENDIX D—DATA SETS

Frequencies

In the following tables, the responses for each question are listed. The column labeled "Frequency" contains the number of agencies that selected each response, as well as those that did not answer the question, and the totals. The column labeled "Percent" is the corresponding proportion of the total number of respondents in the survey – 6,819. The column labeled "Valid Percent" provides the figures that are cited in this report, and shows the percentages as calculated for the set of agencies that selected one of the four Continuum-based responses (that is, agencies that selected “Don’t know” or “Other,” who left the question unanswered are not included in this percent calculation). The column labeled "Cumulative Percent" shows the valid percents as they progressively add toward 100%.

Decision Making Groups—Cross Discipline

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal partnerships between organizations	1,689	24.8	29.0	29.0
	Mix of informal, formal partnerships	3,164	46.4	54.3	83.2
	Only formal partnerships	705	10.3	12.1	95.3
	Formal groups proactively recruit new members beyond first responders	272	4.0	4.7	100.0
	Total	5,830	85.5	100.0	
Missing	Don't know	424	6.2		
	Other	152	2.2		
	Unanswered	413	6.1		
	Total	989	14.5		
Total		6,819	100.0		

Decision Making Groups—Cross Jurisdiction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal partnerships between organizations	1,603	23.5	27.5	27.5
	Mix of informal, formal partnerships	3,237	47.5	55.5	83.0
	Only formal partnerships	771	11.3	13.2	96.2
	Formal groups proactively recruit new members beyond first responders	219	3.2	3.8	100.0
	Total	5,830	85.5	100.0	
Missing	Don't know	430	6.3		
	Other	177	2.6		
	Unanswered	382	5.6		
	Total	989	14.5		
Total		6,819	100.0		

Decision Making Groups—Local-State Government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal partnerships between organizations	1,921	28.2	34.4	34.4
	Mix of informal, formal partnerships	2,684	39.4	48.1	82.5
	Only formal partnerships	767	11.2	13.7	96.2
	Formal groups proactively recruit new members beyond first responders	213	3.1	3.8	100.0
	Total	5,585	81.9	100.0	
Missing	Don't know	623	9.1		
	Other	238	3.5		
	Unanswered	373	5.5		
	Total	1,234	18.1		
Total		6,819	100.0		

Agreements—Other Disciplines

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal, undocumented agreements	2,406	35.3	41.5	41.5
	Published, active agreements w/some pertinent organizations	2,042	29.9	35.2	76.7
	Published, active agreements w/all pertinent organizations	1,090	16.0	18.8	95.5
	Processes to develop, review agreements every 3-5 yrs, after system upgrades and events that test capabilities	261	3.8	4.5	100.0
	Total	5,799	85.0	100.0	
Missing	Don't know	471	6.9		
	Other	168	2.5		
	Unanswered	381	5.6		
	Total	1,020	15.0		
Total		6,819	100.0		

Agreements—Other Jurisdictions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal, undocumented agreements	2,059	30.2	34.5	34.5
	Published, active agreements w/some pertinent organizations	2,383	34.9	39.9	74.4
	Published, active agreements w/all pertinent organizations	1,231	18.1	20.6	95.0
	Processes to develop, review agreements every 3-5 yrs, after system upgrades and events that test capabilities	296	4.3	5.0	100.0
	Total	5,969	87.5	100.0	
Missing	Don't know	440	6.5		
	Other	144	2.1		
	Unanswered	266	3.9		
	Total	850	12.5		
Total		6,819	100.0		

Agreements—Local-State Government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal, undocumented agreements	2,229	32.7	41.8	41.8
	Published, active agreements w/some pertinent organizations	1,920	28.2	36.0	77.9
	Published, active agreements w/all pertinent organizations	915	13.4	17.2	95.0
	Processes to develop, review agreements every 3-5 yrs, after system upgrades and events that test capabilities	265	3.9	5.0	100.0
	Total	5,329	78.1	100.0	
Missing	Don't know	870	12.8		
	Other	243	3.6		
	Unanswered	377	5.5		
	Total	1,490	21.9		
Total		6,819	100.0		

Funding for Capital Investments—Within Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None, or some funds pieced together	2,637	38.7	43.5	43.5
	Funding allocated, but doesn't meet all needs	2,249	33.0	37.1	80.5
	Funding meets requirements	436	6.4	7.2	87.7
	Working to ensure future funding	744	10.9	12.3	100.0
	Total	6,066	89.0	100.0	
Missing	Don't know	614	9.0		
	Other	86	1.3		
	Unanswered	53	0.8		
	Total	753	11.0		
Total		6,819	100.0		

Funding for Operating Costs—Within Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None, or some funds pieced together	2,760	40.5	43.4	43.4
	Funding dedicated in current budget cycle	2,669	39.1	41.9	85.3
	Funding dedicated beyond current budget cycle	457	6.7	7.2	92.5
	Working to ensure funding beyond time that current sources expire	480	7.0	7.5	100.0
	Total	6,366	93.4	100.0	
Missing	Don't know	280	4.1		
	Other	76	1.1		
	Unanswered	97	1.4		
	Total	453	6.6		
Total		6,819	100.0		

Strategic Planning—Other Disciplines

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No plan in place; some planning may have begun	2,368	34.7	40.5	40.5
	Planning process in place, plan under development	1,959	28.7	33.5	73.9
	Plan in place, accepted by all participating organizations	1,172	17.2	20.0	94.0
	Plan reviewed annually, after upgrades and events that test capabilities	354	5.2	6.0	100.0
	Total	5,853	85.8	100.0	
Missing	Don't know	411	6.0		
	Other	71	1.0		
	Unanswered	484	7.1		
	Total	966	14.2		
Total		6,819	100.0		

Strategic Planning—Other Jurisdictions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No plan in place; some planning may have begun	2,267	33.2	39.3	39.3
	Planning process in place, plan under development	2,057	30.2	35.7	75.0
	Plan in place, accepted by all participating organizations	1,118	16.4	19.4	94.4
	Plan reviewed annually, after upgrades and events that test capabilities	322	4.7	5.6	100.0
	Total	5,764	84.5	100.0	
Missing	Don't know	491	7.2		
	Other	78	1.1		
	Unanswered	486	7.1		
	Total	1,055	15.5		
Total		6,819	100.0		

Strategic Planning—State-Local Government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No plan in place; some planning may have begun	2,313	33.9	43.7	43.7
	Planning process in place, plan under development	1,812	26.6	34.3	78.0
	Plan in place, accepted by all participating organizations	868	12.7	16.4	94.4
	Plan reviewed annually, after upgrades and events that test capabilities	295	4.3	5.6	100.0
	Total	5,288	77.5	100.0	
Missing	Don't know	860	12.6		
	Other	116	1.7		
	Unanswered	555	8.1		
	Total	1,531	22.5		
Total		6,819	100.0		

SOPs—Other Disciplines

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal policies, practices, procedures	2,904	42.6	49.4	49.4
	Formal policies, practices, procedures for daily events	1,340	19.7	22.8	72.3
	Formal policies, practices, procedures for daily & out-of-ordinary events	1,319	19.3	22.5	94.7
	Processes to develop, annually update policies, practices, procedures for consistency across responders	311	4.6	5.3	100.0
	Total	5,874	86.1	100.0	
Missing	Don't know	336	4.9		
	Other	89	1.3		
	Unanswered	520	7.6		
	Total	945	13.9		
Total		6,819	100.0		

SOPs—Other Jurisdictions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal policies, practices, procedures	2,754	40.4	47.1	47.1
	Formal policies, practices, procedures for daily events	1,405	20.6	24.0	71.2
	Formal policies, practices, procedures for daily & out-of-ordinary events	1,371	20.1	23.5	94.6
	Processes to develop, annually update policies, practices, procedures for consistency across responders	314	4.6	5.4	100.0
	Total	5,844	85.7	100.0	
Missing	Don't know	402	5.9		
	Other	112	1.6		
	Unanswered	461	6.8		
	Total	975	14.3		
Total		6,819	100.0		

SOPs—State-Local Government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal policies, practices, procedures	2,776	40.7	53.0	53.0
	Formal policies, practices, procedures for daily events	1,032	15.1	19.7	72.7
	Formal policies, practices, procedures for daily & out-of-ordinary events	1,147	16.8	21.9	94.6
	Processes to develop, annually update policies, practices, procedures for consistency across responders	285	4.2	5.4	100.0
	Total	5,240	76.8	100.0	
Missing	Don't know	855	12.5		
	Other	161	2.4		
	Unanswered	563	8.3		
	Total	1,579	23.2		
Total		6,819	100.0		

Command & Control—Other Disciplines

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Formal SOPs	2,867	42.0	49.8	49.8
	Formal SOPs in planned, daily events for joint incident response	1,395	20.5	24.2	74.0
	Formal SOPs in daily & out-of-ordinary events for joint incident response	1,222	17.9	21.2	95.2
	Policies reviewed annually, after events that test capabilities	275	4.0	4.8	100.0
	Total	5,759	84.5	100.0	
Missing	Don't know	356	5.2		
	Other	149	2.2		
	Unanswered	555	8.1		
	Total	1,060	15.5		
Total		6,819	100.0		

Command & Control—Other Jurisdictions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Formal SOPs	2,747	40.3	48.3	48.3
	Formal SOPs in planned, daily events for joint incident response	1,388	20.4	24.4	72.7
	Formal SOPs in daily & out-of-ordinary events for joint incident response	1,300	19.1	22.8	95.5
	Policies reviewed annually, after events that test capabilities	255	3.7	4.5	100.0
	Total	5,690	83.4	100.0	
Missing	Don't know	444	6.5		
	Other	157	2.3		
	Unanswered	528	7.7		
	Total	1,129	16.6		
Total		6,819	100.0		

Command & Control—State-Local Government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Formal SOPs	2,763	40.5	53.8	53.8
	Formal SOPs in planned, daily events for joint incident response	1,046	15.3	20.4	74.2
	Formal SOPs in daily & out-of-ordinary events for joint incident response	1,090	16.0	21.2	95.5
	Policies reviewed annually, after events that test capabilities	233	3.4	4.5	100.0
	Total	5,132	75.3	100.0	
Missing	Don't know	877	12.9		
	Other	200	2.9		
	Unanswered	610	8.9		
	Total	1,687	24.7		
Total		6,819	100.0		

Approaches—Other Disciplines

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	2,177	31.9	37.9	37.9
	Planned solutions readily deployable; don't employ compatible equipment	797	11.7	13.9	51.7
	Fixed infrastructure- based solutions use compatible equipment	2,317	34.0	40.3	92.1
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	456	6.7	7.9	100.0
	Total	5,747	84.3	100.0	
Missing	Don't know	409	6.0		
	Other	110	1.6		
	Unanswered	553	8.1		
	Total	1,072	15.7		
Total		6,819	100.0		

Approaches—Other Jurisdictions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	1,960	28.7	34.4	34.4
	Planned solutions readily deployable; don't employ compatible equipment	948	13.9	16.6	51.0
	Fixed infrastructure- based solutions use compatible equipment	2,357	34.6	41.4	92.4
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	432	6.3	7.6	100.0
	Total	5,697	83.5	100.0	
Missing	Don't know	483	7.1		
	Other	120	1.8		
	Unanswered	519	7.6		
	Total	1,122	16.5		
Total		6,819	100.0		

Approaches—State-Local Government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	1,990	29.2	39.6	39.6
	Planned solutions readily deployable; don't employ compatible equipment	878	12.9	17.5	57.1
	Fixed infrastructure- based solutions use compatible equipment	1,779	26.1	35.4	92.5
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	376	5.5	7.5	100.0
	Total	5,023	73.7	100.0	
Missing	Don't know	974	14.3		
	Other	189	2.8		
	Unanswered	633	9.3		
	Total	1,796	26.3		
Total		6,819	100.0		

Implementation—Other Disciplines

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No consistent approach to solutions; responders improvise at scene	1,675	24.6	28.6	28.6
	Planned solutions require human intervention by someone other than responders	1,915	28.1	32.7	61.4
	Solutions available to all responders as authorized, without intervention	2,032	29.8	34.7	96.1
	Advanced solutions, technologies, processes piloted & tested	226	3.3	3.9	100.0
	Total	5,848	85.8	100.0	
Missing	Don't know	304	4.5		
	Other	75	1.1		
	Unanswered	592	8.7		
	Total	971	14.2		
Total		6,819	100.0		

