2009 HOUSE POLITICAL SUBDIVISIONS

HB 1054

2009 HOUSE STANDING COMMITTEE MINUTES

Bill No. HB 1054

House Political Subdivisions Committee

☐ Check here for Conference Committee

Hearing Date: January 8, 2009

Recorder Job Number: 6697

Committee Clerk Signature

Minutes:

Chairman Wrangham: Opened the hearing on HB 1054.

Roxanne Woeste, Legislative Counsel: Explained the bill. This was not included in the executive budget for this study. Next generation 911 refers to the significant changes that will be coming in the industry in regard to public safety and the needs to these new technology methods which include, voice, data, video messages, tracking systems, handheld computers, down load cell phones etc. It has been determined that this will be used nationwide with generation 911. The Federal Dept. of Transportation has been assigned the responsibility to guide the 911 efforts and the State 911 Assoc. has already begun planning.

Dave Sprynczynatky: Director of Emergency Services. Yesterday we appointed a new director for State Radio., Mike Lynk. Greg Wilz has been acting so he will discuss it further later. This study has been through the task force. It was not funded in this budget. Discussed fact that he was very pleased with how the task force did and it did consist of various disciplines throughout the state.

Rep. Nancy Johnson: Would you please prioritize these three bills now in order of importance.

Dave Sprynczynatky: Quick frankly I think the one you just heard, HB 1055 is the most critical for the state. We need to insure with the limited resources we have, that we are efficiently and effectively utilizing those resources and am positing ourselves so that we can respond to any incident man made or natural anywhere in the state. Seconded I think it would be HB 1054 and then HB 1055.

Greg Wilz, Deputy Director, and Dept. of Emergency Services: (see testimony #1).

Rep. Kretschmar: Would there be any connection between this bill and HB1056?

Greg Wilz: I do not believe there is an overlap between to conflict of these two studies. One is really taking a look at what it is going to take in ND to become next generation. I know that the Assoc. of Counties has some of this information, but it is going to take a number of years to get that. We want to be able to spend dollars and it really counts and not wastes it.

Rep. Zaiser: What are your views on the priorities?

Greg Wilz: These are all very important things. I do not know which one to tell you which one is most important. Sounded like the 911 one was very important.

Rep. Corey Mock: Are there other services that citizens may have now that are not functional with the current system, but not being used now.

Greg Wilz: The only services that work now are a phone call. You can't email us, you can't send us a picture, you cannot video screen, or fax. You have all the other abilities, but we can't do any of them.

Rep. Corey Mock: How is Phase II 911 different than next generation 911?

Greg Wilz: I am not the expert; I have only been interim director for the past six month; however, there are folks in the room that know more about it than I do. I do know that with a

cell phone there is no physical address that comes up so how we deal with this lack of physical address. We need a GPS chip to know where people are.

Rep. Corey Mock: Is there any agency cooperation with this program now?

Greg Wilz: With the new PSAP I think those connections will be made. I think where we are at today allotting of the stuff has not been implemented but it is coming.

Rep. Klemin: Where does the $1 fee with the cell phone go now?

Greg Wilz: The $1 cell phone fees goes to: .25 phone company; .38 to ND Assoc. of Counties; balance goes to the individual county 911 program. That program sometimes pays for a part time 911 coordinator; signs, and maintenance. That 911 dollar is not getting the job done now. These programs are now getting additional funding from the local counties to keep it going.

Rep. Nancy Johnson: What is the ND Metro Chiefs Assoc?

Greg Wilz: This would be the chiefs that have full time fire chiefs like Fargo, Grand Forks and larger cities.

Rep. Jerry Kelsh: Have you ever contacted the cell phone companies. Maybe they could help us with this study just like On Star does to pin point an accident. Has that been looked into?

Greg Wilz: The next generation 911 is in competition with the cell phone providers. I believe that will be looked at. I don't think it has been looked at.

Chairman Wrangham: You mentioned the Next Generation 911 is coming? What are we going to study?

Greg Wilz: We are trying to define specifically what ND needs to put into place to call itself a next generation 911. What things need to be added and that are already in place so that out

PSAPs need to get this accomplished and it will probably take from 3-5 years. We need to continue to monitor what is going on out there and make smart investments. We need to know what needs to be done at every level with the actual hardware to get us up to speed.

Chairman Wrangham: It should be up to the fiber supplier to study this and put it in so why **are we doing the study?**

Greg Wilz: the actual access to the line and stuff I think is their baby. We need to know what are the routers, servers, switches and software that need to drive all this to make it happen. I think that is actually what the study does.

Rep. Klemin: This bill looks more like Legislative Counsel and adjutant general study?

Greg Wilz: That task force made a recommendation that monies should be set aside to do this study. Who anchors this bill is not important. This is really a PSAP thing. This committee should be responsible for conducting this study.

Rep. Koppelman: I assume after the study this would involve legislative action. Is there any reason why this could not be handled without a study? This would be much more cost effective for the tax payers of the state Why would this not work?

Greg Wilz: It probably would answer some of the things and questions. I think this would be a technology thing.

Rep. Jerry Kelsh: What does PSAP stand for?

Greg Wilz: Public Service Answering Points.

Terry Traynor, Ass't Director of ND Assoc. of Counties: (see Testimony #2). What Next Generation 911 is a whole new gallery? Right now 911 calls come in on two copper wires. We trick the system to handle the call; which keeps the system working. The study needs to be so that we can get the system working better and up to date. What we have now in ND is

amazing for a state our size. We have a lot of local state and government officials that work hard to have that happen. (See Next Generation 9-1-1 Planning booklet) Plus (booklet called A Policy Maker Blueprint for Transitioning to the Next Generation 9-1-1 System) for your information. (See additional testimony #3) I sent each one of you a link of that on email too. The federal government, even in this time of cutbacks, has put new money into a legislation called the Enhance 911. It is a federal act to promote 911 across the country. ND is earmarked for $500,000 to begin the process. That money has to go into implementation. State has to come up with a match of $500,000. We are hoping we can bring enough resources together to get the federal funds as well. It is not going to be cheap. All the money collected now is going to the current network now. The state pretty much owns the network. We need the state to help us figure out how to get this 911 system set up. Right now when we push the 911 number we get a state location response and not the area where they are calling from. Right now we are just paying to maintain the system we now use. We need the states involved. Right now On Star goes to a location at a correct number in this area. Our existing system of 911 does not go directly to the right area.

Rep. Kilichowski: .58 cents goes back to the 911 county. Is there any surplus in these counties from this money?

Terry: It depends on the counties and how they use their money. Grand Forks is hoping to move to a new location with new equipment so their putting all their money in the bank. As a result their property taxes are paying for their dispatchers etc. If you look at the long term they are all spending their money.

Rep. Jerry Kelsh: What about contacting the cell phone companies?

Terry: I think that is a good idea. We need to bring them to the table as well. Both cell and landline have a vested interest in how this turns out. Someone is going to have to transport these calls. This needs to be handled through the FCC and maybe they're willing to put money into it.

Rep. Zaiser: What are your thoughts of putting into the legislative counsel study? What are your thoughts on that?

Terry: It is going to take someone like Federal engineering because it is a technical study. It is really not something that citizens and public officials can understand.

Rep. Conrad: EFCC was mentioned. That might be a group to do this. Can you comment on that?

Terry: Yes, the third member is really the adjutant general on behalf of state radio. The group can get together and talk about guidelines but it has to go back to the legislature since it is more an advisory committee. We do not have the ability of receiving the disbursing funds.

Rep. Koppelman: I think as a state we need to look at this as a public safety prospective. I think we need to look at this at a broader state issue. What will this interface look at and check on the other states and the public and private section. Where are they at?

Terry: The federal government funded three Next Generation pilot projects. One is in Minneapolis. No one is very far down the road. There is a lot of planning going on right now. We are ahead of a lot of the states since we have one fiber backbone. The state and county handles the one fiber. We need to plan together to see what we have.

Rep. Koppelman: discussed the state of Kentucky. Seems like the right hand needs to know what the left hand knows so we do not duplicate things.

Rep. Klemin: Brought up the Kimball study.

Terry: This is the first study and we need more information and that is why the study is needed. We can't use federal dollars to study, but we can use local dollars for study. Then that would be eligible to match for a federal dollars match.

Rep. Klemin: How do we know if someone else hasn't already got the study done that we could use so we could use the $100,000 for implementation instead.

Terry: We are going to spend many times that in studying and implementing that as we go along. I can see the value of putting the money in both places. Before we can invest more we are going to have to study ND to a greater extend because we will need work done to be sure it fits ND.

Chairman Wrangham: When you get calls on the internet do they pay the $?

Terry: No. There are many voice providers out in the world and it is impossible to collect on this. The internet is all over and there is no way to do this. ND has no requirements to operate on the internet in ND.

Chairman Wrangham: It would be tough to get those dollars back.

Terry: They have no requirements to register in ND so we have no clear way to determine if they are operating here or not.

Rep. Klemin: Is there some other bill that will address this action grant program with the federal program.

Terry: Yes there is another bill that will address their roll in responding to the federal role in the 911.

Rep. Jerry Kelsh: Discussed amount that the $1 gets and who it goes to. Is it .38 cents and is state radio going up?

Terry: State Radio is the PSAP; the answering point for 22 counties. Six counties around Devils Lake that are answered by one place. Fargo, Cass County, Clay County, and Moorhead they all have one so there is a number of different public handling points all with different costs. To support the network that was put in place for wireless that takes .38 from every wireless phone device. 5 cents of the top for each phone company for collecting it so it is 56 cents left there and 5 cents for land line for other expenses.

Rep. Koppelman: It would be helpful for you to put together a breakdown for us to look at for where the costs go.

Terry: Would do that.

Rep. Corey Mock: What arrangement do they have with other states? Fargo dispatch is unique since it is the only one in the country that has cross the state border in this way. How is this affecting that state of Minnesota?

Terry: They will be involved in the study as well.

Rep. Corey Mock: They are already received money from Minnesota?

Terry: No they are receiving no money. PSAP is receiving no money in Minnesota. It is a contract and the state if funding this.

Rep. Zaiser: Is there a way we could learn from Minnesota some way instead of reinventing the wheel?

