NENA NG9-1-1 Go-To Handbook
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Synopsys of the material content:
Intended to provide an introductory perspective to NG9-1-1 and guidance to help 9-1-1 Authorities place some context around the large amount of reference information that exists about NG9-1-1. Provide some pointers to the documents and sections of documents that can assist in developing a timely and efficient project management approach and transition plan to accomplish implementation of NG9-1-1

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1 Executive Overview

The purpose and scope of this document is to provide guidance to help 9-1-1 Authorities create a smooth, timely and efficient project management approach and transition plan to accomplish implementation of NG9-1-1. A considerable trove of written material and standards exists about the topic of NG9-1-1 within NENA, APCO, and other standards and industry organizations. An oft stated question is, "where does one start to gain a more complete understanding of all the materials?" This reference document can assist in answering this question. To navigate among the many NG9-1-1 reference materials, which are dispersed in various online web site locations, can be a daunting task for a new reader to the subject of NG9-1-1, and sometimes even so for a seasoned industry professional. Various topic areas relevant to NG9-1-1 are listed in this document to orient a 9-1-1 Authority person in search of context specific information. The topic area contains a very brief description and a list of references is given. The references contain a pointer to the most relevant portions of the referenced document for a reader to focus on to gather an understanding of that topic area. The reference pointers are just a beginning shortcut for a reader to focus on, as only a complete reading of the materials referenced can fully provide the background information a reader should understand to make an orderly and progressive transition to NG9-1-1.

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Reason for Issue/Reissue

NENA reserves the right to modify this document. Upon revision, the reason(s) will be provided in the table below.

Doc #	Approval Date	Reason for Changes
NENA-INF-006.1-2014	01/08/2014	Initial Document
NENA-INF-006.1.1-2014	05/30/2015	Update web page links
NENA-REF-010.2-2019	05/07/2019	Update & convert to a reference document

2 Planning for NG9-1-1 Transition

While the development of technical standards and related information is still ongoing, there are many actions that 9-1-1 Authorities should consider in preparing for transitioning to an NG9-1-1 environment. These actions relate mostly to the preparation necessary to lay the proper foundation for this transition. At a high level, this process is relatively logical, and involves efforts to identify and organize the following Project Management actions:

- **Initiatives**: Education, governance, scope & goals
- **Drivers**: cost factors, emergency event response, institutional, statutory, geo-political situations, opportunities and constraints
- **Constraints**: Identify the bounds within which the initiative will need to exist
- **Requirements**: What kind of service environment is called for
- **Inventory**: What is already in place and what is missing
- **Partnerships**: Build Inter-local/inter-authority relationships and communication channels, including the current provider of emergency services
- **Specific Actions**: Establish coordination of roles and responsibilities, Funding sources, Documentation, and Performance Measurement Metrics
- **Planning**: Technological and Operational deployment, training, communication, testing, and go-live plans and procedures.

More specifically, the remaining topics within section 3 provide additional detail on activities related to these project management actions.

2.1 Self-education

Educate the 9-1-1 Authority planning team to understand what NG9-1-1 involves and its impacts across Emergency Services Internet Protocol networks (ESInet), NG9-1-1 services (applications & databases), roles, responsibilities and operational procedures. Self-education can span across all references provided in this document, but at a minimum, the below references and a basic understanding of what is important in NG9-1-1 when educating the planning team. This is especially true when comparing NG9-1-1 and the Public Safety Broadband Network (FirstNet).

References:

2011 9-1-1 Tutorial V4.1[1]: On the linked web page for the Tutorial, look for heading "Documents Related to NG9-1-1 – Not listed as Standards" and the Tutorial is the second bulleted link under the heading.

National 911 Program and NASNA's NG911 & FirstNet Guide for State and Local Authorities[2]: Entire Document.

FCC Task Force on Optimal PSAP Architecture (TFOPA) [3]: Section 3, Executive Summary, Section 4.4 on Cybersecurity, Section 5.9 on Summary, Recommendations, and Conclusion, and Section 7 the Findings and Recommendations Summary.
Call Answering Standard/Model Recommendation (ANS NENA-STA-020)[4]: Section 2.
FCC's National Broadband Plan[5]: Chapter 16.
NENA Standard Managers Guide to Title II: Direct Access (NENA-STA-035)[6]: Section 2.
Draft Report for National 9-1-1 Assessment Guidelines [7]: Final Draft Guidelines Section 6 and Appendix B.

2.2 Governance

Establish a service management (governance) structure with the authority to engage in the project. Recognizing that NG9-1-1, by nature, reflects layered, interconnected systems, initial transition steps will in many cases occur at local and regional 9-1-1 Authority levels. Those activities, in turn, may progressively link together into larger regional NG9-1-1 systems. That leads to a logical role for states to deploy resources to help support and/or ensure statewide connectivity. Governance structures will need to be established to manage these intergovernmental arrangements, unless such mechanisms already exist. Among other things, agreements governing such arrangements will address relative management roles, responsibilities, and cost sharing. Ultimately, there is no single answer to how these systems will interconnect, and how related governance systems will evolve. Factors that will impact this include things like:

- Local, regional, and state emergency event response considerations
- Historical institutional, statutory, geo-political culture, arrangements and related environment
- Joint service environment (both existing and proposed)
- Resource and cost sharing opportunities, factors and constraints.

Note: Whatever intergovernmental arrangements are put in place to explore, coordinate and plan for these matters may not necessarily reflect the long-term arrangement necessary to oversee and manage the system(s) involved.

