



Intelligent Transportation Systems
U.S. Department of Transportation



Next Generation 9-1-1 (NG9-1-1) System Initiative



Procurement Tool Kit

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Dear Colleagues

The U.S. Department of Transportation (USDOT) is pleased to provide you with this Next Generation 9-1-1 (NG9-1-1) *Procurement Tool Kit*, a collection of resources to assist you in the transition from today's 9-1-1 systems to NG9-1-1. We developed this tool kit in response to recognition by stakeholders from throughout the 9-1-1 community that while information about NG9-1-1 systems is widely available, guidance in developing procurement specifications for transition services and network equipment is not. The objective of this tool kit is to fill that gap.

The *Procurement Tool Kit* makes it easier to assess the information you need, plan for procurement and implementation, and gauge the overall success of your efforts. It describes the essential steps in planning for NG9-1-1 and outlines the resources available to assist you. This tool kit provides a self-assessment tool, planning tools, recommended options, and methods to identify issues that may confront 9-1-1 authorities interested in implementing Internet Protocol (IP)-based, 9-1-1 emergency communications systems. In addition, it discusses what changes and procurements are possible and provides a path forward for state and local authorities.

Throughout the *Procurement Tool Kit*, we reference a number of NG9-1-1 Initiative documents. These documents were created as part of USDOT's research and development project, funded by the Intelligent Transportation System's Joint Program Office (ITS JPO). These materials, which are available at our website (<http://www.its.dot.gov/NG911>), reflect the input and feedback of subject matter experts from throughout the 9-1-1 community.

Publishing this tool kit represents the conclusion of the NG9-1-1 Initiative and the transfer of the program materials and responsibility to the National E9-1-1 Implementation Coordination Office (ICO). The ICO is a joint program office of the USDOT National Highway Traffic Safety Administration (NHTSA) and the Department of Commerce, National Telecommunications and Information Administration (NTIA).

The ICO is charged with improving coordination and communication among federal, state, and local emergency communication systems, emergency personnel, public safety organizations, telecommunications carriers, and telecommunications equipment manufacturers and vendors. In addition, the ICO will develop, collect, and disseminate information concerning practices, procedures, and technology used in implementation of Enhanced 9-1-1 (E9-1-1) services.

USDOT recognizes the extraordinary work public safety answering point (PSAP) personnel do, 24/7/365, often under very trying conditions. We look forward to the day when legacy 9-1-1 systems are retired and replaced with NG9-1-1 solutions. With appropriate planning, training, implementation, and maintenance, the true value and benefits of NG9-1-1 will be realized.

We solicit and appreciate your feedback on the *Procurement Tool Kit* and welcome the opportunity to provide you with additional resource materials. Further information on the ICO is available at <http://www.e-911ico.gov>. The program office can also be reached via e-mail at nhtsa.national911@dot.gov or by telephone at (202) 366-3485.

Sincerely,
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Co-Managers, US DOT NG9-1-1 Initiative



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Preface

The Department of Transportation (USDOT) Next Generation 9-1-1 System Initiative (NG9-1-1) is establishing the foundation for an evolutionary transition to enable the general public to make a 9-1-1 “call” from any wired, wireless, or Internet Protocol (IP)-based device, and to allow the emergency services community to take advantage of Enhanced 9-1-1 (E9-1-1) call delivery and other functions through new internetworking technologies based on open standards. The Nation’s 9-1-1 system, currently based on 1960s technology, cannot handle the text, data, images, and video that are increasingly common in personal communications and critical to future transportation safety and mobility advances.

The NG9-1-1 Initiative is one of the first federally funded studies to comprehensively define and document a future vision for 9-1-1 systems. As a result of this project and other efforts, a fundamental transformation of the way 9-1-1 calls are originated, delivered, and handled is slowly getting underway. USDOT has helped defined the system architecture; developed a transition plan that considers responsibilities, costs, schedule, and benefits for deploying IP-based emergency services across the Nation; and implemented a working proof-of-concept (POC) demonstration system. The NG9-1-1 Initiative’s POC helped stimulate action within the community to get more involved and to start discussing the issues.

USDOT is helping to plan the future of 9-1-1, today



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Introduction

Today's 9-1-1 emergency communications professionals face challenges on multiple fronts—a fundamental lack of resources, aging equipment operating past its intended lifecycle, emerging consumer technology that has outpaced public safety answering point (PSAP) upgrades, and outdated funding models that do not consider the dwindling number of landline subscribers and the continued increase in the number of consumers choosing wireless and alternate telephony providers. These issues, while difficult to address, are not impossible to overcome, and many stakeholders throughout the community are already working toward resolutions.

One of the first questions to answer is “What exactly is NG9-1-1?” Although there appear to be a number of ideas about what constitutes Next Generation 9-1-1 (NG9-1-1), the National Emergency Number Association (NENA) glossary definition describes NG9-1-1 as:

... the next evolutionary step in the development of the 9-1-1 emergency communications system known as E9-1-1 since the 1970s. NG9-1-1 is a system comprised of managed IP-based networks and elements that augment present-day E9-1-1 features and functions and add new capabilities. NG9-1-1 will eventually replace the present E9-1-1 system. NG9-1-1 is designed to provide access to emergency services from all sources, and to provide multimedia data capabilities for PSAPs and other emergency service organizations.¹

The NG9-1-1 system will enhance 9-1-1 service to the public, allowing callers to request emergency assistance by sending text, images, and video (in addition to voice) from several different kinds of access networks and communications devices using open standards. This capability is a departure from today's ability to send voice and a very limited amount of data.

During the NG9-1-1 Initiative, the U.S. Department of Transportation (USDOT) has developed a substantial body of knowledge on the issues and associated strategic options that can be implemented to address the transition to NG9-1-1. Project documents are freely available on the USDOT website.² In addition, the project has served as an agenda for action and a foundation for the 9-1-1 community in planning and deploying NG9-1-1. One of the overriding conclusions reached was that although technical challenges exist, many of the issues faced by the community are operational and logistical in nature, requiring a more open and collaborative relationship among stakeholders. This *Procurement Tool Kit* seeks to help improve communications among the various individuals, groups, and companies interested in NG9-1-1.

The *Procurement Tool Kit* has four parts (see Exhibit 1), and while mostly independent of one another, each is designed to support an iterative process, building on the previous part. The document offers tools to assist with assessment, planning, procurement, and evaluation of success. Briefly, the document includes the following sections:

¹ National Emergency Number Association, Glossary: <http://www.nena.org/glossary/term/27> (last accessed September 14, 2009).

² USDOT, Intelligent Transportation System Joint Program Office (ITS JPO): <http://www.its.dot.gov/NG911> (last accessed September 14, 2009).

- ▶ **Preliminary Assessment Tool**—A survey to help identify the current state of emergency communications readiness for NG9-1-1. Within the various topic areas (e.g., planning, governance, standards and technology), we raise questions to identify what work has been completed or is in process that pertains to NG9-1-1 features or issues.
- ▶ **NG9-1-1 Planning Tool**—Planning for implementation of NG9-1-1 is a critical task, considering the multiple aspects associated with developing a comprehensive plan. The planning tool describes the recommended plan components and process steps, offers suggestions, and includes links to additional references and resources to assist you in developing and tailoring a specific NG9-1-1 transition plan for your organization.
- ▶ **Procurement Tool**—The procurement tool offers guidance with procuring goods and services associated with a transition to NG9-1-1. Because not all organizations have the same experience and/or skills with purchasing IT solutions, the tool includes a “best value” process that may help improve individual procurement efforts.
- ▶ **Post-Implementation Evaluation Tool**—Upon completion of a procurement or NG9-1-1 implementation, we urge stakeholders to review their efforts, identify lessons learned, and share that valuable information with others across the 9-1-1 community. All too often, this important last step is overlooked during system implementations, and future efforts lose the opportunity to benefit from this information.

Exhibit 1—NG9-1-1 Procurement Tool Kit



1 Preliminary Assessment Tool

1.1 Preface

Today's 9-1-1 systems are an aging patchwork of disparate applications implemented throughout the past decades. Because these systems often have dissimilar capabilities, the first step for any organization is to assess its current capabilities, identify immediate and long-term needs, and analyze the future vision for its service delivery.

Performing this assessment is critical to the overall process. It helps characterize the goals of the organization, sets initial expectations for success, and gives its stakeholders a chance to participate.

The Preliminary Assessment Tool is a short survey to assist in determining the current capabilities of your emergency communications system. This awareness helps determine the point at which the organization should enter into the NG9-1-1 evolution process. The 9-1-1 community is at many different stages with regard to NG9-1-1 planning. While some 9-1-1 authorities have either not begun or only recently begun discussing the topic, other "early adopters" have demonstrated an appetite for advancement and have already implemented some NG9-1-1 components in preparation for a future transition. As a result, the transition path varies across the community.

When using this Preliminary Assessment Tool, there are no "right or wrong" answers, and no grade or rating will be assigned to a completed assessment. Simply put, the tool helps to identify what work has been done and what is left to do. After completing the assessment, particular areas of focus will emerge. Section 2, NG9-1-1 Planning Tool, will help organizations better prepare with the necessary planning and implementation steps.

1.2 Assessment Tool

Topic	Y	N	UNK
1—Formal 9-1-1 Plan Development			
1.1—Does your state, region, or locality have a strategic 9-1-1 plan in place?			
1.2—Does your state, region, or locality have a 9-1-1 coordinator (or coordinating body)?			
1.3—Does your state have a statewide 9-1-1 plan in place?			
1.4—Does your 9-1-1 plan have sections on...			
1.4.1—Goals and vision for the transition to NG9-1-1?			
1.4.2—Resource allocation?			
1.4.3—Regulation and governance?			
1.4.5—9-1-1 system management and oversight?			
1.4.6—System monitoring and performance metrics?			
2—Policy & Governance			
2.1—Are all appropriate officials at all levels (e.g., 9-1-1 administrator, emergency management agency, homeland security bureau, chief information officer, utilities commissioner) involved in 9-1-1 planning and policy-development activities in your state, region, or locality?			
2.2—Has a central coordinating body or mechanism been designated for NG9-1-1 implementation in your state, region, or locality?			
2.3—Are you aware of laws that need to be changed in your state, region, or locality to support NG9-1-1 technology, system management, and data security?			
2.4—Does legislation in your state, region, or locality allow the certification of new service providers that may access the NG9-1-1 network, as appropriate?			
3—Funding			
3.1—Is there an identified and sustainable funding source for 9-1-1 system operations, maintenance, and development in your state, region, or locality?			
3.2—Has your 9-1-1 authority applied for grants to help fund 9-1-1 services, planning, and/or the transition to NG9-1-1?			
3.3—Does your 9-1-1 system share resources with other public safety or government entities?			
3.4—Is a plan in place to determine the budget required to fund the transition to and operation of an NG9-1-1 system?			

Topic	Y	N	UNK
4—Standards and Technology			
4.1—Do personnel from your state, region, or locality participate in standards development organizations/activities?			
4.2—Does your state, region, or locality have a data security policy in place that considers 9-1-1 or public safety network access management?			
4.3—Does your 9-1-1 authority maintain operational and technical requirements for the 9-1-1 system?			
4.4—Is your 9-1-1 system composed of network equipment that meets open standards requirements?			
4.5—Does your 9-1-1 authority engage all appropriate stakeholders in determining the responsible entity and mechanisms for providing accurate and reliable location information for NG9-1-1 calls?			
5—Network Environment			
5.1—Do all the public safety answering points (PSAPs) within your jurisdiction have broadband IP network access?			
5.2—Does your local exchange carrier (LEC) have the capability to natively deliver IP calls to your PSAPs?			
5.3—Has your 9-1-1 authority created a system architecture for planned NG9-1-1 capable PSAPs in your state, region, or locality?			
6—System and PSAP Operations			
6.1—Does your state, region, or locality have the ability to handle wireline, wireless, and voice over IP (VoIP) 9-1-1 calls?			
6.2—Are policies in place in your state, region, or locality that dictate procedures for handling 9-1-1 calls from emerging technology, including images, video, text, and data?			
6.3—Do regulations in your state, region, or locality allow PSAP interoperability?			
6.4—Do PSAPs in your state, region, or locality coordinate with one another, and with neighboring PSAPs?			
6.5—Does your state, region, or locality engage all appropriate stakeholders regarding 9-1-1 call handling and location determination procedures?			
6.6—Are memoranda of understanding (MOU) in place that allow your state, region, or locality to coordinate with neighboring jurisdictions on topics such as call overflow, load sharing, backup conditions, and sharing of services (e.g., geographic information system [GIS], shape files)?			

Topic	Y	N	UNK
7—Continuity Planning in the NG9-1-1 Environment			
7.3—Is a continuity of operations (COOP) plan in place for disaster recovery?			
7.4—Has a threat analysis and/or business impact analysis been conducted to support PSAP business continuity planning in your state, region, or locality?			
8—Training			
8.1—Are call taker training standards and formal training programs established in your state, region, or locality?			
8.2—Are call takers in your state, region, or locality exercising proper procedure for handling calls from outside their standard jurisdiction?			
8.3—Do PSAPs in your state, region, or locality collaborate for combined training events?			
8.4—Is a plan in place in your state, region, or locality to retrain or orient PSAP staff to handle the new media and data that will accompany NG9-1-1 calls?			
9—Stakeholder Awareness and Education			
9.1—Are the public and policymakers in your state, region, or locality informed about today’s provided 9-1-1 services?			
9.2—Is a plan in place to educate 9-1-1 personnel and policymakers in your state, region, or locality on NG9-1-1 and their roles in a successful transition?			
9.3—Is the public in your state, region, or locality educated on the public benefits provided by NG9-1-1?			

1.3 Assessment Review

After an initial review of the assessment questions, some will find that not every question can be immediately answered. Research and investigation into some of the areas is expected and very much part of the overall process. Building relationships and sharing information with stakeholders throughout the 9-1-1 community is an essential component of NG9-1-1.

When evaluating any “No” and “UNK” answers in the assessment, refer to Section 2, NG9-1-1 Planning Tool. This tool helps establish or customize the formal plans needed to implement NG9-1-1 solutions. The planning sections mirror the assessment and can be used in whole or in part, as your needs dictate.

Review the assessment tool regularly for changes that may affect your planning. In addition, for tracking purposes, add issues or aspects of NG9-1-1 that are not on the assessment. While the assessment attempts to be comprehensive, NG9-1-1 continues to develop, and new items of interest will continue to emerge.



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2 NG9-1-1 Planning Tool

2.1 Preface

Author and leadership expert Steven R. Covey recommends: “start with the end in mind.” That advice is particularly germane when planning a new, complex information technology (IT) solution like NG9-1-1. Having a detailed plan of action, with specific actions, milestones, and a final goal, is paramount to the success of any project.

Using the high-level topics in the *Preliminary Assessment Tool* (found in Section 1 of this document), we provide guidance for plan development for each of the topic areas:

- 2.2 Formal 9-1-1 Plan Development
- 2.3 Policy and Governance
- 2.4 Funding
- 2.5 Standards and Technology
- 2.6 NG9-1-1 Network Environment
- 2.7 System and PSAP Operations
- 2.8 Continuity Planning in the NG9-1-1 Environment
- 2.9 Training
- 2.10 Stakeholder Education and Awareness

Each section focuses on specific aspects of planning for the transition to NG9-1-1. Within each section, there is an overview, one or more steps, and links to online resources available to support the plan development process. You should view the steps as intermediate actions that describe the methods to further progress in that area. Each step includes a description, method, and recommendations to accomplish that step. We present these steps in order, with the last step being most closely associated with the goals of NG9-1-1.

Not every section may be of interest to every reader, however, there may be other people within your organization that might benefit from that information or be responsible for that individual topic area.

Remember—planning is key to your success. A good plan can be compared with a roadmap for an upcoming trip. The map has the destination (goal) and path to take to be successful. The plan allows you to sequence the work, track your progress, and mitigate (route around) potential problems. Without a plan, success is undefined, valuable time and resources are wasted, and any progress is left simply to chance.

2.2 Formal 9-1-1 Plan Development

A formal 9-1-1 plan is a significant first step in planning for NG9-1-1. It unites the significantly large community of 9-1-1 stakeholders around a common mission, status, and vision for the 9-1-1 system. A formal plan also documents the way forward for the transition to NG9-1-1, and can then be used to apply for grants or to demonstrate tangible progress to government officials and other stakeholders. As always, documenting a plan assists in effective execution and in meeting goals.

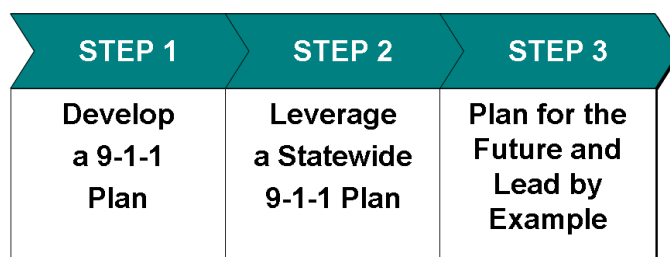
2.2.1 Overview

This section provides steps, recommendations, and resources for development of a 9-1-1 plan, leveraging a 9-1-1 plan, planning for the future of 9-1-1, and taking a leadership role in nationwide 9-1-1 planning. Depending on what your state, region, or locality has accomplished so far in 9-1-1 planning, as measured by the *Preliminary Assessment Tool*, you may want to skip ahead to the subsection that discusses your immediate next action.

Formal 9-1-1 Plan Development includes three steps (see Exhibit 2):

- ▶ **Step 1—Develop a 9-1-1 Plan.** This step primarily focuses on starting the formal 9-1-1 planning process. Prior to Step 1, an organization may not have a strategic 9-1-1 plan in place, the plan has not been formally accepted at the appropriate level(s), or the plan needs significant revisions to address all the topics mentioned in the *Preliminary Assessment Tool*.
- ▶ **Step 2—Leverage a Statewide 9-1-1 Plan.** Once a plan exists, an organization needs to effectively implement the 9-1-1 plan. Prior to Step 2, a formal 9-1-1 plan may be in place that addresses nearly all necessary topics, but perhaps not all stakeholders, or possibly there is a lack of stakeholder understanding or active involvement related to their role and/or responsibility within the plan.
- ▶ **Step 3—Plan for the Future and Lead by Example.** This step focuses on planning for the future and being seen as a leader in implementing NG9-1-1 technologies. Planning efforts include long-term horizons (5-year and 10-year plans) that elaborate on realistic goals for the immediate and extended future of the organization and 9-1-1 system. As a leader, you and your organization can help others learn from implementation successes and lessons learned.

Exhibit 2—Formal 9-1-1 Plan Development Steps



2.2.2 Step 1—Develop a 9-1-1 Plan

One of the first steps toward successful transition to NG9-1-1 is development of a 9-1-1 plan. Some states have determined that the best results are achieved when formal planning is coordinated at the state level. Often, those states provide some funding mechanism or have regulations for 9-1-1 coordination at the state level. Others, however, conduct planning activities at the local, regional or sub-state authority level. There are still many states, regions, and localities that have no formal planning process in place. This section describes what a formal 9-1-1 plan is, why it is needed, and recommends ways to help ensure development of a successful plan.

Description

The primary purpose of a 9-1-1 plan is to succinctly communicate the mission and vision of the 9-1-1 system to its stakeholders. The plan should identify system stakeholders (if not by name, at least by title and role) and their responsibility in meeting short- and long-term program goals. This planning document is an opportunity to lay out the way ahead in the transition to NG9-1-1 in a coordinated fashion. In addition, many federal and other grant programs require a plan or statement of purpose as prerequisites for funding. A 9-1-1 plan can address these needs, in whole or in part.

Typically, the 9-1-1 plan should establish the mission and goals of the 9-1-1 system, identify milestones for achieving the goals, assign tasks that must be completed to reach these milestones, and allocate resources for accomplishing those tasks.

A 9-1-1 plan should include, but not necessarily be limited to, all of the following sections—

- ▶ Goals and vision—including discussion of the 9-1-1 mission, as well as detailed goals for the 9-1-1 system and organization
- ▶ Resource allocation—indicating funding sources and how they will be used
- ▶ Regulation and governance—including the legislative environment and the role of leadership in achieving 9-1-1 goals
- ▶ System management and oversight—discussing organization of the control over the 9-1-1 system at the local, regional, and state levels
- ▶ Overview of current and planned system and environment—including discussion of infrastructure both internal and external to the 9-1-1 system
- ▶ System monitoring and performance metrics—identifying how progress will be tracked and performance will be measured
- ▶ Plan revision process—laying out the process for changing the plan as the environment, circumstances, and priorities evolve.

Recommendations

A number of resources across the 9-1-1 community stand ready to assist localities, states, and regions that are beginning or revising their 9-1-1 plans. The National Association of State 9-1-1 Administrators (NASNA) can provide templates and other resources to aid you in creating a plan. You can also leverage existing state plans as a basis for new plan development—taking the most applicable sections from a handful of plans may be a good option. Reaching out to

neighboring jurisdictions, leveraging or establishing relationships with other public safety agencies, and engaging national 9-1-1 organizations such as NENA will give you access to resources that may speed plan development.

The first course of action in the planning process is the designation of a planning team. 9-1-1 plans can be developed internally, or you may consider procuring the services of a consultant to develop your 9-1-1 plan. If you choose to develop your 9-1-1 plan internally, consider forming a small, interdepartmental team to develop your plan, ensuring multiple viewpoints are considered. If you choose to contract out your 9-1-1 plan development, consider using the *Procurement Tool*, provided in Section 3 of this document, to guide your procurement process.

A 9-1-1 plan should address stakeholder needs and concerns. NG9-1-1 stakeholders comprise a large community that includes the following list, as discussed in the *NG9-1-1 System Description and Requirements Document*³—

- PSAPs
- 9-1-1 authorities
- Policy Governance Groups
- Third-Party Service Providers
- Public Safety Dispatchers
- Emergency Management Centers
- Emergency Responders
- n-1-1 Providers
- Traffic Management Centers
- Access Service Providers
- Access Network Providers
- Service Application Providers
- Public

As you develop a 9-1-1 plan, engage stakeholders to determine what information they would find most useful in achieving the goals laid out in the plan. Ideally, the 9-1-1 plan reflects input from all NG9-1-1 stakeholders or is developed by a team of representatives comprising these stakeholder groups. A high level of stakeholder involvement ensures that the plan is acceptable to the entire 9-1-1 community, which increases stakeholders' support and willingness to act on the tasks assigned them in the plan.

The 9-1-1 plan should be written with an understanding of how services are provided today and how they need to be provided in the future. In developing the formal 9-1-1 plan, consider breaking down the necessary changes into actionable development items. Consider using the *NG9-1-1 Transition Plan*⁴ and NASNA's *Model State 9-1-1 Plan*⁵ as reference documents for developing the plan, determining necessary actions, and assigning ownership for those actions.

To be effective, the formal 9-1-1 plan should be developed or approved by an organization with the authority to shape the policies and procedures of the 9-1-1 system. Prior to beginning the approval process, check the plan for compliance with any applicable regulatory or grant

³ USDOT *NG9-1-1 System Description and High-Level Requirements Document*, July 31, 2007.

http://www.its.dot.gov/ng911/pdf/NG911_HI_RES_Requirements_v2_20071010.pdf (last accessed September 14, 2009).

⁴ USDOT *NG9-1-1 Transition Plan*, February 2, 2009. http://www.its.dot.gov/ng911/pdf/NG911_Transition_PlanFinal.pdf (last accessed September 14, 2009).

