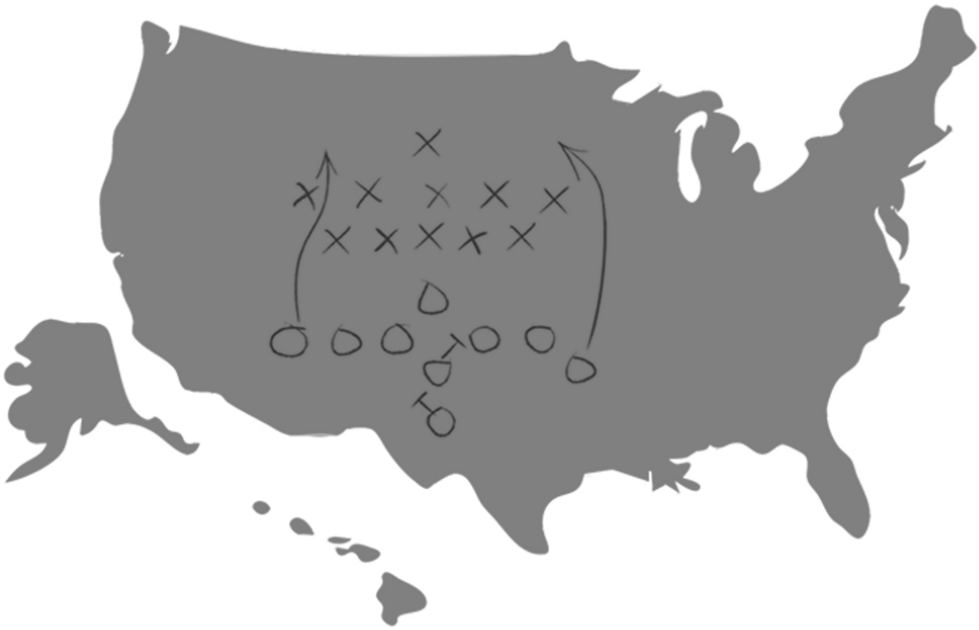
The National 911 Program

Next Generation 911 (NG9-1-1) Interstate Playbook



Implementing State-to-State 9-1-1 Connectivity

Lessons Learned, Challenges, and Opportunities

CHAPTER 1

Washington, DC
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911.gov

About the National 911 Program

The mission of the National 911 Program is to provide federal leadership in supporting and promoting optimal 9-1-1 services. It was created as a point of coordination for activities among 9-1-1 stakeholders and to provide information that can be used to improve the 9-1-1 system. We do that by developing a variety of tools and resources, including tools that can be used to plan and implement Next Generation 9 1-1 (NG9-1-1).

The National 911 Program is housed within the Office of Emergency Medical Services at the National Highway Traffic Safety Administration (NHTSA), which is part of the U.S. Department of Transportation (USDOT).

The data within the NG9-1-1 Interstate Playbook was collected as part of a project that facilitated and monitored discussion, strategies, planning and implementation between the states of Minnesota and North Dakota, with participation by the states of South Dakota and Iowa.

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CHAPTER 1
NEXT GENERATION 9-1-1 INTERSTATE PLAYBOOK

A CALL FOR HELP

The 9-1-1 caller was in Woodlawn Park in Marshall County, Minnesota, when during a picnic, an elderly family member started to experience chest pains. Dialing from a cell phone to report the incident, their call is answered at the Walsh County, North Dakota 9-1-1 Center due to Woodlawn Park, Minnesota being directly across the river from North Dakota. Transfers between 9-1-1 centers in Marshall and Walsh counties are now possible thanks to integrated Emergency Service IP Networks (ESInets) in Minnesota and North Dakota. If this integration were not in place, only the voice call would have been transferred without any additional call data. The telecommunicator would then have needed to solicit further details from the caller or call taker verbally, using valuable time.

Sound familiar? For 9-1-1 centers near state borders, this problem is a daily occurrence and without integration, response delays and errors can occur. Recently though, four states in the north central mid-west have been exploring new technology opportunities to become more interoperable. Identifying long standing challenges, implementing legal agreements, and involving service providers and vendors, several 9-1-1 centers have addressed and successfully overcome some of these longstanding challenges and influences on their mission critical operations. The Next Generation 9-1-1 Interstate Playbook outlines their journey.

LESSONS LEARNED

The interoperability of the Minnesota and North Dakota ESInets has improved response times and outcomes for 9-1-1 calls for service such as the one described above. This Interstate Playbook outlines the planning, discussion, challenges and processes of interconnecting and interoperating state emergency services networks so that what they have learned can benefit the entire 9-1-1 community.

HOW DOES THE INTERSTATE PLAYBOOK HELP YOUR STATE?

The steps and information provided in the Interstate Playbook can help other states and regions throughout the nation avoid some of the pitfalls and problems that often arise when different systems are connected. What has been learned and shared in the Interstate Playbook can assist others to move toward interconnection between states faster and with fewer challenges. The Playbook allows states and regions understand what to expect, how to overcome challenges, and makes recommendations on other available resources.

WANT TO JUMP START NG9-1-1 INTERCONNECTION IN YOUR STATE?

The “plays” outlined in the Interstate Playbook help step the agency, region or state through the myriad of challenges interconnecting neighboring states or regions. The Interstate Playbook recognizes the need for a formal agreement with your partners, identifies who should be involved in the planning and execution of the interoperable connection, suggests how your vendor and service provider should be engaged to assist, notes the importance of the testing process and communication with involved PSAPs, and helps you avoid “gotchas” you might face along the way. All the sections are designed to inform and assist in an easy to digest format of background information you should know, considerations and best practices to follow, key focus points that will aid you in a smooth transition, followed up by support references for additional information and understanding.

WANT TO LEARN MORE?

The Interstate Playbook would not have been possible without the great assistance of state 9-1-1 coordinators and 9-1-1 personnel from Minnesota, North Dakota, South Dakota, and Iowa. For more information on the Interstate Playbook, visit www.911.gov, or contact the National 911 Program at nhtsa.national911@dot.gov.

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Executive Summary

As the states of Iowa, Minnesota, North Dakota, and South Dakota embarked on the implementation of Next Generation 9-1-1 (NG9-1-1) in their respective states, a discussion with the National 911 Program (Program) identified an area where support and coordination from the Program might prove beneficial to their end goal of a fully integrated, multistate system. As an interim step, and prior to deployment of National Emergency Number Association (NENA) i3 standard-based technology and applications, the states wanted to interconnect their NG9-1-1 networks, known within the industry as Emergency Services Internet Protocol Networks (ESInets), but didn't know where to start the planning process or how to achieve implementation. The Program provided the guidance and technical support framework to help the states achieve their collective vision through coordination of discussion, technical subject matter expertise, project planning and implementation testing coordination and process management.

Forging new efforts in the transitional implementation of NG9-1-1—such as the interconnection of statewide systems for improved 9-1-1 service across state borders—is without a roadmap, which is typical when one is among the first to adopt new technologies and adapting operational and administrative models. Consequently, the states needed a process to follow in order to facilitate the transition to NG9-1-1. That need for a process was the genesis for the development of the NG9-1-1 Interstate Playbook (Playbook). The aforementioned states knew they were not alone. Other states in similar stages of NG9-1-1 implementation also would benefit from such a Playbook as more and more of the nation deploys NG9-1-1.

The Playbook is an effort to document, in a simple, understandable and usable format, the experiences and activities of the states as they have worked to interconnect two or more state NG9-1-1 networks. By cataloging the challenges, describing the legal framework, outlining the processes and testing protocols, and reporting on the outcomes of those activities, other states or regions will have a roadmap to follow that will help them clear a path to their own success.

The ultimate goal of NG9-1-1 is to provide an effective, interconnected system of systems for the processing of emergency 9-1-1 calls across the nation. This Playbook describes the methods that Iowa, Minnesota, North Dakota, and South Dakota followed. No doubt there will be many other methods implemented before end-state NG9-1-1 capabilities are realized. However, by recounting the processes these four states used, discussing the issues, identifying the challenges and recommending methods to overcome and deal with these situations, other states or regions may achieve more effective planning and more successful outcomes.

Improving service to the public by achieving efficiencies is the ultimate goal of NG9-1-1. Efficient 9-1-1 systems that enable the seamless interconnection and distribution of calls and caller data regardless of jurisdictional boundaries is the operational goal of this Playbook.

1. Background – Development of the NG9-1-1 Interstate Playbook

The NG9-1-1 Interstate Playbook is an effort to document, in a usable format, the experiences and activities followed to interconnect two or more state NG9-1-1 networks, known within the industry as Emergency Services Internet Protocol Networks (ESInets). By cataloging the challenges, describing the legal framework, outlining the processes and testing protocols, and reporting on the outcomes from those activities, it is hoped that other states or regions will have a roadmap to follow that will help them clear a path to their own success.

It should be noted that this Playbook is describing the transitional environment for interim NG9-1-1 solutions, i.e., ESInet-to-ESInet interconnection using Internet Protocol Selective Routers (IPSR) for the call-routing application. It is not what the industry envisions for "end-state" NG9-1-1. The end state for NG9-1-1, with full National Emergency Number Association (NENA) i3 standard-based technology and applications, is not yet as widely implemented throughout the country. The transitional environment discussed in the Playbook, however, is applicable to technical interfaces that exist today.

The Program often solicits input from state 9-1-1 agencies to determine what Program initiatives might be useful to the 9-1-1 community at large. As the states of Iowa, Minnesota, North Dakota, and South Dakota embarked on the implementation of NG9-1-1 in their respective states, the discussion with the Program identified an area where Program support might prove useful. Forging new efforts in the implementation of NG9-1-1—such as the interconnection of statewide systems for improved 9-1-1 service across state borders—is without a roadmap, which is typical when one is among the first to adopt new technologies and adapting operational and administrative models. Consequently, the states needed a process, or "playbook," to follow in order to facilitate their transition to NG9-1-1.

These four states were at various stages of implementing statewide ESInets and related subsystems, and are employing various solutions in their respective states. But they knew that they needed to interconnect the state systems in order for public safety answering points (PSAPs) to transfer calls between disparate NG9-1-1 implementations. The four participating states undertook a collaborative dialogue to capture the experiences, challenges and issues faced when integrating non-similar statewide systems, and to identify possible solutions to those challenges and issues. That collective dialogue initiated the development of activities that has become the NG9-1-1 Interstate Playbook.

While the Program has facilitated this project by providing a forum for discussion and development, the Playbook is <u>not</u> federally owned or mandated—rather it is a compilation of lessons learned, caveats, mission-critical actions, and recommended methods to achieve interstate connectivity.

It is hoped that through these efforts, other states and 9-1-1 practitioners replicate this process and learn from their shared experiences. Indeed, as NG9-1-1 matures and more states begin their own implementation processes, the experiences of these four pioneering states, which are documented in this Playbook, may help to offer guidance to other states and regional entities

1.1.Playbook Principles

The common definition of a "playbook" is a set of documented strategic tactics or methods[1] that can assist the planning agency, state or region to develop approaches to implementing a solution or addressing an issue. While the term usually is used in relation to a sports reference to contain descriptions of the different offensive and defensive plays or actions that are used by a team, the use of the term "playbook" here is to describe the challenges and approaches to implementing interstate connectivity so that others may learn what to avoid, what to expect, and what they can do to facilitate their own interconnected implementation.

This NG9-1-1 Interstate Playbook describes the plans and approaches used to implement interstate connectivity for other states or regions. It is intended to help users in their pursuit to interconnect state ESInets. The Playbook can be consulted and used at any point in the integration process.

The "plays" included in the Playbook were designed with the following principles in mind:

- Deliberative, thorough, focused planning may be the single most important activity involved in a successful integration.
- Information-sharing and safeguarding environments are built on a set of capabilities and services that provide ways to exchange information for better decision-making, across systems, organizations, jurisdictions, and domains.
- "You don't know what you don't know" often can lead to a costly failure and can result in irreversible damage to trust in the project goals. The continuous engagement of the appropriate stakeholders throughout the entire process will increase the probability of interconnection success.
- Almost every "play" is iterative, in that initial trials often lead to repetition, but at a higher scale of implementation and complexity.

The Playbook was developed by the Program for the 9-1-1 public safety community using the experiences of the four participating states—Iowa, Minnesota, North Dakota, and South Dakota—as the foundational framework and incorporating numerous existing resources and methodologies in the "plays."

- Feedback is always welcome, and the Program is especially interested in hearing from the community of interest about resources that we can add to each of the plays and/or successful implementations of the Playbook. When you discover a resource or an experience you think others can benefit from in their pursuit of state interconnection of ESInets, please share it with the National 911 Program so that others in the 9-1-1 community can take advantage of the collective wisdom and knowledge. Please contact the National 911 Program by email at: NHTSA.National911@dot.gov.

[1] http://www.merriam-webster.com/dictionary/playbook

1.2. Playbook Goal

To achieve Internet Protocol (IP)-to-IP, 9-1-1 call transfers across state boundaries, using multiple network and database vendors, for all types of calls (initial pilot project provided for wireless, but ultimately wireline/text/Voice over IP [VoIP] as well), to include callback number and location information. Establish an interim transitional approach (IPSR-to-IPSR) and a long-term roadmap to adhere to NENA i3[2] conventions with approximate timeframes.

1.3.Playbook Objective

To identify, document, and mitigate the issues, challenges and opportunities of interconnecting state-to-state ESInets in an effort to improve 9-1-1 interoperability, leverage the experiences gained from the states' implementations of NG9-1-1, to assist other states undertaking similar initiatives.