References:

The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Procurement Tool Kit[8]: Section 2.3 Policy and Governance.
The USDoT 911 Initiative Transition Plan Document[9]: Strategic Options for NG9-1-1 Governance and Policy section.
NENA Inter-Agency Agreements Model Recommendations - (NENA-INF-012)[10] :Entire document.

2.3 Communications Plan

Develop a plan to open lines of communications among the stakeholders throughout the life of the project. Consider the below questions as the Communications Plan is developed:

- Context – what's happened before? What's the history?
- Environmental Scan – what are the key factors that will affect your success? What is the current situation driving the need for change?
- Stakeholders – identify your stakeholders and their expected reactions. How you will manage them?
- Objectives – what do you want to achieve? (should be clear, relevant, measurable)
- Strategy – where are you going and why? What are the major activities to move the effort forward?
- Audiences – who are the key audiences?
- Announcement – given the strategy, are you making an announcement? What are you announcing?
- Messages – what are you saying about the announcement?
- Tactics – how will you implement your strategy, both before, during and after the main announcement?
- Issues – what problems may you have to overcome?
- Budget – what will the communications strategy cost?
- Evaluation – how will you know if you've been successful?

The general sections of a communications plan can vary depending on the local environment and the scope of the planned NG9-1-1 effort. This is a sample Communications Plan from a statewide NG9-1-1 effort.

2.3.1 Sample Communications Plan

The general sections of what a typical communications plan might contain are shown below. Inclusion of a specific section shown below will depend on the local environment and the scope of the planned NG9-1-1 effort. The communications plan will likely evolve over time and the contents might vary during the transition effort to NG9-1-1.

- Purpose
- Goals and Objectives for NG9-1-1 Specific Communications
- Stakeholders and Roles
- Communications Policy and Objectives
- Communications Channels, Targets and Frequency
- Communications Plan Activities
- Mid to Long-term Communications Activities
- Communications to Support NG9-1-1 Milestones
- Educational Communications Strategy
- PSAP and GIS Locality Specific Planning.

2.3.2 Example Communications Plan

A representative example of a communications plan for NG9-1-1 prepared by 9-1-1 Authorities in Virginia can be found at the following link:

https://www.vita.virginia.gov/media/vitavirginiagov/integrated-services/pdf/psc/2018/01112018DraftNG911DepCommPlanv3.pdf

References:

NASNA Model State 9-1-1 Plan[11]:Tools and Techniques section (Page 72), and Table 3.3 NASNA Model State 9-1-1 Plan Project Communications Plan (Page 76).

2.4 Statement of Documentation

Establish a library function to memorialize the project. Pertinent documents and communications should be assembled in a formal manner to allow audit and remedial processes. Ensure that all terms used in Project related documents are very clear to all users of the documents, even those who may have a less active role, especially those in control of providing the necessary funding. Utilize document management tools wherever possible including standardized file name structures and metadata tagging.

References:

NENA Master Glossary of 9-1-1 Terms (NENA-ADM-000)[12]: Entire document as reference for terms only.
ITIL Service Asset and Configuration Management[13]: The sections dealing with Configuration Identification, Configuration Control, and Configuration Verification and Audit.
NENA/APCO Next Generation 9-1-1 Public Safety Answering Point Requirements (NENA/APCO-REQ-001)[14] Annotate the project library documentation to note which specific requirements from (NENA/APCO-REQ-001) are considered mandatory for the scope of the specific NG9-1-1 project identified.

2.5 Estimated Scope and Project Timelines

This is an early statement of expectations. At a minimum, the agencies expected to have access to the NG9-1-1 system should be identified. The scale of the project, such as regional or state level, must be considered (see Governance). If the network is intended to transport more than 9-1-1 calls, (e.g., NCIC, IP radio, Poison Control), specify exactly what other emergency services applications are intended to be supported on the network. This helps establish the network engineering criteria for the systems involved. Resource and cost sharing may occur at basic network levels, and must be factored into this analysis.

When scope and governance are identified, a project definition and timeline should be initiated, for review and approval with project stakeholders.

References:

The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Transition Plan[9]:Entire document.
NASNA Model State 9-1-1 Plan[11]: Entire document.

SMS Text to 9-1-1 Resources[15] : The web page has several linked documents that all can be useful to a jurisdiction in determining scope: (1) Is Text-to-9-1-1 Right for my PSAP? A Consideration Document, (2) Interim SMS Text-to-9-1-1 Information and Planning Guide.

2.6 Budget & Funding

Create a preliminary budget based upon estimated costs to deploy NG9-1-1 and evaluate recurring costs. Additionally, current funding sources should be evaluated in order to determine whether transition costs can be covered. If any gaps exist, new funding sources will need to be identified in order to close the gap.

References:

The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Procurement Tool Kit[8]: Section 2.4 Funding.
The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Transition Plan[9]: Strategic Options for NG9-1-1 Funding Section.
NASNA Model State 9-1-1 Plan[11]: Section 3.4 Economics.
Next Generation 911 Cost Study [16]: Sections 2, 3, 4 and 5.
US DoT Final Analysis of Cost, Value, and Risk Executive Summary document[17]: Entire document.

2.7 Financial Forecasting

Create a realistic fiscal plan for the project in terms of both startup and ongoing obligations with input from the stakeholder community. Outreach and coaching from the commercial stakeholders can greatly assist in developing this forecast.