Implementation—Other Jurisdictions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No consistent approach to solutions; responders improvise at scene	1,563	22.9	26.9	26.9
	Planned solutions require human intervention by someone other than responders	2,069	30.3	35.5	62.4
	Solutions available to all responders as authorized, without intervention	1,955	28.7	33.6	96.0
	Advanced solutions, technologies, processes piloted & tested	233	3.4	4.0	100.0
	Total	5,820	85.3	100.0	
Missing	Don't know	367	5.4		
	Other	78	1.1		
	Unanswered	554	8.1		
	Total	999	14.7		
Total		6,819	100.0		

Implementation—State-Local Government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No consistent approach to solutions; responders improvise at scene	1,770	26.0	33.6	33.6
	Planned solutions require human intervention by someone other than responders	1,989	29.2	37.7	71.3
	Solutions available to all responders as authorized, without intervention	1,305	19.1	24.8	96.1
	Advanced solutions, technologies, processes piloted & tested	205	3.0	3.9	100.0
	Total	5,269	77.3	100.0	
Missing	Don't know	800	11.7		
	Other	118	1.7		
	Unanswered	632	9.3		
	Total	1,550	22.7		
Total		6,819	100.0		

Maintenance & Support—Within Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No routine/ consistent approach for preventive maintenance, repair, replacement	1,631	23.9	27.0	27.0
	Maintenance plans ensure minimum level of reliability, availability	1,918	28.1	31.8	58.8
	Maintenance plans ensure IO capability 24x7	2,136	31.3	35.4	94.1
	Near-, long- term lifecycle planning for next solution ongoing	354	5.2	5.9	100.0
	Total	6,039	88.6	100.0	
Missing	Don't know	334	4.9		
	Other	82	1.2		
	Unanswered	364	5.3		
	Total	780	11.4		
Total		6,819	100.0		

Training for Support Personnel—Within Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal education/training	2,347	34.4	39.1	39.1
	Some received formal training	2,271	33.3	37.8	76.8
	Substantially all received formal, regular training	1,160	17.0	19.3	96.1
	After action reports, changing operational environment assessed to adapt future training	232	3.4	3.9	100.0
	Total	6,010	88.1	100.0	
Missing	Don't know	269	3.9		
	Other	163	2.4		
	Unanswered	377	5.5		
	Total	809	11.9		
Total		6,819	100.0		

Training for Field Personnel—Within Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Informal education/training	2,482	36.4	40.7	40.7
	Some received formal training	2,226	32.6	36.5	77.1
	Substantially all received formal, regular training	1,222	17.9	20.0	97.1
	After action reports, changing operational environment assessed to adapt future training	175	2.6	2.9	100.0
	Total	6,105	89.5	100.0	
Missing	Don't know	184	2.7		
	Other	137	2.0		
	Unanswered	393	5.8		
	Total	714	10.5		
Total		6,819	100.0		

Exercises—Other Disciplines

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	May have participated in planning workshops	2,884	42.3	53.1	53.1
	Regularly participate in tabletop exercises	1,300	19.1	23.9	77.0
	Regularly participate in fully functional operational exercises	877	12.9	16.1	93.1
	After action reports from fully functional exercises, changing operational environment evaluated to adapt exercises	375	5.5	6.9	100.0
	Total	5,436	79.7	100.0	
Missing	Don't know	411	6.0		
	Other	372	5.5		
	Unanswered	600	8.8		
	Total	1,383	20.3		
Total		6,819	100.0		

Exercises—Other Jurisdictions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	May have participated in planning workshops	2,819	41.3	53.5	53.5
	Regularly participate in tabletop exercises	1,231	18.1	23.4	76.9
	Regularly participate in fully functional operational exercises	874	12.8	16.6	93.5
	After action reports from fully functional exercises, changing operational environment evaluated to adapt exercises	343	5.0	6.5	100.0
	Total	5,267	77.2	100.0	
Missing	Don't know	508	7.4		
	Other	409	6.0		
	Unanswered	635	9.3		
	Total	1,552	22.8		
Total		6,819	100.0		

Exercises—State-Local Government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	May have participated in planning workshops	2,738	40.2	59.5	59.5
	Regularly participate in tabletop exercises	964	14.1	21.0	80.5
	Regularly participate in fully functional operational exercises	609	8.9	13.2	93.7
	After action reports from fully functional exercises, changing operational environment evaluated to adapt exercises	288	4.2	6.3	100.0
	Total	4,599	67.4	100.0	
Missing	Don't know	933	13.7		
	Other	519	7.6		
	Unanswered	768	11.3		
	Total	2,220	32.6		
Total		6,819	100.0		

Frequency of Use and Familiarity—Other Disciplines

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Seldom use solutions, except in planned events	1,988	29.2	34.8	34.8
	Solutions used regularly for out-of-ordinary events, to limited extent for daily events	1,973	28.9	34.6	69.4
	Solutions used regularly for daily, out-of-ordinary events	1,126	16.5	19.7	89.1
	Solutions used regularly for daily, out-of-ordinary events on demand, in real time, when needed, as authorized	621	9.1	10.9	100.0
	Total	5,708	83.7	100.0	
Missing	Don't know	322	4.7		
	Other	183	2.7		
	Unanswered	606	8.9		
	Total	1,111	16.3		
Total		6,819	100.0		

Frequency of Use and Familiarity—Other Jurisdictions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Seldom use solutions, except in planned events	1,961	28.8	34.9	34.9
	Solutions used regularly for out-of-ordinary events, to limited extent for daily events	1,939	28.4	34.5	69.4
	Solutions used regularly for daily, out-of-ordinary events	1,145	16.8	20.4	89.8
	Solutions used regularly for daily, out-of-ordinary events on demand, in real time, when needed, as authorized	575	8.4	10.2	100.0
	Total	5,620	82.4	100.0	
Missing	Don't know	400	5.9		
	Other	197	2.9		
	Unanswered	602	8.8		
	Total	1,199	17.6		
Total		6,819	100.0		

Frequency of Use and Familiarity—State-Local Government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Seldom use solutions, except in planned events	2,405	35.3	48.5	48.5
	Solutions used regularly for out-of-ordinary events, to limited extent for daily events	1,443	21.2	29.1	77.6
	Solutions used regularly for daily, out-of-ordinary events	707	10.4	14.3	91.8
	Solutions used regularly for daily, out-of-ordinary events on demand, in real time, when needed, as authorized	406	6.0	8.2	100.0
	Total	4,961	72.8	100.0	
Missing	Don't know	846	12.4		
	Other	311	4.6		
	Unanswered	701	10.3		
	Total	1,858	27.2		
Total		6,819	100.0		

Crosstabs - Findings by Discipline

These tables compare the percentages of Fire/EMS and Law Enforcement agencies that selected any given response for each question. The cells in yellow show a statistically significant difference in the form of an adjusted residual value greater than 2. A residual is the difference between the actual value (count) of a cell versus the expected value, based on the distribution of the sample. Cross tabs that showed no statistically significant differences are not displayed.

Decision Making Groups - Cross Discipline * discipline

			discipline		Total
			Fire/EMS	Law Enforcement	
Decision Making Groups - Cross Discipline	Informal partnerships between organizations	Count	841	848	1,689
		% within discipline	28.8%	29.2%	29.0%
		Adjusted Residual	-0.3	0.3	
	Mix of informal, formal partnerships	Count	1,537	1,627	3,164
		% within discipline	52.6%	56.0%	54.3%
		Adjusted Residual	-2.6	2.6	
	Only formal partnerships	Count	354	351	705
		% within discipline	12.1%	12.1%	12.1%
		Adjusted Residual	0.0	0.0	
	Formal groups proactively recruit new members beyond first responders	Count	191	81	272
		% within discipline	6.5%	2.8%	4.7%
		Adjusted Residual	6.8	-6.8	
Total		Count	2,923	2,907	5,830
		% within discipline	100.0%	100.0%	100.0%

Agreements - Other Jurisdictions * discipline

			discipline		Total
			Fire/EMS	Law Enforcement	
Agreements - Other Jurisdictions	Informal, undocumented agreements	Count	976	1,083	2,059
		% within discipline	32.5%	36.6%	34.5%
		Adjusted Residual	-3.3	3.3	
	Published, active agreements w/some pertinent organizations	Count	1,179	1,204	2,383
		% within discipline	39.2%	40.6%	39.9%
		Adjusted Residual	-1.1	1.1	
	Published, active agreements w/all pertinent organizations	Count	683	548	1,231
		% within discipline	22.7%	18.5%	20.6%
		Adjusted Residual	4.0	-4.0	
	Processes to develop, review agreements every 3-5 yrs, after system upgrades and events that test capabilities	Count	169	127	296
		% within discipline	5.6%	4.3%	5.0%
		Adjusted Residual	2.4	-2.4	
Total		Count	3,007	2,962	5,969
		% within discipline	100.0%	100.0%	100.0%

Funding for Capital Investments - Within Organization * discipline

			discipline		Total
			Fire/EMS	Law Enforcement	
Funding for Capital Investments - Within Organization	None, or some funds pieced together	Count	1,321	1,316	2,637
		% within discipline	43.1%	43.9%	43.5%
		Adjusted Residual	-0.6	0.6	
	Funding allocated, but doesn't meet all needs	Count	1,189	1,060	2,249
		% within discipline	38.8%	35.3%	37.1%
		Adjusted Residual	2.8	-2.8	
	Funding meets requirements	Count	183	253	436
		% within discipline	6.0%	8.4%	7.2%
		Adjusted Residual	-3.7	3.7	
	Working to ensure future funding	Count	372	372	744
		% within discipline	12.1%	12.4%	12.3%
		Adjusted Residual	-0.3	0.3	
Total		Count	3,065	3,001	6,066
		% within discipline	100.0%	100.0%	100.0%

Approaches - Other Disciplines * discipline

			discipline		Total
			Fire/EMS	Law Enforcement	
Approaches - Other Disciplines	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	Count	1,183	994	2,177
		% within discipline	40.4%	35.3%	37.9%
		Adjusted Residual	4.0	-4.0	
	Planned solutions readily deployable; don't employ compatible equipment	Count	401	396	797
		% within discipline	13.7%	14.1%	13.9%
		Adjusted Residual	-0.4	0.4	
	Fixed infrastructure- based solutions use compatible equipment	Count	1,156	1,161	2,317
		% within discipline	39.5%	41.2%	40.3%
		Adjusted Residual	-1.4	1.4	
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	Count	190	266	456
		% within discipline	6.5%	9.4%	7.9%
		Adjusted Residual	-4.1	4.1	
Total		Count	2,930	2,817	5,747
		% within discipline	100.0%	100.0%	100.0%

Approaches - Other Jurisdictions * discipline

			discipline		Total
			Fire/EMS	Law Enforcement	
Approaches - Other Jurisdictions	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	Count	1,039	921	1,960
		% within discipline	36.0%	32.8%	34.4%
		Adjusted Residual	2.6	-2.6	
	Planned solutions readily deployable; don't employ compatible equipment	Count	496	452	948
		% within discipline	17.2%	16.1%	16.6%
		Adjusted Residual	1.1	-1.1	
	Fixed infrastructure- based solutions use compatible equipment	Count	1,165	1,192	2,357
		% within discipline	40.4%	42.4%	41.4%
		Adjusted Residual	-1.6	1.6	
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	Count	187	245	432
		% within discipline	6.5%	8.7%	7.6%
		Adjusted Residual	-3.2	3.2	
Total		Count	2,887	2,810	5,697
		% within discipline	100.0%	100.0%	100.0%

Maintenance & Support - Within Organization * discipline

			discipline		Total
			Fire/EMS	Law Enforcement	
Maintenance & Support - Within Organization	No routine/ consistent approach for preventive maintenance, repair, replacement	Count	807	824	1,631
		% within discipline	26.4%	27.6%	27.0%
		Adjusted Residual	-1.1	1.1	
	Maintenance plans ensure minimum level of reliability, availability	Count	1,074	844	1,918
		% within discipline	35.1%	28.3%	31.8%
		Adjusted Residual	5.7	-5.7	
	Maintenance plans ensure interoperable capability 24x7	Count	1,011	1,125	2,136
		% within discipline	33.1%	37.7%	35.4%
		Adjusted Residual	-3.8	3.8	
	Near-, long- term lifecycle planning for next solution ongoing	Count	165	189	354
		% within discipline	5.4%	6.3%	5.9%
		Adjusted Residual	-1.6	1.6	
Total		Count	3,057	2,982	6,039
		% within discipline	100.0%	100.0%	100.0%

Exercises – State-Local Government * discipline

			discipline		Total
			Fire/EMS	Law Enforcement	
Exercises - State/Local Gov't	May have participated in planning workshops	Count	1,400	1,338	2,738
		% within discipline	62.3%	56.9%	59.5%
		Adjusted Residual	3.7	-3.7	
	Regularly participate in tabletop exercises	Count	427	537	964
		% within discipline	19.0%	22.8%	21.0%
		Adjusted Residual	-3.2	3.2	
	Regularly participate in fully functional operational exercises	Count	296	313	609
		% within discipline	13.2%	13.3%	13.2%
		Adjusted Residual	-0.1	0.1	
	After action reports from fully functional exercises, changing operational environment evaluated to adapt exercises	Count	125	163	288
		% within discipline	5.6%	6.9%	6.3%
		Adjusted Residual	-1.9	1.9	
Total		Count	2,248	2,351	4,599
		% within discipline	100.0%	100.0%	100.0%

Crosstabs - Findings by Population Served

These tables compare the percentages of the five population-served size segments that selected any given response for each questions. The cells in yellow show a statistically significant difference in the form of an adjusted residual value greater than 2. A residual is the difference between the actual value (count) of a cell versus the expected value, based on the distribution of the sample. Cross tabs that showed no statistically significant differences are not displayed.