⁵ NASNA. *Model State 9-1-1 Plan*. Contact NASNA through its website (<http://www.nasna911.org>) for information on how to obtain this document.

acquisition requirements. Stakeholder reviews of plans nearing the approval stage, such as state-level reviews for local plans and local-level reviews for state plans, help reduce the need for immediate major revisions. The approval process includes developing plans for distribution of the plan to actors and stakeholders. The approval authority considers, among other criteria, the appropriateness of the plan's scope, the validity of assumptions and constraints, the goals and vision, applicability of these goals in the overarching goals of the state or locality, the projected cost and timeline of actions items, and the plan's value in attaining defined goals.

Governments and 9-1-1 boards should consider appointing a 9-1-1 coordinator or identifying the person responsible for leading 9-1-1 planning and policy efforts, as well as to serve as a point of contact for collaborative 9-1-1 efforts with neighbors.

2.2.3 Step 2—Leverage a Statewide 9-1-1 Plan

Once a formal 9-1-1 plan has been developed and accepted, it should be implemented to maximum effect. If your state, region, or locality has a 9-1-1 plan in place that meets all the planning criteria discussed in the *Preliminary Assessment Tool* and in Step 1, you will need to ensure that all stakeholders, including 9-1-1 authorities and PSAPs understand their role in the execution of the plan. The goals laid out in a statewide 9-1-1 plan can be reached only through full stakeholder buy-in to the formalized planning efforts. This section describes how a 9-1-1 plan should be leveraged at the state and local levels, and recommends ways to use a 9-1-1 plan to reach the goals of the state, region, or locality.

Description

It is in the interest of stakeholders at all levels to take action on the 9-1-1 plan. 9-1-1 authorities and PSAPs should align their strategy, goals, operations, and policies to the plan. Relationships with local exchange carriers (LEC) and other service providers should be developed or improved to prepare for the possible changes in service. State and local legislators, and 9-1-1 or public safety organizations that guide legislators in these matters should consider effecting change where necessary to meet the current and future needs of 9-1-1, as laid out in the plan. A well-written 9-1-1 plan should assign clear actions and development items to all stakeholders involved in successfully reaching the 9-1-1 goals and transitioning to NG9-1-1.

Recommendations

9-1-1 authorities and PSAPs, both large and small, within a state, region, or locality with an active 9-1-1 plan in place should consider getting involved in the implementation and maintenance of the 9-1-1 plan. Each organization has a unique viewpoint on the issues at hand and thus can provide valuable contributions to the plan itself and its implementation. 9-1-1 authorities and PSAPs may consider drafting their own plans that show how the local operations and policies align to the overarching 9-1-1 plan and lay out a roadmap for attaining the plan's 9-1-1 vision.

Assigning a primary point of contact for all 9-1-1 plan implementation activities should be considered. Often, this is a 9-1-1 Coordinator, PSAP Manager, or even a member of the 9-1-1 authority. Depending on the scope and level of detail of the 9-1-1 plan, the timeline, and the

number of stakeholders and tasks involved, the 9-1-1 Coordinator should be assigned sufficient resources to successfully manage the overall effort.

Stakeholders at all levels can actively participate in implementing the 9-1-1 plan. Whether presenting a state plan at the local level to stimulate involvement, or sharing local plans with the state-level 9-1-1 board, all levels of 9-1-1 governance need to coordinate to work toward a well-planned NG9-1-1 system. Those without direct authority often have influence, which can be useful in promoting and supporting implementation. The governance organizations should also communicate the 9-1-1 plan to other agencies and non-governmental organizations (e.g., private industry NG9-1-1 stakeholders) to ensure that 9-1-1 operation and evolution efforts are well coordinated.

2.2.4 Step 3—Plan for the Future and Lead by Example

States, regions, and localities with well-developed, fully implemented 9-1-1 plans should focus their planning efforts on the future of their 9-1-1 system and on assisting their neighbors with their planning efforts.

Description

A goal for those states that are more advanced in the 9-1-1 planning process should be the development of 5- and 10-year plans. These supplemental plans set the course for achieving, and perhaps surpassing, the vision described in the existing 9-1-1 plan, in terms of achievable milestones. Planning for the future today demonstrates to stakeholders that there is a long-term evolution envisioned for the future of 9-1-1.

The planning efforts of your neighboring states and localities are just as important as your own to the nationwide transition to NG9-1-1 and to the effectiveness of NG9-1-1 in your own jurisdiction. Development of regional NG9-1-1 systems will speed nationwide adoption of NG9-1-1. Leaders in the field of 9-1-1 planning have an opportunity to set an example for those with less developed 9-1-1 planning.

Recommendations

More advanced organizations should consider continuing the 9-1-1 planning process by setting and revising goals through development and maintenance of 5- and 10-year plans. Goals might include, for example, full NG9-1-1 compliance in 10 years. Any goals set by these plans should be presented in the context of short- and long-term accomplishments necessary to meet these goals in the desired time frame.

Advanced states, regions, and localities should also get involved in collaborative planning efforts. By planning with neighboring states or jurisdictions, broader regional policies and operations, such as long-distance overflow/failover support scenarios, can be planned.

Leadership by example can include making resources, work products, and lessons learned publicly available. When others have the opportunity to see your success and avoid missteps, they benefit from your contribution, and the collaborative nationwide 9-1-1 community that NG9-1-1 requires to succeed will continue to grow. As relationships are established, opportunities for sharing resources may also lead to significant cost savings.

2.2.5 For Additional Information

You can find additional information regarding the development and execution of 9-1-1 plans at—

- ▶ USDOT ITS JPO. *NG9-1-1 System Initiative: Transition Plan*. February 2, 2009. http://www.its.dot.gov/ng911/pdf/NG911_Transition_PlanFinal.pdf
- ▶ NASNA. *Model State 9-1-1 Plan*. Contact NASNA through its website (<http://www.nasna911.org>) for information on how to obtain this document.
- ▶ Indiana Wireless Enhanced 911 Advisory Board. *Indiana Statewide 9-1-1 Plan*. December 2, 2008. http://www.innena.org/documents/Indiana%20Statewide%209-1-1%20Plan%20-%20Final_121108.pdf
- ▶ Texas Commission on State Emergency Communications (CSEC). *Next Generation 9-1-1 Master Plan*. February 2009. http://www.911.state.tx.us/files/pdfs/ng911_master_plan_feb_2009.pdf
- ▶ Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA). *Developing and Maintaining State, Territorial, Tribal, and Local Government Emergency Plans*. April 14, 2009. <http://www.fema.gov/about/divisions/cpg.shtm>

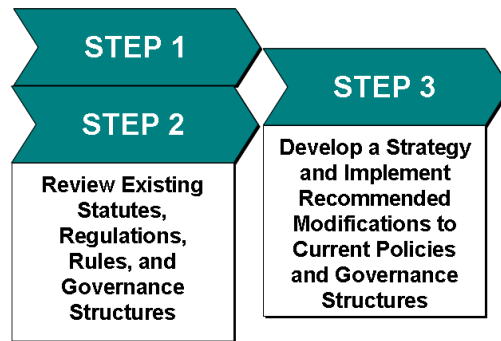
2.3 Policy and Governance

Without effective policy development in conjunction with technical and operational NG9-1-1 system development, the best system designs, architectures, and plans will be just that—designs, architectures, and plans. To actually implement an NG9-1-1 system requires effective overall policies, laws, and regulations that facilitate and make legal all aspects of NG9-1-1. In addition, stakeholders must work together to make sure that appropriate governance structures are in place to enable the effective implementation and operation of an NG9-1-1 system.

2.3.1 Overview

This section provides a summary of key policy and governance issues that you should consider to enable the transition to NG9-1-1, as well as recommendations and resources to assist with policy and governance analysis and revision. It is important to note that most policy and governance issues should not be addressed by individual PSAPs or even individual 9-1-1 authorities. Given the interconnected nature of NG9-1-1 systems, it is important for all 9-1-1 authorities in a region or state, along with other related emergency response and government stakeholders, to jointly address policy and governance issues in a coordinated manner. It is also important to note that while all jurisdictions share some similar policy and governance issues, every jurisdiction is unique in its starting point. Therefore, the steps outlined below are illustrative of the general policy and governance issues, but are not inclusive of every issue that may need to be addressed in any given jurisdiction. There are three general steps (see Exhibit 3):

- ▶ **Step 1—Review Existing Statutes, Regulations, and Rules.** This step focuses on bringing together all appropriate stakeholders to review existing laws and regulations to determine whether they will enable the desired NG9-1-1 system based on the overriding goals of the 9-1-1 plan. Review current state and local policies, statutes, regulations, and tariffs to determine whether the current regulatory structure will support or could even prohibit the implementation of NG9-1-1 technologies.
- ▶ **Step 2—Review Existing Governance Structures.** You can approach this step in parallel with Step 1 to bring together all appropriate stakeholders to review existing governance structures for 9-1-1 and public safety communications systems. The review examines the current structure and authority of state, regional, and local 9-1-1 and public safety governing authorities to ensure existing governance structures will enable the desired NG9-1-1 system based on the 9-1-1 plan goals.
- ▶ **Step 3—Develop a Strategy and Implement Recommended Modifications to Current Policies and Governance Structures.** After identifying potential problems or gaps in the results of Steps 1 and 2, develop recommended modifications to current policies and governance structures, and an action plan and strategy to implement the recommendations.

Exhibit 3—Policy and Governance Steps**2.3.2 Step 1—Review Existing Statutes, Regulations, and Rules**

While a state or region may be prepared to transition to NG9-1-1, state and/or local rules and regulations in their current form may not enable the transition. In some instances, regulations written for a voice-centric, analog telephone-based E9-1-1 system may actually prohibit certain aspects of NG9-1-1. At a minimum, current regulations and rules may raise questions about the legality of some capabilities enabled by NG9-1-1, which could slow progress unless such questions are addressed. Analyzing all current state and local statutes and regulations early in the transition process, and making modifications as necessary, is a critical step to ensure that plans to migrate to NG9-1-1 can occur in a timely manner.

Description

Numerous capabilities and functions that are possible with NG9-1-1 are not possible with the E9-1-1 system, or are provided in a new way. For each of these capabilities and functions that are new or provided differently, 9-1-1 leaders should ask themselves whether current laws, regulations, tariffs, and overall policies allow and enable such new system features. For example, are current funding methods and levels sufficient to pay for initial and recurring costs, particularly during the transition from E9-1-1 to NG9-1-1 and when multiple entities share networks and databases? Are non-regulated entities permitted to play the role of the 9-1-1 System Service Provider (SSP), and if so, what process governs service provision in an unregulated IP-based world? During the transition from E9-1-1 to NG9-1-1, when new and legacy systems must be able to interoperate, will regulations/tariffs written only for telephone-based E9-1-1 systems slow the transition and cause confusion?

Once regional and/or state NG9-1-1 plans have been established, stakeholders should form a working group (or working groups) whose mission is to research and analyze all current state/local rules and regulations (including tariffs). The working group(s) should consist of individuals who understand the features that will be possible with the NG9-1-1 system and also individuals with experience in analyzing, drafting, and implementing new statutes and regulations. The working group(s) should be very inclusive of all 9-1-1, emergency response, government, and industry groups that have a stake in the transition to NG9-1-1. The goal of the working groups) should be to examine rules and regulations that cover every possible aspect of the NG9-1-1 system and to highlight which rules need to be modified or areas where new regulations may be needed.

Recommendations

Once a working group has been formed to review current policies, the group should develop a target list of all the issues it plans to analyze in current rules and regulations. The group should research where all 9-1-1 and relevant emergency communications related rules can be found in statutes, regulations (from a state Public Utility Commission [PUC] or State 9-1-1 Agency), or tariffs. Once all rules and regulations have been identified, the group should develop a plan with specific deliverables and deadlines. A few common themes within most statutes and regulations that may need to be analyzed, and questions to be asked, include, but are not limited to—

- ▶ **Imposition/collection of 9-1-1 fees and/or surcharges**—Are statutes or regulations written to require collection of a 9-1-1 fee or surcharge from users of any type of calling or messaging service that is capable of accessing an NG9-1-1 system and/or any access networks (e.g., Internet Service Providers [ISP]) used by consumers that enable calling or messaging services to complete 9-1-1 calls or messages via the NG9-1-1 system?
- ▶ **Eligible use of funds**—Are statutes, regulations, or tariffs narrowly written to cover the costs of a limited set of 9-1-1 elements that would prohibit the use of 9-1-1 fee revenues to fund IP-based NG9-1-1 systems? Rules governing the eligible use of funds must consider all aspects of NG9-1-1. Consider including all costs associated with new services, networks, software, hardware, databases, and any other elements that may need to be funded to enable NG9-1-1.
- ▶ **9-1-1 System Service Provider (SSP)**—Do any statutes or regulations indicate that only a certified telecommunications provider, or more narrowly, only a provider of local exchange service, may perform the role of a 9-1-1 SSP? Are there provisions that require specific technology components for "E9-1-1" service delivery that are not necessarily the same for NG9-1-1? In NG9-1-1 systems, entities who are not traditional telecommunications providers may be in a position to provide NG9-1-1 service and statutes and regulations should be analyzed to address this issue.
- ▶ **Access to 9-1-1 systems**—Are any types of services, such as sensors and alarms, currently legally prevented from accessing the 9-1-1 system? One of the many benefits of implementing NG9-1-1 is that it allows appropriate and authorized sharing of automated data sources (e.g., telematics data, bioterrorism, or health sensors) with PSAPs and other emergency response agencies.
- ▶ **Definitions, terminology, and lexicon**—All definitions and terminology contained in statutes, regulations, and/or tariffs should be reviewed to ensure they do not limit the ability to implement NG9-1-1. Is a new definition for "NG9-1-1" needed? Examine current rules using terms such as "calls," "telephone service," "emergency telephone system," "trunks," "dials/dialed," etc. and modify them as appropriate to cover the calling and messaging capabilities enabled by NG9-1-1. For example, does a definition for "calls" include not just a voice call, but also messages or any other type of communication delivered over the NG9-1-1 system? Another example is the definition of a PSAP. Does a definition limit a PSAP to a physical facility or building, or can a PSAP be "virtual" whereby 9-1-1 calls may be answered from anywhere that IP access is available once an authorized person logs in with the proper user ID and password?

- ▶ **9-1-1 authority capabilities**—Do any statutes or regulations prohibit a state, regional, or local 9-1-1 authority from deploying, operating, or managing software- and database-controlled NG9-1-1 systems that replace traditional wireline E9-1-1 systems? Do 9-1-1 and public safety authorities have sufficient authority to implement emergency service IP networks to replace dedicated 9-1-1 telephony systems that are shared among multiple emergency response entities (not standalone 9-1-1 networks)?
- ▶ **Call routing**—Do any statutes or regulations indicate 9-1-1 call routing can only be done by location? Are there rules prohibiting the sharing of networks to route calls for multiple national N-1-1/800 numbers (e.g., 2-1-1, 3-1-1, 8-1-1, 9-1-1, suicide hotline, poison control)? With NG9-1-1, call routing may be handled by business rules/policies, which may indicate that calls should be routed based on caller characteristics, not just the location of the call. For example, a Spanish-speaking person could dial 9-1-1, the caller’s device could indicate a Spanish-speaking caller, and a business rule built into a policy-based routing function could indicate all Spanish callers for this location route to a pre-determined PSAP and call taker position number OR if no call taker is available, add Language Line to the call and route to appropriate PSAP based only on the location of the call. Another example would be a video call from a deaf caller could automatically be routed to a certain PSAP or call taker that would enable a real-time video call to a 9-1-1 call taker certified in American Sign Language (ASL) interpretation. Do current statutes and rules enable non-location-based call routing?
- ▶ **Liability**—Do existing liability protection statutes or regulations cover ALL services and information that may be delivered over NG9-1-1 systems and shared among emergency response entities (e.g., voice, sensors, images and other data, video, medical records, and any new, not yet developed, product or service)?
- ▶ **Privacy and confidentiality**—Do existing privacy, confidentiality, disclosure, and retention statutes or regulations apply to all types of 9-1-1 calls and call content that are possible with an NG9-1-1 system (e.g., voice, data, images, video, information from third-party databases added to a 9-1-1 call record)?

2.3.3 Step 2—Review Existing Governance Structures

Related to policy issues is the need to examine current 9-1-1 and emergency communications governance structures to determine how well they will facilitate NG9-1-1. Governance structures that exist for current E9-1-1 systems may not be effective in an NG9-1-1 environment and may require modification. This is the case for two primary reasons. (1) The architecture and operation of NG9-1-1 systems may be more efficiently managed at a regional, state, or even multistate level (with 9-1-1 operations remaining primarily local). (2) The increased information sharing capabilities of NG9-1-1 systems mean that 9-1-1 and emergency communications systems will be much more interrelated in a next generation environment, calling for more coordinated governance of the entire emergency communications enterprise.

Description

NG9-1-1 systems are not being designed as dedicated, closed, single-purpose systems. They will be shared systems composed of multiple entities. 9-1-1 will be only one part of a much larger system shared with general government, private sector entities, and other public safety services and agencies. The amount and type of information (voice, text, or video) received by PSAPs and shared with emergency response agencies will greatly surpass that received by current E9-1-1

systems. For example, NG9-1-1 makes it possible to transmit video, still images, medical information, and a host of other data with a 9-1-1 call. In addition, the architecture of NG9-1-1 systems will significantly increase the amount of information, equipment, and services contained in shared databases and networks. For example, the same emergency services IP-network that is used to route all forms of voice, video, and data to PSAPs could be shared with other emergency response entities to enable IP-based voice and data applications used by first responders (e.g., radio over-IP).

With the increased amount of information made available by NG9-1-1 and the shared databases and networks among an increasing number of emergency response entities, existing governance structures may not be effective in an NG9-1-1 environment. Analyzing current 9-1-1 and emergency communications governance structures at the state, regional, and local levels, and making modifications as necessary, is a critical step to ensure effective and orderly transition to and operation of NG9-1-1 systems. The goal of any governance structure should be to determine the most efficient and cost-effective way to manage the overall NG9-1-1 system, from a technical and systems operation perspective, while maintaining the ability of local authorities to determine local call processing and information sharing policies. Ultimately, those who govern the 9-1-1 system have the obligation to provide a system that is worthy of the caller's trust.

Recommendations

In an NG9-1-1 environment, the roles of the PSAPs, responders, communications service providers, and related entities will expand beyond traditional 9-1-1 services to higher levels of interaction, managed situational intelligence, enhanced capabilities, and more comprehensive communication and coordinated response. Clear roles, responsibilities, and regulatory authority regarding all aspects of the system must be determined.

Once regional and/or state NG9-1-1 plans have been established, stakeholders should form a working group (or groups) to research current governance structures at the state, regional, and local levels for 9-1-1 and public safety communications systems. The working group(s) should consist of individuals from all organizations (public and private) involved in 9-1-1 and emergency communications within the area for which the system is being designed. At a state or regional level, local and regional 9-1-1 emergency response and government leaders should come together with appropriate state level officials from departments that include the state 9-1-1 program, homeland security/emergency management agency, public utilities commission, state information technology office, state police, and others.

Issues for the working group(s) to address include, but are not limited to—

- ▶ Is there an existing state agency that will be responsible for management of the NG9-1-1 system(s) within the state and for coordination with other state and federal authorities? If not, can an existing agency take a leadership role at the state level or is a new entity needed?
- ▶ What will be the authority of the state agency responsible for managing the NG9-1-1 system, as it relates to regional or local authorities, concerning the funding of the system, access to and use of the system, maintenance and security of the system, and other technical and system operations issues?

- ▶ What is the role of the state PUC as the 9-1-1 system moves to a more competitive environment with many functions of the system provided by IP-based, non-tariffed, and unregulated communications providers?
- ▶ Is the equivalent of the “State Information Technology Agency” well positioned to play a greater leadership role in an IP-based NG9-1-1 environment compared with the current system? If not, should it be?
- ▶ With NG9-1-1, networks and databases are expected to be shared by numerous emergency services agencies and other government functions, which are under the jurisdiction of different parent agencies. Who is responsible for establishing the authority of agencies that are part of the NG9-1-1 system with regard to who has access to the system and information, who can share and receive such information, and who will maintain it?
- ▶ In an environment where networks and databases will be shared by numerous entities, do current governance structures allow for cost-sharing and what is the mechanism for determining the relative share that each entity pays to fund and maintain the system?
- ▶ NG9-1-1 systems can allow increased security of information through role-based access control and data rights management that limits access to information only to authorized entities. If there are existing MOUs or best practices with respect to current information sharing protocols among emergency response agencies, can those policies be used as a foundation for the implementation of electronic data rights management systems?
- ▶ If software- and database-controlled NG9-1-1 systems give 9-1-1 governing authorities greater ability to make or adjust call routing decisions in a more seamless manner than is possible with current E9-1-1 systems, does the governance structure effectively define who has the authority to make such decisions?

2.3.4 Step 3—Develop a Strategy and Implement Recommended Modifications to Current Policies and Governance Structures

Once existing policies and governance structures have been reviewed and needed changes to the current structure have been identified, the next step is to develop a strategy and plan to implement the changes.

Description

After completing a review of all existing 9-1-1 statutes and regulations, you may conclude that significant changes need to be made to existing policies. Some revisions may need to be made to statutes, while other modifications or additions to agency rules and regulations or tariffs may be necessary. It will be important to determine which issues require statutory treatment and which issues can more effectively be addressed through changes in rules or regulations. When considering ideal governance structures for the NG9-1-1 system, stakeholders need to assess whether any statutory or rule changes are necessary or whether existing governance structures are sufficient to implement and operate NG9-1-1 systems.

Recommendations

First and most important in developing a strategy and plan to implement policy and governance changes is to identify all stakeholders that will be affected by the proposed changes and make sure everyone is involved in the planning process. Stakeholders should include representatives

from 9-1-1 and public safety authorities and other emergency response entities, as well as state and local government organizations. All affected industry stakeholders should also be involved, including legacy E9-1-1 SSPs and originating service providers (wireline, wireless, VoIP, etc.), as well as new technology providers. Ideally, all of the affected stakeholders will have been involved in the previous steps. If that is the case, developing a strategy and policy implementation plan will be a much simpler task.

Some specific topics to consider when developing a strategy and plan to implement policy and governance changes include, but are not limited to—

- ▶ Consider whether desired changes can be made through the leadership and efforts of volunteer 9-1-1 and public safety leaders or whether it is possible and desirable to hire outside consultants, attorneys, and/or lobbyists. Implementing statutory and regulatory change is not an easy task, and sometimes a call to the experts can be a worthy investment.
- ▶ Develop materials to educate relevant state legislatures, agencies, and regulatory bodies, as well as municipal government bodies, to ensure that they understand how current regulations and laws facilitate or inhibit NG9-1-1. Make sure materials are simple and quick to read and understand. (See Section 2.10 of this document for additional information on Stakeholder Education and Awareness.)
- ▶ Determine whether individual policy modifications are best made through statutory revision or through a rule change at an implementing agency (e.g. state PUC or state 9-1-1 agency). Decisions need to consider the level of detail desired in statutes versus the amount of flexibility given to independent regulatory agencies tasked with implementing general statutory commands.
- ▶ Consider the approach to take in implementing policy changes, whether in the form of a single, omnibus bill that addresses all issues in a single piece of legislation or addressing issues in a piecemeal manner.
- ▶ Consider seeking waivers of some current rules and regulations in the short term during the initial transition to NG9-1-1 before final policy changes can be made.
- ▶ Consider an appropriate media strategy to support the overall transition to NG9-1-1 and specific legislative and policy efforts.
- ▶ Consider the statutory or regulatory changes needed to address the ideal governance structure for NG9-1-1 (including establishment of a single agency responsible for managing the NG9-1-1 system and clear policies on the relationship of the many state agencies affected by NG9-1-1).
- ▶ Consider the identification of a central organization or individual to serve as the point of contact to champion your cause. Your choice for this role may have considerable implications for success.