While the ultimate goal of NG9-1-1 is to provide an effective interconnected system of systems for the processing of emergency 9-1-1 calls, there are various approaches that states and regions will take to accomplish this goal. These different approaches will, by necessity, follow a standardized method of interconnection recommended by industry standards and best practices. By describing the processes, issues, challenges and methods to overcome and deal with these situations, other states or regions can achieve more-effective planning for the transition to NG9-1-1.

1.4.Acknowledgements

The National 911 Program wishes to gratefully acknowledge the participation of the states of Iowa, Minnesota, North Dakota, and South Dakota in this effort. The efforts of their identified 9-1-1 professionals—who set a goal, patiently worked through the challenges, coordinated the effort of a several vendors and service providers, and exhibited diligence during endless conference calls— are much appreciated on behalf of the greater 9-1-1 community, which will benefit from the experiences documented in this Playbook.

The participation of support vendors and the 9-1-1 service providers—including CenturyLink™ and its contractor West Safety Services (formerly known as Intrado), Independent Emergency Services (IES), GeoComm, and Comtech TCS (formerly known as TeleCommunication Systems, Inc., or TCS)—also is very much appreciated. Mission Critical Partners, Inc. (MCP) provided project management and subject-matter expertise to the project, and their contributions also are greatly appreciated.

While this document contains the names of companies and agencies that participated in the Playbook development, their inclusion does not represent an endorsement of any kind.

[2] https://www.nena.org/?page=i3_Stage3

2. Policy Considerations

Policies are fundamental to developing adequate controls, defining parameters and establishing responsibilities and commitments for the states, 9-1-1 authorities, and agencies involved.

2.1. Transition Issues

Because of the level of complexity and the opportunities that are available, numerous transition issues must be addressed before deployment of NG9-1-1 can occur, and certainly must be addressed once NG9-1-1 integration with neighboring entities is explored.

2.2. Understanding the Regulatory Environment

If the PSAP, the region or the state are not well familiarized with the regulatory environment under which the 9-1-1 entity operates, it is recommended that you become educated on the regulations affecting 9-1-1. Regulation in the telecommunications industry can be legislated, governed by administrative rules (such as state 9-1-1 rules), and even may be federally regulated, e.g., Federal Communications Commission (FCC) regulation of the wireless industry.

Understanding the rights of the 9-1-1 entity, the limitations of the 9-1-1 service provider, and the extent of your ability to effect changes to the rules and regulations—and to operate effectively within them—will help make the transition to NG9-1-1 smoother.

Some service providers involved in the case study for this Playbook initially expressed regulatory concerns that they may be prevented from transporting 9-1-1 calls across local access and transport area (LATA) boundaries, or from opening up systems that potentially could be used instead of the standard toll network for call processing. In some cases, specialized agreements may be requested or required in order to proceed with the transition. These agreements help to protect the 9-1-1 service provider when they are conducting work in areas in which they have limited or no previous experience.

2.3. Transitioning from Regulated Services to Unregulated Services

The transition of government and service providers from the current regulated environment to the anticipated unregulated—or, at the very least, "less regulated"—environment represents a reality with which 9-1-1 operations will need to grapple. Moreover, the means by which 9-1-1 authorities will manage their communications is changing. 9-1-1 center administrators will need to become much savvier about their own networks, system capabilities, and service levels than ever before. Some advice for 9-1-1 authorities includes:

- Become knowledgeable about 9-1-1 regulations in your state
- Understand the regulatory environment under which your current 9-1-1 service provider operates
- Discuss how regulations in another state may impact your ability to interconnect to that state's system

- Discuss what contracts or agreements might need to be executed in order for your service providers to proceed

2.4. Vendor Role as Part of the Transition Process

The state or PSAP authority's service vendors will play a significant role in the interconnection of ESInets and other NG9-1-1-related services. 9-1-1 service providers and their vendors, database management services, network service providers, computer-aided dispatch (CAD) vendors, customer premises equipment (CPE) vendors, and geographic information system (GIS) data stewards are all potentially significant to the interconnection. The NG9-1-1 service provider should be included early in the discussion and planning process, and clearly will be a significant player in the preparation and testing process. Be sure to seek their expertise and understanding, have them confirm and verify their network and systems that will be involved in the interconnection, and keep their service suppliers and related system operators a part of the process.

Considerations and Best Practices

- Be sure to fully understand federal, state and local regulation as well as the jurisdiction's ability to work within existing rules or to influence changes to rules.
- Formalize agreements between jurisdictions to ensure all parties understand their responsibilities, including defining levels of authority and requirements to each with respect to network health and maintenance.
- Engage vendors in the planning process and solicit their technical expertise. Ensure that existing contracts include specific tasks and resources to enable vendor participation.

Key Focus Points

- Regulatory understanding
- Collaboration between governments/jurisdictions
- Role identification and assignment

Support References

NENA Master Glossary of 9-1-1 Terminology
http://www.nena.org/glossary

Next Generation 911 Cooperative Governance
https://resourcecenter.911.gov/code/ContentDetail.aspx?ContentID=482

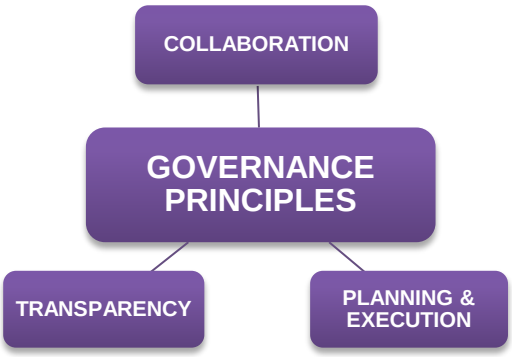
FCC's Communications Security, Reliability and Interoperability Council (CSRIC) Best Practices
https://www.fcc.gov/nors/outage/bestpractice/BestPractice.cfm

National 911 Program NG911 Standards Identification and Review Document
http://911.gov/pdf/NG911-Standards-Identification-Analysis_03222016.pdf

2.5.Governance

Underlying the interconnection implementation is the need for coordination among multiple 9-1-1 authorities. With multiple entities involved, the roles and responsibilities, as well as the intergovernmental arrangements for interoperability, will need to be defined across jurisdictional boundaries and within new partnerships. This is more complicated than the legacy 9-1-1 model of an independent, unilateral style of deployment because of the potential need to determine the responsibilities of each entity, how to exchange voice and location data, and how to address liability and confidentiality protection across jurisdictional boundaries (assuming that liability and confidentiality protection might be different for each jurisdiction).

Collaboration, coupled with a proper governance strategy, will implement the vision and the systems that monitor and record what is occurring, define the steps needed to ensure compliance with agreed-upon policies, and provide for corrective action in situations where the agreements have been ignored or misinterpreted. The three widely accepted governance principles—collaboration, transparency and planning/execution—if applied to the policy and decision-making process, will help ensure that the project achieves the mission; the principles also should drive every decision that is made by the parties. In that way, the decisions will be based on the values of service delivery identified by all parties involved in the agreement.



In order to effectively interconnect NG9-1-1 systems, a high level of coordination must exist. While each state-level agency can and should make decisions and plans that best fit their own needs, planning coordination needs to occur so that the 9-1-1 agencies can work effectively with their partners across jurisdictional boundaries. The “old way” of handshake agreements is not necessarily the most effective approach in an NG9-1-1 environment. To successfully address the changing landscape and to accommodate the benefits of emerging technologies, it will be necessary to review, amend, or establish new methods and processes.

Initially, the parties may not appreciate the need for a formalized governance structure. However, the significance of formulating an appropriate authority structure for the states and the framework around which the participants will plan and make decisions cannot be overstated. This may be the single most important (and often time-consuming) activity undertaken and should be done with transparency and inclusion of all potential participants. The need for a formal, legally reviewed and accepted agreement that outlines the responsibilities and commitments of the parties is essential to healthy ongoing

relationships and functional interconnected systems. More information related to an Interstate Agreement and the elements it should include can be found in Section 2.6 of the Playbook.

Considerations and Best Practices

- Seek strong collaboration for effective policy
- Engage the necessary jurisdictional authorities and clearly define roles to ensure that the project achieves its mission
- Describe the responsibilities of the parties involved in the interconnectivity process
- Identify and describe the change management process to be followed
- Formalize agreements that outline the appropriate authority structure for all concerned.

Key Focus Points

- Encourage collaboration
- Engage all appropriate levels of government
- Define authority and responsibilities and clarify roles

Support References

Next Generation 911 Cooperative Governance
https://resourcecenter.911.gov/code/ContentDetail.aspx?ContentID=482

State Profile Data
https://resourcecenter.911.gov/code/9-1-1ProfileDatabase.aspx

NENA NG911 State-National Balance Policy Statement
www.nena.org/resource/resmgr/ng9-1-1_project/ng9-1-1state-nationalbalance.pdf

Next Generation Partner Program: Transitioning Emergency Communications into the Next Generation, www.nena.org/resource/collection/6D23C86F-A4E3-471A-8A8F-BD256702B1B1/2006_NG_Partner_Program_Report_FINAL.pdf

National 911 Program Initiatives
http://www.911.gov/program_initiatives.html

FCC Task Force on Optimal PSAP Architecture (TFOPA) Final Report
https://apps.fcc.gov/edocs_public/attachmatch/DA-16-179A2.pdf

SAFECOM, Emergency Communications Governance Guide
https://www.dhs.gov/safecom/governance

2.6. Interstate Cooperative Agreements

An Interstate Cooperative Agreement (ICA)—known also as a Memorandum of Understanding (MOU), a Memorandum of Agreement (MOA), a Cooperative Agreement or an Interstate Agreement—is the mechanism used by governing bodies and entities of authority that outlines the roles, authority, contributions and parameters on which the parties to the agreement have concurred as they relate to a particular project. Such an agreement identifies the responsibilities of the parties, any financial obligations or understandings, and demarcation of tasks or duties, and often is used to clarify policies and voting rights of the participants. Informal agreements are fine for modest projects but a complex undertaking such as linking two or more state ESInets demands a more formal approach to how the jurisdictions will integrate their services.

A sample ICA is included in Appendix 3. The sample paragraphs provide examples and guidance only and should *not* be taken literally.

2.7. The Need for an ICA/MOU

Agencies use an ICA/MOU as the formal documentation of how they will work together on an agreed-upon project or meet an agreed-upon objective. The main purpose of such a document is to establish a written understanding of the responsibilities and expectations of each party. The ICA/MOU should be a legal document that is binding and holds the parties responsible to their commitments. Jurisdictions and agencies are familiar with these types of agreements and often will have agreements in place for call-handling processes between counties or PSAP jurisdictions. There is less evidence that this is a common occurrence between states, at least not within the 911 community.

Playbook participants were charting less-traveled territory when working to develop appropriate and acceptable language for an ICA/MOU, especially when working with legal support teams from other states. It is recommended that you:

- Engage legal departments early in the process
- Try to find existing agreements between your states from which you can draw previously agreed-upon language to replicate in your NG9-1-1 ICA/MOU
- Do not underestimate the time it will take legal departments to craft appropriate language for the ICA/MOU to which both states can agree

There are numerous lessons learned that can be useful when undertaking an endeavor of this kind. Moreover, there are tools available to help the jurisdictions through the process. Consult the templates provided, start the process early, get your legal teams involved in the process, have a clear definition of what you want in an agreement, and formalize it in writing.

There are two primary reasons why writing a formal agreement is important. First, it will document everyone's understanding of their respective responsibilities and the process that all parties will have to follow. Second, a formal agreement provides historical information that will be useful as time goes by to codify what has been done, even if the principals currently involved no longer are in their present positions.

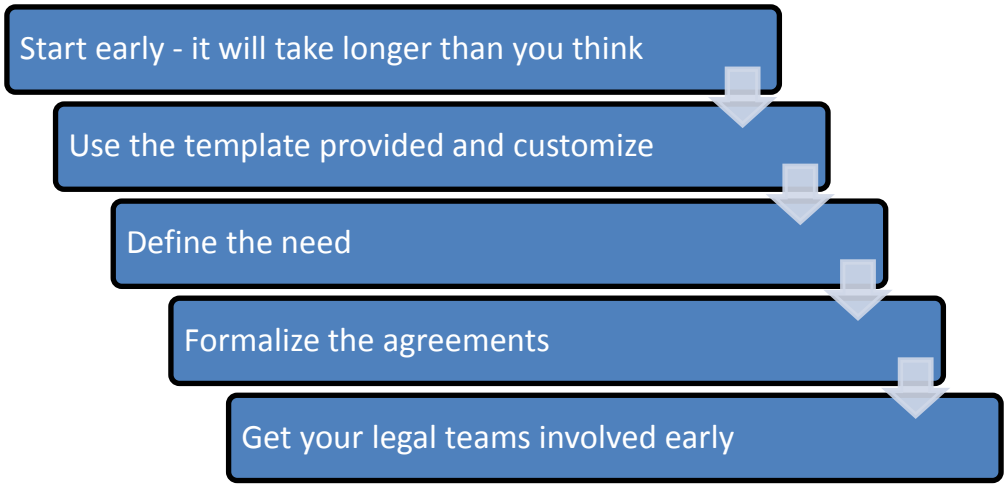


Figure 1: Interstate Agreement Lessons Learned

"Early on we questioned if an agreement document was really necessary. But now, with a formal agreement in place, and having gone through the process of discussing the items to include in the agreement, there is a recognition that both parties have to share information, share activities related to the interconnection and a responsibility to keep the information up to date. We understand more fully the needs for due diligence. The Agreement ensures that the responsibilities are clearly understood."