Terry: That is why we have the Kimball study and we work closely with them now and we will be tied into it. We did get the study a lot cheaper since we have a working association with them.

No Opposition

No Neutral testimony.

Hearing closed. We will be receiving further information from Rep. Porter.

2009 HOUSE STANDING COMMITTEE MINUTES

Bill No. HB 1054

House Political Subdivisions Committee

☐ Check here for Conference Committee

Hearing Date: January 15, 2009

Recorder Job Number: 7104

Committee Clerk Signature

Minutes:

Chairman Wrangham reopened hearing on HB 1054.

Rep. Klemin: I think we can learn allot from other studies that are being done without doing our own.

Rep. Conrad: As I understand the technical, what do we need of this and that? If I understand from Mr. Traynor it is a different study.

Rep. Koppelman: The study should not just look at the 911 needs; it should be talking about that and board band coverage and public safety. We could remove the appropriation and just do the study then if something comes up with the other studies going on them it is something we could look at.

Rep. Jerry Kelsh: I think this is the most efficient method of implementing the next generation 911. It is to share technology and use the current technology. I am not sure all that would entail, but sometime we are going to have to look at some of this technology. We need to keep up with the new technology.

Rep. Corey Mock: In my conversation I was in favor of HB 1054. I am questioning that in conservation from Dave Sprynczynatky that in Next Generation 911 it will cost up to $30 million. They think this will happen within the next four years. Because of the technology our

infrastructure will have to be improved to accomplish those demands. Without the study the concern is we could spend that if not more because we are not sure what other PSAP's and other jurisdictions have. I am not sure where I am at on the costs and how to reduce the next generation 911.

Rep. Pietsch: If we were to say yes to this $100,000 and look at Traynor's testimony he said we could apply for $30 million grants for these various things and they are hoping there would be a $500,000 grant coming through so we are looking at $600,000?

Rep. Headland: they are asking for specific appropriations and if we are to pass this will go to appropriations and they will have to make their case again to them there. I think if it wasn't a high enough priority for them let them make their case down in appropriations.

Do Not Pass Motion Made By Rep. Headland Seconded By Rep. Kretschmar:

Vote: 8 Yes 5 No 0 Absent Carrier: Rep. Headland

Roll Call Vote #: 1

Date: 1-15-09

2009 HOUSE STANDING COMMITTEE ROLL CALL VOTES
BILL/RESOLUTION NO.

House Political Subdivisions Committee

☐ Check here for Conference Committee

Legislative Council Amendment Number

Action Taken Do Pass (Do Not Pass) Amended

Motion Made By Rep. Headland Seconded By Rep. Kretschmar

Representatives	Yes	No	Representatives	Yes	No
Rep. Dwight Wrangham, Chairman	✓		Senator Kari Conrad		✓
Rep. Craig Headland, Vice Chairman	✓		Senator Jerry Kelsh		✓
Rep. Patrick Hatlestad	✓		Senator Robert Kilichowski		✓
Rep. Nancy Johnson	✓		Senator Corey Mock		✓
Rep. Lawrence Klemin	✓		Senator Steve Zaiser		✓
Rep. Kim Koppelman	✓				
Rep. William Kretschmar	✓				
Rep. Vonnie Pietsch	✓				

Total (Yes) 8 No 5

Absent 0

Floor Assignment Rep. Headland

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

HB 1054: Political Subdivisions Committee (Rep. Wrangham, Chairman) recommends **DO NOT PASS** (8 YEAS, 5 NAYS, 0 ABSENT AND NOT VOTING). HB 1054 was placed on the Eleventh order on the calendar.

2009 TESTIMONY

HB 1054

TESTIMONY - HB 1054
HOUSE COMMITTEE – POLITICAL SUBDIVISIONS
JANUARY 8, 2009
BY GREG WILZ
DEPUTY DIRECTOR, DEPARTMENT OF EMERGENCY SERICES

Mr. Chairman and members of the committee, my name is Greg Wilz. I am the Deputy Director of the Department of Emergency Services (NDDES) and Director of Homeland Security for the state of North Dakota. Today I am here as a representative of the task force established at the request of the interim Public Safety Committee. The Public Safety Committee asked that the task force be established to request improvements to emergency services by adding organizational changes, system upgrades, process or protocol changes and statutory changes to ensure the future viability and capability of emergency services in North Dakota. Fifteen organizations were represented on the task force and are listed on the back of this testimony. My intent is to provide background information as was discussed within the task force and not to take an agency position on HB 1054.

North Dakota has been a national leader in implementing both 911 and Phase II 911. In fact, the state was one of the first in the nation to become phase II compliant which dramatically improved 911 services and has been responsible for saving many lives.

During the next few years, an upgrade known as Next Generation 911 will establish new standards of excellence. Its technology will shift from a legacy analog system to an internet protocol (IP) network. It is designed to enhance flexibility and capability in order to meet the exponential growth of consumer devices that send and receive text, data, and digital images to report or request emergency assistance.

This technology will enable public service answering points (PSAPs) to exchange and disseminate text messages that will the alert the public about actual or impending emergency and disaster events. It provides the ability to stream videos so camera images from banks, law enforcement, and other response disciplines as well as send cell phone photos that provide real time situational awareness of dangerous incidents enabling responders to tactically plan a safer initial response in much shorter periods of time.

Although current architecture has served us well, it is outdated. Today North Dakota PSAPs are in the same situation as the call center that handled the Virginia Tech shootings. Thirty-two students sent text message warnings; however, the PSAP was not equipped to receive the messages.

HB 1054 recognizes that current 911 technology requires updating to meet future public safety demands. It requests funding to study and determine potential changes required to adequately implement Next Generation 911 so that future investments by the state, counties, and cities will be effective and based on the best information available. Over time this investment will prove significant and will most likely impact current 911 funding models, the number of viable PSAPs in the state, and PSAP to PSAP interfacing.

Thank you, I will try to answer any questions you may have.

Task Force Membership

N.D. Department of Emergency Services
N.D. Division of Homeland Security
N.D.Division of State Radio
N.D. Police Chiefs Association
N.D. Sheriffs Assoc.
N.D. Fire Chiefs Assoc.
N.D. Metro Chiefs Assoc.
N.D. Emergency Medical Services Assoc.
N.D. Healthcare Assoc.
N.D. Emergency Management Assoc.
N.D. National Guard
N.D. 911 Assoc.
N.D. Public Health Assoc.
N.D. Highway Patrol
N.D. Bureau of Criminal Investigation

#2

Testimony To The
HOUSE POLITICAL SUBDIVISIONS COMMITTEE
Prepared January 8, 2009 by the
North Dakota Association of Counties
Terry Traynor – Assistant Director

REGARDING HOUSE BILL 1054

Chairman Wrangham and members of the Committee, the North Dakota Association of Counties is supportive of the dedication of State resources to this important issue.

As you are likely aware, our current statewide Enhanced 911 system is built on an infrastructure designed for analog voice communication. Local governments working with the telecom industry have implemented work-arounds and technical fixes to "trick" the system into handling voice (and a very limited amount of data) for cell phone and the currently small number of Voice over Internet Protocol (VoIP) calls in the State.

North Dakota counties and cities have been discussing the Next Generation of 911 with their counterparts around the country for several years – and all recognize the challenges to be faced. This past summer, through a joint powers agreement, North Dakota's 911 jurisdictions contracted with L. Robert Kimball and Associates for the development of an initial Master Plan to guide our NextGen efforts.

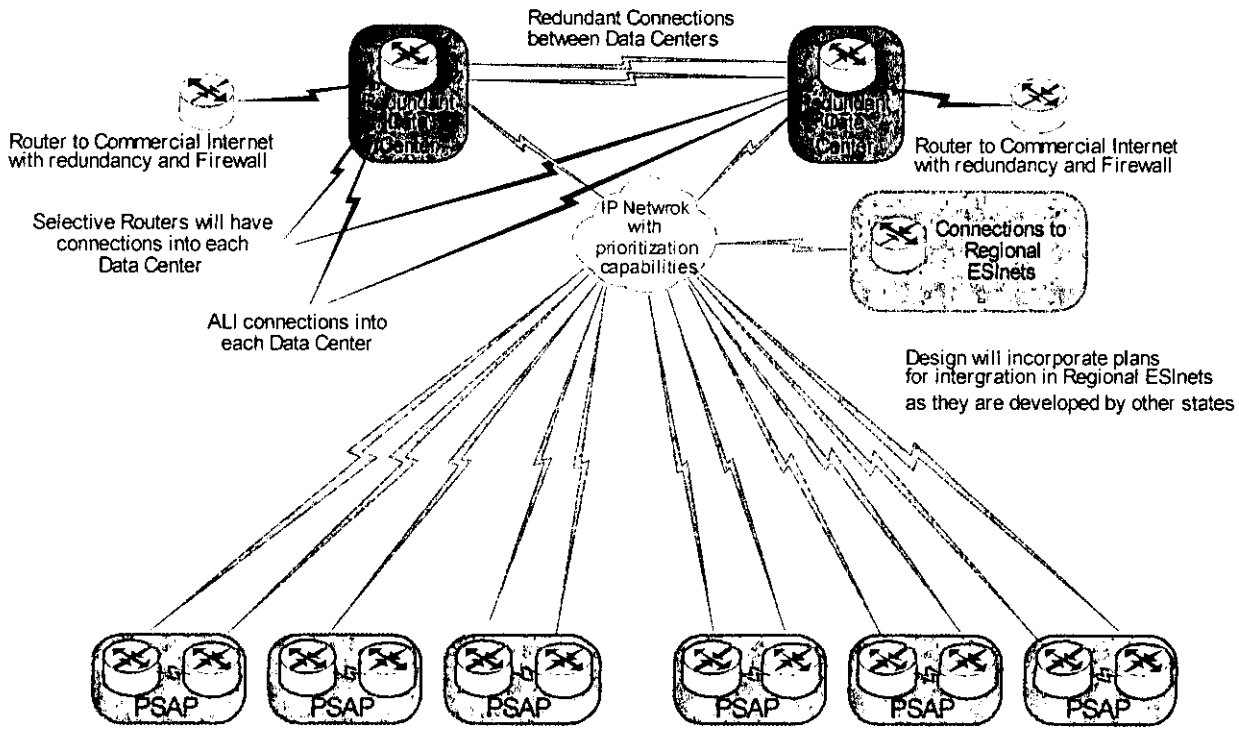
Kimball is the same firm that has developed plans for Montana and Minnesota, as well as the national plan for the U.S. Dept. of Transportation through the National Emergency Number Association (NENA). I have a single bound copy of the North Dakota Master Plan (completed just this past month), and I have arranged to have a digital copy of this Plan emailed to each of you while this hearing is underway. Attached to my testimony is a summary of their report.