2.3.5 For Additional Information

You can find additional information regarding policy issues at—

- ▶ USDOT ITS JPO. *NG9-1-1 System Initiative Transition Plan*. February 2, 2009.
http://www.its.dot.gov/ng911/pdf/NG911_Transition_PlanFinal.pdf

- ▶ NENA. Next Generation Partner Program. <http://www.nena.org/ng-partner-program>
- ▶ NENA. *A Preliminary Policy Maker Blueprint for Transitioning to the Next Generation 9-1-1 System*. September 2008. <http://www.nena.org/ng-partner-program/NG911-Transition-Policy-Maker-Blueprint>
- ▶ 9-1-1 Industry Alliance (9IA). *2008 Study on the Health of the US 9-1-1 System*. http://www.911alliance.org/9IA_Health_of_US_911%20_2_.pdf
- ▶ Congressional Research Service. *Emergency Communications: The Future of 911*. June 16, 2009. <http://opencrs.com/document/RL34755>

Find additional information regarding governance issues at—

- ▶ USDOT ITS JPO. *NG9-1-1 System Initiative Transition Plan*. February 2, 2009. http://www.its.dot.gov/ng911/pdf/NG911_Transition_PlanFinal.pdf
- ▶ DHS. *National Emergency Communications Plan (NECP)*. August 7, 2008. http://www.dhs.gov/xlibrary/assets/national_emergency_communications_plan.pdf
- ▶ NENA. *Next Generation 9-1-1 Responding to an Urgent Need For Change: Initial Findings and Recommendations of NENA's NG E9-1-1 Program*. February 2006. http://www.nena.org/sites/default/files/ng_final_copy_lo-rez.pdf

Find information on how to develop a successful strategy and plan to implement policy change at—

- ▶ USDOT ITS JPO. *NG9-1-1 System Initiative Transition Plan*. February 2, 2009. http://www.its.dot.gov/ng911/pdf/NG911_Transition_PlanFinal.pdf

2.4 Funding

Today's 9-1-1 system is funded by a wide variety of funding sources, ranging from surcharges for wireline and wireless customers to general funds collected from state or local taxes, and from other sources such as grants for targeted purchases. Funding is for widely disparate uses, including 9-1-1, interoperable police/fire/emergency medical services (EMS) radio systems, public health alert networks, and poison control.

Currently, traditional funding methods are eroding as more and more traditional wireline customers convert to wireless devices and to other potentially non-revenue-generating services such as mobile VoIP. If traditional revenue streams fall short of funds sufficient to support even current needs, elected officials and 9-1-1 authorities may face difficulties in obtaining funds to enable NG9-1-1 and the conversion and building of networks and databases as part of NG9-1-1. Diversion of existing surcharges further erodes the ability of 9-1-1 authorities to maintain or expand 9-1-1 services.

As we transition to NG9-1-1 technologies, new funding models need to be developed. Potential funding models include fixed-amount surcharges on all calling services, a surcharge on access infrastructure providers, a universal statewide communications surcharge, a universal federal communications surcharge, incident-based user fees, and the more traditional use of bonding for capital expenditures. It is likely that a combination of these sources will be employed in various states.

Not only must funding for NG9-1-1 be available, but during the transition period, legacy systems must also be supported while NG9-1-1 is being implemented. This may present short-term difficulties in funding, but in the long term may result in costs somewhat lower than today's costs for E9-1-1, depending on the nature of next generation solutions and how costs are ultimately shared.⁶

This funding section of the Planning Tool applies not only to 9-1-1 authorities and regional entities, but is key to action items for many state 9-1-1 offices as well. Funding initiatives are often established at higher jurisdictional levels (e.g., the state), with 9-1-1 authorities receiving that funding, which is generated through various surcharge methods and then distributed by the states to counties and/or other jurisdictions.

2.4.1 Overview

Funding is a three-step process of assessing current funding methods, projecting needs for NG9-1-1, and developing action items to accomplish the goal of adequate and sustained funding of NG9-1-1 (see Exhibit 4).

- ▶ **Step 1—Assess the Current Funding Environment.** First, examine existing funding methods and the amount of revenue generated by each source. Together, those sources

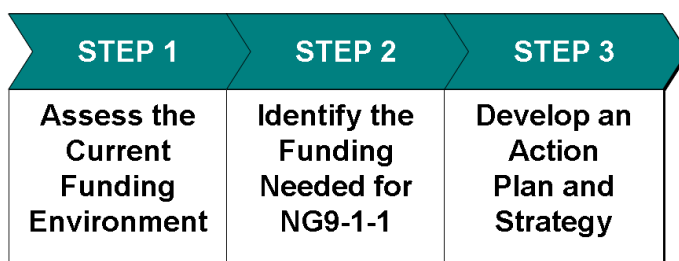
⁶ USDOT ITS JPO. *NG9-1-1 Final Analysis of Cost, Value, and Risk*. March 5, 2009.

http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf (last accessed September 14, 2009).

provide the total amount of funding to support current capital requirements, as well as the cost to operate today’s 9-1-1 system, including staffing of PSAPs serving a given geographical area or jurisdiction.

- ▶ **Step 2—Identify the Funding Needed for NG9-1-1.** Once you know the current funding levels, you need to project the funding needed to support a NG9-1-1 environment. All stakeholder jurisdictions—state and local—must be involved in developing projections of revenues and expenses needed to support the future NG9-1-1 system, including shared costs and transition costs, consistent with a statewide strategic plan, if one exists, or a more regional or local plan for development of the NG9-1-1 system.
- ▶ **Step 3—Develop an Action Plan and Strategy.** With the project funding needed for NG9-1-1 identified, you can focus on developing an action plan and strategy to obtain sufficient funding to enable implementation and then long-term maintenance of the NG9-1-1 system. As NG9-1-1 is developed, some short-term (1- to 2-year) transition costs are likely while moving from legacy systems to the NG9-1-1 environment.

Exhibit 4—Funding Steps



2.4.2 Step 1—Assess the Current Funding Environment

Description

With few exceptions, most 9-1-1 authorities receive their funding from surcharges, general revenues of their respective jurisdictions, and from grants usually targeted for specific needs. Typically, funds collected from users by wireline, wireless, and other service providers are distributed by the state to each jurisdiction using a formulation developed by that state. 9-1-1 authorities then manage the funds distributed by states, complemented by general revenues and grants, which together, compose the total of revenues available to operate the 9-1-1 system.

The current funding environment includes a short-term opportunity for Stimulus Package funding from the National Telecommunications and Information Administration (NTIA—within the U.S. Department of Commerce) and the Rural Utilities Service (RUS—within the U.S. Department of Agriculture). This funding includes \$4.7 billion available from NTIA⁷ and \$2.5 billion available from RUS⁸. These funds are scheduled to be awarded prior to September 30, 2010 so that they can begin to accomplish the short-term goal of job creation. Public safety is

⁷ DOC NTIA. Broadband Technology Opportunities Program (BTOP). <http://www.ntia.doc.gov/broadbandgrants/index.html> (last accessed September 14, 2009).

⁸ USDA RUS. Broadband Initiatives Program (BIP). <http://broadbandusa.sc.egov.usda.gov/> (last accessed September 14, 2009).

designated as one of five areas for funding under the NTIA program, and there is every indication that the RUS will also look favorably on applications from public safety agencies to improve broadband service in rural areas. Another opportunity for funding is from grants targeted to 9-1-1 to be provided by the National 9-1-1 Implementation and Coordination Office (ICO—jointly managed by NTIA and National Highway Transportation Safety Administration [NHTSA]), also referred to as the National 9-1-1 Office. Currently, \$43.5 million is authorized for the ICO grant program, with funds to be awarded to states and territories that apply and meet the grant criteria.⁹

Recommendations

9-1-1 authorities, regional entities, and state 9-1-1 offices can help address adequate funding for future 9-1-1 requirements taking the following actions—

- ▶ Become involved in statewide funding mechanisms and efforts; for example, if there is a 9-1-1 administrator at the state level, coordinate funding efforts with that office to ensure synchronized and focused efforts
- ▶ Support efforts at the state level to increase funding for 9-1-1
- ▶ Support legislation prohibiting the diversion of funds that were collected for use in public safety communications for 9-1-1
- ▶ Participate in the formulation of statewide legislation to ensure that regulations properly define telecommunications devices and their eligibility for funding, and are sensitive to the changing and evolving nature of telecommunication services
- ▶ Ensure legislation includes proper definitions of NG9-1-1 and provides for appropriate liability protection.

2.4.3 Step 2—Identify the Funding Needed for NG9-1-1

Description

This step involves estimating the funding needed for NG9-1-1 based on known and projected cost parameters. In the USDOT report, *Final Analysis of Cost, Value, and Risk*,¹⁰ costs are estimated for a number of categories, including the following—

- *Hardware*
- *Software*
- *Operations & Maintenance (O&M)*
- *Personnel*
- *Network*
- *Security*
- *Recurring Training*
- *Facilities*
- *Travel*

That report provides a useful structure for estimating the costs to move from today's costs for E9-1-1 to costs for NG9-1-1.

⁹ National 9-1-1 ICO ENHANCE 9-1-1 Act Grants. <http://www.e-911ico.gov/> (last accessed September 14, 2009).

¹⁰ USDOT ITS JPO. *NG9-1-1 Final Analysis of Cost, Value, and Risk*. March 5, 2009.

http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf (last accessed September 14, 2009).

Coordinating implementation of 9-1-1 service delivery among 9-1-1 entities within a state or at the state level enables cost sharing and shared services for various components of the NG9-1-1 system. States, regions, and 9-1-1 authorities should plan to take advantage of shared services and costs whenever possible, building those savings into the pre-planning, planning, and implementation process.

Recommendations

NG9-1-1 planners should consider the following actions related to estimating the one-time and operating costs related to the transition to NG9-1-1—

- ▶ Identify the system environment and the agencies involved, along with their functional needs and relationships. (Among other benefits, this action helps clarify opportunities for sharing system resources and costs.)
- ▶ Determine costs for ESInets, IP software services, and IP PSAP equipment based on the above analysis.
- ▶ Restructure your agency costs based on new network access costs, equipment leases, and other operating expenses.
- ▶ Determine costs for shared services in a NG9-1-1 system in conjunction with your statewide 9-1-1 programs and the above analysis.
- ▶ Determine potential savings from those shared services.
- ▶ Identify recurring and non-recurring operating costs.
- ▶ Identify transition costs associated with NG9-1-1 (training, equipment, network), and how those costs may be reduced upon implementation. Also address the fiscal impact of maintaining legacy functions during the transition period involved.

2.4.4 Step 3—Develop an Action Plan and Strategy

Description

Once costs for the transition to NG9-1-1 have been identified, focus on the plan of action and strategies needed to identify and acquire the necessary funding. You will need funding for the initial implementation as well as ongoing O&M of NG9-1-1. Developing adequate funding for NG9-1-1 implementation will likely be one of the most difficult aspects of the NG9-1-1 transition and therefore should be initiated as early in the process as possible.

Recommendations

We recommend the following actions to ensure funding for NG9-1-1 as it is developed in your jurisdiction, state, or region. These actions are not necessarily sequential, but move from pre-planning to planning to implementation over time.

- ▶ Ensure that the strategic 9-1-1 plan for the 9-1-1 authority (or state, region, or PSAP) adequately addresses funding needs and methods of obtaining funding in the variable public safety environment.
- ▶ Assess current and projected funding sources and their ability to support migration to NG9-1-1.

- ▶ Estimate short-term and long-term change in revenues from surcharges, fees, and other sources.
- ▶ Prepare a funding plan to address current needs, funding during transition, and long-term funding once NG9-1-1 is in place. The funding plan should include costs for network, IP software, IP PSAP equipment, database management, and training, as listed above under cost parameters, as well as consideration for acquiring and leveraging sustainable funding.
- ▶ Identify additional sources for funding beyond current sources as necessary.
- ▶ As necessary, identify and apply for federal and state grants, perhaps as part of a state or regional submission (sources include NTIA, RUS, National 9-1-1 Office grants). Where applicable, collaborate with the state 9-1-1 administrator to identify sources and prepare proposals.
- ▶ Explore the potential for multi-county or regional intergovernmental arrangements to reduce costs for NG9-1-1 systems and the impact on funding. Work with counties to create a regional entity or arrangement to logically develop a multijurisdictional NG9-1-1 system, either as a group of counties or on a statewide level.
- ▶ Identify other funds for which the agency is eligible, possibly to fund one-time equipment acquisitions or other capital costs (e.g., excess surcharge funds from the state, additional grants).
- ▶ Coordinate funding efforts with education and outreach programs to promote public awareness of the benefits and value of emergency communications services.
- ▶ Prepare public education materials for distribution to decision makers, stakeholders, and the general public explaining the value of NG9-1-1 and how it will be funded.
- ▶ Evaluate the 9-1-1 funding program at least quarterly to monitor revenues, costs, and project future funding requirements and sources. These internal audits should include development of measurement parameters, evaluation, and communication of results to all stakeholders.

2.4.5 For Additional Information

You can find additional information regarding funding the transition to and operation of NG9-1-1 at—

- ▶ USDOT ITS JPO. NG9-1-1 Final Analysis of Cost, Value, and Risk. March 5, 2009.
http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf
- ▶ NENA. *A Policy Maker Blueprint for Transitioning to the Next Generation 9-1-1 System*. September 2008.
http://www.nena.org/sites/default/files/NG9-1-1PolicyMakerBlueprintTransitionGuide-Final_0.pdf
- ▶ NENA. *Funding 9-1-1 into the Next Generation: An Overview of NG9-1-1 Funding Model Options for Consideration*. March 2007.
<http://www.nena.org/media/File/NGFundingReport.pdf>
- ▶ 9-1-1 Industry Alliance. *Study on the Health of the US 9-1-1 System*. 2008.
http://www.911alliance.org/91A_Health_of_US_911%20_2_.pdf

- ▶ NENA. Grant Management for PSAPs Course – contact NENA at 800.332.3911 or visit <http://www.nena.org/education/keeping-your-psap-finely-tuned/grant-management> for information about this one-day course.
- ▶ NENA. Public Education & PSAP Training Committee. <http://www.nena.org/operations-committee-public-ed-psap-training>
- ▶ Holloway, James E., et al., Regulation and Public Policy in the Full Deployment of the Enhanced Emergency Call System (E9-1-1) and Their Influence on Wireless Cellular and Other Technologies, 12 B.U. J. Sci. & Tech. L. 93, 125 (2006). Available (for viewing) at: http://www.bu.edu/law/central/jd/organizations/journals/scitech/volume121/documents/holloway_EIC_WEBformat.pdf

2.5 Standards and Technology

Nationwide (in reality, global) standards are critical to the ability to achieve 9-1-1 interoperability across multiple local, regional, state, and national public safety jurisdictions, and beyond into the wider emergency communications environment. Adherence to a common set of methods and standards enables seamless interaction for call and data handling. Standards are under development at all levels of technology, and every participant within the NG9-1-1 community (technical or not) can get involved in the standards development process and share their expertise and opinion about multiple aspects of NG9-1-1 technology, operations, and policies.

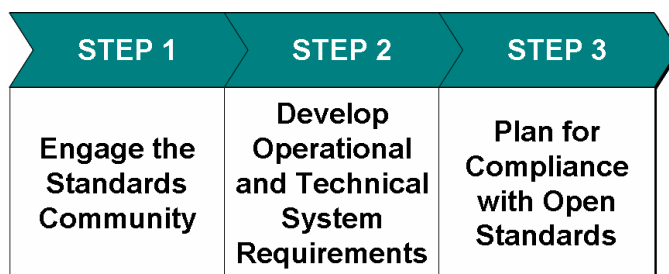
2.5.1 Overview

With standards playing such a key role in achieving a common set of requirements for NG9-1-1, engaging the standards community, developing operational and technical system requirements, and planning for compliance with open standards are all important steps in the standards and technology aspects of NG9-1-1. This section outlines the steps that can be taken within the standards community.

Planning for Standards and Technology includes three general steps (see Exhibit 5):

- ▶ **Step 1—Engage the Standards Community.** Work across nationwide and global standards organizations is already underway. Often, the 9-1-1 community is not aware of the activities of the various standards organizations or the opportunities that exist to be involved. Engaging the standards community provides both awareness and the ability to apply those standards throughout the NG9-1-1 implementation.
- ▶ **Step 2—Develop Operational and Technical System Requirements.** Stakeholders implementing NG9-1-1 solutions will need to identify the desired operational and technical system requirements to be provided. These requirements define the internal and external features of the system, as well as the process and methodologies to follow in the planning, development, execution, operations and maintenance of the system.
- ▶ **Step 3—Plan for Compliance with Open Standards.** With an awareness of the breadth of standards in the community, stakeholders will need to identify how their system will comply with the open standards being developed and implemented within the NG9-1-1 community. Employing open standards is critical to fostering a collaborative environment, where emergency communications organizations share vital data, in real-time.

Exhibit 5—Standards and Technology Development Steps



2.5.2 Step 1—Engage the Standards Community

Description

The major standards development organizations (SDOs) affecting and affected by NG9-1-1 standardization include those supporting legacy wireline and cellular telephony, and newer IP service providers, including those wireless services recently coming into wide application, such as WiFi and WiMAX.

SDOs are almost exclusively international in scope. Involved SDOs also include groups within the Alliance for Telecommunications Industry Solutions (ATIS)¹¹ concerned with the conversion to IP-based networks and services within the North American wireline and wireless carriers, and the Internet Engineering Task Force (IETF)¹², which is a longstanding worldwide volunteer group developing standards applicable to IP in general, as well as the Internet specifically.

While NENA is not an American National Standards Institute (ANSI)-certified SDO, it serves as a primary developer and coordinator of overall technical and operations standards for NG9-1-1 and works in direct or indirect collaboration with service providers and their related SDOs to establish compatible and converged standards across the emergency communications environment. These standards objectives apply from the initiation of emergency calls and data through NG9-1-1 processing and delivery to PSAPs and other emergency entities.

These are just some of the SDOs that are actively engaged in developing standards for the emergency communications community. Because these organizations depend on volunteers, they continuously seek input and domain expertise from individuals from the community to provide time and effort to collectively develop these standards.

Recommendations

9-1-1 authorities should monitor standards work and be involved where possible, through NENA and the Association of Public-Safety Communications Officials – International (APCO)¹³ and their interaction with other SDOs, in defining how public safety 9-1-1 communications needs to work.

Planning efforts and system development should be aligned with existing and developing standards. Unlike previous 9-1-1 system design, which used purpose-specific network and switching equipment, NG9-1-1 is designed with an open architecture and is based on software structures that allow use of off-the-shelf hardware and common use IP software services. Not only does this enable a standardized base structure and design, but also allows for reduced costs because many of the components of NG9-1-1 are not specially built for just 9-1-1 purposes. However, because the software and databases structure of NG9-1-1 does drive a higher dependence on IT support than in the past, one of the challenges for public safety is to determine how to provide IT support as a shared service across multiple 9-1-1 authorities where those

¹¹ ATIS. <http://www.atis.org/>

¹² IETF. <http://www.ietf.org/>

¹³ APCO International. <http://www.apcointl.org/>

groups are establishing their own NG9-1-1 systems, rather than relying on services from commercial vendors.

There is a common misconception that only individuals with significant technical expertise can participate in the standards development process. The standards development process typically relies on a volunteer workforce with varying levels of technical and operational expertise to conduct its business. Individuals can contribute to the standards process by reading and learning more about the standard, contributing to the debate to drive toward a rough consensus, but more importantly, by following and implementing those standards.

Use of standards as references for request for proposals (RFP) requirements, for systems operations and security guidance, in IT support, and in database management is essential to obtaining maximum results from NG9-1-1 and for emergency calling procedures and support. Reference and conformance to standards now in existence or pending should be fully integrated into planning for NG9-1-1, and for ongoing evolution of upgrades and operations for NG9-1-1.

Working groups developing RFPs, operational procedures, or performing regular audits of existing operations are encouraged to review available and emerging standards and requirements for applicability. Awareness of available standards is sometimes a barrier to adoption, and stakeholders would be well-served to engage the community at large through conferences, forums and other online resources. Identifying and following adopted standards provides for a uniform implementation of NG9-1-1, reducing the number of “unique” applications of technology that have plagued the existing 9-1-1 enterprise.

Application and use of compatible standards among all NG9-1-1 systems is critical to ensure interoperability across local, state, and national interactions and multiple public safety operations.

2.5.3 Step 2—Develop Operational and Technical System Requirements

Description

Traditional system and software engineering projects, both large and small, are often deemed mostly unsuccessful for many years as reported by organizations such as Standish, Gartner Group and the Project Management Institute. Some of the most prevalent reasons given for this lack of success fall into three primary categories; lack of user involvement in the entire engineering process, unclear statement of requirements and a lack of visible executive management support for the program from start to finish. Additionally, many of these projects face one of today’s most critical challenges: the transformation of traditional stove pipe communities into an integrated dynamic enterprise that includes shared and coordinated objectives, maintenance and componentization of embedded legacy systems, new business policies, common stakeholders, security constraints, business rules and a larger ecosystem in which the enterprise must operate.

The complexity of IT solutions, competing objectives and divergent stakeholder perspectives increases the project risk and possibility for failure. The ability to analyze, understand and communicate this complexity in a framework and language that is understandable to all

stakeholders is crucial to the translation of enterprise needs into system requirements to be implemented.

Many public safety organizations do not have experience with developing functional, operational and technical requirements or with implementing complex IT solutions. Historically, today's 9-1-1 technology has not required the same level of detail that will be demanded by the transition to NG9-1-1. While some work has been done to develop NG9-1-1 requirements, there is still much left to be done.

Recommendations

NG9-1-1 planners should consider the following actions related to developing NG9-1-1 system requirements—

- ▶ Identify the personnel and skills needed to implement all of the mission-critical applications for a group, regional, or state data center supporting NG9-1-1. A determination should be made about what areas should be supported internally or outsourced. These decisions will depend on whether, or to what extent, contracted vendors supply NG9-1-1 systems. If a region or state intends to support NG9-1-1 or parts of it themselves, technical systems requirements will drive IT support required.
- ▶ Engage and become involved with the standards community as described in the previous step to identify existing and emerging standards, which can drive the requirements process.
- ▶ Evaluate existing requirements that are currently available. Use of common standard requirements improves consistency and operability between implementations of like systems. Review and adaptation of requirements may also be useful.
- ▶ Assist in the requirements process efforts underway in the community. Organizations such as NENA and APCO are actively developing operational and technical requirements for NG9-1-1.
- ▶ When developing requirements, organizations are urged to follow best practices for gathering, developing, decomposing and documenting requirements, following a systems engineering process.

2.5.4 Step 3—Plan for Compliance with Open Standards

Description

Implementing NG9-1-1 solutions using open standards will benefit the organization, enterprise and the 9-1-1 community as a whole. Leveraging open standards, by its very nature, increases quality, reduces risk, and improves flexibility, by not being tied to a specific vendor or solution. With a “vendor-neutral” approach, organizations will benefit from competition that reduces cost and ensures interoperability. This interoperability is key to enabling real-time sharing of caller data.