Jason Horning
(former) NG9-1-1 Project Manager, North Dakota Association of Counties

2.8. What Should an ICA/MOU Include?

Each section of the sample ICA/MOU contained in Appendix 3 poses questions or concepts to consider to help guide the state(s) when writing content for the Agreement. Sample paragraphs also are included for reference or to provide clarification on what might be included. It is important to note, however, that the sample paragraphs are intended for illustration purposes to help the jurisdiction build the specific ICA/MOU that is appropriate for their purposes. The sample language used in this document is drawn from numerous other example Agreements among and between several disciplines. In all likelihood, each state participating in the Agreement will have existing Agreements for other services or purposes they will want to draw from and use.

Further, each state's Agreement language will need to be modified and customized according to the purpose of the Agreement.

While this document does not address every issue that jurisdictions may face when seeking to establish an ICA/MOU, it might be helpful for the jurisdiction to consider all the factors that the jurisdiction might want to address. The ICA/MOU should be customized to the capability or resource for which it is

established, and should consider any unique characteristics of the specific community and participating jurisdictions as appropriate. Some typical sections that should be considered for inclusion in the ICA/MOU are listed in the table below:

Table 1: ICA/MOU Section Considerations

Clarify terminology	Identify authorized representatives
State audit requirements	State data practices considerations
State sovereign immunity conflicts	Commitment of vendor(s) for testing
Entrance criteria for adding new partners to the ICA/MOU	Provisioning, testing and verification process responsibilities
Effective date of the Agreement and any reference to renewal, review, or expiration dates, if desired	Contact information, including but not limited to escalation point of contact for reporting issues 24 x 7 x 365
Change notification process, i.e., how each of the parties will keep others informed of any changes they will be making to their systems that may have impact on other parts of the system or network	Mutual agreement of database reconciliation to ensure database compatibility within participating systems, e.g., pseudo-Automatic Number Identification (P-ANI)
Change management processes that the parties will agree to follow when any changes to systems or networks are implemented	Commitments to provide prompt notification to the other parties regarding service interruptions or problems, regular system maintenance, system security, aligning operational procedures or any other processes that are employed by the jurisdictions
Dispute resolution process, i.e., how issues will be identified, tracked, addressed and escalated if not resolved: o Who will manage or maintain the records, administer the system, or act as system integrator? o What will be the venue for any litigation? Whose laws will govern? o What are the responsibilities/actions of the disputed party?	Cost allocation, i.e., if there are any shared elements, how will costs be shared: o How will the responsibilities of each jurisdiction be identified and clarified? o How will upgrades and ongoing maintenance be funded? o What are the financial obligations of the parties?
Termination/withdrawal of partners, i.e., the conditions, notification criteria, and technical issues under which a jurisdiction may withdraw from the Agreement: o What are the circumstances or conditions for withdrawal? o What notification to the other parties to the Agreement is necessary? o What is the process for exiting the Agreement? Is there any financial implication, either to the exiting jurisdiction or to the remaining parties?	Annual review of agreement(s) o What circumstances will require a change to the Agreement? o What is an appropriate timeline for review? o What will be the process for amending the Agreement?
Assignment: o Can the Agreement be assigned or transferred to another entity? o Is there any approval needed or required?	Mutually agreed-upon policies and procedures will make it much easier to manage situations when things go awry, so invest time into developing those policies and procedures upfront.
Other possible agreements that may be necessary or important to the successful implementation and ongoing operation of the networks: o Intracontinental (cross-border) agreements (if applicable; e.g.US/Canada or US/Mexico) o Tribal agreements (if applicable) o Service level agreements (SLA)	

Considerations and Best Practices

- Ask "Why is this ICA/MOU necessary"?
- For what capability or resource is this ICA/MOU being created?
- What agencies are participating in the ICA/MOU? Include public safety agencies, other governmental bodies, and any private or non-governmental services
- What agreements or parameters are set forth by this ICA/MOU?

Key Focus Points

- Collaborate with transparency and shared vision
- Have a draft of agreed-upon responsibilities for legal partners
- Get legal teams involved early in the process
- Formalize the agreement

Support References

NENA Information Document, NENA-INF-012.2-2015 Inter-Agency Agreements
www.nena.org/resource/resmgr/Standards/NENA-INF-012.2-2015_InterAge.pdf

SAFECOM, Writing Guide for a Memorandum for Understanding (MOU),
https://www.dhs.gov/safecom/governance

2.9.Financial Considerations

Coordinating the implementation of interconnected 9-1-1 service delivery enables 9-1-1 Authorities and PSAP Administrators to share various components of the NG9-1-1 system and system functionality. This interconnected environment provides opportunity for cost sharing and shared services among the 9-1-1 Authorities or other entities/agencies involved (e.g., emergency responders) or other government departments. A more detailed definition of NG9-1-1 is available on the NENA website (https://www.nena.org/resource/resmgr/ng9-1-1_project/whatisng911.pdf). A more complete discussion of funding, cost sharing, cost/benefit analysis and cost factors to be considered when interconnecting state systems can be found in Appendix 5.

One of the most critical factors in any technical and operational endeavor is making sure the agency has sufficient funding to conduct its business. Determining the cost of the project—whether the agency is purchasing new technology/equipment or transitioning to a new network— requires careful planning and many levels of analysis concerning both cost and how to fund the project.

2.10. Identify All Associated Costs

In order to conduct a thorough and comprehensive evaluation of the project's cost, it will be important to prepare a list of all known associated costs. This list should include costs associated with current service providers that may be required through part or all of the transition (both recurring and non-recurring); staff support-system management or administrative costs; technical support costs; financial support costs, such as financial services from other agencies or companies; legal fees for contract review and administration; any managed services contracts; licenses; upgrade costs projected through the

lifecycle of the transition; GIS preparation and integration, ongoing maintenance costs following the transition; equipment co-location costs; consulting services costs; and training costs.

Engineering costs may be incurred by one or potentially all of the system participants, as well as costs related to obtaining necessary test equipment. Personnel costs for administration or testing also should be a consideration, and there may be legal costs related to ICA/MOU development.

As an example, the Playbook participants found a need to dual-load subscriber records for an uncommon but not totally foreign situation in two border PSAPs. The smaller local/regional Incumbent Local Exchange Carrier (ILEC) in one state served subscribers who actually were located in the adjacent state. In order to route their calls appropriately, the telephone records for those subscribers had to be loaded into both states' PSAP databases. Whether the costs related to these dual records are the responsibility of the state or the local jurisdiction really doesn't matter. What does matter is that the additional costs of these dual records have to be considered. In this case, both non-recurring, one-time fees and monthly recurring fees needed to be calculated into the total cost estimate.

Additionally, the determination of demarcation points in the network(s) will be important, both for outlining any shared costs and for determining when the agency's commitment to fund its portion of the network(s) ends. Agreeing to these demarcation points early in the process helps to conduct appropriate, accurate and fair analysis of cost sharing, and informs partners of their level of financial responsibility or contribution.

2.11. Lifecycle Cost Projections

For the purposes of estimating what your anticipated costs might be, and in order to have complete budget data, it is recommended that you project the lifecycle costs through the transition, and if appropriate beyond the transition. A one-, five-, seven- and ten-year lifecycle expectancy is generally considered more than adequate for estimating purposes. This information also is useful for determining the elements you will need to consider in long-range budgeting for the jurisdiction.

Table 2: Lifecycle Cost Projection

Cost Element	Example	Current Cost	Anticipated Lifecycle Cost			
			1-yr.	5-yr.	7-yr.	10-yr.
Recurring costs	9-1-1 service provider cost for services, ALI records					
Non-recurring costs	9-1-1 service provider					
Technical support and/or consultant costs	Additional staff requirements					
Financial support costs	Additional audit costs					
Legal fees	Contract review and administration; contract preparation					
Managed services contracts	Additional services not currently needed					
Licenses	License fees; user fees					

Cost Element	Example	Current Cost	Anticipated Lifecycle Cost			
Upgrades	Ongoing upgrade costs					
GIS	Technology upgrades, database preparation and system integration					
Maintenance	Contracted fees for additional equipment or network					
Equipment co-location costs	Space in other facilities					

Considerations and Best Practices

- Cost of provisioning new service
- Cost of database changes or additions
- Cost of testing support
- Cost of engineering support for inter-vendor design development
- Cost impact to shift from IPSR to i3 call routing
- Cost impact to interoperate between i3 and IPSR platforms
- Cost of inaction

Key Focus Points

- Accurate estimating
- Understanding all cost elements
- Clear focus on end goal
- Seeking cost-sharing opportunities
- Anticipated obsolescence of existing systems and technology
- Shared resources

Support References

For further information on performing a Cost/Benefit Analysis, see Appendix 5.

FCC Task Force on Optimal PSAP Architecture (TFOPA) Final Report
https://apps.fcc.gov/edocs_public/attachmatch/DA-16-179A2.pdf

Blue Ribbon Panel on 911 Funding Report
http://www.911.gov/funding911.html

Funding 9-1-1 Into the Next Generation
https://www.nena.org/general/custom.asp?page=NGPP_911FundingRpt

Four Potential Sustainable Funding Models for NG911
http://www.nasna911.org/resources/Public-Library

3. Planning

One of the initial tasks that an agency, or group of agencies, will need to do is to define the scope and purpose of the project. This will require gathering the stakeholders and capturing in writing the range and span of the project.

3.1. Understand What You Need

It is important that all stakeholders share in the vision for the project and therefore are part of determining its scope. Key stakeholder organizations should be invited to actively participate in defining both what the project is and what the project is not. Clearly defining the extent and scale of the effort, and how the group wants to achieve the goals of the project, will help the agency or region understand the requirements of the participants.

Defining roles and responsibilities of the partners, and the expectations of other agencies involved, will provide clarity and will strengthen the state's ability to achieve project success.

3.2. Understand Where You Are and Where You Are Going

When planning for interconnection between two ESInets, the participating parties must assess where they are now in terms of call-routing methodologies and where they plan to be in the near and long term. As an example, with the participating states, two had deployed statewide ESInets with transitional IPSR call routing. This functionality would be in place for the near term, with both states planning to migrate to an i3 geospatial call-routing methodology in the long term. By establishing an understanding of where they were for the near term, the states were able to agree upon the implementation of interoperability through an IPSR.

To date, the transition to NG9-1-1 has been viewed in three main stages, as identified by the National 911 Program's NG9-1-1 Transition Plan in 2009.[3]

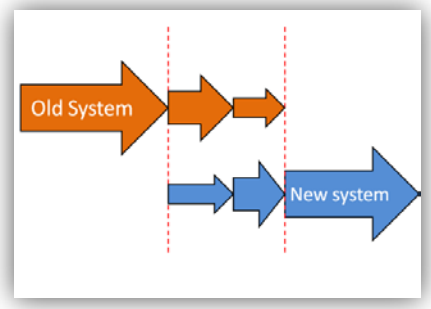
Figure 2: Transitional View of NG9-1-1 Implementation

Legacy – The Legacy stage is characterized as the point in time where 9-1-1 services are provided by the traditional incumbent local exchange carrier (ILEC) with circuit-switched infrastructure and ALI circuits. Planning for NG9-1-1 has yet to occur and technology serving the PSAP provides no advanced feature functionality.

[3] http://ntl.bts.gov/lib/35000/35600/35654/NG911_Transition_PlanFinal.pdf

Foundational - The first migration activity from Legacy systems to NG is considered the Foundational stage. As the name implies, the Foundational stage is where the groundwork and planning for NG911 implementation is initiated. NG911 feasibility studies are performed; governance, operational, and technical planning occurs; data preparation commences; and IP networks may be implemented. NG911 systems are not yet operational and system procurement is either planned or underway.

Transitional – The Transitional stage is the tipping point where services have migrated partially from the legacy environment and the 9-1-1 services are enabled by an IP infrastructure. The NG9-1-1 call-routing services may be transitional IPSR or use i3 geospatial call routing. The ESInet is in place and delivering calls and location data to the PSAPs. At this point, a governance model has been established and a detailed NG9-1-1 roadmap will be developed.



Intermediate - advanced call- and data-delivery interfaces. Business and performance elements are maturing and are reviewed in regular intervals to optimize operations.

End State – The End State is the stage where the PSAPs are served by NG911 standards-based systems, from call origination to call handling. ESInets are interconnected and the call continuum delivers rich data to first responders in the field. The nation's 9-1-1 system is fully interoperable with well-established policies and procedures to support operations. Early adopters of NG9-1-1 technologies may be on their third or fourth generation of core systems.

Considerations and Best Practices

- Know where you are starting from and know where you are going
- Consider a single point person or project manager to lead the effort with appropriate level of accountability
- Engage the identified "champions" for the project to lead the discussion

Key Focus Points

- Identify present state
- Clarify purpose and direction
- Clearly define scope
- State the end goal
- Gain consensus of the partner

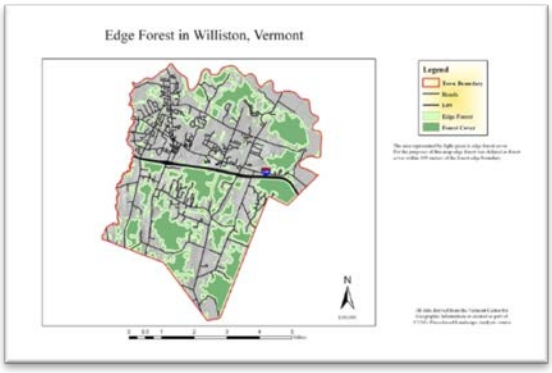
Support References

A Policy Maker Blueprint for Transitioning to NG911
https://www.nena.org/?NGPP_TransPolicy

NG911 Transition Policy Implementation Handbook: A Guide for Identifying and Implementing Policies to Enable NG911,
www.nena.org/resource/resmgr/ngpp/ng911_transition_policy_impl.pdf

3.3.Fundamental GIS Requirements for NG9-1-1

NG9-1-1 requires comprehensive spatial data to perform the location and call-routing functions traditionally performed through database lookup in legacy 9-1-1 systems. A robust GIS encompassing not only the area of responsibility for the PSAP, but also reaching well into the bordering PSAPs, must be built from the disparate programs at each of the jurisdictions served by the PSAP(s). There are measures that should be employed across the GIS enterprises involved in the interconnection of state NG9-1-1 implementations.