Decision Making Groups - Cross Discipline * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Decision Making Groups - Cross Discipline	Informal partnerships between organizations	Count	494	264	258	331	194	1,541
		% within population served	38.7%	32.1%	28.7%	27.7%	16.5%	28.7%
		Adjusted Residual	9.1	2.3	0.0	-0.9	-10.4	
	Mix of informal, formal partnerships	Count	603	434	497	663	731	2,928
		% within population served	47.3%	52.7%	55.3%	55.4%	62.2%	54.5%
		Adjusted Residual	-6.0	-1.1	0.5	0.7	6.0	
	Only formal partnerships	Count	124	87	109	154	184	658
		% within population served	9.7%	10.6%	12.1%	12.9%	15.7%	12.3%
		Adjusted Residual	-3.2	-1.6	-0.1	0.7	4.0	
	Formal groups proactively recruit new members beyond first responders	Count	55	38	35	49	66	243
		% within population served	4.3%	4.6%	3.9%	4.1%	5.6%	4.5%
		Adjusted Residual	-0.4	0.1	-1.0	-0.8	2.0	
Total		Count	1,276	823	899	1,197	1,175	5,370
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Decision Making Groups - Cross Jurisdiction * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Decision Making Groups - Cross Jurisdiction	Informal partnerships between organizations	Count	464	263	246	304	182	1,459
		% within population served	36.4%	31.5%	27.2%	25.7%	15.6%	27.2%
		Adjusted Residual	8.5	3.0	0.0	-1.3	-10.1	
	Mix of informal, formal partnerships	Count	641	435	512	667	729	2,984
		% within population served	50.4%	52.0%	56.6%	56.5%	62.6%	55.7%
		Adjusted Residual	-4.4	-2.3	0.6	0.6	5.4	
	Only formal partnerships	Count	133	111	117	164	192	717
		% within population served	10.4%	13.3%	12.9%	13.9%	16.5%	13.4%
		Adjusted Residual	-3.5	-0.1	-0.4	0.6	3.5	
	Formal groups proactively recruit new members beyond first responders	Count	35	27	29	46	62	199
		% within population served	2.7%	3.2%	3.2%	3.9%	5.3%	3.7%
		Adjusted Residual	-2.1	-0.8	-0.9	0.4	3.3	
Total		Count	1,273	836	904	1,181	1,165	5,359
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Decision Making Groups - Local-State Government * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Decision Making Groups - Local/State Gov't	Informal partnerships between organizations	Count	522	309	316	364	265	1,776
		% within population served	42.5%	38.8%	37.9%	32.1%	23.3%	34.6%
		Adjusted Residual	6.6	2.7	2.2	-2.0	-9.1	
	Mix of informal, formal partnerships	Count	522	341	396	559	634	2,452
		% within population served	42.5%	42.8%	47.5%	49.3%	55.8%	47.8%
		Adjusted Residual	-4.3	-3.1	-0.2	1.1	6.1	
	Only formal partnerships	Count	137	120	96	168	186	707
		% within population served	11.2%	15.1%	11.5%	14.8%	16.4%	13.8%
		Adjusted Residual	-3.1	1.1	-2.1	1.1	2.9	
	Formal groups proactively recruit new members beyond first responders	Count	47	26	25	42	51	191
		% within population served	3.8%	3.3%	3.0%	3.7%	4.5%	3.7%
		Adjusted Residual	0.2	-0.7	-1.2	0.0	1.5	
Total		Count	1,228	796	833	1,133	1,136	5,126
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Agreements - Other Disciplines * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Agreements - Other Disciplines	Informal, undocumented agreements	Count	599	362	389	491	386	2,227
		% within population served	46.1%	43.4%	44.1%	42.0%	33.3%	41.7%
		Adjusted Residual	3.7	1.1	1.6	0.2	-6.5	
	Published, active agreements w/some pertinent organizations	Count	402	282	303	434	448	1,869
		% within population served	30.9%	33.8%	34.3%	37.1%	38.7%	35.0%
		Adjusted Residual	-3.5	-0.8	-0.4	1.7	3.0	
	Published, active agreements w/all pertinent organizations	Count	246	156	157	205	250	1,014
		% within population served	18.9%	18.7%	17.8%	17.5%	21.6%	19.0%
		Adjusted Residual	0.0	-0.2	-1.0	-1.4	2.6	
	Processes to develop, review agreements every 3-5 yrs, after system upgrades and events that test capabilities	Count	53	35	34	40	74	236
		% within population served	4.1%	4.2%	3.9%	3.4%	6.4%	4.4%
		Adjusted Residual	-0.7	-0.3	-0.9	-1.9	3.7	
Total		Count	1,300	835	883	1,170	1,158	5,346
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Agreements - Other Jurisdictions * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Agreements - Other Jurisdictions	Informal, undocumented agreements	Count	524	316	329	397	331	1,897
		% within population served	39.1%	36.6%	36.4%	32.8%	28.1%	34.5%
		Adjusted Residual	4.0	1.4	1.3	-1.4	-5.2	
	Published, active agreements w/some pertinent organizations	Count	506	325	355	517	487	2,190
		% within population served	37.7%	37.6%	39.3%	42.8%	41.4%	39.9%
		Adjusted Residual	-1.8	-1.5	-0.4	2.3	1.2	
	Published, active agreements w/all pertinent organizations	Count	251	178	187	245	275	1,136
		% within population served	18.7%	20.6%	20.7%	20.3%	23.4%	20.7%
		Adjusted Residual	-2.0	-0.1	0.0	-0.4	2.6	
	Processes to develop, review agreements every 3-5 yrs, after system upgrades and events that test capabilities	Count	60	45	32	50	84	271
		% within population served	4.5%	5.2%	3.5%	4.1%	7.1%	4.9%
		Adjusted Residual	-0.9	0.4	-2.1	-1.4	3.9	
Total		Count	1,341	864	903	1,209	1,177	5,494
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Agreements - Local-State Government * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Agreements - Local/State Gov't	Informal, undocumented agreements	Count	558	340	364	418	382	2,062
		% within population served	46.7%	44.0%	45.6%	39.5%	35.4%	42.0%
		Adjusted Residual	3.7	1.2	2.2	-1.9	-5.0	
	Published, active agreements w/some pertinent organizations	Count	377	276	281	419	411	1,764
		% within population served	31.5%	35.7%	35.2%	39.6%	38.1%	36.0%
		Adjusted Residual	-3.7	-0.2	-0.5	2.8	1.7	
	Published, active agreements w/all pertinent organizations	Count	196	124	117	180	225	842
		% within population served	16.4%	16.0%	14.6%	17.0%	20.9%	17.2%
		Adjusted Residual	-0.8	-0.9	-2.1	-0.2	3.7	
	Processes to develop, review agreements every 3-5 yrs, after system upgrades and events that test capabilities	Count	65	33	37	42	60	237
		% within population served	5.4%	4.3%	4.6%	4.0%	5.6%	4.8%
		Adjusted Residual	1.1	-0.8	-0.3	-1.5	1.3	
Total		Count	1,196	773	799	1,059	1,078	4,905
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Funding for Capital Investments - Within Organization * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Funding for Capital Investments - Within Organization	None, or some funds pieced together	Count	750	430	418	479	350	2,427
		% within population served	55.1%	48.9%	44.4%	39.1%	29.6%	43.4%
		Adjusted Residual	10.0	3.5	0.6	-3.5	-10.8	
	Funding allocated, but doesn't meet all needs	Count	410	297	355	493	523	2,078
		% within population served	30.1%	33.8%	37.7%	40.2%	44.3%	37.2%
		Adjusted Residual	-6.2	-2.3	0.3	2.5	5.7	
	Funding meets requirements	Count	64	48	59	102	122	395
		% within population served	4.7%	5.5%	6.3%	8.3%	10.3%	7.1%
		Adjusted Residual	-3.9	-2.0	-1.1	1.9	4.9	
	Working to ensure future funding	Count	136	105	110	151	186	688
		% within population served	10.0%	11.9%	11.7%	12.3%	15.7%	12.3%
		Adjusted Residual	-3.0	-0.4	-0.7	0.0	4.0	
Total		Count	1,360	880	942	1,225	1,181	5,588
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Funding for Operating Costs - Within Organization * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Funding for Operating Costs - Within Organization	None, or some funds pieced together	Count	798	422	419	509	372	2,520
		% within population served	54.3%	45.0%	43.2%	40.0%	31.0%	43.1%
		Adjusted Residual	10.1	1.3	0.1	-2.5	-9.5	
	Funding dedicated in current budget cycle	Count	531	422	433	553	529	2,468
		% within population served	36.1%	45.0%	44.6%	43.5%	44.1%	42.2%
		Adjusted Residual	-5.4	1.9	1.7	1.0	1.5	
	Funding dedicated beyond current budget cycle	Count	55	44	56	115	152	422
		% within population served	3.7%	4.7%	5.8%	9.0%	12.7%	7.2%
		Adjusted Residual	-5.9	-3.3	-1.9	2.8	8.2	
	Working to ensure funding beyond time that current sources expire	Count	85	50	62	95	147	439
		% within population served	5.8%	5.3%	6.4%	7.5%	12.3%	7.5%
		Adjusted Residual	-2.9	-2.8	-1.4	-0.1	7.0	
Total		Count	1,469	938	970	1,272	1,200	5,849
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Strategic Planning - Other Disciplines * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Strategic Planning - Other Disciplines	No plan in place; some planning may have begun	Count	630	345	358	480	366	2,179
		% within population served	48.4%	40.5%	40.1%	40.6%	31.5%	40.4%
		Adjusted Residual	6.7	0.1	-0.2	0.1	-7.0	
	Planning process in place, plan under development	Count	387	279	298	408	442	1,814
		% within population served	29.7%	32.8%	33.4%	34.5%	38.0%	33.6%
		Adjusted Residual	-3.4	-0.6	-0.2	0.7	3.6	
	Plan in place, accepted by all participating organizations	Count	222	181	189	224	259	1,075
		% within population served	17.1%	21.3%	21.2%	18.9%	22.3%	19.9%
		Adjusted Residual	-3.0	1.1	1.0	-1.0	2.2	
	Plan reviewed annually, after upgrades and events that test capabilities	Count	63	46	47	71	96	323
		% within population served	4.8%	5.4%	5.3%	6.0%	8.3%	6.0%
		Adjusted Residual	-2.0	-0.8	-1.0	0.0	3.7	
Total		Count	1,302	851	892	1,183	1,163	5,391
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Strategic Planning - Other Jurisdictions * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Strategic Planning - Other Jurisdictions	No plan in place; some planning may have begun	Count	606	353	349	436	341	2,085
		% within population served	47.1%	42.8%	39.5%	37.6%	29.4%	39.3%
		Adjusted Residual	6.6	2.3	0.2	-1.3	-7.7	
	Planning process in place, plan under development	Count	403	256	330	450	472	1,911
		% within population served	31.3%	31.1%	37.3%	38.8%	40.8%	36.0%
		Adjusted Residual	-4.0	-3.2	0.9	2.3	3.8	
	Plan in place, accepted by all participating organizations	Count	222	175	161	216	248	1,022
		% within population served	17.2%	21.2%	18.2%	18.6%	21.4%	19.2%
		Adjusted Residual	-2.1	1.6	-0.8	-0.6	2.1	
	Plan reviewed annually, after upgrades and events that test capabilities	Count	56	40	44	57	97	294
		% within population served	4.4%	4.9%	5.0%	4.9%	8.4%	5.5%
		Adjusted Residual	-2.1	-0.9	-0.8	-1.0	4.8	
Total		Count	1,287	824	884	1,159	1,158	5,312
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Strategic Planning - State-Local Government * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Strategic Planning - State/Local Gov't	No plan in place; some planning may have begun	Count	588	354	359	459	373	2,133
		% within population served	50.9%	46.0%	45.4%	43.0%	34.5%	43.8%
		Adjusted Residual	5.5	1.3	1.0	-0.6	-7.0	
	Planning process in place, plan under development	Count	350	243	264	376	446	1,679
		% within population served	30.3%	31.6%	33.4%	35.2%	41.2%	34.5%
		Adjusted Residual	-3.5	-1.9	-0.7	0.6	5.3	
	Plan in place, accepted by all participating organizations	Count	156	133	125	180	191	785
		% within population served	13.5%	17.3%	15.8%	16.9%	17.7%	16.1%
		Adjusted Residual	-2.8	0.9	-0.3	0.7	1.5	
	Plan reviewed annually, after upgrades and events that test capabilities	Count	62	40	42	52	72	268
		% within population served	5.4%	5.2%	5.3%	4.9%	6.7%	5.5%
		Adjusted Residual	-0.2	-0.4	-0.3	-1.0	1.9	
Total		Count	1,156	770	790	1,067	1,082	4,865
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