Although there is much more caller data available in NG9-1-1, the ability to route calls and data to the appropriate PSAP or other emergency entity based on location (and other characteristics) depends on the availability and quality of caller location information. Some newer call origination services cannot yet provide automatic caller location data for emergency calling. It is

expected that in the longer term, the calling device will either identify and supply its location, or that the device or the NG9-1-1 system will access a Location Information Server (LIS) that contains the caller location, analogous to today's Automatic Location Identification (ALI) database or Mobile Positioning Center (MPC) or VoIP Positioning Center (VPC) for wireline, cellular, and VoIP services. For the Internet version of VoIP, the likely source of automatic user location information depends on the access provider's knowledge of where the caller is located.

Recommendations

Encourage the use of open standards within the 9-1-1 community. Assist with standards development efforts underway.

Compliance with the related standards and the provision of automatic caller locations depend heavily on the originating service provider or access provider capabilities. Public safety authorities at state, regional, and local levels need to demand support for appropriate capabilities and improvements in location provision. Where applicable, carrier certification requirements by regulatory authorities need to reflect the need for accurate, automatic location provision for 9-1-1 services. In all cases, public safety organizations need to ensure that originating service providers, SDOs, legislators and regulators understand the need for location information.

2.5.5 For Additional Information

You can find additional information related to 9-1-1 standards and technology at—

- ▶ USDOT ITS JPO. *NG9-1-1 Architecture Analysis Report*. November 2007.
http://www.its.dot.gov/ng911/pdf/1.F2_FINAL_MED_ArchitectureAnalysis_v1.0.pdf
- ▶ USDOT ITS JPO. *NG9-1-1 Transition Plan*. February 2009.
http://www.its.dot.gov/ng911/pdf/NG911_Transition_PlanFinal.pdf
- ▶ NENA NG9-1-1 Standards. <http://www.nena.org/standards-recommendations-information> (NENA documents reference standards utilized by other SDOs).
- ▶ The Alliance for Telecommunications Industry Solutions (ATIS). <http://www.atis.org/>
- ▶ Emergency Services SDO Coordination Workshop. <http://www.emergency-services-coordination.info/>

Find additional information regarding requirements gathering at—

- ▶ Bahill, A. T. and Dean, F., Discovering system requirements, Chapter 4 in *Handbook of Systems Engineering and Management*, second edition, A.P. Sage and W.B. Rouse (Eds), John Wiley & Sons, 205-266, 2009.
<http://www.sie.arizona.edu/sysengr/publishedPapers/requirements.pdf>

Find additional information regarding standards development at—

- ▶ Sliman, E., *Business Case for Open Standards*. Open Standards.net, Updated May 9, 2002.
<http://www.openstandards.net/viewOSnet1C.jsp?showModuleName=businessCaseForOpenStandards>

2.6 NG9-1-1 Network Environment

The capabilities of NG9-1-1 are supported by the Emergency Service IP networks (ESInet), which provide engineered, managed data transport with easily expandable bandwidth, the IP software services that provide the call and data core functions for emergency communications, and the various databases that control and enable the software.

Organizations responsible for NG9-1-1 planning, or their technical representatives, need to be familiar with NG9-1-1 architecture and technology (see USDOT *NG9-1-1 Architecture Analysis Report*¹⁴ and NENA i3 documents¹⁵), including key subsystems. NG9-1-1 planners will need to appoint and oversee management for each subsystem, including resolution of security issues and management of database systems.

The 9-1-1 authority, or other NG9-1-1 planning organization, will face a number of challenges related to planning for the transition to NG9-1-1. Planning organizations need to compare and coordinate plans with other organizations in the surrounding geographical areas and within the state, establish geographic and jurisdictional orientation, determine the level for the establishment and operation of the ESInet (e.g., local, regional, state), and identify operational and maintenance constraints for system security and databases.

2.6.1 Overview

Planning for implementation of the NG9-1-1 network will require coordination at multiple levels and with multiple organizations with which the 9-1-1 authorities may or may not already have relationships. The process will include identifying the legacy network capabilities, planning for the new NG9-1-1 network, collaborating with service providers, and implementing a NG9-1-1 network.

Some of the work within this focus area is highly technical and complex. We urge organizations to engage IT specialists who are responsible for today's 9-1-1 connectivity and networking and will be responsible for the design, implementation, operations, and maintenance of NG9-1-1. Remember, the NG9-1-1 environment will differ from today's 9-1-1 in a number of ways. For example, not every PSAP will need to house its own data center and will not need the same level of networking capabilities. As described in the NG9-1-1 *Final Analysis of Cost, Value, and Risk* report,¹⁶ it may be most cost effective to establish statewide or regional data centers responsible for the networking and routing needs of dozens or even hundreds of PSAPs. Each of the PSAPs will be fully connected to NG9-1-1, but the networking and storage equipment will be housed at centralized location(s), with redundant and resilient capabilities, eliminating the need to duplicate those resources at every PSAP.

Developing an NG9-1-1 Network Environment includes six steps (see Exhibit 6):

¹⁴ USDOT ITS JPO. *NG9-1-1 Architecture Analysis Report*. November 2007. (last accessed September 14, 2009).

http://www.its.dot.gov/ng911/pdf/1.F2_FINAL_MED_ArchitectureAnalysis_v1.0.pdf

¹⁵ NENA. *Functional and Interface Standards for NG9-1-1 (i3)*. December 18, 2007. (last accessed September 14, 2009).

<http://www.nena.org/standards/technical/voip/functional-interface-NG911-i3>

¹⁶ USDOT ITS JPO. *NG9-1-1 Final Analysis of Cost, Value, and Risk*. March 5, 2009. (last accessed September 14, 2009).

http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf

- ▶ **Step 1—Research Legacy Network Topology and Technology.** Identify existing network capabilities, the network topology (configuration, layout, and connectivity of network elements), and overall capabilities, focusing on reusability and extensibility (the ability to extend the system [or network] to meet emerging needs).
- ▶ **Step 2—Develop a NG9-1-1 Architecture.** A number of resources exist to help in the design of a NG9-1-1 architecture that meets the needs of your locale, state, or region. The organization’s architecture requirements will depend on the size, coverage, and expected call volume. In addition, NG9-1-1 emphasizes greater reuse and sharing of common architectural components.
- ▶ **Step 3—Leverage Legacy and Shared Resources.** After you have identified existing networking capabilities and developed the system architecture, develop a plan for how to leverage and reuse existing resources. Consider development of MOUs, joint agreements, and/or letters of intent when identifying shared resources.
- ▶ **Step 4—Coordinate with Originating Service Providers.** One of NG9-1-1’s main features is native delivery of emergency calls via IP. 9-1-1 authorities need to work with the originating service providers to determine how best to implement call routing and delivery in an IP-based environment.
- ▶ **Step 5—Determine Network Support and Maintenance Needs.** The NG9-1-1 network will require ongoing O&M support to meet the reliability needs of the participating PSAPs and users. However, in an NG9-1-1 environment, caretaking responsibilities may not fall to each and every PSAP. In a shared resources model, participants would determine which organization is responsible for that upkeep.
- ▶ **Step 6—Implement NG9-1-1 Network Resources.** Once the NG9-1-1 environment has been planned, the organization will take steps to implement the plan and establish NG9-1-1 networks and systems.

Exhibit 6—NG9-1-1 Network Environment Steps

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Research Legacy Network Topology	Develop a NG9-1-1 Architecture	Leverage Legacy and Shared Resources	Coordinate with Originating Service Providers	Determine Network Support and Maintenance Needs	Implement NG9-1-1 Network Resources

2.6.2 Step 1—Research Legacy Network Topology and Technology

Description

Before NG9-1-1 planners can understand the “to-be” network and database structure, they must first analyze the “as-is” network and database topology and technology. This first step is essential to understanding the necessary changes for the transition to a next generation system. In addition, the research should also investigate the level to which existing system components could be reused or extended.

Recommendations

Before planning for the NG9-1-1 network and system, identify and gather data on—

- ▶ Role of the local, state or regional emergency communications environment within the larger NG9-1-1 system
- ▶ 9-1-1 plans in adjacent geographic areas
- ▶ Available channels for collaboration with other governmental entities
- ▶ Availability of GIS data for the geography currently served, as well as to be served
- ▶ Current database and data formats, as well as conversion plans for the new system
- ▶ Databases and content involved in the current system
- ▶ Network connectivity, configuration, layout, features, and capabilities of the as-is network
- ▶ Ability for existing network components to be reused, upgraded, or otherwise extended to support additional requirements as needed by NG9-1-1.

2.6.3 Step 2—Develop a NG9-1-1 Architecture

Description

In concert with architectural development work planned or underway in neighboring jurisdictions or within a state or region, the NG9-1-1 planning organization should collaborate to design, develop, and implement an NG9-1-1 architecture. Planners should strive to reuse existing components within today's 9-1-1 network, as it makes sense. In addition, in the common environment, the use of shared components and resources should be maximized to reduce capital expenditures and O&M costs, as well as to improve efficiency, reliability, and resilience.

Organizations looking to implement NG9-1-1 solutions should leverage existing research and guidance, in particular, the work done as part of NG9-1-1 Initiative as described in the *NG9-1-1 Architecture Analysis Report*¹⁷ and *NG9-1-1 Final System Design*,¹⁸ as well as the NENA i3 documents.¹⁹

Recommendations

To develop an NG9-1-1 architecture for your environment, we recommend the following:

- ▶ Identify the NG9-1-1 components to be provided by the local, state, or regional authority.
- ▶ Determine the size of the NG9-1-1 system based on coverage area, number of users, expected call volume, existing data to be converted, and other pertinent metrics. Consider and plan for a specific percentage of growth, comparable to growth in population served, year-over-year call volume increase, etc.

¹⁷ USDOT ITS JPO. *NG9-1-1 Architecture Analysis Report*. November 2007.

http://www.its.dot.gov/ng911/pdf/1.F2_FINAL_MED_ArchitectureAnalysis_v1.0.pdf

¹⁸ USDOT ITS JPO. *NG9-1-1 Final System Design*. February 2009.

http://www.its.dot.gov/ng911/pdf/USDOT_NG911_FINAL_System_Design.pdf

¹⁹ NENA. *Functional and Interface Standards for NG9-1-1 (i3)*. December 18, 2007.

<http://www.nena.org/standards/technical/voip/functional-interface-NG911-i3>

- ▶ Perform a gap analysis between the components already in existence (considering which components could be reused or upgraded) and what NG9-1-1 components are desired.
- ▶ Engage IT professionals, network designers, enterprise architecture and NG9-1-1 experts to assist in the design process.
- ▶ Develop a high-level, conceptual architecture encompassing the major components, responsibilities, physical locations, and planned connectivity between physical locations. Consider resilience and reliability issues.
- ▶ Decompose the high-level architecture into a more detailed architectural assessment. Identify components and sub-components, connectivity, and individual particulars for each component (e.g., operating system, major applications, databases).
- ▶ Consider identifying dataflow (i.e. types of data shared across components).
- ▶ Identify and resolve any single points-of-failure.

2.6.4 Step 3—Leverage Legacy and Shared Resources

Description

Coordination and collaboration are critical to planning and implementation of a successful transition to NG9-1-1. The extent to which any 9-1-1 system can maximize the technological opportunities provided by migrating to NG9-1-1, depends directly on the level of coordination and collaboration. One of the many reasons is that the sharing of resources can reduce both infrastructure and system operating costs (and energy use), and allow increased information transfer. The sharing of both network infrastructure resources and database resources will lead to cost savings and foster a collaborative environment.

In addition to the sharing of resources among agencies and jurisdictions, the network equipment and databases used in the legacy E9-1-1 system may be of use to the planned NG9-1-1 system. This reuse of infrastructure and information can help streamline the procurement process, as well as represent a cost savings.

Recommendations

NG9-1-1 planners should evaluate current 9-1-1 system equipment for compatibility with the planned IP-based system. Where possible, reuse of equipment from the legacy system can reduce the hardware costs of a transition to NG9-1-1. Planned technology refresh for the current system can help to absorb NG9-1-1 implementation costs. For example, if a legacy piece of hardware needs to be replaced (i.e., because of component failure, to adhere to a replacement cycle, or when maintenance costs exceed the replacement cost), the organization could consider replacing the component with one that will serve the current purpose, but also could be repurposed for NG9-1-1. Unfortunately, not all legacy components may be suitable for reuse.

In addition to legacy system equipment, services and infrastructure can be shared among PSAPs, jurisdictions, public safety organizations, or even neighboring states. NG9-1-1 planners would be wise to consider options for equivalent shared services running in the ESInet that can support multiple PSAPs. States, regions, and 9-1-1 authorities should plan to take advantage of shared services and costs whenever possible.

Even in the early stages of NG9-1-1 system procurement planning, the 9-1-1 authority or planning organization should begin estimating NG9-1-1 network and other infrastructure costs. The 9-1-1 authority can then analyze how leveraging external and existing resources and infrastructure affect these costs. Planners should have a preliminary understanding not only of the costs of available equipment, but also the standards and how suppliers address them. Planning for NG9-1-1 will benefit from this basic understanding of cost and value long before the procurement process actually begins. Pooling equipment needs can result in increased purchasing power.

At this stage, if a neighboring state or jurisdiction is more advanced in the area of NG9-1-1 infrastructure implementation, or in emergency communications collaboration as a whole, reach out to determine whether other 9-1-1 authorities in your area have already established sharable data stores and other resources.

Develop agreements to collaborate and share data and resources within the NG9-1-1 environment. Consider executing formal MOUs or other agreements between entities that clearly describe the nature of the agreement, responsibilities of each party, and any other policy or governance issues. Developing these agreements in advance will help smooth the process for all participants.

Data format issues may arise when attempting to collaborate with other organizations or use old systems or databases. If your data is not in a compatible format, it may be cost effective to convert all data to one format, or it may be more beneficial to convert data as needed. Consider using a standard data format. In extreme cases, data format differences can be an insurmountable hurdle, but do not assume this is the case. Analyze the issue by determining why the data needs to be in its current format and what the cost of transition would be, and plan accordingly. Evaluate and consider implementing a National Information Exchange Model (NIEM)²⁰ compliant format, to provide a foundation for seamless information exchange.

2.6.5 Step 4—Coordinate with Originating Service Providers

Description

To receive 9-1-1 calls natively in IP, 9-1-1 authorities must work with Originating Service Providers to develop a plan to transition from legacy call deliver to IP-based call delivery. Both the service provider and PSAP must take steps before this can occur. The PSAP will benefit from IP call delivery in a number of ways, including the ability to route calls across the PSAP network (and maintain the ability to share data) much more easily than with legacy 9-1-1. This NG9-1-1 capability frees the PSAP from answering calls only at specific geographic locations, improves the ability for advanced call-routing features, and provides options with regard to backup, redundancy, and call congestion control.

²⁰ NIEM. <http://www.niem.gov>

Recommendations

NG9-1-1 planners should identify the capabilities of the originating IP call delivery and legacy service providers for the NG9-1-1 service area of interest. Critical service provider data includes—experience (success) with connecting to NG9-1-1 systems, transition planning status for supporting adjacent E9-1-1 systems while interfacing to NG9-1-1, and available support for legacy wireline and cellular carriers (e.g., supplying inbound gateways). More specifically—

- ▶ Determine the process for interconnecting each Originating Service Provider to the ESInet for its service areas affecting the NG9-1-1 systems.
- ▶ Establish sources of database content for GIS and other data systems, both derived from current databases or for new NG9-1-1 unique data.
- ▶ Identify the cost to transition to IP-based call delivery.

2.6.6 Step 5—Determine Network Support and Maintenance Needs

Description

Implementing an NG9-1-1 architecture is only the beginning. Operational support and maintenance needs require careful planning and cost estimating. By sharing resources, you may be able to decrease this cost for individual participating organizations, but you must identify cost recovery and sharing methods.

Recommendations

To determine NG9-1-1 support and maintenance needs, we recommend the following:

- ▶ Identify expected IP PSAP maintenance and ongoing support needs based on past experience and experiences of others that have implemented similar systems. Include the cost of hardware, software, support personnel, third-party applications, maintenance agreements, and data center requirements (power, cooling, security, other environmental costs, etc.)
- ▶ Determine the cost to implement connectivity from originating service providers
- ▶ Estimate costs for ESInet and other networking needs (connectivity, maintenance, etc.)
- ▶ Develop policies for user access, security (physical and logical), continuity, backups, and other maintenance concerns.

2.6.7 Step 6—Implement NG9-1-1 Network Resources

Description

With the development of the high-level and detailed NG9-1-1 architecture, the components can be procured, implemented, tested, and placed into production. Planning should include how to conduct system and end-user training. Coordination with affected NG9-1-1 stakeholders is crucial.

Recommendations

To implement NG9-1-1 in your environment, we recommend the following:

- ▶ Develop a bill of materials (BoM) for the hardware and software to be procured. Ensure compatibility across components and systems. Seek out open, non-proprietary systems that are compliant with community-accepted standards.
- ▶ Procure, install, and initiate integration testing of each component in a controlled manner. When testing NG9-1-1 functions and features, ensure that test calls for each originating provider type are conducted before the procurement is considered completed.
- ▶ Ensure that the continuity plans have been developed and exercised.
- ▶ Schedule and execute system and end-user training to ensure the user community and maintenance staff are prepared to operate and support the system.
- ▶ Schedule and plan the cutover to production (live operations). Develop a rollback plan that could be accessed should problems arise.

2.6.8 For Additional Information

You can find additional information related to system architecture at—

- ▶ USDOT ITS JPO. *NG9-1-1 Architecture Analysis Report*. November 2007.
http://www.its.dot.gov/ng911/pdf/1.F2_FINAL_MED_ArchitectureAnalysis_v1.0.pdf
- ▶ NENA. *Functional and Interface Standards for NG9-1-1 (i3)*. December 18, 2007.
<http://www.nena.org/standards/technical/voip/functional-interface-NG911-i3>
- ▶ USDOT ITS JPO. *NG9-1-1 Final System Design*. February 2009.
http://www.its.dot.gov/ng911/pdf/USDOT_NG911_FINAL_System_Design.pdf
- ▶ USDOT ITS JPO. *NG9-1-1 Final Analysis of Cost, Value, and Risk*. March 5, 2009.
http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf

You can find additional information related to development of MOUs at—

- ▶ DHS SAFECOM Program. *Writing Guide for a Memorandum of Understanding (MOU)*. December 2006.
<http://www.fcc.gov/pshs/docs/clearinghouse/DHS-MemorandumOfUnderstanding.pdf>
- ▶ http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf

You can find additional information related to data standards at—

- ▶ National Information Exchange Model (NIEM). <http://www.niem.gov/>

2.7 System and PSAP Operations

NG9-1-1 offers significant enhancements that will provide the public, in emergency situations, more and improved ways to be served by public safety, emergency services, and other essential services. Simultaneously, it offers significant improvement opportunities for 9-1-1 entities and many others, which provide critical services to the public. The creation of an operational environment that correctly deals with the major changes inherent to NG9-1-1 is critical to assuring these benefits.

An operationally focused project team should be formed, and its members tasked with performing the steps detailed in this section. This team should include leaders/experts in areas of 9-1-1 PSAP operations and supervision, human resources, operational interaction with other entities (particularly first responders), PSAP training, and mapping/GIS. This initial core operations lead team must closely coordinate its work with others responsible for similar policy/governance and technical tasks.

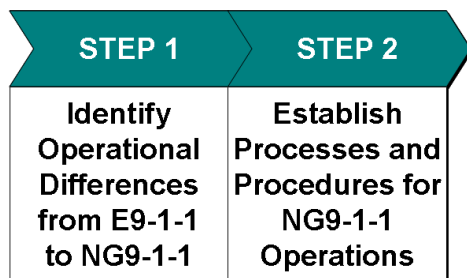
2.7.1 Overview

System and PSAP operations will generally require preparation, training, and understanding regarding the NG9-1-1 system and the operational differences between today's 9-1-1 and NG9-1-1, and development of policies and procedures to support NG9-1-1 operations. Although many organizations have developed their own policies over the course of many years, the introduction of NG9-1-1 will change some of the basic tenets of call processing and handling. A solid understanding of these changes will help to reduce risk in transition to NG9-1-1 as well as better prepare the end users for the change.

Planning for system and PSAP operational changes include two general steps (see Exhibit 7):

- ▶ **Step 1—Identify Operational Differences Between E9-1-1 and NG9-1-1.** Knowledge of the differences between today's 9-1-1 systems and NG9-1-1 is crucial to prepare for the transition. Once the gaps are identified, the missing policies and training plans can be developed.
- ▶ **Step 2—Establish Processes and Procedures for NG9-1-1 Operations.** For most organizations, the policies and procedures for handling 9-1-1 operations are intact and effective. The project team should develop and tailor specific guidance for NG9-1-1 operations needs to the individual organization's needs. The guidance should adhere to emerging standards for governance, training, and operation in order to improve interoperability with neighboring or backup resources.

Exhibit 7—System and PSAP Operations Plan Development Steps



2.7.2 Step 1—Identify Operational Differences Between E9-1-1 and NG9-1-1

Development of an action plan that is based on an operational gap analysis of today’s 9-1-1 versus NG9-1-1 provides 9-1-1 authorities, PSAPs, and other stakeholders with a roadmap of what needs to be addressed from an operational perspective, including training and policy development. Policies and procedures need to be developed prior to transition, and the users (PSAP personnel, system support staff, etc.) need to be trained before they can be expected to use and maintain the new system.

Description

PSAPs will need to develop “local experts” on the planning, development, implementation, and execution of NG9-1-1 systems and technologies. This knowledge and understanding will be gained through research, individual contributions, conferences, training, and experience. Individuals at the local, state, and regional level will become specialists through learning, doing, and sharing information with others. Implementation of NG9-1-1 is a collaborative effort, and people at all levels can participate in furthering NG9-1-1.

Recommendations

To identify, understand, and prepare for differences between current operations and NG9-1-1 operations, we recommend the following:

- ▶ Read. Research and knowledge is critical to this step. It is important to read what is currently available regarding NG9-1-1, paying particular attention to operations-related content, along with closely examining technical and policy areas for operations-related inferences. Key research resources are the USDOT NG9-1-1 website²¹, along with Technical Assistance Center²² and NENA websites.²³ Others include appropriate IETF working group web pages²⁴ and APCO.²⁵

²¹ USDOT ITS JPO. *NG9-1-1 Initiative*. <http://www.its.dot.gov/ng911>

²² NHTSA / NTIA. *National 9-1-1 ICO*. <http://www.e-911ico.gov/index.html>

²³ NENA. <http://www.nena.org>

²⁴ IETF. *Active IETF Working Groups*. <http://www.ietf.org/html.charters/wg-dir.html>. Consider in particular: Emergency Context Resolution with Internet Technologies (ecrit): <http://www.ietf.org/html.charters/ecrit-charter.html>, Geographic Location/Privacy (geopriv): <http://www.ietf.org/html.charters/geopriv-charter.html> and Session Initiated Protocol (sip): <http://tools.ietf.org/wg/sip/>

²⁵ APCO International. <http://www.apcointl.org/>

- ▶ Attend training, often provided at conferences, about NG9-1-1's operational considerations.
- ▶ Create lists of action items to address with regard to operational changes, training, and policy changes. Suggested initial items include—
 - Handling of new types of media and calls:
 - ▶ Emergency text and instant messaging
 - ▶ Sensor/alarm notifications
 - ▶ Video calls
 - ▶ Receipt and processing of additional data (including personal, vehicle, building/site, pictures, etc.)
 - Routing of business rules
 - Contingency planning (disaster scenarios)
 - Security considerations
 - Expanded agency and entity interaction
 - Virtual and remote answering points
 - Human-machine interface (HMI) considerations
 - Mapping/GIS
 - System administration
 - Personnel selection and hiring considerations.
- ▶ Develop an operational transition plan to enable NG9-1-1 technologies. Include an implementation timeline, list of actions and responsibilities, and a list of resources available.

