

# Transitioning Emergency Communications Into The Next Generation

**NENA Next Generation Partner Program  
2006 Report**



NATIONAL EMERGENCY NUMBER ASSOCIATION



## NEXT GENERATION PROGRAM PARTNERS

In just over two years, the number of NENA NG Partner Program members has more than doubled. Collective guidance and input from these entities has proven invaluable across multiple initiatives and projects.

Numerous action items and recommendations from organized NGPP meetings have been incorporated into a broad spectrum of NENA operational, policy and technical groups and other industry efforts. While NGPP output (including topic meeting reports, white papers and the annual summary report) document many remaining questions and challenges related to NG9-1-1, the overall knowledge base and appreciation of the importance of the issue continues to rapidly expand. In addition to increased awareness of NG9-1-1, more specificity and detail around a multitude of operational, technical and policy issues are being developed as part of a detailed NG9-1-1 project plan.

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#### 2006 Program Partners:



#### New Partners joining in early 2007:



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#### FOR MORE INFORMATION

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Visit [www.nena.org](http://www.nena.org) for a copy of this report and for additional information on the NG Partner Program.

# Next Generation Challenges

In the past 15 years, advancements in modern communications technology have created the need for a more advanced system to access emergency care. While the existing 9-1-1 system has been successful for more than 30 years, it has been stretched to its limit as technology advances. New wireless and IP-based communications devices are being developed at a rapid rate, offering capabilities such as combined audio, video, text messaging, and Internet access.

Unfortunately, the current 9-1-1 system was never intended to receive calls and data from these new and emerging technologies. As a result, the nation's 9-1-1 systems are in need of a significant overhaul in order to keep pace with a growing need to perform new functions.

According to a recent research and market survey <sup>1</sup>, more than 9 percent of U.S. wireless subscribers currently use wireless handsets as their primary phone, and between 23 and 37 percent of U.S. wireless subscribers will use their handsets as their primary phone by 2009<sup>1</sup>. Research also suggests that the 8 million U.S. residential VoIP subscribers who exist today will exceed 27 million by 2009<sup>2</sup>.

In addition to the proliferation of new devices and data sources, local and wide area wireless networks are allowing the mobile public to communicate wirelessly from more locations. Some cities, including San Francisco and Philadelphia, are in the process of provisioning citywide Wi-Fi networks that will potentially allow the public to wirelessly communicate on IP-enabled devices from anywhere in their metropolitan areas. Additionally, WiMAX build out is beginning to occur, including at least one nationwide initiative of a major communications provider.

Applying these new technologies to emergency communications offers significant opportunities but also presents major challenges to the 9-1-1 community, which raises questions that await final answers.

- How do you locate a business traveler dialing 9-1-1 from a portable computer on the 10th floor of a hotel in an unfamiliar city?
- How do you route the IP-based 9-1-1 call and its associated data to the appropriate Public Safety Answering Point (PSAP)?
- How can this data be seamlessly shared among all entities involved with emergency response?
- How can the 9-1-1 system be developed to keep pace with emerging technologies on the horizon?
- How will the 9-1-1 system maintain funding levels as more people rely on wireless or IP voice communication?

“...to establish a cohesive vision that brings together leading technology providers and public safety stakeholders to focus on critical aspects of NG9-1-1.”

<sup>1</sup> In-Stat Research and Markets Survey, Report Number: IN0502092MCM, October 2005.

<sup>2</sup> IDC: <http://www.idc.com>.

- How, if we are to migrate from today's 9-1-1 system to IP-based emergency communications networks, will such a migration be funded and what jurisdictional, regulatory and legislative issues might arise?

To respond to the changing communications landscape, it is apparent that there is a critical need for an IP-enabled Next Generation 9-1-1 (NG9-1-1) system, one that is able to adapt rapidly to new technology and support new communications devices. Such a move, from today's 9-1-1 system to NG9-1-1, requires a national focus on key technical, operational, and policy issues.

The National Emergency Number Association (NENA) formed the NG Partner Program to create a public/private partnership to improve the nation's 9-1-1 system. The primary objective of this program is to establish a cohesive vision that brings together leading technology providers and public safety stakeholders to focus on critical aspects of NG9-1-1. Since migrating to NG9-1-1 requires significant collaboration among multiple parties, a major focus of the NG Partner Program has been to ensure that all issues are thoroughly examined with a national project management approach.

By early 2007, 40 partners have joined the program. This represents a more than 50 percent increase from 2005.

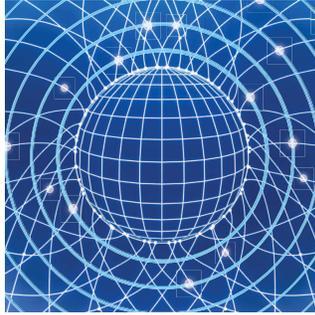
#### **Program Structure and Results**

In 2006, the program partners focused on eight specific topic areas by holding three two-day sessions and two one-day sessions. The topic areas discussed were Funding, Data, Location/National Call Routing, Education, Requirements/Standards, Demos/ Trials/IP Network Deployments, Interoperability, and Disaster Planning.

When possible, the partners provided specific recommendations. In other instances, issues that require additional consideration have been identified. Recommendations of the program partners are shared with existing NENA committees as valued input. In many instances, such input has resulted in positive action.

Much work remains to be done. NENA will continue its leadership position in the development and enabling of an NG9-1-1 system. The 2007 NENA NG Partner Program is designed to further address the issues identified in 2006.

"In some instances, emergency responders are being sent into harm's way without the information they need and others are being asked to operate with technology that was in use over 20 years ago."



# The Future of Emergency Communications – A Synopsis

While the events of Sept. 11, 2001, brought national attention to the nation's out-moded emergency communications systems, NENA had already recognized the limits of the current systems and published a report, 9-1-1 Future Path Plan, in early 2001. By 2003, NENA had initiated IP-based 9-1-1 developments as other organizations also embarked on emergency communications initiatives<sup>3</sup>.

Hurricanes in 2004 and 2005 further illustrated the critical role that communications plays in supporting emergency response efforts of the public, first responders, and government. These natural disasters placed additional emphasis on disaster preparedness, response and recovery, and the need for flexible technology.

Currently, emergency responders are being asked to save lives with communications and information technology that most private citizens and businesses no longer use. In some instances, emergency responders are being sent into harm's way without the information they need and others are being asked to operate with technology that was in use over 20 years ago.

<sup>3</sup> Notable among these, and from which the source summary paper borrows liberally, are the FCC's NRIC advisory group, especially Focus Groups 1B, 1D, 2A and 2B reports, the NENA NG 9-1-1 (i3) requirements and design, federal DOJ and DHS work on XML-based data standardization, the USDOT NG9-1-1 Project, and the COMCARE E-Safety Network project. Standards efforts among many interest groups continue to develop around the opportunity to apply IP technology to radically improve and expand emergency communications capabilities.



Please refer to pages 12 and 13 for a graphic representation of **The Future of 9-1-1 and Emergency Communications: A Blueprint for a 'System of Systems'**

“New devices, such as a direct report of a heart attack from a device worn on the chest, could also have a direct link with NG9-1-1. Increased use of text messaging must also be supported, in general, and to accommodate persons with disabilities.”

## OVERALL EMERGENCY COMMUNICATIONS NEEDS

A critical weakness in existing emergency communications systems is that emergency response agencies are generally isolated from each other. Presently, the “emergency response community” includes public and private organizations that need to share emergency information, including: law enforcement, fire services, EMS, 9-1-1, emergency operations centers, hospitals, clinics, public health agencies, transportation agencies, public works departments, utilities and others.

The National Reliability and Interoperability Council (NRIC) Focus Group 1D, an advisory group of the Federal Communications Commission (FCC), identified one solution within two complementary areas: technological and institutional. In December 2005, NRIC published a final report that defined an effective future emergency communications system as an “internetwork,”<sup>4</sup> a set of policies, tools, interfaces, and standards that securely connect the multiplicity of local, regional, and national wireline and wireless networks. Such an internetwork will enable modern, integrated information capabilities to support local, regional and national emergency needs. It is, in effect, a system of systems<sup>5</sup>.

NENA’s 9-1-1 Future Path Plan also proposed a hierarchy of interconnected local, regional and national IP networks that would enable NG9-1-1 and many other emergency communications applications. The resulting model is a set of coordinated applications on an IP internetwork that serves multiple governmental functions and seamlessly interfaces voice and electronic data. In addition to improving response for daily emergencies, such a model would also improve homeland security by providing a nationally coordinated emergency response system.