This issue is one of particular interest to Congress as well. As the summary discusses, the federal ENHANCE 911 Act, has appropriated $43 million for grants for states and local governments to begin implementation. It is our hope that through this study, or by some other vehicle, $500,000 in State funding will be made available to match the $500,000 offered by this federal program.

NEXT GENERATION 911
CHALLENGES AND OPPORTUNTIES FOR NORTH DAKOTA

North Dakota's current 911 network, as those of all other states, was designed to rapidly answer traditional landline telephone calls for emergency medical, fire, and law enforcement assistance. Creative call routing allowed this network to manage cellular calls, but the continued deployment of new communication services is setting the stage for the ultimate replacement of this legacy network. This future network, built on a broadband Internet Protocol (IP) backbone, is being referred to by the federal government as "Next Generation 911" or "NG911".

The North Dakota 911 Association, and its member counties and cities have dedicated almost $100,000 for the assessment of our current statewide 911 network, and the development of a Master Plan for NG911 across North Dakota. This assessment and master plan was developed by L. Robert Kimball and Associates, one of the foremost emergency communication consultants in the country. The master plan includes a generalized design (below) of the future network to serve North Dakota's NG911 needs.



22 Connected PSAP's with a connection to another PSAP for redundancy

This design incorporates the visions of the various national agencies and organizations that have been charged with conceptualizing this new system. Building on the work of the National Emergency Number Association (NENA), the Network Reliability and Interoperability Council (NRIC) (an advisory group to the Federal Communications Commission (FCC)), and the U.S. Department of Transportation (US DOT) NG9-1-1 Initiative, the NG9-1-1 concept envisions a

systematic transition to a new system. The new system will accommodate a flexible services infrastructure where existing and new emergency communications applications of all types can be implemented without requiring major overhauls to existing network elements. For North Dakota and its public safety answering points (PSAPs), implementation of and transition to NG9-1-1 may have far-reaching impacts such as:

- Call handling processes and procedures,
- Personnel issues – including staff with new skills and training on new systems,
- New and expanded data sources,
- Calls including audio, video, and telematics that can enable new sources of information for decisions about handling calls and dispatching and coordination of resources,
- Methods of transferring and coordinating information among PSAPs, emergency operations centers, and other public safety entities beyond that currently provided for the public switched telephone network, and
- Greater interconnectivity among local PSAPs, regional, state, and national agencies for coordination of emergency responses.

The current 911 network was designed by local phone companies and funded by the local 911 fee on telephone service. The incorporation of wireless 911 technology was largely successful through statewide project management and the coordination of all local governments through a single purchasing agreement. The successful transition to NG911, as indicated by the US DOT, will require even greater investment and cooperation – involving national, state, regional, and local coordination. The Master Plan suggests a 5-7 year phased-in process.

Success of NG911 will require North Dakota to address issues such as:

- Governance of the NG911 project and the future network,
- Uniform, statewide standards of answering, transferring, dispatching and managing calls,
- Project management and consulting services,
- Staff recruitment, training, and retention, and
- Funding of the transition and the network's ongoing costs.

The federal government has recently released draft rules for a nationwide grant program for NG911 – to be made available by September 2009. North Dakota's share of this funding is (at a minimum) $500,000 – with the requirement of a statewide matching investment of an equal amount.

North Dakota's local governments are looking to the Legislature for assistance in taking the current Master Plan to the next step by assisting in the development of a governance body, authorization of the receipt of available federal funding, dedication of the necessary matching funds, and the policy development assistance to make the project successful.

#3

Testimony To The
HOUSE POLITICAL SUBDIVISIONS COMMITTEE
Prepared January 8, 2009 by the
North Dakota Association of Counties
Terry Traynor – Assistant Director

REGARDING HOUSE BILL 1054 – Additional Information

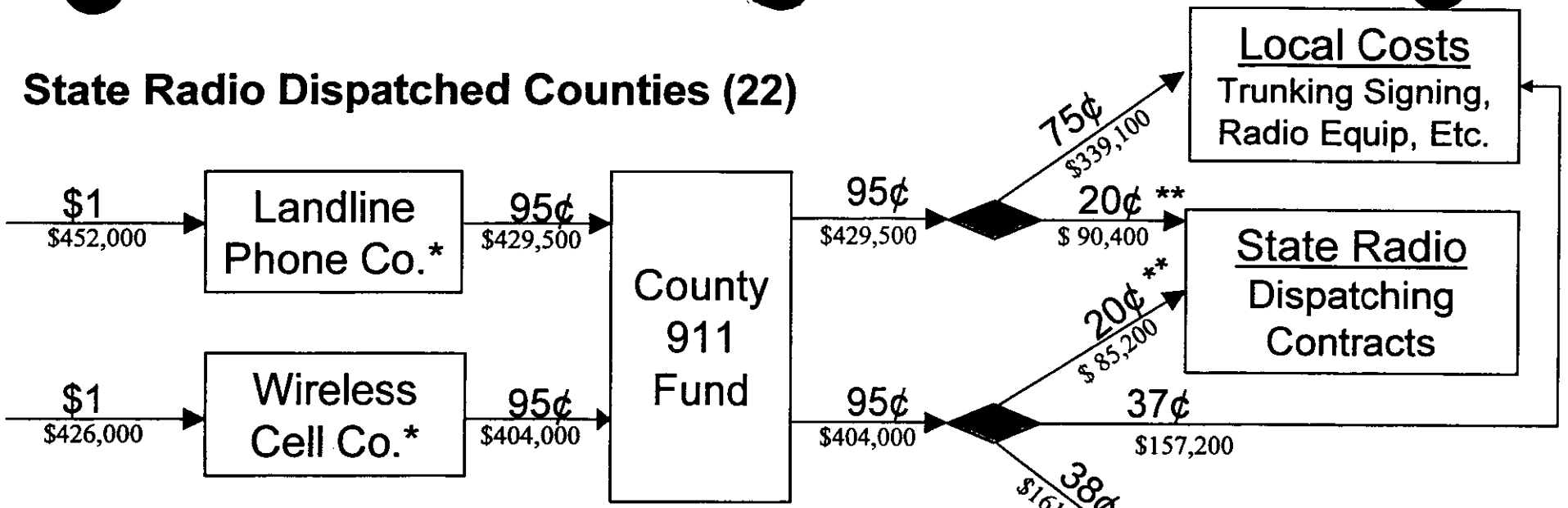
As requested at today's hearing, I am attaching (on the reverse) a flowchart depicting the statewide expenditure of Emergency Services Communication Services Fees that are levied on telecommunication service ($1/device) by local 911 Jurisdictions.

This information is generated from CY2007 fee information gathered as part of the statutory reporting requirement of the Emergency Services Communication Coordinating Committee (ESCC). This report is filed biennially with the Legislative Council. This past Interim, the Energy Development and Transmission Committee received this report and it is attached to their August 5, 2008 Minutes on the Legislative Council website.

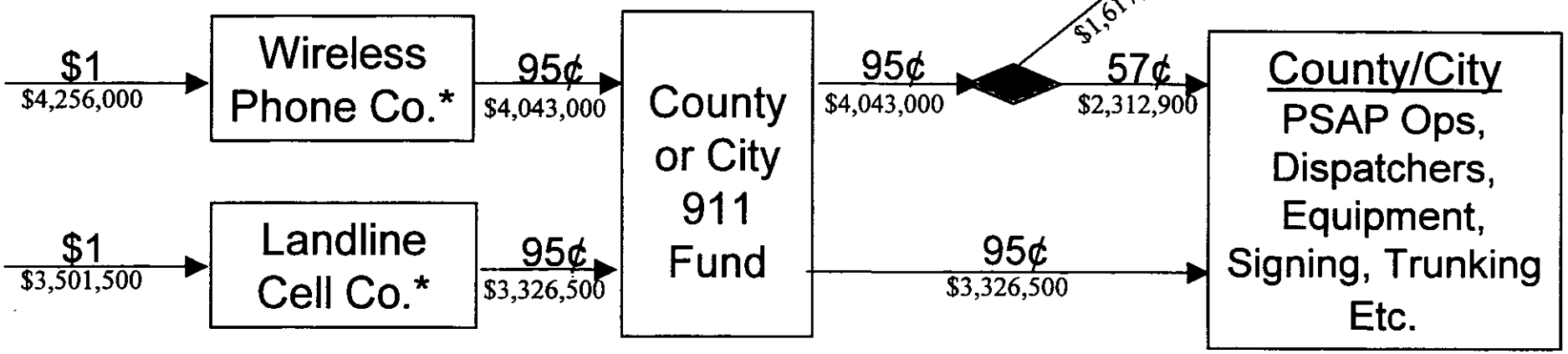
This report has a wealth of information concerning the current Emergency Services Communication System; including PSAP numbers, call volume, agencies dispatched, staffing levels, revenues, expenditures and reserves.

I hope this addresses the committees request, but I would be pleased to provide additional information if needed.

State Radio Dispatched Counties (22)



Locally Dispatched Counties/Cities



* Phone companies retain about $432,500 for collecting the fee – they also receive payments for trunking and database information. All figures based on CY07 collection data.