2.7.3 Step 2—Establish Processes and Procedures for NG9-1-1 Operations

Description

PSAPs will need to review existing 9-1-1 policies and procedures to identify which ones will need to change to support NG9-1-1 and what new policies must be developed. PSAPs generally have a collection of policies that have evolved with the organization's existing operational needs. Engaging operational policy-making stakeholders, as well as end users, will be critical to the success of this new policy development effort.

Recommendations

To establish processes and procedures for NG9-1-1 operations, we recommend the following:

- ▶ Expand the project team to include representatives from additional entities and in particular, ensure there is representation from the user community (those immediately affected by new or changing directives)
- ▶ Review and revise the plan developed in Step 1 as needed
- ▶ Analyze the action plan for commonalities of certain topics or issues to assist in creating teams to develop new processes and procedures and revise or delete existing items where appropriate

- ▶ Create the necessary specialized teams, some of which may be tasked with specific categories, while others may be tasked with work across many categories, for example, Human Resources identifying all categories possibly affecting hiring procedures, scheduling processes, and other areas of responsibility.

2.7.4 For Additional Information

You can find additional information related to system and PSAP operations at—

- ▶ NENA. *Intro to Next Generation 9-1-1* course.
<http://www.nena.org/education/the-future-is-here/intro-to-ng>
- ▶ NENA Education Courses. <http://www.nena.org/education/courses>
- ▶ NENA Conferences and Meetings. <http://www.nena.org/conferences-meetings>
- ▶ NENA PSAP Operations & NG9-1-1 Integration (PONGI).
<http://www.nena.org/operations-committee-ng911-integration>
- ▶ NENA Operational Standards. <http://www.nena.org/operations-standards>
 - NENA IP-Capable PSAP Minimum Requirements (Standard number: 58-001)
<http://www.nena.org/standards/operations/IP-PSAP-minimum-requirements>
- ▶ National 9-1-1 ICO Technical Assistance Center (TAC). Contact via: e-mail: nhtsa.national911@dot.gov or telephone at (202) 366-3485.

2.8 Continuity Planning in the NG9-1-1 Environment

Business continuity planning (BCP) is important for almost any commercial or governmental entity. For 9-1-1 authorities, such planning usually takes the form of specific guidelines to ensure mission-critical emergency operations can continue during a crisis. These guidelines are critical for every PSAP. Many PSAPs already have some level of planning that defines what should be done when the “exceptional” emergency occurs. Plans can range from designating a set of contact personnel, to backup systems, to employing full-scale standby solutions to be implemented when a primary facility must be evacuated. The level of plan complexity and intricacy must be consistent with the needs of the organization and available resources.

While this section discusses the basic components and methodologies that comprise continuity of operations (COOP) and BCP, it is not intended to replace the comprehensive planning approach that most organizations need. The goal is to underscore the importance of such a plan and describe the role of that plan in the context of NG9-1-1.

2.8.1 Overview

When private businesses develop their in-house emergency response plans, often one of the first steps listed is to access public safety services. Without question, the public’s expectation is that 9-1-1 will always be accessible and ready to respond to an emergency. Those individuals that support 9-1-1 operations recognize that while 9-1-1 is virtually always prepared, there are always points-of-failure within an enterprise and often these are outside the organization’s control.

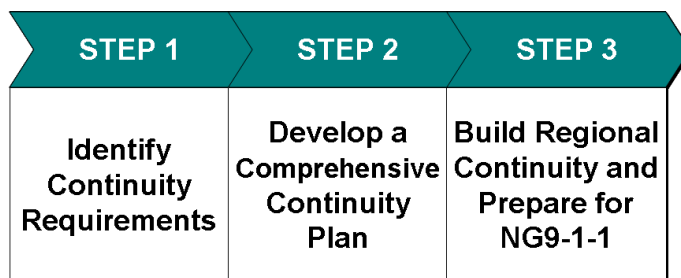
As shown in Exhibit 8 and described below, there are three notional steps of continuity planning within the NG9-1-1 environment. These steps include identifying the continuity requirements, developing a comprehensive plan, and implementing regional continuity planning in preparation for NG9-1-1. This final step allows organizations to embrace a more regional (or long distance) perspective, sharing resources and providing options to guard against service interruptions. One of the main goals of NG9-1-1 is to provide additional options for call handling, congestion control, and system reliability and recovery. Continuity planning provides the framework for leveraging the new abilities provided by NG9-1-1.

Continuity Planning for NG9-1-1 includes three main steps:

- ▶ **Step 1—Identify Continuity Requirements.** 9-1-1 authorities may have no formal COOP plan or a very limited plan. This may be because a 9-1-1 operation has limited resources, or is small and relies on a larger organization’s 9-1-1 service for backup. Nonetheless, organizations need to formulate and address their continuity requirements before an emergency event actually occurs so that personnel are confident in their ability to implement the plan as designed.
- ▶ **Step 2—Develop a Comprehensive Continuity Plan.** Organizations implementing NG9-1-1 solutions should develop comprehensive continuity plans that take into consideration an “all hazards” approach, including procedures to help mitigate impact and speed a return to routine operations.
- ▶ **Step 3—Build Regional Continuity and Prepare for NG9-1-1.** One of NG9-1-1’s main features is to reduce the physical limitations of today’s PSAPs. In NG9-1-1, the location of

the calltaker becomes less important and the NG9-1-1 enables virtualization. NG9-1-1 planners should develop comprehensive and effective continuity programs that consider the key role that neighboring jurisdictions play in sustaining essential services or recovering damaged services throughout all phases of an incident.

Exhibit 8—Continuity Planning Steps



2.8.2 Step 1—Identify Continuity Requirements

Description

This step is intended for 9-1-1 authorities with no formal COOP plan or a very limited plan. In some cases, the 9-1-1 operation is limited by perceived lack of resources or an immediate need. For example, a local town PSAP responsible for a relatively small geographical area may rely on the county’s 9-1-1 operations if a major problem occurs. While this solution works well for most situations, the same problem that incapacitates the town (e.g., severe weather) can also affect the county operation. Multiple layers of preparation and cooperation are not only necessary but become more accessible and realistic in NG9-1-1.

Organizations in this stage typically have some ideas about how to cope with major disruptions but have not documented mitigation strategies and policies, or coordinated their plans with the plans of other services both within and adjacent to their jurisdictions. Sometimes, although a plan is documented and in place, it lacks a fundamental component—regular testing. An untested plan is a liability that lulls the organization into a false sense of security. It is essential to identify COOP requirements before a critical incident so that personnel are as familiar as possible with operational procedures and the usage of various products and services which will come into play during an emergency.

Recommendations

NG9-1-1 implementing agencies should conduct operational impact analyses to identify scenarios where facilities, systems, equipment, or operations are interrupted or disrupted, and any opportunities for hazard mitigation. In the analysis, you should determine continuity requirements and develop strategies based on the requirements, so that a more general continuity plan can be formulated with training, testing, and exercise. Emphasize the impact of interruptions to critical business functions and define thresholds for minimum/maximum down time.

Operational disruptions can occur from a diverse set of threats, both natural and man-made. Preparing to respond to a catastrophic equipment failure is just as important as being able withstand severe weather. Developing “what if” scenarios will help to identify a range of

possible situations and start to develop response strategies to mitigate the impact. However, it will also help strengthen a pragmatic approach to handling those scenarios that simply cannot be imagined.

2.8.3 Step 2—Develop a Comprehensive Continuity Plan

Description

If your organization has at least a rudimentary plan in place, regularly tests the plan, and consistently reviews and improves the plan, you are ahead of many other jurisdictions and should be commended for your proactive stance. Now you need to expand planning to produce a comprehensive continuity plan that considers the local event and has procedures to help reduce the impact to a manageable situation. For instance, if a situation at the PSAP requires a physical evacuation to the organization's backup facility, the secondary location must be capable of beginning live operations relatively quickly and not be susceptible to service interruptions. You need to expand the plan to go beyond handling a single situation; multiple (or cascading) failures will still cause an outage.

Recommendations

Continuity plans are only as good as the ability of personnel to respond effectively during an emergency. Formulate a cohesive plan that is accessible to all personnel and outlines the flow of continuity operations, continuity organizations, continuity requirements and strategies, damage assessment procedures, COOP activation procedures, roles and responsibilities, facility and operations tabletop exercises, and identifies gaps or weaknesses.

Often, a comprehensive continuity plan requires the use of experts (like a Certified Business Continuity Professional) with specific knowledge and experience in developing, implementing, testing and maintaining these plans. Consider engaging these domain experts, even if it is only to validate your internal planning efforts.

Start with the many publicly-available resources to begin the planning process and engage internal and external resources as needed. With such emphasis on community and business preparedness, there may be resources available to you that you are initially unaware of.

2.8.4 Step 3—Build Regional Continuity and Prepare for NG9-1-1

Description

Those organizations with a robust, but local, continuity plan should next focus on developing regional continuity capabilities and consider how to best implement the inherent continuity features of NG9-1-1. Coordination with neighboring jurisdictions and policies and procedures to handle call congestion and overflow is a critical component of developing regional continuity planning. In addition, exercising these plans is critical to their maintenance and upkeep.

Inherently, the features of NG9-1-1 support both a regional and long distance approach to continuity planning. NG9-1-1 planners have the opportunity to put continuity plans into place that mitigate various situations, such a short-term influx of calls related to a single event, to full

transfer of operations to support a large-scale disaster or evacuation. NG9-1-1 also improves restoration of service should an entire operation (facility and personnel) be incapacitated.

Recommendations

Regional continuity planning is best exercised on a regular basis, with several jurisdictions participating, so that all parties are familiar with anticipated gaps in either technologies or services, and so that roles and responsibilities are clearly understood. It is essential that as many people as possible who will be called upon to respond to, or who may be affected by, a critical incident, are as familiar with COOP operational procedures that will be activated during a real emergency.

To facilitate a regional approach, planners must establish and strengthen relationships with neighboring jurisdictions. Organizations will need MOUs, policies and procedures, methods to share data (geographical, operational, and historical) and most importantly, regular opportunities to test this process. Testing will identify gaps and provide a chance to refine and improve the plan.

BCP testing often takes two forms: Simulated Event or Tabletop Exercise. During a simulated event, participants would act as if an event had occurred and would demonstrate their response to that situation. A tabletop exercise is similar, except that participants have an opportunity to discuss or “walk through” the exercise. Both methods have their advantages, but a simulation may be more realistic to the individuals involved, but may be more invasive to daily operations.

2.8.5 For Additional Information

You can find additional information related to continuity planning at—

- ▶ FEMA Emergency Management Institute. IS-546 Continuity of Operations (COOP) Awareness Course. <http://www.training.fema.gov/EMIWeb/IS/is546.asp>
- ▶ IS-547 Introduction to Continuity of Operations (COOP). <http://www.training.fema.gov/EMIWeb/IS/is547.asp>
- ▶ U.S. Department of Homeland Security, Ready.gov’s ReadyBusiness, Continuity of Operations Planning. <http://www.ready.gov/business/plan/planning.html>
- ▶ Nonprofit Risk Management Center, Business Continuity Planning Course. <http://nonprofitrisk.org/tools/business-continuity/intro/1.htm>
- ▶ National Fire Protection Association (NFPA) Standard on Disaster/Emergency Management and Business Continuity Programs (NFPA 1600). <http://www.nfpa.org/assets/files/pdf/nfpa1600.pdf>
- ▶ NENA Public Safety Answering Point Site Selection Criteria Operations Information Document (56-506). <http://www.nena.org/operations/standards/psap-site-selection>
- ▶ NENA “Preparing for the Worst” (continuity and disaster planning) courses. <http://www.nena.org/education/preparing-for-the-worst>
- ▶ DRI International, Business Continuity Training and Certification. <https://www.drii.org/>
- ▶ DHS Homeland Security Exercise and Evaluation Program (HSEEP). <https://hseep.dhs.gov>

2.9 Training

In an NG9-1-1 environment, almost all those employed in the emergency communications field will be expected to take on new and/or altered responsibilities. Because of the new tools available to call takers and other public safety personnel, the new types of information available, and the new information exchange environment, a large-scale training effort must be undertaken prior to, or in parallel with, the deployment of new hardware, software, and services associated with the transition to NG9-1-1. This training should be sufficient to accomplish, from the public point of view, a seamless transition to NG9-1-1. During and after this transition, public expectations will continue to mandate that emergency response always be timely and effective.

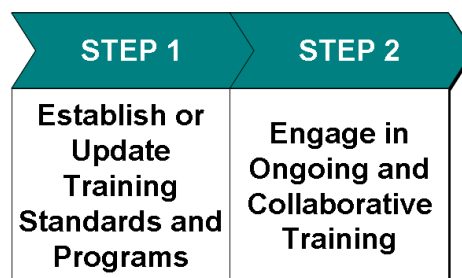
2.9.1 Overview

Training PSAP personnel to understand and use the NG9-1-1 functions and features is one of the most essential tasks to ensure the system performs as intended, the overall quality of emergency response is improved, and the cost and effort incurred to facilitate the migration are worthwhile. Thus, thorough, timely, and ongoing training must be developed and implemented for use during NG9-1-1 development, deployment, and maintenance.

Training Plan development generally includes two steps (see Exhibit 9):

- ▶ **Step 1—Establish or Update Training Standards and Programs.** Modify and institute all training programs well in advance of NG9-1-1 equipment, software, and service deployment. This includes training to receive, manipulate, and properly use current and new types of call-related information; training for call takers, so they can adjust to seeing rather than hearing incoming calls; training on new methods and procedures for disseminating information to current and new first responders and public safety groups; and training on new and/or updated interfaces, applications, tools, and software systems that operate in the NG9-1-1 environment.
- ▶ **Step 2—Engage in Ongoing and Collaborative Training.** Increasingly, NG9-1-1 implementing agencies share applications and networks within the NG9-1-1 environment. Because of the increased interaction across jurisdictions and between agencies, groups should engage in collaborative training to ensure a continuity of services throughout the emergency response chain and across geographic boundaries.

Exhibit 9—Training Plan Development Steps



2.9.2 Step 1—Establish or Update Training Standards and Programs

Description

Many states, counties, localities, PSAPs, public safety associations, and other groups provide mandatory or recommended training for the users of the current 9-1-1 system. To prepare personnel to perform new or altered job duties necessitated by the transition to NG9-1-1, planners should identify affected training programs, redesign or develop new programs and implement all modifications well in advance of actual NG9-1-1 equipment, software, and service deployment.

Recommendations

Address all aspects of NG9-1-1 that will alter the current 9-1-1 operating environment, including, but not limited to—

- ▶ Training to receive, manipulate, and properly use current and new types of call-related information, including video, text, and data; training for call takers, so they may adjust to seeing rather than just hearing incoming calls.
- ▶ Training on new methods and procedures for disseminating information to current and new first responders and public safety groups.
- ▶ Training on new and/or updated interfaces, applications, tools, and software systems that operate within the NG9-1-1 environment.

In some states or jurisdictions, training standards are mandated by law or statute. Review these laws or statutes, and, if necessary, modify them to ensure that training requirements are consistent with and adequate for the necessary training for PSAP personnel working within an NG9-1-1 environment. Because of the complexity of the NG9-1-1 environment, if a state or jurisdiction does not have mandatory training requirements, we recommend that the organization seek guidance to create such requirements or attempt to meet base-level training recommendations of a federal 9-1-1 entity or a nationally recognized public safety association.

2.9.3 Step 2—Engage in Ongoing and Collaborative Training

Description

Because the NG9-1-1 system is designed to be highly adaptable and evolving, new system and application development will be continuous. Therefore, training requirements and/or programs for PSAP personnel must undergo periodic revision and employees should receive regular and ongoing training, as appropriate and necessary. Further, because of the sharing of applications and networks within the NG9-1-1 environment and the increased interaction across jurisdictions and between agencies, organizations should engage in collaborative training to ensure a continuity of services throughout the emergency response chain and across geographic boundaries.

Recommendations

Identify a learning strategy that coincides with your organization's goals for moving into the NG9-1-1 environment. Policies and standard operation procedures (SOPs) should be developed,

including a training and outreach plan that specifies how and by what method training will proceed (e.g., train-the-trainer sessions, presentations, online resources, meetings, brochures.)

Consider attending training classes provided during conferences or sponsoring training programs. Encourage organizations from throughout the state or region to participate in training. Develop training standards and minimums that support a consistent approach to content and delivery.

2.9.4 For Additional Information

You can find additional information related to emergency communications training at—

- ▶ APCO American National Standards (ANS). Minimum Training Standards. <http://apcointl.org/new/commcenter911/APCOstandards.php>
 - Minimum Training Standards for Public Safety Communications Training Officer - APCO ANS 3.101.1-2007. <http://apcointl.org/new/commcenter911/downloads/APCO-ANS-CTO2007.pdf>
 - Minimum Training Standards for Public Safety Communications First-Level Supervisor. http://apcointl.org/new/commcenter911/downloads/First_Level_Supervisor.pdf
 - Minimum Training Standards for Telecommunicators (Project 33). <http://apcointl.org/institute/documents/P33.pdf>
 - APCO ADA Training Standards for Telecommunicators. <http://apcointl.org/new/commcenter911/downloads/ADA-TDDTrainingStandard.pdf>
- ▶ NENA Education Courses. <http://www.nena.org/education>
 - NENA “The Future is HERE!” courses. <http://www.nena.org/education/the-future-is-here>
- ▶ NENA. Training the 9-1-1 Trainer course. <http://www.nena.org/education/getting-the-word-out/training-the-911-trainer>

2.10 Stakeholder Education and Awareness

There is widespread agreement that all entities affected by the transition to NG9-1-1—including PSAPs and 9-1-1 authorities, the public safety community, services and equipment providers, policymakers, and the public—need to be kept informed of NG9-1-1 technologies and how they affect emergency communications. To ensure a seamless transition that is invisible to the public and to promote full use of NG9-1-1's expanded feature set and capabilities, educating this target audience is essential. Education is critical to the effectiveness of all aspects of NG9-1-1—including funding, operations, standards and technology, and governance and policy—and certainly deserving of significant investment to increase the level of understanding about NG9-1-1 by all stakeholders. Besides careful planning, stakeholder engagement is the next most important aspect of NG9-1-1 implementation.

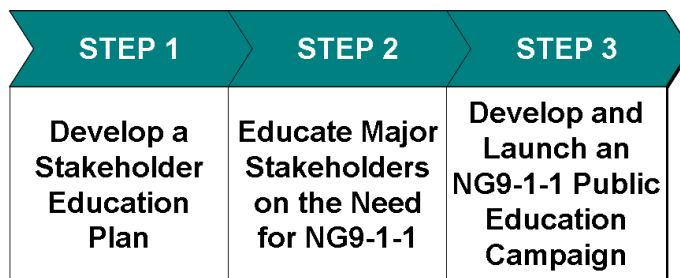
2.10.1 Overview

Identification of target audiences, development of appropriate messages for each audience, the content of requests for action, and the methods by which those messages and requests for action will be delivered are all elements of a successful education and awareness program for NG9-1-1. During NG9-1-1 development, deployment, and O&M, messages should be delivered to all stakeholder groups regarding the benefits, value, and proper use of the new system. These messages can be conveyed via multiple and varied delivery methods, including, but not limited to, dissemination of reports provided by federal agencies and/or public safety associations, print, television, and radio media outreach, as well as public service announcements (PSA).

Planning for Stakeholder Education and Awareness includes three steps:

- ▶ **Step 1—Develop a Stakeholder Education Plan.** As part of the development of a Stakeholder Education Plan, identify and engage the stakeholder community. Once you understand the target audience, develop a Stakeholder Education Plan to describe the strategies, methods, and goals of stakeholder engagement and education.
- ▶ **Step 2—Educate Major Stakeholders on the Need for NG9-1-1.** Institute a continued and methodical education program to ensure that the stakeholder community understands the need for NG9-1-1, the limitations of today's 9-1-1 systems, the benefits and values (and risks) associated with transitioning to NG9-1-1, and the stakeholders' role in the transition process. You can focus this effort on stakeholders, with the exception of the public, who will need to participate in the planning and deployment of NG9-1-1.
- ▶ **Step 3—Develop and Launch an NG9-1-1 Public Education Campaign.** The public education campaign will be critical to the overall success of NG9-1-1. Deliver a coordinated and unified message about what NG9-1-1 is and what it is not, because the public will need to understand the limitations of NG9-1-1, the benefits and capabilities of the system, and when, how, and why to access NG9-1-1.

Exhibit 10—Stakeholder Education and Awareness Steps



2.10.2 Step 1—Develop a Stakeholder Education Plan

Description

Development of a Stakeholder Education Plan involves two main tasks: stakeholder identification and development of a plan to engage and educate those individuals and groups.

There is little question that stakeholder management is critical to the success of any project or system implementation. NG9-1-1 provides a unique opportunity to identify and address this community for maximum benefit. Some stakeholders will be engaged for their technical abilities, furthering the knowledge about NG9-1-1 and resolving technical issues. Others will be important as sources of funding to underwrite the transition to NG9-1-1. The largest stakeholder group, however, is the public, which will interact with NG9-1-1, receive its benefits, and need information on how best to access and use this system.

As described previously in Section 2.2—Formal 9-1-1 Plan Development, NG9-1-1 stakeholders comprise a large community that includes the following stakeholder groups as discussed in the *NG9-1-1 System Description and Requirements Document*²⁶—

- *PSAPs*
- *9-1-1 authorities*
- *Policy Governance Groups*
- *Third-Party Service Providers*
- *Public Safety Dispatchers*
- *Emergency Management Centers*
- *Emergency Responders*
- *n-1-1 Providers*
- *Traffic Management Centers*
- *Access Service Providers*
- *Access Network Providers*
- *Service Application Providers*
- *Public*

These stakeholders are involved in all aspects of the creation, delivery, receipt, and management of 9-1-1 calls. Many organizations will have some, mostly informal relationships with a number of individuals and groups within NG9-1-1.

²⁶ USDOT *NG9-1-1 System Description and High-Level Requirements Document*, July 31, 2007.
http://www.its.dot.gov/ng911/pdf/NG911_HI_RES_Requirements_v2_20071010.pdf (last accessed September 14, 2009).

After stakeholder identification, the organization should develop a plan for educating each stakeholder set. The plan addresses the target audiences, the messages, the methods and strategies, and expected outcomes. With such a diverse stakeholder community, the education approach will need to be tailored to the needs of each group.

Recommendations

We recommend the following actions to help identify stakeholders:

- ▶ Using the list of stakeholder groups described in this section, brainstorm the list of stakeholders in each of those categories. Develop a list of stakeholders based on past relationships and contacts, but be sure to include individuals who are “known about,” even if they are not directly known.
- ▶ After developing a large list, prioritize the individuals and groups into primary and secondary stakeholders. Primary stakeholders will be those with a direct influence, contact, or responsibility.
- ▶ Determine contact methods (telephone numbers, e-mail and mailing addresses, etc.) for each of the stakeholders and if possible, identify the stakeholder’s preferred method of contact.

