Indiana Statewide 9-1-1 Plan

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DOCUMENT CHANGE HISTORY

Version	Publication Date	Description of Change
v 0.1	November 17, 2008	Final Draft
V 1.0	December 2, 2008	Final Deliverable as approved by the IWAB incorporating feedback from the planning committee, the ITA, and AT&T

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

1.1. BACKGROUND AND PURPOSE

A convergence of new challenges and opportunities has been the impetus for the State of Indiana's planning initiative.

1.1.1. The Challenges

Indiana's statewide Enhanced (E9-1-1) network, (also known as the IN911 network), which provides E9-1-1 to cellular and wireless callers, is one of the most technologically advanced in the nation.[1] Nevertheless, the relentless march toward technological convergence and rapid changes in consumer habits have outpaced even the IN911 system's ability to handle cellular 9-1-1 calls made in non-traditional modes, such as text messaging, or using converged technological capabilities, such as the ability to send video or photo images relating to an emergency. What this means as a practical matter is that a growing number of consumers—based solely on their technology choices—may no longer have full access to the IN911 network. This is a serious public safety issue. Going further, the hearing and speech impaired, who rely almost exclusively on SMS, instant messaging and text messaging to communicate, have very limited access to 9-1-1 emergency services, creating non-compliance with the Americans with Disabilities Act (ADA). To assure the broadest availability of E9-1-1 services, there needs to be significant additional, new improvements to the IN911 network components and the equipment used by the PSAPs.

Terrorist attacks and widespread natural disasters demand that 9-1-1 Public Safety Answering Points (PSAPs), emergency responders and other public safety agencies have the ability to transfer voice and data among themselves to facilitate the response to an emergency. The IN911 network enables most of Indiana's 9-1-1 PSAPs to transfer a cellular call, along with its associated location information, to any other PSAP that is connected to the IN911 network; but more is needed. Emergencies do not respect borders, and cellular/wireless technology does not, either. It is necessary for PSAPs in Indiana and the bordering states of Michigan, Illinois, Ohio, and Kentucky to have the capability to transfer cellular 9-1-1 calls and data and among themselves.

These challenges are huge, and successfully meeting them requires a level of planning and collaboration that has not been necessary in the past.

1.1.2. The Opportunities

Federal policy recognizes the growing need for statewide planning to assure the efficient implementation of advanced public safety technologies, as well as the efficient use of limited dollars, and increasingly requires statewide planning and coordination as a prerequisite for federal funding. The example most important to Indiana's Statewide 9-1-1 Plan is the ENHANCE 911 Act of 2004 as amended in 2008 (the Act). The Act requires states to have a statewide 9-1-1 Plan (among other requirements) in order to

[1] This network uses the most modern, state-of-the-art technology available: a self-healing fiber optic network (SONET) that serves as a transport network for a diverse IP-based 'mesh network' that delivers wireless 9-1-1 voice and ALI data using Internet Protocol (IP) technology.

qualify for PSAP grant funding under the Act. These grants are specifically for the purpose of helping PSAPs implement wireless phase II enhanced 9-1-1 and Internet Protocol (IP)-enabled 9-1-1 networks. The amount of Federal funding available to Indiana is $783,700.36.[2] With the 50 percent match that the ENHANCE 911 Act of 2004 requires, the total value of the opportunity is more than $1.5 Million.

Of equal importance is the opportunity presented by the process of planning itself. Developing Indiana's statewide 9-1-1 plan in close conjunction with stakeholders can be expected to have three beneficial outcomes, beyond contributions to the Plan itself. Firstly, the collaborative planning exercise involving key stakeholders has the potential to build and strengthen the effective relationships that are essential to the success not only of the plan but also of the next generation of wireless 9-1-1. Secondly, and perhaps most importantly, it enables the public to have access to 9-1-1 service regardless of the communication technology they prefer. Thirdly, having participated in the planning process, stakeholders have a stake in the successful implementation of the Plan.

The purpose of the Indiana Statewide 9-1-1 Plan is to:

- Build a cooperative and collaborative mechanism for the advancement of wireless 9-1-1
- Facilitate the migration of Indiana's PSAPs to the next generation of wireless 9-1-1 capability
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The audience for the Indiana Statewide 9-1-1 Plan is:

- PSAP call takers, supervisors, managers, and information technology (IT) technicians
- Local government officials
- County 9-1-1 coordinators
- State and local law enforcement, fire, and Emergency Medical Service (EMS) agencies
- Related public safety agencies
- State and federal legislators
- E9-1-1 service providers

1.2. THE PLANNING PROCESS

In developing this plan, the Indiana Wireless E9-1-1 Advisory Board (IWAB) assembled a planning team comprised of a representative from the IWAB, the IWAB's executive director, a representative of the Indiana chapter of the National Emergency Number Association (NENA), two County 9-1-1 coordinators, two representatives of the Indiana Utility Regulatory Commission (IURC), and INdigital telecom, the

[2] The national 9-1-1 Implementation Coordination Office, which was created by the 2004 Act, recently released a Notice of Proposed Rulemaking (NPRM) to launch the grant program. The anticipated adoption of Final Rules may require some immediate changes to Indiana's State 9-1-1 Plan.

IN911 network provider. A consultant, L. Robert Kimball & Associates, Inc. (Kimball), facilitated the compilation and development of the Plan.

In September 2008, Kimball conducted a kick-off meeting, SWOT[3] exercise and initial planning session to gather information and develop a clear understanding of the status and future vision of 9-1-1 in Indiana. This enabled the stakeholders to contribute to the effort, thereby bringing a full range of thinking to the table and creating consensus. The information from the SWOT exercise was analyzed and transformed into goals and objectives, again involving the entire planning team.

Formal weekly conference calls and other, less formal discussions further refined the goals and objectives identified in that initial meeting. This regular process of information exchange resulted in a true statewide approach to planning and assisted in charting a course for the next generation of wireless E9-1-1 in Indiana. In addition, the final draft of the Plan was circulated to representatives of the landline telephone industry through the Indiana Telecommunications Association for additional comment and refinement prior to being presented to the IWAB for consideration of formal approval and adoption.

1.3. GOALS AND OBJECTIVES

The Indiana Statewide 9-1-1 Plan identifies the key goals and objectives for improving wireless E9-1-1 service and functionality across Indiana and influences Indiana's statewide decisions concerning wireless E9-1-1, and, where applicable, limited elements of landline E9-1-1 services. The successful achievement of the Plan's goals and objectives result in Indiana's ability to continue to meet the public's high level of expectations for 9-1-1 service, provide a consistent level of 9-1-1 service statewide and contribute to the security of all.

The overarching vision is to assure that Indiana's citizens and visitors have E9-1-1 service no matter where they are calling from, no matter what sort of wireless device, protocol or service they use and whether they communicate by voice, text or other media.

- **Goal 1 – Provide a functionally-comparable level of E9-1-1 service statewide.**
  - Establish a stakeholder working group to make recommendations to the IWAB on a variety of technical, operational and policy matters to advance wireless E9-1-1 in Indiana
  - Identify data elements to measure the technological progress of wireless E9-1-1 and the data collection mechanism
  - Define the base line level of wireless E9-1-1 service for Indiana
  - Identify minimum technical and operational standards
  - Draft legislation for governance, funding and connectivity

[3] SWOT is an acronym for "Strengths, Weaknesses, Opportunities and Threats." A SWOT analysis is a useful tool for helping stakeholders identify needed changes, understand the value of making those changes and invest in the process of implementing them.

- **Goal 2 – Provide all cellular and wireless technology users with equal access to IN911 and ESInets that are interconnected with it.**
  - Identify the network architectural and application requirements for SMS protocol interfaces, TDD messaging, text messaging, instant messaging, wireless transmission of still images and video images, telematics, language line services, and video relay for the deaf and speaking impaired
  - Work with PSAPs and local government to develop funding sources
- **Goal 3 – Achieve the seamless transfer of wireless E9-1-1 voice and data across state lines.**
  - Negotiate formal Memoranda of Agreement (MOA) with contiguous County governments from Michigan, Illinois, Kentucky and Ohio
  - Build out IN911 to the borders of Indiana and adjacent states, or to the borders of adjacent regional or state ESInets

1.4. ACTION NEEDED TO IMPLEMENT THE PLAN

A majority of the technological and consumer changes driving the development of Next Generation E9-1-1 capabilities are wireless and mobile in nature, thus the first step in addressing them is logically through the IWAB. This Plan reflects the current statutory framework: wireless E9-1-1 is a statewide and state level function; landline E9-1-1 is local. Action needed to achieve the Plan's goals and objectives distill down to these three broad items:

- Legislation to update Indiana's landline and wireless statutes to reflect industry and technological trends, to address broader public policy issues affecting E9-1-1 and to meet the evolving needs of PSAPs and public safety agencies.
- Development of the capability, in conjunction with the vendor community and E9-1-1 service providers, to assure that Indiana's citizens and visitors have E9-1-1 service no matter where they call from, no matter what wireless device, protocol or service they use or whether they communicate by voice, text, image or video.
- Increased staffing for the IWAB to better fulfill its mission of coordinating, supporting and facilitating current and future wireless E9-1-1 services.

1.5. ACKNOWLEDGEMENTS

The Indiana Wireless E9-1-1 Advisory Board would like to acknowledge the effort and leadership of the planning team:

- Mr. Brad Meixell, Operations Manager, Clark County E9-1-1, and member of the IWAB
- Mr. Tom Brindle, Director, Kosciusko Communications

- Mr. Barry Ritter, Director, Wayne County Emergency Communications
- Ms. Cindy Snyder, Director, Steuben County Communications, and 1st VP Indiana NENA
- Ms. Pamela Taber, Director of Communications, IURC
- Mr. Brian Mahern, Utility Analyst, IURC
- Mr. Mark Grady, Corporate Development Manager, INdigital telecom
- Mr. Matt Hibiske, Chief Communications Officer, INdigital telecom

In addition, IWAB Executive Director, Mr. Kenneth Lowden, provided invaluable leadership, energy and vision to assemble and coordinate the team.

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2. INTRODUCTION

The impetus for the Indiana Statewide 9-1-1 Plan project (the Plan) was the 2004 federal legislation, *Ensuring Needed Help Arrives Near Callers Employing 911 Act* (ENHANCE 911 Act), as amended in the summer of 2008 by the *New and Emerging Technologies 911 Improvement Act* (NET 911 Improvement Act). The 2004 Act established a national 9-1-1 Implementation Coordination Office (ICO) as a joint program of the National Telecommunications and Information Administration (NTIA) in the U.S. Department of Commerce and the National Highway Traffic Safety Administration (NHTSA) in the U.S. Department of Transportation. The ICO was charged with facilitating coordination between federal, state and local emergency communications systems and organizations and the administration of a PSAP grant program. Two key provisions in the ENHANCE 911 Act were the requirement for states seeking grant funding under the Act to have a statewide 9-1-1 plan in place and to coordinate their grant applications with their PSAPs.
The ICO worked with the National Association of State 9-1-1 Administrators (NASNA) and Kimball and charged them with creating a model state 9-1-1 plan for states to use to guide the development of their individual plans. The Indiana Wireless Board (IWAB) determined the most cost effective path would be to leverage its own existing service contract with Kimball to develop a customized 9-1-1 Plan for the State of Indiana.

The purpose of the Indiana Statewide 9-1-1 Plan is to:

- Build a cooperative and collaborative mechanism for the advancement of wireless E9-1-1
- Facilitate the migration of Indiana's PSAPs to the next generation of wireless E9-1-1 capability

In developing this plan, the IWAB assembled a planning committee of stakeholders from several industry sectors: the Board, Indiana NENA, two County 9-1-1 coordinators, the Utility Regulatory Commission and INdigital Telecom, its wireless enhanced 9-1-1 network provider. Kimball, in its role as consultant, facilitated the compilation and development of the Plan. The Indiana Telecommunications Association and AT&T had the opportunity to review final drafts of the Plan.

A regular process of information exchange resulted in a true statewide approach to planning. The exchange of information assisted in charting a course for the future of wireless E9-1-1 service in Indiana.

The Board intends this Plan to be a living document for the use of Indiana's PSAPs, public safety stakeholders, E9-1-1 service providers and policy makers as they work together to advance wireless E9-1-1 services for the benefit of all the citizens of Indiana.

2.1. NATIONAL OVERVIEW OF THE HISTORY AND BACKGROUND OF 9-1-1

The concept of a nationwide emergency telephone number was first adopted in Great Britain in 1937. The history of 9-1-1 in the United States began in 1967. On May 23 of that year, Indiana Congressman, Mr. J. Edward (Ed) Roush, attended House sub-committee hearings on the *Comprehensive Fire Research and Safety Act of 1967*. In response to testimony unfavorably comparing the rate of fire deaths in the United States with other nations and linking that high rate with the length of time to respond,

Representative Roush recommended a single, nationwide telephone number for reporting fires. That same year, President Johnson's Commission on Law Enforcement and Administration of Criminal Justice also recommended a nationally uniform three-digit emergency telephone number. In November of that year, the FCC met with the American Telephone and Telegraph Company (AT&T); and, shortly thereafter, AT&T announced—at a press conference held in the Washington, D.C. office of Indiana Representative Roush—that it had reserved the numbers 9-1-1 for emergency use nationwide.

The Alabama Telephone Company implemented the nation's first 9-1-1 system in Haleyville, Alabama. On February 16, 1968, Alabama Speaker of the House, Mr. Rankin Fite, made the first 9-1-1 call from the Haleyville city hall. Congressman, Mr. Tom Bevill, answered the call on a red-colored telephone located in the police department. [4]

Early 9-1-1 technology had limited capability, and 9-1-1 calls had to be delivered to an answering point within the caller's telephone exchange. Since there was (and is) little correlation between a telephone exchange boundary and the emergency responder's jurisdiction, a 9-1-1 call could end up at a (PSAP) that did not serve the caller's location. This basic 9-1-1 service, as it has since been defined, did not provide any telephone number or location information with the call—it was a voice service only, and the caller had to provide his or her location and call-back information.

Significant advancement in 9-1-1 technology occurred with the introduction of Enhanced 9-1-1 (E9-1-1) in the early 1980s. Using the existing circuit switched technology; E9-1-1 added the capability of selectively routing 9-1-1 calls to the PSAP serving the caller's location and delivering that call with the caller's telephone number and location. Other features, such as selective transfer, which enabled a 9-1-1 operator to transfer the caller to a specified agency for dispatch, further streamlined the call-handling process.