The needs of the new system of emergency communications include:

- Improved natural disaster management, including the prevention of and response to potential terrorist actions.
- Full support of new communications and information technology for emergency services.
- Reducing the danger of viruses capable of generating automated 9-1-1 calls and overwhelming the network.
- Use and enhance increasingly available sources of information that are only readily available with a flexible, wide access, high bandwidth network.
- Improved accessibility and increased compatibility to ensure all Americans have access to the emergency response system, including those with disabilities.

Today, millions of cell phone subscribers and commercial vehicles with GPS and communications systems can provide precise locations and verbal descriptions of emergencies. In the future, more will be able to provide images or other data. New devices, such as a direct report of a heart attack from a device worn on the chest, could also have a direct link with NG9-1-1. Increased use of text messaging must also be supported, in general, and to accommodate persons with disabilities.

NG9-1-1 will also address N-1-1 numbers and other services, such as poison control centers using 800 services for state/regional routing. For many VoIP customers, there is limited or no access to at least some N-1-1 numbers and some 800 number emergency services cannot be properly routed.

Work is well underway within NENA, the Internet Engineering Task Force (IETF), federal XML initiatives for data management standardization, and other standards development organizations to provide the standards required to fully converge circuit switched (voice and text) and data networks into one NG9-1-1 packet network, based on IP. Infrastructure requirements include transport, standards, applications and services, policies and protocols, and associated governance.

<sup>4</sup> We use this unfamiliar term to make two points: (a) our strong belief that the model of the Internet should be copied for emergency communications in the future (except for its failure until recently to focus proper attention on security), and (b) that we do not favor building a new “national emergency network.” There are already many networks, and there need to be many more built at the state and local level. Our focus is on how to connect them (and applications that ride on them) into a seamless whole, rather than replace them.

<sup>5</sup> “System of Systems.” Emergency communications devices are associated with systems and networks that range in size from small to large. Whether large or small, the systems and the networks they use work with each other to pass information and communications back and forth seamlessly. In some cases, new networks must be deployed by agencies, localities, regions, states, tribes or federal agencies. In other cases, we need to connect tools, systems and networks that are already deployed. Our overall goal is that all systems together become a system of systems.

### NG9-1-1 AS A MAJOR APPLICATION OF THE EMERGENCY COMMUNICATIONS NETWORK

As with many other networks, NRIC Focus Group 1B foresees the convergence of data, voice, text and video networks, based on ubiquitous packet transports and using standard Internet Protocols. While 2010 will not mean the end of older telecommunications equipment, Focus Group 1B advocates that the nation should have IP-based E9-1-1 capability, and begin its transition whenever and wherever possible.

The future Emergency Services Network will accommodate a flexible services infrastructure where applications are defined and introduced without requiring major overhauls to existing network service providing elements. Capabilities will include the ability for regional and national interests to monitor, impact, and participate in emergency events or emergency preparedness. Emergency management centers at all levels of government will be able to monitor data in real time, with an ability to recognize patterns at local, regional and national levels.

Implementation of NG9-1-1 standards will have far-reaching operational impacts:

- Handling calls from new devices, which will require new processes and procedures for call takers.
- Connecting new network elements to the system will require new administration and management tasks.
- Providing new capabilities, including the ability to transfer calls with location and all associated data, will require new processes and procedures for call takers.
- Accessing additional data will require new call taker processes, procedures, and monitors.
- New databases will require new processes and procedures for call takers, database administrators and management.
- Increased information will require new decision support tools that help interpret data for call takers and dispatchers.
- Improved connectivity will create new relationships among PSAPs and other local, regional and national emergency agencies, requiring new processes and procedures for call takers and management.

Such changes to the system will position PSAPs as emergency communications hubs, but will not restrict others to access the same data. In addition, supplemental data such as telematics or patient medical history can be accessed from other sources.

### TRANSITION AND IMPLEMENTATION

Once design, standards, and testing are completed, NG9-1-1 capabilities can be implemented as sub-state or state level IP networks that are validated to have the security, authentication and management characteristics necessary for dependable NG9-1-1 service.

As shown in the diagram on pages 12-13, IP-based telecommunications services will be able to connect from the Internet via IP routers and high-level security processes into an IP-based NG9-1-1 system.

As local/regional emergency services IP networks supporting NG9-1-1 applications become interconnected to each other (as well as federal functions/networks such as homeland security), the overall benefit to emergency communications will become a reality. There is an opportunity to leapfrog wireless and other services to full E9-1-1/NG9-1-1 in areas where the traditional networks do not exist, at lower cost. For example, IP mesh networks can supply transport where no phone and/or traditional 9-1-1 access exists (e.g., remote rural areas and Indian tribal lands).

During this process, legacy telecommunications systems for wireline, wireless, VoIP and others will likely transition to IP-based connectivity and into the local emergency services IP networks. The components highlighted in green at the lower right of the diagram on pages 12-13 can be removed in preference to more effective NG9-1-1 components and functions.

Functions, such as telematics, will initially connect to the emergency services IP networks via the Internet until the internetwork of emergency services IP networks is complete. At that time, these nationally oriented services can select a connection through their local emergency services IP networks.

Current complications such as trunk groups and individual selective routing switches will no longer be an issue. Data access will become a combination of baseline information arriving with

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the “call” (whether voice, text or video), automatic delivery of additional data based on parameters defined by each emergency communications center, and call center initiated queries for supportive data.

The emergency center personnel will be able to deliver an appropriate set of data on a given emergency to any other emergency group, anywhere, via the emergency communications internet-work.

It is critical that networks, systems and applications be well tested, and that service and system operational methods be developed and interactively pre-tested before use in order to minimize potential for service disruption.

### THE ROLE OF THE NENA NG PARTNER PROGRAM

The name of the NG E9-1-1 Program has been changed to NG Partner Program. It will continue to analyze and support resolutions for identified enabling factors to accelerate implementation of NG9-1-1.

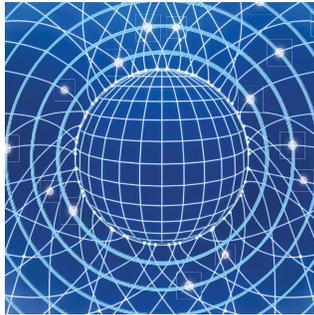
NENA's NG Partner Program's primary objective is to accelerate planning, enabling and implementation of NG9-1-1 through partnerships between business, government and other interested parties. This effort, while focused on NG9-1-1, requires a coordinated approach to remove roadblocks and meet general emergency communications infrastructure needs.

### Moving Forward

It is not sufficient to merely develop standards and plans for the technical structure and capabilities of future emergency communications networks and systems. In order to accomplish NG9-1-1 goals promptly, parallel work is required to minimize critical path timeframes. Major critical gaps/enabling factors include:

- Changing public policy to fit technological realities.
- Resolving jurisdictional issues at the local, state and federal levels.
- Converging actions across the nation on testing, pilot programs and first applications.
- Acceleration of needed standards to support NG9-1-1 development.
- Revising funding methodology and accelerating the availability of needed resources.
- Developing technical policy and protocols for interoperability among agencies
- Developing network and systems operations, methods and procedures, as well as rigorous testing.
- Educating and expanding the viewpoints of stakeholders, including the public, which is also critical to progress in other areas of public safety.

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## Topic Area Findings and Recommendations

Program partners, NENA staff, and invited content experts met face to face for a series of eight topic area meetings in 2006. Each meeting focused on a different topic – funding, data, call routing/location, education, requirements/standards, demos/trials/IP network deployments, interoperability, and disaster planning. The consensus that emerged from each of the meetings was recorded and distributed. Those reports, representing the perspective of each group, were synthesized to focus on the common themes that emerged.

It is important to note that many of the topic area discussions were occurring at the same time while critical developments in the industry required immediate action and recommendations. NENA and the program partners acted in concert to address these issues as they arose.

**TOPIC AREA #1 FUNDING**

The introduction of new IP-based voice communications technology is already having an impact on PSAP funding levels. Every month, thousands of subscribers of wireline telephone service are dropping their home telephone service in favor of voice-over-IP (VoIP) or wireless service as their primary, and often only, telephone service<sup>1</sup>.

With the loss in landline customers, there is a loss in E9-1-1 surcharge revenue that funds the current 9-1-1 system. Although wireless customers have a fee assessed, it sometimes results in less money received by the PSAP than the wireline equivalent. Work is still ongoing in most states to determine how VoIP fits into the existing model.

Right behind VoIP are a host of new wireless, text, and video devices that are expected to directly access 9-1-1. Unfortunately, it is unclear how existing providers who are already paying into the 9-1-1 system or new providers will support or cause additional drain on the system. The question — how does the existing model account for these new devices? — remains unanswered.