SOPs - Other Disciplines * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
SOPs - Other Disciplines	Informal policies, practices, procedures	Count	740	428	449	587	472	2,676
		% within population served	56.5%	49.7%	49.9%	49.7%	40.5%	49.4%
		Adjusted Residual	5.9	0.2	0.4	0.2	-6.8	
	Formal policies, practices, procedures for daily events	Count	295	213	235	259	251	1,253
		% within population served	22.5%	24.7%	26.1%	21.9%	21.5%	23.1%
		Adjusted Residual	-0.6	1.2	2.3	-1.1	-1.4	
	Formal policies, practices, procedures for daily & out-of-ordinary events	Count	232	171	172	272	362	1,209
		% within population served	17.7%	19.8%	19.1%	23.0%	31.1%	22.3%
		Adjusted Residual	-4.6	-1.9	-2.5	0.7	8.1	
	Processes to develop, annually update policies, practices, procedures for consistency across responders	Count	43	50	43	63	80	279
		% within population served	3.3%	5.8%	4.8%	5.3%	6.9%	5.2%
		Adjusted Residual	-3.5	0.9	-0.5	0.3	3.0	
Total		Count	1,310	862	899	1,181	1,165	5,417
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

SOPs - Other Jurisdictions * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
SOPs - Other Jurisdictions	Informal policies, practices, procedures	Count	686	439	435	543	442	2,545
		% within population served	52.4%	51.2%	48.5%	46.4%	38.2%	47.2%
		Adjusted Residual	4.3	2.5	0.8	-0.6	-6.9	
	Formal policies, practices, procedures for daily events	Count	325	201	221	286	277	1,310
		% within population served	24.8%	23.4%	24.6%	24.5%	23.9%	24.3%
		Adjusted Residual	0.5	-0.7	0.3	0.1	-0.3	
	Formal policies, practices, procedures for daily & out-of-ordinary events	Count	252	166	200	278	354	1,250
		% within population served	19.3%	19.3%	22.3%	23.8%	30.6%	23.2%
		Adjusted Residual	-3.9	-2.9	-0.7	0.5	6.7	
	Processes to develop, annually update policies, practices, procedures for consistency across responders	Count	45	52	41	62	84	284
		% within population served	3.4%	6.1%	4.6%	5.3%	7.3%	5.3%
		Adjusted Residual	-3.4	1.1	-1.0	0.1	3.4	
Total		Count	1,308	858	897	1,169	1,157	5,389
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