By the 1990s, the use of cellular technology increased dramatically as consumers in our increasingly mobile society enthusiastically adopted it. Initially, it was expected that cellular phone use would occur primarily in cars on America's roads and highways; and, by extension, so would cellular emergency calls. No one anticipated that people would carry and use them wherever they went. These changes in consumer calling habits posed serious challenges for public safety because landline E9-1-1 systems did not have the capability of providing location information for cellular callers.

In 1996, the Federal Communications Commission (FCC) released its *First Report and Order on Docket 94-102* mandating wireless E9-1-1. The cellular industry devised two main solutions to identify the longitude and latitude of the caller's location: a GPS chip within the handset itself or networked triangulation from cellular towers. Implementation was to occur in two phases: Phase I provided the caller's callback number and the address of the receiving antenna tower; Phase II provided a more accurate latitude/longitude coordinate for the calling device. Phase II accuracy requirements varied depending on technology. The network solution required location to be within 100 meters (328 feet) for 67 percent of calls and 300 meters (984 feet) for 95 percent of calls. The handset solution required location to be within 50 meters (164 feet) for 67 percent of calls and within 150 meters (492 feet) for 95 percent of calls. There was still the problem of getting this new type of location data into the existing landline E9-1-1 system, and the wireless E9-1-1 solution we have today is essentially a work-around. Although less-than-perfect and inherently less reliable than landline technology, wireless E9-1-1, where it

[4] Alabama Chapter of NENA website, "World's First 911 Call" <http://www.al911.org/first_call.htm> (April 18, 2008)

has been implemented, still represents a huge improvement in PSAPs' ability to get help to a wireless caller's location.

Not long after wireless E9-1-1 implementations began to reach maturity at the majority of PSAPs, Voice over Internet protocol (VoIP), text messaging, picture and video messaging, and other new technologies appeared on the market, adding a host of new issues and challenges for 9-1-1. Consumers have adopted these technologies for their everyday communications, and they expect to be able to use these technologies to communicate with 9-1-1.

We are now at a point where it is not possible to modify or patch the nation's legacy E9-1-1 system further. It has reached the end of its ability to adapt to new modes of communication, particularly those based on Internet Protocol (IP) or that require greater capacity to transmit the rich data streams and content that are integral to modern communications. The communications industry is moving away from legacy circuit switched technology and toward IP for precisely the same reasons. It is critically important that 9-1-1 not be left behind and thereby unable to benefit from "the added values these innovations offer for emergency response improvement." [5]

In response to the need to address the critical state in which 9-1-1 finds itself, Congress passed the *ENHANCE 911 Act of 2004* and the *NET 911 Improvement Act of 2008*. The support and funding made possible through this recent legislation helps "eligible entities," including states, to make the upgrades necessary for wireless Phase II E9-1-1 and IP-enabled emergency communications.

The latest legislation also charged the ICO with creating a "National Plan…for migrating to a national IP-enabled emergency network capable of receiving and responding to all citizen-activated emergency communications and improving information sharing among all emergency response entities."[6] The federal government has clearly established the public policy direction for 9-1-1 services. The ICO promulgated Final Rules after Indiana developed and compiled this Plan.

[5] Texas Commission on State Emergency Communications, "Agency Strategic Plan for Fiscal Years 2007–2011" June 2006, page 8

[6] Ibid.

2.2. OVERVIEW OF THE HISTORY AND BACKGROUND OF 9-1-1 IN THE STATE OF INDIANA

On March 1, 1968, just a few days after the first 9-1-1 call in Haleyville, Alabama, AT&T implemented Basic 9-1-1 in Huntington, Indiana. Although no public records exist documenting the exact date or location of the first landline E9-1-1 system in Indiana, New Paris Telephone's records indicate that E9-1-1 began in Elkhart County on November 30, 1987. The 9-1-1 Director at Elkhart County, Shelia Malone, was an early proponent of E9-1-1, which initially presented ANI (the caller's telephone number) to the call-taker and later presented ALI (both the caller's phone number and the civil address). Funding for these early E9-1-1 systems was provided through a small property tax 'millage' made legal by the Indiana state legislature. This was the initial legislative intent to fund E9-1-1 service.

In 1988, legislation to provide funding through telephone user surcharges was enacted, and E9-1-1 was deployed throughout much of Indiana. E9-1-1 service was originally provided by Indiana Bell (later Ameritech, SBC and now AT&T); General Telephone (later Verizon); United Telephone of Indiana (later Sprint and now Embarq).

In 1987, the first cellular systems began to appear, and cellular 9-1-1 calls were typically routed to the closest district post of the Indiana State Police. On February 27, 1998, Indiana became the first state to pass wireless E9-1-1 legislation (*Public Law 98-1998 Section 1*), providing liability parity for wireless carriers and landline carriers, cost recovery for wireless carriers and local governments and creating the Indiana Wireless Enhanced 9-1-1 Advisory Board (IWAB). Governor O'Bannon signed the new law in March 1998. 9-1-1 fee collections began at the start of the new fiscal year (July 1998) and the first PSAP payout occurred in October of 1998.

According to NENA, the first wireless Phase I E9-1-1 call in the U.S. was made in Allen County (Indiana) on March 31, 1998. The wireless carrier involved was Centennial Communications, the third-party location company was XYPOINT and the telephone provider was GTE. On October 20, 2001, St. Clair County (Illinois) became the first PSAP in the U.S. to provide Phase II wireless E9-1-1 service, but only for Verizon wireless customers. Lake County, Indiana began Phase II service with several wireless carriers shortly after that. AT&T is the E9-1-1 service provider for both St. Clair County and Lake County.

In 2003, the Indiana legislature enacted legislation to remove the wireless carrier cost recovery provision of the statute and reduce the surcharge from 65 cents to 50 cents per wireless access line. Other important changes included the creation of an annual equal distribution of approximately $17,000 to each eligible County in addition to the existing population-based distribution, and the creation of a technology sub-account that permitted the Board to enter into vendor arrangements, such as the Wireless Direct project, and to plan for future technology applications.

The Board immediately set to work to modernize wireless E9-1-1 service delivery. It hired a consultant to develop a Request for Information (RFI) for a wireless direct network using modern, digital technology and assist with the evaluations and vendor selection. Within 24 months, INdigital Telecom (an entity owned by 12 independent Local Exchange Carriers [LECs]) had built a statewide, IP-based network with the potential to provide the Next Generation 9-1-1 network backbone for the State of Indiana.

The next major milestone in legislative policy was enacted in 2008. The primary effect of HB-1204 was to limit Counties to no more than two PSAPs after December 31, 2014, and to prohibit Counties from increasing their landline 9-1-1 fees until consolidation had been accomplished.

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3. CURRENT 9-1-1 ENVIRONMENT

Indiana has a population of approximately 6.4 million and 92 Counties.

- Several of the more rural Counties have populations of only 5,000 to 10,000.
- Six Counties have significant non-English speaking populations, with LaGrange approaching 35 percent.
- Several Counties have senior citizen populations greater than 15 percent.
- The most heavily populated County, Marion, includes the capital city, Indianapolis, the nation's 13th largest city.
- Indianapolis hosts a major tourist attraction, the Indianapolis Motor Speedway, which brings millions of visitors annually to the Indianapolis area for the Indy 500, the NASCAR Brickyard 400 and other auto racing events.
- Indianapolis is also home to the Indiana Convention Center and Lucas Oil Stadium. The Future Farmers of America—an important and large federally chartered corporation—holds its annual convention there, drawing nearly 60,000 conventioneers.
- Four major universities are located in Indiana (Indiana, Purdue, Notre Dame and Ball State), with significant student populations and sporting events that draw crowds of fans.
- Indiana is home to two professional sports teams, the Colts (NFL) and the Pacers (NBA).
- The Indiana Department of Natural Resources reports that its eight reservoirs and 22 state parks had nearly 15 million visitors in 2008.

All of this has an impact on Indiana's 9-1-1 centers, and the diversity that this represents places unique demands on Indiana's landline and wireless enhanced 9-1-1 systems. Indiana is the transportation crossroads of the Midwest, and the extensive interstate highway system contributes a significant portion of the calls made to 9-1-1 from cellular phones.

Cellular and wireless technology has evolved and converged with other technologies in the ten years since the IWAB was created. Today, mobile phones are also personal computers, GPS receivers, cameras, televisions, and music players. They can provide high-speed Internet access and have multi-media reception and transmission capabilities. They give consumers many alternative modes of communication in addition to voice: email, text-messaging, video, and still image messaging. The clear trend is toward the convergence of technologies into single, multi-purpose wireless devices.[7] The implication for Indiana's PSAPs is huge.

[7] Wikipedia, The Free Encyclopedia, "Technological convergence," <http://en.wikipedia.org/wiki/Technological_convergence> (Accessed November 9, 2008)

3.1. CURRENT LEGISLATIVE AND REGULATORY ENVIRONMENT AND PROGRAM STRUCTURE

3.1.1. Indiana's Statutory Provisions for 9-1-1 Service

Title 36, Article 8, Chapter 16 of Indiana Code (IC 36-8-16 Emergency Telephone System Fee) governs enhanced 9-1-1 in the State of Indiana. Title 36, Article 8, Chapter 16.5 (IC 36.8.16.5 Enhanced Wireless Emergency Telephone Service) governs wireless enhanced 9-1-1 in the State of Indiana.

General statutory provisions for landline Enhanced 9-1-1 service include the assessment (landlines and VoIP), collection, administration, and use of 9-1-1 fees; the scope of authority of the County or municipal unit; 9-1-1 database requirements; liability protection, and penalties.

General statutory provisions for wireless enhanced 9-1-1 service include the assessment (post-paid and pre-paid wireless), collection, administration, auditing, and use of 9-1-1 fees; establishment of a Wireless Enhanced 9-1-1 Advisory Board ("IWAB" or "Board") and its powers; PSAP funding eligibility, use of funds and audits; confidentiality, and liability protection.

Legislation passed in 2008 limits the number of PSAPs that can operate in a County after December 31, 2014. The same legislation froze all County 9-1-1 fees until they comply.

3.1.2. Governance

3.1.2.1. Local

Counties and municipal units initiate emergency telephone service by adopting an ordinance to impose a fee on landline and VoIP. County fees supersede municipal fees, although the County must assure the rate is adequate to cover the municipality's outstanding 9-1-1 service obligations. A County or municipal unit may contract with a service supplier and use its fee revenues to make any payments required by the contract, as well as to pay bond obligations.

3.1.2.2. State

The State, through the IWAB, provides wireless Enhanced 9-1-1 statewide, including funding, PSAP guidance and directives to support it. Its chair, by statute, is an elected official—the state treasurer. The IWAB is comprised of seven members: three PSAP representatives recommended jointly by the Indiana chapters of the National Emergency Number Association (NENA) and the Association of Public-Safety Communications Officials (APCO), and three Commercial Mobile Radio Service (CMRS) members recommended by the state's wireless carriers. The governor makes the appointments. The IWAB has one employee—an executive director.

The IWAB has jurisdiction only over wireless enhanced 9-1-1 service. Its authority includes:

- Administration of the Wireless Emergency Telephone System Fund

- Adjustment of the wireless 9-1-1 fee[8]
- Disbursement of funds to local governments for wireless E9-1-1 system costs
- Contracting
- Rule-making

The IWAB operates as a quasi-state government agency and is not required to submit a budget to the legislature, although it must submit an audit semi-annually to the State Board of Accounts on its management of the Fund.

3.1.3. Intergovernmental Coordination

Indiana's current mechanism for statewide coordination of 9-1-1 system implementation is limited to wireless. The IWAB exercises its coordination and support function by:

- Providing a private statewide IP backbone network for wireless 9-1-1 calls
- Coordinating all interconnections with the statewide network
- Providing guidelines, forms, and a process for counties to request Federal funding under the ENHANCE 911 Act of 2004 as amended
- Providing monthly funding to all 92 Counties, pursuant to the statutes that govern the distribution of funds[9]
- Auditing the Counties' use of those funds as provided by the statutes
- Assisting and guiding local or regional 9-1-1 authorities and PSAPs within the limits of its statutory authority

The IWAB engages its stakeholders and solicits input by:

- The composition of the IWAB itself, which gives wireless service providers and PSAPs equal representation
- Assuring its meetings are publicized and accessible to the public, in accordance with the Indiana open-door statutes
- Attending the state chapter meetings of NENA and APCO
- Publishing a stakeholder targeted newsletter twice a year
- Hosting three meetings a year for sheriffs, County commissioners, 9-1-1 coordinators, and PSAP personnel (one in the north, one in the south and one in Indianapolis)

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8 The wireless E9-1-1 fee may be adjusted annually upwards or downwards but may not be increased more than seven cents. The maximum rate allowed by law is 50 cents per month per subscriber number.

9 This funding, which is targeted to making improvements and enhancements for wireless enhanced 9-1-1 service, also has a collateral benefit to landline service because there is no equipment or software that is exclusive to wireless.

While the IWAB has no jurisdiction over the local provision of landline Enhanced 9-1-1 service, its position as a state governmental entity gives it a comprehensive statewide perspective on the range of issues facing Indiana's PSAPs, and this perspective enables the IWAB to be a support and resource for them in addressing these issues.

The Indiana's Utility Regulatory Commission's (IURC) role is limited to review and approval of carrier 9-1-1 tariffs and receipt of carrier individual case basis (ICB) filings, which have a direct impact on the Counties' 9-1-1 service costs. The type and nature of these ICBs and their associated product and service contracts have limited (in some instances) PSAPs and Counties from directly connecting with the state's IN911 network.

The IWAB provides a semi-annual filing of its statement of accounts and activities to the Legislature under §36-8-16.5-24. In addition, it provides an independent subject matter expert and resource to legislators for various matters broadly related to enhanced 9-1-1 service in Indiana.

3.2. CURRENT 9-1-1 TECHNOLOGY

3.2.1. Overview

Three Local Exchange Carriers (LECs) provide 9-1-1 service in Indiana:

- AT&T
- Embarq
- Verizon

Ten Commercial Mobile Radio Service (CMRS) carriers provide service in Indiana:

- AT&T Wireless (f/k/a Cingular)
- Bluegrass Cellular
- Centennial Communications[10]
- Cincinnati Bell Wireless
- Cricket Wireless (a/k/a Leap Wireless)
- Sprint Nextel
- Revol wireless
- T-Mobile
- Verizon Wireless
- US Cellular

It is not known how many VoIP service providers (VSPs) offer service in Indiana because there is no state-level mechanism to collect that information. VoIP provider compliance is a local matter.

One hundred sixty-five PSAPs operate within 91 County E9-1-1 systems[11] for landline and VoIP calls, and a single, statewide transport network for wireless E9-1-1 calls. One hundred thirty-four of these PSAPs serve as primary call-taking agencies.