Examples above demonstrate the disjointed nature of the current 9-1-1 funding model and suggest that new funding models must be considered to sustain 9-1-1 today and enable the migration to NG9-1-1. There is an inherent flaw in a system that is fundamentally reactionary and treats individual technologies differently as they enter the market.

This lack of uniformity and consistency means that any shock to the system (such as the transition from wireline to VoIP phone service) will require an on-the-fly fix to ensure that funding levels not only remain consistent but also support serious technical and operational impacts. Simply put, under the current model, it is impossible to maintain the status quo, let alone fund NG9-1-1.

New ideas are needed, leadership is required from government at all levels and industry, and all parties need to rethink how 9-1-1 and emergency communications will be funded.

A key component of this discussion must be to understand how technology will enable solutions to improve the public's access to a modernized 9-1-1 system while simultaneously providing a backbone for voice and data communications among all entities involved in emergency response. In other words, the same emergency services IP network that will enable NG9-1-1 will also enable interoperable voice, data, and video communications among all emergency responders. Thus, a funding model must reflect such a reality. It requires less focus on an individual profession or function and more focus on improving the emergency response system as a whole. This can only be accomplished through the sharing of funds and technology.

**PRINCIPLES OVERVIEW**

Regardless of the ultimate model chosen, sufficient funds must be provided to pay for migration to and maintenance of NG9-1-1 (the network and associated control and database systems), as well as agency equipment, personnel, operational and training costs.

In assessing and collecting 9-1-1 emergency communications funds, some basic principles include:

- Funds collected must be used for their intended purpose - No raiding for non-9-1-1/emergency communications purposes
- Funding from all access methods – Any communications device in which the public has an expectation to receive emergency services
- Technology and competitively neutral
- Equitable allocation of revenues
- Constantly evolving system focused on improving level of service
- Efficient, accountable operations
- Coordination, cooperation and collaboration amongst all industry players and government entities

“There is an inherent flaw in a system that is fundamentally reactionary and treats individual technologies differently as they enter the market.”

“...under the current model, it is impossible to maintain the status quo, let alone fund NG9-1-1.”

<sup>1</sup> Residential access lines have dropped from 127.3 million in 2001 to 104.7 million in June 2006, an 18 percent decrease. Business access lines have dropped 62.8 million in 2001 to 58 million at the end of 2005. Source: Federal Communications Commission, Trends in Telephone Service - [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-270407A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-270407A1.pdf) .

### FUNDING NEEDS TO FOLLOW ARCHITECTURE

Today, funding for emergency communications and 9-1-1 assumes that individual agencies and professions (9-1-1, law enforcement, EMS, public health, emergency management, transportation, etc.) must bear all of the costs for their communications needs. Thus, funding for individual agencies and professions is fragmented and uncoordinated, leaving agencies often competing for the same funds and developing systems that are not interoperable.

The NG9-1-1 model envisions a system with shared networks, databases and applications in which the communications costs of all agencies are potentially shared, and thus reduced. However, while there appears to be general agreement on overall architecture, there is not yet clear agreement as to which entity funds what and at what level. Therefore, it is imperative that efforts be made to identify both existing and new physical and operational components of an NG9-1-1 system and determine how major components should be funded.

Elements of an NG system that need to be funded include:

- **Technical standards:** Domain specific standards (standards that are unique to an individual profession) should continue to be developed and funded through existing sources. However, national multi-domain standards (e.g. messaging standards, network interface standards) should be developed nationally. While federal funding to assist in such standards/interface development should be provided, the standards should be national, not federal, and such standards must be practitioner driven.
- **Operational standards:** Work still needs to be done to determine the affect of NG9-1-1 operational costs. For example, will allowing access to 9-1-1 from "any device, anytime, anywhere" impact PSAP staffing levels? An NG9-1-1 environment in which data of all types can be shared among agencies, something that is largely not done today, will impact the operational relationships between emergency response entities. As new technology is deployed, funding should be provided to examine these operational impacts and develop standard operating procedures.
- **Inter-network:** There will be costs associated with linking the multiplicity of emergency networks and maintaining their interoperability. It is not yet clear what level those costs will be and who will be responsible to fund such efforts.
- **Emergency network:** There will be costs associated with building and maintaining a private but shared wired and/or wireless emergency services network for some, or all emergency response agencies in a given geographic area. As currently envisioned, the cost for an individual agency will be that agency's share of a managed state or local IP network. Cost for a connection to the network (each agency pays a recurring fee, state pays connection costs, etc.) may be determined based on the geographic level of the network (national, state, regional).
- **Facilitation services:** Facilitation services are shared services that no individual entity should be responsible for funding on its own. Examples include: shared authentication services, rights management, and directory services. Such shared facilitation services do not exist today. Initial funding from federal and state governments is needed to establish these services. However, it is envisioned that these shared services are owned and operated by a cooperative effort of all emergency response professions. After initial seed capital is provided by federal/state governments, facilitation services will be self-sustaining and paid for through subscriptions by individual emergency response entities, public and private, that need access to the information.
- **Shared software systems:** Applications or services can be acquired to service multiple agencies in a geographic or professional area. These could include a shared GIS system or an ASP-based CAD system for multiple 9-1-1 centers. In other words, agencies can replace single-use Customer Premises Equipment (which is presumed to be acquired on an individual agency-by-agency basis) with shared systems at a lower cost.
- **Unique software systems and Customer Premises Equipment:** As they are today, it is presumed that these systems will continue to be acquired on an individual agency-by-agency basis.

In determining all of the elements of NG9-1-1/emergency communications that must be funded, at what level, and by whom, several factors must be considered:

- No single funding model will work, at least not in the near to intermediate term. Individuality of state/local governments must be respected.
- Spend money to save money – There will be initial costs associated with the building or adap-

"...funding for individual agencies and professions is fragmented and uncoordinated..."

tation of existing IP-based networks and for the cost of individual connections of entities to such networks. However, it is anticipated there will be future savings in monthly recurring costs and increased capabilities from the use of such networks. There is a federal role here in providing needed seed capital.

- Federal and state policy must be revised to accommodate NG9-1-1. Current legislation and regulation must be analyzed and new policies offered that provide necessary funding and incentives to migrate to NG9-1-1.
- Education of state and municipal level government leaders is essential.

### FUNDING 9-1-1 INTO THE NEXT GENERATION

The NG Partner Program has produced a white paper for 9-1-1 leaders and policy makers entitled "Funding 9-1-1 Into the Next Generation: An Overview of NG9-1-1 Funding Model Options for Consideration." The paper does not recommend one specific model over another but puts forth several alternative funding models for consideration that outline the benefits and potential barriers to the proposed models.

None of the ideas raised are meant to be exclusive as the best funding model may be a combination of several. In addition to the funding model itself, policy makers are also encouraged to consider other systemic issues when providing funding for 9-1-1, including determining what minimum requirements PSAPs must meet to qualify for funding. The end result will consistently lower the average cost of each 9-1-1 communication through technological advancement and overall system performance.

The funding models that were identified include:

- Fixed amount surcharge on all calling services (current model)
- Surcharge on access infrastructure provider (impose a surcharge on the network provider rather than individual service providers)
- Universal Statewide Communications Surcharge (single fee on ALL devices/services that can/should connect to 9-1-1, collected at the state level)
- Universal Federal Communications Surcharge (single fee on ALL devices/services that can/should connect to 9-1-1, collected at the federal level)
- User (incident) fee (per use charge for each communication to 9-1-1)
- General Fund Tax Revenue (federal, state and local)

The entire report may be viewed at <http://www.nena.org/media/files/NGE9-1-1ProgramFundingModelOpportunitiesfinal.pdf>

### TOPIC AREA #2 AND #3 DATA AND CALL ROUTING/LOCATION

Consensus is emerging from a diverse set of emergency domains, including but not limited to 9-1-1, concerning high-level next generation emergency communications requirements, architecture, standards, services, and facilitation (core) services for an overall internetwork to enable information sharing among all emergency agencies. In this next generation environment, there little or no difference for routing and handling purposes between voice, text, or video since they are all "data."<sup>2</sup>

NENA NG Partner Program Consensus Vision Principles (expansion of ideas discussed in NRIC 1d report)

1. Enterprise definition: All emergency response organizations are included and connected in an overall Safety Enterprise framework, not just individual domains such as 9-1-1. We need to use a broad definition of emergency organization, including public and private. Rights management core services should control access to and use of these networks, not architecture. More than 100,000 emergency agencies need to be included in addition to first responders.
2. Purpose: All hazards (day to day and mass events), multi-use, multi-user.
3. Wireline or wireless? The answer is both as one enhances the other. The traditional limitation of the interoperability problem to wireless needs of first responders is no longer tenable (although that issue remains important).