We recommend the following actions to develop an effective stakeholder education plan:

- ▶ Know your message. When preparing your stakeholder education plan, know what the message to your stakeholders is. Understanding the “what” makes the “how,” “when,” and “where” of message delivery more about simple logistics and timing.
- ▶ Identify the timeline for message delivery. The plan may call for some initial distribution of information, with a trickle of updates that continue during the implementation process. Regardless of the overall length of time for engagement, you need to ensure that stakeholders receive information regularly and have an opportunity to provide input. Otherwise, stakeholders will start to question whether their input and involvement is important.
- ▶ Determine the medium for transmitting your message. In today’s media-rich communications environment, there are many ways to share your message with your stakeholders. Remember that not every stakeholder must receive information in the same manner, on the same schedule, or even in the same quantity. You may choose to tailor your message, based on the audience and the level of influence of that stakeholder. Consider using a combination of e-mail, teleconferences, in-person meetings and forums, and even the media to distribute your information.
- ▶ Brainstorm with a small group of individuals to get their input on a draft plan before sending it out to a larger group of individuals. Consider making the first stakeholder engagement as an effort to get input and feedback on the Stakeholder Education Plan.
- ▶ Distribute the plan, or at least a subset of the plan to your stakeholders to start managing their expectations. Ensure that the plan is followed to avoid confusion and disenchanted stakeholders, which will often work against you.

2.10.3 Step 2—Education Major Stakeholders on the Need for NG9-1-1

Description

The success of the project is directly tied to support from the stakeholder community. Educating those stakeholders on various levels about what NG9-1-1 is and is not and the benefits and values of transitioning to NG9-1-1, is the first step toward building a consensus among decision makers and agents of change that this transition is imperative.

These stakeholder groups will not all share the same roles or responsibilities during the transition to NG9-1-1 or after its implementation. For this reason, a “one-size-fits-all” approach to educating the various parties, who may at times represent divergent interests, is not recommended. Instead, materials must be crafted with the purpose in mind of addressing the concerns and areas of responsibility of each individual stakeholder group.

This step focuses on informing those stakeholders who will have direct participation in the planning and deployment of the NG9-1-1. Typically, the general public will not have a specific role in this process at this juncture, and educating those end users is covered as part of the public education campaign described in Step 3.

Recommendations

We recommend the following actions to educate major stakeholders on the need for NG9-1-1:

- ▶ Seek to develop a culture of awareness about the features, capabilities, benefits, and value of transitioning to NG9-1-1, especially compared with the current 9-1-1 system. Consider describing some of the limitations of today’s 9-1-1 systems (e.g., aging PSAP equipment, inability to accept rich-media caller data [images, video, text messages], dwindling landline subscriber base [reducing PSAP funding], difficulties in consistently and accurately acquiring callers’ locations).
- ▶ Develop opportunities to discuss NG9-1-1 (and your organization’s needs) at every opportunity. Board meetings, status meetings, forums, conferences, editorials, e-mail blasts, and visits with local, state, and federal legislators are all great opportunities to share the status of your efforts, identify risks and needs, and give stakeholders an opportunity to get their questions answered.
- ▶ Meet and engage your stakeholders before you need them. Knowing your stakeholders and developing a relationship with them improves the chances of success when you need their influence or support.
- ▶ Consider participating in NENA’s annual “9-1-1 Goes to Washington” conference.²⁷
- ▶ Implement your Stakeholder Education Plan as intended.

²⁷ NENA. 9-1-1 Goes to Washington Conference. For more information visit: <http://www.nena.org/911gtw>

2.10.4 Step 3—Develop and Launch an NG9-1-1 Public Education Campaign

Description

Educating the public about NG9-1-1 should be done in two phases, with two distinct results in mind. First, the public should be educated about the need for NG9-1-1, which will create a groundswell of support for its implementation. An informed and engaged public will act as an extremely powerful and influential lobbying group with decision makers who may be under-informed about the creation of NG9-1-1. Later, once transition is nearing completion, the public must also be educated about NG9-1-1's expanded capabilities for receiving information and about how they can best use these new options for contacting emergency services.

Over the past several decades, public education campaigns were critical to the success of the current 9-1-1 system. Educating the public about the availability of 9-1-1 for access emergency services has become a victim of its own success. Most (if not all) PSAPs are experiencing congestion on their emergency lines with calls of a non-emergency nature. With the transition to NG9-1-1, the 9-1-1 community has an opportunity to “re-train” the public about the proper use of 9-1-1, when it is appropriate to call, and how to best use the 9-1-1 system.

Recommendations

We recommend the following actions to develop and launch a public education campaign:

- ▶ Engage individuals who have experience with sharing information with the public. Consider developing relationships with public safety public information officers (PIO) within your jurisdiction, public affairs officials within public and private agencies, and public relations professionals. These individuals often have specialized training and experience dealing with the media and the public. They may also have significant relationships with media outlets that could be leveraged for transmitting your message.
- ▶ Work with the radio, print, and television media outlets. Provide them access to knowledgeable individuals and engage them as partners. Providing the media with a regular feed of information gives them an opportunity to report on your progress as their time allows.
- ▶ Develop specific messages annually for the national 9-1-1 Education Month each April, but be prepared to continue to spread that message throughout the entire year.
- ▶ Leverage existing public education efforts already in place for today's 9-1-1 systems.

2.10.5 For Additional Information

You can find additional information related to stakeholder identification and awareness at—

- ▶ AccountAbility. AA1000SES, *Stakeholder Engagement Standard*. September 2005. <http://www.accountability21.net/uploadedFiles/publications/SES%20Exposure%20Draft%20-%20FullPDF.pdf>
- ▶ AccountAbility. *From Words to Action: The Stakeholder Engagement Manual*. July 2005. <http://www.accountability21.net/publications.aspx?id=904>
- ▶ International Association for Public Participation (iap2). *Spectrum of Public Participation*. 2007. http://www.iap2.org/associations/4748/files/IAP2%20Spectrum_vertical.pdf



- ▶ International Association for Public Participation (iap2). *Public Participation Toolbox*. December 2006. http://iap2.affiniscape.com/associations/4748/files/06Dec_Toolbox.pdf

You can find additional information related to public education at—

- ▶ E9-1-1 Institute. *National 9-1-1 Education Month resources*. <http://www.e911institute.org/Education%20Month/911educationmonth.html>
- ▶ NENA. *9-1-1 Education Resources*. <http://www.nena.org/education/911-education-resources>
- ▶ NENA. *Getting the Word Out*. <http://www.nena.org/education/getting-the-word-out/>

3 Procurement Tool

3.1 Preface

The purpose of this Procurement Tool is to provide any state and local entity with a guide and set of best practices for developing a procurement system that enables them to get the best value for their NG9-1-1 system. The tool outlines both a process and a rationale for conducting government bids that, if adopted, leads to more open, transparent, non-discriminatory, competitive, and technology-neutral procurements.

The Procurement Tool describes a typical procurement process, outlining the steps most often needed to develop procurement documents, review processes, and a decision framework. This process would be altered based on local regulations, but for organizations without local guidance, the tool is a resource for the overall process. While the process presented is applicable in general to any “best value” procurement, the complexity and specific circumstances of any given procurement should dictate which steps should be undertaken. Note, however, that sample terms and conditions and contract language are not included. ***Additionally, this guide is not meant to replace or supersede any law, policy, regulation or custom in your locale.***

Following the description of the steps in the procurement process, this Procurement Tool provides best practices and lessons learned by organizations at various stages in the process.

You should be aware that the procurement process outlined here might not be necessary if the systems and/or services you require are available from an existing statewide contract. In fact, you might be *required* to use a statewide contract, if one is available, to fulfill your NG9-1-1 needs. Please refer to any current procurement and contract management policies that might affect your process.

Finally, this procurement tool is generally applicable to IT procurements for implementing NG9-1-1 systems, equipment, and/or consulting services. The procurement process for other commodities or services (e.g., legal services) may have nuances not covered here.

3.2 *The Procurement Process*

3.2.1 **Why Use the Competitive Procurement Process?**

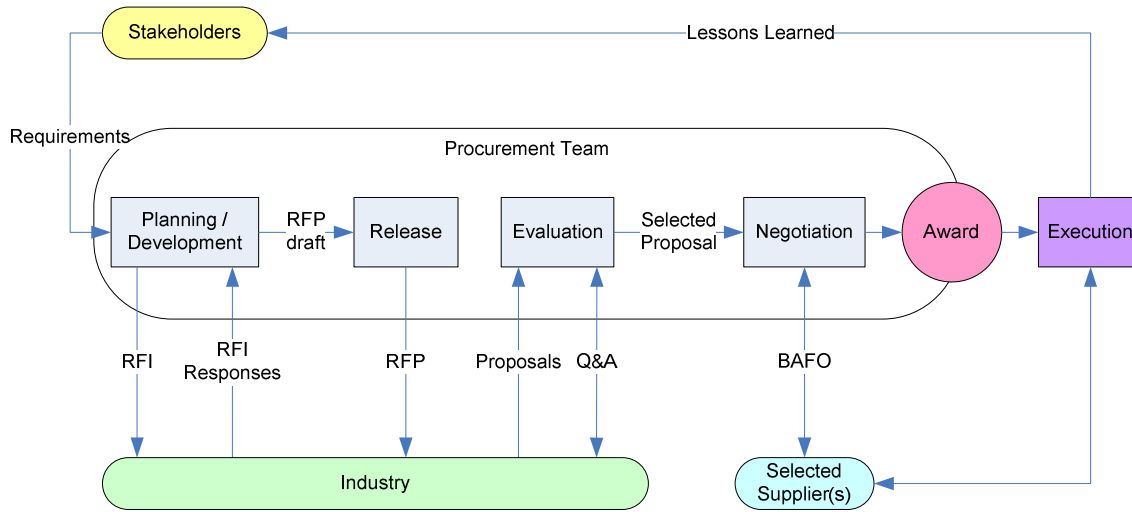
Any government entity that needs IT systems such as NG9-1-1 has multiple choices in selecting an approach to satisfy its needs. At one end of the spectrum, it can acquire the system entirely through internal resources. At the other end, it can hire an independent contractor. In between are other alternatives such as procuring specific skills and resources, or actually developing a system jointly with a contractor. Each approach has advantages and disadvantages. We assume that most government entities do not maintain nor wish to acquire the requisite skill levels internally. Therefore, the most logical solution may be to contract through a procurement process. This Procurement Tool provides a process oriented toward this more complex type of procurement. The principles, however, apply in general to any type of IT procurement.

3.2.2 **Overview**

The flowchart in Exhibit 11 below depicts the procurement process in simplified form and shows the main entities engaged in the procurement process:

- ▶ **Stakeholders** are the representatives of all the groups affected in any way by the system to be procured. The stakeholder group must be diverse and capture the interests of all the parties affected by the planning, implementation, and operation of the NG9-1-1 system. It is assumed that stakeholders have needs, the fulfillment of which is the goal of the procurement process.
- ▶ **Industry** is composed of all the companies and other entities that can provide NG9-1-1 solutions that address the stakeholders' needs.
- ▶ The **Procurement Team** is a representative subgroup of the stakeholders that manages and implements the procurement process.
- ▶ **Selected Supplier(s)** is a team of one or more solution providers that has been chosen by the Procurement Team because its solution offers the best value to the 9-1-1 authority.
- ▶ The arrows represent the interactions between the entities and their contributions to the process. These formal interactions are captured in various artifacts described in some detail throughout this tool.

Exhibit 11—Procurement Process



The phases of the process are represented by the five rectangles. Each is described in detail below.

3.2.3 Phase I: Planning/Development

The planning phase of the procurement process is crucial. A well-planned procurement has a much better chance of success than a poorly or hastily planned one. While this notion might seem self-evident, there are countless examples of projects that suffered because of inadequate planning during procurement.

We strongly recommend planning all NG9-1-1 procurements to allow sufficient time for multiple rounds of negotiations on price and other factors. You are encouraged to conduct a comprehensive needs assessment to determine the required type, quality, and quantity of equipment and services required from the procurement. Decisions regarding the duration, funding availability, performance measures, pricing structures, contract evaluation, and contract monitoring should be made during the planning phase of the procurement.

3.2.3.1 Step 1—Know the Industry

Before actually starting a procurement process, it is important to understand how the industry decides whether or not to bid on a government opportunity. This understanding allows you to plan and execute a procurement that is attractive to the industry. Your goal is to attract a number of high-quality bids for your NG9-1-1 project.

Any company assessing a government opportunity must answer the following questions:

Is the opportunity real?

This is usually the first aspect industry assesses. For any company to be comfortable in bidding a government opportunity, there must be a clear understanding that the project is—

- ▶ Funded and will continue to be funded throughout the period of performance
- ▶ Important enough to survive political and budgetary pressures
- ▶ Realistically scoped and has a believable time frame
- ▶ Communicated and managed effectively.

Obviously, the most important factor is the continuing availability of funding. System integrators will scrutinize funding sources and use their prior experiences with the government when making a decision.

Is the opportunity profitable?

In most cases, companies bidding on government opportunities are for-profit companies. They must assess the opportunity based on corporate expectations regarding profit margins. They assess the cost associated with responding to a bid (the Bid and Proposal costs). Depending on the size of the potential contract and other requirements, such as building proof-of-concept systems before award, this cost can be significant and comes out of the bottom line.

Is the bid winnable?

There are two aspects in play here: is the company able to perform the task under the circumstances of the contract, and is it likely that the company will win the bid.

The first part of the question tries to assess whether the company's core competencies cover the opportunity's requirements or whether teaming partners must be found and engaged. The ability to find and retain the right team is essential for a successful bid.

The second part of the question is harder to answer because the perception of the company's chances to win is influenced by factors that are not easy to quantify and can change rapidly (e.g., competitive landscape). Usually, each company applies its internal risk assessment processes to determine its chances of winning.

Understanding how offerors make their decisions can greatly benefit 9-1-1 authorities that desire to maximize competition, attract qualified offerors, and benefit from positive relationships with their contractors.

3.2.3.2 Step 2—Communicate with the Industry

The procurement process offers multiple opportunities for the Procurement Team to interact with the industry. The most fruitful interactions occur in the initial planning phase when your team can engage the industry to clarify—

- ▶ Technical issues such as the most current solutions for NG9-1-1 systems
- ▶ Industry best practices on building and maintaining NG9-1-1 systems
- ▶ Any other issues that are unknown or unclear to your team.

Engaging the industry early is a great opportunity to understand which companies are interested in bidding, and what concerns they have about your project.

In this initial phase, you can have broad and free communication with the industry. The most effective way to reach out is through a Request for Information (RFI) (see below). If done in a manner other than an RFI, you should be careful that the solicitation does not have the effect of precluding competition.

As the procurement process progresses, your contact with the potential offerors becomes more formal and prescribed, governed by the rules of the process. This Procurement Tool highlights, at each step, which type of interaction is recommended or allowed.

Request for Information

An RFI is a standard business process whose purpose is to collect written information, recommendations, and capability presentations related to your project from various suppliers. RFIs describe the organization's needs and perceived requirements.

You will send the RFI to a broad base of potential offerors. It informs them of your intentions and shapes their eventual response to your subsequent Request for Proposals (RFP) or Request for Quotes (RFQ). Industry can also begin to assess potential teaming partners.

The number and quality of responses to the RFI allows you to assess the competitive landscape and build an approach and strategy for the RFP or RFQ. The information gathered through the RFI drives the decisions in the subsequent phases of the procurement. Some of the information you might ask for includes—

- ▶ Supplier characterization, including facilities, finances, attitudes, and motivations
- ▶ State of the supply market
- ▶ Supply market dynamics
- ▶ Trends and factors driving change
- ▶ Alternative pricing strategies
- ▶ Supplier competition
- ▶ Breadth and width of product and/or service offerings, by supplier
- ▶ Supplier strategic focus, business, and product plans.

During this step, communication is open, and you are actively engaged with industry in exploring needs and possible relevant technologies.

The format and content of an RFI is usually up to you. Best practices suggest that you include at least the following sections:

- ▶ **Background**—Explain the context of your project, including all relevant information for the industry to understand your particular situation
- ▶ **Objective**—Explain what you expect to accomplish through the RFI

- ▶ **Purpose**—Explain what information you seek. Use a format that facilitates making comparisons between responders. This section may include a detailed list of products and/or services for which pricing is requested. The pricing should be used for comparative purposes, not as the basis for buying decisions.
- ▶ **Submission Guidance**—Explain submission requirements such as deadlines and contact information.

3.2.3.3 Step 3—Identify Procurement Objectives

The competitive procurement process begins with identifying the procurement objectives. You must articulate these objectives in a way that allows you to develop the necessary internal controls mandated by the procurement guidance applicable to you.

The objectives are not limited to the functional requirements that prompted the procurement in the first place. Examples of objectives could be—

- ▶ Support NG9-1-1 operational requirements
- ▶ Manage the procurement process efficiently and effectively
- ▶ Develop strong relationships with other functional groups
- ▶ Develop integrated purchasing strategies that support organizational strategies, goals, and objectives.

Internal control is the integration of the activities, plans, attitudes, policies, and efforts of the people of an organization working together to provide reasonable assurance that the organization will achieve its objectives and mission.

Follow applicable guidance on instituting and monitoring internal controls for the objectives identified.

3.2.3.4 Step 4—Set Up Structures

Before you embark on the procurement adventure, you must set up the structures that will see the procurement through.

Assemble Your Procurement Team

All procurements must have a Procurement Leader. This person is responsible for coordinating the Procurement Team, which manages the procurement process from start to finish.

The Procurement Leader—

- ▶ Determines how many people are needed to constitute a successful Procurement Team
- ▶ Determines the scope of the procurement, duration, funding, and appropriate method of distribution
- ▶ Determines how to accomplish the necessary steps in a timely manner so that the contract is executed successfully

- ▶ Ensures communication and distribution of information to all Procurement Team members; answers questions; obtains technical, legal, and fiscal assistance from the Procurement Team and other departments; and coordinates the competitive process
- ▶ Is responsible for managing and documenting the procurement process.

The Procurement Team should be cross-functional and include any individual involved in the development and management of the resulting contract. Members of the team should have knowledge, experience, or expertise with the NG9-1-1 system being procured and should include individuals with programmatic, administrative, legal, fiscal/budget, and contract management experience, where appropriate.

Using a cross-functional team approach and including a variety of department staff ensures that both the procuring staff and user staff understand and agree to the clear goal of the procurement and the contract expectations. The size of a Procurement Team is determined by the size, scope, and complexity of the procurement. Low dollar or simple procurements may need only one or two Procurement Team members while more complex procurements may require greater resources to explore all of the options.

External Consultants

When starting the NG9-1-1 procurement, you might decide that you do not have the entire skill set needed to successfully complete the procurement. In that case, you should acquire outside consultant assistance. Consultants can be very effective in providing help throughout the process. There are a few issues to consider when employing consultants:

- ▶ Outside consultants should sign non-disclosure agreements.
- ▶ Outside consultants generally may not compete for the business being solicited in any procurements they have been involved in developing.
- ▶ The final selection decision on offerors should be made by organization employees (the Procurement Team). Consultants may provide advice and counsel when required, but the final decision should be made by the Procurement Team.

Consider developing a consulting agreement that clearly articulates goals, specific deliverables, schedules and progress milestones, and includes an option to terminate at your convenience.

3.2.3.5 Step 5—Create Procurement Repository

A repository must be created and maintained for all procurements. The procurement repository serves two primary purposes:

- ▶ Provides an accurate record of the procurement process (development, evaluation, and selection process)
- ▶ Serves as a contract management tool for monitoring and documenting contract performance and contract activity.

The Procurement Leader is usually responsible for creation, maintenance, and ongoing management of the procurement repository. Disposal of the procurement repository must be handled in accordance with the records retention and disposal requirements of the state.

The repository may be electronic or a paper file. The Procurement Leader is responsible for development of a document management system that is consistent and supports easy document retrieval. The contents of the files should be detailed enough to enable an individual with no knowledge of the process to reconstruct an accurate picture of the procurement process and contract performance. If you choose an electronic repository, the location of all information must be readily available.

The following is a list of some of the most common items generally contained in a procurement file at the completion of the process:

Procurement Materials:

- ▶ RFP/RFQ and amendments (including all applicable attachments)
- ▶ Notes, minutes, or other related materials generated during the procurement development and bidder selection process
- ▶ List or sign-in sheet at bidders' conference (if offered)
- ▶ Copies of written questions and answers provided by the Procurement Team, if applicable
- ▶ Any correspondence to and from offerors distributed manually or electronically
- ▶ Written summary of the evaluation process, completed evaluation forms, and any minutes or notes from evaluation committee meetings
- ▶ Evaluation criteria and any amendments (with reasons for the amendments)
- ▶ Notes from offerors' presentations and demonstrations
- ▶ Clarification documents (if required)
- ▶ Reference checks
- ▶ Recommendation for selected bidder(s)
- ▶ Notification of contract execution
- ▶ Responses from non-selected offerors (selected responses are already part of the contract package)
- ▶ Requests for and any correspondence resulting from any debriefing requests or public record/freedom of information requests
- ▶ Requests for and any correspondence resulting from appeals (if applicable)
- ▶ Any other required forms or additional information as required by policy.

Contract Materials:

- ▶ The contract package, which includes—
 - Standard Contract Form (executed)—original with applicable attachments and other negotiated items
 - Copy of the applicable Terms and Conditions
 - Copy of the RFQ or RFP
 - Selected offeror's response (including any negotiated items, additional conditions, and forms)

- Other items required by policy
- ▶ Documentation related to payments (invoices, etc.), performance, contract monitoring and evaluation, agreements, correspondence, contract compliance, and negotiations pertaining to options to renew

3.2.3.6 Step 6—Identify Project Needs

Once the project objectives have been articulated, the Procurement Leader has been assembled the Procurement Team, and the repository has been created, it is time to start defining the needs of the project. After using the Preliminary Assessment Tool and the Planning Tool, you should have a good understanding of what the scope of your NG9-1-1 project.

In this step, you must build on that understanding and identify the project's needs. Most of the needs come directly from the Assessment and Planning Tools. Some of the more specific or particular needs might have to be identified through other methods. It is paramount to identify all the needs at this time.

Some of the methods to ensure a thorough discovery of needs are—

- ▶ Engage all stakeholders at the outset. Different perspectives on the same matter often yield a better understanding of the problem.
- ▶ Create a common language. Certain terms might be used and understood differently in different stakeholder constituencies. Make sure everyone speaks the same language.
- ▶ Solidify performance expectation. Ensure that all stakeholders have similar expectations related to the performance of the NG9-1-1 system. See Section 2.5.3—Develop Operational and Technical System Requirements for specific strategies on gathering requirements.

At this time, the Procurement Leader should make sure the entire Procurement Team has a good understanding of all the following aspects of the project:

- ▶ Needs
- ▶ Goals
- ▶ Objectives
- ▶ Constraints
- ▶ Missions
- ▶ Operations Concept
- ▶ Budget
- ▶ Schedule
- ▶ Management and Organization.

Clarity in these areas helps the Procurement Team make good assumptions about what is required to complete the NG9-1-1 project.

3.2.3.7 Step 7—Develop Requirements

Requirements are the formal expression of project needs. They are carefully crafted to convey the meaning of the need clearly and entirely. Well-crafted requirements lead to solutions that satisfy the need. Bad requirements result in the wrong solution being built.

Good Requirements

Requirements must capture *what* the NG9-1-1 system should be and NOT *how* it should accomplish its tasks. Good requirements are necessary, verifiable, attainable, and unambiguous.

- ▶ Necessary—What would happen if the requirement were omitted? If eliminating the requirement does not have an effect on the system, the requirement is not necessary and it should be removed. This is particularly important for performance requirements; over-specified requirements are usually difficult and expensive to implement.
- ▶ Verifiable—How will the requirement be verified? How will you know that the need was met? When writing requirements, specify also the acceptance criteria; this is your most important tool in managing the performance of the contractor at implementation time.
- ▶ Attainable—Is the requirement feasible? If you are uncertain, you must research the matter until you understand all the implications. This is an area in which external consultants can have a significant positive impact on the project. Does the requirement fit your budget, schedule, and other constraints? You should not specify requirements that are too expensive (in terms of money, time, resources) to attain.
- ▶ Unambiguous—Each requirement should express a single thought, be concise, and simple. It is important that requirements not be misunderstood—they must be unambiguous. Simple sentences are highly encouraged when writing good requirements.