[10] During the development of this plan, AT&T Wireless announced plans to acquire Centennial Communications.
[11] Two Counties, Fountain and Warren, comprise a single consolidated 9-1-1 operating authority.

3.2.2. Landline E9-1-1 Infrastructure

The landline 9-1-1 network consists of circuit switched, analog technologies, in-band signaling and low-speed data transmissions (1,200-to-9,600 baud data lines). This technology, which AT&T developed in the late 1960s, has not had significant updates. While the LECs have deployed fiber optic networks employing digital signaling technologies for commercial purposes, these technologies have not been widely applied to landline 9-1-1 service.

3.2.2.1. System Level of Service

All but one of Indiana's 165 PSAPs handle landline enhanced 9-1-1 calls.[12]

3.2.2.2. PSAPs

The majority of Indiana's PSAPs use one of the many Plant CML products. A small minority use equipment from IPC/Positron, Zetron, Emergitech, and 911 Inc. Four PSAPS have IP-based CPE, which enables them to terminate VoIP calls directly.

There is no mechanism at the state level to collect detailed information about CPE ownership, year installed or condition. Absent specific information, the only thing known with certainty is that the majority of Indiana's PSAPs have to replace their CPE before they can implement full Next Generation 9-1-1 (NG9-1-1).

There is also no mechanism at the state level to collect information about landline call volumes. Based on what is known, and by applying statistical analysis, an estimated 1.2 million landline 9-1-1 calls were made in 2007.

There are currently no PSAPs that perform specialized functions based on call type and characteristics, e.g., video calls from the deaf or non-English language.

3.2.2.3. LEC 9-1-1 Selective Routers

Among the three major LECs that provide E9-1-1 services, there are currently 16 selective routers, some of which also serve as tandem switches. These are located throughout the state and serve the majority of Indiana's PSAPs. Selective routers perform the function of routing an E9-1-1 call to the correct PSAP and are critical components of the existing landline delivery network. Tipton Telephone (d/b/a TDS) serves the PSAP in Tipton County through a hybrid trunking arrangement. AT&T uses three Lucent/Alcatel 5ESS 9-1-1 tandem switches to serve 80 primary PSAPs, 10 secondary PSAPs and four back-up PSAPs. Verizon uses 12 CML selective routers, which also function as ANI/ALI controllers, to serve 49 primary PSAPs, one secondary PSAP and two back-up PSAPs. Embarq uses one Nortel DMS-500 tandem switch (and is transitioning away from a Plant CML selective router) to serve 18 primary PSAPs.

[12] That PSAP, Martin County, does handle wireless Phase II calls.

3.2.2.4. ALI Database

AT&T-served PSAPs currently receive landline, VoIP and wireless ALI data via the AT&T regional ALI platform. These ALI platforms were upgraded to IP-based systems in 2008 and transport the ALI data and the Selective Router API links over a private IP network. The AT&T private IP network for ALI is a fully redundant, self-healing network. The IP ALI data links are converted back to analog circuits if the PSAP CPE is not capable of IP ALI links. Verizon-served PSAPs are migrating from a legacy ALI platform to the Verizon nationwide ALISA platform. These conversions are taking place in late 2008. This network utilizes IP over frame relay. Embarq-served PSAPs currently receive landline ALI service via an IP-based national platform.

Certain other PSAPs in Indiana receive landline ALI via local ALI database servers or via IP networking provided as a parallel overlay to the IN911 wireless ALI network. Forty-five PSAPs have enhanced ALI display system capabilities through software extensions that were created as a part of the deployment of the IN911 network. These PSAPs can display additional information from telematics providers and other emerging technologies.

The LECs have each announced plans to move landline ALI database service to IP-based network platforms. All three LECs have deployed some type of national database connectivity. Thus, all PSAPs are in some stage of migration to IP-based ALI networks; some have completed that process.

3.2.2.5. Known Vulnerabilities

The LEC 9-1-1 networks are either not 100 percent redundant or have limited areas of redundancy. LEC 9-1-1 service uses the LEC regional or LATA tandem. Therefore, survivability of the tandem as a selective router also relies on survivability of the same switch to provide service for landline calls of all types, including 9-1-1 calls. Because of this single network element, if the 9-1-1 tandem switch were to fail, the majority of all landline calls would also be impaired.

3.2.3. Wireless E9-1-1 Infrastructure

The State of Indiana provides a single, statewide private E9-1-1 network (IN911 network) to handle 9-1-1 calls from cellular phones. This network uses the most modern, state-of-the-art technology available: a self-healing fiber optic network (SONET) that serves as a transport network for a diverse IP-based 'mesh network' that delivers 9-1-1 voice and ALI data using Internet Protocol (IP) technology. IP signaling is converted to analog voice and traditional RS-232 data communications to serve legacy PSAP equipment in the back room of the local PSAP. All aspects and network elements that make up the IN911 network are 100 percent redundant.

3.2.3.1. System Level of Service

All counties have wireless Phase II service with all carriers, i.e., 100 percent of the geography and 100 percent of the population.

Martin County's PSAP is "specialized" in that it handles wireless Phase II wireless E9-1-1 calls but not landline Enhanced 9-1-1 calls. There are no other PSAPs at the present time that perform specialized functions based on call type and characteristics, e.g., video calls from the deaf, non-English language.

The IN911 network does not currently handle certain types of communications or protocols from cellular or other wireless devices: telematics, SMS, text messaging, still images, video images or video relay. INdigital telecom, the IN911 network operator, has plans to include transit, routing and delivery for these types of messages in 2009.

3.2.3.2. PSAPs

One hundred thirty-four PSAPs serve as the primary answering point for wireless E9-1-1 calls and either directly dispatch first responders or transfer to a secondary PSAP that dispatches on a localized basis.

3.2.3.3. CMRS Carrier Infrastructure

Among the ten CMRS carriers, there are 36 Mobile Switching Centers (MSC) located throughout the Midwest. All 36 of them connect to the two fully redundant mated-pair tandem selective routers on the IN911 network. From there, wireless 9-1-1 calls are processed in one of two ways depending on whether the LEC that provides equipment (CPE) allows the PSAP to connect directly to the state's network or not. All PSAPs served by Verizon and Embarq have direct connectivity (or the functional equivalent) with the IN911 network, which means wireless 9-1-1 calls can be delivered directly to the appropriate PSAP. No PSAPs served by AT&T have direct connectivity with the state's network, so their wireless calls are routed to the AT&T selective routers and then to the PSAP. The state's wireless E9-1-1 system processed nearly 2.1 million wireless 9-1-1 calls in 2007.

3.2.3.4. Wireless ALI database

Verizon-served PSAPs currently receive all wireless 9-1-1 ALI from the IN911 network. This network is integrated into the current legacy ALI platform and is migrating to full integration with the Verizon ALISA platform in late 2008 and early 2009. Embarq-served PSAPS currently receive all wireless 9-1-1 ALI information directly from the IN911 network. AT&T-served PSAPs currently receive wireless ALI data via the AT&T ALI network as described in the landline section.

3.2.3.5. Known Vulnerabilities

The IN911 network is fully redundant at all levels. It uses redundant, paired selective router tandems and multiple IP-based selective routing services, redundant ALI links and controllers. The underlying IP transport is fully redundant to each PSAP, and the connections to all legacy LEC network elements used for 9-1-1 service are also redundant.

The IN911 network is a fully private network that makes extensive use of IP security protocols and procedures. In addition to these precautions, the network is highly monitored to automatically detect any operational abnormality. While no network can be made 100 percent secure, every reasonable effort has been made to assure the integrity of the IN911 network.

3.3. PSAP INTEGRATION WITH EMERGENCY COMMUNICATIONS, TELECOMMUNICATIONS AND INFORMATION NETWORKS

At present, many PSAPs function independently of each other. There is limited integration of E9-1-1 and radio systems with one another or with other related or unrelated public safety systems.

From a purely technological perspective, the IN911 network can support other public safety functions, and there are several recent initiatives to provide Emergency Services IP Network (ESInet) services on the IN911 backbone. For example, Crawford County is very rural and did not have a NCIC/IDACs (National Crime Information Center / Indiana Data and Communications) connection. The IN911 network was partitioned to provide secure, CJIS (Criminal Justice Information Services) compliant connections. This allowed Crawford County direct access to national databases for criminal investigation as well as other public safety-related matters directly related to wireless 9-1-1 calls. In addition, the IWAB has an IP transport sharing inter-local agreement with the Indiana Supreme Court, Judicial Technology and Automation Committee (JTAC). The court, through JTAC, is an international leader for its work on major technology initiatives, including the Odyssey statewide case management system; electronic Protection Order Registry; electronic Citation and Warning System for law enforcement and electronic infraction reporting to the Bureau of Motor Vehicles. The IN911 network's functionality is used only for matters directly relating to wireless enhanced 9-1-1 and public safety.

The IN911 network serves public safety needs and PSAPs through access to other state agencies, and benefits the public interest through the various inter-local agreements, which thereby reduces the overall cost of the IN911 network. Additional applications related to NG9-1-1 and other related public safety communications functions are under development. Current public policy, legislation and regulations govern the development of these services.

3.4. ECONOMICS

3.4.1. Current Funding

3.4.1.1. Landline E9-1-1

IC 36-8-16 and 36-8-16.5 provide for the funding of landline and wireless enhanced 9-1-1 services through the assessment of a fee on subscribers.

The County's fiscal body may adopt an ordinance to impose the enhanced emergency telephone system fee and must apply it uniformly to switched access landlines and interconnected VoIP. Counties use the same process to increase, reduce or rescind the fee. Counties with a first- or second-class city may charge up to three percent of the average monthly telephone access charge. Indiana has one first-class city and approximately 12 second-class cities, so there are only 14 or 15 Counties that assess the fee at the three percent rate. The remainder can assess up to 10 percent of the cost basic monthly telephone access charge. Carriers remit directly to the County's fiscal body for deposit into a dedicated account. Recent legislation prohibits fee increases until a County complies with the new PSAP limits.

County 9-1-1 fees may be used to pay the following one-time and recurring costs[13]:

- 9-1-1 hardware, software or other equipment used to answer 9-1-1 calls
- The rates and fees paid to telephone companies for connection to the telephone companies' 9-1-1 network, including trunks, circuits and ALI database
- Salaries, training and other personnel costs for PSAP employees
- Voice and data communications equipment, infrastructure or other information technology necessary to provide emergency response services; including radio dispatching, satellite towers and/or other technology used to communicate with responders
- Emergency notification system

3.4.1.2. Wireless E9-1-1

The state funds wireless E9-1-1 service through a uniform fee on pre-paid and post-paid wireless subscribers. The IWAB has authority to adjust the fee annually, and any adjustment upward may be no more than seven cents. The current rate is set at the maximum 50 cents per subscriber line. CMRS and pre-paid wireless service providers remit the fee to the state treasurer for deposit into the dedicated fund.

The state, pursuant to IC 36-8-16.5-39, allocates wireless funds in the following manner[14]:

- IWAB administration ($.010 per line per month)
- PSAP Equal Share ($.039 per line per month)
- Population Based ($.344 per line per month)
- Technology Subaccount ($.100 per line per month)[15]

See Figure 1 for a graphic representation.

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[13] IC36-8-16-14

[14] Wireless carriers retain $.007 of the fee for the cost of collection and remittance. In 2007, that would have amounted to approximately $175,425.00.

[15] These funds are used to cover the costs of the State wireless E9-1-1 network.

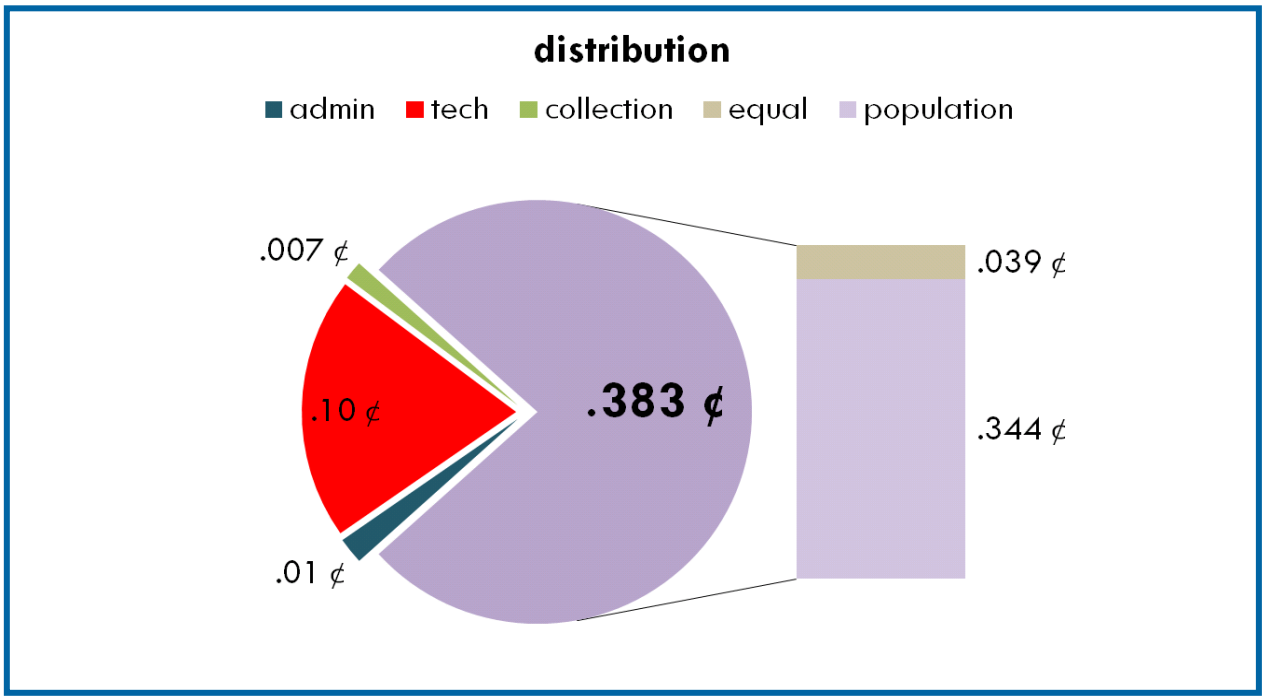

Figure 1

The IWAB provides monthly funding to all 92 Counties; and, in the decade since the IWAB's inception, it has distributed a total $152,014,939. Counties may use the wireless funds for the following purposes[16]:

- Necessary computer hardware, software (including mapping), and database equipment for wireless Enhanced 9-1-1
- Personnel expense and training
- Any item directly associated with the provision of wireless E9-1-1 services
- Consumer education

3.4.2. Federal Funding for 9-1-1

Federal funding for 9-1-1 has been sparse. Many, if not most, federal grants to states and local government require state and local planning of one form or another. Currently, as of November, 2008, the national 9-1-1 ICO is in the comment period for a Notice of Proposed Rulemaking (NPRM) for the governance of the 9-1-1 grant program authorized under the ENHANCE 911 Act of 2004 as amended.