<sup>2</sup> This consensus has been reached in a number of venues and is covered in NENA NG9-1-1 design work, and in existing documents including NRIC VII Focus Groups 1B and 1D reports, and "Emergency Services Enterprise Framework: A Service-Oriented Approach", Dwarkanath and Daconta, found at [www.comcare.org/ESafetyVision.html](http://www.comcare.org/ESafetyVision.html).

"Current legislation and regulation must be analyzed and new policies offered that provide necessary funding and incentives to migrate to NG9-1-1."

"...policy makers are also encouraged to consider other systemic issues when providing funding for 9-1-1, including determining what minimum requirements PSAPs must meet to qualify for funding."

4. Build a new network? Instead of building a new, single national network, it is recommended that the focus remain on the transition between existing and future systems and networks. By building an internetwork that links independently owned and operated systems and networks, both legacy and new ones, the network will be better equipped to handle future change by encouraging the appropriate levels of government to build new wireline and wireless backbone networks. For communications purposes, individual emergency domains (e.g. 9-1-1) should be generally a set of applications riding on broader emergency networks that include other emergency response organizations (and perhaps other governmental and quasi-governmental bodies).
5. Open architecture or proprietary? The answer is an open, service-oriented architecture based on industry standards. Internet protocol will handle all information: voice, data, and video.
6. Controls? (a) Data receipt. We need a strong identity rights management/access control core service to ensure security. However, in general, the default for routing should be to allow receiver control of access to information. In general, we should let organizations determine what data/incidents they receive, for what area and how – using shared core services to express those choices. (b) Networks. Moving information among the wide variety of organizations will be best enabled by having broader, shared emergency networks that include all emergency response organizations (and perhaps other government bodies). These should be managed from higher levels -- state, region – not the local or profession/domain level. (c) Core services. The new tools needed to enable modern routing across the internetwork are “core services,” to be offered collectively by the emergency communities on a shared, non-profit basis: specifically a comprehensive agency locator service/registry, and a supporting identity rights management service.
7. What do individual agencies control? They should be the primary decision makers on how they use emergency information, and what specialized, domain-specific software they use in their facilities, but those must be interoperable (interfaces to enterprise standards). Silos and one-off systems should be discouraged.
8. Architecture: The answer is to make it flat, not hierarchical or with a center. By creating a service-oriented architecture loosely coupling independently owned and managed entities, we can emphasize reusability and draw on the private sector. It is recommended to allow specific agency applications in order for organizations to retain their autonomy.
9. Process change: We can make preparation and response even better by using new information to improve emergency response beyond creating a digital record of what we used to do with voice alone.

In addition to the above, the partners reached consensus on these data items:

1. There will be an Emergency Services internetwork that will be designed fundamentally by local entities, including 9-1-1 agencies or hospitals.
2. Governance/standards should be set higher than they are today; data information would be local at most efficient level possible whether local, statewide, or regional.
3. The current trend suggests service-oriented networks, shared business processes. As a result, we need a structure that allows for the migration of an individual service to a shared service; CAD at one end, for example, shared at other end.

Routing data between applications and networks requires real interoperability between them. A number of interoperability categories beyond traditional land mobile radio uses were laid out, in ascending order of interoperability (and difficulty)

- Voice: telephone and radio
- Sneaker net; fax; email
- Sharing information using a single Web-based application
- Sharing information between two or more applications using data standards
- Reaching into third party databases for their information and acting on it with decision support tools

Radios, AVL, and Location are already working on or are going to IP. Reaching into a third party database already exists

The current state of affairs among PSAPs and all emergency agencies is not positive in the area of interoperability. Gaps identified include:

“...individual emergency domains (e.g. 9-1-1) should be generally a set of applications riding on broader emergency networks that include other emergency response organizations...”

# The Future of 9-1-1 and Emergency Communications

## A Blueprint for a 'System of Systems'

How do you locate a business traveler dialing 9-1-1 from a portable computer on the 10th floor of a hotel in an unfamiliar city? How do you route the IP-based 9-1-1 call and its associated data to the appropriate Public Safety Answering Point (PSAP)? How can this data be seamlessly shared among all entities involved with emergency response? How will the 9-1-1 system maintain funding levels as more people rely on wireless or IP voice communication? And, if we are to migrate from today's 9-1-1 system to IP-based emergency communications networks, how will such a migration be funded, and what jurisdictional, regulatory and legislative issues might arise?

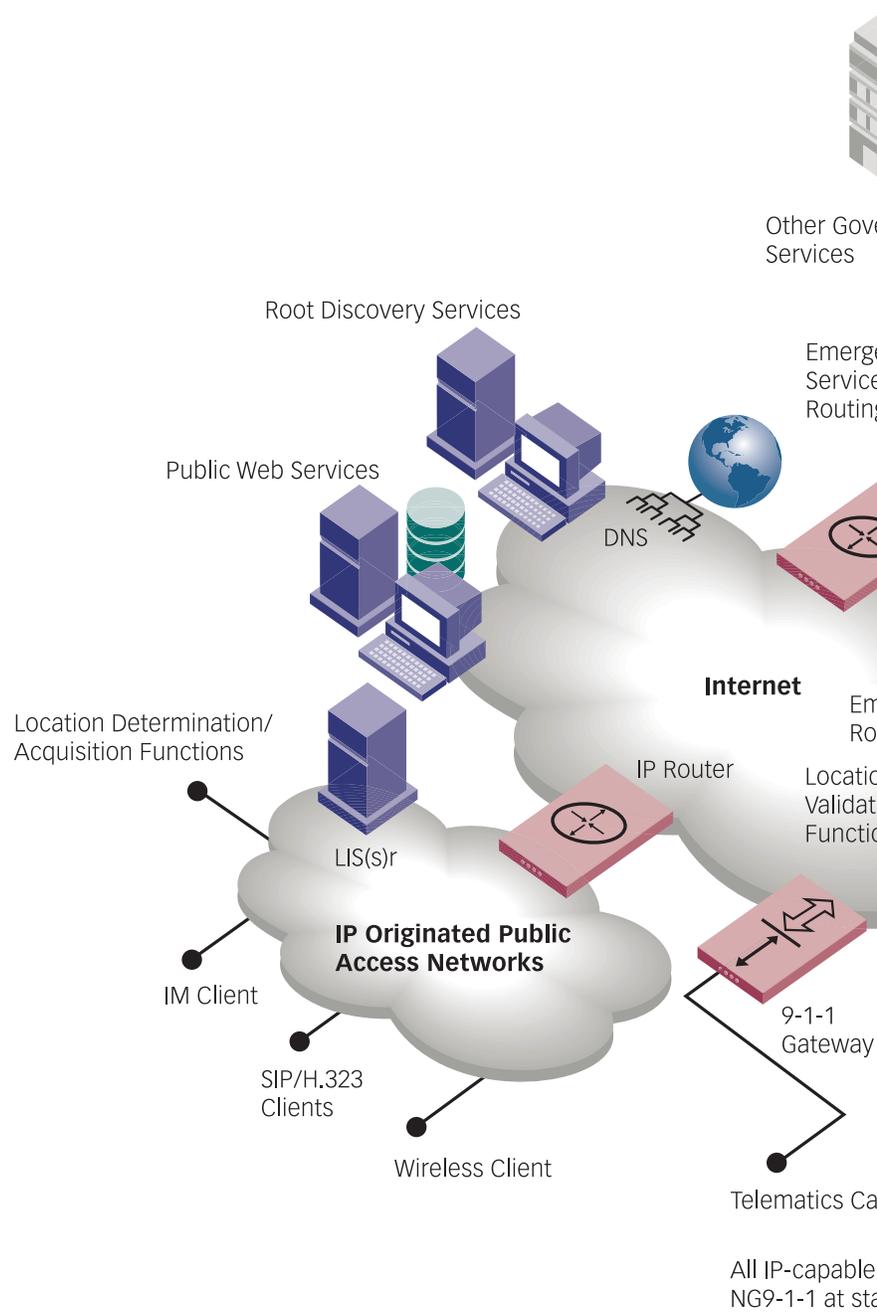
To respond to the changing communications landscape, it is apparent that there is a critical need for an IP-enabled Next Generation 9-1-1 (NG9-1-1) system, one that is able to adapt rapidly to new technology and support new communications devices.