The first step in GIS planning for interconnected state ESInets is to conduct a review of the GIS data and to take an inventory of the stakeholders or data stewards involved. It is the responsibility of the PSAP(s) to determine the sources of the spatial data that will drive the NG9-1-1 program, and which may need to be supplied to, and maintained by, the adjacent state's PSAPs.

3.3.1. PSAP GIS Data Supporting 9-1-1

The GIS data to support the implementation of a NG9-1-1 system at every PSAP across the country is available from many different sources. While the minimum essential datasets (MEDs) are available from commercial and government sources, this data may not contain the necessary essential elements of information (EEIs).

At a minimum, NG9-1-1 requires road centerlines with address ranges and boundary files for the PSAP, as well as the response areas for law enforcement, fire/rescue and emergency medical services (EMS). The PSAP must identify the data steward for each of the datasets. The PSAP and the data steward should work together to ensure that, as this data is updated, the PSAP receives the most current data. The data collection process is not a "one-and-done" effort. It is imperative that the data available to the NG9-1-1 system mirrors the real world as accurately as possible. In the case of road centerlines, updates can occur as often as daily, as new subdivisions are platted or large parcels of land are subdivided. If multiple jurisdictions are served by the PSAP, these relationships must be cultivated with the data stewards at every jurisdiction to ensure that all data is kept current.

Furthermore, with the mobile nature of today's 9-1-1 caller—roughly 70 percent of 9-1-1 calls are placed from cellular telephones[4]—it is necessary to maintain similar data for all bordering PSAPs. The technology for locating wireless callers varies by carrier, and the accuracy of the location process depends on the level of sophistication of the carrier equipment, tower locations, customer equipment and many other factors. PSAPs can receive misdirected calls for service from miles within neighboring jurisdictions' borders. It is recommended that PSAPs maintain data ten miles beyond their own boundaries.

[4] https://www.fcc.gov/consumers/guides/911-wireless-services

3.3.2. Regional (Multijurisdictional or Consolidated) or Interstate Implementations

In addition to the requirements for a local implementation, regional or interstate NG9-1-1 programs require a much higher level of coordination. Data from multiple jurisdictions must be aggregated into a single dataset. This effort will require a process called "edge matching," wherein boundary lines are matched to eliminate situations where two or more polygons claim the same geography, and orphaned areas (geography not claimed by any polygon) and road centerlines are adjusted at boundary lines to maintain continuity across jurisdictions.

These regional or interstate implementations can encompass geography from multiple states and now, even more data stewards. Inter-local agreements may be required to bring resolution to conflicting laws or to provide budgetary guidance. These agreements should provide guidance to the data stewards regarding data modifications necessary to permit data aggregation.

Considerations and Best Practices

- Maintain a consistent coordination environment to facilitate more-frequent sharing of data and incident response best practices
- Collaborate to establish program metrics and measurable milestones
- Incentivize county agencies to maintain and share data with the PSAP through a cost-sharing program for select datasets
- Develop a regional shared services and resources approach
- Develop "common GIS data" processes across the service area, based on current NENA standards.

Key Focus Points

- GIS data fields that correspond to the Presence Information Data Format-Location Objects (PIDF-LO) standard
- Location data detailed in the Civic Location Data Exchange Format (CLDXF) standard
- Location information in the NENA-STA-010.2-2016 standard[5]
- PSAP service boundary
- 9-1-1 entity service boundary
- Emergency service number (ESN) boundaries corresponding to local response agencies such as law enforcement, fire/rescue, EMS, special response taskforces, and other response assets.

Support References

NENA Information Document, NENA-INF-012.2-2015 Inter-Agency Agreements
http://www.nena.org/?page=InterAgencyAgreemnts

SAFECOM, Writing Guide for a Memorandum for Understanding (MOU)
https://www.dhs.gov/safecom/governance

[5] *NENA Functional and Interface Standards for Next Generation 9-1-1 Version 1.0 (i3)*

4. Technical Considerations

- When interconnecting two or more state or regional ESInets, technical considerations become critically important. he complexity of technologies used by each state or region, the vendor applications involved, the technology used by independent PSAPs, and the need to engage technical staff of all parties adds to the challenge but also provides opportunities to conduct the emergency services business in new and exciting ways.

4.1.Readiness Assessment

As discussed in Section 3.2, a critical start to the planning effort is to assess where each state is now and where each is going. This has a direct correlation to the technology implementations in each state/region. Assessing the current and near-term call-routing methodology enables the parties to determine the potential compatibility and interoperability roadblocks. For example, sending a PIDF-LO to an IPSR will result in a default route at best. Similarly, an ESInet sending ANI in a Session Initiation Protocol (SIP) header to an i3-compliant call-routing platform to perform a selective router database (SRDB) look-up of an ESN will produce comparable results. As the technical solutions mature, new complexities may be introduced and the interoperability impacts must be addressed in technology-upgrade planning. Technical protocol and interface compatibility must be assessed and plans developed for addressing potential limitations of near-term implementations.

In the technical readiness assessment, the physical interface requirements must be reviewed. Do the proposed network meet-me points have the physical space, bandwidth and port availability required to interconnect systems? If not, does the capability exist to expand? Additionally, HVAC and power considerations should be made when performing these assessments.

Readiness assessments also should consider the availability of the technical resources required to support the project. Time will need to be budgeted for engineering reviews of specifications, test case analysis, provisioning support, and testing support. Software engineering time may be required for similar reviews, as well as potential software development. Identifying these activities and requirements early in the planning stage will assist the project in achieving success.

4.2.Technical Considerations

The following list of technical considerations will assist the state or regional entities in navigating through the important elements of preparing for interconnection implementation. These steps are not exhaustive but rather represent the process overall. States/regions may need to adapt the process for their own needs, budget constraints, or specific applications.

4.2.1. Use Cases and Needs Requirement Development

Evaluate established use cases or define high-level use cases that enumerate possible implementation scenarios.

Use cases frequently are used in software development to describe the different interactions that can take place between a user and a system or application. Because use cases focus on people, system functionality is brought to light early on, which opens up numerous benefits throughout the solution

development process. It also can help to ensure that the implementation teams are addressing the specific need that has been defined.

Defining use cases for what you want to accomplish can be beneficial in several ways. Use cases can help to manage complexity since they focus on one specific usage aspect at a time. Whatever the use case, it will be important to clearly define what it is you are seeking to accomplish in order to manage both the process to achieve it and the technology and parties involved in the solution.

4.2.2. Develop test plan method of procedures (MOP) for each use case

- Identify the involved providers
- Determine all solution providers involved
- IPSR, ALI, network, prime vendors, subcontractor vendors, i3 solution providers, etc.

4.2.3. Evaluate Technical Design Solutions

Call- and data-routing solution design will be one of the necessary steps in the technical process to address the use cases. Understanding how call and data routing occurs within each state's ESInet is essential to being able to design an interconnection solution that is effective. An example might involve multiple ALI providers in one state requiring ALI steering provisioning.

4.2.4. Define system interfaces and operational scenarios

This element is important so that all who are working on the use cases fully comprehend the specific design that will be most effective, and are able to identify any potential incompatibilities. Some possible scenarios that may be involved include:

- IPSR-to-IPSR system design
- Legacy IPSR-to-NENA i3 system design
- NENA i3-to-NENA i3 system design

Where disparate vendors are coming together to provide interconnection, it is critical that the vendors share, evaluate and discuss the proposed interface specification. The project cannot simply rely on agreeing to a set of standards, as the interpretation of those standards by individual vendors may vary, which could have a detrimental effect on the success of the interconnection. Assessment of the specification, combined with interactive dialogue on the different perspective, is a healthy means to agree upon a common specification.

4.2.5. Project Plan and Budget

The project plan and project budget should account for potential software development by one or more vendors.

Once software is developed to the specification, the vendors should conduct lab testing to verify the respective software is performing as designed. Additional software revisions and subsequent lab testing may be required to address any anomalies in lab testing.

4.2.6. Prepared Detailed Network and Call-Flow Process Diagrams

Identifying call flow for each use case for each of the solution designs will be helpful for all parties to understand the nuances of the systems involved, and may help to discover issues before they become problems.

4.2.7. Diversity/Redundancy/Single Points of Failure

Any opportunity to improve diversity of service, redundancy, or reliability should be considered. In addition, an attempt to identify any single points of failure also should be considered. The detailed call-flow diagrams mentioned above will help to identify any potential single points of failure.

4.2.8. Other Interconnection Considerations

A series of other interconnection considerations include:

- Co-location of equipment, e.g., customer edge routers, firewalls, session border controllers (SBCs), data center space and environmental requirements
- Historical CPE management information system (MIS) data available for logging metrics on call transfers across state borders
- Network operations center (NOC) to NOC
- Network performance monitoring
- Alarm severity levels should be established and audited
- Application layer monitoring
- Trouble-ticketing process
- Outage notification process
- Issue-resolution process
- After-action trouble ticket report process
- Escalation process
- Security monitoring
- Determine sizing for anticipated end-state IP connectivity needs
- Determine circuit provisioning and data provisioning (as necessary)
- Emergency services query key (ESQK)/emergency services routing key (ESRK) loading and reconciliation process (as necessary)
- Network provisioning, e.g., closed user group (CUG) pinhole provisioning[6]
- Location information server (LIS) and uniform resource identifier (URI) provisioning
- Circuit identification (ID) provisioning within monitoring systems

4.2.9. Service Level Agreements

A service level agreement (SLA) is a contract between a service provider/vendor and the jurisdiction that defines the level of service expected from the service provider/vendor, how the vendor will meet that level of service, and the penalty for non-compliance. SLAs are output-based in that their purpose is specifically to define what services the jurisdiction will receive. The need for SLAs should be considered.

[6] *The process of opening limited access to authorized users or systems through provisioning of a firewall and associated security systems*

4.2.10. Minimum Network Requirements

Agreements should be made between vendors regarding minimum network requirements. Areas of potential consideration include:

- Quality of service (QoS) marking
- Mean opinion score (MOS)
- Jitter
- Latency
- Guaranteed throughput
- Encryption
- Other

Business changes in any industry can impact schedules, personnel, timelines, agreements and technological applications, and NG9-1-1 is no exception. How to deal with issues of business upheaval affecting other organizations partway through your project may present a harsh and startling reality. Company name changes, takeovers or purchase by other companies can affect contracts. Make sure that the assignment of duties and responsibilities is a requirement in your agreements, in order to protect your requirements and preserve the time schedule.

Concerns of legacy service providers may be raised related to 9-1-1 traffic crossing LATA boundaries, and the issue of whether such transport is allowed by current regulatory parameters may threaten to delay your project.

Considerations and Best Practices

- Solution design roadmap and recognition of how it may or may not align with neighboring states
- Policy routing rules functionality enabled by the i3 operating environment – opportunities may exist to better serve cross-border events.
- Cost impact to enable functionality
- Ensure that the solution design and cooperative agreement enable future interoperability needs, such as text, multimedia messaging service (MMS), and additional data, without a wholesale replacement.

Key Focus Points

- Assess each state's readiness
- Develop needs requirements
- Identify key stakeholders and appropriate technical advisors
- Evaluate technical design solutions for optimal functionality

Support References

NENA Security for NG9-1-1 Standard (NG-SEC), February 6, 2010, pg. 11.
www.nena.org/resource/resmgr/Standards/NENA_75-001.1_NG-Security_20.pdf

Framework for Improving Critical Infrastructure Cybersecurity, Version 1.0, National Institute of Standards and Technology, February 12, 2014. http://www.nist.gov/cyberframework/upload/cybersecurity-framework-021214.pdf

4.3.System Security Consideration

Critical infrastructure is defined in the National Institute of Standards and Technology (NIST) Cybersecurity Framework document as "systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters." Due to the increasing pressures from external and internal threats, organizations responsible for critical infrastructure such as state 9-1-1 ESInets and PSAP communications networks need to have a consistent and iterative approach to identifying, assessing, and managing vulnerabilities and security risks. This consideration is necessary regardless of an organization's size, threat exposure, or security sophistication today, and becomes increasingly critical as formerly closed 9-1-1 systems begin to use elements of the public network for call and data transport.[7]

Assessing what is best for your state is only part of the consideration. What your neighboring states do to manage vulnerabilities also will impact you. Consequently, development of a security plan for ensuring that each interconnected state is performing due diligence and following accepted best practices in this area is essential to the health and reliability of the systems.

The NENA Security for Next Generation 9-1-1 Standard[8] provides a basis for evaluating and assessing security levels and risk. The standard identifies the basic requirements, standards, procedures, and practices for achieving the minimum level of security applicable to NG9-1-1 entities. This standard should be consulted and used to audit each interconnecting state's level of risk, and to establish an understanding by each state of the security practices that will be necessary for them to follow. A review of each state's security policy is an important step in assessing risk. If no such policy exists, the state should consider the creation of a robust security policy.