The grant program provides funding for wireless E9-1-1 Phase II and for IP-enabled emergency networks. The IWAB qualifies to apply on behalf of Indiana's PSAPs for both types of grants. The availability of these grants can help prepare Indiana's PSAPs for the next generation of wireless capability to serve the growing number of consumers who use non-voice wireless messaging protocols and modes of

[16] IC 36-8-16.5-41

communication, as well as to assure that PSAPs have the capability to receive and process these types of "calls." This is particularly important since the deaf rely increasingly on these new technologies, and the Americans with Disabilities Act require the deaf to be provided equal access to 9-1-1.

IWAB intends to use its existing relationships and processes to coordinate its application with Indiana's PSAPs and to distribute ENHANCE 911 Act grant funding.

3.4.3. Current Revenues and Costs

The mechanism at the state level for collecting information concerning 9-1-1 revenues and costs at the County level is a formal, statutory audit process. The aggregate information for the Counties came from the State Board of Accounts report entitled *Report on the Expenditure of E911 Fees January 1, 2005 to December 31, 2007*, filed October 16, 2008.[17] The aggregate information for the IWAB information came from the IWAB.

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[17] Kimball accepted the E9-1-1 expenditures/disbursements information contained in the State Board of Accounts (SBOA) report at face value. The SBOA report acknowledged the difficulties the auditors encountered in attempting to identify exactly what the individual County and statewide aggregate E9-1-1 expenditures were, and exactly what the Individual County and statewide aggregate E9-1-1 revenues were. Issues identified included questionable expenditures, comingling of funds, etc.

Local/Landline		State/Wireless	
2007 aggregate County landline E9-1-1 fee revenues	$45,166,038[18]	2007 IWAB 50 cents wireless E9-1-1 fee revenues	$25,060,653
2007 aggregate County landline E9-1-1 disbursements	$57,256,106[19]		
		2007 IWAB Distributions	
		Population-based and equal share distributions to County 9-1-1 authorities	$19,431,992[20]
		IWAB administration	$507,363
		Technology	$5,121,298
		Total	**$25,060,653**

3.4.4. Next Generation Considerations

In Indiana today, both landline and wireless E9-1-1 revenues and costs are relatively straightforward. In a full NG9-1-1 environment, there are new costs that may be shared among state and local jurisdictions. Some of the issues driving the development of NG9-1-1 are wireless issues. For example, telematics, SMS protocol messaging, text messaging, transmission of still images and video images from cellular and other wireless devices. As the state 9-1-1 program is currently structured, the statutorily defined purposes for which Indiana's wireless funding can be used are broad enough to account for new services that may be required to provide the next generation of wireless E9-1-1. The revenues generated by the surcharge, however, may not be adequate to cover the costs of these new services. Further study is needed to quantify the costs and determine how to pay for them. The IWAB originally had a process whereby Counties could request proportional funding for shared costs, and that process could be reinstated for the next generation of wireless E9-1-1 services. Doing so would require a change in the statute.

Determining the cost to implement NG9-1-1 in Indiana is challenging. The variable network costs are higher or lower depending on whether the state's existing IN911 network is used to provide an ESInet. The technology trend is toward more mobile and wireless technologies and away from landlines. Reflective of that trend, the proportion of wireless 9-1-1 calls continues to increase relative to landline 9-1-1 calls. Some Indiana 9-1-1 authorities report that up to 75 percent of all E9-1-1 calls come from wireless callers. It is conceivable that the state would want to realize the full potential of its investment in the IN911 network, particularly as it already processes the majority of E9-1-1 calls, and leverage that investment for the good of E9-1-1 generally. As with the initial procurement of the IN911 network, a competitive procurement process assures the best solution at the best price.

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18 State Board of Accounts, *Report on the Expenditure of* E9-1-1 *Fees January 1, 2005, to December 31, 2007*, filed October 16, 2008, page 7

19 Ibid.

20 The IWAB operates on a July-to-June fiscal year, and the Counties operate on a calendar year fiscal year. Any apparent discrepancy between wireless revenues the Counties reported receiving from the IWAB and what the IWAB reported distributing to the Counties is likely due to the differences in the state and County fiscal year cycles, which makes accounting somewhat less than precise.

3.5. ACTION NEEDED TO ACHIEVE THE PLAN'S GOALS AND OBJECTIVES

This Plan has been constructed to reflect the current statutory framework: wireless E9-1-1 is a statewide and state-level function; landline E9-1-1 is local. We note that not all future 9-1-1 needs are likely to fit within the current statutory framework. Action needed to achieve the Plan's goals and objectives include:

- Legislation to update Indiana's landline and wireless statutes to reflect industry and technological trends, to address broader issues affecting 9-1-1 and to meet the evolving needs of PSAPs and public safety
- Development of the capability, in conjunction with the vendor community, to assure that Indiana's citizens and visitors have E9-1-1 service no matter where they call from; no matter what wireless device, protocol or service they use; whether they communicate by voice, text, image or video
- Increased staffing for the IWAB as described in Section 6 Resource Allocation.

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4. FUTURE ENVIRONMENT

4.1. VISION

Indiana's PSAPs receive, process, and dispatch help quickly and accurately to wireless callers:

- From any geographical location
- Using any wireless device or service
- Using any wireless protocol
- Whether they communicate by voice or text

This vision reflects the current statutory framework, but a holistic vision would not be so limited. A more comprehensive vision for Indiana is presented in the following statements.

In the future, Indiana leverages the economies of scale inherent in a single, uniform statewide E9-1-1 infrastructure or interconnected ESInets with equipment and technology to enable all 9-1-1 calls to be processed regardless of technology and to enable the seamless transfer of voice and data among PSAPs within Indiana and adjoining states and regions.

In the future, related statewide public safety services, e.g., poison control, trauma centers, 2-1-1, 5-1-1, NCIC/IDACS, JTAC, are able to exchange voice and data seamlessly with the E9-1-1 system to provide better service to the public in an emergency.

In the future, the state would operate an E9-1-1 program with adequate authority, staff and funding to coordinate and support the advancement of E9-1-1 and related public safety services statewide.

In the future, Indiana's E9-1-1 program would have working relationships with (and the ability to seamlessly share data with) other state and federal agencies that provide or support emergency services.[21]

In the future, centralized services and applications that are common to all PSAPs is evaluated and considered, specifically where reducing local government costs to provide E9-1-1 service can be achieved within the statutory policy established by the legislature.

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[21] Examples include the Indiana Department of Homeland Security, the State Department of Health, the Federal Emergency Management Agency (FEMA), the Department of Homeland Security (DHS) and the National Guard.

5. GOALS, OBJECTIVES AND MEASURES

Goal 1 Provide a functionally comparable level of E9-1-1 service statewide	
Objective 1	Establish a stakeholder working group to make recommendations to the IWAB on a variety of technical, operational and policy matters to advance wireless E9-1-1 in Indiana.
Completion Date	November 30, 2008
Measurement(s)	Agenda created and first meeting scheduled
Objective 2	Using NASNAs *Report on Data Elements to Measure the Technological Progress of 9-1-1* (see Appendix A), the stakeholder working group identifies the data elements germane to wireless E9-1-1 and the data collection mechanism.
Completion Date	June 30, 2009
Measurement(s)	Data elements and data gathering mechanism approved by IWAB
Objective 3	Recommend a definition of the base line level of service for Indiana, e.g., call set up, routing accuracy, that is in alignment with national standards and is vendor neutral
Completion Date	August 1, 2009
Measurement(s)	Recommended definition adopted by the IWAB
Objective 4	Recommend minimum technical and operational standards to include call-taker training/certification; staffing; Multi Line Telephone Systems (MLTS) and interoperability operational support on an inter-agency basis
Completion Date	August 1, 2009
Measurement(s)	Recommended minimum standards adopted by the IWAB
Objective 5	Recommend legislation to: • Establish a state entity with appropriate authority, funding and staffing to facilitate/coordinate statewide E9-1-1 planning, and provide services and technology that is vendor neutral. • Establish a uniform, statewide E9-1-1 funding mechanism • Enable interconnectivity between the state IN911 network and other ESInets
Completion Date	January 1, 2010
Measurement(s)	Legislation introduced

Goal 2 Provide all cellular and wireless technology users with equal access to IN911	
Objective 1	Identify requirements for SMS protocol interfaces, TDD messaging, text messaging, instant messaging, wireless transmission of still images, and video images, telematics, language line services, and video relay for the hearing impaired
Completion Date	July 1, 2011
Measurement(s)	Report delivered to IWAB
Objective 2	The IWAB works with PSAPs and local government to develop funding sources
Completion Date	December 31, 2011
Measurement(s)	Legislation introduced
Goal 3 **Achieve seamless transfer of wireless E91-1 voice and data across state lines**	
Objective 1	Negotiate formal Memoranda of Agreement (MOA) with contiguous County government from Michigan, Illinois, Kentucky, and Ohio
Completion Date	July 1, 2010
Measurement(s)	MOAs approved by IWAB
Objective 2	Build out the IN911 network to the borders of Indiana and adjacent states or other state or regional ESInets
Completion Date	December 1, 2010
Measurement(s)	Interstate interconnections achieved, testing completed, and network ready for service

5.1. TRACKING PROGRESS

The Indiana Statewide 9-1-1 Plan is a living document that is used on an ongoing basis. Indiana's goals are high-level, general directions; and the objectives for achieving the goals are concise, specific and measurable. Each objective has a deadline for completion and an associated metric to measure progress. The IWAB's staff is responsible for executing the Plan and tracking progress.

IWAB uses current processes in place with its network vendor, INdigital telecom, to measure and continually improve network performance.

Once IWAB has approved the stakeholder working group's recommendations regarding data elements to measure the technological progress of wireless E9-1-1, that information is collected and used to measure technological progress.

6. RESOURCE ALLOCATION

The IWAB has only one staff person—an executive director. This level of staffing is not adequate to fully support the initiatives and perform the tasks associated executing the plan. Additional staffing resources are needed, whether acquired through contracted services or by hiring permanent staff.

Identified staffing needs include a CPA, two positions to support local government and the PSAPs (one in the north, and one in the south) and an administrative assistant. The financial staff would develop and manage a state grant program and manage federal grants. The staff that provide direct support to local government and the PSAPs would have general understanding of the issues and technologies related to wireless E9-1-1, as well the ability to facilitate communications among all IWAB's stakeholders. An administrative assistant would provide general administrative and program support. Having these additional resources would enable the IWAB's executive director to focus more on higher-level functions such as planning and program development.

In the short term, IWAB can use a part-time accountant from the Treasurer's Office to develop a state grant program to support upgrades for the next generation of wireless E9-1-1 and to manage federal grants.

If IWAB requires additional funding, it has the authority to increase the wireless E9-1-1 surcharge by seven cents once each year.

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7. UPDATING THE PLAN

The IWAB's staff is responsible for executing the Plan and taking the lead in keeping it updated as progress is made. The IWAB's staff convenes a meeting of the stakeholder working group at least once annually, prior to the IWAB's last calendar year meeting. The IWAB staff, in conjunction with the working group, undertakes any major revisions, additions or eliminations of goals and objectives that are necessary. Goals and/or objectives that were successfully implemented are removed from the Plan, or if further work is needed, it remains in the plan; and new tasks are added for the next year. The IWAB staff present the working group's recommendation for the IWAB's consideration. The IWAB reviews the recommendations at its last meeting of the calendar year. Staff executes the updated Plan, and the cycle continues.

There may be times when regulatory or technological changes require commensurate changes to the plan on a schedule outside the routine annual process. In that event, the IWAB's executive director takes the lead in coordinating with the stakeholder working group to develop a recommendation for the IWAB's consideration.

Changes to the plan are documented in the following manner:

- The Plan is given a new version number following the annual review and update cycle, or following any interim update that was necessary. The number given at that time is a full number, that is, 1.0, 2.0 etc.
- Any changes made to the Plan on an interim cycle are given a fractional number, that is, 1.1 or 1.2, etc.
- The date field documents the date that the IWAB board approved the change, or in the case of an interim administrative change, the date of that change.
- The "description of change" field documents the nature of the change and the page and/or section affected.
- The footers of all revised pages are edited to indicate that the page had been revised and the date of the revision.

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8. MECHANISM(S) FOR OVERSEEING AND MANAGING THE STATE'S 9-1-1 SYSTEM

The State provides wireless E9-1-1 as a state-level function. The provision of landline E9-1-1 is a local government function.

8.1. LANDLINE E9-1-1

Although landline E9-1-1 is a local government matter, the 2008 legislature enacted new provisions limiting the number of PSAPs a County could operate and prohibited any increases in the 9-1-1 fee until the number of PSAPs had been reduced in compliance with the law.

The fiscal body of a County has authority to establish a fee on landline telephone services and VoIP services to pay for E9-1-1. The mechanism for overseeing and managing a County or municipal 9-1-1 system is typically through a contract between the unit of government and the Local Exchange Carrier (LEC), or a competitive 9-1-1 service provider. The unit obtains and maintains the necessary hardware and software for its PSAPs through a lease arrangement with the LEC or through a competitive procurement. A unit of government may or may not establish an E9-1-1 committee or board to provide policy direction and oversight.

The mechanism for managing and overseeing these systems is by individual, local ordinances, and contractual arrangements with the LEC or a competitive 9-1-1 service provider. It is not typical for Counties or municipal units of government to coordinate on a regional basis for the provision of service. There is no mechanism for the statewide coordination of landline 9-1-1 services.

8.2. WIRELESS E9-1-1

Local, regional, and state-level system functions relative to the State's IN911 network are coordinated, mutually supportive, comprehensive in scope, and efficient in operation. State legislation, policies and rules govern the provision of statewide wireless E9-1-1.

The mechanism for overseeing and managing the IN911 network is a state-level program office housed within the Office of the Treasurer, staffed only by an executive director, which administers the program on behalf of the IWAB. IWAB's responsibilities include:

- Overseeing and managing the state IN911 network
- Providing a clearing house for information about local, regional, state, and national wireless E9-1-1 issues
- Being the liaison between local/regional E9-1-1 stakeholders and state/federal agencies on matters broadly relating to wireless E9-1-1

Because of its limited staffing, the IWAB relies on its network vendor INdigital telecom and additional oversight is provided through the use of contracted consulting services. Network performance standards are established by contract, as are the processes necessary to assure the reliability and continued operation of the IN911 network.