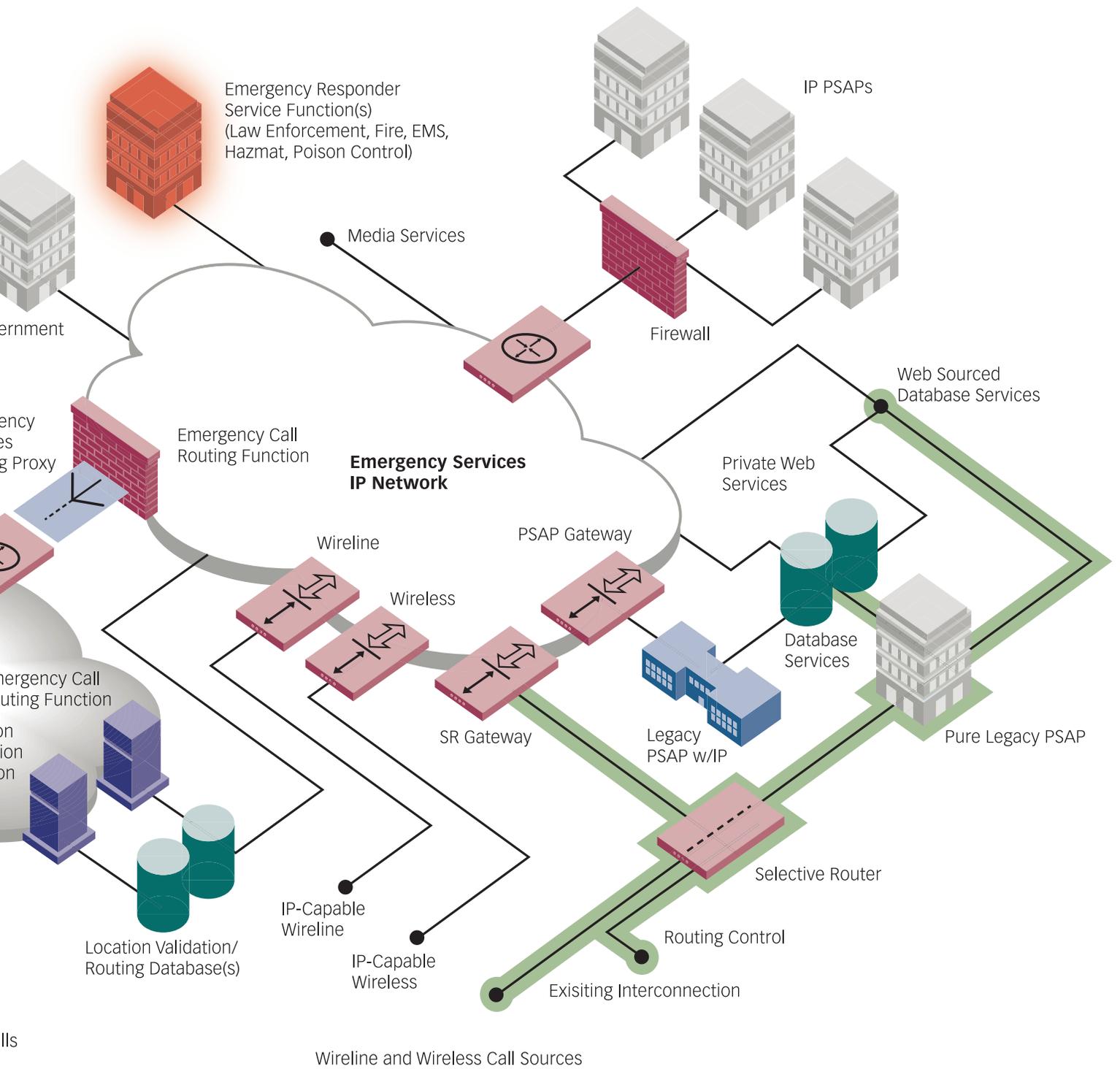
A critical weakness in existing emergency communications systems is that responding agencies are generally isolated from each other. Presently, the "emergency response community" includes public and private organizations that need to share emergency information, including: law enforcement, fire services, EMS, 9-1-1, emergency operations centers, hospitals, clinics, public health agencies, transportation agencies, public works departments, utilities, and others.

### THE 'INTERNETWORK'

The National Reliability and Interoperability Council (NRIC) Focus Group 1D, an advisory group of the Federal Communications Commission (FCC), identified one solution within two complementary areas: technological and institutional. In December 2005, NRIC published a final report that defined an effective future emergency communications system as an "internetwork" – a set of policies, tools, interfaces and standards that connect securely the multiplicity of local, regional and national wireline and wireless networks. Such an internetwork will enable modern, integrated information capabilities to support local, regional and national emergency needs. It is, in effect, a system of systems.

NENA's 9-1-1 Future Path Plan also proposed a hierarchy of interconnected local, regional and national IP networks that would enable NG9-1-1 and many other emergency communications applications. The resulting model is a set of coordinated applications on an IP internetwork that serves multiple governmental functions and seamlessly interfaces voice and electronic data. In addition to improving response for daily emergencies, such a model would also improve homeland security by providing a nationally coordinated emergency response system.





lls

call sources through  
part of transition

- MOUs and Mutual Aid agreements do not cover data exchanges
- Agencies lack critical applications to support these exchanges
- Common protocols and processes have not been developed to facilitate exchanges
- Data exchange standards mostly do not exist
- Where standards exist, vendors have not built interfaces to them
- Applications duplicate functions that should be shared: e.g. rights, routing
- Shared enabling facilitation (core) services do not yet exist
- Some define interoperability very narrowly as everyone (or each agency) having access to a single vendor product through a password
- Strong business cases of the value of data interoperability do not exist
- System to measure total cost of ownership of the multiplicity of stovepipes and duplicative functions doesn't exist

Interoperability gap analysis areas needing additional attention include:

- IP connectivity between all entities
- Local officials must buy in to plan
- Standards-based environment, agency can implement and not be told later, the agency finds out it was non-standard
- Has money now, no standards to help buy
- Security
- Closing incident and how
- Migration to the new system

One NG Partner Program action item is to create a working group to develop recommendations concerning the most appropriate entity/entities, which will determine the devices/services that may and/or should access the NG9-1-1 network.

Beyond 9-1-1 baseline information, we can get an unlimited type of data/language from the device, or related to the device, from each request for help. There is also a need to determine where this should be studied in future NG9-1-1 work.

Another NG Partner Program action item is to create a working group that will develop recommendations (operational, policy and technical) concerning the appropriate entity/entities that will analyze and enable coordinate-based routing in an NG9-1-1 environment.

Recommendations from partners include the following:

- Technical and Operations Committee liaisons provide an activities status update during each NG Program Partner meeting
- Education/Advertising subgroup - develop and promote the concept of Next Generation Emergency Communications, to include NG9-1-1
- Need PSAP minimum requirements for NG-IP interface and support
- Fund and trial alpha versions of core services, including directory services, such as an Emergency Provider Access Directory (EPAD), and associated rights management tools, in a variety of field trials
- Continue detailing governance structures for these core services
- Connect NENA Technical and Operational Committees formally into consideration of these core services
- Educate decision makers about their value in enabling interoperability and routing.
- Write up the categories of access based on:
  - Two-way dialogue
  - Voice/text
  - Telemetry
- Write-up specifics on data transport and routing, cross-domain standards, managed data, and facilitation/core services
- Security – reach out to subject matter experts on security issues
- Legal – liability/privacy statutes that preclude agency sharing of information over existing networks
- Monitor and contribute to the development of physical IP networks in various states (such as IN, IL, MD, NC and PA) necessary for NG9-1-1

“The current state of affairs among PSAPs and all emergency agencies is not positive in the area of interoperability.”

- Develop a profile of known devices and establish functional requirements to ensure valid access for recognized devices to NG9-1-1
- Ensure that NG9-1-1 system enables improved emergency alerting capabilities to all recognized communications devices

For the emergency call itself, and related data which may accompany it, there needs to be minimum core data standards. Beyond that, PSAP choice (of what will be received) must receive additional attention (rights management). However, what is done today must change in an NG9-1-1 environment. With the selective router components going away, CPE and the IP network will have intelligence. For diversity/redundancy, there must be two broadband pipes for data flow.

#### TOPIC AREA #4 EDUCATION

It is essential that all entities – PSAPs, the public safety community, government, the public, consumer groups and the media – be kept informed of developments in next generation technologies and how they will impact emergency communications.

Several issues/challenges have been identified. The public must be properly educated about how 9-1-1 actually works today, and what will be different in the future. The “need to know” messages for each target audience must be identified, as well as delivery mechanisms for each target audience. Common elements for all groups need to be identified, including specific messages for selected target audiences.

Finally, NENA and others must educate on NG9-1-1 while continuing its efforts on general 9-1-1 education. A positive message should be sent by using established, well-known characters (e.g. McGruff or Red E. Fox) in sponsored education programs. NENA and others should educate with a view toward the broad picture, but also recognize that there are state/regional differences in how 9-1-1 authorities operate.