** State Radio fees scheduled to increase to 38¢ per device.

HB1054

A Policy Maker Blueprint for Transitioning to the Next Generation 9-1-1 System

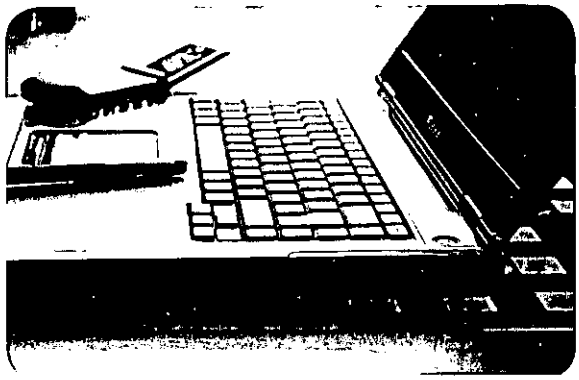
ISSUES AND RECOMMENDATIONS FOR STATE AND FEDERAL POLICY MAKERS TO ENABLE NG9-1-1

September 2008

NENA
Next Generation Partner Program

THE CHALLENGE

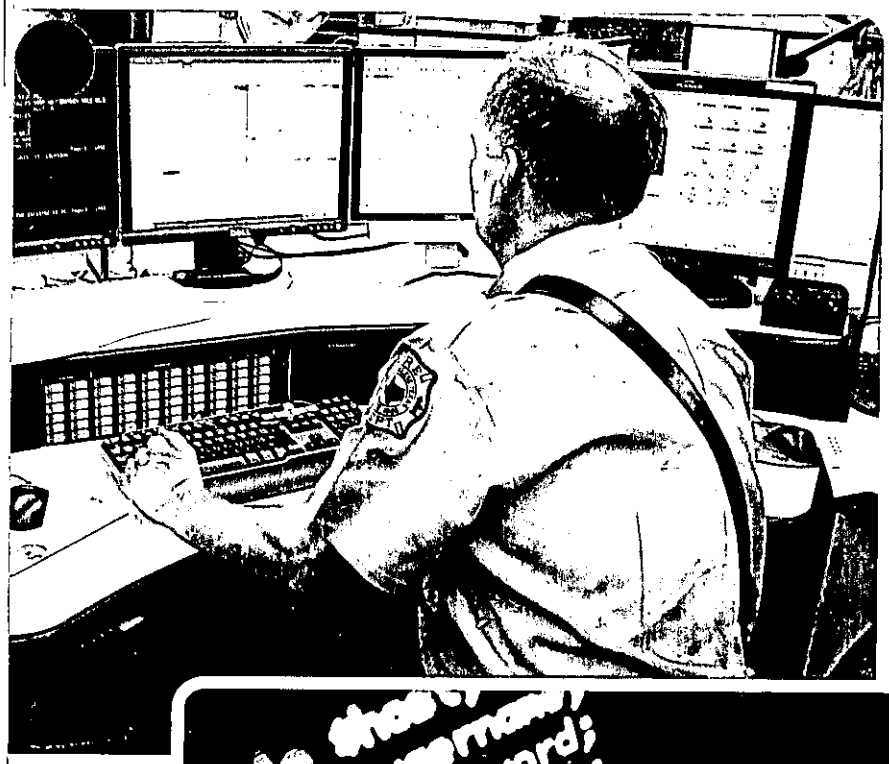
Every year approximately 240 million 9-1-1 calls are made in the United States with countless lives saved and property protected. Yet, our nation's 9-1-1 system is being pushed to the edge and is increasingly falling behind as technology in the hands of consumers rapidly advances past the capabilities of the current E9-1-1 system. Text messaging and instant messaging are becoming a more common method of communication than the traditional two way voice telephone call. Pictures and videos from phones and PDAs are being shared instantly with friends and colleagues around the world. Video and text based communications are replacing traditional TTY communications for the deaf and hard of hearing. Automobiles are being outfitted with telematics systems that automatically open up a voice call and provide valuable crash data when a car is involved in an accident. These are all amazing technologies, and citizens can reasonably expect to be able to contact 9-1-1 with technologies they use to communicate every day. Yet, all of these advancements in consumer communications technology have one important characteristic in common: ***today's legacy 9-1-1 system cannot deliver any of this information to 9-1-1 centers***. The architecture of the legacy 9-1-1 system is based on circuit switched telephony designed to enable telephone calls to 9-1-1, not data. Simply put, the 9-1-1 system has not kept up with technology and is badly in need of modernization.

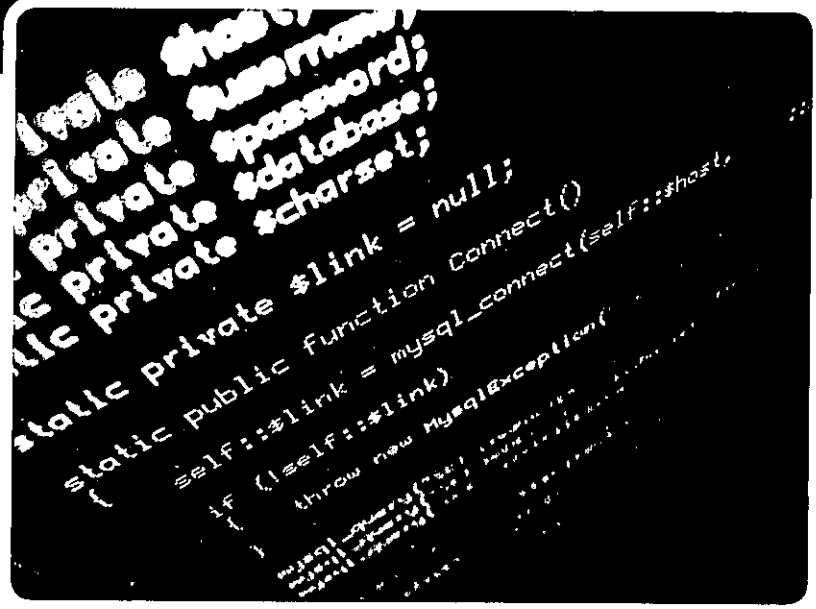


THE OPPORTUNITY

While the current 9-1-1 system is certainly limited, there is good news. Significant work has been done to design and prepare for the transition to an IP-based Next Generation (NG) 9-1-1 system to handle all of the communications services listed above and more. NG9-1-1 is the future of emergency communications.[1] Consumers will have more ways to access 9-1-1 using the types of technology they use to communicate every day. 9-1-1 centers will receive more and better information about emergencies of all magnitudes to effectuate a more intelligent emergency response. The system will be based on the most modern technology, with increasing intelligence in the network and the use of shared services to potentially lower overall system costs. In sum, NG9-1-1 can mean increased capabilities, efficiencies and opportunities for consumers and public safety agencies, more lives saved and potentially lower costs for state and local governments facing increasingly tight budgets.

1 More information on NG9-1-1 is available at www.nena.org and in the Appendix at the end of this document.





THE CHALLENGE AND OPPORTUNITY FOR POLICY MAKERS

Significant NG9-1-1 technology and standards development is underway and proof of concept trials and demonstrations are being conducted. This is essential, but equally important to technology development, is the fact that NG9-1-1 also requires the modernization of state and national 9-1-1 policies, regulations and statutes. NG9-1-1 is not yet a fundamental policy goal at the state and national level. Some existing state and federal regulations and statutes arguably prohibit, and certainly do not help enable, NG9-1-1. All the technology development in the world will only be as effective as the policies and rules that enable the implementation of NG9-1-1.

THE PURPOSE OF THIS REPORT

NENA's Next Generation Partner Program has developed multiple Reports on NG9-1-1 policy issues and recently completed several NG9-1-1 Transition Policy Briefs. These documents, contained in this report, raise important policy issues that must be addressed simultaneously with technology and standards development, and provide recommendations for policy maker consideration. To meet the objective of a fully functioning next generation 9-1-1 and emergency communications system, it is critical that state and federal policy makers (1) make the transition to NG9-1-1 a fundamental policy objective and (2) take timely and carefully scrutinized action to analyze and update existing 9-1-1 rules and regulations. There can be no more "critical infrastructure" than the 9-1-1 system. Thus, this document is designed to assist state and federal government leaders to initiate critical policy efforts necessary for the modernization of our 9-1-1 system.

NEXT GENERATION PARTNER PROGRAM
NG9-1-1 TRANSITION POLICY BRIEF

NUMBER: One

SUBJECT: State-Level 9-1-1 Leadership and Coordination

OBJECTIVE: Establishment of a State Level organization to plan, coordinate and implement a Next Generation 9-1-1 system

TARGET AUDIENCE: 9-1-1 Authorities, Legislatures and Governors' Offices

JURISDICTION: State

BACKGROUND: The level and manner of coordination of 9-1-1 varies widely from state to state. In some states, 9-1-1 is strictly a local matter. A number of states have centralized the 9-1-1 program function or have otherwise established a statewide coordination mechanism, although their circumstances and authority vary widely due to the way state laws and regulations conceive and define the state-level function. For example, some states have a central, state-level 9-1-1 program, but it is primarily focused on cost reimbursement. Some states have centralized the 9-1-1 oversight function, but it focused exclusively on wireless. Some states have centralized the 9-1-1 oversight function and provided it with broad authority and adequate resources to oversee all aspects of 9-1-1. And some states have elected to combine local autonomy and state level coordination. The ability to effect both interstate and intrastate coordination of NG9-1-1, and to coordinate it with other emergency communications, will be a key factor in its – NG9-1-1's – success.

DISCUSSION: The principle of state-level coordination for 9-1-1, and of overall emergency communications, is not new. It is explicitly articulated in the Wireless Communications and Public Safety Act of 1999[2], in which Congress desired states to implement seamless, end-to-end emergency telecommunications services and found that efficiency in deploying such "requires statewide coordination of the efforts of local public safety, fire service and law enforcement officials, emergency dispatch providers, and transportation officials; the establishment of sources of adequate funding for carrier and public safety, fire service and law enforcement agency technology development and deployment; the coordination and integration of emergency communications with traffic control and management systems..." Furthermore, Congress directed the FCC to help make this happen by encouraging the development and implementation of "coordinated statewide deployment plans, through an entity designated by the governor" that should "include representatives of the foregoing organizations and entities in development and implementation of such plans." The principle of statewide coordination and planning under the auspices of a designated state-level entity is reinforced in the ENHANCE 911 Act of 2004 and is a specific eligibility criterion for PSAP grant funding under the Act. Similarly, statewide planning and coordination for use of homeland security communications grants is being required, and gradually expanded from solely first responder voice communications to include all emergency organizations and all types of emergency communications.