The IWAB engages its stakeholders and solicits input by:

- The composition of the IWAB itself, which gives wireless service providers (CMRS) and PSAPs equal representation
- Assuring its meetings are publicized and accessible to the public, in accordance with the Indiana open door statutes
- Attending the state chapter meetings of NENA and APCO
- Publishing a stakeholder targeted newsletter twice a year
- Hosting three meetings a year for sheriffs, County commissioners, 9-1-1 coordinators, and PSAP personnel (one in the north, one in the south and one in Indianapolis)

The executive director has the authority to involve stakeholders at any time.

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9. MECHANISM FOR INITIATING AND MONITORING AN IMPLEMENTATION PROJECT

9.1. LANDLINE E9-1-1

Landline E9-1-1 is a local service with local oversight. The mechanism for initiating and monitoring an implementation project for landline E9-1-1 services is typically through the serving LEC. Some County and municipal governments may have technical and project management staff, but most do not. Currently, there is no state-level mechanism for assisting local governments with their implementation projects.

9.2. WIRELESS E9-1-1

The IWAB relies on contracted services for the initiation and monitoring of wireless E9-1-1 projects.

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10. CONCLUSION

The demands on Indiana's IN911 network, and on the other existing E9-1-1 networks, have increased and become more complex due to the expansion of wireless subscribers, and of wireless services of all types; a state population that is shifting toward mobile services and the public's demand for access to emergency services through modern wireless communication protocols, modes and devices.

This Plan establishes the foundation for taking Indiana's E9-1-1 capabilities to the next level—through assuring that all Indiana PSAPs achieve a minimum standard level of service statewide and, at the same time, enabling the development of a more comprehensive and technically advanced level of service to meet the evolving needs of cellular and wireless consumers.

The evolution of wireless services in today's society has created a widening gap between the person calling 9-1-1 and the agency that answers those calls for help. This plan represents a comprehensive but flexible approach and is the framework for effective public policy that looks to the future.

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APPENDIX A – REPORT ON DATA ELEMENTS TO MEASURE THE TECHNOLOGICAL PROGRESS OF 9-1-1

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Report

on

Data Elements to Measure the Technological Progress of 9-1-1

submitted to

National Association of State 9-1-1 Administrators (NASNA)

July 2008 ©

Kimball

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

1.1. BACKGROUND

In the fall of 2007, the national 9-1-1 Implementation Coordination Office (ICO) entered into a cooperative agreement with the National Association of State 9-1-1 Administrators (NASNA). The arrangement was conceived to implement the provisions of the ENHANCE 9-1-1 Act of 2004 related to:

- Developing, collecting, and disseminating information about technologies used to provide enhanced 9-1-1 service; and
- Advising and assisting "eligible entities," such as states, to prepare 9-1-1 implementation plans

The agreement included funding for NASNA to procure the services of a project manager for this work. In September 2007, NASNA released a Request for Proposals (RFP). Kimball responded and was selected to conduct the project. This report is the second deliverable, and is intended to identify and recommend appropriate data elements that would measure the technological progress of 9-1-1 and would be feasible to collect.

1.2. METHODS

On January 8, 2008, Kimball sent a memorandum to NASNA, the National Emergency Number Association (NENA), and the Association of Public-Safety Communications Officials (APCO), soliciting their input on 9-1-1 planning and coordination issues, and on what information to collect for the purposes of measuring the technological progress of 9-1-1. The Kimball team subsequently held face-to-face meetings with these stakeholders on January 22, 2008. In addition, we communicated with stakeholder representatives, Noblis, and the ICO staff by telephone and email.

On the basis of the input received, we compiled a preliminary list of data elements that these stakeholders identified as being potential progress measures and presented it to NASNA for further review and comment. We also sent the preliminary list to Noblis, which is conducting a public safety answering point (PSAP) benchmarking project for the USDOT to develop data elements to measure the progress of Next Generation 9-1-1 (NG9-1-1)[1] at the PSAP and 9-1-1 authority level. In coordination with Noblis, Kimball removed most data elements having to do with Internet protocol (IP) and NG9-1-1 from its recommendations.

[1] NENA is in the process of finalizing a formal definition of NG9-1-1 (See Appendix B, used with permission) and is also updating its definition of Enhanced 9-1-1. The best way to understand what NG9-1-1 is is to consider its capabilities in relation to Basic 9-1-1 and Enhanced 9-1-1. Basic 9-1-1 sends a 9-1-1 call to a telephone set at a PSAP located within the same telephone exchange as the one from which the call originated; the PSAP may not be the one that actually serves the caller's location; there are no data provided with the call. Enhanced 9-1-1 selectively routes a 9-1-1 call to the correct PSAP regardless of the originating telephone exchange and sends data that include the caller's location and call back number. NG9-1-1 includes all current E9-1-1 capabilities, and has additional capability to interface with a variety of non-traditional call and message services; process voice and non-voice, multi-media messages; acquire and integrate additional data useful to call routing and handling (which the NENA Future Path Plan refers to as essential, supportive and supplemental data); and deliver the calls/messages and data to PSAPs and other appropriate emergency entities. Please see the following links to internet information on NG9-1-1. http://www.nena.org/pages/ContentList.asp?CTID=65 and http://www.its.dot.gov/ng911

The Kimball project team also held several follow-up telephone and email conversations with these key stakeholders as needed to clarify our understanding and to get further input.

1.3. SUMMARY OF KEY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

While most of the data elements identified by the stakeholders reflected the current environment, some reflected the fact that the transition to IP-enabled technology, and ultimately to full NG9-1-1 capability, is underway. In light of the Noblis project described above, Kimball's recommendations attempt to avoid unnecessary duplication of that effort.

Our findings, conclusions, and recommendations fall into five categories:

1. **Management Information System (MIS) -** It is essential to quantify the level of MIS capability that exists, either at the PSAP level and/or within 9-1-1 authority systems. It is an important progress measure in its own right, *and* a MIS is the source of many of the other data elements that were identified as being feasible to collect, e.g., total number of 9-1-1 calls, call volume by call type, length of time to answer, and length of time from answer to dispatch. We recommend the collection of these data at both the PSAP and 9-1-1 system levels, understanding that in some cases those may be the same.
2. **9-1-1 system data -** The most basic and important data element identified in this category is the system level of service by percentage of population and percentage of geographic coverage. System level of service includes 9-1-1 remote call forwarding as required by the Federal Communications Commission's (FCC's) *Fifth Report and Order*[2], basic 9-1-1, enhanced 9-1-1 (E9-1-1), wireless Phase I and II, and voice over Internet protocol (VoIP). We recommend this information be collected, along with the number of 9-1-1 systems in a state, the number of primary and secondary PSAPs in each system, the percentage of population and the percentage of geography served by PSAPs performing specialized functions based on call type and characteristics, e.g., wireless, video calls from the deaf, non-English language.
3. **Financial data -** For the purposes of this report, the term 9-1-1 authority is intended to be functional and descriptive, referencing state, regional, County or municipal organizations with planning, coordination, funding and support responsibilities, but generally not direct PSAP operational responsibility. Kimball recommends data be collected concerning revenues and expenditures, and projections of same, at the 9-1-1 authority level; and the cost per 9-1-1 call at the PSAP level.
4. **Institutional environment data -** This category includes new legislation that would involve a change from the traditional 9-1-1 funding model to a technology neutral funding model; a change in an existing state 9-1-1 program's authority and resources to enable it to coordinate statewide planning and implementation; and the establishment of a state 9-1-1 program where there is not one at present. Kimball recommends collecting and reporting this information.
5. **Transitional information -** This category includes information that would track the efforts of 9-1-1 authorities to adapt and prepare for the future of 9-1-1. Following discussions with NASNA members and the ICO staff, Kimball recommends collecting only one element:

[2] FCC. Fifth report and order; First report and order: Implementation of 911 Act (WT-Docket No. 00-110 and CC Docket No. 92-105). Washington, D.C.: Federal Communications Commission, 2001.

advanced call types, but only to the extent that such calls are transmitted with an identifying class of service.

Finally, we note that if these data elements are to be collected in a manner that yields meaningful information, they must be standardized, agreed upon, and applied consistently nationwide (at least to the extent that they will be aggregated at those levels). Such standardization should include both the element definitions and base parameters involved.

2. INTRODUCTION

In 2004, Congress identified E9-1-1 as a "high national priority" requiring federal leadership and resources[3], and memorialized its findings in the opening section of the Ensuring Needed Help Arrives Near Callers Employing 911 Act (ENHANCE 911 Act or Act). Subsequent sections of the Act established the mechanisms for the federal government to provide that leadership and resources to state, local, and tribal governments in the implementation of wireless E9-1-1.

2.1. NATIONAL 9-1-1 IMPLEMENTATION COORDINATION OFFICE

The ENHANCE 911 Act amended Part C of Title I of the National Telecommunications and Information Administration Organization Act (47 12 U.S.C. 901 et seq.) by establishing a national 9-1-1 Implementation Coordination Office (ICO) as a joint program of the National Telecommunications and Information Administration (NTIA) in the U.S. Department of Commerce and the National Highway Traffic Safety Administration (NHTSA) in the U.S. Department of Transportation. The ICO was charged with the establishment of ". . . 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 manufacturers, and vendors involved in the implementation of E-911 services . . ."[4] Additionally, the ICO was made responsible for administering the wireless Phase II E9-1-1 implementation grant program created by subsection (b) of the Act.

Eligibility requirements for state entities provide that the state must have:

- Coordinated its application with the PSAPs located within the state
- Designated a single officer or governmental body of the state to serve as the coordinator of implementation of E9-1-1 services (except that such designation need not vest such coordinator with direct legal authority to implement E-911 services or manage emergency communications operations)
- Established a plan for the coordination and implementation of E9-1-1 services
- Integrated telecommunications services involved in the implementation and delivery of Phase II E9-1-1 services

Recently passed federal legislation[5] expands the ICO's mandate to include developing and reporting to Congress a "National Plan…for migrating to a national IP-enabled emergency network capable of receiving and responding to all citizen-activated emergency communications and improving information sharing among all emergency response entities."[6] It also expands the grant program to include "migration to an IP-enabled emergency network."[7]

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[3] Public Law No: 108-494, December 23, 2004 (Title I)
[4] Ibid, Section 158(a)(1)(A).
[5] New and Emerging Technologies 911 Improvement Act of 2008 (HR 3403), 110th Congress, June 23, 2008
[6] Section 158 of the National Telecommunications and Information Administration Organization Act (47 U.S.C. 942) subsection (d) (1)
[7] Ibid. subsection (b)(1).

2.2. NATIONAL ASSOCIATION OF STATE 9-1-1 ADMINISTRATORS

The National Association of State 9-1-1 Administrators (NASNA) is the only national 9-1-1 industry association whose membership consists entirely of representatives of states or state-like entities[8] that provide a central 9-1-1 planning or administrative function. Its purpose is to:

- Promote information sharing amongst those states with programs dedicated to implementing 9-1-1 emergency telephone systems;
- Assist other states with resolving issues necessary to accomplish statewide implementation and maintenance;
- Encourage the establishment of a coordination person within each state or province;
- Identify and recommend minimum standards for 9-1-1 emergency telephone systems;
- Identify and recommend appropriate legislation or rules concerning the administration of statewide 9-1-1 telephone system programs;
- Serve as a knowledge resource for fulfilling the purposes described in this section.[9]

NASNA's purpose complements the ICO's. Thus, the ICO saw that entering into a more formal arrangement with NASNA would enable both entities to accomplish their respective missions in two key areas: statewide 9-1-1 planning and coordination, and resolving issues associated with measuring progress on a statewide basis.

As part of the collaborative arrangement between the two organizations, the ICO provided funding to NASNA for the purpose of completing two deliverables: a Model State 9-1-1 Plan and a Report on Data Elements to Measure the Technological Progress of 9-1-1 at the state level. In September 2007, NASNA released a RFP. Kimball responded and was selected to conduct the project. This report is the second deliverable intended to identify and recommend appropriate data elements that would be feasible to collect.

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8 Thirty-eight states and the District of Columbia comprise the current membership.

9 By-Laws of the National Association of State 9-1-1 Administrators, <http://www.nasna911.org/pdf/NASNA-CB.pdf>, 2003

3. METHODS

Kimball conducted research in two stages. First, the project team interviewed each of the three national 9-1-1 trade associations: the National Association of State 9-1-1 Administrators (NASNA), the National Emergency Number Association (NENA), and the Association of Public-Safety Communications Officials (APCO)–on January 22, 2008. The interviews were designed to solicit feedback and opinions from the leadership of these associations on six questions presented in a memo dated January 8, 2008 (Appendix A). Subsequently, we compiled a preliminary list of data elements that were identified by these stakeholders as being potential progress measures.

We analyzed the list of data elements, categorized them, and sent the compilation to the NASNA membership and to the ICO staff for review and comment on April 18, 2008. Additionally, we solicited input from Noblis, as described above.

NASNA's, Noblis', and the ICO's input was solicited and provided throughout the project, and incorporated into this final Report on Data Measures to Evaluate the Technological Progress of 9-1-1.

4. FINDINGS

NASNA, NENA, and APCO identified many of the same data elements for measuring the technological progress of 9-1-1. Noblis suggested an additional element relating to state and local 9-1-1 authority plans for migrating to the Next Generation of 9-1-1. This *Findings* section consolidates all the information gathered into five basic categories: MIS data, technical data, financial data, institutional environment data, and transitional data.

We found that the associations' responses leaned towards the current 9-1-1 operational environment although some 9-1-1 systems are already making the transition to NG9-1-1 solutions. This report, along with Noblis' report described above, should be considered in concert, recognizing that the 9-1-1 industry's migration to NG systems is a process with no clear demarcation point between one and the other. Ultimately, the two should be consolidated.

Our analysis, conclusions, and recommendations are provided in sections five and six of this report.