The message should not try to “sell” NG9-1-1, but instead stress that we are evolving in order to improve 9-1-1 in a cost efficient manner. The “message” should support the people of 9-1-1 and should share what has changed in the last several years – history, current environment, near-term and long-term NG9-1-1. The message should indicate that you can dial 9-1-1 from anywhere, while remembering that there are some areas without Enhanced 9-1-1, and will continue to lack E9-1-1 during the transition to NG9-1-1.

Government may be the hardest, and perhaps most important, audience to educate, especially with respect to funding alternatives. It may be difficult to gain support for additional surcharges or fees because of an aversion to tax increases. NENA must garner support that will enable NG9-1-1.

Most of the education efforts at this time should be geared toward people in the 9-1-1 and emergency communications industry, government officials and other public safety agencies that are responsible for building out the various IP networks that will support NG9-1-1. The general public, while important to the ultimate success of NG9-1-1, should not be the primary target for near-term education efforts. It would, however, be helpful to have “60 Minutes” type segments to generate more interest in NG issues. The message must be controlled to ensure positive reporting on issues that are occurring during the transition period.

#### TOPIC AREA #5 REQUIREMENTS/STANDARDS

Defining NG9-1-1 requirements and writing standards to meet those requirements is essential to NENA’s mission and public safety services as a whole. NG9-1-1 development work is being done by multiple NENA committees and work groups.

- The NENA VoIP/Packet Technical Committee has transmitted several documents to various SDOs, nationally and internationally for their review and comment. They requested that the SDOs review NENA’s work and provide information on their standards work to aid in NG9-1-1 and emergency communications. One gap SDO groups have identified is that there is no forum to pull together all public safety entities (including fire, EMS, police, emergency management, poison control, FEMA, DOJ, DHS, USDOT, Coast Guard, and others). Since NG emergency communications will allow any authorized emergency services agency access to the emergency services network, ensuring these entities are working together is critical.

“The public must be properly educated about how 9-1-1 actually works today, and what will be different in the future.”

“Government may be the hardest, and perhaps most important, audience to educate, especially with respect to funding alternatives.”

“Defining NG9-1-1 requirements and writing standards to meet those requirements is essential to NENA’s mission...”

- NENA staff and committee leaders participated in an SDO emergency services coordination workshop hosted by Columbia University. The meeting was very productive in understanding where each technology SDO stands on location identification, with more than 50 people representing 20 organizations in attendance. This SDO coordination group plans to meet every six months to continue coordination efforts.
- The NENA Operations Committee is in the process of revising the NENA IP-Capable PSAP Features and Capabilities standard (NENA 58-001). This document is intended to be a guide for the NENA Technical and Operations Committees to use in establishing additional standards in preparation for the installation of IP-based 9-1-1 systems in the PSAP. The 9-1-1 equipment, software, and service vendors should use this standard 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 equipment to IP-based systems.
- A major issue identified by NENA’s Operations Committee is lack of 9-1-1 access for users of video and text devices, which are used today by the deaf community. Many of these callers encounter communication challenges and slow response times when trying to make use of 9-1-1.
- The NENA Data Technical Committee has completed “NENA Data Standards for the Provisioning and Maintenance of Master Street Address Guide (MSAG) Files to Validation Databases (VDBs) and Emergency Routing Databases (ERDBs).” This document provides general system and process requirements for the VDB, ERDB, and 9-1-1 administrator to maintain the MSAG and the alternate address records required to perform their prescribed functions in the interim solution for VoIP and E9-1-1 (i2) architecture. These essential functions will be integral components in an NG9-1-1 environment.
- Security and proper access to the Next Generation Emergency Services Network is essential. NENA 08-001 Interim VoIP Architecture for Enhanced 9-1-1 Services (i2) standard indicates that NENA should assume the role of authorizing access to the NG network by being or chartering the Valid Emergency Services Authority (VESA). VESA is the agency that authorizes who may access the NG Emergency Services Network. NG Program Partners agreed that NENA should assume this role.

There are many other SDOs and federal agencies involved with defining NG emergency communications requirements. NENA attempts to maintain contact with all of these agencies and, when necessary, develops partnership or alliance agreements.

The NG Partner Program identified gaps in requirements and standards for NG9-1-1 as well as activities that need to be coordinated with other groups and have initiated efforts to address those gaps. Some of the issues identified were authentication/authorization, rights management, policy mechanism, jurisdictional and political considerations, testing, federal and state leadership, and funding.

Regarding authentication and authorization, NENA has assembled a small team representing a subset of NG Partners, focused on industry-led credentialing and certification processes. This effort will create several scenarios for review with the NG Partner management team and then determine what further steps will be taken based on NG Partner support.

### **NENA NG9-1-1 TRANSITION PLANNING**

In order to ensure all transition issues from a Public Safety Authority’s existing 9-1-1 system to an NG9-1-1 system are covered, a small group of NENA Technical and Operations Committee leaders prepared an outline defining the scope and a starter set of deliverables. This effort led to the creation of the NG9-1-1 Transition Planning Committee (NGTPC), which was formed in November 2006 and held its first face-to-face meeting in January 2007.

The committee has been tasked with identifying transition steps useful to Public Safety Authorities and other stakeholders in moving from each type of 9-1-1 system and service environment starting point to NG9-1-1. This includes the related development actions needed to allow the transition to a fully capable NG9-1-1 service.

The committee is expected to expand the starting areas of consideration and move into any other areas deemed appropriate to the general objective. It is also anticipated that the NGTPC will create new working groups and assign some issues to existing committees/working groups. NENA anticipates that deliverables from this committee will be very useful in the USDOT NG9-1-1 Project.

## FEDERAL ACTIVITIES

Among several developments within the federal government that will likely impact the development of NG9-1-1 is the FCC's creation of the Bureau of Public Safety and Homeland Security. The bureau will be responsible for a variety of security and public safety functions previously scattered through several bureaus. The bureau has three divisions focusing on policy, public communications outreach and operations, and communications systems analysis. The bureau is designed to streamline the response of the agency to the needs of responders and others dealing with emergency communications. The functions of the bureau will include 9-1-1 and E9-1-1 services as well as interoperability, network security, and spectrum licensing for public safety entities. All of these functions will impact NG9-1-1.

In addition to the FCC, the national 9-1-1 Implementation and Coordination Office (ICO), a joint effort of the Department of Transportation, National Highway Traffic Safety Administration (NHTSA) and the Department of Commerce, National Telecommunication and Information Administration (NTIA) continues to have a key role at the federal level. The ICO was charged to "establish a joint program to facilitate coordination and communication between federal, state and local emergency communications systems, emergency personnel, public safety organizations, telecommunications carriers, telecommunications equipment manufactures and vendors involved in the implementation of E-911 (sic) services." Working with its federal partners, the ICO is in a prime position to play a key role in coordinating efforts to develop a set of national requirements and standards for NG9-1-1.

Finally, the Department of Homeland Security, through the Office of Interoperability and Compatibility (OIC), is charged with facilitating the development of national emergency communications voice and data standards. These efforts should contribute to needed data standards for next generation emergency communications.

## TOPIC AREA #6 DEMOS, TRIALS AND IP NETWORK DEPLOYMENTS

NENA maintains a current list of IP network demos, trials and implementations in order to monitor state and regional efforts which may be useful for future NG9-1-1 trials. Two examples of current efforts include:

### TEXAS A&M PROJECT

The Texas A&M NG-911 project is a U.S. Department of Commerce NTIA funded project that establishes an NG9-1-1 test bed for functionality testing of prototype NG9-1-1 protocols. The two-year project is a collaborative effort between universities, industry, state and local governments, NENA and Internet2. The project involved installing equipment in PSAPs in Texas and Virginia and subsequently testing against the evolving NENA i3 (IP) requirements. The supporting infrastructure development was accomplished at Columbia University, while the deployment and testing took place at Texas A&M University. This \$1.3 million trial was completed through an NTIA grant and involvement of the Texas and Virginia 9-1-1 offices, Cisco and Nortel. It began in 2004 and was scheduled to end December 2006, with a final report available in first quarter 2007. There were 14 project partners working toward NTIA's goal. The value of this project is that it tests technology against NENA requirements, validates the requirements with call taker feedback and helps to determine gaps in standards.

### STATE OF INDIANA IP NETWORK

Indiana has implemented a statewide IP network (IN911) that is currently in use and has the potential to evolve into the backbone of a full NG9-1-1 and emergency communications network. INdigital Telecom was selected by the Indiana Wireless E9-1-1 Advisory Board to build a new 9-1-1 network. The project, known as Project Crossroads, is targeted to become an advanced technology E9-1-1 network for wireless calls in Indiana. The rapidly changing needs of public safety required the construction of a next generation IP-based 9-1-1 network. INdigital is now building an advanced self-healing next generation E9-1-1 network.