The Language of Requirements

In addition to clarity and conciseness, the Procurement Team should pay attention to the following rules about word usage:

- ▶ Requirements use *shall*, statements of fact use *will*, and goals use *should*.
- ▶ The usage of these terms is standardized in government agencies and in industry. You will confuse everyone if you deviate from them. All *shall* statements (requirements) must be verifiable; otherwise, compliance cannot be demonstrated.
- ▶ Each requirement must use only one subject and one predicate. Complex requirements must be broken down into simple sentences.
- ▶ Requirement statements must not be complicated by explanations of operations, design, or other related information. This non-requirement information must be provided in an introduction to a set of requirements or in the rationale.
- ▶ Bad grammar increases the risk of requirement misinterpretation.

The words in Exhibit 12 below should be avoided at all costs. They introduce ambiguities into the requirements that can poison the project in the long term.

Exhibit 12—Banned Words

Banned Words	Usage
<ul style="list-style-type: none"> ▶ Are ▶ Is ▶ Was ▶ Must 	<p>Do not use these words in the text of the requirements. You may use them in a descriptive section or in the lead-in to a requirements section of the specification.</p>
<ul style="list-style-type: none"> ▶ Support 	<p>The word “support” can only be used to describe the load-bearing properties of a structure. All other usage is problematic. For example, “the system shall support user input” is a meaningless requirement. You must specify—usually in multiple requirements—what this support actually means.</p>
<ul style="list-style-type: none"> ▶ But not limited to ▶ Etc. 	<p>These terms are used to express the author’s uncertainty about the requirement (i.e., “there might be more X, but we don’t know at this time”). If you leave the ambiguity in the requirement, the offerors will increase the cost estimate to account for the higher risk. They might also use it as the excuse to do unnecessary work.</p> <p>There are three ways to correct the problem:</p> <ol style="list-style-type: none"> 1. Go to the stakeholders and get clarification, if possible. 2. Employ the help of a consultant to clarify the matter and identify all possibilities. Sometimes this option will not work because the uncertainty can only be removed by actually executing the project. 3. Require an analysis task in the project itself that will determine whether more items need to be added to the Statement of Work (SOW). If more items are found, you may have to increase the scope of the contract to cover the additions.
<ul style="list-style-type: none"> ▶ And/Or 	<p>This gives the offerors a choice of interpretation, and they will most likely choose “or,” which carries a lesser burden in the verification phase of the project.</p>
<ul style="list-style-type: none"> ▶ Minimize ▶ Maximize 	<p>These words are ambiguous unless the conditions for achieving the minimum or maximum are clearly defined. In most cases, these words are used incorrectly.</p>
<ul style="list-style-type: none"> ▶ Rapid ▶ User-friendly ▶ Easy ▶ Sufficient ▶ Adequate ▶ Quick 	<p>These words are ambiguous because they reflect a perception rather than a reality. “User-friendly” will have different meaning to a software developer and an end user. You should never use these words because the requirements become un-verifiable. Instead, define clear performance parameters that provide objective descriptions (e.g., replace “the system shall respond quickly” with “the system shall respond within 1 second”).</p>

Missing Requirements

If the Procurement Team focused narrowly on certain parts of the system, some types of requirements might never be written. Care should be taken to ensure that the requirements cover the entire system in equal detail. The list in Exhibit 13 below can be used as a reference:

Exhibit 13—Requirements Categories

Requirement Categories		
Functional	Safety	Privacy
Performance	Facility	Training
Maintainability	Regulatory	Design constraints
Interface	Transportation	Personnel
Operability	Security	Reliability
Environment	Deployment	

Requirements overlooked in this phase of the project become obvious in later phases. They contribute to a pernicious phenomenon called “requirements creep.”

Requirements Creep

Requirements creep (sometimes known as feature creep or scope creep) is a tendency for project requirements to increase during development beyond those originally foreseen, leading to features that were not originally planned and resulting risk to product quality, schedule, and cost. Requirements creep is usually driven by the following factors:

- ▶ **Missing original requirements**—If it becomes apparent during development that system needs are not being addressed, new requirements will be introduced, which, in turn, increase scope. To mitigate this problem, analyze requirements thoroughly and fill in any identified gaps before releasing the requirements.
- ▶ **Changes in the environment**—Projects that unfold over a long period are vulnerable to changes in the systems around them. New requirements must be introduced to deal with these changes. This type of scope creep is not necessarily foreseeable but must be addressed.
- ▶ **Growing “wish list”**—As the project progresses, various stakeholders “discover” new requirements. This is usually the result of a poor initial understanding of the project or a major change in the stakeholder population.
- ▶ **Vague original requirements**—Contractors might deal with ambiguous requirements by increasing their scope of work through new requirements. Minimize this problem by writing unambiguous requirements.

Requirements Best Practices

- ▶ Ensure that all requirements are necessary. Eliminate frivolous requirements while ensuring that the underlying needs are met.
- ▶ Be realistic; keep requirements commensurate with your budget. Do not require 50 terabytes of storage (i.e., 50,000 gigabytes) if your annual data collection will not exceed 1 terabyte.

- ▶ Write the requirements in simple sentences. Use one subject and one verb in each requirement. Break down complicated requirements into multiple simple ones.
- ▶ Do not design the system in the requirements. The requirements should specify *what* must be done, NOT *how*. If you must specify the “how” in the requirements, make sure it is a real requirement that reflects a real need. Otherwise, your requirement will influence and possibly limit the solutions proposed by the offerors, resulting in a suboptimal or unnecessarily costly system.
- ▶ Do not name specific components, subsystems, or parts in the requirements that reflect your preconceived notions about how the system should be built.
- ▶ Keep it simple. Achieving simplicity and clarity is sometimes difficult. Use multiple reviews of the requirements with different groups and persons in order to identify areas of confusion.
- ▶ Ensure you capture *all* requirements. Pay attention to security and privacy requirements—rapid changes are likely in these areas for the foreseeable future, and compliance is not optional in most cases.

3.2.3.8 Step 8: Develop Quotation Request

Once you have gathered and reviewed the requirements, it is time to prepare the quotation request.

As mentioned before, you can pursue two avenues at this point. If you have few requirements and they are well understood, and if you are sure about the technical path in the execution phase, then you might consider a Request for Quote (RFQ).

If the requirements are complex and you do not have a clear grasp of what must be implemented and how, you are better served by issuing a Request for Proposals (RFP).

Whether you choose to pursue an RFP or an RFQ, the steps in this phase of the procurement are similar:

- ▶ Develop document
- ▶ Review it with the appropriate stakeholders
- ▶ Obtain approval from the appropriate authority.

Once the document is approved, it enters Phase II, Release.

Request for Quote

An RFQ is a solicitation sent to potential suppliers containing a precise, detailed list or description of all relevant parameters of the intended purchase, such as—

- ▶ Personnel skills or competencies
- ▶ Part descriptions/specifications or numbers
- ▶ Quantities/volumes
- ▶ Description or drawings
- ▶ Quality levels

- ▶ Delivery requirements
- ▶ Term of contract
- ▶ Terms and conditions
- ▶ Other value-added requirements or terms
- ▶ Draft contract.

RFQs are best suited to products and services that are standardized and commoditized (e.g., supplies). They are meant to provide a means for comparing offerings on a narrow basis, usually just price. RFQs are not adequate for dealing with more nuanced requirements.

Use RFQs only when procuring products and services with which you are familiar.

Request for Proposals

An RFP is a solicitation sent to potential suppliers with whom you are considering creative relationship or partnership. Typically, the RFP leaves all or part of the precise structure and format of the response to the discretion of the suppliers. The creativity and innovation that suppliers propose to build into their proposals can be used to distinguish one from another.

To be effective, the RFPs should reflect your strategy and business objectives, providing detailed insight upon which suppliers can offer a perspective. The RFP must be built on your solid understanding of your needs and requirements. If any issues or areas of your project are not well understood, you must describe them specifically in the RFP as items to be addressed by the offerors. A good description of the problem and its root causes is required for a meaningful response from the industry.

RFPs are usually time-consuming for both you and the industry. For larger projects, or if your needs and requirements prove hard to articulate, it is conceivable that your RFP preparation would last several months. The industry needs adequate time to respond, especially if there was no RFI issued in the earlier phase of the procurement. Specifying a too short response period will discourage some suppliers from responding.

Preparing an RFP

All RFPs are different because they address different problems. Well-designed RFPs, however, are similar in structure.

Elements common across RFPs include an overview of the business issue, a description of the product and/or services required, detailed business requirements, other information, proposal format, due date, selection criteria, timeline, questions, how to respond, and point of contact.

RFPs also contain information specific to the NG9-1-1 authority, the project, or the Procurement Team. These elements might be specific information on a price breakout, approach suggestions, or any other documents required.

The elements of an RFP are outlined below:

- ▶ **Overview of the Business Issue**—There should be a succinct description of the business issue or problem that is driving this particular purchase. It should be stated in one or two paragraphs and should give suppliers a summary of the project and why it was initiated.
- ▶ **Description of Products or Services**—The RFP should contain a brief but insightful description of the products or services the NG9-1-1 authority needs. These goods or services could be complex and may be difficult to describe in detail. Nevertheless, a good description helps suppliers in developing a targeted and relevant proposal.
- ▶ **Detailed Requirements (SOW)**—In addition to the description of products or services, you must clearly outline the business requirements. Sometimes this section is called the SOW. The SOW can include support requirements, delivery guidelines, design specifications, quality metrics, etc. Its purpose is to give the suppliers details on what is needed for this acquisition so that they can develop with a proposal that meets these requirements. Often, the requirements section constitutes a major portion of the RFP. If the requirements do not accurately reflect the authority's needs, suppliers will not present proposals that address the key issues. As mentioned before, it is always important to collaborate with all the stakeholders to ensure the requirements are accurate and complete.
- ▶ **Other Information Needed for the Proposal**—Sometimes additional information is needed to round out the picture for the offerors. This information usually includes usage metrics, demand projections, current performance information, internal survey results, etc. The key for this section is to provide the right amount the information. Too little might prevent the offerors from formulating a relevant response; too much might be confusing and cause the offerors to propose unnecessary work.
- ▶ **Approach Suggestions**—If the Procurement Team decides that a specific approach to the solution would work better than others, this is the place to suggest it to the industry. However, doing so reduces the diversity and creativity of the proposed solutions. Prescribing very specific approaches can also discourage some companies from bidding at all.
- ▶ **Performance Metrics**—Performance metrics are very valuable for measuring the performance of both the supplier and the solution. Clear and upfront understanding of the performance requirements has multiple benefits for both the NG9-1-1 authority and the industry because it—
 - Sets the authority 's expectations for the system's performance
 - Provides a scale for measuring both system and contractor performance
 - Limits the likelihood of requirement and scope creep
 - Simplifies the verification and validation of the system
 - Helps contractors assess whether they are qualified to perform the work
 - Keeps prices realistic.
- ▶ **Proposal Format**—All RFPs must specify the format and length of the offeror proposals. A highly structured format for proposals makes it easier to compare the responses from suppliers. It also encourages clarity and provides focus in the supplier proposals. Place your requirements in a point-by-point format and encourage suppliers to respond to each point.

The RFP should state the maximum length of the proposal. Enforcing a maximum length helps reduce the time needed to review the proposal and ensures that suppliers keep unnecessary information to a minimum. Specifying page count is not enough—to truly control the length, you must specify minimum font size (for both narrative and graphics elements) and minimum margins. You may also want to specify the maximum length of specific sections of the proposal rather than just a total proposal length

- ▶ **Due Date**—The due date for the supplier proposals should be clearly stated near the beginning of the RFP and in other relevant places.
- ▶ **Selection Criteria**—This section contains essential information for suppliers. It should clearly state the areas and metrics used to evaluate the received proposals. If possible, the RFP should disclose the weighting of each section or topic as a part of the overall proposal score. This weighting is often described as a percentage or in terms of points out of a total possible score.

This section is very important for the industry; it helps suppliers focus their responses on the criteria on which their proposals will be judged. It is also important for the authority because well-documented selection criteria diminish the chances of a protest.

- ▶ **Questions**—Suppliers may request clarification or ask questions about even the most well-written RFPs. Any RFP should clearly specify the mechanism by which suppliers can ask questions. You should set a time period during which supplier questions can be submitted. This time period should not be too close to the deadline for the proposal submissions so suppliers have time to adjust their proposals based on your responses. The contact point for the RFP on the Procurement Team then receives questions from and provides responses in written form to the suppliers. The Procurement Team point of contact must then provide the questions and answers to all suppliers and make them a part of the RFP as an amendment. This can bring additional clarity to the requirements and provide documentation for the project. All such correspondence must be archived in the procurement repository (see Phase I, Step 5).
- ▶ **Timeline**—The timeline should display the RFP creation date, the RFP send date, the time period for questions, the due date for proposals, the selection period, and the projected award date. All this information should be communicated as clearly as possible.
- ▶ **Point of Contact**—The point of contact is the person on the Procurement Team who handles interactions with the industry. This means that all supplier questions and comments about the RFP will be directed to this person. You might want to include a backup point of contact in case the primary point of contact is out of the office or unavailable.
- ▶ **Price Breakdown**—The purpose of this section is to request a breakdown of the price to ensure that proposals can be compared easily. This section is usually included on large projects where pricing is complicated. This section is optional. If you want to require this breakdown, make sure you specify a format to make sure that pricing can be accurately compared.
 - The price breakdown can provide insight into offerors’ business practices. However, requiring a price breakdown might discourage some suppliers.

- ▶ **Other Documents**—Your local guidelines, regulations, and policies might require inclusion of additional documents in the response to the RFP (e.g., diversity certifications, agreements to certain terms and conditions).
- ▶ **How to Respond**—This section includes special instructions on how to respond to the RFP solicitation. It should include information on the address to send the proposal, the submission format (hard copy, electronic, etc.). It should also specify any additional submission requirements and can emphasize the deadline.

3.2.3.9 When to Use an RFQ or an RFP

As a general rule, RFQs should be used when you are purchasing products or services with which you are familiar and that do not require significant changes to your current system. These are “plug-and-play” products, i.e., straightforward upgrades with no compatibility issues anticipated. The evaluation is usually based on price alone.

RFPs should be used when the problem is complex, unclear, or outside the competency of the NG9-1-1 authority. RFPs are helpful when supplier creativity and innovative approaches to problems are needed. It is important to remember that the RFP process can take a significant amount of time to complete and could result in delays to the start of the project. Therefore, it only makes sense to use an RFP when the benefits from obtaining supplier proposals are greater than the extra time required to prepare the RFP and to manage the RFP process. Exhibit 14 presents some of the pros and cons of the two solicitation types.

Exhibit 14—RFPs and RFQs—Pros and Cons

Type	Pros	Cons
RFQ	<ul style="list-style-type: none"> • Can be conducted easily, and the process is much quicker • Is easy to evaluate 	<ul style="list-style-type: none"> • Is suitable only for straightforward, well-understood procurements
RFP	<ul style="list-style-type: none"> • Is the best method available for obtaining the best value for the NG9-1-1 authority • Highlights potential project risks for a complex project • Allows the industry to participate actively and creatively in developing a solid solution • Encourages suppliers to submit organized proposals that can be evaluated using a quantifiable methodology 	<ul style="list-style-type: none"> • Can be extremely time consuming for both the NG9-1-1 authority and suppliers • Might intimidate some suppliers and/or make them perceive a low chance of winning, discouraging them from submitting a proposal • If requirements are not well articulated, can result in poor responses both in technical content and pricing, making evaluation difficult • Can require a lengthy process to accurately assessing suppliers’ responses and might require specialized knowledge

3.2.4 Phase II: Release

At this point, it is assumed that you have developed—

- ▶ An RFQ or an RFP that has a complete and unambiguous SOW.
- ▶ Evaluation criteria for judging the responses to the RFQ or RFP. It is important to understand that changing the evaluation criteria after the industry replies to your solicitation is not advisable because it significantly increases the chances of later protests, damages future relationships with the industry, and might even be illegal.

3.2.4.1 Step 1—Announce the Procurement

Once you are comfortable with the content of the RFP, it is time to broadcast it to the industry.

Posting it to your website, leveraging your existing contact list, and using various forms of media to publicize the RFP's existence are all options to increase exposure.

3.2.4.2 Step 2—Select the Evaluation Team

The next step is to choose an Evaluation Team. This team could be the same as the Procurement Team that prepared the solicitation, or it could be composed of entirely different people. In most cases, the Evaluation Team contains the core group that developed the SOW, augmented with a number of specialists who can understand and evaluate the technical aspects of the proposals.

If you do not have in-house specialists, it is useful to employ consultants to fulfill that role. The right mix of consultants should have a wide understanding of the industry and deep insight into the particular solutions proposed by the industry.

To ensure a fair and transparent process, you must take a few precautionary steps:

- ▶ Hire consultants who are independent and have no vested interest in any of the proposed solutions, specific technologies, or manufacturers.
- ▶ Execute a non-disclosure agreement (NDA) with the consultants that restricts their ability to share information about the review process.
- ▶ Compartmentalize the information available to the consultants (e.g., technical consultants should not be aware of pricing information). This approach limits evaluation criteria cross-contamination.
- ▶ Do not allow consultants to have unsupervised interactions with the offerors. Remember that all contact with the industry must be documented rigorously.
- ▶ Do not allow consultants to negotiate, influence, or derail the procurement process. It is your responsibility to execute the procurement, and therefore you should be in control at all times.

3.2.4.3 Step 3—Interact with the Industry

Once your solicitation has been issued, you should be prepared to answer whatever questions the industry might have. If your solicitation is an RFP, you should expect more questions from the supplier community than in the case of an RFQ. The best way to handle questions depends largely on the number of bidders and the complexity of the solution you are contemplating.

If you anticipate a large number of bidders, you should consider holding a bidders' conference. This is usually a question-and-answer session in which all interested bidders can participate. This type of meeting has many advantages:

- ▶ It is fast and efficient because many suppliers will have the same questions. This reduces the amount of time the Evaluation Team must dedicate to answering RFP-related questions.
- ▶ It creates a brainstorming environment where questions from one supplier trigger further questions from other suppliers, and the issues and complexities of the RFP are explained and understood faster.
- ▶ It allows the Evaluation Team and the NG9-1-1 authority to gauge the interest within the industry for responding to the RFP.
- ▶ It allows the industry to understand who else is interested in bidding and gives them the opportunity to pursue teaming agreements that increase their chances of winning.

The alternative to the bidders' conference is answering the questions individually. You must decide which avenue is better. The bidders' conference has the overhead of the associated cost and logistics, but it is more effective and saves time and money in the long run if enough bidders attend. Answering individual bidders can be a resource drain if there are enough of them. In addition, because of the one-on-one nature of the interaction, there is more chance that some suppliers will misunderstand certain issues in the RFP.

Either way you choose to pursue this phase of the procurement, make sure that you keep the process on track. The timeline for answering questions should be clearly specified in the RFP, and you should adhere to it strictly. When this period is over, there should be no more interaction with the industry until the Q&A session in the Evaluation phase.

3.2.5 Phase III: Evaluation

During Evaluation phase of the procurement process, the NG9-1-1 authority determines which proposal offers the best value.

3.2.5.1 Step 1—Prepare

To prepare for the evaluation process, each of the following potential issues must be considered and addressed as required.

Conflict of Interest

Once you have received the proposals, and it is clear which companies are involved in the RFP/RFQ, each member of the Evaluation Team must make sure that he or she does not have a potential conflict of interest. An example of a conflict of interest is a situation in which a state employee or family member owns a business that is competing for a state contract, and that state employee participates in the decision-making process to award that contract. It is important to avoid even the appearance of impropriety in the evaluation process. Disclose potential problems at the earliest possible time and make adjustments to keep the process fair to all competitors. Your awareness of a potential conflict may not arise until you are well into the evaluation process. If there is any question about a potential conflict of interest, notify the Procurement Leader immediately and consult legal counsel. If an individual has a conflict of interest, that

person cannot be a member of the Evaluation Team. Each member of the Evaluation Team must sign a "Non-Conflict of Interest" form. These forms must be signed before any committee members begin their initial evaluation of the RFPs/RFQs. The signed forms become part of the artifacts of the procurement stored in the repository.

Confidentiality

In certain cases, documents received as part of an RFP/RFQ must be protected from public view. If such documents are present, each member of the Evaluation Team will be asked to sign a "Confidentiality Statement" form that sets out their responsibility to maintain the confidentiality of these documents during and after the RFP/RFQ evaluation process.

Familiarity with the Project

If the Evaluation Team is composed of individuals who were not involved with drafting the RFP/RFQ, it is very important that all Evaluation Team members read the RFP/RFQ and have a clear understanding of the requirements and evaluation criteria before attempting to evaluate proposals.

Responsiveness

The Procurement Leader must review all proposals for responsiveness before distributing them to the Evaluation Team. A "responsive" proposal conforms in all material respects to the RFP/RFQ. A proposal may be deemed "non-responsive" if any of the required information is not provided, the submitted price is found to be excessive or inadequate as measured by criteria stated in the RFP/RFQ, or the proposal is clearly not within the scope of the project described and required in the RFP/RFQ. Extreme care should be used when making this decision because of the time and expense that a potential bidder has put into submitting a proposal. If a proposal is determined to be "non-responsive," provide a written justification for this conclusion.

Proposals deemed non-responsive cannot be considered for award; therefore, they should not be forwarded to the Evaluation Team.

3.2.5.2 Step 2—Conduct Review

To conduct a review, each of the following potential issues must be considered and addressed as required.

Initial Meeting

We recommend that the Procurement Leader meet with the Evaluation Team before distributing copies of the received proposals. Discuss the proposal review and scoring process to ensure each team member has a clear understanding of the scoring process and how points are assigned. Provide team members with a copy of each proposal, written instructions on how to conduct the evaluation, and the evaluation worksheets to be used when scoring proposals.

Develop a schedule for the evaluation process based on the tentative schedule laid out in the RFP/RFQ. Remember, the team members need sufficient time to read and evaluate each proposal. Plan head for those members of the team that need to travel to attend meetings and use telephone or video conferencing whenever practical.

There are two ways for the Evaluation Team to evaluate proposals and document the results:

1. Each member evaluates each proposal and records his or her ratings on an evaluation worksheet. The Procurement Leader compiles the resulting evaluations from all team members, resolves any factual oversights, makes sure the resulting team member notes are legible, and produces a summary that constitutes the Evaluation Team's recommendation.
2. Each member on the Evaluation Team evaluates each proposal and makes notes about his or her observations and tentative rating on an evaluation scoresheet. The team then meets as a group to review the individual proposals, arrives at a group consensus on the associated ratings, and produces a summary that constitutes the team's recommendation.

Either approach is workable, but the NG9-1-1 authority (or the Procurement Leader) should decide which approach to take before beginning the evaluation process.

NOTE: In some cases, the Procurement Leader might decide that the Evaluation Team should not know the price until after it has compiled its first scoring. In general, this approach avoids the possibility of the prices influencing the scoring when non-price criteria are being considered.