4.3.1. Security Policy

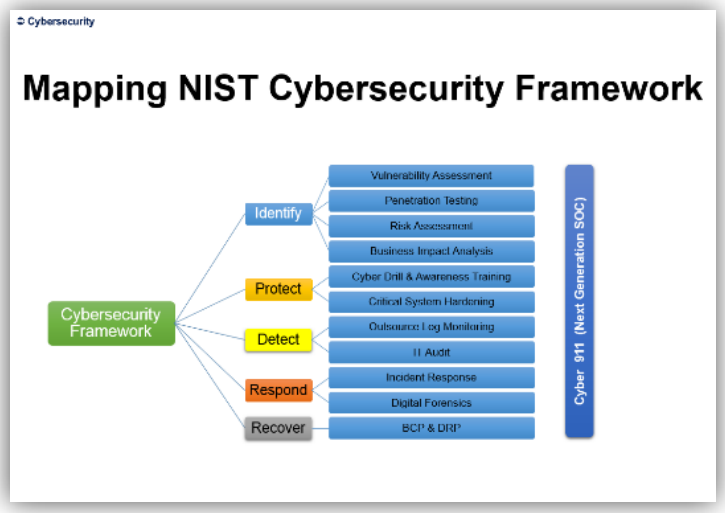
The creation of a security policy is the first step in any effective attempt at implementing a security program. A security policy is a clearly documented statement of organizational goals and intentions for security, and the commitment to security that the state embraces. When entities implement security measures without a security policy, it can result in ineffective or unfocused security controls and ultimately leads to more vulnerability. A security policy should facilitate an environment of secure functionality and document the state's commitment to security practices.

[7] *Framework for Improving Critical Infrastructure Cybersecurity, Version 1.0, National Institute of Standards and Technology, February 12, 2014.* *http://www.nist.gov/cyberframework/upload/cybersecurity-framework-021214.pdf*

[8] *NENA Security for Next Generation 9-1-1 Standard (NG-SEC), February 6, 2010, pg. 11.* https://www.nena.org/?page=NG911_Security

4.3.2. Security Plan

Each state is encouraged to develop a security policy and a subsequent security plan for the interconnection of its ESInet. If a security plan already exists in the state, it should be reviewed for modifications due to the interconnection with another state's ESInet. Best practices noted in the NIST Cybersecurity Framework[9] include the following functions in the development of an effective security plan:



- **Identify**
  - Risk
  - Vulnerabilities
  - Threats
- **Protect**
  - Mitigation Policy
    - Levels of authority/approval to initiate procedures
  - Access (Physical and Virtual)
  - Cybersecurity Checklist[10]
- **Detect**
  - Monitoring
  - Detection Process
- **Respond**
  - Continuity of Operations Plan (COOP)
  - Communications
    - Media handling
- **Recover**

It is recommended that the NG9-1-1 entity responsible for the network shall identify and classify network segments (e.g., call-taker networks, CAD networks, vendor partner networks, etc.) based on its business and technical functions, so that the appropriate levels of protection can be configured for each segment. All boundaries or points in ingress and egress shall be clearly defined for every network. These may include external network connections, servers, or other points of contact with other networks.

Considerations and Best Practices

- Establish regular assessments of security risks and vulnerabilities on your ESInet, and work with neighboring states to evaluate risks at interconnection points

[9] *Framework for Improving Critical Infrastructure Cybersecurity, Version 1.0, National Institute of Standards and Technology, February 12, 2014.* http://www.nist.gov/cyberframework/

- Develop an effective security policy. Consult standards and best practices resources for increased awareness and support
- Develop an effective security plan that includes facilitation of notification to others interconnecting to your network

Key Focus Points

- Effective security policies and plans
- Appropriate standards-based Border Control Functions (BCF)
- Annual review of security policies, practices and systems
- Collaboration with neighboring state entities

Support References

FCC CSRIC IV, Working Group 4 (WG4) Final Report, March 18, 2015
https://transition.fcc.gov/pshs/advisory/csric4/CSRIC_IV_WG4_Final_Report_031815.pdf

FCC Task Force on Optimal PSAP Architecture (TFOPA) Final Report, Appendix 2, Working Group 1 (WG1), December 10, 2015.
https://apps.fcc.gov/edocs_public/attachmatch/DA-16-179A2.pdf

Framework for Improving Critical Infrastructure Cybersecurity, Version 1.0, National Institute of Standards and Technology, February 12, 2014.
http://www.nist.gov/cyberframework/upload/cybersecurity-framework-021214.pdf

4.4. Testing

When changes or enhancements are made to a technical system or network, system testing is necessary to ensure that the changes are implemented in the manner that is expected. System testing of a new or changed service, in any environment, is important, but in a 9-1-1 environment it is essential. Testing will establish confidence in the systems, will help to identify anomalies, will allow for correction and mitigation prior to live traffic, and will prepare staff for operating in a live environment. The state or region and the PSAP have joint responsibility to ensure that the 9-1-1 system has not been negatively impacted by any modifications or new connectivity.

The call testing between the Minnesota and North Dakota border counties was the culmination of provisioning the wireless call-transfer capability within the IPSR application, provisioning the CUGs in the multiprotocol label switching (MPLS) network, and programming ALI steering. Together, these activities enabled the voice and ALI data delivery between state ESInets. The importance of this testing was to ensure that the systems performed as intended but, most importantly, ensuring that there are no delays when transferring emergency calls and dispatching emergency services.

4.4.1. Pre-Test Preparation

In preparation for testing, thorough and constant communication and coordination between the state 9-1-1 Authorities and the PSAPs involved is paramount. It is important that a specific person from each responsible state or regional entity be assigned to the project to assist with the coordination and testing of the counties in their respective state/region. The testing coordinator should be responsible for developing the test plan and test schedule, drafting communications, guiding the PSAPs in their

preparation for the test, working with the 9-1-1 service provider(s), and conducting the test(s). The testing coordinator should provide clear and consistent communications to the PSAPs about the testing goal(s).

4.4.2. Test Plan

A testing plan, schedule, and any relevant information should be developed or gathered with the assistance of the state/region and sent to the PSAPs. See Appendix 8 (Sample PSAP Test Notification Message) for a communique example. The test plan should include the intent of the test to ensure that the 9-1-1 call is transferred correctly and that the terminating PSAP receives the same information displayed on its ALI screen as the originating PSAP. The test plan also should include a list of the applicable transfer protocols (in this case it was the star code assignments for each PSAP and a list of the appropriate contacts in each PSAP), the contact information for the State's testing coordinator, a description of how the tests will be conducted, and the appropriate documentation of the testing and the test results. The test plan may need to consider whether special provisioning may be required in the PSAP CPE; for the testing in Minnesota and North Dakota, a consideration was made for provisioning star codes in the PSAP CPE. If provisioning is required, the timeline to accomplish that task should be considered. However, the test coordinator should be prepared to walk PSAPs through the manual process if the provisioning is not accomplished prior to conducting the test. It also should be noted that most border counties may not have mapping of adjacent border counties unless GIS integration has been accomplished in advance of the testing. Please see Section 0 for a discussion of GIS considerations.

4.4.3. Test Schedule

If travel by test personnel is necessary, the test coordinator should be sure to consider the travel time. Shift schedules and staff availability should be evaluated so as to not negatively-affect live 9-1-1 operations.

4.4.4. Security Plan

Equipment that will be needed for the test should be gathered. The states and/or PSAPs will need to obtain a device from each service type and carrier serving in the PSAP's jurisdictions to use for testing. This task may not be as easy as it seems and proved to be a challenge for some of the PSAPs involved in the testing scenarios for the Playbook. For example, when there are small areas of coverage for a wireless carrier in the PSAP's jurisdiction, it can be challenging to find someone who has service with that carrier. PSAP employees, other department or agency personnel, friends/acquaintances of PSAP employees or a local contact/service agency for the carrier involved all may be possible sources for the PSAP to consider. Alternatively, wireless prepaid devices are an affordable solution to simplify the process of acquiring test handsets. Another recommended best practice is for a state to establish a cache of handset equipment for each major service provider to make available on "loan" to a jurisdiction for testing purposes.

4.4.5. Test Documentation

The test documentation should include sections that document time of the test call, telephone numbers of test phones used, displayed information, rebid data display, and a place to make notes or to document anomalies and other items of interest.

The test personnel also may benefit from having a screenshot of the ALI screen for each PSAP to be tested. With this information, the test personnel can better assist the PSAP with locating the information or data on their screen during the testing process. A test documentation spreadsheet to guide the test process and to capture the test results should be prepared. A sample is included in Appendix 9 for your consideration.

It will be helpful to pre-populate as much information into the test documentation as is available prior to conducting the test. This will help speed up the testing process and minimize the inconvenience of testing to the PSAP.

It is important to prepare a comprehensive test plan with specific documentation as to what information the test coordinator should be collecting, particularly if the test coordinator is conducting the test from a remote location via conference call. If possible, it is preferable for the test coordinator to be onsite.

Once the plan has been developed and the information has been gathered, it will be helpful to conduct a briefing for the PSAPs. The briefing should address all of the test information that the tester will be requesting and provide for an opportunity to answer any questions that the PSAPs may have. Information for the PSAPs should include an explanation of what is being tested, how the tests will be conducted, a test plan, the testing documentation, the anticipated end results or expected outcomes of the test, and contact information of the testing authority.

Once these task have been accomplished testing can begin.

4.4.6. Conduct Testing

The test coordinator should:

- Set up a conference bridge
- Share contact information with testing personnel and the PSAP(s)
- Gather test documentation, such as ALI screen for PSAP(s) being tested and test documentation worksheets (See Appendix 9)
- Execute the test plan
- Coordinate provisioning changes per the test plan
- Document results of test cases
- Exhibit caution if persistent issues or anomalies occur. If a pre-determined threshold of issues is experienced, then testing should be postponed so that troubleshooting may be conducted.

4.4.7. Go Live

- Once testing is complete and a review of the test cases is performed, the states/agencies shall determine the success or failure of the testing and determine if it is time to open up the systems for live 9-1-1 traffic.
- Test cases should have pre-determined risk classifications and, once testing is complete, any test case failures and/or anomalies should be assessed to determine whether the failure or anomaly is an aberration or systemic.

Determinants for "go live" include completion of successful testing, completion of the appropriate agreements, satisfaction of any anomalies noted during testing, and completion of any desired GIS modifications.

4.4.8. Post Test

The test coordinator should complete the test documentation to include any follow-up items that need to be considered. A well-documented test summary will assist the state in preparation for additional test conditions and situations.

The test coordinator also should be responsible for following up on any anomalies or concerns noted in the testing process. Determination of whether trouble-reporting procedures will change post interconnection should be reviewed and amended if appropriate.

Considerations and Best Practices

- Test Pre-Planning
  - Assign a test coordinator
  - Develop the Test Plan (See Appendix 9)
    - Determine the functionality that is to be tested
    - Determine the wireless carriers that are involved
    - Determine if GIS modifications or system provisioning are required prior to the transition process
  - Gather necessary information from the PSAP
  - Provision star codes as appropriate at the PSAP

- Test Cases
  - Test cases should document pertinent elements of the test, such as expected outcomes, key contributors, exceptions and other data. An example test case template may be seen in Appendix 9

- Test Plan
  - Document all possible interconnection test scenarios
  - Allow for necessary documentation for each wireless carrier serving in the PSAP's jurisdictions
  - Conduct a briefing call with PSAPs

- Test Schedule
  - Timing of testing should be coordinated with the PSAP authority
  - In larger PSAPs, additional staffing may be required during test periods
  - Travel time from PSAP to PSAP should be considered

- Test Equipment/Documentation/Information Procurement
  - Assist with wireless handset procurement if appropriate
  - Secure a conference bridge

- Obtain ALI screen reference documentation
- Provide PSAP and test coordination contact information
- Understand PSAP configuration for manual or automatic rebid

- Testing Consideration
  - Wireless test call may be presented to the PSAP initially as Wireless Phase 1 (WPH1) but may automatically update to Wireless Phase 2 (WPH2), or a manual rebid may be necessary
  - Test personnel should be cognizant of PSAP needs and the potential necessity to halt or delay testing if higher-priority events occur in the PSAP, making staff unavailable during the scheduled test time. Ensuring that there are no major incidents active in either county involved in the testing, such as a major storm, SWAT activation, etc., will be necessary before proceeding with the test.

Key Focus Points

- ➢ Planning and preparation will keep testing running smoothly and produce the intended results.
- ➢ Communication, follow-up and documentation are key to a successful test.

Support References

- See Appendix 8 for Sample PSAP Communique
- See Appendix 9 for Sample Test Plan and Test Documentation
- See Appendix 10 for the Interconnection Testing Checklist
- See Section 0 for GIS Considerations

5. "After Care" – After Implementation Follow-up, On-Going Activities and Other Considerations

No project is ever really complete. The project just transitions from an initial building-and-implementation stage to the ongoing "care and feeding" of the new system(s). Ongoing administration and maintenance of the NG9-1-1 network and the integration with other states' systems is equally important as building it. Interstate agreements will need to be renewed, maintenance and upgrades to each system will need to be managed and coordinated with other entities, testing of new applications will need to be synchronized, and GIS systems will need to be refreshed and integrated with neighboring systems. The integration of NG9-1-1 ESInets is not a "one-and-done" event. Care will need to be taken to pay attention to system changes made in one network and their impact, or at least the consideration of an impact, on the interconnected network or system. The systems are no longer solely independent of one another.