The second generation of INdigital's work will form one of the largest private statewide 9-1-1 networks in the U.S. When it is complete, the IN911 network will have IP connectivity for all of Indiana's emergency service providers, providing them with a state-of-the-art platform for new types of emergency services. The IN911 network is a public / private partnership that has been developed without the use of tax dollars. Project Crossroads has improved public safety in these areas:

"The NENA NG Transition Planning Committee has been tasked with identifying transition steps useful to Public Safety Authorities and other stakeholders in moving from each type of 9-1-1 system and service environment starting point to NG9-1-1."

- Reduced E9-1-1 call setup time, so emergency calls connect faster
- Improved call routing accuracy so emergency calls get to the correct emergency service provider
- Worked with emergency service providers and wireless carriers to perform comprehensive network testing

These benefits are expected to be expanded upon as the network develops full NG9-1-1 functionality.

NENA NG Program Partners will be provided regular feedback to include successes and challenges on all NG9-1-1 demos, trials and implementations. They will be asked to become involved in the testing process where their expertise will be useful.

## TOPIC AREA #7 INTEROPERABILITY

The NENA Next Generation Partner Program defines interoperability as follows:

*"Interoperability is defined as the ability of all public and private emergency response providers and relevant federal, state, and local government agencies to communicate with each other as necessary and authorized, utilizing information technology systems and radio communications systems, and to receive, access and exchange voice, text, visual and multi-media data with one another on demand, in real time."*

Such a definition not only includes communications of all kinds among emergency responders, but also the public that makes emergency calls to 9-1-1. As the NG Partner Program discussion on funding has indicated, the same underlying emergency services internetwork that will enable access to 9-1-1 from "any device, any time, anywhere" will also advance information sharing among all entities involved in emergency response. Thus, the discussions of funding and interoperability are tightly interrelated and must be considered together.

### FEDERAL AND STATE POLICY

Besides the three numbers "9-1-1," interoperability is one of the most recognized terms in the world of public safety communications today. When most policy makers describe interoperability, they are explicitly referring to first responder voice communications in the field.

All too often during major emergencies, including 9/11 and Hurricane Katrina, police, fire and EMS responders are not able to effectively communicate due to a lack of interoperable radio systems. This is a critical problem that must be solved. Yet, there are other significant, but less visible, information sharing problems that are not generally included in discussions on interoperability and emergency communications. Policies must place an equal priority on solutions that enable both inter-organizational communications as well as interpersonal communications from all authorized sources, public and private.

In conjunction with emergency communications funding considerations, it is essential that policy makers understand and promote policies that will enable solutions to improve the public's access to a modernized 9-1-1 system while simultaneously providing a backbone for voice and data communications among all entities involved in emergency response. Thus, interoperability and emergency communications policy must be broadly defined to include 9-1-1 and all other entities involved with emergency response.

As Congress and federal and state government agencies continue to address the issue of emergency communications, it is important not only to broadly define interoperability, but also to require recipients of government funding to adhere to an inclusive definition of interoperability that advances the interoperability of voice, data and video communications among all entities involved in emergency response.

Policies and legislation should allow funds to be used for equipment, software and services that will enable the use of shared IP-based emergency service networks and services to enable next generation emergency communications. Such networks and services will not only advance data and video communications to and from the public and among emergency response agencies, but they will also provide solutions to the more traditional radio communications needs of emergency responders.

"The second generation of INdigital's work will form one of the largest private statewide 9-1-1 networks in the U.S. When it is complete, the IN911 network will have IP connectivity for all of Indiana's emergency service providers, providing them with a state-of-the-art platform for new types of emergency services."

### INTEROPERABILITY OF THE NEXT GENERATION EMERGENCY SERVICES NETWORK: A VIRTUAL ENTERPRISE WITHOUT AN OWNER

The Next Generation emergency communications internetwork has been well documented by the NG Partner Program, the FCC's Network Reliability and Interoperability Council (NRIC), COMCARE and elsewhere. The fundamental notion of NG9-1-1/emergency communications is that there will be numerous shared networks and services at the national, state and regional level. Such a system will only work if there is complete interoperability among all the component parts through the use of common standards and system interfaces.

Unlike most elements of 9-1-1 and emergency communications today, many of the required elements in an NG environment will not have a single owner but will be shared among multiple entities responsible for emergency response. Such a model requires forward thinking policy, planning and funding solutions. For example, in an NG9-1-1 environment the following elements will not be "owned," literally or figuratively, by one single entity:

- Multi-domain standards (e.g. messaging standards, network interface standards that are not unique to any one profession, but are used by all relevant parties)
- State or regional IP emergency services networks (not a 9-1-1 network – an emergency services IP network of which 9-1-1 is a node and contributes the appropriate portion of funds required to interface with the network)
- Facilitation services: core services that all authorized entities can access to enable information sharing among all entities involved in emergency response, including among agencies who are often not local and otherwise known to one another (including shared agency directory services, security, rights management and authentication services)
- Shared software systems (for example, many different agencies need electronic mapping that could be a shared resource among numerous agencies rather than requiring each individual agency to purchase and maintain their own maps)

The multitude of entities involved in emergency response and the focus on shared systems in an NG environment requires the interoperability of all voice and data systems. This will require technical and operational modifications to existing practices and will also entail needed legislative and regulatory change to laws and tariffs that may have the unintended effect of inhibiting progress. Such interoperability is dependent on improved leadership at all levels of government and must involve extensive planning, training and management in a coordinated project management approach.

#### TOPIC AREA #8 DISASTER PLANNING

Disaster planning and recovery must be considered as next generation 9-1-1 and PSAP operational needs and issues are identified. Redundancy, diversity, and backup in an IP environment must be identified and implemented. Using planned emergency network layers can minimize any loss of communications region to region, state to state, county to county, municipality to municipality. Multiple points of connectivity to redundant databases, as well as automatic and manual rerouting of any and all communications services (voice, multimedia, radio, etc) to other PSAPs should be considered. Recognizing the essential importance of a distributed national routing database, diversity and redundancy of it and any other databases using any of its subsets, should be considered. In all planning, security is of critical importance, and must be an integral function.

The final report of the FCC's Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks, submitted June 12, 2006, noted that Hurricane Katrina severely tested the reliability and resiliency of the communications infrastructure in the impacted area. The panel also found that the unique conditions in the aftermath of the hurricane, including flooding, widespread and extended power outages, and serious security issues, were responsible for damaging or disrupting communications service to a huge geographic area for a prolonged period of time.

If properly implemented, Next Generation 9-1-1 should help minimize negative impacts of inadvertent line cuts during restoration and could more easily provide redundant pathways for communications traffic, both problem areas identified by the panel.

Additional significant impediments to the recovery effort, identified by the Independent Panel, which should be improved in an NG9-1-1 environment, were:

"Policies must place an equal priority on solutions that enable both inter-organizational communications as well as interpersonal communications from all authorized sources, public and private."

"Using planned emergency network layers can minimize any loss of communications region to region, state to state, county to county, municipality to municipality."

- Lack of established coordination between the communications industry and state and local officials as well as among federal, state and local government officials with respect to communications matters
- Failure to consistently and accurately disseminate important information to the public
- Disruption of public safety communications operability, as well as a lack of interoperability

NG9-1-1 should significantly improve upon the four recommendation areas the Katrina Panel provided to the FCC for improving disaster preparedness, network reliability and communications among first responders. The recommendation areas included:

- (1) Pre-positioning the communications industry and the government for disasters in order to achieve greater network reliability and resiliency;
- (2) Improving recovery coordination to address existing shortcomings and to maximize the use of existing resources;
- (3) First responder communications - improving the operability and interoperability of public safety and 9-1-1 communications in times of crisis; and,
- (4) Improving communication of emergency information to the public.

The 2006 NG Partner Program discussions on disaster planning made it clear that having accurate, current geospatial data can be very critical after a major catastrophe or a local incident and must be considered in all disaster planning. 3-D and multiple views of a site can aid first responders with their approach to an incident and in the safety of personnel. Imagery may be available in dispatch and mobile terminals and can be used by all emergency services agencies.

Next Generation 9-1-1 and emergency communications will positively impact a multitude of disaster situations ranging from natural disasters to those that negatively impact the health of a significant portion of the populace.