References:

Next Generation 9-1-1 Transition Policy Implementation Handbook[18]: NG9-1-1 Transition Policy Issue Number: Two.
Next Generation 911 Cost Study[16]: Sections 2, 3, 4, and 5.
Model State 911 Plan - NHTSA[19]: Chapter 2.

2.8 Functional Requirements

Functional Requirements are the capabilities that can be reasonably expected to be deployed. The Functional Requirements should be developed within the NG9-1-1 project effort and should be kept open for review and modification for the life of the project.

References

NENA NG9-1-1 Tutorial[1]: Slide 23.
Overview of Policy Rules for Call Routing and Handling in NG9-1-1 - (NENA-INF-011) (Under update- originally NENA 71-502) [20]: Section 3.

USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative: Final System Design Document [21]: Entire document.
NG9-1-1 Transition Planning Considerations - (NENA-INF-008)[22]: Section 7.
NENA i3 Standard for Next Generation - (NENA-STA-010)[23]: Section 5.

2.9 Data Inventory & Standardization

For Data Inventory and Standardization, data sources should be identified for use in the development of this project. For example, while the Master Street Address Guide (MSAG) is required as a data source, this project will require migration from tabular data to a combination of tabular and spatial data. A clear understanding of the source of all required data, including spatial/mapping data stored in a Geographic Information System (GIS), ownership, responsibility and maintenance must be established.

References:

NENA White Paper - A PSAP Managers' Guide to Geographic Information Technology[24]: Entire document.
NG9-1-1 Transition Planning Considerations - (NENA-INF-008)[22]: Section 9.5.3 Data Management Considerations, Section 11 Database Transition Considerations, and Appendix C Data Transition Check List.
NG9-1-1 Additional Data - (NENA-STA-012) (originally NENA 71-001)[25]: Entire document.
Synchronizing GIS with MSAG and ALI (NENA 71-501)[26]: Entire document.
NENA Provisioning and Maintenance of GIS Data to ECRF/LVF - (NENA-STA-005)[27] : Entire document.
NENA NG9-1-1 Civic Location Data Exchange Format Standard - (NENA-STA-004)[28]: Section 3.
NENA Standard for NG9-1-1 GIS Data Model - (NENA-STA-006)[29]: Section 3.

2.10 Establish Performance Measurement Metrics

To establish Performance Measurement Metrics, determine the methodology that will be used to ensure that network and system operation and reliability meet acceptable and adopted standards. Solutions should provide the capability to monitor, record, and analyze system performance data against predefined metrics (i.e., establish system norms and flag exceptions). A key element of reliability is security and specifically Cybersecurity which should be addressed during all phases of planning, deployment and testing.

References:

USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative: Final System Design Document[21]: Section 7.
NENA Security for Next-Generation 9-1-1 Standard (NG-SEC) - (NENA 75-001)[30]: Entire Document.
APCO ANS 3.103.2.2015 Minimum Training Standards for Public Safety Telecommunicators[31]: Sections 4, 6, and 7.
NENA NG9-1-1 Processing Metrics Standard - (NENA-STA-019)[32]: Section 2.

Next Generation 9-1-1 Security (NG-SEC) Audit Checklist[33]: Section 3.
NENA NG9-1-1 Evaluation and Testing Programs[34]: Entire Document.

2.11 Network Analysis

For the geographic area being served, an analysis of existing broadband infrastructure must be developed. The analysis should be as complete as possible and include both private and public facilities. Record both the network architecture design and signaling used for each identified source of bandwidth and associate each with the user-stakeholder location. Where possible, note areas that lack physical diversity, so they can be analyzed further for possible remedies to lessen the risk of service failures. Consider how this area will interconnect with adjoining networks. Assess the need to interconnect with the E9-1-1 System Service Provider for routing and bridging of 9-1-1 calls. This may be needed when originating carriers remain supported by the legacy Selective Router and the appropriate Public Safety Answering Points (PSAPs) have transitioned to the NG9-1-1 system. It may also be necessary if calls are to be bridged between PSAPs supported by the NG9-1-1 system and those remaining on the legacy emergency system.

References:

NG9-1-1 Transition Planning Considerations - (NENA-INF-008)[22]: Sections 9.3.1, 9.5.1.1, 9.5.1.2, and 9.5.2.
NENA Security for Next-Generation 9-1-1 Standard (NG-SEC) - (NENA 75-001)[30]: Sections 6.4 and 9.6.
NENA Emergency Services IP Network Design for NG9-1-1 (ESIND) - (NENA_INF-016)[35]: Entire Document.

2.12 Socialization and Education

For socialization and education, once the steps above have matured to a point where they can be expressed in common language, use your "Communications Plan" to begin the process of describing the project, its current state and estimated timelines to your stakeholders. Keep in mind an important part of this process is answering the question of "what's in it for me" from the perspective of all stakeholders.

References:

The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Procurement Tool Kit[8]: Section 2.10 Stakeholder Education and Awareness.
The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Transition Plan[9]: Strategic Options for NG9-1-1 Transition Education and Awareness section.
NASNA Model State 9-1-1 Plan[11]: Entire document.
NENA Recommended NG9-1-1 Public Education Plan for Elected Officials and Decision Makers[36]: Entire Document.
Sample Brochure for Elected Official Explaining NG9-1-1[37]: Entire Document.
What is the Future of 9-1-1?[38]: Entire Document.