A positive and reliable working relationship with the support staff of the other entity, state or region will be essential. Regular and periodic communication between support staffs is encouraged. This might take the form of a monthly check-in telephone communication between technical staff members and/or

email exchanges just to see how things are going, or if any issues/anomalies have been experienced. An annual meeting between state coordinators and technical staff might be useful just to review procedures or to renew the commitment to keeping each other informed, to review the ICA requirements and responsibilities of the parties, or to share experiences and address questions

5.1.Network Audit

An annual audit of network elements also should be considered. Has the system(s) changed in anyway over the past year? Are there new applications implemented? Is there additional technology employed that should be noted in the network schematic? The service providers may need to be involved in the audit to provide the entities appropriate information to be documented. The usefulness of an audit can assist the state/region/PSAP in trouble shooting and identifying who needs to be involved in the resolution of an issue or who needs to be notified when a change or addition of technology is warranted.

5.2.GIS Audit

Annually, an audit of GIS spatial information should be conducted. Areas to include in the review at a minimum are: changes to data steward contact information; review of the update process for function and thoroughness; review of edge-match boundary files; any changes in service area jurisdiction for response services (law enforcement, fire/rescue; EMS).

5.3.ANI Database Audit

If special arrangements are required, an annual audit of databases such as ANI and P-ANI information should be considered to ensure that the special arrangement are still functioning as designed.

5.4.ICA Annual Review

As part of the requirements specified in the ICA, an annual review should be conducted. The review should consider all of the requirements listed to ensure that the process is functional, responsibilities are well defined and understood, and commitments to the agreed-upon requirements are accepted and adopted into processes. This annual check among the entities to the ICA helps to renew commitments and refresh everyone's understanding of their responsibilities.

5.5.Other Considerations

There may be unique or special circumstances that can be addressed or resolved in the NG9-1-1 environment. One example of how Minnesota and North Dakota resolved a long-standing issue is discussed below.

5.5.1. Unique or Special Circumstances

A small, locally owned telephone company in North Dakota serves customers in both North Dakota and Minnesota. Due to cost constraints, legacy network connectivity, and decisions made years ago, calls for North Dakota-based subscribers are routed to the neighboring Minnesota PSAP. As North Dakota prepares its location database for the county in which theses subscribers reside, the Master Street Address Guide (MSAG) and road centerline information provided for these subscribers will need to be validated against the North Dakota dataset. The subscriber calls then can be routed to the North Dakota

PSAP. Additionally, the local telco's connectivity to the Minnesota legacy network gateways will require provisioning to deliver calls to North Dakota. This solution is simplified today, as both states are served by a common Next Generation Core Services (NGCS) solution provider. Should either state change solution providers, this arrangement will need to be accounted for in the system design through similar interconnectivity of the ESInets, or by having the telco connect to the North Dakota legacy network gateways (LNGs). Both solutions will have an impact on costs for the telco, the NGCS solution provider, and the states involved.

6. Call to Action

Next Generation 9-1-1 implementation is continually maturing and as such, this is the NG9-1-1 Interstate Playbook, "First Edition." Indeed, even within the pioneering four states—Iowa, Minnesota, North Dakota and South Dakota—there will be several more interconnection phases conducted, some of which will involve interconnecting disparate ESInets. These future phases will have different requirements and methods of operation that will contribute to future editions of the Playbook. These challenges will present new opportunities to explore options and provide alternate choices for states and regions to consider.

States and regional jurisdictions can do much to advance NG9-1-1 implementation and interconnectivity between and among neighboring states. If your ESInet is operational, start the process now to interconnect to neighboring regional or state ESInet systems. These four states have started the process and the tools to accomplish it are within the pages of this Playbook—now it's up to you. Put these recommendations into action so that the 9-1-1 community can start to realize the vision and benefits of a network of networks.

Interconnecting more states to each other begins to weave the mesh of NG9-1-1 capabilities wider and with more functionality than has been enjoyed previously, but it is only the beginning. You can help write the rest of the story.

The National 911 Program will continue to monitor the efforts of these four states and the entire 9-1-1 industry at large. The Program is committed to documenting the collective experience for the benefit of all states, regions and 9-1-1 operations throughout the nation, in order to accelerate the implementation and interconnection of NG9-1-1 services.

7. Appendices

APPENDIX 1 — ACRONYM LIST

A list of acronyms used throughout this report is provided in the table below.

ACRONYM	DEFINITION
ALI	Automatic Location Identification
APCO	Association of Public-Safety Communications Officials, International
ATIS	Alliance for Telecommunications Industry Solutions
BCF	Border Control Function
BP	Best Practices
CAD	Computer-Aided Dispatch
CALEA	Commission for Accreditation for Law Enforcement Agencies
CLDXF	Civic Location Data Exchange Format
CLU	Closed User Groups
CPE	Customer Premises Equipment
ECRF	Emergency Call Routing Function
EEI	Essential Elements of Information
EIDD	Emergency Incident Data Document
EMS	Emergency Medical Service(s)
ESInet	Emergency Services Internet Protocol Network(s)
ESN	Emergency Services Number
ESRP	Emergency Services Routing Proxy
FCC	Federal Communications Commission
GIS	Geographic Information System
i3	Detailed Functional and Interface Standards for the NENA i3 Solution – Stage 3
ICA	Interstate Cooperative Agreement
IETF	Internet Engineering Task Force
IP	Internet Protocol
IPSR	Internet Protocol Selective Router
LEC	Local Exchange Carrier
MED	Minimum Essential Datasets
MOA	Memorandum of Agreement
MOP	Method of Procedure
MOU	Memorandum of Understanding
NENA	National Emergency Number Association
NG9-1-1	Next Generation 9-1-1
NGCS	Next Generation Core Services
NIST	National Institute of Standards and Technology
NOC	Network Operations Center
PIDF-LO	Presence Information Data Exchange Format-Location Object
PSAP	Public Safety Answering Point
QoS	Quality of Service
SBC	Session Border Control
SIP	Session Initiated Protocol
SLA	Service Level Agreement(s)

ACRONYM	DEFINITION
SME	Subject-Matter Expertise/Expert
SOP	Standard Operating Procedure(s)
SR	Selective Routing/Router
SRDB	Selective Routing Database
TFOPA	FCC Task Force on Optimal PSAP Architecture
URI	Uniform Resource Identifier

APPENDIX 2 — SUMMARY OF CONSIDERATIONS AND BEST PRACTICE RECOMMENDATIONS

Policy Considerations and Recommended Best Practices

- Become knowledgeable about 9-1-1 regulations in your state.
- Understand the regulatory environment under which your current 9-1-1 service provider operates.
- Discuss how regulations in one state may impact your ability to interconnect to that other state's system.
- Discuss what contracts or agreements might need to be executed in order for your service providers to participate.

- Be sure to fully understand federal, state and local regulation as well as the jurisdiction's ability to work within existing rules or to influence changes to rules.
- Formalize agreements between jurisdictions to ensure all parties understand their responsibilities, including defining levels of authority and requirements to each with respect to network health and maintenance.
- Engage vendors in the planning process and solicit their technical expertise.

Governance Considerations and Recommended Best Practices

- Seek strong collaboration for effective policy.
- Engage the necessary jurisdictional authorities and clearly define roles to ensure that the project achieves its mission.
- Describe the responsibilities of the parties involved in the interconnectivity process
- Identify and describe the change management process to be followed.
- Formalize agreements that outline the appropriate authority structure for all concerned.

Cooperative Agreements/Interstate Agreements/MOUs Considerations and Recommended Best Practices

- Engage legal departments early in the process.
- Try to find existing agreements between your states from which you can draw previously agreed-upon language to replicate in your NG9-1-1 ICA/MOU.
- Do not underestimate the time it will take legal departments to craft appropriate language for the ICA/MOU to which both states can agree.
- Ask "Why is this ICA/MOU necessary"? For what capability or resource is this ICA/MOU being created? What agencies are participating in the ICA/MOU? Include public safety agencies, other governmental bodies, and any private or non-governmental services. These questions will help drive the appropriate content in the Agreement.
- Define what understandings, agreements or parameters are set forth by this ICA/MOU clearly and comprehensively.

Financial Considerations and Recommended Best Practices

- Consider the cost of provisioning new service including the cost of database changes or additions, the cost of testing support, the cost of engineering support for inter-vendor design development, the cost to shift from IPSR to i3 call routing.
- Cost impact to interoperate between i3 and IPSR platforms
- Do not forget to consider the cost of inaction and how future systems costs for the current network may affect the cost of operations.

Planning Considerations and Recommended Best Practices

- Know where you are starting from and know where you are going. Have a clearly defined goal and an understanding of the steps necessary to achieve your vision.
- Consider a single point person or project manager to lead the effort with appropriate level of accountability and authority to get the job done.
- Identify and engage "champions" for the project to lead the discussion and to fuel the passion for achieving the mission.

GIS Considerations and Recommended Best Practices

- Maintain a consistent coordination environment to facilitate frequent sharing of data and incident response best practices.
- Collaborate to establish program metrics and measurable milestones that will reflect the operational effectiveness of the implementation.
- Incentivize county agencies to maintain and share data with the PSAP through a cost-sharing program for select datasets.
- Develop a regional shared services and resources approach.
- Develop "common GIS data" processes across the service area, based on current NENA standards.

Technical Considerations and Recommended Best Practices

- Solution design roadmap and recognition of how it may or may not align with neighboring states
- Policy routing rules functionality enabled by the i3 operating environment – opportunities may exist to better serve cross-border events.
- Cost impact to enable functionality
- Ensure that the solution design and cooperative agreement enable future interoperability needs, such as text, multimedia messaging service (MMS), and additional data, without a wholesale replacement.

Security Considerations and Recommended Best Practices

- Establish regular assessments of security risks and vulnerabilities on your ESInet, and work with neighboring states to evaluate risks at interconnection points.
- Develop an effective security policy. Consult standards and best practices resources for increased awareness and support.
- Develop an effective security plan that includes facilitation of notification to others interconnecting to your network.

Testing Considerations and Recommended Best Practices

- Test Pre-Planning
  - Assign a test coordinator with the skills and abilities to carry out the program management function with the appropriate level of authority and accountability.
  - Develop an effective Test Plan (See Appendix 9) to include, at a minimum, the following:
    - the functionality that is to be tested
    - the wireless carriers that are involved
    - GIS modifications or system provisioning are required prior to the transition process
  - Gather necessary information from the PSAP.
  - Obtain the necessary test equipment such as wireless devices from each of the major carriers serving the jurisdiction.
  - Work with the 911 service provider to provision star codes as appropriate at the PSAP.

- Test Case(s)
  - Test cases should document pertinent elements of the test, such as expected outcomes, key contributors, exceptions and other data. An example test case template may be found in Appendix 4

- Test Plan
  - Document all possible interconnection test scenarios.
  - Allow for necessary documentation for each wireless carrier serving in the PSAP's jurisdictions.
  - Conduct a briefing call with PSAPs to ensure they are aware of the testing to be conducted, clarify expectations of the PSAP as the testing personnel, describe the needed documentation and information to be recorded, establish testing parameters and responsibilities.

- Test Schedule
  - Timing of testing should be coordinated with the PSAP authority and agreed upon in advance of the test.
  - In larger PSAPs, additional staffing may be required during test periods.
  - Travel time from PSAP to PSAP should be considered and accommodated in the test schedule.

- Test Equipment/Documentation/Information Procurement
  - Assist with wireless handset procurement if appropriate.
  - Secure a conference bridge for test dates and ensure all involved are aware of the bridge information.
  - Obtain ALI screen reference documentation from each PSAP involved in the test.
  - Share PSAP and test coordination contact information.
  - Understand PSAP configuration for manual or automatic rebid so that test guidance can be given when necessary.

- Testing Consideration
  - Wireless test call may be presented to the PSAP initially as Wireless Phase 1 (WPH1) but may automatically update to Wireless Phase 2 (WPH2), or a manual rebid may be necessary. Be sure the testing coordinator is knowledgeable and can provide assistance during the test.
  - Test personnel should be cognizant of PSAP needs and the potential necessity to halt or delay testing if higher-priority events occur in the PSAP, making staff unavailable during the scheduled test time. Ensuring that there are no major incidents active in either county involved in the testing, such as a major storm, SWAT activation, etc., will be necessary before proceeding with the test.

APPENDIX 3 — MEMORANDUM OF UNDERSTANDING/INTERSTATE COOPERATIVE AGREEMENT SAMPLE

Considerations for development of an interstate cooperative agreement (ICA) or memorandum of understanding (MOU) between State A, State B, State C, and State D as part of the Next Generation 9-1-1 implementation.

This tool is intended to be a guide for writing an ICA or MOU. The document is outlined in a recommended agreement structure with suggested headings for each section of the agreement. The SAFECOM MOU Writing Guide[11] was consulted and used as a template for this sample.

Each section poses questions or concepts to consider to guide the state(s) when writing content for such an agreement. Sample paragraphs also are included for reference or to provide clarification on what might be included. It is important to note, however, that the sample paragraphs are intended for illustration purposes toward the specific ICA/MOU example. The sample language used in this document is drawn from several example ICAs and MOUs among and between several disciplines. In all likelihood, each state participating in the ICA/MOU will have existing agreements for other services or purposes they will want to draw from and use.

Further, each state's ICA/MOU language will need to be modified and customized according to the purpose of the agreement. The sample paragraphs provide examples and guidance only and should *not* be taken literally.

This document does not address every issue that jurisdictions may face when seeking to establish an interstate ICA or MOU. The ICA/MOU should be customized to the capability or resource for which it is established, and should consider any unique characteristics of the specific community and participating jurisdictions as appropriate.

Introduction

The Introduction section of the ICA/MOU helps the reader understand the agreement content. It should describe the need or purpose of the agreement, the states involved in forming the agreement, why it is necessary/important/useful to work together in the manner described in the agreement, and similar introductory language. The introduction section should be a simple explanation of the agreement and why it is necessary. It does not need to include details about past efforts or discuss how the states reached this level of agreement.