Various functions and capabilities that should be considered in disaster planning and recovery and can be improved upon in an NG9-1-1 environment include:

- Dynamic electronic provision and updates of critical health data (such as medical symptoms and complaints) to appropriate state and federal agencies, including utilizing Artificial Intelligence (AI) algorithms to detect patterns
- Expanded emergency notification to public, both via increased access methods and by reaching a wider and/or selective audience
- Timely, dynamic input from various devices, such as sensors (from highway to water to aerial) within a next generation emergency network
- Increased interaction with hospitals and other medical facilities to better track beds available, provide secondary or alternate triage when facilities are full, and track quarantine processes
- Rerouting of 9-1-1 calling, including to more distant locations and including access to distributed support systems
- Use of pre-staged equipment that can be easily relocated
- Reconfiguring IP network – including radios and other voice, data, multimedia systems
- Flexibility to dynamically reconfigure network and routing in advance and during disaster and in restoration mode
- In the event of extensive quarantining, can use the virtual call taker concept as they may be quarantined with family members, but may not be sick themselves.

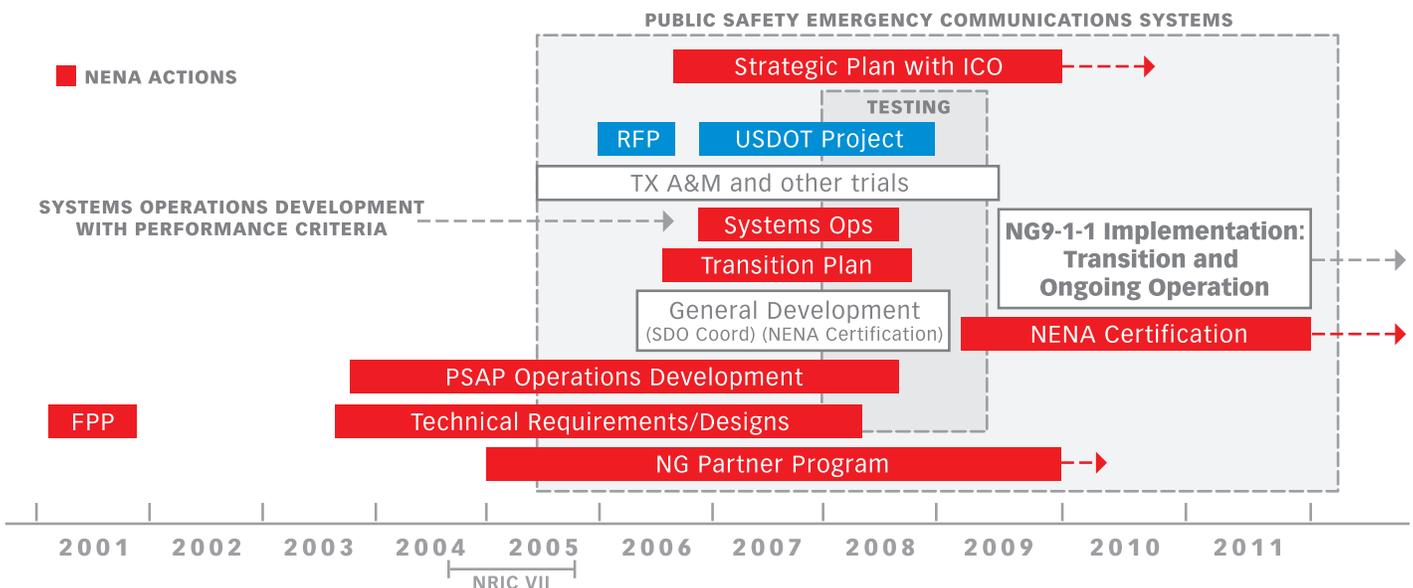
Since NG9-1-1 greatly enhances the capabilities of working together from the 9-1-1 call delivery and receipt throughout ongoing processes, there is a need to pre-plan at a greater level of detail across a much wider area than is often done including across state and national borders, and among states not necessarily geographically connected.

“NG9-1-1 should significantly improve upon the four recommendation areas the Katrina Panel provided to the FCC for improving disaster preparedness, network reliability and communications among first responders.”

# NENA Next Generation 9-1-1 Project

**N**G9-1-1 is designed to provide phased replacement of today's E9-1-1 system with an inter-networked, IP based NG9-1-1, with greatly expanded capabilities for emergency call/message handling, multimedia emergency communications, and data acquisition, management and sharing. The vision will not be achieved without a well coordinated overall project plan, of which the NENA NG Partner Program is a critical element. The NG9-1-1 project is intended to provide a detailed road map of needed activities and the timeframes within which they should be completed in an effort to effectively and efficiently implement NG9-1-1. Additional components of the NG project plan include the recently formed NG9-1-1 Transition Planning Committee, PSAP operations development, systems operations development and overall testing. All of these elements must be developed in a parallel fashion to ensure timely and effective NG9-1-1 development and implementation. More information and updated NENA NG9-1-1 project status are available at the NENA Website.

## NG9-1-1 PROJECT ACTIVITY RELATIONSHIPS



The recently initiated U. S. Department of Transportation (USDOT) NG9-1-1 Project and the overall NENA project plan, including the critical work of the NG Partner Program, are mutually supportive and complementary. As the NG Partner Program has identified on numerous occasions, there is an essential role for the federal government to provide needed leadership to enable the transition to NG9-1-1. The USDOT NG9-1-1 Project is an example of such leadership.

# U.S. Department of Transportation NG9-1-1 Project

The USDOT NG9-1-1 Project is a federally promoted program through fiscal year 2008. The ITS Joint Program Office of the Research and Innovative Technology Administration (USDOT) and the EMS Office of the National Highway Traffic Safety Administration (USDOT) have announced that Booz Allen Hamilton is the company that will serve as lead contractor. Others involved include NENA, L. Robert Kimball & Associates, Inc., and Texas A&M University. The project will be undertaken in four phases:

## PHASE I

- Phase 1 Development
- Concept of Operations Document
- System Requirements
- Architecture Analysis

## PHASE II PRELIMINARY TRANSITION ANALYSIS

- Benefit/Cost (overall system costs and benefits of implementing)
- Transition Assessment

## PHASE III

- Phase III Design & Demonstration
- System Design Development
- Call Taker – Human Machine Interface
- Data Analysis and Acquisition
- Proof-of-Concept Demonstration

## PHASE IV FINAL TRANSITION ANALYSIS

- Final Benefit/Cost
- Final Transition Assessment

# 2007 NG Partner Program

**B**uilding upon the success in 2006, the NG Partner Program in 2007 is designed to further address issues identified in previous years of the program and to provide recommendations for immediate and long-term actions.

The core set of activities for the 2007 NG Partner Program include the following:

## **NENA staff provide regular updates on the overall NG Project plan**

### **Provide input to the USDOT NG9-1-1 Project**

- Include a review of the USDOT NG9-1-1 project at all Program Partner meetings
- Develop a monthly newsletter for NG Partners
- Review USDOT project reports

### **Certification, certificating and credentialing**

- NENA consider developing a certification program to be accredited by ANSI
- NENA credential companies who may access the NG Emergency Services Network

### **Demos/trials/deployments**

- Identify all IP networks being developed
- Evaluate progress and attempt to identify pros/cons of each project (lessons learned)
- Provide opportunities for those considering demos/trials to meet with Program Partners prior to implementation.

### **NG Transition Planning Committee (NGTPC)**

- NG Program Partners should actively participate in all transition planning activities

### **Carry forward action items from 2006**

- Distribute funding model paper
- Develop cost matrix
- Develop an education program for NG9-1-1
- Identify gaps

**NENA will continue to represent recommendations from the NG Program Partners in meetings with standards development organizations.**

The purpose of each meeting is to contribute substantially toward the acceleration of NG9-1-1 through the resolution of key issues or barriers, as well as the identification of gaps in our understanding of NG9-1-1 and what work is required to fill those gaps. Toward this end, the program develops specific action plans for implementation by those who can make next generation 9-1-1 a reality.

There are many stakeholders that must be brought into the process, including vendors, public safety groups and government at all levels. The NG Partner Program recognizes the need to integrate its activities with those of other organizations also involved in NG9-1-1 and is actively pursuing additional program partners.

For more information, contact Dr. Robert Cobb, NG Partner Program manager, at 1-800-332-3911 or via email at [bcobb@nena.org](mailto:bcobb@nena.org).

**2006 PROGRAM PARTNERS:**



**NEW PARTNERS JOINING IN EARLY 2007:**



**EMERGENCY HELP.** Anytime, anywhere, any device.™

VISIT [WWW.NENA.ORG](http://WWW.NENA.ORG) FOR THE LATEST UPDATES ON THE NEXT GENERATION PARTNER PROGRAM.



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