2.13 PSAP Inventory

`If there is no central repository for information regarding the equipment and software inventories within the PSAP, one must be assembled. Going beyond just the Call Handling application, this inventory should be as granular as reasonably possible, and may include items used in the PSAP operational environment such as types of Computer Aided Dispatch (CAD), other public safety applications, mobile data applications, control of radio consoles and related administrative communications. These documents must be kept open for updates on a regular basis. This activity supports overall planning, and includes identifying opportunities to share resources, and assists in ensuring interoperability.

References:

Virtual PSAP Management - (NENA-INF-025)[39]: Section 8 Training and Section 10 Staffing.

2.14 Refinement of Scope

Using input from the former tasks, develop a refined, realistic scope for the project. Specificity and clarity are required of this step and it is urged that the entire stakeholder community be aware of the scope.

References:

The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Transition Plan[9]: How NG9-1-1 Could Be Implemented Across the Nation: Implementation Environments and Potential Deployment Approaches section.
NG9-1-1 Transition Planning Considerations - (NENA-INF-008)[22]:
Section 9.

2.15 Deployment and Testing Planning

Creation of a plan for deploying and testing, even if incomplete must begin prior to the "Acquisition" phase of the project. Reasonably estimate the amount of effort not only for the public agencies including central 9-1-1 Authority groups, but the provider community as well. Assess the interaction and testing that may be required with the System Service Provider (there may be more than one). Use a methodical approach to deployment and expect a thorough test period prior to going live with any installation. This plan, including specific test scripts must be in written form. Initially the test scripts might be high level. But before testing begins, those high-level scripts will need to be detailed and shared with all impacted stakeholders. Everyone involved in testing must understand their role and responsibility.

Reference:

NENA Security for Next-Generation 9-1-1 Standard (NG-SEC) - (NENA 75-001)[30]:
Section 11: Compliance Audits and Reviews.
USDoT NG9-1-1 POC Test Plan[40]: Entire Document.

2.16 Acquisition

Acquisition is usually done as a Request for Proposal (RFP) or similar. Acquisition may be done as a single provider solution or be provided by more than one source. Regardless of how the solution is acquired, local and state procurement laws will dictate the process.

References:

The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Procurement Tool Kit[8]: Section 2 NG9-1-1 Planning Tool and Section 3 Procurement Tool.
NASNA Model State 9-1-1 Plan[11]: Appendix A.

2.17 Training

Expect and plan for training of telecommunicators, technical and administrative personnel. It is important to include training for the technical staff who will be called upon to perform administration of the system once it is up and running.

References:

Virtual PSAP Management - (NENA-INF-025)[39]: Section 8 Training.
Synchronizing GIS with MSAG and ALI - (NENA 71-501)[26]: Entire document.
APCO ANS 3.103.2.2015 Minimum Training Standards for Public Safety Telecommunicators[31]: Entire Document.
Handling Text-to-9-1-1 in the PSAP Information Document[41]: Section 4.

2.18 Testing

Prior to going live, a thorough test of all system components should be performed. Using the testing processes developed during the "Deployment and Testing Planning" step, apply the tests, as appropriate, and document the results for all system components.

References:

NENA Security for Next-Generation 9-1-1 Standard (NG-SEC) - (NENA 75-001)[30]: Sections 7.1.5.3; 7.2.8.3.1; 7.4.5; 13.2.1.
NENA NG9-1-1 System and PSAP Operational Features and Capabilities Requirements - (NENA 57-750)[42]: Sections 3.1; 5; 7.
NENA i3 Standard for Next Generation (NENA-STA-010)[23]: Section 10.

2.19 Go-Live

A Go-Live Checklist should be developed to be used to determine if all procedures, system capabilities, fallback or failover considerations, and interoperating systems are ready for cutover to live operations on the NG9-1-1 system. Among possible items for such a high-level checklist are the following:

- Has compliance been achieved with all statutes or regulations that allow a state, regional, or local 9-1-1 authority to deploy, operate, or manage software and database controlled NG9-1-1 systems?

- Does the 9-1-1 Authority have sufficient jurisdiction to implement NG9-1-1 emergency service IP networks to replace dedicated 9-1-1 systems that are shared among multiple emergency response entities?
- Are existing liability protection statutes or regulations in place to cover all services and information that may be delivered over NG9-1-1 systems and shared among emergency response entities (e.g., voice, sensors, images and other data, video, medical records, and any new, not yet developed, product or service)?
- Are existing privacy, confidentiality, disclosure, and retention statutes or regulations sufficient to apply to all types of 9-1-1 calls and call content that are possible with an NG9-1-1 system (e.g., voice, data, images, video, information from third-party databases added to a 9-1-1 call record)?
- Has full coordination and planning been achieved with Originating Service Providers (OSPs) to allow native delivery of emergency calls via Internet Protocols?
- Are all system maintenance and Service Level Agreements in place to allow the NG9-1-1 network and system to be managed and operated operate in a secure 24/7/365 fashion?
- Have all Policy Routing Rules and Call Diversion strategies been established and agreed to with surrounding jurisdictions?
- Has a rollback plan been developed that would be implemented if the Go-Live is not successful? For instance, if a situation at the PSAP requires a physical evacuation to the organization's backup facility, the secondary location can begin live operations relatively quickly and not be susceptible to service interruptions.
- Has all system and end-user training been completed to ensure the user community and maintenance staff are prepared to operate and support the system?
- Has a complete treatment of verification and validation taken place to ensure GIS data for NG9-1-1 meets or exceeds the NENA 98% accuracy threshold?
- Has the NG9-1-1 Service Provider completed all Operational Readiness Tests of the network to include end-to-end tests, integration with NG9-1-1 Core Services Functional Elements, system and network failover tests, third-party integration tests, and Call Handling System integration tests?
- Has consideration and planning for denial of service attacks, telephony denial of service attacks and other cybersecurity protections been completed and thoroughly tested?
- Are the necessary call and system performance metrics for NG9-1-1 identified and able to be captured within reporting and systems and management monitors to allow the 9-1-1 Authority to measure system performance and to monitor key performance thresholds?
- Is there a detailed Transition Go-Live Plan (including tasks delineated in hourly increments with specific individuals assigned to tasks for Go-Live Day) in place with all system and network partners? A well-coordinated and well-documented cutover plan is needed to systematically and efficiently make the cutover from the legacy 9-1-1 system and legacy Service Provider to taking calls with the new System Service Provider within the NG9-1-1 system.