Considerations

- Why is this ICA/MOU necessary?
- For what capability or resource is this ICA/MOU being created?

[11] https://www.dhs.gov/sites/default/files/publications/Writing%20Guide%20for%20a%20Memorandum%20of%20Understanding_0.pdf

- What agencies are participating in the ICA/MOU? (Include public safety agencies, other governmental bodies, and any private services.)
- What agreements or parameters are set forth by this ICA/MOU?

Sample Introduction Content #1 – Narrative

[Insert name of state(s) here] *recognize the need for interstate communication, connectivity, network interface and cooperation required to provide seamless Next Generation 9-1-1 (NG9-1-1) service and improve the quality of public safety services for the citizens of our respective states.*

[Insert name of state(s) here] *have well-established methods, procedures and capabilities for current 9-1-1 operations and call handling in their respective states. In addition, there are mutual-aid agreements for 9-1-1 call processing between the states in place. While these plans, procedures and agreements formally extend beyond local jurisdictions, they tend to remain intra-discipline in practice. Today's public safety realities have highlighted the need for states and regions to work together and across state boundaries to establish NG9-1-1 communications network connectivity—not only across traditional jurisdictional boundaries, but across disciplines as well.*

To remedy the need for greater interstate communications and shared responsibilities that are present in NG9-1-1 systems, the ***[insert name of state(s) here]*** *have worked cooperatively to develop an interstate network solution. This solution establishes ____(describe what)_____ with procedures that are agreed to by the parties and used by key 9-1-1 public service officials, 9-1-1 public safety and response officials, and public and private service participants in the provisioning of 9-1-1 call-taking and incident-response services in their respective states.*

Typical governmental agreements of this nature often start with "whereas" clauses, and the introduction of this type of agreement can include such statements instead of a narrative introduction.

Sample Introduction Content #2 – Clauses

Sample Introduction Content #2 – Clauses *(there may be typical state legal language that is appropriate and desired by the attorneys general of the state partners, but the general text below is an illustration of what might be included.)*

This Agreement is made and entered into this day of _____, YYYY, by and between **[State Partner 1], [State Partner 2]** and **[State Partner 3].**

R E C I T A L S

WHEREAS, **[State Partner 1], [State Partner 2]** and **[State Partner 3]** have come together to collaborate to integrate Next Generation 9-1-1 systems; and

WHEREAS, the partners listed below have agreed to enter into a collaborative agreement in which **[State Partner X]** will be the lead agency and named system manager, and the other agencies will be partners in this application; and

WHEREAS, the partners herein desire to enter into a Memorandum of Understanding setting forth the NG9-1-1 services to be provided by the collaborative; and

WHEREAS, the agreement was prepared and approved by the collaborative through its partners is to be submitted to the Governors of each state on or before **[date]**.

NOW, THEREFORE in consideration of the covenants and conditions outlined in this agreement and for other good and valuable consideration, each to the other, receipt of which is hereby acknowledged by all parties, the parties hereby agree in the following sections of the Agreement:

SECTION 1. PURPOSE

The Purpose section should be a concise statement discussing the intention of the new or proposed capability, interaction, or agreement that makes the ICA/MOU necessary. It explains how the agencies involved will establish and manage the new capability and under what circumstances.

Considerations

- To what capability does the ICA/MOU apply? When answering this question, consider the following questions:
    - What is the intended level of authority?
    - When will it be used?
    - How will it be used?

Sample Purpose Content

The purpose of the Interstate Cooperative Agreement (or Memorandum of Understanding) for NG 9-1-1 is to provide a reasonable and agreed-upon network infrastructure management and communications structure for ***[Insert name of states here]*** and other key support agencies when managing any 9-1-1 call or incident that affects public safety in ***[Insert name of states here]***. This network transcends traditional or mutual intra-discipline aid in terms of purpose. The Interstate Cooperative Agreement ensures an organized method of coordinating ***[Insert name of states here]*** resources to expedite efficient deployment of an NG 9-1-1 infrastructure and the resources necessary to manage and maintain said networks, and serves primarily as a logistics and interrelated 9-1-1 network.

SECTION 2. SCOPE

The Scope section of the Agreement should list the states/agencies and jurisdictions to be included in the ICA/MOU and describe their relationship. This section also can discuss peripheral benefactor agencies to the ICA/MOU or users of the systems involved in the agreement, level of authority for the infrastructure, level of responsibility, cost-sharing arrangements, governance aspects, etc.

Considerations

- Who are the public safety, public service, and other governmental and non-governmental entities that will use the capability/resource of this agreement?
- What is the authority structure for the capability/resource of this agreement?

Sample Scope Content

Description of Partner Agencies—For each member of the collaborative agreement, provide some background on the state /agency or organization and its work regarding 9-1-1/Next Generation 9-1-1.

History of Relationship—Provide a brief history of the collaborative relationship between the state partners, including when and under what circumstances the relationship began and when each state partner joined the collaboration effort. Specify how often the collaborators meet.

Describe any changes in the collaboration, including an explanation or description of any new or additional partners that have been added since the original agreement, or any partners that would no longer participate.

Describe the critical and long-range goals of the collaboration.

SECTION 3. DEFINITIONS

The Definition section describes the operational and technical terms associated with the capability or resource of the agreement and for which the agreement is written. Providing definitions will help avoid confusion and uncertainty.

Considerations

- Are there any NG9-1-1 infrastructure-specific terms or acronyms that need to be defined? Consider including any or all of these acronyms and definitions
- Consider including definitions for each of the technical and operational aspects of the capability/resource of the NG9-1-1 network(s) specific to the state(s) systems involved in the agreement

Sample Definitions Content

The Next Generation 9-1-1 system and network elements are referred to as **[insert name of NG9-1-1 capability or resource]**, whether utilized as part of the **[insert name of states]** public safety communication network or any other state partner network. The **[insert name of NG9-1-1 capability or resource]** is composed of … (*list the network elements that are part of the NG9-1-1 infrastructure this ICA/MOU covers and any appropriate definitions*).

The ICA/MOU also may refer to the NENA Glossary document[12] as the governing document for terms. Any additional terms that are specific to the state(s) or their respective NG9-1-1 network infrastructure should be included.

SECTION 4. POLICY

The Policy section of the ICA/MOU describes the specifics of the NG9-1-1 infrastructure and the practices, procedures, methods and standards to be followed by the parties. This section also can mention authorized use of the system of networks, activation of network rerouting and continuity of operations, and other backup circumstances. Items for consideration in this section might include:

- Roles, responsibilities, and authorities of the partners
- Financial obligations of the partners
- How the partners will make changes to the infrastructure impacting other partners' systems
- Standards to be followed
- Record keeping
- Modifications to the network(s) or infrastructure
- Notification to the parties of changes or modifications
- Maintenance practices
- System monitoring
- System security procedures
- Ownership of assets

Considerations

- Who has the ability to authorize use of the capability/resource?
- What are the participation requirements in this agreement?
- What is the decision-making process for actions by the partners pursuant to this agreement?
- Are there operating procedures or effective practices associated with the integration of NG9-1-1 networks that should be identified? Can specific procedures be referenced?
- What system security will be maintained by each of the partners?
- Will the partners share applicable security requirements of their respective systems/networks?
- Do the partners agree to inform the other partners of any changes to the risk profile of their respective systems, including configuration changes?
- Is there a need to inform the other partners in a timely and deliberative manner, in an agreed-upon process, of any security breaches to their respective systems/networks?
- What maintenance procedures will be conducted by each of the partners so as to avoid impacting the network(s) used by the other partners?
- What standards will be followed?
- Who is responsible for ensuring that the agreed-upon standards associated with this Agreement are followed appropriately?

[12] NENA Master Glossary of 9-1-1 Terminology (NENA-ADM-000.18-2014). http://www.nena.org/glossary

- What is the process if standards are not followed?
- Are there additional requirements of the partners?

Sample Policy Content

By signing this agreement, each state partner agrees to participate in the agreement to the greatest possible extent. The purpose of these procedure requirements is to ensure awareness of the network integration and to prepare personnel for its activation.

NOW, THEREFORE, it is hereby agreed by and between the partners as follows:

- *Clearly state the roles and responsibilities each organization or agency will assume to ensure the success of the proposed project*
- *Describe the resources each partner will contribute to the project either through time, in-kind contribution or with the use of grant funds, e.g., office space, project staff, training*
- *Identify the representatives of the planning and development team, who will be responsible for planning, developing, and implementing project activities, and describe how they will work together and work with project staff.*
- *Demonstrate a commitment on the part of all partners to work together to achieve stated project goals and to sustain the project once grant funds are no longer available*

SECTION 5. TIMELINE

The Timeline section of the agreement should state the beginning and ending date of the ICA/MOU if there is to be one. A reference to the signature dates on the agreement signatory page may be helpful. If there is to be a lead agency/state, that could be noted in this section.

Considerations

- Will there be an ending date or renewal date for the ICA/MOU forcing partner states to review the agreement on a regular basis and update the agreement as appropriate?

Sample Timeline Content

The responsibilities and authority described in this agreement are contingent on___(describe any contingent situations that may apply)_____. Responsibilities and authority under this Interstate Cooperative agreement (or Memorandum of Understanding) coincide with the agreement period of MM/DD/YYYY through MM/DD/YYYY, and will be reviewed and renewed on an annual basis (or every X number of years).

SECTION 6. MAINTENANCE OR MODIFICATIONS TO THE NETWORK

The Maintenance section should designate a responsible party or parties for maintaining equipment, systems, and licenses. This section can name a jurisdiction (state), agency, or individual as the responsible party. The section also should describe the process for modifying the agreement, cost allocation, requirements and points of demarcation.

Considerations

- Who is the NG9-1-1 system manager/administrator or point of contact (POC) for each state partner?
- What is the maintenance requirements associated with participating in this ICA/MOU?
- Who will own the gateways and interfaces required?
- What are the points of demarcation in each of the state partners' networks?
- Who has the authority to update or modify the agreement?
- What is the process for updating or modifying the agreement?
- Will updates or modifications require the agreement to have a new signature page verifying the understanding of the change by each participating agency?
- If there are costs to the other partners because of the change or modification of one of the partners, how will the cost for such changes be allocated?
- Who will maintain the network and equipment?

Sample Maintenance Content

The **[insert name of state]** will be responsible for overall administration and maintenance of the overall systems that make up the interstate NG9-1-1 interoperability plan. A NG9-1-1 system administrator/single point of contact (POC) shall be named for each state partner. The NG9-1-1 system administrator shall be responsible for day-to-day network optimization for their portion of the network and for communicating any integration or interface issues with the other state partners as appropriate or necessary. An integration policy shall be established and agreed to by the state partners and attached to this agreement. The integration policy should stipulate network responsibilities, points of demarcation, contact information, communication methods between the POCs and the state partners, and minimum timeframes for communication system reports and issues, procedures for dispute resolution, and technology/equipment ownership specifics.

Updates to the NG9-1-1 network will take place after the state partners meet and gain consensus on proposed changes. It then should be the responsibility of the state partners to decide the best possible method of implementation and dissemination of information regarding operational changes to all affected agencies in their respective states. In the event that a proposed change or technical upgrade to the NG9-1-1 interstate network degrades the capability or changes the purpose of the systems, a new signature page verifying the understanding of changes may be required.

Any system changes desired by one of the state partners that impacts another state partner's portion of the network, or requires additional investment by that other state partner(s), the cost of said change shall be negotiated with the affected partner.

SECTION 7. UPDATES TO AGREEMENT/PARTNERSHIP

This section describes how updates can be made to the ICA/MOU. It includes information such as who has the authority to initiate an update to the agreement, how updates will be made, how participating agencies will be notified of any proposed updates, and the types of updates that will require signatures of all participating agencies or a formal amendment to the agreement.

Considerations

- What are the circumstances that might change the original ICA/MOU and require a new agreement or modification to the existing agreement?
- Can just the exhibits/attachments be changed?
- Is legal review required for every modification?
- How will new state partners be added to the agreement?

Sample Updates to Agreement Content

All parties entering into this Interstate Cooperative Agreement (or Memorandum of Understanding) acknowledge that any modifications to this agreement must be by mutual consent, in writing, and will be treated as an amendment to this agreement.

New state partners will be added to this agreement by mutual consent of the existing agreement partners.

SECTION 8. COMMITMENT TO AGREEMENT

The Commitment section of the agreement should define the parties to the agreement, a statement of what is being agreed to, any financial commitment or understanding, and an approval or commitment statement to the agreement.

Considerations

- What is being agreed to?
- What financial obligations are the state partners committing to?

Sample Commitment to Agreement Content

1) The collaboration service area includes **[specify region, state, tribe, territory, county, or multi-jurisdictional area as applicable]**.

2) The state partners agree to collaborate and provide **[specify type of service, such as "integrated NG9-1-1 network systems"]** pursuant to the agreement policy narrative of this document and any attachments to this agreement.

3) Cost allocation for the state partners' contributions to this collaboration will be provided as outlined in the attached budget detail worksheet **[if applicable].**

4) We, the undersigned have read and agree with this ICA/MOU. Further, we have reviewed the proposed timeline and cost allocation and approve it.

SECTION 9. SIGNATURES

There should be a signature page to the ICA/MOU for state partners to officially affix their commitment to the clauses of the agreement by signature and date. All attachments finalized should be included for each of the partners to review before signing. There should be the corresponding number of original copies of

the agreement to sign as there are state partners, in order for each partner to have a signed original for the state's record.