The link between these principles and the vision of NG9-1-1 is clear. Many key features and functions NG9-1-1 will require an effective state-level leadership and coordination mechanism to be in place. NG9-1-1 and next generation emergency communications generally, as an "interconnected system of

2 PUBLIC LAW 106-81-October 26, 1999.

local and regional emergency services systems (system of systems)"[3] that ultimately becomes "...a nationally interoperable emergency services internetwork"[4] with the coordinated involvement of all state, regional and local stakeholders is what will finally achieve the vision of the 1999 Act.

Although the staffing of PSAPs and handling of 9-1-1 calls (and associated emergency response) will generally remain a local function, subject primarily to local decisions, aspects of NG9-1-1 will require state-level planning and implementation coordination. For example, network and related information delivery functions will no longer be agency specific, but will be shared by all authorized emergency agencies. Such shared Emergency Services IP Networks (ESInets) may be developed and managed locally or regionally, but need strong state level leadership and coordination, to ensure both operability and interoperability of state, local and regional ESInets, and to ensure they conform to applicable policies and industry-based standards. Further, coordination with national entities to ensure statewide compliance with required standards, federal policies and the like is best accomplished when said coordination occurs at the state level.

ACTION PROPOSED TO RESOLVE ISSUE:

- Each state needs to have an organization, with appropriate authority, responsible for planning, coordinating and implementing the NG9-1-1 system, that reflects the following:
  - Statewide scope
  - Coordination within the state and with adjacent states and federal authorities
  - Coordination with other emergency service functions and other relevant stakeholders involved in the development and implementation of seamless, end-to-end NG emergency communication services
  - The appropriate adoption of industry-based standards, rules, policies and procedures by stakeholders necessary to support such deployment
  - Adequate funding to support state and local planning and implementation of NG9-1-1
- Each state needs to have an organization, with appropriate authority, responsible for planning, coordinating and implementing a seamless Next Generation end-to-end emergency communication system, including 9-1-1.

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3 USDOT. "Next Generation 9-1-1 (NG9-1-1) System Initiative: Concept of Operations." Intelligent Transportation Systems. April 2007. 12. http://www.its.dot.gov/ng911/ng911_pubs.htm (April 19, 2008)

4 Ibid

NEXT GENERATION PARTNER PROGRAM
NG9-1-1 TRANSITION POLICY BRIEF

NUMBER: Two

SUBJECT: Funding the NG9-1-1 System

OBJECTIVE: Ensure sufficient resources are made available to implement and operate the NG9-1-1 system.

TARGET AUDIENCE: 9-1-1 and Public Safety Authorities, Legislatures and Governors' Offices

JURISDICTION: Federal/State/Local

BACKGROUND: Current State and local 9-1-1 funding and planning legislation and authority are functionally tied to the architecture of the current 9-1-1 system and state or local public safety operations. Existing laws or authority often do not take into consideration the Next Generation of 9-1-1 in which 9-1-1 will be an application that utilizes Emergency Services IP Networks (ESInets), along with other emergency services functions.

DISCUSSION: The 9-1-1 system and other emergency communications functions are funded by different and disparate funding sources. Those funding structures are used, and indeed are typically required to be used, to create separate and distinctly different systems (e.g. 9-1-1; interoperable Police/ Fire/EMS radio systems; public health alert networks, poison control centers etc). Absent significant inter-governmental cooperation, this form of planning and funding may not lead to economies of scale that will enable parity of emergency services capabilities, interoperability, increased efficiency or cost savings within all aspects of emergency communications. More so than today, the Next Generation System will be a shared system comprised of multiple entities and components, including 9-1-1, the support of which will require coordinated planning and funding.

ACTION PROPOSED TO RESOLVE ISSUE:

- State and local governments should examine funding, operations, and legislation to ensure they promote the needed ESInets and cooperation, including interstate ESInets and NG9-1-1 in general.
- Any fees assessed to enable NG9-1-1 imposed on end users or devices of any service or infrastructure with the ability to access the NG9-1-1 system should be reasonable, equitable and nondiscriminatory;
- Fee remittance should be made for deposit into a dedicated fund and the allowable uses should ensure the provision of the needed services and constrain diversion of funds to other non-allowable purposes;
- Establish a maximum fee, providing the 9-1-1 authority with the ability to adjust the fee rate based on the cost to provide service;
- It is possible to pay for NG9-1-1 services as part of a shared NG emergency services network in which multiple emergency services functions will pay a portion of the network costs and policy makers should explore and examine this possibility.
- State and federal legislation and grant programs should reflect the growing convergence and integration of emergency response technology and agency interaction. State interoperability plans and federal funding in support of them must be for overall next generation emergency communications, including NG 9-1-1.

- Federal and state interoperability and Next Generation 9-1-1 definitions need to be more comprehensive and inclusive, e.g., all emergency response agencies, including 9-1-1, and all forms of emergency communications. As state and federal policy officials review and modify current 9-1-1 related policies; all definitions should be reviewed to align with next generation technology.
- Funding legislation should encourage parity of emergency services capabilities, interoperability, increased efficiency or cost savings within all aspects of emergency communications.
- Fee should be based on sound planning that includes short- and long-term projections of recurring and non-recurring costs and revenues;
- Service provider fee remittances should be audited for accuracy, and the 9-1-1 authority or PSAP should be audited or monitored for use of funds in compliance with legislative and authorized intent.

NEXT GENERATION PARTNER PROGRAM
NG9-1-1 TRANSITION POLICY BRIEF

NUMBER: Three

SUBJECT: Establishing State-Wide Emergency Services IP Networks (ESInets)

OBJECTIVE: Ensuring that state/regional/local authorities recognize the need and apply directive influence to enable and initiate state-wide ESInets needed for NG9-1-1

TARGET AUDIENCE: 9-1-1 and Emergency Services Authorities, Legislatures, Regulatory Agencies and Governors' Offices

JURISDICTION: State/Regional/Local

BACKGROUND: Most current 9-1-1 and emergency communications systems are local or regional in nature, both operationally and technically. However, the proposed technical architecture of the NG9-1-1 system indicates the need for state-wide management and coordination of IP emergency service networks (ESInets). In addition to technical specifications, the NENA **Functional and Interface Standards for Generation 9-1-1 (i3)** provides some guidance on Roles and Responsibilities for ESInets. There are two key aspects to the deployment of ESInets: (1) the physical buildout and coverage of the ESInets and (2) the management and coordination of ESInets.

ESInets may be deployed at a state level and there may be increased efficiencies and economies of scale in doing so. However, ESInets will very likely be deployed at a sub-state level (regional/county) in many areas which must then be interconnected with other sub-state ESInets to establish a standardized, interconnected and interoperable state-wide ESInet. In practice there will be a number of different ways to effect statewide ESInet coverage. A state level entity or organization is recommended to implement and manage the interconnected state-wide ESInet (comprised of the interconnected regional/local IP networks or a single state network). A state level entity or organization can play a significant role by providing an IP backbone network to make interconnection of regional/local ESInets more efficient.

No matter who manages the ESInet(s) in a state, it is desirable to have one entity or organization coordinate development and management of the network in order to ensure adherence to appropriate standards and achieve the economies of scale and efficiencies that NG9-1-1 promises. To further improve efficiency, one entity per state should be responsible for arranging interconnect between their network and adjacent state networks. This includes both redundant physical connections and router configuration to allow seamless interagency communications.

Local and regional 9-1-1 operations will continue to be handled at the current entity level.

DISCUSSION: ESInets are critical to the NG9-1-1 and next generation emergency communications architecture. They will provide call routing, transport, interoperability, security, and related services that can most effectively and efficiently be coordinated at the state level and facilitate required intra and interstate connectivity that will be very difficult, if not impossible, to achieve at the regional or local level.

State-wide ESInets are more than just physical pathways. They host (or provide access to) numerous application layer services that support interoperability among the highly diverse regional/local networks

and agency applications. These include appropriate standardized core services such as GIS-based directories of authorized organizations and resources, and access control/identity management for implementation of information sharing policies. These directories will enable interstate and intrastate dissemination and queries for emergency incident information and messages, including references to locations, agencies and data sources. All authorized organizations (local, state, national, public, private) need to be able to implement their data policies through these core services. The ESInets may also offer optional managed services (or access to them) for use by individual agencies.

While there are numerous statewide programs in place for the funding and administration of 9-1-1 service and other emergency services, no state today is implementing and operating a comprehensive ESInet shared by 9-1-1 and other emergency services and government functions. Some have state networks for specific emergency functions (e.g. Indiana has an innovative statewide wireless 9-1-1 network; there are many state Health Alert Networks; law enforcement networks including NCIC and NLETS). Some states do not have the ability or authority to establish a state-wide ESInet. Some states do not have a state-wide 9-1-1 authority. Most states do not have a comprehensive state emergency communications agency, or if they do have one, the agency does not have the authority or funding to implement an ESInet and carry out these comprehensive new responsibilities involving all emergency response agencies, including coordination with state and local agencies or organizations responsible for 9-1-1.

ACTION PROPOSED TO RESOLVE ISSUE:

- Policymakers at all levels should commit to the development and deployment of interoperable state-wide ESInets as a fundamental 9-1-1 and emergency communications policy objectvive.
- 9-1-1 and emergency services authorities need to review existing legislation and regulations to ensure there are no barriers to, and sufficient authority for, the establishment of state-wide ESInets. Statutes and regulations to enable Next Generation systems should be actively pursued. Any current rules that would prohibit, or fail to authorize, the establishment NG9-1-1 must be resolved.
- Where existing state statutes and regulations permit, state, regional, and local 9-1-1 and emergency services authorities should work cooperatively toward establishing state-wide ESInets.
- Where not currently authorized, states should affirmatively legislate, authorize, organize and fund state-wide ESInets and key interoperability services hosted on, or accessed by them. It is in the operational and financial interests of emergency agencies to share and contribute to an ESInet. Planning and funding should involve and come from all emergency services, including but not limited to 9-1-1. The federal government should support efforts to establish state-wide ESInets.
- Emergency services agencies need to consider the sharing of infrastructure with other governmental entities as a matter of affordability. This calls for the development of new cooperative working agreements between federal, state and local agencies to participate in shared state backbone networks that include priority access for emergency services, particularly during disasters.