4.1. MANAGEMENT INFORMATION SYSTEM DATA

- Number of PSAPs equipped with Management Information System (MIS) tools to collect, extract, compile, and analyze data
- Total number of 9-1-1 calls by PSAP and system
- Call volume (numbers), by call type (wireline, wireless Phase I, wireless Phase II, Voice over Internet Protocol (VoIP), Multi-Line Telephone System[10] (MLTS)), by PSAP, and by system
- Percentage of call volume by call type (wireline, wireless Phase I, wireless Phase II, VoIP, MLTS), by PSAP, and by system
- Percent of wireless Phase II calls delivered with Phase I data (applies only to PSAPs or systems that have implemented wireless Phase II with all carriers)
- Time to answer by PSAP and system
- Time interval from answer to dispatch by PSAP and system

4.2. 9-1-1 SYSTEM DATA

- Total number of 9-1-1 systems in a state with the number of PSAPs in each system (should add up to the total number of PSAPs)
- Number and percentage of PSAPs that have completed wireless Phase I implementation (i.e., with all carriers)
- Number and percentage of PSAPs that have completed wireless Phase II implementation (i.e., with all carriers)

[10] Includes Private Branch Exchange (PBX) and Central Office-based (CENTREX) systems

- Number of call taking equipment positions at each PSAP
- Percentage of time the wireline ALI system is operational
- Number of 9-1-1 network outages exceeding two hours' duration
- System engineered for P.01 Grade of Service
- Call delivery mechanisms (native IP, selective routing, direct trunking, etc.)
- System level of service (9-1-1 remote call forwarding, basic, enhanced, wireless Phases I and II, VoIP, IP-enabled, etc.) as defined by the state coordinating body based on information provided by the 9-1-1 authority(ies)
- Percentage of state's population at each level of 9-1-1 service (9-1-1 remote call forwarding, basic, enhanced, wireless Phase I, wireless Phase II, VoIP, and IP-enabled, etc.)
- Percentage of state's population receiving E9-1-1 (automatic location identification (ALI) and automatic number identification (ANI)) through identified technology (i.e., landline, VoIP, and Phase II)
- Percentage of state's geography served by 9-1-1 remote call forwarding, E9-1-1, wireless Phase I, wireless Phase II, and VoIP
- Number of telecommunications companies by technology or classification (Regional Bell Operating Company (RBOC), local exchange carrier (LEC), competitive local exchange carrier (CLEC), wireless, VoIP))
    - Number and percentage of PSAPs taking their wireless calls directly
    - The nature of PSAPs that take wireless calls directly, e.g., highway patrol, local PSAP
- Number of PSAPs currently served by IP-enabled 9-1-1 systems
- Number of PSAPs currently involved in IP-enabled 9-1-1 deployments
- Number and percentage of deployed IP-enabled systems compliant with nationally accepted ESInet standards
- Number and percentage of counties that do not have countywide 9-1-1 service

4.3. FINANCIAL DATA

- Revenues by 9-1-1 authority
- Expenditures by 9-1-1 authority
- Cost per call
- Amount of 9-1-1 funds diverted to purposes for which the funds were not collected

4.4. INSTITUTIONAL ENVIRONMENT DATA

- Legislative work needed
- The status of proposed legislation
- Nature and organizational location of the 9-1-1 authority

4.5. TRANSITIONAL DATA

- Identification of specific advanced call types currently being received, i.e., calls other than land line, wireless, and VoIP
- The number of 9-1-1 authorities considering a migration to NG systems
- The number of 9-1-1 authorities actively engaged in a NG9-1-1 technology procurement

5. ANALYSIS AND CONCLUSIONS

This section presents Kimball's assessment of these data elements as progress measures for the purposes described, and the feasibility of collecting these data. It takes into account the work of Noblis to develop data elements to measure the progress of PSAPs to IP-enabled and full NG9-1-1 systems.

5.1. MANAGEMENT INFORMATION SYSTEM DATA

Management Information Systems (MIS) data provides the most objective and standardized means of reporting data. Each of the national associations interviewed commented on the need for standardized and reliable data. Not all PSAPs or 9-1-1 systems have MIS capabilities; many that have the capability do not use it; others that have the capability have not trained their staff to use it. Therefore, the availability of empirical MIS data at present is not ubiquitous. Tracking progress in MIS utilization is highly desirable to measure ongoing actions to enhance 9-1-1 services.

5.1.1. Number of PSAPs Equipped with MIS Tools to Collect, Extract, Compile, and Analyze Data

Once a State's baseline technology assessment is complete, assuming it included current MIS capability, the metric for measuring progress would be the number of PSAPs or 9-1-1 systems that install and use MIS functionality going forward.

This metric can be applied at the PSAP level and at the 9-1-1 system level.[11] It is not necessary for individual PSAPs to have this equipment installed on their premises *if* the capability exists at the higher 9-1-1 system level *and* the PSAP has access to and uses the information generated. The point is that all 9-1-1 systems collect data and information that is comprehensive and reflects all PSAPs in the state.

In a NG9-1-1 environment, 9-1-1 systems will be interconnected, and new tools for collecting data about critical functions will be developed and implemented. In such an environment, MIS-like functionality may exist only at the system level, with individual PSAPs given access rights to their data.

Kimball concludes that it is feasible to collect baseline data regarding MIS capability and to continue to collect it to measure the technological progress of 9-1-1.

5.1.2. Total Number of 9-1-1 Calls by PSAP and System

The total number of 9-1-1 calls handled/processed by PSAP and system are important measurements. The information provides the basis for the analysis of call volume by call type. Within the "system"[12]

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[11] Ultimately a 9-1-1 system is a combination of human, data, equipment and network functions that all must work together to effectively provide the services involved for a specific geographic region. And, in a Next Generation environment, it reflects the fact that PSAP operations at the local level will be interconnected through regional and state networks that support a variety of "system" functions, including, but not limited to data sharing and collection. See U.S. Department of Transportation, "Next Generation 9-1-1 (NG9-1-1) System Initiative, System Description and Requirements Document." October 10, 2007. Version 2.0. p 1-2.

[12] We base this upon NENA's definition of 9-1-1 system as "the set of network, database and CPE components required to provide 9-1-1 service" and its definition of 9-1-1 service area as "the geographic area that has been

context, such data would be aggregated by PSAP, with groups of PSAPs representing logical regional interconnected arrangements.[13] This metric assumes that "call type" will be defined in a standard way, based upon nationally accepted definitions, and in the future will include new and emerging types of calls.[14]

5.1.3. Call Volume[15] (Numbers) by Call Type (e.g., Wireline, Wireless Phase I, Wireless Phase II, VoIP, MLTS) by PSAP and System; Percentage of Call Volume by Call Type by PSAP and System

These two items represent two different ways to analyze the same data, and are important data measures that are feasible to collect. Data collection, aggregation and reporting would be similar to the previous item.

5.1.4. Percent of Wireless Phase II Calls Delivered with Phase I Data (Applies Only to PSAPs or Systems That Have Implemented Wireless Phase II with All Carriers)

Most traditional MIS track incoming calls by "Class of Service." Wireless 9-1-1 calls are presented as a Phase I call until a re-bid is performed. MIS systems do not capture the fact that the re-bid function was performed, nor do they update the change in status of the location information. Furthermore, call-takers are trained to ask callers for their location and may never perform a re-bid.

Kimball does not think this is a valid measure unless such distinctions can be addressed effectively.

5.1.5. Time to Answer by PSAP and System

This metric is the time that lapses between when a call is presented to the call-taker (starts ringing) and when the call-taker answers the call.

We understand that human factors may determine the length of time it takes to answer a call, and no MIS can capture those. Kimball believes it is feasible to collect this information. In addition, collecting this information will become an important measure of the impact of new NG9-1-1 call and data types on the call-taker.

5.1.6. Time Interval from Answer to Dispatch by PSAP and System

This metric is the time that lapses between when the call-taker answers the call to when the call-taker initiates dispatch or transfers the call to dispatch.

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granted authority by a state or local governmental body to provide 9-1-1 service." NENA. Master Glossary of 9-1-1 Terminology NENA-00-001, Version 11, May 16, 2008

[13] For example, by supporting regional 9-1-1 authorities, metropolitan areas, etc.

[14] We use the definition of "call" developed by the USDOT in its NG9-1-1 project: "For the purposes of this NG9-1-1 System Description and Requirements Document, [call means] any real-time communication—voice, text, or video—between a person needing assistance and a PSAP call-taker. This term also includes non-human-initiated automatic event alerts, such as alarms, telematics, or sensor data, which may also include real-time communications. U.S. Department of Transportation, Next Generation 9-1-1 (NG9-1-1) System Initiative, System Description and Requirements Document. October 10, 2007. Version 2.0. Appendix B, Glossary

[15] We intend "call volume" to mean total incoming calls presented, not necessarily answered and not necessarily requiring an emergency responder to be dispatched.

MIS systems typically do not capture this information in a single-stage call handling environment, i.e., when the call-taker is also the dispatcher. Even in a two-stage call-handling environment, i.e., when the call-taker is not the person who dispatches the responder, obtaining this information may require manual analysis. It is also incident specific, i.e., the time involved may depend upon the nature and type of call, the availability of information about the incident, call-handling policy and procedure (including, for example, emergency medical dispatch (EMD) and emergency fire dispatch (EFD)), and whether the call needed to be redirected to the correct PSAP.

We think that the effort to collect this information is worthwhile and important. Having a baseline of the time interval will enable the impact of NG9-1-1 on call handling to be measured.

5.2. 9-1-1 SYSTEM DATA

Noblis is under contract with the ICO to develop PSAP level progress metrics relating to IP-enabled and NG9-1-1 technology. We coordinated with Noblis on the preparation of this report to assure that our recommendations do not include any elements that would be a duplication of Noblis' work.

5.2.1. Total Number of 9-1-1 Systems in a State with the Number of PSAPs in Each System

This metric builds on our earlier discussion of 9-1-1 systems, and is intended to reflect the number of integrated 9-1-1 operations in a state. Knowing the number of systems and the number of PSAPs in each system is an important basis for further analysis and helps clarify the institutional and operational environment in a state.

We note that this metric is not specific about whether "PSAPs" means primary PSAPs only or includes secondary PSAPs. We think it should be both, and we think it is appropriate and feasible to collect this information.

5.2.2. Number and Percentage of PSAPs That Have Completed Wireless Phase I Implementation (i.e., With All Carriers) and Number and Percentage of PSAPs That Have Completed Wireless Phase II Implementation (i.e., With All Carriers)

During the course of Kimball's analysis, we were asked whether the intent was to measure the PSAPs' readiness or the carriers' compliance status. First, the status of carrier compliance is the FCC's responsibility and is already measured. In addition, PSAP readiness has become much less of an issue as deployments have rolled out across the nation. The bottom line from our perspective is the service that is being delivered to the public, and that is a factor of carrier compliance.

We see three service-level states:

- No service
- Partial (meaning that some, but not all, carriers are providing Phase I or II)
- Complete (Phase I and Phase II)

The "partial" and "all" service-level states imply that the PSAP *is* ready. The "no service" service-level state is more problematic and difficult to measure. There may be several reasons why this state exists: first, there may be no wireless service within the PSAP's jurisdiction; second, wireless calls made within the PSAP's jurisdiction may be routed to a designated wireless PSAP somewhere else; third, the PSAP may not be ready; and fourth, the carrier(s) may not be ready.

We received an additional comment to the effect that the 'number and percentage of PSAPs' metrics may not be the right measure. For example, if a small number of PSAPs (relative to the total number of PSAPs) have been designated to answer wireless calls for an entire system, then the entire population is served. Similarly, in a NG9-1-1 environment, it is conceivable that a state might designate certain PSAPs to perform specialized call handling on a statewide basis, for example answering all video relay calls from the deaf. Although a small number of PSAPs are involved, the coverage is one hundred percent, and that is what a state would want to measure.

Analyzing the metric in the context of both comments, we conclude that geographic service coverage and population coverage are the more appropriate metrics; additionally, this metric is already encompassed within the broader "system level of service" metric (5.2.8).

5.2.3. Number of Call-Taking Equipment Positions at Each PSAP

Kimball does not think this is a valid data element for measuring the technological progress of 9-1-1. That is not to say that a state could not collect this information, but it is not directly relevant to measuring technological progress.

5.2.4. Percentage of Time the Wireline ALI System Is Operational

The wireline ALI system is no longer the only data system that provides location information for E9-1-1, and NG9-1-1 will involve additional, new data sources. The percentage of time the wireline ALI system is operational may be an important metric for 9-1-1 service management, but the availability of that information depends entirely on whether 9-1-1 service providers are contractually obligated to report it. Even if the data were uniformly available and feasible to collect, we do not think this data element would measure the technological progress of 9-1-1.

Note: This is a metric that will be overtaken by NG9-1-1 and the ESInet measures that will deal with system availability.

5.2.5. Number of 9-1-1 Network Outages Exceeding Two Hours Duration

The FCC already requires telecommunications service providers to report network or E9-1-1 system interruptions lasting thirty minutes or more within two hours of their occurrence. Some 9-1-1 authorities include outage reporting in their service agreements with their 9-1-1 service providers, but most do not. It may be more useful to measure the number of 9-1-1 authorities that require outage reporting as part of their service level agreements with their 9-1-1 service provider.

Note: This is a metric that will be overtaken by NG9-1-1 and the ESInet measures that will deal with system availability.

5.2.6. System Engineered for P.01 Grade of Service

P.01 Grade of Service is a telephone network engineering standard intended to assure that no more than one out of one hundred calls will be blocked during peak call volume periods. It is based on the decades-old, circuit-switched technology used in today's 9-1-1 systems, which is rapidly being replaced by IP-enabled technology. IP-enabled networks are engineered differently, and the P.01 Grade of Service standard does not apply.

Some, but not all, 9-1-1 authorities have adopted this standard and require it in their service agreements with their 9-1-1 service providers. It may be more useful to measure the number of 9-1-1 authorities that require P.01 as part of their service level agreements with their 9-1-1 service provider.

Note: NG9-1-1 will have its own metrics to measure system availability and quality of service.

5.2.7. Call Delivery Mechanisms (e.g., Native IP, Selective Routing, Direct Trunking)

These 9-1-1 system call delivery mechanisms are already embedded within the "system level of service" metric (5.2.8). Note: Call delivery mechanisms are evolving, and ultimately will be taken over by NG networks that may vary in architecture, but will exhibit standard interfaces and interconnections. Interoperability will assure that, along with the need to commonly interface with standardized emergency response systems.

5.2.8. System Level of Service (e.g., 9-1-1Remote Call Forwarding, Basic, Enhanced, Wireless Phases I and II, VoIP) as Defined by the State Coordinating Body Based on Information Provided by the 9-1-1 Authority

A data metric that quantifies the level of service at the 9-1-1 system level is a key progress measure. It is feasible to collect. The information could be easily aggregated to measure service levels based on both percentage of population and geography.[16] The metric is feasible to collect.

5.2.9. Percentage of State's Population and Percentage of State's Geography at Each Level of Service

Both of these data elements provide another way to analyze the same information as the previous metric. As we argued in the section concerning how to measure the level of wireless enhanced 9-1-1 service, we think that percentage of population and percentage of geography are appropriate data elements to measure the technological progress of 9-1-1.

5.2.10. Percentage of State's Population Receiving Enhanced 9-1-1 Through Identified Technology (i.e., Landline, VoIP, and Wireless Phase II)

This is a summarizing data element, derived from the metric above.