SOPs - State-Local Government * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
SOPs - State/Local Gov't	Informal policies, practices, procedures	Count	653	427	441	534	524	2,579
		% within population served	57.1%	55.5%	55.8%	51.0%	48.8%	53.5%
		Adjusted Residual	2.8	1.2	1.4	-1.8	-3.4	
	Formal policies, practices, procedures for daily events	Count	238	146	146	219	205	954
		% within population served	20.8%	19.0%	18.5%	20.9%	19.1%	19.8%
		Adjusted Residual	1.0	-0.6	-1.0	1.1	-0.6	
	Formal policies, practices, procedures for daily & out-of-ordinary events	Count	204	154	159	244	277	1,038
		% within population served	17.8%	20.0%	20.1%	23.3%	25.8%	21.5%
		Adjusted Residual	-3.5	-1.1	-1.1	1.6	3.9	
	Processes to develop, annually update policies, practices, procedures for consistency across responders	Count	49	43	45	50	67	254
		% within population served	4.3%	5.6%	5.7%	4.8%	6.2%	5.3%
		Adjusted Residual	-1.7	0.4	0.6	-0.8	1.6	
Total		Count	1,144	770	791	1,047	1,073	4,825
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Command & Control - Other Disciplines * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Command & Control - Other Disciplines	Formal SOPs	Count	731	421	457	555	485	2,649
		% within population served	57.2%	50.5%	51.0%	47.9%	42.6%	49.9%
		Adjusted Residual	6.0	0.4	0.7	-1.6	-5.6	
	Formal SOPs in planned, daily events for joint incident response	Count	301	220	231	290	252	1,294
		% within population served	23.6%	26.4%	25.8%	25.0%	22.1%	24.4%
		Adjusted Residual	-0.8	1.5	1.1	0.6	-2.0	
	Formal SOPs in daily & out-of-ordinary events for joint incident response	Count	209	161	168	249	327	1,114
		% within population served	16.4%	19.3%	18.8%	21.5%	28.7%	21.0%
		Adjusted Residual	-4.7	-1.3	-1.8	0.5	7.2	
	Policies reviewed annually, after events that test capabilities	Count	37	31	40	65	75	248
		% within population served	2.9%	3.7%	4.5%	5.6%	6.6%	4.7%
		Adjusted Residual	-3.5	-1.4	-0.3	1.7	3.4	
Total		Count	1,278	833	896	1,159	1,139	5,305
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Command & Control - Other Jurisdictions * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Command & Control - Other Jurisdictions	Formal SOPs	Count	678	411	440	524	466	2,519
		% within population served	54.3%	49.6%	49.3%	46.2%	41.1%	48.1%
		Adjusted Residual	5.0	0.9	0.8	-1.4	-5.3	
	Formal SOPs in planned, daily events for joint incident response	Count	315	226	222	278	252	1,293
		% within population served	25.2%	27.3%	24.9%	24.5%	22.2%	24.7%
		Adjusted Residual	0.5	1.9	0.2	-0.2	-2.2	
	Formal SOPs in daily & out-of-ordinary events for joint incident response	Count	219	161	193	276	343	1,192
		% within population served	17.5%	19.4%	21.6%	24.3%	30.2%	22.8%
		Adjusted Residual	-5.0	-2.5	-0.9	1.4	6.8	
	Policies reviewed annually, after events that test capabilities	Count	36	31	37	56	73	233
		% within population served	2.9%	3.7%	4.1%	4.9%	6.4%	4.4%
		Adjusted Residual	-3.1	-1.1	-0.5	0.9	3.7	
Total		Count	1,248	829	892	1,134	1,134	5,237
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Command & Control - State-Local Government * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Command & Control - State/Local Gov't	Formal SOPs	Count	661	387	444	543	531	2,566
		% within population served	59.3%	52.2%	56.8%	52.5%	50.3%	54.3%
		Adjusted Residual	3.9	-1.2	1.5	-1.3	-2.9	
	Formal SOPs in planned, daily events for joint incident response	Count	220	175	149	215	204	963
		% within population served	19.7%	23.6%	19.1%	20.8%	19.3%	20.4%
		Adjusted Residual	-0.6	2.4	-1.0	0.4	-0.9	
	Formal SOPs in daily & out-of-ordinary events for joint incident response	Count	204	150	154	227	255	990
		% within population served	18.3%	20.2%	19.7%	21.9%	24.2%	20.9%
		Adjusted Residual	-2.5	-0.5	-0.9	0.9	2.9	
	Policies reviewed annually, after events that test capabilities	Count	29	29	35	50	65	208
		% within population served	2.6%	3.9%	4.5%	4.8%	6.2%	4.4%
		Adjusted Residual	-3.3	-0.7	0.1	0.8	3.2	
Total		Count	1,114	741	782	1,035	1,055	4,727
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Approaches - Other Disciplines * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Approaches - Other Disciplines	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	Count	597	354	325	429	295	2,000
		% within population served	46.9%	42.3%	36.9%	36.6%	26.0%	37.8%
		Adjusted Residual	7.7	3.0	-0.6	-0.9	-9.2	
	Planned solutions readily deployable; don't employ compatible equipment	Count	136	126	146	175	156	739
		% within population served	10.7%	15.1%	16.6%	14.9%	13.7%	14.0%
		Adjusted Residual	-3.8	1.0	2.5	1.1	-0.2	
	Fixed infrastructure- based solutions use compatible equipment	Count	481	314	362	474	501	2,132
		% within population served	37.8%	37.5%	41.1%	40.5%	44.1%	40.2%
		Adjusted Residual	-2.0	-1.8	0.6	0.2	3.0	
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	Count	58	43	48	93	184	426
		% within population served	4.6%	5.1%	5.4%	7.9%	16.2%	8.0%
		Adjusted Residual	-5.2	-3.4	-3.1	-0.1	11.4	
Total		Count	1,272	837	881	1,171	1,136	5,297
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Approaches - Other Jurisdictions * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Approaches - Other Jurisdictions	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	Count	534	334	294	371	269	1,802
		% within population served	42.5%	40.3%	33.6%	32.1%	23.7%	34.3%
		Adjusted Residual	7.0	4.0	-0.5	-1.8	-8.5	
	Planned solutions readily deployable; don't employ compatible equipment	Count	174	131	169	197	201	872
		% within population served	13.8%	15.8%	19.3%	17.1%	17.7%	16.6%
		Adjusted Residual	-3.0	-0.7	2.3	0.5	1.1	
	Fixed infrastructure- based solutions use compatible equipment	Count	492	321	367	502	494	2,176
		% within population served	39.1%	38.8%	41.9%	43.5%	43.5%	41.4%
		Adjusted Residual	-1.9	-1.7	0.3	1.6	1.6	
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	Count	57	42	46	84	172	401
		% within population served	4.5%	5.1%	5.3%	7.3%	15.1%	7.6%
		Adjusted Residual	-4.7	-3.0	-2.9	-0.5	10.8	
Total		Count	1,257	828	876	1,154	1,136	5,251
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Approaches - State-Local Government * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Approaches - State/Local Gov't	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	Count	517	320	291	401	301	1,830
		% within population served	47.6%	44.9%	38.7%	39.0%	29.0%	39.7%
		Adjusted Residual	6.2	3.1	-0.6	-0.5	-8.0	
	Planned solutions readily deployable; don't employ compatible equipment	Count	144	112	156	181	217	810
		% within population served	13.3%	15.7%	20.7%	17.6%	20.9%	17.6%
		Adjusted Residual	-4.2	-1.4	2.5	0.1	3.2	
	Fixed infrastructure- based solutions use compatible equipment	Count	366	241	266	374	382	1,629
		% within population served	33.7%	33.8%	35.4%	36.4%	36.8%	35.3%
		Adjusted Residual	-1.2	-0.9	0.0	0.8	1.1	
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	Count	58	39	39	71	138	345
		% within population served	5.3%	5.5%	5.2%	6.9%	13.3%	7.5%
		Adjusted Residual	-3.1	-2.2	-2.6	-0.8	8.1	
Total		Count	1,085	712	752	1,027	1,038	4,614
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Implementation - Other Disciplines * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Implementation - Other Disciplines	No consistent approach to solutions; responders improvise at scene	Count	492	250	253	320	230	1,545
		% within population served	37.3%	29.8%	28.3%	27.0%	19.8%	28.6%
		Adjusted Residual	8.0	0.8	-0.3	-1.4	-7.5	
	Planned solutions require human intervention by someone other than responders	Count	390	270	283	372	431	1,746
		% within population served	29.6%	32.2%	31.6%	31.3%	37.2%	32.3%
		Adjusted Residual	-2.5	-0.1	-0.5	-0.8	4.0	
	Solutions available to all responders as authorized, without intervention	Count	405	298	330	456	408	1,897
		% within population served	30.7%	35.5%	36.9%	38.4%	35.2%	35.1%
		Adjusted Residual	-3.9	0.3	1.2	2.7	0.1	
	Advanced solutions, technologies, processes piloted & tested	Count	32	21	29	39	90	211
		% within population served	2.4%	2.5%	3.2%	3.3%	7.8%	3.9%
		Adjusted Residual	-3.2	-2.3	-1.1	-1.3	7.6	
Total		Count	1,319	839	895	1,187	1,159	5,399
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Implementation - Other Jurisdictions * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Implementation - Other Jurisdictions	No consistent approach to solutions; responders improvise at scene	Count	433	253	250	290	207	1,433
		% within population served	33.3%	30.1%	27.9%	24.5%	17.9%	26.7%
		Adjusted Residual	6.2	2.5	0.9	-1.9	-7.6	
	Planned solutions require human intervention by someone other than responders	Count	439	270	315	415	455	1,894
		% within population served	33.8%	32.1%	35.1%	35.1%	39.4%	35.2%
		Adjusted Residual	-1.2	-2.0	-0.1	-0.2	3.3	
	Solutions available to all responders as authorized, without intervention	Count	392	289	304	443	405	1,833
		% within population served	30.2%	34.4%	33.9%	37.4%	35.1%	34.1%
		Adjusted Residual	-3.4	0.2	-0.1	2.7	0.8	
	Advanced solutions, technologies, processes piloted & tested	Count	35	28	28	36	88	215
		% within population served	2.7%	3.3%	3.1%	3.0%	7.6%	4.0%
		Adjusted Residual	-2.8	-1.1	-1.5	-1.9	7.1	
Total		Count	1,299	840	897	1,184	1,155	5,375
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Implementation - State-Local Government * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Implementation - State/Local Gov't	No consistent approach to solutions; responders improvise at scene	Count	460	270	282	360	268	1,640
		% within population served	39.2%	35.4%	35.2%	33.9%	25.2%	33.7%
		Adjusted Residual	4.5	1.1	0.9	0.2	-6.7	
	Planned solutions require human intervention by someone other than responders	Count	397	266	295	386	481	1,825
		% within population served	33.8%	34.9%	36.8%	36.4%	45.2%	37.5%
		Adjusted Residual	-3.0	-1.6	-0.5	-0.9	5.9	
	Solutions available to all responders as authorized, without intervention	Count	278	195	201	279	258	1,211
		% within population served	23.7%	25.6%	25.1%	26.3%	24.2%	24.9%
		Adjusted Residual	-1.1	0.5	0.1	1.2	-0.6	
	Advanced solutions, technologies, processes piloted & tested	Count	39	31	24	36	57	187
		% within population served	3.3%	4.1%	3.0%	3.4%	5.4%	3.8%
		Adjusted Residual	-1.1	0.3	-1.4	-0.9	2.9	
Total		Count	1,174	762	802	1,061	1,064	4,863
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Maintenance & Support - Within Organization * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Maintenance & Support - Within Organization	No routine/ consistent approach for preventive maintenance, repair, replacement	Count	502	295	251	283	179	1,510
		% within population served	36.4%	33.3%	27.3%	23.6%	15.4%	27.2%
		Adjusted Residual	8.8	4.4	0.1	-3.2	-10.2	
	Maintenance plans ensure minimum level of reliability, availability	Count	463	298	303	374	316	1,754
		% within population served	33.5%	33.6%	32.9%	31.2%	27.1%	31.6%
		Adjusted Residual	1.8	1.4	1.0	-0.3	-3.7	
	Maintenance plans ensure IO capability 24x7	Count	376	252	323	472	541	1,964
		% within population served	27.2%	28.4%	35.1%	39.4%	46.4%	35.4%
		Adjusted Residual	-7.3	-4.7	-0.2	3.3	8.9	
	Near-, long- term lifecycle planning for next solution ongoing	Count	40	42	43	70	129	324
		% within population served	2.9%	4.7%	4.7%	5.8%	11.1%	5.8%
		Adjusted Residual	-5.4	-1.5	-1.6	0.0	8.6	
Total		Count	1,381	887	920	1,199	1,165	5,552
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Training for Support Personnel - Within Organization * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Training for Support Personnel - Within Organization	Informal education/training	Count	641	359	360	446	345	2,151
		% within population served	47.2%	40.6%	39.3%	37.2%	29.3%	38.9%
		Adjusted Residual	7.3	1.2	0.3	-1.3	-7.6	
	Some received formal training	Count	450	325	343	481	492	2,091
		% within population served	33.2%	36.8%	37.4%	40.2%	41.7%	37.8%
		Adjusted Residual	-4.0	-0.7	-0.2	1.9	3.1	
	Substantially all received formal, regular training	Count	231	172	185	223	271	1,082
		% within population served	17.0%	19.5%	20.2%	18.6%	23.0%	19.6%
		Adjusted Residual	-2.7	-0.1	0.5	-0.9	3.4	
	After action reports, changing operational environment assessed to adapt future training	Count	35	28	28	48	71	210
		% within population served	2.6%	3.2%	3.1%	4.0%	6.0%	3.8%
		Adjusted Residual	-2.7	-1.1	-1.3	0.4	4.5	
Total		Count	1,357	884	916	1,198	1,179	5,534
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Training for Field Personnel - Within Organization * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Training for Field Personnel - Within Organization	Informal education/training	Count	625	371	367	497	410	2,270
		% within population served	45.2%	41.5%	38.8%	40.8%	34.9%	40.4%
		Adjusted Residual	4.2	0.7	-1.1	0.3	-4.3	
	Some received formal training	Count	496	328	355	421	444	2,044
		% within population served	35.9%	36.7%	37.5%	34.6%	37.8%	36.4%
		Adjusted Residual	-0.5	0.2	0.8	-1.5	1.1	
	Substantially all received formal, regular training	Count	228	176	209	257	268	1,138
		% within population served	16.5%	19.7%	22.1%	21.1%	22.8%	20.3%
		Adjusted Residual	-4.0	-0.5	1.5	0.8	2.4	
	After action reports, changing operational environment assessed to adapt future training	Count	33	19	15	42	52	161
		% within population served	2.4%	2.1%	1.6%	3.5%	4.4%	2.9%
		Adjusted Residual	-1.2	-1.5	-2.6	1.4	3.6	
Total		Count	1,382	894	946	1,217	1,174	5,613
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Exercises - Other Disciplines * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Exercises - Other Disciplines	May have participated in planning workshops	Count	767	445	464	567	421	2,664
		% within population served	66.2%	57.6%	54.3%	50.9%	37.6%	53.1%
		Adjusted Residual	10.2	2.8	0.8	-1.7	-11.8	
	Regularly participate in tabletop exercises	Count	226	184	217	287	293	1,207
		% within population served	19.5%	23.8%	25.4%	25.7%	26.2%	24.1%
		Adjusted Residual	-4.1	-0.2	1.0	1.5	1.9	
	Regularly participate in fully functional operational exercises	Count	116	108	126	194	258	802
		% within population served	10.0%	14.0%	14.8%	17.4%	23.1%	16.0%
		Adjusted Residual	-6.3	-1.6	-1.1	1.5	7.3	
	After action reports from fully functional exercises, changing operational environment evaluated to adapt exercises	Count	49	35	47	67	147	345
		% within population served	4.2%	4.5%	5.5%	6.0%	13.1%	6.9%
		Adjusted Residual	-4.1	-2.8	-1.7	-1.3	9.4	
Total		Count	1,158	772	854	1,115	1,119	5,018
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Exercises - Other Jurisdictions * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Exercises - Other Jurisdictions	May have participated in planning workshops	Count	723	433	466	559	430	2,611
		% within population served	64.4%	58.6%	56.3%	51.9%	39.2%	53.7%
		Adjusted Residual	8.2	2.9	1.7	-1.4	-10.9	
	Regularly participate in tabletop exercises	Count	227	171	202	266	273	1,139
		% within population served	20.2%	23.1%	24.4%	24.7%	24.9%	23.4%
		Adjusted Residual	-2.9	-0.2	0.7	1.1	1.3	
	Regularly participate in fully functional operational exercises	Count	126	106	124	189	255	800
		% within population served	11.2%	14.3%	15.0%	17.5%	23.3%	16.5%
		Adjusted Residual	-5.4	-1.7	-1.2	1.1	6.9	
	After action reports from fully functional exercises, changing operational environment evaluated to adapt exercises	Count	46	29	35	64	138	312
		% within population served	4.1%	3.9%	4.2%	5.9%	12.6%	6.4%
		Adjusted Residual	-3.6	-3.0	-2.8	-0.7	9.5	
Total		Count	1,122	739	827	1,078	1,096	4,862
		% within population served - Other Jurisdictions	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Exercises - State-Local Government * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Exercises - State/Local Gov't	May have participated in planning workshops	Count	648	420	445	577	453	2,543
		% within population served	68.5%	66.4%	63.0%	60.2%	45.3%	59.9%
		Adjusted Residual	6.1	3.6	1.9	0.2	-10.8	
	Regularly participate in tabletop exercises	Count	170	119	154	200	250	893
		% within population served	18.0%	18.8%	21.8%	20.9%	25.0%	21.0%
		Adjusted Residual	-2.6	-1.5	0.6	-0.2	3.5	
	Regularly participate in fully functional operational exercises	Count	87	72	79	121	187	546
		% within population served	9.2%	11.4%	11.2%	12.6%	18.7%	12.9%
		Adjusted Residual	-3.8	-1.2	-1.5	-0.3	6.3	
	After action reports from fully functional exercises, changing operational environment evaluated to adapt exercises	Count	41	22	28	61	111	263
		% within population served	4.3%	3.5%	4.0%	6.4%	11.1%	6.2%
		Adjusted Residual	-2.7	-3.1	-2.7	0.2	7.3	
Total		Count	946	633	706	959	1,001	4,245
		% within population served - State/Local Gov't	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Frequency of Use and Familiarity - Other Disciplines * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Frequency of Use and Familiarity - Other Disciplines	Seldom use solutions, except in planned events	Count	524	289	283	367	376	1,839
		% within population served	41.7%	35.3%	32.0%	31.6%	33.0%	35.0%
		Adjusted Residual	5.7	0.2	-2.0	-2.7	-1.6	
	Solutions used regularly for out-of-ordinary events, to limited extent for daily events	Count	393	305	348	413	357	1,816
		% within population served	31.2%	37.2%	39.4%	35.6%	31.3%	34.5%
		Adjusted Residual	-2.8	1.8	3.4	0.9	-2.6	
	Solutions used regularly for daily, out-of-ordinary events	Count	221	160	169	243	235	1,028
		% within population served	17.6%	19.5%	19.1%	20.9%	20.6%	19.5%
		Adjusted Residual	-2.0	0.0	-0.3	1.4	1.0	
	Solutions used regularly for daily, out-of-ordinary events on demand, in real time, when needed, as authorized	Count	120	65	83	137	173	578
		% within population served	9.5%	7.9%	9.4%	11.8%	15.2%	11.0%
		Adjusted Residual	-1.9	-3.0	-1.7	1.0	5.1	
Total		Count	1,258	819	883	1,160	1,141	5,261
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Frequency of Use and Familiarity - Other Jurisdictions * population served

			population served					Total
			<2500	2500 - 4999	5000 - 9999	10,000 - 24,999	>24,999	
Frequency of Use and Familiarity - Other Jurisdictions	Seldom use solutions, except in planned events	Count	518	285	309	345	347	1,804
		% within population served	42.1%	35.5%	35.2%	30.5%	30.5%	34.8%
		Adjusted Residual	6.1	0.5	0.2	-3.5	-3.4	
	Solutions used regularly for out-of-ordinary events, to limited extent for daily events	Count	364	292	331	431	368	1,786
		% within population served	29.6%	36.4%	37.7%	38.1%	32.4%	34.5%
		Adjusted Residual	-4.2	1.2	2.2	2.9	-1.7	
	Solutions used regularly for daily, out-of-ordinary events	Count	222	169	167	239	257	1,054
		% within population served	18.0%	21.1%	19.0%	21.1%	22.6%	20.4%
		Adjusted Residual	-2.3	0.6	-1.1	0.7	2.2	
	Solutions used regularly for daily, out-of-ordinary events on demand, in real time, when needed, as authorized	Count	127	56	72	116	164	535
		% within population served	10.3%	7.0%	8.2%	10.3%	14.4%	10.3%
		Adjusted Residual	0.0	-3.4	-2.3	-0.1	5.1	
Total		Count	1,231	802	879	1,131	1,136	5,179
		% within population served	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Crosstabs - Findings by Primary Wireless System

These tables compare the percentages of the three types of primary wireless systems that selected any given response for each question. The cells in yellow show a statistically significant difference in the form of an adjusted residual value greater than 2. A residual is the difference between the actual value (count) of a cell versus the expected value, based on the distribution of the sample. Cross tabs that showed no statistically significant differences are not displayed.