NEXT GENERATION PARTNER PROGRAM
NG9-1-1 TRANSITION POLICY BRIEF

NUMBER: Four

SUBJECT: Addressing Transitional Regulation/Legislation/Tariff Modifications to Enable Next Generation 9-1-1 Deployment

OBJECTIVE: Modify and update current legislation, regulations and tariffs to ensure a competitive E9-1-1 environment and a transition to a full NG9-1-1 system

TARGET AUDIENCE: 9-1-1 and Public Safety Authorities, State Legislatures, Regulatory Agencies and Governors' Offices, Federal Communications Commission, Congress

JURISDICTION: Federal, State and Local

BACKGROUND: As compared to the current marketplace where Incumbent Local Exchange Carriers (ILECs) are the predominate 9-1-1 System Service Providers (SSPs), in the NG9-1-1 marketplace it is anticipated that there will be multiple providers offering a variety of service capabilities and options, thereby providing greater choices for 9-1-1 governing authorities. As we transition to a full NG9-1-1 system, it is also expected, and is indeed a policy objective, that competitive alternatives for current E9-1-1 services will emerge as well. An open, competitive E9-1-1 environment should be fostered and should be done so with an eye towards a full NG9-1-1 system.

NG9-1-1 is not simply an extension of E9-1-1. While a full NG9-1-1 system must support all E9-1-1 functions and features, NG9-1-1 is Internet Protocol (IP) based, and software and database controlled in fundamentally new ways, enabling many new technical and operational capabilities to further enhance the coordination and delivery of emergency services nationwide. However, before and during the transition to a full NG9-1-1 system, it is expected that new E9-1-1 service offerings will be provided by competitive 9-1-1 SSPs in direct competition with incumbent SSPs. Such offerings will likely replicate current E9-1-1 functions and advance beyond current E9-1-1 system capabilities, while, initially, not being a full NG9-1-1 system. In many cases, competitive SSPs will offer individual components of 9-1-1 solutions. As these competitive E9-1-1 service offerings and full NG9-1-1 capabilities are deployed, they will necessarily involve new complex technical and business arrangements that current regulations and laws did not fully contemplate.

DISCUSSION: NG9-1-1 will not be deployed in a "flash cutover". There will be PSAPs and areas that remain tied to the legacy E9-1-1 system for quite some time that must be able to interoperate with PSAPs that have migrated to NG9-1-1. With that reality in mind, it is imperative that 9-1-1 authorities at every level – as well as industry – begin now to lay the foundation for NG9-1-1 by facilitating the deployment of "dual-mode" capabilities in networks and/or IP-enabled PSAPs that can translate between the legacy, circuit switched environment and the next generation environment. This will be a significant issue as NG9-1-1 will not be deployed as a single nationwide project. It will take several years to complete the transition.

Much of the legislative and regulatory framework governing the provisioning, operation and maintenance of PSAPs, and the 9-1-1/emergency communications system that serves PSAPs, rests with state and local governments, and as such, varies greatly across the country. Additionally, the Federal Communications Commission plays a significant role in regulating communications providers and its current rules that require the delivery of wireless and Voice over IP (VoIP) 9-1-1 "calls" over the "wireline

E9-1-1 network" which could be argued does not clearly include the routing of 9-1-1 calls via an IP-based NG9-1-1 system. These state and federal laws and regulations were written in an era where all the possibilities and technological capabilities of NG9-1-1 simply did not exist. Similarly, the United States Congress plays a significant role in regulating communications providers and establishes the national regulatory framework through federal statutes. Many existing laws, regulations and tariffs make specific reference to older technologies or system capabilities which may inadvertently inhibit the migration to NG9-1-1. To foster the rapid migration of NG9-1-1, it is essential that state and federal legislatures and regulatory bodies review current laws and regulations to keep pace with the rapidly changing public safety marketplace and to create a framework which will optimize 9-1-1 governing authority choices and establish a competitively neutral marketplace that allows 9-1-1 authorities to replace legacy 9-1-1 functions component by component.

ACTION PROPOSED TO RESOLVE ISSUE:

To meet the objective of a fully functioning next generation 9-1-1 and emergency communications system, it is critical that state regulatory bodies and legislatures, as well as the FCC and Congress take timely and carefully considered action to analyze and update existing 9-1-1 rules and regulations to ensure they optimize 9-1-1 governing authority choices for E9-1-1 and NG9-1-1 and foster competition by establishing a competitively neutral marketplace.

- State legislatures and regulatory bodies, as well as the FCC and Congress, must initiate efforts to understand how current regulations and laws facilitate, or inhibit, the local, state, regional and national interoperable environment of NG9-1-1, and analyze how such rules and regulations may need to be modified to enable the IP-based, software and database controlled structure of NG9-1-1.
- State legislatures and regulatory bodies, as well as the FCC and Congress, are encouraged to take appropriate steps to enable competition for the delivery of E9-1-1 service that will provide increased opportunities and choices for 9-1-1 governing authorities today. Simultaneously, as such rules are considered, states must ensure that any regulatory actions will effectively enable the transition to a full NG9-1-1 system.
- Some example regulatory/legislative issues that must be addressed include:
  - Laws/regulations concerning the eligible use of 9-1-1 funds
  - Provisions that require specific technology components for "E9-1-1" service delivery that are not necessarily the same for NG9-1-1.
  - Laws which may inhibit appropriate and efficient information sharing of 9-1-1 data with appropriate safeguards for privacy protection. For example, regulations/laws/tariffs may need to be modified to ensure that 9-1-1 authorities or new customer-authorized service providers should be entitled to receive relevant routing, location and other related 9-1-1 information in the possession of the incumbent service provider at reasonable rates and terms. Such information is essential to ensure an efficient and error free transition of service providers. Other examples may include sharing of emergency-related information between 9-1-1 and other emergency response organizations.Existing 9-1-1 service arrangements and tariffs which may inhibit enabling new entrants to make similar competitive services available on a component by component basis, where technically and operationally feasible. Unbundled tariff options should be made available in such a way that prices of each unbundled component reflect reasonable rates and terms.
  - Uniform requirements for all 9-1-1 service providers to meet accepted industry standards (reference to industry standards is necessary for service integrity).
- New competitive providers should be afforded reasonable and nondiscriminatory treatment equal to that of incumbent service providers by requiring comparable agreements and terms between all service providers.
- Where regulatory requirements are in place, such requirements should be functional and performance based without reference to any specific proprietary technologies, manufactures or service providers.

APPENDIX A

NENA Policy Statement on the Proper Balance and Timing of State and National Regulatory and Legislative Activities During the Transition to NG9-1-1

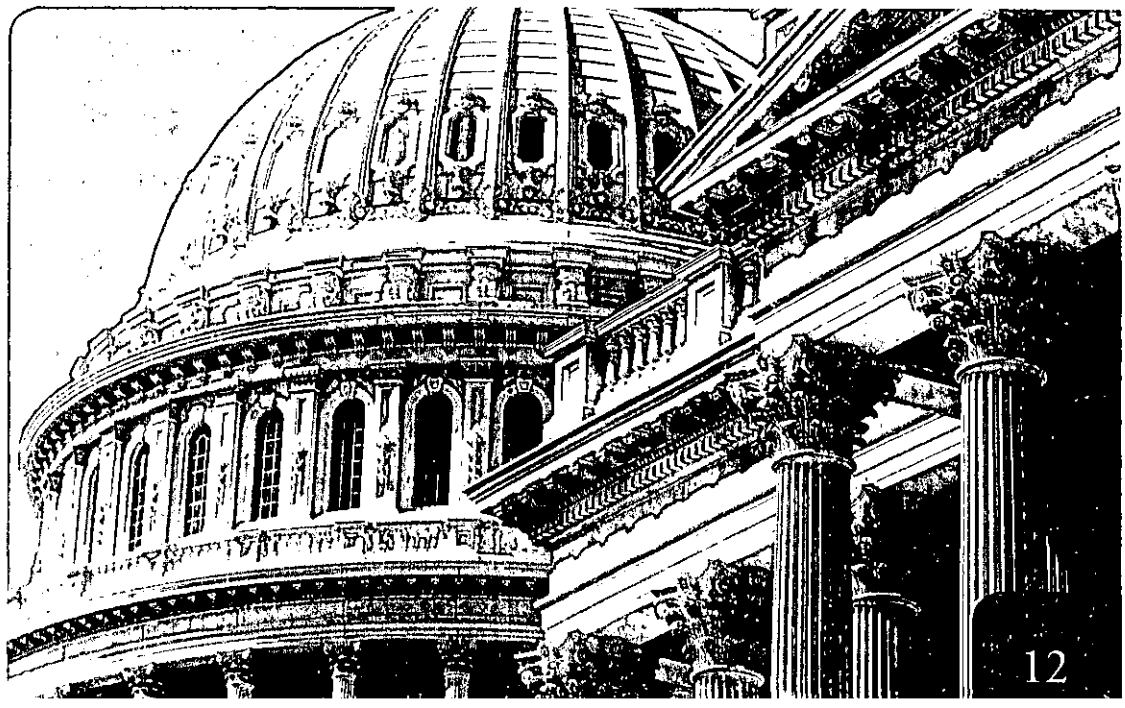
(April 2008)

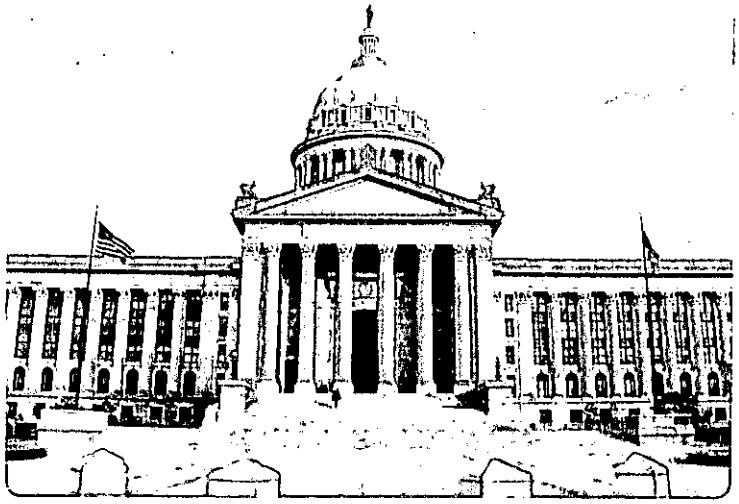
The evolution from today's 9-1-1 service structure to tomorrow's IP-based Next Generation (NG) 9-1-1 system requires several major areas of simultaneous and interactive activities. A coordinated set of actions combining national, state, and local authorities is required to successfully accomplish critical preparations, development, testing and implementation of NG9-1-1. This must be done in a way that retains and expands the quality and effectiveness of 9-1-1 service through knowledgeable and cooperative efforts at all levels of government. We hope and expect that interested parties will participate on more than one level so that developments can be shared.