Evaluation Worksheet

An evaluation worksheet is used to guide the Evaluation Team members in their review and evaluation of proposals. It provides a list of individual evaluation criteria and the rating scale to be used. The evaluation worksheet does not include pricing. The resulting evaluation framework is very important because it—

- ▶ Provides a means for all Evaluation Team members to review and evaluate proposals in a consistent and objective manner
- ▶ Helps the evaluation team discuss differences in their initial review and, for those differences that are based on an incomplete or incorrect reading of the information presented, resolve them
- ▶ Documents the results of the Evaluation Team's work and provides support for the final recommendations.

Any notations made on the evaluation worksheet become public record. Each evaluation worksheet should be completed in full, signed, and dated by the Evaluation Team member.

Rating Scales

Numerical Scoring Systems

The rating scale establishes standards by which points are assigned to proposals and ensures that members of the Evaluation Team evaluate each proposal consistently.

A notional rating scale that uses 4 values (0, 1, 2, and 3) is presented in Exhibit 15 below.

Exhibit 15—Notional RFP/RFQ Rating Scale

Evaluation Criteria	Value	Explanation
Criterion 1	0	Not addressed or response of no value
	1	Limited applicability
	2	Some applicability
	3	Substantial or total applicability
Criterion 2	0	Not addressed or completely non-compliant
	1	Limited compliance
	2	Substantial compliance
	3	Total compliance

A zero value typically constitutes no response or an inability of the supplier to meet the criterion. In contrast, the maximum value should constitute a high standard of meeting the criterion. Each intermediate value should be defined to cover some intermediate condition.

The rating scale needs to be customized for each evaluation criterion. For example, if criteria can be evaluated as only “yes” or “no,” then the rating scale would have only two possible values (i.e., the maximum points or a zero).

Non-numerical Scoring Systems

Non-numerical rating systems (e.g., “Exceeds, Meets, Partially Meets, Does Not Meet” or “Outstanding, Excellent, Good, Satisfactory, Minimally Acceptable, Unacceptable”) are sometimes chosen because evaluation criteria are difficult to categorize or are too uncertain or too subjective to determine a reasonable numerical rating system. If the Procurement Leader has chosen a non-numerical rating system, the decisions of each evaluator must be explained and documented. With a non-numerical rating system, it is necessary, for the sake of fairness to the competitors, that the Evaluation Team member explain in writing how they arrived at the ratings. The explanation must be rational and consistently applied from competitor to competitor. The Procurement Leader will advise Evaluation Team members on how to exercise independent judgment but will also make sure that the written description of how the offers were ranked is rational, understandable, consistent with the team’s ratings, and is not in conflict with the terms or requirements of the RFP/RFQ. The Procurement Leader should not write or modify the team members’ explanation on their behalf; it must be in their own words.

Communications with Offerors

The Evaluation Team members must discuss this procurement only within the activities of the Procurement Team. If the Procurement Leader has arranged communication with the offerors, it

should be done while the Evaluation Team is in session so all members can benefit from the communication at the same time. It is not appropriate for any of the team members to have direct communication with any of the bidders outside the formal in-session communications arranged by the Procurement Leader. Any attempt by one of the offerors to have direct or indirect communication with the Evaluation Team members outside the formal framework should be avoided and reported to the Procurement Leader.

Independent Judgment

In evaluating proposals, Evaluation Team members must exercise “independent judgment.” They have been entrusted with an essential part of an important public decision, and they must exercise their judgment in a manner that is not dependent on anyone else’s opinions or wishes.

Team members can seek to increase their knowledge before awarding points by asking questions and seeking appropriate information. Ensure, however, that they do not allow their actions to be influenced by another person’s wishes (i.e., a desire that more points be awarded to a particular offeror).

It is possible that team members will hear from other persons not on the Evaluation Team (even if they do not want to) about how they should be awarding points to this proposal. For the most part, these contacts by others will not rise to the level of serious concern unless the Evaluation Team members feel their independence is being compromised in some manner. The Evaluation Team members should report to the Procurement Leader any attempts by others to improperly influence the process.

The exercise of independent judgment applies not only to possible influences from outside the Evaluation Team, but also to influences from within the team. Debate, even passionate debate, about how well a proposal meets the evaluation criteria is normal and acceptable within the team. As independent evaluators, team members may be swayed by debate in making their judgment about how many points they award, and that is fine. However, evaluators may not act in a concerted way to either favor or disfavor a particular proposal or group of proposals because the evaluation would not be based on the independent judgment of the individual evaluators.

Evaluation of Proposals

We recommend that Evaluation Team members read each proposal twice—the first time for understanding, without evaluating. Then, review and evaluate each proposal to measure the quality and degree of compliance with the evaluation criteria. Make notes and give tentative ratings on the evaluation score sheet. Remember, these forms become public documents after the contract award.

Team members should contact the Procurement Leader if they feel a proposal does not comply with a mandatory requirement (such as a minimum number of years of experience or a required license, etc.) or if they have questions about the scoring process.

Members of the Evaluation Team need to review and evaluate each proposal individually, without discussing their evaluation with other team members. They should not communicate,

either before or after the evaluation, with any of the suppliers who submitted a proposal and should notify the Procurement Leader if a supplier attempts to contact them.

Comparison of Offers

Proposals should not be compared directly with one another to select the best one because the comparison cannot be done objectively across a number of proposals. While a certain amount of comparison naturally occurs during the evaluation process, proposals must be evaluated or scored using the criteria set out in the RFP/RFQ. In addition, evaluation committee members should record brief comments that provide insight on why they awarded points or failed to award points based on RFP/RFQ evaluation criteria for a particular item.

Consolidation of Evaluation Scores

After all Evaluation Team members have completed the evaluation process, the team can meet as a group to discuss the proposals and identify and make clarifications. If aspects of a proposal need to be clarified, the Procurement Leader or the team may communicate with an offeror to clarify uncertainties or eliminate confusion. This communication may not result in a material or substantial change to the proposal, but evaluation team members may modify their scores during the discussion/clarification period. The individual scores are then read and a total of the combined scores calculated.

If any scores appear unusual, the Procurement Leader should ask the evaluator to explain his or her scores, or reconsider if an error seems apparent. Evaluators should always have a reasonable, rational, and consistent basis for their scores because they might be required to explain the scores in the event of a protest.

Discussions with Offerors

After the initial evaluation, offerors of proposals in contention for award may be offered the opportunity to discuss their proposals with the Evaluation Team at the discretion of the Procurement Leader. The Procurement Leader may limit discussions to specific sections of the proposals received or specific sections of the RFP/RFQ.

Offerors must be accorded fair and equal treatment with respect to any opportunity for discussion and revision of proposals. The opportunity for confidential discussions, if held, must be extended to all offerors submitting proposals deemed reasonably acceptable for award. Do not use any “auction techniques” that reveal one offeror's price to another and do not disclose any information derived from competing proposals. Any oral modification of a proposal resulting from discussions must be submitted in writing by the offeror.

Best and Final Offer (BAFO)

On occasion, the Evaluation Team may not be satisfied with the proposals or feel that the proposals could be improved. The Evaluation Team may determine that it is in the best interest of the 9-1-1 authority to request best and final offers. The 9-1-1 authority initiates the request for best and final offer; the process is not initiated by an offeror's request for an opportunity to submit a best and final offer. Best and final offers are not necessary when the Evaluation Team is satisfied with the proposals received.

The Evaluation Team should document which offerors will be notified and provided the opportunity to submit best and final offers. Send out the request for best and final offers in a letter stating any specific areas to be covered and the date and time when the best and final offer must be returned. The conditions, terms, or price of the proposal may be altered or otherwise changed if the changes are within the scope of the RFP/RFQ and the instructions contained in the request for best and final offer.

Normally, best and final offers should be submitted only once. However, the Procurement Leader may make a written determination that it is in the 9-1-1 authority's best interest to conduct additional discussions or change the requirements and require another submission of best and final offers. If an offeror does not submit a best and final offer or a notice of withdrawal, the offeror's previous proposal is considered the offeror's best and final offer.

After best and final offers are received, final evaluations are conducted. Best and final offers must be reviewed and scored using the same evaluation criteria published in the RFP/RFQ.

Price Evaluation

Normally, price is considered after the "qualitative" factors have been evaluated. Price does not need to be evaluated by everyone on the Evaluation Team. It is recommended that price be evaluated by at least two people, and discussed with the team.

Convert the price to points for comparison purposes. The proposal with the lowest price receives the maximum points allowed. All other proposals receive a percentage of the points available based on their price relationship to the lowest price proposal. Divide the lowest price proposal received by the price of the proposal being rated, and multiply the results by the maximum points. The result is the awarded points.

This is determined by applying the following formula:

$(\text{Price of Lowest Priced Proposal} / \text{Price of Proposal Being Rated}) \times \text{Maximum Points Available} = \text{Awarded Price Points}$

The points awarded for price are combined with the total points awarded for the technical proposal to determine the successful proposal.

Quality Assurance

Before making the award, the Procurement Leader must ensure the quality control of the evaluation process by checking any mathematic computations and ensuring only those criteria identified were considered. The integrity of the process and procurement system is grounded on the Procurement Leader and Evaluation Team adhering to the procedures and evaluation requirements stated in the RFP/RFQ.

Example: The point total available for price in the RFP is 40 points. The price of the lowest acceptable proposal is \$100,000. Therefore, the lowest proposal price of \$100,000 would be awarded 40 points. The second lowest acceptable proposal submitted a price of \$125,000. The second lowest proposal price of \$125,000 would be awarded 32 points.

$$\frac{\$100,000}{\$125,000} = 0.8 \times 40 = 32$$

Evaluations must not be influenced or based on discrimination due to the race, religion, color, national origin, sex, age, marital status, pregnancy, parenthood, disability, or political affiliation of the offeror.

Selecting “Best Value” Solutions

While some procurement efforts must award to the “lowest bidder” in terms of cost, procurement efforts are increasingly seeking best value when selecting a vendor. Best value allows the evaluation team to consider the entirety of the proposal, instead of a single factor (cost). There are a number of aspects of a proposal that should be considered when determining best value, including—

- ▶ Overall technical solution / compliance with requirements
- ▶ Vendor past performance and experience
- ▶ Total cost of ownership
- ▶ Availability of warranties and maintenance
- ▶ Training and customer support provided / available
- ▶ Environmental and energy efficiency
- ▶ Delivery and performance terms

3.2.6 Phase IV: Negotiation

Once the vendor has been selected, it is time to write the contract. Usually this process requires some level of negotiation—sometimes because the supplier has not quite met all requirements or has offered options in its proposal. There may also be some terms and conditions that need to be clarified. However, there should be no material changes to the information provided in the proposal.

If material changes are requested, especially if they are brought up at the last minute by the supplier, it may be time to go back and re-solicit the RFP. Proposals from suppliers that have no intention of honoring the terms, or that contain unreliable information, are indicators of potential future problems with the supplier. While a supplier may legitimately indicate that a feature will be available at some time in a future release of the product, a feature that is indicated as currently available should not be later designated as a planned feature rather than an actual feature.

A frequent cause of changes in the negotiation phase is problems with how the RFP itself was written. The more effort and thought devoted to the process early on, the fewer problems there will be at the end of the process. Problems that can be avoided include errors of omission and fuzziness, as well as items that were included but were not essential to the desired result. Often, these items can substantially drive up the price.

Excess requirements and unrealistic budget expectations can cause significant changes during negotiations. At this stage, many suppliers try to pare back the requirements to fit their budget. The result is often a final price that, while it meets the budget, delivers a far less substantial product than would have been delivered by limiting the scope of the requirements earlier.

3.2.7 Contract Award

As the procurement process comes to an orderly conclusion, either an award is made or an indication that all bids were rejected occurs. With an award and subsequent contract, the procurement process ends and project execution commences. During the award process the following actions may occur—

Notice of Intent to Award

After the successful proposal is selected, a Notice of Intent to Award is sent to all offerors and any other interested parties. This notice typically contains the following information:

- ▶ Name of the issuing organization
- ▶ Solicitation number and name
- ▶ List all offerors that submitted proposals
- ▶ Name the successful offeror
- ▶ Notice of the right to protest the award in writing to the responsible Procurement Officer within 7 days after the interested party knew or should have known about the award decision
- ▶ Procurement Leader's name and contact information.

The Notice of Intent to Award also provides the successful offeror(s) with notice that they are required to execute a contract with the NG9-1-1 authority and provide any required proof of insurance or bonds within a specified number of days (usually 10 working days) after the notice of award.

Rejection of All Bids and Re-bidding

On occasion, a decision may be made to reject all bids or proposals received. Reasons might include—

- ▶ None of the responses met the specifications.
- ▶ Prices received were not reasonable or exceeded the budgeted amount.
- ▶ Competition was insufficient (e.g., few, if any, competitive bids were received).

The Procurement Leader must provide a written justification whenever a decision is made to reject all bids or proposals. Notify all offerors that responded to the solicitation and explain why all bids or proposals were rejected. The solicitation process may be repeated or canceled altogether.

Repeating the bidding process immediately is acceptable when there are significant changes to the specifications, more suppliers are given the opportunity to bid, or there were mistakes in the original solicitation. In fairness to the offerors whose prices have been revealed to their competitors through the bidding process, a solicitation that was opened but not awarded should not be reissued for at least 3 months. If the solicitation process is repeated sooner, the procurement officer should document the reason.

Request for Public Information

After the Notice of Intent to Award is issued, the proposals and contents of the procurement repository become subject to state open records laws. You can expect to receive requests for copies of proposals and evaluation documents. Remember, information can only be confidential if determined to be so under state or federal law.

Offerors very commonly mark their proposals as “confidential.” Before releasing the proposal to the requestor, contact the firm that submitted the proposal and inform them that you have received a request for public information. If your state has an open records law, information can only be kept confidential if it determined to be so under state or federal law. Then, point out that their whole proposal is marked “Confidential.” Ask them to indicate specifically what information or sections they consider confidential. Requests for public information must be answered promptly, so give the firm a deadline to respond to you.

If the request for public information includes the section that the offeror feels is confidential, seek legal counsel to help determine whether or not that section can be made open or must be kept confidential.

Protests, Appeals, and Lawsuits

Protests, appeals, and lawsuits are a part of procurement life. Most actions are related to procedural issues and usually involve the decision of the Procurement Leader. It is extremely important that the procurement process be followed closely, and the evaluation be conducted properly. Keep good records documenting in detail all decisions made along the way.

3.2.8 Project Execution / Delivery

Although the evaluation and selection process has finished, the solution must be delivered as specified in the contract. While some individuals on the selection team may ultimately be involved in the delivery process, a transfer of information about the successful vendor is made to the project delivery team. The delivery team will be responsible for ensuring the project is implemented according to the schedule and budget.

Administering the contract requires regular review of a vendor’s work performance, resolving any disputes, recommending changes to scope, quality, or schedule as specified in the contract and escalating issues as needed.

A contract concludes when the terms of a contract have been satisfied (e.g., a product or service has been accepted), the period of performance has passed or through termination of the contract

3.3 Recommendations

Recommendations for conducting a procurement process include, but are not limited to—

- ▶ Use an RFI to notify the industry of your project. This allows potential offerors to prepare for the response.
- ▶ Allow enough time for the industry to respond.

- ▶ Avoid requiring brand name equipment in your RFP. Doing so limits competition and solution diversity.
- ▶ Make sure that the performance requirements are in line with the project needs, the 9-1-1 authority's expectations, and the budget. High performance usually carries a high price. The price of a system can increase exponentially relative to its performance.
- ▶ Adapt successful procurement strategies from other NG9-1-1 authorities.

3.4 For Additional Information

You can find additional information related to the procurement process at—

- ▶ Ivy Hooks, Compliance Automation, Inc. “It All Begins with Good Requirements.”
<http://www.dtic.mil/ndia/2001systems/hooks.pdf> and
<http://www.complianceautomation.com/resources.html>
- ▶ Suki Mhay, “Request for... Procurement Processes (RFT RFQ RFP RFI).”
<http://www.negotiations.com/articles/procurement-terms/>

4 Post-Implementation Evaluation Tool

4.1 Preface

The purpose of the Post-Implementation Evaluation (PIE) Tool is to provide NG9-1-1 entities with a guide and a set of best practices for conducting a PIE. The PIE is a valuable tool that will be used to evaluate whether the project objectives were met, determine the effectiveness of the implementation and oversight process, and develop lessons learned for future projects. Exhibit 16 shows the Post-Implementation Evaluation process.

Exhibit 16—Post-Implementation Evaluation Process

STEP 1	STEP 2	STEP 3	STEP 4
<p>Review Baseline Project Objectives</p>	<p>Develop Lessons Learned</p>	<p>Evaluate Project</p>	<p>Continuous Improvement</p>
<ul style="list-style-type: none"> Review project plans, schedule, materials to determine whether project goals met Evaluate on-time/on-budget delivery Identify gaps and bottlenecks with schedules, milestones, and deliverables 	<ul style="list-style-type: none"> Identify change control issue such as changing requirements Identify lessons learned in terms of processes, technology, people, client satisfaction, design, and procurement Include in analysis detail such as identification of impact (detrimental, beneficial, good practice) 	<ul style="list-style-type: none"> Identify project team members, end users, and stakeholders to comment on operational, technical, and contractual areas of project Provide detailed descriptions of project's successes or problems, including stakeholder feedback on areas of effectiveness and need for improvement 	<ul style="list-style-type: none"> Integrate collected and analyzed information into a comprehensive report Present analysis methods and results Add lessons learned to implementation evaluation body of knowledge

4.2 Post-Implementation Review

The PIE is part of the project closeout phase, conducted after delivery of the project. The purpose of the PIE is to evaluate whether the project objectives were met, to determine how effectively the project was run, and to develop lessons learned. The lessons learned will be used to improve future project delivery.

4.2.1 The PIE Team

The PIE team should include a range of people to give a holistic view of the project. This team should include project team members, end users, and stakeholders. They should be able to speak to the operational, technical, and contractual areas of the project.

4.2.2 The PIE

The PIE will be used to measure the proposed (baselined) project against the actual (delivered) project. It is strongly recommended that a third-party, non-biased facilitator conduct the PIE. The different perspectives and expectations of all participants can result in widely differing opinions on the success or failure of the project as well as its participants. There should be a focus on the process rather than individuals and teams. This should minimize finger-pointing and hurt feelings. This needs to be an open process. The PIE should be conducted after the project deliverable has been in operation and the users have had the opportunity to receive training and are familiar with its operations.

The following is a list of tools that can be used to gather information for the PIE report.

- ▶ Lessons Learned Exercise
- ▶ Survey or Questionnaire
- ▶ Gap Analysis
- ▶ Open Discussion.

These tools will be used to focus on five general areas:

- ▶ What went well?
- ▶ What didn't go well?
- ▶ What was outside of your control?
- ▶ What would you do differently?
- ▶ What recommendations would you make?

4.2.3 The PIE Project Materials

As mentioned previously, the purpose of the PIE is to measure the delivered project against proposed project. The following items will need to be reviewed:

- ▶ Project Charter (including goals, objectives and deliverables)
- ▶ Project Schedule
- ▶ Project Cost
- ▶ Project Requirements.

4.2.4 The PIE Time Frame

The PIE should be conducted after the project is operational. All issues should be resolved, training completed, and users should be familiar with the operations before a PIE is conducted. Recommended time frames range from 6 weeks to 6 months after cutover.

4.3 The PIE Output

The report should include the results of the analysis, lessons learned, and recommendations. A broad distribution should be used to ensure the information is shared with organizations that can benefit from the lessons learned. (e.g., APCO, NENA, DOT ITS LL, LLIS.gov repositories, etc.)

4.4 Recommendations

Conduct a lessons learned effort to review the success and challenges associated with the project implementation. Openly share the results with your stakeholders and others within the 9-1-1 community to ensure that other organizations can benefit from the lessons. These lessons often are applicable to any project implementation, and represent a valuable investment in the success of any subsequent project management endeavor.

4.5 For Additional Information

You can find additional information related to post-implementation review at—

- ▶ State of California, Office of Systems Integration, Project Management Office—Post Implementation Evaluation Report Instructions. [http://www.bestpractices.osi.ca.gov/sysacq/documents/PIER%20Instructions_final%20073008%20\(5280\).doc](http://www.bestpractices.osi.ca.gov/sysacq/documents/PIER%20Instructions_final%20073008%20(5280).doc)
- ▶ State of Washington, Information Services Board, Project Management Framework, Closure—Post Implementation Review. <http://isb.wa.gov/tools/pmframework/projectclosure/postimplementation.aspx>
- ▶ State of Washington, Information Services Board, Project Management Framework, PIR Report: <http://isb.wa.gov/tools/pmframework/templates/PIRreport.doc>
- ▶ Washington, Information Services Board, Project Management Framework, PIR Survey. <http://isb.wa.gov/tools/pmframework/templates/PIRsurvey.doc>

You can find additional information related to lessons learned at—

- ▶ ITS Lessons Learned Write-up Guide. <http://www.itslessons.its.dot.gov/its/benecost.nsf/ByLink/LessonDocs>
- ▶ ITS Lessons Learned Repository. <http://www.itslessons.its.dot.gov/>
- ▶ DHS FEMA, Lessons Learned Information Sharing. <https://www.llis.dhs.gov/>
- ▶ State of California, Office of Systems Integration, Project Management Office—Lessons Learned Instructions. [http://www.bestpractices.osi.ca.gov/sysacq/documents/Lessons%20Learned%20Template_Final%20\(5278\).doc](http://www.bestpractices.osi.ca.gov/sysacq/documents/Lessons%20Learned%20Template_Final%20(5278).doc)
- ▶ State of California, Office of Systems Integration, Project Management Office—Lessons Learned Training Presentation. <https://admin.na3.acrobat.com/a819975250/lessonslearned>
- ▶ Donahue, Amy K. and Robert V. Tuohy. “Lessons We Don’t Learn: A Study of the Lessons of Disasters, Why We Repeat Them, and How We Can Learn Them.” *Homeland Security Affairs II*, no. 2 (July 2006) <http://www.hsaj.org/?article=2.2.4>

4.6 Sample Lessons Learned Template

Project Name	Date	Project Team
Objective: Project goals were achieved		
What went well?	What could have been improved?	What was outside of our control?
▶	▶	▶
Objective: All requirements met		
What went well?	What could have been improved?	What was outside of our control?
▶	▶	▶
Objective: Project completed according to schedule		
What went well?	What could have been improved?	What was outside of our control?
▶	▶	▶

Objective: Project completed within budget		
What went well?	What could have been improved?	What was outside of our control?
▶	▶	▶
Objective:		
What went well?	What could have been improved?	What was outside of our control?
▶	▶	▶
Objective:		
What went well?	What could have been improved?	What was outside of our control?
▶	▶	▶
What could have been done differently?		What recommendations would you make for future efforts?
▶		▶

4.7 Lessons Learned Consolidation Template

	Question	Result	Improvement Area
Initiation	▶ How well was the project mission understood by the entire team?	▶	▶
	▶ Where success criteria determined and understood?	▶	▶
	Question	Result	Improvement Area
Planning	▶ Did the project team adhere to the schedule?	▶	▶
	▶ Was the skill set of the team members sufficient?	▶	▶
	▶ Were the requirements complete?	▶	▶
	▶ Were there many requirement changes?	▶	▶
	▶ Were the requirements easy to understand?	▶	▶
	Question	Result	Improvement Area
Execution	▶ Were there many problems that tracked back to the requirements?	▶	▶
	▶ Was the implementation strategy effective and accurate?	▶	▶
	▶ Was the documentation adequate?	▶	▶

	Question	Result	Improvement Area
Monitoring	▶ Did the change control process adequately track changes back to the project?	▶	▶
	▶ Was the process for change understood by the project team?	▶	▶
	Question	Result	Improvement Area
Closeout	▶ Was there an orderly closeout of the project?	▶	▶