Decision Making Groups - Cross Discipline * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Decision Making Groups - Cross Discipline	Informal partnerships between organizations	Count	480	659	480	1,619
		% within Primary Wireless System	39.4%	27.9%	23.1%	28.6%
		Adjusted Residual	9.5	-1.0	-7.0	
	Mix of informal, formal partnerships	Count	601	1,317	1,167	3,085
		% within Primary Wireless System	49.4%	55.7%	56.1%	54.5%
		Adjusted Residual	-4.0	1.5	1.8	
	Only formal partnerships	Count	92	283	318	693
		% within Primary Wireless System	7.6%	12.0%	15.3%	12.2%
		Adjusted Residual	-5.6	-0.5	5.3	
	Formal groups proactively recruit new members beyond first responders	Count	44	106	116	266
		% within Primary Wireless System	3.6%	4.5%	5.6%	4.7%
		Adjusted Residual	-2.0	-0.6	2.4	
Total		Count	1,217	2,365	2,081	5,663
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Decision Making Groups - Cross Jurisdiction * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Decision Making Groups - Cross Jurisdiction	Informal partnerships between organizations	Count	412	719	416	1,547
		% within Primary Wireless System	34.7%	30.4%	19.7%	27.3%
		Adjusted Residual	6.4	4.5	-10.0	
	Mix of informal, formal partnerships	Count	626	1,295	1,227	3,148
		% within Primary Wireless System	52.7%	54.8%	58.0%	55.6%
		Adjusted Residual	-2.2	-1.0	2.8	
	Only formal partnerships	Count	115	271	371	757
		% within Primary Wireless System	9.7%	11.5%	17.5%	13.4%
		Adjusted Residual	-4.2	-3.5	7.1	
	Formal groups proactively recruit new members beyond first responders	Count	34	77	101	212
		% within Primary Wireless System	2.9%	3.3%	4.8%	3.7%
		Adjusted Residual	-1.8	-1.6	3.2	
Total		Count	1,187	2,362	2,115	5,664
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Decision Making Groups – Local-State Government * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Decision Making Groups - Local/State Gov't	Informal partnerships between organizations	Count	468	800	576	1,844
		% within Primary Wireless System	40.3%	36.1%	28.5%	34.1%
		Adjusted Residual	5.0	2.5	-6.8	
	Mix of informal, formal partnerships	Count	537	1,062	1,010	2,609
		% within Primary Wireless System	46.3%	47.9%	49.9%	48.3%
		Adjusted Residual	-1.6	-0.5	1.8	
	Only formal partnerships	Count	122	277	350	749
		% within Primary Wireless System	10.5%	12.5%	17.3%	13.9%
		Adjusted Residual	-3.7	-2.4	5.7	
	Formal groups proactively recruit new members beyond first responders	Count	34	80	88	202
		% within Primary Wireless System	2.9%	3.6%	4.3%	3.7%
		Adjusted Residual	-1.6	-0.4	1.8	
Total		Count	1,161	2,219	2,024	5,404
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Agreements - Other Disciplines * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Agreements - Other Disciplines	Informal, undocumented agreements	Count	631	991	705	2,327
		% within Primary Wireless System	53.2%	41.8%	34.0%	41.3%
		Adjusted Residual	9.3	0.6	-8.5	
	Published, active agreements w/some pertinent organizations	Count	395	866	729	1,990
		% within Primary Wireless System	33.3%	36.5%	35.1%	35.3%
		Adjusted Residual	-1.7	1.6	-0.2	
	Published, active agreements w/all pertinent organizations	Count	124	421	520	1,065
		% within Primary Wireless System	10.4%	17.8%	25.1%	18.9%
		Adjusted Residual	-8.4	-1.9	9.0	
	Processes to develop, review agreements every 3-5 yrs, after system upgrades and events that test capabilities	Count	37	93	120	250
		% within Primary Wireless System	3.1%	3.9%	5.8%	4.4%
		Adjusted Residual	-2.5	-1.6	3.7	
Total		Count	1,187	2,371	2,074	5,632
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Agreements - Other Jurisdictions * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Agreements - Other Jurisdictions	Informal, undocumented agreements	Count	550	872	556	1,978
		% within Primary Wireless System	45.3%	36.3%	25.6%	34.2%
		Adjusted Residual	9.2	2.9	-10.7	
	Published, active agreements w/some pertinent organizations	Count	461	992	863	2,316
		% within Primary Wireless System	37.9%	41.4%	39.8%	40.0%
		Adjusted Residual	-1.7	1.7	-0.3	
	Published, active agreements w/all pertinent organizations	Count	161	435	606	1,202
		% within Primary Wireless System	13.3%	18.1%	27.9%	20.8%
		Adjusted Residual	-7.3	-4.2	10.4	
	Processes to develop, review agreements every 3-5 yrs, after system upgrades and events that test capabilities	Count	43	100	146	289
		% within Primary Wireless System	3.5%	4.2%	6.7%	5.0%
		Adjusted Residual	-2.6	-2.4	4.7	
Total		Count	1,215	2,399	2,171	5,785
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Agreements – Local-State Government * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Agreements - Local/State Gov't	Informal, undocumented agreements	Count	558	926	668	2,152
		% within Primary Wireless System	49.9%	43.7%	34.9%	41.7%
		Adjusted Residual	6.2	2.4	-7.7	
	Published, active agreements w/some pertinent organizations	Count	397	766	695	1,858
		% within Primary Wireless System	35.5%	36.1%	36.3%	36.0%
		Adjusted Residual	-0.4	0.1	0.3	
	Published, active agreements w/all pertinent organizations	Count	126	334	431	891
		% within Primary Wireless System	11.3%	15.8%	22.5%	17.3%
		Adjusted Residual	-6.0	-2.4	7.6	
	Processes to develop, review agreements every 3-5 yrs, after system upgrades and events that test capabilities	Count	38	94	122	254
		% within Primary Wireless System	3.4%	4.4%	6.4%	4.9%
		Adjusted Residual	-2.7	-1.4	3.7	
Total		Count	1,119	2,120	1,916	5,155
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Funding for Capital Investments - Within Organization * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Funding for Capital Investments - Within Organization	None, or some funds pieced together	Count	683	1,065	773	2,521
		% within Primary Wireless System	53.6%	43.7%	35.9%	43.0%
		Adjusted Residual	8.7	1.0	-8.4	
	Funding allocated, but doesn't meet all needs	Count	394	955	842	2,191
		% within Primary Wireless System	30.9%	39.2%	39.1%	37.3%
		Adjusted Residual	-5.4	2.5	2.1	
	Funding meets requirements	Count	81	154	195	430
		% within Primary Wireless System	6.4%	6.3%	9.0%	7.3%
		Adjusted Residual	-1.5	-2.5	3.8	
	Working to ensure future funding	Count	116	263	346	725
		% within Primary Wireless System	9.1%	10.8%	16.0%	12.4%
		Adjusted Residual	-4.0	-3.1	6.5	
Total		Count	1,274	2,437	2,156	5,867
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Funding for Operating Costs - Within Organization * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Funding for Operating Costs - Within Organization	None, or some funds pieced together	Count	660	1,154	834	2,648
		% within Primary Wireless System	50.9%	44.6%	36.9%	43.1%
		Adjusted Residual	6.4	2.0	-7.5	
	Funding dedicated in current budget cycle	Count	505	1,091	984	2,580
		% within Primary Wireless System	39.0%	42.2%	43.5%	42.0%
		Adjusted Residual	-2.5	0.2	1.9	
	Funding dedicated beyond current budget cycle	Count	60	173	215	448
		% within Primary Wireless System	4.6%	6.7%	9.5%	7.3%
		Adjusted Residual	-4.2	-1.6	5.1	
	Working to ensure funding beyond time that current sources expire	Count	71	169	227	467
		% within Primary Wireless System	5.5%	6.5%	10.0%	7.6%
		Adjusted Residual	-3.2	-2.7	5.5	
Total		Count	1,274	2,437	2,156	5,867
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Strategic Planning - Other Disciplines * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Strategic Planning - Other Disciplines	No plan in place; some planning may have begun	Count	612	965	688	2,265
		% within Primary Wireless System	50.3%	40.5%	33.3%	40.0%
		Adjusted Residual	8.3	0.7	-7.8	
	Planning process in place, plan under development	Count	404	818	685	1,907
		% within Primary Wireless System	33.2%	34.4%	33.2%	33.7%
		Adjusted Residual	-0.4	0.9	-0.6	
	Plan in place, accepted by all participating organizations	Count	167	467	511	1,145
		% within Primary Wireless System	13.7%	19.6%	24.7%	20.2%
		Adjusted Residual	-6.4	-1.0	6.4	
	Plan reviewed annually, after upgrades and events that test capabilities	Count	33	131	182	346
		% within Primary Wireless System	2.7%	5.5%	8.8%	6.1%
		Adjusted Residual	-5.6	-1.6	6.4	
Total		Count	1,216	2,381	2,066	5,663
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Strategic Planning - Other Jurisdictions * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Strategic Planning - Other Jurisdictions	No plan in place; some planning may have begun	Count	578	947	643	2,168
		% within Primary Wireless System	48.0%	41.1%	31.0%	38.8%
		Adjusted Residual	7.4	2.9	-9.2	
	Planning process in place, plan under development	Count	434	852	726	2,012
		% within Primary Wireless System	36.0%	37.0%	35.0%	36.0%
		Adjusted Residual	0.0	1.2	-1.2	
	Plan in place, accepted by all participating organizations	Count	163	400	527	1,090
		% within Primary Wireless System	13.5%	17.4%	25.4%	19.5%
		Adjusted Residual	-5.9	-3.4	8.5	
	Plan reviewed annually, after upgrades and events that test capabilities	Count	30	106	179	315
		% within Primary Wireless System	2.5%	4.6%	8.6%	5.6%
		Adjusted Residual	-5.4	-2.8	7.4	
Total		Count	1,205	2,305	2,075	5,585
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Strategic Planning – State-Local Government * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Strategic Planning - State/Local Gov't	No plan in place; some planning may have begun	Count	589	937	690	2,216
		% within Primary Wireless System	51.6%	44.5%	36.8%	43.3%
		Adjusted Residual	6.4	1.5	-7.1	
	Planning process in place, plan under development	Count	374	731	661	1,766
		% within Primary Wireless System	32.8%	34.7%	35.3%	34.5%
		Adjusted Residual	-1.4	0.3	0.9	
	Plan in place, accepted by all participating organizations	Count	140	327	379	846
		% within Primary Wireless System	12.3%	15.5%	20.2%	16.5%
		Adjusted Residual	-4.4	-1.6	5.4	
	Plan reviewed annually, after upgrades and events that test capabilities	Count	38	109	144	291
		% within Primary Wireless System	3.3%	5.2%	7.7%	5.7%
		Adjusted Residual	-3.9	-1.3	4.7	
Total		Count	1,141	2,104	1,874	5,119
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