To meet the objective of a fully functioning next generation 9-1-1 and emergency communications system, it is critical that state regulatory bodies take timely and carefully scrutinized action to analyze and update existing 9-1-1 rules and regulations. Such actions should be designed to facilitate an appropriate competitive 9-1-1 landscape for current E9-1-1 functions while ensuring that new or modified rules and regulations will effectively enable the transition to a full NG9-1-1 system.

NG9-1-1 is not simply an extension of E9-1-1. While a full NG9-1-1 system must support all E9-1-1 functions and features, NG9-1-1 is Internet Protocol (IP) based, and software and database controlled in fundamentally new ways, enabling many new technical and operational capabilities to further enhance the coordination and delivery of emergency services nationwide. During the transition to full NG9-1-1, it is expected that new 9-1-1 service offerings will be provided by incumbent and competitive 9-1-1 System Service Providers (SSPs) that advance beyond current E9-1-1 system capabilities, but simply advancing beyond today's capabilities should not be equated with providing a full NG9-1-1 system. Such efforts may better be characterized as "pre-NG9-1-1". These pre and full NG9-1-1 capabilities will necessarily involve new complex technical and business arrangements that current regulations and laws did not fully contemplate. Thus, states are encouraged to actively consider appropriate steps to enable appropriate competition for the delivery of E9-1-1 service that will provide increased opportunities and choices for 9-1-1 governing authorities today. Simultaneously, as such rules are considered, states must ensure that any regulatory actions will effectively enable the transition to a full NG9-1-1 system.

As states contemplate rule changes, it is critical that steps taken are in accordance with complementary national activities, many of which are being coordinated as a NENA NG9-1-1 Project through the work of NENA committees and the NENA Next Generation Partner Program, and through federal government efforts





such as the USDOT Next Generation 9-1-1 Project. National progress on technical and operational standards development is progressing. Proof of concept trial demonstrations and testing of many aspects of NG9-1-1 are occurring in 2008, the results of which will be compared and analyzed against current expectations and assumptions. NG9-1-1 funding model analysis is progressing. Discussions on the need for proper certification of all aspects of the NG9-1-1 system are ongoing. These and other activities being worked at the national level are the building blocks required to accomplish a fully featured, standards based NG9-1-1 system. Any state regulatory actions concerning NG9-1-1 should appropriately consider ongoing national activities. However, states should actively engage stakeholders today to prepare and plan for the implementation of a full NG9-1-1 system.

In sum, the evolution to an NG9-1-1 system should be treated as a national project in which individual state action is necessary, but must be appropriately coordinated with other state and national activities. While national and international technical and operational standards for NG9-1-1 are still in progress, and much work remains to be done to complete this critical work, many activities can and should be undertaken at the state and local levels to prepare. Chief among these is working to understand how current regulations and laws facilitate, or prohibit, the local, state, regional and national interoperable environment of NG9-1-1, and analyzing how such rules and regulations may need to be modified to enable the IP-based, software and database controlled structure of NG9-1-1.

APPENDIX B

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), and easy access to additional data such as telematics data, building plans and medical information over a common data network. In addition, the need for inter-communications across states, between states, and across international boundaries requires that we create 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 county, state, and international borders, and across the multitude of emergency response professions and agencies, from traditional PSAPs to Poison Control Centers, trauma centers, the Coast Guard, and disaster management centers. There will be 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 being wholly NG9-1-1 compliant. 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 will support NG9-1-1 is becoming clear, and demonstrations and trials are beginning to appear and will contribute to continued standards development. Despite this progress, a fully featured, truly "standards based" NG9-1-1 system is not yet identifiable, 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 standardized interfaces from call and message services
- process all types of emergency calls including 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
- provide a secure environment for emergency communications

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 communications 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**
  Internet Engineering Task Force (IETF) based IP protocol standards provide the basic functionality of the system. NENA has applied standards from IETF and other Standards Development Organizations 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). This NENA Standard defined the core IP functionality of the larger NG9-1-1 system.

- **Software Services/Applications**
  NG9-1-1 uses 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.

- **Databases and Data Management**
  NG9-1-1 uses a set of database systems to house and provide management of the above data content. Some examples are: validation, routing control, policy/business rules, and 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 information, building plans, medical information, 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.

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 exclusively, but the future involves a more 'virtual' approach to how the public and governmental entities accomplish 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 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 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 database 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		
Developing methods to ensure a secure environment	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				
Providing a means for Certification and Accreditation	X				
Ensure that products adhere to defined standards to allow interoperability through open architecture		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 functions2, 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 data 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 achieve 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) , and ready for 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.

APPENDIX C

Related NG9-1-1 Policy Informational Documents

Next Generation 9-1-1 - Responding to an Urgent Need For Change: Initial Findings and Recommendations of NENA's NGE9-1-1 Program (March 2006)
- Available at http://www.nena.org/media/File/ng_final_copy_lo-rez.pdf

Transitioning Emergency Communications Into the Next Generation: NENA Next Generation Partner Program 2006 Report (March 2007)
- Available at http://www.nena.org/media/File/2006NGPartnerProgramReport_1.pdf

Summary of NG9-1-1 Development and NG Partner Program Results for 2007 (May 2008)
- Available at http://www.nena.org/media/File/2007NGPartnerProgramfinalreport.pdf

Funding 9-1-1 Into the Next Generation: An Overview of NG9-1-1 Funding Model Options for Consideration (March 2007)
- Available at http://www.nena.org/media/File/NGFundingReport.pdf

United States Department of Transportation Next Generation 9-1-1 Initiative
- Numerous documents available at http://www.its.dot.gov/ng911/ng911_pubs.htm

9-1-1 Industry Alliance (9IA) 2008 Study on the Health of the US 9-1-1 System (March 2008)
- Available at http://www.911alliance.org/publications/download_report.cfm

HB1054

Report

for

Next Generation 9-1-1 Planning

submitted to

North Dakota Association of Counties and North Dakota 9-1-1 Association

December 2008 ©

Kimball

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1. EXECUTIVE SUMMARY

L. Robert Kimball & Associates, Inc. (Kimball) is pleased to provide the North Dakota Association of Counties (NDACo) and the North Dakota 9-1-1 Association (ND9-1-1) with its report on Next Generation 9-1-1 (NG9-1-1) planning.

The intent of this project is for Kimball to assist NDACo and ND9-1-1 in preparing a document describing an NG9-1-1 strategy, define the budgetary costs and determine the implementation schedule for the strategy.

This high-level document is a master plan for 9-1-1 for North Dakota. This report covers the three primary tasks associated with the project plan.

- Task 1 - Assessment/evaluation
- Task 2 - Network design
- Task 3 - Master plan

1.1 INTRODUCTION

NG9-1-1 is a concept that has real life deployments today. NG9-1-1 is best described as a robust system of systems that allows the public to use any device to request help or send information to the appropriate public safety agency.

NG9-1-1 is commonly viewed as an interconnected, IP-based hierarchy of local, regional, state, and national networks that would enable a more robust interconnectivity and functionality for emergency communications applications than currently exists. The current 9-1-1 systems in North Dakota and throughout the nation are over 30 years old and are generally recognized as being limited both technically and functionally.

Various national agencies and organizations have developed their visions of this new system. Building on the work of the National Emergency Number Association (NENA), the Network Reliability and Interoperability Council (NRIC) (an advisory group to the Federal Communications Commission (FCC)), and the U.S. Department of Transportation (US DOT) NG9-1-1 Initiative, the NG9-1-1 concept envisions a systematic transition to a new system. The new system accommodates a flexible services infrastructure where existing and new emergency communications applications of all types can be implemented without requiring major overhauls to existing network service providing elements. For North Dakota and its public safety answering points (PSAPs), implementation of and transition to NG9-1-1 may have far-reaching impacts such as:

- Call handling processes and procedures.
- Personnel issues.
  - Staffing with new skills (dispatchers and technology support staff).
  - Training on new systems.

- New and expanded data sources.
- Calls including audio, video, and telematics that can enable new sources of information for decisions about handling calls and dispatching and coordination of resources.
- Methods of transferring and coordinating information among PSAPs, emergency operations centers, and other public safety entities beyond that currently provided for the public switched telephone network.
- Greater interconnectivity among local PSAPs, regional, state, and national agencies for coordination of emergency responses.

There is a great deal of work still going on, and continue for some time. The central theme throughout all of the major visions of the next generation is an Internet Protocol (IP) based system that can share voice, video, and data. This system is envisioned to be a dedicated, secure, public safety system.

While this is a conceptual technology, it is in use today in many areas of the country in various forms. There are many vendors that have various types of systems that can provide most of the functions of an NG9-1-1 system.

1.2 METHODOLOGY

To perform this feasibility study, Kimball gathered data in a variety of ways, including face-to-face meetings, telephone interviews, e-mail exchanges, and research on the internet. Kimball developed survey forms and spreadsheets to facilitate gathering the raw data from the various sources. Basic information gathered for each PSAP provided insight as to the current 9-1-1 system in North Dakota.

Additional follow up telephone calls, and e-mail correspondences with NDACo gained additional information on the 9-1-1 infrastructure in the state. Information on the voice network as well as database services was obtained.