[16] The definitions involved in this and other metrics will need to occur at the level to which the data involved will be aggregated. If that is to be state oriented, it should be done at the state level. If that is to be ultimately aggregated at the national level, then the definitions involved would have to be agreed upon nationally.

5.2.11. Number of Telecommunications Companies by Technology or Classification (RBOC, LEC, CLEC, Wireless, and VoIP)

Such classifications in today's telecommunications environment are dynamic, and continue to evolve based upon technology, competitive relationships, and regulatory attention. Such distinctions also vary by state, within the context of state and federal law and rulemaking. With that in mind, this measure may only be valuable to individual states, base upon their specific implementation characteristics. One commenter noted that the way public utility commissions and the FCC categorize telecommunications services makes this metric "elusive." Kimball agrees. To the point of this report, we do not think this data element would measure the technological progress of 9-1-1.

5.2.12. Number and Percentage of PSAPs Taking Their Wireless Calls Directly

This data element had a sub-data element to measure the nature of PSAPs that take wireless calls directly, for example, highway patrol or a local/regional PSAP.

As we considered these two items, we kept going back to the earlier discussion of PSAP level metrics versus percentage of population and geography metrics. Based on what we previously established, we do not think this is a valid data element to measure the technological progress of 9-1-1.

We do think this could be reframed to be the number of PSAPs performing specialized functions based on call type and characteristics, and the percentage of population and geography served. Such an approach would be more generic and would do a better job of measuring the 9-1-1 service environment in today's and tomorrow's world.

5.2.13. Number of PSAPs Currently Served by IP-Enabled 9-1-1 Systems

There is no standard definition of an "IP-enabled" 9-1-1 system. Its meaning differs from person to person. To some, their 9-1-1 system is "IP-enabled" if the PSAPs are served by an IP-enabled backbone network. To others, their 9-1-1 system is "IP-enabled" if the PSAPs are equipped with IP-enabled CPE, regardless of whether they are connected to an IP-enabled backbone network. Yet others use the term to mean NG9-1-1, regardless of whether or not full NG9-1-1 functionality exists. Regardless, this metric is covered in the "system level of service" metric previously addressed (5.2.8). Furthermore, this metric is being developed by Noblis, as previously noted.

5.2.14. Number of PSAPs Currently Involved in IP-Enabled 9-1-1 Deployments

Kimball thinks this metric is already covered in the "system level of service" metric previously addressed (5.2.8). This metric is being developed by Noblis, as previously noted.

5.2.15. Number and Percentage of Deployed IP-Enabled Systems Compliant With Nationally Accepted ESInet Standards

Kimball agrees with one commenter that this metric is not yet valid. As previously noted, not all IP-enabled 9-1-1 systems provide full NG9-1-1 functionality, and not all of these systems will become part of an ESInet. Until there are standard, nationally accepted definitions for the terms "IP-enabled," "NG9-1-1" and "ESInet," this is not feasible to collect. Furthermore, Noblis, as previously noted, is developing this metric.

5.2.16. Number and Percentage of Counties That Have No Countywide 9-1-1 Service

Kimball thinks this metric is already covered in the "system level of service" metric previously discussed (5.2.8).

5.3. FINANCIAL DATA

During the process of gathering input for this report, we were informed that some states have a legal definition of the term "authority." In Michigan, for example, an authority is a separate governmental entity established by a county that can enter into contracts.

This document, as well as the Model State 9-1-1 Plan document, refers to "9-1-1 authorities" and "PSAP authorities." Such references are intended to be functional and descriptive, not legal or statutory. Generally, PSAP authorities are units of government with direct operational responsibility for PSAP services. These are not necessarily the PSAPs themselves, but often the host entity, for example, a city or county responsible for establishing operational policy for PSAP services. 9-1-1 authorities are organizations with planning, coordination, funding and support responsibilities, but generally not direct PSAP operational responsibility.[17] Most state programs fall into the latter category.[18] While the concept of 9-1-1 authority has been around for some time, establishing 9-1-1 authorities is becoming more important to achieve and support an interconnected NG environment with layered responsibilities and functions.

5.3.1. Revenues and Expenditures by 9-1-1 Authority

These two data elements would include not only current revenues and expenditures, but also projected revenues and expenditures.

Current and projected financial information is an element of the Model State 9-1-1 Plan. Having this information is key to planning, and is related to technological progress and system migration to higher levels of service. It may also be helpful to 9-1-1 authorities in documenting funding shortfalls and their impact on 9-1-1 services.

We note that there is no uniformity in how 9-1-1 authorities label their budget and expense categories, and there is no uniformity in what costs are included within those categories. However, when 9-1-1 is funded entirely or partially at the state level, quantifying state 9-1-1 revenues and expenditures is relatively straightforward. When 9-1-1 is funded partially or totally at the local level, the exercise is more difficult. In Kimball's experience, some county or municipal 9-1-1 authorities do not track 9-1-1 costs separately when those costs are embedded within a department whose responsibilities are broader than just 9-1-1, or when 9-1-1 costs are paid with general funds. That said, most 9-1-1 authorities have a mechanism for budget management, and Kimball thinks this information is feasible to collect with the caveat that statewide aggregated figures will be estimates, and should be based upon some degree of standardized definitions of the cost/revenue elements involved. During the discussion at NASNA's June 7, 2008 meeting, it was mentioned that the National Association of State Budget Officers may have standard definitions and categories that could be adopted for this purpose. That would be an excellent place to start.

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[17] Like an emergency communications special purpose district specifically responsible for identified support functions for PSAPs in a defined geographical area.

[18] There are exceptions such as the states of New Hampshire and Rhode Island, which are both.

5.3.2. Cost Per Call

This metric calculates cost based on the total number of incoming calls presented to a call-taker – regardless of whether or not they all were answered and regardless of whether or not they all resulted in a dispatch. Using cost information and call volume information, it is feasible to calculate the cost per call. Cost per call could be a useful way to identify PSAPs that are not cost effective and to identify the need to develop strategies to improve cost effectiveness.

There are issues associated with attempting to measure cost per call, including those outlined in the previous section, 5.3.1. State statutes define 9-1-1 costs differently; and such data are often difficult to collect. Any measure would have to be based on an individual state's definition of what constitutes a 9-1-1 cost, and would have to include all costs falling within the context of that definition (but not more). For example, regional 9-1-1 authorities could be responsible for collecting such information from the PSAP authorities within their jurisdiction, and calculating the resulting cost per call for the region involved. In turn, the state could collect that information and aggregate at the state level. Aggregation of cost per call information at the national level may probably not be meaningful, based on the format of current local and state data. We received a suggestion that cost per call be calculated by funding source, but we do not think this approach would be feasible.

5.3.3. Amount of 9-1-1 Funds Diverted to Purposes for Which the Funds Were Not Collected

This is not a black and white issue, and there are numerous problems with trying to identify how it might be an appropriate metric for measuring the technological progress of 9-1-1.

- There is no standard, common definition of what constitutes a diversion of funds.
- Some states do not necessarily "divert" 9-1-1 funds to other purposes, but simply elect not to appropriate the funds collected back to 9-1-1 services.
- Some state statutes allow states to use funds from whatever source for necessary state purposes.
- There are larger state policy issues that come into play in any decision to tap a state's 9-1-1 fund, and any such decision would have to be viewed in the context of the total amount of surplus, unappropriated funds, and whether the diversion prevented 9-1-1 deployments or otherwise harmed the state's 9-1-1 program. In most states, 9-1-1 funds are managed at the county level, and few state statutes provide for audit of county 9-1-1 funds.
- Politically, it may not be in 9-1-1's best interest to collect these data.

Kimball concludes that this is not an appropriate measure of the technological progress of 9-1-1. More appropriate data elements to collect would be:

- How many jurisdictions have laws on the books prohibiting the use of 9-1-1 funds for purposes other than those for which they were collected?
- How many jurisdictions have retracted such laws?
- How many jurisdictions have laws on the books requiring periodic audits of state and/or local use of their 9-1-1 funds?

5.4. INSTITUTIONAL ENVIRONMENT DATA

5.4.1. Legislative Work Needed and the Status of Proposed Legislation

These two items are too time sensitive to be meaningful. They reflect only the potential for progress and not actual progress. An appropriate measure of progress would be to track enacted legislation. Enacted legislation that would provide a meaningful measure of the technological progress of 9-1-1 would include:

- Changing from the historical funding mechanism on wireline and wireless (and increasingly VoIP) telecommunications services to a mechanism that is technology neutral
- Assigning resources and authority to existing state 9-1-1 programs as are necessary and adequate for statewide planning and coordination, and for NG9-1-1
- Establishing a state 9-1-1 program where one does not exist, and assigning it resources and authority are as necessary and adequate for statewide planning and coordination, and for NG9-1-1

Kimball thinks this information would be feasible to collect.

5.4.2. Nature and Organizational Location of 9-1-1 Authority

In reference to 9-1-1 authorities at the regional and local level, this data element would generally describe the nature of the authorities involved, and/or their hosting governmental environment (i.e., city, county, multi-jurisdictional governmental entity, special purpose district, etc.). Regarding the state 9-1-1 authority, this data element should briefly describe:

- The organizational location/structure of the entity involved (i.e., part of a larger state agency, independent state agency, etc.)
- The type/function of the larger agency (e.g., public safety, homeland security, emergency management, public utilities commission, administration, Governor's office)

The formal relationship between the agency and other 9-1-1 authorities in the state.

Kimball thinks this information would be feasible to collect.

5.5. TRANSITIONAL DATA

5.5.1. Advanced Call Types

This data element is intended to track advanced call types coming in to a state's PSAPs, and to identify what they are. PSAPs currently handle wireline, wireless and, increasingly, VoIP calls. 9-1-1 authorities may endeavor to accommodate the expectations of the calling public even before they have implemented NG9-1-1. Therefore, this metric is about identifying what types of calls PSAPs are receiving other than land line, wireless, VoIP, and wireless VoIP (when such delivery begins to be provided).

If an identifying class of service is transmitted with such calls and the collection of the information is automated, it may be feasible to collect this information.

5.5.2. The Number of 9-1-1 Authorities Considering a Migration to NG Systems

This data element is intended to enable a state to quantify how many 9-1-1 authorities are considering a migration to NG9-1-1. The data could be analyzed in the context of the total number of 9-1-1 authorities in a state. The rate of change could be measured each year. NASNA members pointed out that many, if not most, 9-1-1 authorities are considering NG9-1-1. After further discussion with the NASNA membership, there was unanimous agreement that this would not be a useful measure.

5.5.3. The Number of 9-1-1 Authorities Actively Engaged in a NG9-1-1 Technology Procurement

This data element is intended to enable a state to quantify how many 9-1-1 authorities are actually in the midst of a NG9-1-1 technology procurement. Like the previous data element, the information could be analyzed in the context of the total number of 9-1-1 authorities in a state, and the rate of change could be measured each year. Capturing a procurement in progress, which is what this data element is, would be a matter of timing. After further discussion with the NASNA membership, there was unanimous agreement that this would not be a useful measure.

5.6. CONCLUSION

For some of these data elements to yield meaningful information, each state and the 9-1-1 authorities within that state must use the same definitions, the same base parameters, and the same data measures. As discussed earlier, data elements must be defined and standardized at the level to which the data involved will be aggregated. At the present time, it would not be a useful exercise to collect and report this information because such standards do not exist everywhere. Even if there were standards, the value of the data would be diminished absent a requirement to adopt and implement them.

In a NG9-1-1 environment, systems will be more interconnected and new tools for collecting data about critical functions will be developed and implemented. The need for coordinated and standardized performance measures will become even more important. This may be an opportune time for a lead agency to be identified and for standards to be developed for whatever initial data criteria are established.

6. RECOMMENDATIONS

Kimball's recommendations are limited to data elements that are feasible to collect at the state, regional, local, and tribal levels, understanding that what is available and feasible may not be the ideal. The data identified, in our opinion, may serve as objective measurements of the technological progress of 9-1-1 services at the state level.

As noted throughout this report, if the data involved are to be collected, aggregated, and summarized at both regional and state levels, then an adequate foundation for such analysis must be built, including defining standard data elements, building necessary reporting mechanisms by 9-1-1 authorities, and deploying information tools to help garner and report the data involved. In terms of capacity to do that, many of these items can be built into regional and state system applications as NG9-1-1 migration occurs (a planning factor in that migration). Beyond that, more locally based MIS tools must be utilized, along with reporting mechanisms and tools that facilitate that process.

Based on our analysis, we make the following recommendations. Data elements should be standardized, collected, and reported to measure the technological progress of 9-1-1 at the state level. Data elements collected for the first time would constitute the baseline from which progress would be measured in future data collection cycles. We have also made supporting recommendations where necessary.

6.1. MANAGEMENT INFORMATION SYSTEM DATA

Kimball's first recommendation in this category is that a state's baseline technology assessment includes current MIS capability so that the progress measure would be based on the number of PSAPs/systems that install and use MIS functionality going forward.

We recommend collection of the following data elements:

- The number of PSAPs that are equipped with MIS tools to collect extract, compile, and analyze data
- The total number of 9-1-1 calls by PSAP and system
- Call volume (numbers and percentage) by call type (e.g., wireline, wireless Phase I, wireless Phase II, VoIP, multi-line telephone system (MLTS), abandoned, non-initialized; and new, advanced call types as they are identified), by PSAP and by system
- The length of time to answer by PSAP and system, i.e., the time lapse between when a call is presented to the call-taker (starts ringing) and when the call-taker answers the call; the data should allow this to be analyzed on the basis of call-type, as well
- The length of time from answer to dispatch by PSAP and system, i.e., time lapse between when the call-taker answers the call to when the call-taker initiates dispatch or transfers the call to dispatch, recognizing that call-handling procedures like EMD, language line and similar utilities will impact the data involved

6.2. 9-1-1 SYSTEM DATA

Kimball recommends collection of the following data elements in this category:

- The total number of 9-1-1 systems in a state
- System level of service (9-1-1 Remote Call Forwarding, basic 9-1-1, enhanced 9-1-1, wireless Phases I and II, VoIP)
- The percentage of population and percentage of geography served by each defined level of service
- Nationwide adoption of standard definitions for each level of service (to be used for reporting purposes)
- The number of primary and secondary PSAPs in each system
- The percentage of population and percentage of geography served by PSAPs performing specialized functions based on call type and characteristics, e.g., wireless, video calls from the deaf, non-English language
- The number of 9-1-1 authorities with service agreements requiring their 9-1-1 service provider to report service interruptions
- The number of 9-1-1 authorities with service agreements requiring their 9-1-1 service provider to meet the P.01 Grade of Service standard

6.3. FINANCIAL DATA

Kimball's first recommendation is the nationwide adoption of a standardized definition of "9-1-1 authority."