SOPs - Other Disciplines * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
SOPs - Other Disciplines	Informal policies, practices, procedures	Count	746	1,181	859	2,786
		% within Primary Wireless System	62.2%	49.3%	41.1%	49.0%
		Adjusted Residual	10.3	0.3	-9.0	
	Formal policies, practices, procedures for daily events	Count	227	599	471	1,297
		% within Primary Wireless System	18.9%	25.0%	22.6%	22.8%
		Adjusted Residual	-3.6	3.3	-0.4	
	Formal policies, practices, procedures for daily & out-of-ordinary events	Count	177	504	617	1,298
		% within Primary Wireless System	14.8%	21.0%	29.5%	22.8%
		Adjusted Residual	-7.5	-2.8	9.2	
	Processes to develop, annually update policies, practices, procedures for consistency across responders	Count	50	113	141	304
		% within Primary Wireless System	4.2%	4.7%	6.8%	5.3%
		Adjusted Residual	-2.0	-1.8	3.6	
Total		Count	1,200	2,397	2,088	5,685
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

SOPs - Other Jurisdictions * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
SOPs - Other Jurisdictions	Informal policies, practices, procedures	Count	697	1,196	761	2,654
		% within Primary Wireless System	59.4%	50.7%	35.8%	46.9%
		Adjusted Residual	9.7	4.8	-13.0	
	Formal policies, practices, procedures for daily events	Count	243	576	533	1,352
		% within Primary Wireless System	20.7%	24.4%	25.1%	23.9%
		Adjusted Residual	-2.9	0.8	1.6	
	Formal policies, practices, procedures for daily & out- of-ordinary events	Count	182	479	682	1,343
		% within Primary Wireless System	15.5%	20.3%	32.1%	23.7%
		Adjusted Residual	-7.4	-5.1	11.4	
	Processes to develop, annually update policies, practices, procedures for consistency across responders	Count	51	108	151	310
		% within Primary Wireless System	4.3%	4.6%	7.1%	5.5%
		Adjusted Residual	-1.9	-2.5	4.2	
Total		Count	1,173	2,359	2,127	5,659
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

SOPs – State-Local Government * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
SOPs - State/Local Gov't	Informal policies, practices, procedures	Count	675	1,143	856	2,674
		% within Primary Wireless System	62.0%	54.6%	45.4%	52.8%
		Adjusted Residual	6.9	2.1	-8.1	
	Formal policies, practices, procedures for daily events	Count	189	433	368	990
		% within Primary Wireless System	17.4%	20.7%	19.5%	19.5%
		Adjusted Residual	-2.0	1.7	0.0	
	Formal policies, practices, procedures for daily & out-of-ordinary events	Count	172	425	526	1,123
		% within Primary Wireless System	15.8%	20.3%	27.9%	22.2%
		Adjusted Residual	-5.7	-2.7	7.6	
	Processes to develop, annually update policies, practices, procedures for consistency across responders	Count	52	94	135	281
		% within Primary Wireless System	4.8%	4.5%	7.2%	5.5%
		Adjusted Residual	-1.2	-2.8	3.9	
Total		Count	1,088	2,095	1,885	5,068
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Command & Control - Other Disciplines * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Command & Control - Other Disciplines	Formal SOPs	Count	690	1,175	902	2,767
		% within Primary Wireless System	59.6%	50.0%	43.7%	49.7%
		Adjusted Residual	7.6	0.4	-6.8	
	Formal SOPs in planned, daily events for joint incident response	Count	247	591	498	1,336
		% within Primary Wireless System	21.3%	25.1%	24.1%	24.0%
		Adjusted Residual	-2.4	1.8	0.2	
	Formal SOPs in daily & out-of-ordinary events for joint incident response	Count	168	481	551	1,200
		% within Primary Wireless System	14.5%	20.5%	26.7%	21.5%
		Adjusted Residual	-6.5	-1.7	7.2	
	Policies reviewed annually, after events that test capabilities	Count	53	103	114	270
		% within Primary Wireless System	4.6%	4.4%	5.5%	4.8%
		Adjusted Residual	-0.5	-1.4	1.8	
Total		Count	1,158	2,350	2,065	5,573
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Command & Control - Other Jurisdictions * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Command & Control - Other Jurisdictions	Formal SOPs	Count	663	1,149	837	2,649
		% within Primary Wireless System	59.0%	50.0%	40.3%	48.2%
		Adjusted Residual	8.1	2.3	-9.1	
	Formal SOPs in planned, daily events for joint incident response	Count	223	581	526	1,330
		% within Primary Wireless System	19.8%	25.3%	25.3%	24.2%
		Adjusted Residual	-3.8	1.6	1.5	
	Formal SOPs in daily & out-of-ordinary events for joint incident response	Count	187	477	606	1,270
		% within Primary Wireless System	16.6%	20.8%	29.2%	23.1%
		Adjusted Residual	-5.8	-3.5	8.3	
	Policies reviewed annually, after events that test capabilities	Count	51	90	109	250
		% within Primary Wireless System	4.5%	3.9%	5.2%	4.5%
		Adjusted Residual	0.0	-1.9	1.9	
Total		Count	1,124	2,297	2,078	5,499
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Command & Control – State-Local Government * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Command & Control - State/Local Gov't	Formal SOPs	Count	642	1,119	899	2,660
		% within Primary Wireless System	61.3%	54.7%	48.2%	53.6%
		Adjusted Residual	5.6	1.3	-6.0	
	Formal SOPs in planned, daily events for joint incident response	Count	189	429	385	1,003
		% within Primary Wireless System	18.0%	21.0%	20.6%	20.2%
		Adjusted Residual	-2.0	1.1	0.6	
	Formal SOPs in daily & out-of-ordinary events for joint incident response	Count	173	409	485	1,067
		% within Primary Wireless System	16.5%	20.0%	26.0%	21.5%
		Adjusted Residual	-4.4	-2.2	6.0	
	Policies reviewed annually, after events that test capabilities	Count	44	88	97	229
		% within Primary Wireless System	4.2%	4.3%	5.2%	4.6%
		Adjusted Residual	-0.7	-0.9	1.5	
Total		Count	1,048	2,045	1,866	4,959
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Approaches - Other Disciplines * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Approaches - Other Disciplines	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	Count	542	908	638	2,088
		% within Primary Wireless System	47.1%	38.6%	30.8%	37.5%
		Adjusted Residual	7.6	1.5	-7.9	
	Planned solutions readily deployable; don't employ compatible equipment	Count	199	334	242	775
		% within Primary Wireless System	17.3%	14.2%	11.7%	13.9%
		Adjusted Residual	3.7	0.5	-3.7	
	Fixed infrastructure- based solutions use compatible equipment	Count	345	958	959	2,262
		% within Primary Wireless System	30.0%	40.7%	46.3%	40.6%
		Adjusted Residual	-8.2	0.2	6.7	
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	Count	64	152	232	448
		% within Primary Wireless System	5.6%	6.5%	11.2%	8.0%
		Adjusted Residual	-3.5	-3.7	6.7	
Total		Count	1,150	2,352	2,071	5,573
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Approaches - Other Jurisdictions * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Approaches - Other Jurisdictions	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	Count	489	854	540	1,883
		% within Primary Wireless System	43.5%	37.1%	25.7%	34.1%
		Adjusted Residual	7.4	4.0	-10.3	
	Planned solutions readily deployable; don't employ compatible equipment	Count	218	415	284	917
		% within Primary Wireless System	19.4%	18.0%	13.5%	16.6%
		Adjusted Residual	2.8	2.4	-4.8	
	Fixed infrastructure- based solutions use compatible equipment	Count	361	903	1,033	2,297
		% within Primary Wireless System	32.1%	39.3%	49.2%	41.6%
		Adjusted Residual	-7.2	-3.0	9.0	
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	Count	57	128	241	426
		% within Primary Wireless System	5.1%	5.6%	11.5%	7.7%
		Adjusted Residual	-3.7	-5.1	8.2	
Total		Count	1,125	2,300	2,098	5,523
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Approaches – State-Local Government * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Approaches - State/Local Gov't	Portable, mobile, temporary solutions developed in field using resources/ equipment on hand	Count	457	845	600	1,902
		% within Primary Wireless System	44.8%	42.1%	32.7%	39.1%
		Adjusted Residual	4.2	3.6	-7.1	
	Planned solutions readily deployable; don't employ compatible equipment	Count	199	351	302	852
		% within Primary Wireless System	19.5%	17.5%	16.5%	17.5%
		Adjusted Residual	1.9	0.0	-1.5	
	Fixed infrastructure- based solutions use compatible equipment	Count	310	692	735	1,737
		% within Primary Wireless System	30.4%	34.5%	40.1%	35.7%
		Adjusted Residual	-4.0	-1.5	4.9	
	Infrastructure- based solutions in place; advanced solutions planned are completely transparent to responders in field	Count	55	119	198	372
		% within Primary Wireless System	5.4%	5.9%	10.8%	7.6%
		Adjusted Residual	-3.1	-3.8	6.4	
Total		Count	1,021	2,007	1,835	4,863
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Implementation - Other Disciplines * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Implementation - Other Disciplines	No consistent approach to solutions; responders improvise at scene	Count	472	679	448	1,599
		% within Primary Wireless System	39.5%	28.3%	21.6%	28.2%
		Adjusted Residual	9.7	0.2	-8.4	
	Planned solutions require human intervention by someone other than responders	Count	370	822	664	1,856
		% within Primary Wireless System	31.0%	34.3%	32.0%	32.8%
		Adjusted Residual	-1.5	2.1	-0.9	
	Solutions available to all responders as authorized, without intervention	Count	317	817	850	1,984
		% within Primary Wireless System	26.5%	34.1%	41.0%	35.0%
		Adjusted Residual	-6.9	-1.3	7.2	
	Advanced solutions, technologies, processes piloted & tested	Count	36	78	111	225
		% within Primary Wireless System	3.0%	3.3%	5.4%	4.0%
		Adjusted Residual	-1.9	-2.4	4.0	
Total		Count	1,195	2,396	2,073	5,664
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Implementation - Other Jurisdictions * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Implementation - Other Jurisdictions	No consistent approach to solutions; responders improvise at scene	Count	439	659	393	1,491
		% within Primary Wireless System	37.2%	27.9%	18.7%	26.4%
		Adjusted Residual	9.4	2.1	-10.1	
	Planned solutions require human intervention by someone other than responders	Count	394	916	707	2,017
		% within Primary Wireless System	33.4%	38.8%	33.7%	35.7%
		Adjusted Residual	-1.9	4.0	-2.5	
	Solutions available to all responders as authorized, without intervention	Count	314	717	873	1,904
		% within Primary Wireless System	26.6%	30.4%	41.6%	33.7%
		Adjusted Residual	-5.8	-4.6	9.6	
	Advanced solutions, technologies, processes piloted & tested	Count	34	70	127	231
		% within Primary Wireless System	2.9%	3.0%	6.0%	4.1%
		Adjusted Residual	-2.4	-3.6	5.7	
Total		Count	1,181	2,362	2,100	5,643
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Implementation – State-Local Government * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Implementation - State/Local Gov't	No consistent approach to solutions; responders improvise at scene	Count	460	722	507	1,689
		% within Primary Wireless System	42.0%	34.3%	26.7%	33.1%
		Adjusted Residual	7.1	1.5	-7.5	
	Planned solutions require human intervention by someone other than responders	Count	384	846	706	1,936
		% within Primary Wireless System	35.1%	40.2%	37.1%	37.9%
		Adjusted Residual	-2.2	2.7	-0.9	
	Solutions available to all responders as authorized, without intervention	Count	215	469	593	1,277
		% within Primary Wireless System	19.7%	22.3%	31.2%	25.0%
		Adjusted Residual	-4.6	-3.8	7.8	
	Advanced solutions, technologies, processes piloted & tested	Count	35	70	96	201
		% within Primary Wireless System	3.2%	3.3%	5.0%	3.9%
		Adjusted Residual	-1.4	-1.9	3.1	
Total		Count	1,094	2,107	1,902	5,103
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Maintenance & Support - Within Organization * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Maintenance & Support - Within Organization	No routine/ consistent approach for preventive maintenance, repair, replacement	Count	403	657	499	1,559
		% within Primary Wireless System	33.0%	26.7%	23.3%	26.8%
		Adjusted Residual	5.6	-0.1	-4.6	
	Maintenance plans ensure minimum level of reliability, availability	Count	391	826	626	1,843
		% within Primary Wireless System	32.0%	33.5%	29.2%	31.6%
		Adjusted Residual	0.4	2.7	-3.0	
	Maintenance plans ensure IO capability 24x7	Count	374	859	843	2,076
		% within Primary Wireless System	30.7%	34.8%	39.3%	35.6%
		Adjusted Residual	-4.1	-1.1	4.5	
	Near-, long- term lifecycle planning for next solution ongoing	Count	52	123	175	350
		% within Primary Wireless System	4.3%	5.0%	8.2%	6.0%
		Adjusted Residual	-2.9	-2.8	5.3	
Total		Count	1,220	2,465	2,143	5,828
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Training for Support Personnel - Within Organization * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Training for Support Personnel - Within Organization	Informal education/training	Count	554	970	732	2,256
		% within Primary Wireless System	46.0%	39.6%	34.0%	38.8%
		Adjusted Residual	5.7	1.0	-5.8	
	Some received formal training	Count	444	965	792	2,201
		% within Primary Wireless System	36.9%	39.4%	36.8%	37.9%
		Adjusted Residual	-0.8	2.0	-1.3	
	Substantially all received formal, regular training	Count	167	445	517	1,129
		% within Primary Wireless System	13.9%	18.1%	24.0%	19.4%
		Adjusted Residual	-5.5	-2.1	6.8	
	After action reports, changing operational environment assessed to adapt future training	Count	39	72	113	224
		% within Primary Wireless System	3.2%	2.9%	5.2%	3.9%
		Adjusted Residual	-1.2	-3.1	4.2	
Total		Count	1,204	2,452	2,154	5,810
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Training for Field Personnel - Within Organization * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Training for Field Personnel - Within Organization	Informal education/training	Count	577	1,054	754	2,385
		% within Primary Wireless System	47.8%	42.2%	34.4%	40.5%
		Adjusted Residual	5.8	2.4	-7.3	
	Some received formal training	Count	427	925	797	2,149
		% within Primary Wireless System	35.3%	37.1%	36.4%	36.4%
		Adjusted Residual	-0.9	0.8	-0.1	
	Substantially all received formal, regular training	Count	173	462	558	1,193
		% within Primary Wireless System	14.3%	18.5%	25.5%	20.2%
		Adjusted Residual	-5.7	-2.8	7.7	
	After action reports, changing operational environment assessed to adapt future training	Count	31	55	83	169
		% within Primary Wireless System	2.6%	2.2%	3.8%	2.9%
		Adjusted Residual	-0.7	-2.6	3.3	
Total		Count	1,208	2,496	2,192	5,896
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Exercises - Other Disciplines * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Exercises - Other Disciplines	May have participated in planning workshops	Count	629	1,175	985	2,789
		% within Primary Wireless System	58.0%	53.0%	50.0%	52.9%
		Adjusted Residual	3.8	0.1	-3.3	
	Regularly participate in tabletop exercises	Count	245	545	471	1,261
		% within Primary Wireless System	22.6%	24.6%	23.9%	23.9%
		Adjusted Residual	-1.1	0.9	0.0	
	Regularly participate in fully functional operational exercises	Count	144	359	353	856
		% within Primary Wireless System	13.3%	16.2%	17.9%	16.2%
		Adjusted Residual	-3.0	-0.1	2.6	
	After action reports from fully functional exercises, changing operational environment evaluated to adapt exercises	Count	66	139	161	366
		% within Primary Wireless System	6.1%	6.3%	8.2%	6.9%
		Adjusted Residual	-1.2	-1.6	2.7	
Total		Count	1,084	2,218	1,970	5,272
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Exercises - Other Jurisdictions * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Exercises - Other Jurisdictions	May have participated in planning workshops	Count	619	1,147	967	2,733
		% within Primary Wireless System	59.1%	54.6%	49.4%	53.5%
		Adjusted Residual	4.0	1.3	-4.7	
	Regularly participate in tabletop exercises	Count	233	493	466	1,192
		% within Primary Wireless System	22.2%	23.5%	23.8%	23.3%
		Adjusted Residual	-1.0	0.2	0.6	
	Regularly participate in fully functional operational exercises	Count	134	341	371	846
		% within Primary Wireless System	12.8%	16.2%	18.9%	16.6%
		Adjusted Residual	-3.7	-0.5	3.6	
	After action reports from fully functional exercises, changing operational environment evaluated to adapt exercises	Count	62	120	154	336
		% within Primary Wireless System	5.9%	5.7%	7.9%	6.6%
		Adjusted Residual	-1.0	-2.1	2.9	
Total		Count	1,048	2,101	1,958	5,107
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Frequency of Use and Familiarity - Other Disciplines * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Frequency of Use and Familiarity - Other Disciplines	Seldom use solutions, except in planned events	Count	545	811	554	1,910
		% within Primary Wireless System	46.7%	35.0%	27.0%	34.5%
		Adjusted Residual	9.8	0.7	-9.0	
	Solutions used regularly for out-of-ordinary events, to limited extent for daily events	Count	367	832	716	1,915
		% within Primary Wireless System	31.4%	35.9%	34.9%	34.6%
		Adjusted Residual	-2.6	1.8	0.4	
	Solutions used regularly for daily, out-of-ordinary events	Count	160	449	489	1,098
		% within Primary Wireless System	13.7%	19.4%	23.8%	19.8%
		Adjusted Residual	-5.9	-0.7	5.7	
	Solutions used regularly for daily, out-of-ordinary events on demand, in real time, when needed, as authorized	Count	96	223	292	611
		% within Primary Wireless System	8.2%	9.6%	14.2%	11.0%
		Adjusted Residual	-3.5	-2.8	5.8	
Total		Count	1,168	2,315	2,051	5,534
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Frequency of Use and Familiarity - Other Jurisdictions * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi- jurisdictional shared system	
Frequency of Use and Familiarity - Other Jurisdictions	Seldom use solutions, except in planned events	Count	518	848	516	1,882
		% within Primary Wireless System	45.8%	37.6%	25.0%	34.5%
		Adjusted Residual	9.0	4.0	-11.6	
	Solutions used regularly for out-of-ordinary events, to limited extent for daily events	Count	376	811	699	1,886
		% within Primary Wireless System	33.2%	36.0%	33.8%	34.6%
		Adjusted Residual	-1.1	1.8	-0.9	
	Solutions used regularly for daily, out-of-ordinary events	Count	151	410	558	1,119
		% within Primary Wireless System	13.4%	18.2%	27.0%	20.5%
		Adjusted Residual	-6.7	-3.6	9.2	
	Solutions used regularly for daily, out-of-ordinary events on demand, in real time, when needed, as authorized	Count	86	184	293	563
		% within Primary Wireless System	7.6%	8.2%	14.2%	10.3%
		Adjusted Residual	-3.4	-4.4	7.3	
Total		Count	1,131	2,253	2,066	5,450
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Frequency of Use and Familiarity – State-Local Government * Primary Wireless System