References:

The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Procurement Tool Kit[8]: Section 2 and Section 3.

2.20 Management and Maintenance

As an ongoing element of the project, both the provider and public stakeholder will have a role in continual management and maintenance of the NG9-1-1 system and its components. Maintenance becomes an active part of the "Statement of Documentation" process and will remain an active role throughout the life of the network and system.

References:

Next Generation 9-1-1 Transition Policy Implementation Handbook (March 2010)[18]: NG9-1-1 Transition Policy Issue Number: One; NG9-1-1 Transition Policy Issue Number: Two.
NASNA Model State 9-1-1 Plan[11]: Appendix A.
NENA NG9-1-1 System and PSAP Operational Features and Capabilities Requirements - (NENA 57-750)[42]: Sections 3.1; 5; and 7.
NENA Mutual Aid Standard/Model Recommendation - (NENA-STA-009)[43]: Section 3.12.
NENA Next Generation 9-1-1 Data Management Requirements - (NENA-REQ-002)[44]: Section 3.

2.21 Other References under Development

The following documents are under development within NENA and nearing completion and will prove very useful to those looking for guidance and insight to prepare for NG9-1-1. Links to the documents are not yet available.

NENA Managing and Monitoring NG9-1-1 *(Under development – link not available yet)* (NENA-INF-040): Entire Document.

NENA Next Generation 9-1-1 Fundamentals. *(Under development – link not available yet*). The intent of the Guide to NG9-1-1 is to make the NG specs understandable for the 9-1-1 authorities and PSAP managers.

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3 Recommended Reading and References

A comprehensive list of references is found below. The reader should be aware of an annual effort undertaken by the National 911 Program to prepare a document, "The Next Generation 911 (NG911) Standards Identification and Review"[45] document. The Next Generation 911 (NG911) Standards Identification and Review document is a compilation of existing and planned standards for NG9-1-1 systems distributed by the National 911 Program, a department of the National Highway Traffic Safety Administration of the US Department of Transportation. The mission of the National 911 program is to provide federal leadership and coordination in supporting and promoting optimal 9-1-1 services.

The NG911 Standards Identification and Review document is updated annually to reflect the latest status in NG9-1-1 and related standards. It is a living document that contains information on various standards activities related to NG9-1-1. The document includes a description of the importance of Product, Interface, Data, Design, Test, Performance, and Operational standards, and provides information on the best practices, stakeholders, and standards organizations. The document highlights NG9-1-1/ESInet standards but not lower level standards such as SIP and VoIP.

The core of the document includes references to standards documents from the various organizations including 3GPP, APCO, ATIS, DOC, FCC, ISAO, NENA, and USTelecom. All of the relevant standards committees are also listed. The appendix to the document contains a table with all NG9-1-1 standards documents listed with information on their relevance to the NENA i3 Architecture. The standards documents are categorized based upon whether they relate to Client, Access Networks, Origination Networks, NG9-1-1/ESInets, or PSAPs.

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[1] 2011 9-1-1 Tutorial V4.1. This PowerPoint contains information on NG9-1-1 and the transition to it and a high-level overview to help you be conversant. It does not contain a complete picture detail of NG9-1-1, nor is it intended to make anyone an expert in NG9-1-1.

[2] National 911 Program and NASNA's NG911 & FirstNet Guide for State and Local Authorities. This document published through a cooperative effort between NASNA and the National 911 Program provides a non-technical guide for state and local authorities on NG911 and FirstNet.

[3] FCC Task Force on Optimal PSAP Architecture (TFOPA). The Task Force on Optimal PSAP Architecture (TFOPA) was a federal advisory committee chartered under the Federal Advisory Committee Act (FACA) to provide recommendations to the Federal Communications Commission (FCC) regarding actions that Public Safety Answering Points (PSAPs) can take to optimize their security, operations, and funding as they migrate to Next Generation 9-1-1 (NG9-1-1). The Task Force created a Final Report covering three broad topics: Cybersecurity, Architecture, and Funding of NG9-1-1.

[4] Call Answering Standard/Model Recommendation - (ANS NENA-STA-020). This document serves as a model standard operating procedure for the call taking function within Public Safety

Answering Points (PSAPs) and provides uniformity and consistency in the handling of 9-1-1, other emergency calls and administrative non-emergency calls.

[5] FCC's National Broadband Plan. Contains the results of state infrastructure availability. The portion of this document that pertains to NG9-1-1 is specific to the section on Public Safety and homeland security. That section has mention of, but does not contain larges amount of quality data. In addition, it talks about broadband in general and backhaul. Broadband is the backbone of an ESInet, so in that instance there is some value as well.