- The definition should be functional and descriptive so as to enable data elements to be reported and analyzed in a uniform manner
- It should not be interpreted to impose any legal or statutory obligation on state or local government
- If such a definition were simply to mean an organization with planning, coordination, funding and support responsibilities, such as an emergency communications special purpose district specifically responsible for identified support functions for PSAPs in a defined geographical area (but generally not direct PSAP operational responsibility) it would serve the purpose

Kimball recommends collection of the following data elements in this category:

- Revenues, expenditures and projections by 9-1-1 authority (everyone will need to keep in mind that granularity will not be possible)
- Cost per 9-1-1 call for each PSAP

In addition, we recommend that states collect and report the following information:

- The existence of laws prohibiting the use of 9-1-1 funds for purposes other than those for which they were collected
- The repeal of such laws
- The existence of laws requiring audits to ensure 9-1-1 fund usage complies with state law

6.4. INSTITUTIONAL ENVIRONMENT DATA

Kimball recommends that each state report annually any new statutes concerning:

- A change from the historical funding mechanism on wireline and wireless (and increasingly VoIP) telecommunications services to a mechanism that is technology neutral
- Changes to an existing state 9-1-1 program's authority and resources to enable it to coordinate statewide planning and implementation
- The establishment of a state 9-1-1 program where there has not been one before, and whether it was provided with the resources and authority necessary for statewide coordination of planning and implementation

6.5. TRANSITIONAL DATA

Kimball recommends that each state collect data relating to advanced call types as long as an identifying class of service is transmitted with such calls.

7. CONCLUSION

Kimball previously indicated that each state and the 9-1-1 authorities within that state must use the same definitions, the same base parameters, and the same data measures if these data elements are to yield meaningful information. We recommend that a set of initial data elements be collected and reported only when the following conditions have been met:

- Data elements are established, agreed upon, and applied consistently nationwide
- Standard definitions are established, agreed upon, and applied consistently nationwide
- Base parameters are established, agreed upon, and applied consistently nationwide

We recommend that the national 9-1-1 Implementation Coordination Office (ICO) revisit these initial data elements annually and update them as needed to reflect new metrics developed as 9-1-1 technology evolves.

APPENDIX A–NATIONAL ASSOCIATION SURVEY MEMO

Kimball

MEMORANDUM

To: NASNA, NENA and APCO

From: Jim Goerke and Evelyn Bailey regarding the USDOT-NASNA Model State 9-1-1 Plan Project

Subject: Information Request

Date: January 8, 2008

The US Department of Transportation has entered into a cooperative arrangement with the National Association of State 9-1-1 Administrators (NASNA) to develop a model state 9-1-1 plan, which are necessary to qualify for funding under the ENHANCE 911 Act of 2004. NASNA, in turn, engaged L. Robert Kimball & Associates to develop the plan and to make recommendations for measuring the technical progress of 9-1-1.

Your association has been identified as an important stakeholder in this endeavor. We would like to set up a time around the middle of the month to hear your thoughts and ideas about how best to undertake state level planning for 9-1-1, and how best to measure technical progress. The questions below provide the basis of the interview, which we hold via conference call, or if possible, in person at the NENA TDC-ODC.

A number of states have a state-level 9-1-1 Authority or some degree of statewide 9-1-1 coordination, although the nature and scope of that authority and coordination varies considerably from state to state. As a matter of federal policy, the Wireless Communication and Public Safety Act of 1999 encouraged states to "…deploy comprehensive end-to-end emergency communications infrastructure and programs based on coordinated statewide plans…" many states still lack an effective mechanism or process to accomplish such a goal. In recognition of that fact, and in the interest of moving the process forward, the ENHANCE 911 Act of 2004 mandated statewide 9-1-1 planning as a condition for receiving grant funding under the Act. The 9-1-1 Modernization Act of 2007, pending, would expand that planning requirement to include NG9-1-1.

This brings us to the purpose of our request for your input. We need your opinion on the following items:

1. NG9-1-1, and the interconnectivity it makes possible, may foster the need for more effective coordination and planning at all levels. For example, traditional PSAP institutional environments and arrangements may change recognizing that not all PSAPs may need to be equipped and trained to handle every type of 9-1-1 call (e.g., multi-media, ACN, text). It may be more prudent, at least initially, to establish specialized PSAPs as was done for wireless in some states. That requires planning and coordination. With this in mind, what specific NG9-1-1 system requirements and features may (or would) foster the need for state level planning and coordination?
2. Based upon existing and evolving federal policy, industry best practices, and anticipated NG9-1-1 requirements and needs, what are the state-level needs and requirements for an effective planning, coordination and implementation process?
3. Of the state-level planning and coordination mechanisms that exist today, what could be improved and what is missing?
4. What are the necessary elements of an effective State 9-1-1 Plan?

5. What specific rules, regulations and activities must the national 9-1-1 Implementation Coordination Office undertake to fulfill its mandate to coordinate 9-1-1 implementation nationwide?
6. The Federal Government wants to identify the relevant data that would serve as objective measurements to determine and document the technical progress of 9-1-1 services at the local, regional and state levels. In turn, the aggregate of this information provides an objective measurement of the progress of 9-1-1 services at the national level. Therefore:
    a. What information about 9-1-1 service is already collected at the State level?
    b. What is the mechanism for collection of that information?
    c. Why is this information collected?
    d. How is it analyzed and how is it used?
    e. What information should be aggregated and made available at the state level to allow progress to be monitored and measured at the State level?
    f. What information should the States report to the Federal government so the Federal government can track and measure progress at the national level?

I will call each of you no later than early next week to set up a one-hour interview. Please think about the appropriate subject matter experts in your association you would like to include.

APPENDIX B–DRAFT NENA NG9-1-1 SUMMARY DEFINITION REVIEW 1A

What is NG9-1-1?

Introduction

The evolution of emergency calling beyond the traditional voice 9-1-1 call has caused the recognition that our current E9-1-1 system is no longer able to support the needs of the future. Next Generation 9-1-1 (NG9-1-1) networks replace the existing narrowband, circuit switched 9-1-1 networks which carry only voice and very limited data. Currently there are difficulties in supporting such things as text messages for emergencies, images and video (including support for American Sign Language users), easy access to additional data such as telematics data, building plans and medical info over a common data network. In addition, the need for inter-communications across states, between states, and across international boundaries requires that we change to a more flexible 9-1-1 system design with much greater data handling capabilities. A highly standardized system is essential and critical to seamlessly support communications and data transfer across Counties, States, and international borders, and across the multitude of emergency response professions, from traditional PSAPs to Poison Control , trauma centers, Coast Guard, and disaster management centers. There are numerous and varied steps toward the new system named NG9-1-1, and vendors are already referring to their products as aimed at, enabling, or even being NG9-1-1. Vendors who have direct experience with parts of today's E9-1-1 system and service, and who are directly involved in NENA and other standards development can and are starting to produce NG9-1-1 oriented products. The direction of the Standards that support NG9-1-1 are becoming clear, and demonstrations and trials are beginning to appear and contributes to continued standards development. However, fully featured, truly "standards based" NG9-1-1 is not yet possible, because the necessary standards are still in development. As a result, a summary definition of NG9-1-1 as a system and service process Is needed to clarify what is involved.

NG9-1-1 Summary Definition

NG9-1-1 is a system comprised of hardware, software, data and operational policies and procedures briefly described below, to:

- provide interfaces from call and message services
- process emergency calls and non-voice (multi-media) messages
- 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

The basic building blocks required for NG9-1-1 are:

- Emergency Services IP Network (ESInet)

  ESInets use broadband, packet switched technology capable of carrying voice plus large amounts of varying types of data using Internet Protocols and standards. ESInets are engineered, managed networks, and are intended to be multi-purpose, supporting extended Public Safety services in addition to 9-1-1. NG9-1-1 assumes that ESInets are hierarchical, or a `network of networks' in a tiered design approach to support local, regional, state and national emergency management authorities.

- International Standards Compliant IP Functions

  IETF[40] based IP protocol standards provide the basic functionality of the system. NENA has applied standards from IETF and other SDOs to specific NG9-1-1 requirements. Examples are: Location Validation Function (LVF) and Emergency Call Routing Function (ECRF) and other functions, as defined in NENA 08-002, [IP] Functional and Interface Standards for NG9-1-1 (i3).

- Software Services/Applications

  NG9-1-1 uses a service oriented architecture, software applications and data content to intelligently manage and control its IP based processes. NG9-1-1 is software and database driven to enable an exponential increase in available data and information sharing possibilities. It also provides flexibility and individual agency choice to determine information needs based on predetermined business/policy rules.

- Data Bases and Data Management

  NG9-1-1 uses a set of databases to house and provide management of the above data content. Some examples are: validation, routing control, policy/business rules, system-wide detail call records. Reference pending NENA NG9-1-1 Data standards

  NG9-1-1 provides the mechanisms to access external sources of data, either automatically or manually, via the ESInet, to support more knowledgeable and efficient handling of emergency calls/messages. Examples: telematics/ACN data, hazardous material info, building plans, medical info, etc.

- Security

  NG9-1-1 provides extensive security methods at the hardware and software levels to replicate the privacy and reliability inherent in E9-1-1 services.

- Human Processes

  NG9-1-1 as a service system involves a multitude of human procedures and system operations procedures to control and monitor the functionality and effectiveness of the systems and services that provide NG9-1-1 service. Examples include database establishment and maintenance procedures, IP network operations, security processes, trouble shooting procedures, database auditing and accuracy validation procedures, and many others.

NENA's Role

NENA is an organization chartered to represent both public safety and the 9-1-1 industry, present and future in its mission to focus on the development, evolution, and expansion of emergency communications. NENA is the organization responsible to define NG9-1-1, and to coordinate the development and support of NG9-1-1 as a system and a service to the public, the industry, and to Public Safety entities.

In the past, this has been about 9-1-1 literally, but the future involves a more `virtual' approach to how the public and governmental entities utilize emergency communication through NG9-1-1. Text devices don't `dial' 9-1-1, for example, but use a different form of identification to access the system and achieve delivery to PSAPs and other entities. However, the basic processes and service needs are the same, no matter what `code' is used. The conceptual base of NG9-1-1 is international in scope, designed to support

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[40] IETF (Internet EngineeringTask Force) generates international IP standards for Internet and other applications

all emergency codes, such as 9-1-1, 1-1-2, 1-1-1, and all others among the 62 access codes (at last count) used around the world. Other communications and data exchange functions that will be considered part of an NG9-1-1 system won't use any such access codes, but will access ESInets as necessary to communicate seamlessly across local, State, regional, international boundaries.

What development and support areas does NENA focus on for NG9-1-1
(Other organizations may also be involved)

Role	NENA	Vendors	Local Gov	State Gov	Fed'l Gov
Defining requirements to meet E9-1-1 and NG9-1-1 needs	**X**				
Defining new NG9-1-1 functions and features to expand emergency communications capabilities	**X**	**X**	**X**		
Defining interface and functional standards for NG9-1-1 and its subsystems	**X**				**?**
Defining NG9-1-1 data base content standards?	**X**				
Defining detailed product designs for NG9-1-1 subsystems		**X**			
Defining detailed operations procedures for individual NG9-1-1 subsystems		**X**			
Defining overall NG9-1-1 system operational procedures	**X**		**X**		
Defining best practices for how to utilize NG9-1-1 features and functions	**X**				
Ensuring that local, state, federal and tribal statutes, regulations and overall policies enable, rather than prohibit, NG9-1-1	**X**		**X** **See note below**	**X**	**X**
Defining recommended transition processes to move from today's 9-1-1 systems to NG9-1-1	**X**				

Note: Local Government has two roles – funding management and public safety operations

NG9-1-1 – Are we there yet?
Fully featured, standards based NG9-1-1 will likely be implemented in successive releases; but unless it's a full replacement for existing E9-1-1 functions[2], including additional features to bring 9-1-1 service up to the level needed in today's emergency communications environment, it is not a true "next generation" of 9-1-1. True NG9-1-1 will include the ability to support interactive text messaging, policy-based routing using location and several other factors, such as call type, target PSAP status, network status, and automatic acquisition of supportive date and its use within the system to control routing and other actions prior to delivery to the PSAP, and many other standards defined features and functions.

When a newer, IP based replacement for E9-1-1 meets or exceeds the capability set above, it will reflect fully featured NG9-1-1. Note that this is not about having all possible originating service types implemented, but that the NG9-1-1 capabilities defined above are present, tested (to the extent possible, which may be limited to lab testing if there are no live instances of any given capability), [41] and ready for

[41] Utilizing a new system for ongoing 9-1-1 service in a way that is highly unlikely to disrupt emergency communications requires that the new system be as completely featured as the old system, and tested in advance.

service. If a given IP-based system is not capable of all initial NG9-1-1 features and functions, it can certainly be considered to be on the path to full NG9-1-1, but is still pre-NG9-1-1 in nature.

RCH 7/08

APPENDIX C – GLOSSARY

-A-

9IA	9-1-1 Industry Alliance
ALI	Automatic Location Information
ANI	Automatic Number Identification
APCO	Association of Public Safety Communications Officers

-B-

BRI	Basic Rate Interface

-C-

CAD	Computer Aided Dispatch
CDC	Centers for Disease Control
CLEC	Competitive Local Exchange Carrier
CMRS	Commercial Mobile Radio Service
COS	Class of Service
CPE	Customer Premises Equipment

-D-

DHS	Department of Homeland Security

-E-

E9-1-1	Enhanced 9-1-1
ESInet	Emergency Services IP Network or Emergency Services Internetwork

-F-

FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency

-G-

GIS	Geographic Information Services

-I-

ICO	National 9-1-1 Implementation Coordination Office
ILEC	Incumbent Local Exchange Carrier
IP	Internet Protocol
ISDN	Integrated Services Digital Network

-L-

LEC	Local Exchange Carrier

-M-

MLTS	Multi-Line Telephone System

-N-

NASNA	National Association of State 9-1-1 Administrators
NENA	National Emergency Number Association
NG9-1-1	Next Generation 9-1-1
NHTSA	National Highway Traffic Safety Administration
NRIC	Network Reliability and Interoperability Council
NTIA	National Telecommunications and Information Administration

-P-

PBX	Private Branch eXchange
PRI	Primary Rate Interface
PSAP	Public Safety Answering Point

-U-

USDOD	United States Department of Defense
USDOT	United States Department of Transportation

-V-

VoIP	Voice over Internet Protocol
VSP	VoIP Service Provider
WSP	Wireless Service Provider