Considerations

- How many original state partners will be parties to this ICA/MOU?
- Have all attachments/exhibits been completed and agreed to by the parties?
- Are there any CCs (copies) to be made for interested parties, legal departments, fiscal agents, providers, etc.?

Sample Signature Content

By_____

[Title, State/Regional Partner]

Date _____

By _____

[Title, State/Regional Partner]

Date _____

By_____

[Title, State/Regional Partner]

Date _____

EFFECTIVE DATE. The terms of this agreement will become effective on the date of the last signature of the parties.

ASSIGNMENT. A state partner shall not assign or transfer any interest or right(s) under this agreement to any person or entity without prior written approval of the other parties.

VENUE: The laws of the state of **[specify state]** shall govern this agreement. Any and all legal action necessary to enforce the provisions of this agreement will be held in **[designate location]**. Venue for litigation involving this agreement shall be the **[designate the appropriate Judicial Circuit Court and jurisdiction location]**.

MODIFICATION. This agreement may be modified upon written mutual consent of the parties.

INDEMNIFICATION. Each party agrees to defend, indemnify and hold harmless the other party(s), its officials and employees from all claims, actions losses, suits, judgments, fines, liabilities, costs and expenses (including legal fees) attributable to its negligent acts or omissions, or those of its officials and employees acting within the scope of their employment, or arising out of or resulting from the indemnifying party's negligent performance under this agreement. Nothing contained herein shall constitute a waiver of sovereign immunity or the provisions of **[identify appropriate statute(s)]**. The foregoing shall not constitute an agreement by any of the parties to assume any liability for the acts, omissions and/or negligence of the other party(s).

TERMINATION. The terms of this agreement, as modified with the consent of the parties will remain in effect until **[specify date]**. Any party upon XX days written notice to the other parties may terminate this agreement upon written notice of withdrawal (or termination) has been made by certified mail, return receipt requested, by the withdrawing party to the other party(s) of this agreement. If withdrawal is due to a conflict between the parties relating to the terms of this agreement, the parties shall first attempt to resolve the conflict in accordance with Exhibit X, Dispute Resolution. (*An agreed-upon dispute resolution process should be included in the exhibits to this agreement*).

SUMMARY

For any region to establish NG9-1-1 network interoperability, collaboration and participation of appropriate public safety stakeholders in a governing document or an official agreement will be essential. A formal integration partnership structure provides a unified front across multiple states within a particular political constituency. Such unity aids the funding, effectiveness, and overall support for collaboration. An ICA or MOU is important because it defines the responsibilities of each party in an agreement, provides the scope and authority of the agreement, clarifies terms and outlines compliance issues. It is hoped that this guide for an ICA/MOU will help state practitioners establish the partnerships and authority necessary to achieve an effective governance structure for interoperable NG9-1-1 communications systems and networks.

APPENDIX 4 — Testing

SAMPLE TEST PLAN

Objective

Test the ability to transfer calls between State A (A) and State B (B) PSAPs with ANI and ALI information. Document results to identify limitations so they may be remedied.

State A/State B IPSR interstate call transfer test procedure

1. Set-up two (2) testing preparation coordination calls to explain procedures and address questions
2. If possible, assign a testing coordinator to the project at both the originating and terminating PSAP
3. Prior to testing, confirm that each PSAP has the distributed star code list
4. Place wireless test calls for each originating/terminating PSAP combination.
5. Document the telephone numbers of each test device used in the testing process for trouble reporting.
6. Place test calls for each wireless carrier
7. After documentation of initial call information displayed, the originating PSAP will initiate a call transfer.
8. Document results of each test call in Testing Documentation Worksheet
9. Transferred to PSAP should make at least one rebid with each wireless call at least 30 seconds apart to determine if ALI results change (lat/long, COS).
10. Please note of any nuances that occur during the tests (such as initial bid resulted in Record Not Found, but rebid provided ALI data; ALI data or lat/long changed upon rebid)
11. Testing Coordinator will document all information, even that which is displayed at the transferred to/terminating PSAP. This will require the originating PSAP's telecommunicator to stay on the call after the call is transferred.
12. Thoroughly document all anomalies and issues that arise during testing. Follow-up (if necessary) will be conducted after initial testing is conducted.

SAMPLE TEST PLAN MATRIX

DATE OF TEST CALL	TIME OF TEST CALL	ORIGINATING PSAP	TERMINATING PSAP	CARRIER/PROVIDER	STAR CODE USED	ORIGINATING ALI PROVIDER	TERMINATING ALI PROVIDER	ORIGINATING PSAP DISPLAYED CALL BACK NUMBER	CALL BACK NUMBER DISPLAYED AT TERMINATING PSAP (IF DIFFERENT FROM ORIGINATING PSAP)	ORIGINATING PSAP DISPLAYED ADDRESS	ADDRESS DISPLAYED AT TERMINATING PSAP (IF DIFFERENT FROM ORIGINATING PSAP)	INITIAL LATITUDE/LONGITUDE DISPLAYED? (Y/N)	ORIGINATING PSAP DISPLAYED CLASS OF SERVICE	CLASS OF SERVICE DISPLAYED AT TERMINATING PSAP (IF DIFFERENT FROM ORIGINATING PSAP)	P-ANI	P-ANI DISPLAYED AT TERMINATING PSAP (IF DIFFERENT FROM ORIGINATING PSAP)	CUSTOMER NAME	ESN	ESN DISPLAYED AT TERMINATING PSAP (IF DIFFERENT FROM ORIGINATING PSAP)	REBID WORKS? (Y/N)	ORIGINATING PSAP REBID #1 DISPLAY CHANGE AFTER TRANSFER? (Y/N)	# OF REBIDS	NOTES

TEST READINESS CHECKLIST

ACTIVITY	ASSIGNED TO	DATE COMPLETED
▪ **Test Pre-Planning**		
o Assign a test coordinator		
o Develop the Test Plan		
o Determine the functionality that is to be tested		
o Determine the wireless carriers that are involved		
o Determine if GIS modifications or system provisioning are required prior to the transition process		
o Gather necessary information from the PSAP		
o Provision Star Codes as appropriate at the PSAP		
▪ **Test Plan**		
o Document all possible test scenarios of interconnection		
o Allow for necessary documentation for each wireless carrier serving in the PSAP jurisdiction		
o Conduct briefing call with PSAPs		
▪ **Test Schedule**		
o Timing of testing should be coordinated with PSAP authority		
o In larger PSAPs, additional staffing may be required during test periods		
o Travel time from PSAP to PSAP should be considered		
▪ **Test**		
o Equipment/Documentation/Information procurement		
o Assist with wireless handset procurement if appropriate		
➢ Secure conference bridge		
➢ Obtain ALI screen reference documentation		
➢ Provide PSAP and test coordination contact information		
➢ Understand PSAP configuration for manual or automatic rebid		
▪ **Testing Considerations**		
o Wireless test call may be presented to the PSAP initially as WPH1 but may automatically update to WPH2 or a manual rebid may be necessary		

ACTIVITY	ASSIGNED TO	DATE COMPLETED
o Test personnel should be cognizant of PSAP needs and the potential necessity to halt or delay testing if higher priority events occur in the PSAP making staff unavailable during the scheduled test time. Ensuring there are no major incidents active in either county involved in the testing such as a major storm, SWAT activation, etc., will be necessary before proceeding with the test.		

APPENDIX 5 — ADDITIONAL REFERENCES

Transition Process

US DOT Transition Plan, February 2, 2009
http://ntl.bts.gov/lib/35000/35600/35654/NG911_Transition_PlanFinal.pdf

US DOT National 911 Program, State Profile Data
https://resourcecenter.911.gov/code/9-1-1ProfileDatabase.aspx

US DOT National 911 Program, State 911 Assessment Program
http://www.911.gov/state911assessment.html

NENA NG9-1-1 Planning Guidelines Information Document (NENA INF-006.1)
http://www.nena.org/resource/resmgr/Standards/NENA-INF-006.1.1-2014_NG911_.pdf

Governance

Funding 911 into the Next Generation, An Overview of NG9-1-1 Funding Model Options for Consideration, March, 2007, NENA Next Generation Partners Program
https:// www.nena.org/resource/resmgr/NGPP/NGFundingReport.pdf

CRS Report - 11-21-2001 - Future of 911
https://resourcecenter.911.gov/code/ContentDetail.aspx?ContentID=353

A Policy Maker Blueprint for Transitioning to NG911, September, 2008, NENA Next Generation Partners Program
http://www.nena.org/resource/resmgr/ng9-1-1_project/ng9-1-1policymakerblueprintt.pdf

NASNA Comments on 911 Governance and Reliability FCC NPRM,
https://drive.google.com/file/d/0B_rtue3opT_JdG5UcG10SlpfaXM/view

NG911 Transition Policy Implementation Handbook: A Guide for Identifying and Implementing Policies to Enable NG911
http://www.nena.org/resource/resmgr/ngpp/ng911_transition_policy_impl.pdf

iCERT Study on the Health of the US 9-1-1 System,
http://www.theindustrycouncil.org/Summary%20of%20report-2-29-08.pdf

iCERT, History of 911, What it Means for the Future of Emergency Communications
http://www.theindustrycouncil.org/publications/iCERT-9EF_Historyof911_WebVersion.pdf

iCERT, The Status of NG911 Deployment in the United States
http://www.theindustrycouncil.org/publications/iCERTReportontheStatusofNG911DeploymentintheUnitedStates.pdf

A National Plan for Migrating to IP-Enabled 9-1-1 Systems, The National E9-1-1 Implementation Coordination Office, September 2009
https://www.ntia.doc.gov/legacy/reports/2009/NationalNG911MigrationPlan_sept2009.pdf

Financial Considerations

SAFECOM, Emergency Communications Grant Guidance
https://www.dhs.gov/safecom/funding

Improving Grant Management for Public Safety Communications Systems,
https://www.dhs.gov/publication/funding-documents

FCC's Seventh Annual Report to Congress on State Collection and Distribution of 911 And Enhanced 911 Fees and Charges
https://apps.fcc.gov/edocs_public/attachmatch/DOC-337223A1.pdf

Funding Emergency Communications - Technology and Policy Considerations, Congressional Research Service, December 14, 2011
https://resourcecenter.911.gov/code/ContentDetail.aspx?ContentID=477

NRIC/CSRIC Best Practices
https://www.fcc.gov/nors/outage/bestpractice/BestPractice.cfm

National Conference of State Legislatures, Enacted Legislation,
http://www.ncsl.org/research/telecommunications-and-information-technology/state-9-1-1-legislation-tracking-database.aspx

Tennessee Attorney General's opinion on 911 Fund Diversion
https://www.tn.gov/assets/entities/attorneygeneral/opinions/op09-087.pdf

NENA INF-006.1; National 911 Guidelines Assessment Report
http://www.nena.org/resource/resmgr/Standards/NENA-INF-006.1.1-2014_NG911_.pdf

NENA NG91-1 Transition Policy Implementation Handbook
http://www.nena.org/resource/resmgr/ngpp/ng911_transition_policy_impl.pdf

NG9-1-1 System Initiative, Final Analysis of Cost, Value, and Risk, US DOT, March 5, 2009 v1.0
http://ntl.bts.gov/lib/35000/35600/35650/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf

Emergency 9-1-1 Service Funding Study, State of Vermont, January 3, 2012
http://www.leg.state.vt.us/reports/2012ExternalReports/274190.pdf

Funding Mechanisms for Public Safety Communications Systems,
https://www.dhs.gov/publication/funding-documents

NASNA White Paper "*Four Potential Sustainable Funding Models for NG911*"
https://drive.google.com/a/publicsafetypolicyconsulting.com/file/d/0B6UENGshedL6MmI5dWFFMVlneU9PZ2hVakNoUVpCeDdOLVZj/view?pref=2&pli=1

Minnesota-ARMER (Allied Radio Matrix for Emergency Response) 911 Funding Study, February 11, 2014
https://dps.mn.gov/divisions/ecn/programs/armer/Documents/minnesota-armer-and-ng911-funding-study.pdf

Planning

Next Generation 911 Cooperative Governance
https://resourcecenter.911.gov/code/ContentDetail.aspx?ContentID=482

Next Generation Partner Program: Transitioning Emergency Communications into The Next Generation
http://www.nena.org/resource/collection/6D23C86F-A4E3-471A-8A8F-BD256702B1B1/2006_NG_Partner_Program_Report_FINAL.pdf

Implementation and Execution

A Policy Maker Blueprint for Transitioning to NG911, September, 2008, NENA Next Generation Partners Program
http://www.nena.org/resource/resmgr/ng9-1-1_project/ng9-1-1policymakerblueprintt.pdf

Next Generation 911 Cooperative Governance, Intrado, Inc.
https://resourcecenter.911.gov/code/ContentDetail.aspx?ContentID=482

FCC Task Force on Optimal PSAP Architecture (TFOPA) Final Report
https://apps.fcc.gov/edocs_public/attachmatch/DA-16-179A2.pdf

NENA INF-006.1; National 911 Guidelines Assessment Report;
http://www.nena.org/resource/resmgr/Standards/NENA-INF-006.1.1-2014_NG911_.pdf

Technical Considerations

NENA Technical Information Document, Network/System Access Security, 04-503, December 1, 2005.
http://www.nena.org/resource/resmgr/Standards/NENA_04-503.1_Network_System.pdf

NENA Functional Interface Standards for Next Generation 9-1-1, Version 1.0 (i3), 08-002, December 18, 2007.
http://www.nena.org/?page=FuncIntrface_NG911

NENA Security for Next Generation 9-1-1 Standard (NG-SEC), February 6, 2010.
www.nena.org/resource/resmgr/Standards/NENA_75-001.1_NG-Security_20.pdf