[6] NENA Standard Managers Guide to American with Disabilities (ADA) Title II: Direct Access - (NENA-STA-035). NG9-1-1 is an important step forward to allow for individuals who are deaf, deafblind, hard of hearing as well as individuals who have speech disabilities to have direct access to 9-1-1 emergency services using various communication modalities. Many individuals with disabilities are using Internet and wireless text devices as their primary modes of telecommunications. At the same time, PSAPs are considering and planning to shift from analog telecommunications technology to new Internet-Protocol (IP) enabled NG 9-1-1 services that will provide voice and data (such as text, pictures, and video) capabilities. The FCC initiated rule making effort developed revisions to the Department's regulation to ensure direct access to NG 9-1-1 services for individuals with disabilities. On February 22, 2012, Congress enacted the NG9-1-1 Advancement Act of 2012 as part of the Middle-Class Tax Relief and Job Creation Act of 2012.

[7] Draft Report for National 9-1-1 Assessment Guidelines. The National 911 Program developed consensus guidelines that can be used to assess statewide 9-1-1 systems in preparation for NG9-1-1. The consensus guidelines serve as an objective benchmark for the assessment of the status of a statewide 9-1-1 system and is a useful tool to evaluate where a state's system currently stands, provide a path for enhancement, and provide an objective evaluation that may help states leverage their respective resources. States are not required to adopt the guidelines; any established assessment process will be conducted on a voluntary basis.

[8] The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Procurement Tool Kit. This Procurement Tool Kit seeks to help improve communications among the various individuals, groups, and companies interested in NG9-1-1. The Procurement Tool Kit has four parts, and while mostly independent of one another, each is designed to support an iterative process, building on the previous part. The document offers tools to assist with assessment, planning, procurement, and evaluation of success. Briefly, the document includes the following sections:

- Preliminary Assessment Tool - A survey to help identify the current state of emergency communications readiness for NG9-1-1. Within the various topic areas (e.g., planning, governance, standards and technology), identify what work has been completed or is in process that pertains to NG9-1-1 features or issues.
- NG9-1-1 Planning Tool - Planning for implementation of NG9-1-1 is a critical task, considering the multiple aspects associated with developing a comprehensive plan. The planning tool describes the recommended plan components and process steps, offers suggestions, and includes links to additional references and resources.
- Procurement Tool - The procurement tool offers guidance with procuring goods and services associated with a transition to NG9-1-1.

- Post-Implementation Evaluation Tool - Upon completion of a procurement or NG9-1-1 implementation, we urge stakeholders to review their efforts, identify lessons learned, and share that valuable information with others across the 9-1-1 community.

[9] The USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative Transition Plan The NG9-1-1 Initiative has researched and analyzed the transition issues along with the strategic elements and options that could be followed to further the progress and implementation of NG9-1-1. The intent of this Transition Plan is to frame the view of NG9-1-1 deployment issues held by stakeholders and provide options for addressing key issues with the goal of making implementation a reality.

[10] NENA Inter-Agency Agreements Model Recommendations - (NENA-INF-012).
This document is provided as a Model Recommendation for the development of Mutual Aid Agreements and Memorandums of Understanding (MOUs) between Public Safety Answering Points and affiliated or support organizations. The documents discussed and attached should be modified to meet the unique requirements of individual States and Municipalities. The purpose of the NENA Inter-Agency Agreements Model Recommendations is to provide rationale and guidance for the development, promulgation and implementation of agreements between public safety communications and affiliated agencies to share information as needed to provide the highest level of service to the citizens.

[11] NASNA Model State 9-1-1 Plan - This document is dated, was produced in 2008. Nevertheless, it still contains good information. This document contains models for state coordination and collaboration; approaches oversight and management of the state's 9-1-1 network; mechanisms for establishing and monitoring process in implementing the state's 9-1-1 system; mechanisms for the allocation of state and federal funding, if available, to PSAPs for equipment and operations; and methods by which PSAPs will integrate with other emergency communication, telecommunications and information networks.

[12] NENA Master Glossary of 9-1-1 Terms (NENA-ADM-000) - Provides a consistent definition for all definitions and acronyms identified with NENA Standards documents produced by the NENA Committees.

[13] IT Infrastructure Library (ITIL). ITIL is a collection of best practices on a variety of IT project related topics. It includes recommendations about maintaining project documentation under its Service Asset and Configuration Management section.

[14] NENA/APCO Next Generation 9-1-1 Public Safety Answering Point Requirements (NENA/APCO-REQ-001). This technical document introduces requirements for a NG9-1-1 Public Safety Answering Point (PSAP) that can receive IP-based signaling and media for delivery of emergency calls conformant to the latest version of the NENA i3 Architecture document.

[15] SMS Text-to-9-1-1 Resources for PSAPs & 9-1-1 Authorities. The purpose of this document is to assist NENA members in reaching out to the public, special interest groups, and other key stakeholders regarding the implementation of Interim SMS Text-to-9-1-1. It can be easily adapted to fit the size, budget, and political nature of individual regions.

[16] Next Generation 911 Cost Study, A Report to Congress (October 2018). This document provides an assessment of the current 9-1-1 service environment and the future NG9-1-1 architecture, in addition to a detailed estimate concerning the costs to bring next-generation service to the Nation's 6,000-plus public safety answering points (PSAPs), also known as 911 call centers.

[17] US DoT Final Analysis of Cost, Value, and Risk Executive Summary document. This document provides a holistic and structured approach for examining a broader range of costs, benefits and risks than those considered in a traditional cost-benefit analysis.