			Primary Wireless System			Total
			independently owned, operated, used system	system serves several agencies in jurisdiction	multi-agency, multi-jurisdictional shared system	
Frequency of Use and Familiarity - State/Local Gov't	Seldom use solutions, except in planned events	Count	592	990	734	2,316
		% within Primary Wireless System	57.5%	50.4%	40.6%	48.2%
		Adjusted Residual	6.7	2.5	-8.2	
	Solutions used regularly for out-of-ordinary events, to limited extent for daily events	Count	264	580	559	1,403
		% within Primary Wireless System	25.6%	29.5%	30.9%	29.2%
		Adjusted Residual	-2.8	0.4	2.0	
	Solutions used regularly for daily, out-of-ordinary events	Count	104	250	331	685
		% within Primary Wireless System	10.1%	12.7%	18.3%	14.3%
		Adjusted Residual	-4.3	-2.5	6.2	
	Solutions used regularly for daily, out-of-ordinary events on demand, in real time, when needed, as authorized	Count	70	145	185	400
		% within Primary Wireless System	6.8%	7.4%	10.2%	8.3%
		Adjusted Residual	-2.0	-2.0	3.7	
Total		Count	1,030	1,965	1,809	4,804
		% within Primary Wireless System	100.0%	100.0%	100.0%	100.0%

Frequencies - Homeland Security Directors

Decision Making Groups - FEMS/LE Membership

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	informal partnerships	4	12.1	12.1	12.1
	voluntary formal statewide partnership	13	39.4	39.4	51.5
	formal IO planning, governing body thru legislation/exec order	12	36.4	36.4	87.9
	formal groups proactively recruit new participants beyond first responders	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Decision Making Groups - Local Government Membership

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	informal partnerships	5	15.2	15.2	15.2
	voluntary formal statewide partnership	13	39.4	39.4	54.5
	formal IO planning, governing body thru legislation/exec order	12	36.4	36.4	90.9
	formal groups proactively recruit new participants beyond first responders	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Decision Making Groups - Local/State Government Membership

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	informal partnerships	6	18.2	18.2	18.2
	voluntary formal statewide partnership	11	33.3	33.3	51.5
	formal IO planning, governing body thru legislation/exec order	12	36.4	36.4	87.9
	formal groups proactively recruit new participants beyond first responders	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Decision Making Groups - Federal Government Membership

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	informal partnerships	19	57.6	61.3	61.3
	voluntary formal statewide partnership	7	21.2	22.6	83.9
	formal IO planning, governing body thru legislation/exec order	3	9.1	9.7	93.5
	formal groups proactively recruit new participants beyond first responders	2	6.1	6.5	100.0
	Total	31	93.9	100.0	
Missing	Don't Know	1	3.0		
	Other	1	3.0		
	Total	2	6.1		
Total		33	100.0		

APPENDIX E—DEFINITION OF TERMS

Term	Definition
Advanced	Question response that indicates efforts to sustain and assure continuous improvement of interoperability into the future
Capital Investments	Interoperability equipment and other one-time costs
Confidence Interval	A plus-or-minus figure around the confidence level
Confidence Level	A figure that represents the how often the true percentage of the population would pick an answer, within a given confidence interval
Cross Discipline	First responder agency from a different discipline within the same jurisdiction (e.g., municipal police and municipal fire within the same city or township)
Cross Jurisdiction	First responder agency of the same discipline outside of the jurisdiction but within the same level of government (e.g., fire/EMS agencies from neighboring counties)
Daily Event	Vehicle pursuit, multiple station response, etc.
Dedicated Funding	Funding specifically included in the budget for interoperability
Early	Question response that indicates little or no activity in the sub-element
Field Personnel	Firefighters, EMTs, and law enforcement officers who provide response on the scene
Formal Partnership	A group or governing body with a published agreement that designates its authority, mission, and responsibilities
Formal SOPs	Published and active SOPs
Formal Training	Training that includes a lesson plan and an assessment of student performance or change in behavior; may be in a classroom or on the job
Full	Question response that indicates substantially complete progress in the sub-element
Informal Training	Training with no lesson plans of assessment of study performance; may be on-the-job training
Large Fire/EMS Agency	One that serves a population greater than 25,000
Large Law Enforcement Agency	One with 30 or more sworn officers
Life Cycle Planning	Execution of planning, design, acquisition, implementation, and operations/maintenance of equipment
Moderate	Question response that indicates some progress in the sub-element
Operating Costs	Operations and maintenance, leases, staffing, etc.
Out-of-the-ordinary Event	Mass casualties, flipped tanker on the highway, etc.
Published and Active agreements	Memoranda of Understanding, Executive Orders, Interlocal Agreements, etc.
Small Fire/EMS Agency	One that serves a population of fewer than 2,500
Small Law Enforcement Agency	One with 10 or fewer sworn officers
State-local	First responder agency of the same discipline but across levels of government (e.g., municipal police and state police)
Support Personnel	Administrators, dispatchers, and other personnel who provide communications support to first responders in the field

APPENDIX F—ACRONYMS

DHS	Department of Homeland Security
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
GAO	General Accounting Office
GPS	Global Positioning System
MDT	Mobile Data Terminal
MHz	Megahertz
NIJ	National Institute of Justice
NIMS	National Incident Management System
NPSPAC	National Public Safety Planning Advisory Committee
NRBA	Non-Response Bias Analysis
OMB	Office of Management and Budget
PDA	Personal Digital Assistant
PRA	Paperwork Reduction Act
PSWN	Public Safety Wireless Network
PWG	Practitioner Working Group
RF	Radio Frequency
SME	Subject Matter Expert
SOP	Standard Operating Procedure
SOW	Statement of Work
UASI	Urban Area Security Initiative