[18] Next Generation 9-1-1 Transition Policy Implementation Handbook (March 2010). In 2010, NENA published a report titled "Next Generation 9-1-1 Transition Policy Implementation Handbook: A Guide for Identifying and Implementing Policies to Enable NG9-1-1". In that report, several checklist items were developed to provide states and other regional 9-1-1 authorities with a framework with which to evaluate their respective state and/or local legislation in light of how well that legislation enables the transition to NG9-1-1. The Colorado 9-1-1 Resource Center volunteered to evaluate how well the checklist items met their intended need and this report documents that process.

[19] Model State 911 Plan - NHTSA. The Model State 9-1-1 Plan document is intended help states develop a better planning and coordination process for 9-1-1 communications. It addresses the following elements:

- Models for state coordination and collaboration;
- Approaches to oversight and management of the state's 9-1-1 network;
- Mechanism for establishing and monitoring progress in implementing the state's 9-1-1 system;
- Mechanism for the allocation of state and federal funding, if available, to public safety answering points (PSAPs) for equipment and operations; and
- Methods by which PSAPs will integrate with other emergency communication, telecommunications, and information networks.

[20] Overview of Policy Rules for Call Routing and Handling in NG9-1-1 - (NENA-INF-011) (originally NENA 71-502). This document is an overview of what policy rules are, how policy is defined, and the ways that they may be used. Policy rules influence the delivery of calls to a PSAP and, how these calls are handled based on call taker skill sets and other criteria. Policy rules are defined and implemented by the governing 9-1-1 Authority. This document is currently under update.

[21] USDoT Next Generation 9-1-1 (NG9-1-1) System Initiative: Final System Design Document. The NG9-1-1 Final System Design document is the culmination of the technical work of the NG9-1-1 Initiative. Starting with the NG9-1-1 Concept of Operations (CONOPS), the project team leveraged past work done in the public safety and standards communities. After the CONOPS, the project developed both high-level and detailed requirements, an architecture analysis report, and the initial system design. These project artifacts served as the basis for the Proof of Concept (POC)

Deployment Plan. This document helps to define the system architecture and develop a transition plan that considers responsibilities, costs, schedule, and benefits for deploying NG9-1-1.

[22] NG9-1-1 Transition Planning Considerations - (NENA-INF-008). This Information Document is intended to provide NENA's recommendations for transitioning to NG9-1-1. In doing so, this document reflects the definition of NG9-1-1 developed by NENA through a separate work effort, and is summarized as follows: NG9-1-1 is a system comprised of hardware, software, data and operational policies and procedures briefly described below, to:

- process emergency voice and non-voice (multi-media) calls
- acquire and integrate additional data useful to call routing and handling
- deliver the calls/messages and data to the appropriate PSAPs and other appropriate emergency entities
- support data and communications needs for coordinated incident response and management.

[23] NENA i3 Standard for Next Generation - (NENA-STA-010) (formerly Detailed Functional and Interface Specification for the NENA i3 Solution – Stage 3). This is a NENA standards document that describes requirements for end-state NG9-1-1 architecture. The document describes standards for the Emergency Services IP network (ESInet), i3 Public Safety Answer Points (PSAPs), legacy gateway systems, and functional elements that make up the NENA i3 architecture for Next Generation 9-1-1.

[24] NENA White Paper - A PSAP Managers' Guide to Geographic Information Technology . The paper includes information on how to best deal with wireless information coming into PSAPs. The focus of the paper is how to best utilize GIS in dealing with wireless calls in a PSAP.

[25] NG9-1-1 Additional Data - (NENA-STA-012) (originally NENA 71-001). (Update in Progress). With the implementation of NG9-1-1 there will be many forms of additional data available to emergency responders. This document covers the use of additional data associated with a call, a location, a caller and a PSAP. Together with the SIP Invite and PIDF-LO, additional data associated with a call has the ability to look at other data sources; i.e., Vehicle Emergency Data Set (VEDS) to assist in determining the appropriate call routing and handling.

[26] Synchronizing GIS with MSAG and ALI - (NENA 71-501). This document is the NENA information document for the synchronization of certain Geographic Information Systems (GIS) database layers with the Master Street Address Guide, the Automatic Location Information data, and optionally the site / structure locations. This document is meant to provide PSAP management, vendors, and other interested parties necessary guidelines for synchronizing GIS data with existing 9-1-1 databases. The synchronization process of the GIS data is most reliably accomplished by qualified, trained individuals or vendors that have received formal GIS training and instruction.

[27] NENA Provisioning and Maintenance of GIS Data to ECRF/LVF - (NENA-STA-005). This document defines operational processes and procedures necessary to support the i3 Emergency Call Routing Function (ECRF) and Location Validation Function (LVF). Additionally, this document

identifies ECRF/LVF performance and implementation considerations for 9-1-1 Authorities' consideration.

[28] NENA NG9-1-1 Civic Location Data Exchange Format Standard - (NENA-STA-004). The CLDXF standard document describes the exchange of United States civic location address information for 9-1-1 calls, both within the US and internationally, including its outlying territories and possessions and defines the detailed data elements needed for address data exchange.

[29] NENA Standard for NG9-1-1 GIS Data Model - (NENA-STA-006). This document defines the Geographic Information Systems (GIS) Data Model, which supports the NENA Next Generation 9-1-1 (NG9-1-1) Core Services (NGCS) of location validation and routing, both geospatial call routing or to the appropriate agency for dispatch. This model also defines several GIS data layers used in local Public Safety Answering Point (PSAP) and response agency mapping applications for handling and responding to 9-1-1 calls.

[30] NENA Security for Next-Generation 9-1-1 Standard (NG-SEC) - (NENA 75-001). The purpose of this document is to establish the minimal guidelines and requirements for the protection of the NG9-1-1 assets or elements within a changing business environment. It identifies basic requirements, standards, procedures, or practices to provide the minimum levels of security applicable to NG9-1-1 entities. This document will impact the operations of 9-1-1 systems and PSAPs as standardized security practices are implemented where they have not been in place before. NG9-1-1 entities will be required to understand, implement and maintain new security solutions, mechanisms and processes.

[31] Minimum Training Standards for Public Safety Telecommunicators - (APCO ANS 3.103.2.2015). This document provides nationally recognized, universally accepted, minimum topics that can be used to train aspiring and current 9-1-1 telecommunicators (call-takers and dispatchers) and which provide the foundation for their ongoing professional development.

[32] NENA NG9-1-1 Processing Metrics Standard - (NENA-STA-019). The intent of this document is to define normalized NG9-1-1 call processing metrics for computing useful statistics so that independent implementations can derive the same comparable measurements.

[33] Next Generation 9-1-1 Security (NG-SEC) Audit Checklist - (NENA-75-502). This document provides a summary of the requirements and recommendations detailed in the NGSEC standard and provide the educated user a method to document a NG-SEC Audit.

[34] NENA NG9-1-1 Evaluation and Testing Programs). This webpage lists NENA's series of testing and evaluating programs to support the rollout of NG9-1-1.

[35] NENA Emergency Services IP Network Design for NG9-1-1 (ESIND) - (NENA-INF-016). This document is intended to provide information that will assist in the development of requirements necessary to design ESInets that meet industry standards and best practices related to the NG9-1-1 systems that will depend on them for services. Readers are encouraged to review and refer to this

document during preparations for procuring, building and implementing an ESInet and to use it as an informative resource.

[36] NENA Recommended NG9-1-1 Public Education Plan for Elected Officials and Decision Maker. The purpose of this document is to assist NENA members in reaching out to local decision makers to educate them on NG9-1-1 basics and the need to address funding, legislative and regulatory issues to enable the transition to NG9-1-1.

[37] Sample Brochure for Elected Official Explaining NG9-1-1. This brochure is an example of a brochure to communicate with elected officials about the purpose and goals of NG9-1-1.

[38] What is the Future of 9-1-1?. This PowerPoint slide deck is some background information for where 9-1-1 is headed and might prove useful as a starting point for an agency conducting outreach to stakeholders who need to become involved in the expected changes.

[39] Virtual PSAP Management (NENA-INF-025). This document is intended as a guide for PSAP staff and policy makers to evaluate and consider the opportunities and challenges presented with the NG9-1-1 systems as they relate to personnel and PSAP management. Specifically, what considerations might be necessary for employing virtual workers for the traditional PSAP environment.

[40] USDoT NG9-1-1 POC Test Plan. The reader should note that the USDoT POC test plan document provides information that can help organize system testing, but the Proof of Concept tests represented only part of the overall NG9-1-1 system as applicable to the specific POC objectives.

[41] Handling Text-to-9-1-1 in the PSAP Information Document. The NENA Information Document (INF) for Handling Text-to-9-1-1 in the PSAP is intended to provide a guideline for PSAPs with recommendations for emergency calling to 9-1-1 using text messaging.

[42] NENA NG9-1-1 System and PSAP Operational Features and Capabilities Requirements - (NENA 57-750). This document is intended to be a guide for the NENA Technical and Operations Committees, as well as other national and international standards organizations, to use in developing and finalizing standards in preparation for implementation of standards-based NG9-1-1 systems. The IP network, 9-1-1 equipment, software vendors, as well as service providers should use this requirements document as a guide during their product research and development. PSAP administrators may also find this document useful for planning purposes, as they prepare to transition from their current 9-1-1 system to NG9-1-1 systems, and to update internal policy and procedures to leverage the new features, requirements, and capabilities in the NG environment.

[43] NENA Mutual Aid Standard/Model Recommendation (NENA-STA-009). This document is provided as an Operational Standard/Model Recommendation for the development of Mutual Aid Agreements (MAA) or Memorandums of Understanding (MOU) between Public Safety Communications Agencies. This document is a Model Recommendation and should be modified to meet the unique requirements of individual States and Municipalities. It provides the essential

elements of a Mutual Aid Agreement. All elements should be detailed to the extent required for the agencies involved and should be reviewed by legal counsel prior to establishing such an agreement.

[44] NENA Next Generation 9-1-1 Data Management Requirements (NENA-REQ-002). This document defines discrepancy report and the performance reports associated with processes within the Next Generation 9-1-1 (NG9-1-1) system. The intent of the document is to provide 9-1-1 Authorities, vendors, Communication Service Providers (CSP), and other interested parties with guidelines for communicating issues or status of various elements within the system. The components of the document are Discrepancy Report Requirements and Performance Statistic Report Requirements.

[45] The Next Generation 911 (NG911) Standards Identification and Review. This document provides 911 leaders easy access to a robust list of standards that support informed decisions for an effective and efficient transition to NG911. The report includes a "what's new" section that identifies standards added or updated in a year. In addition to identifying hundreds of NG911-related standards, it also provides insights on the different types of standards, information about how they are developed and accredited, and a description of why NG911 standards are necessary. The report also addresses categories where additional standard development is needed, including access and origination networks, call signaling, call routing, call logging, and geographic information systems (GIS) and other call attribute data.