Kimball used recognized best practices in the telecommunications field, as well as documents and statements from national organizations such as NENA, APCO and USDOT to develop recommendations for the state regarding this NG9-1-1 system.

1.3 FINDINGS–CURRENT SYSTEM

There are 23 PSAPs that serve North Dakota including one that is located in South Dakota. These PSAPs use a variety of different 9-1-1 answering equipment called Customer Premise Equipment (CPE). PSAP CPE is specialized telephone answering equipment that permits the request for and display of a caller's phone number and the location of wire line phones and wireless phones as well as performing other specialized public safety related functions. The age of this CPE ranges from being installed in 1997 to the most recent, installed in 2008. Most PSAP CPE configurations are stand-alone with all equipment located at the PSAP. There are two PSAPs that operate as remote workstations off of the CPE switching equipment at another PSAP. Most of the PSAP CPE is reported by the vendors to be upgradable to make it IP compliant, but all require some type of upgrade to support IP communications.

Two Qwest-owned selective routers serve the majority of the PSAPs. The Qwest selective routers deliver most wire line and all wireless calls. There are several PSAPs that are served by direct trunks from the wire line central offices and do not have the benefits of selective routing. All of the selective routers to PSAP trunks are: Centralize Automatic Message Accounting (CAMA) type trunks. These trunks are traditional analog 9-1-1 trunks and provide a reliable connection to deliver 9-1-1 calls, but are limited in their capabilities to handle digital technologies. Qwest has installed router-to-router trunks between the two selective routers, enabling PSAPs to transfer fully enhanced 9-1-1 calls (both voice and associated location data) across the network where necessary.

Qwest/Intrado provides centralized wireless and Voice over Internet Protocol (VoIP) automatic location identification (ALI) database for all of the PSAPs and wire line ALI for many of the PSAPs. Some of the PSAPs have standalone ALI databases for wire line that they maintain on site.

The wireless 9-1-1 project lead by the NDACo has been very successful in delivering wireless Enhanced 9-1-1 (E9-1-1) calls to the PSAPs in the state so that all wireless callers have E9-1-1 service. This is a great accomplishment when looking at the fact that not all states have fully deployed wireless E9-1-1 in accordance with the FCC guidelines first published in 1996.

The systems in place today are working well. These systems were developed using the best available technology at the time they were developed. Newer technologies are being developed today that benefit the 9-1-1 system into the future.

1.4 PRELIMINARY DESIGN

The conceptual design for North Dakota is based on the NENA and US DOT Emergency Services IP Network (ESInet) design. The diagram below illustrates the system design. It includes redundant data centers for providing the NG9-1-1 services and data storage, and PSAP connectivity. This design also includes connection to the legacy 9-1-1 system. A full size diagram is included in Appendix A.

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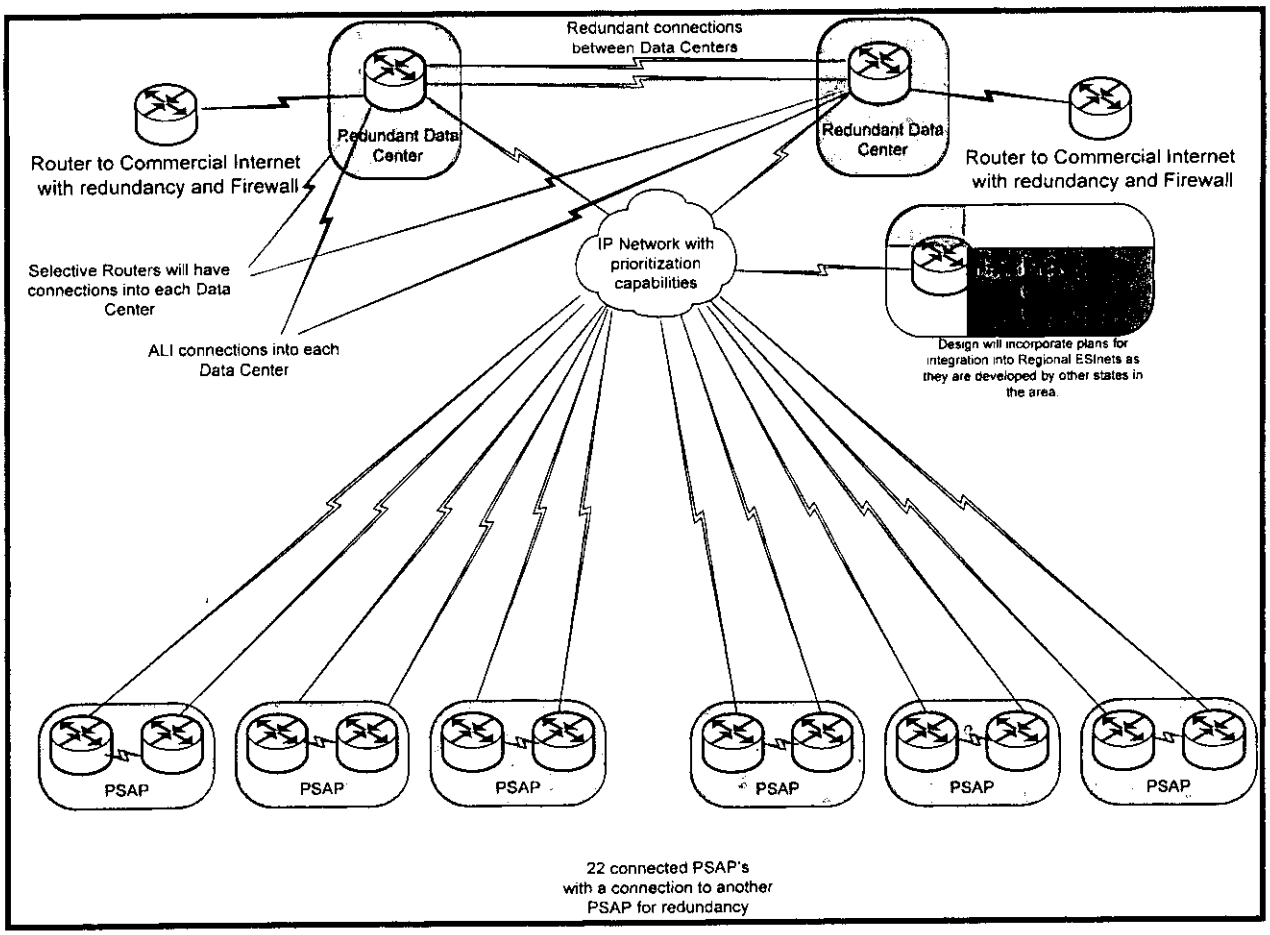


This design uses two geographically diverse datacenters to provide the NG9-1-1 services such as:

- Border control function
- Emergency services routing function
- Location validation function
- Legacy gateway

These datacenters provide the functions traditionally performed by the controllers at each PSAP, as well as more advanced functions of NG9-1-1. This can reduce the equipment needed at the PSAP. This may also reduce the number of 9-1-1 trunks needed by combining them at a central location.

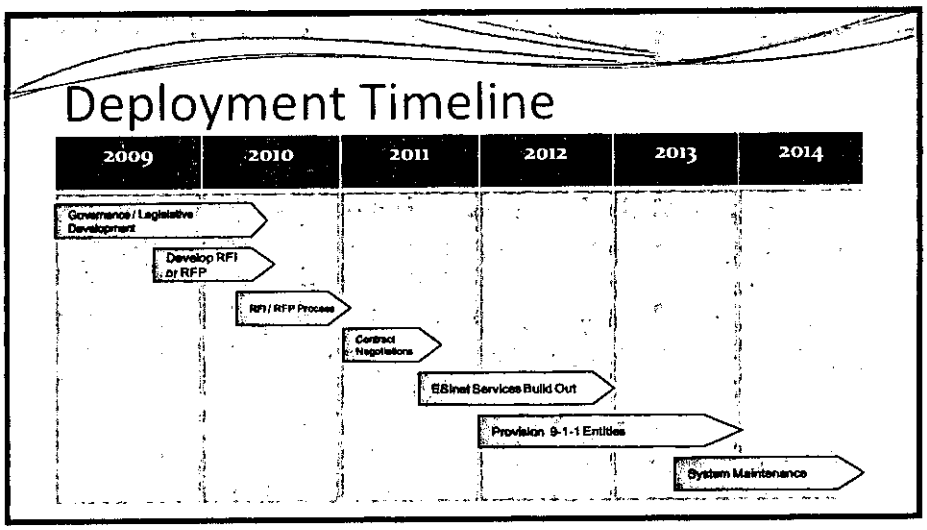
The system design covers the needed connectivity to the PSAPs, data centers, and call origination systems. Each location has two connections for reliability. In the case of the PSAPs they use a connection to the core, and a second connection to a neighboring PSAP. This design describes the major components of an IP Transport such as:

- Bandwidth
- Network management
- Service levels

1.5 PLANNING RECOMMENDATIONS

This plan looked at a six-year deployment effort. Many of these steps have some overlap, but, in general, the first two years would be used to develop the internal structure and defining the functionality needed to properly provide service to the residents and visitors to the state of North Dakota. NENA has indicated that they expect the first fully functional NG9-1-1 system is deployed in the fourth quarter of 2009. NENA and other organizations are working to complete the needed standards to reach that goal. Using this time to develop the systems needed, positions North Dakota will need to make use of these standards when completed.

The next three years would be for deployment of the final solution, and one year of annual maintenance for reference. This time frame is not firm, but gives a good overview of the process that should be followed to deploy these systems.



The costs associated with the deployment of the conceptual design are:

- One-time costs
- Recurring costs
- Professional services

These costs are budgetary and based on the full NG9-1-1 conceptual design. The actual costs may be reduced through developing more detailed functional requirements and competitive procurement processes.

The funding of the NG9-1-1 may be able to be reduced through the use of the federal 9-1-1 grant funding that is scheduled to be released in 2009. North Dakota is listed to get at least $500,000 in 50 percent matching funds from the National 9-1-1 Coordination Office. This match can be monetary or in-kind services. The final rules are yet to be published, but the Notice of Proposed Rule Making (NPRM) was published on October 3, 2008.[1]

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[1] Federal Register, Proposed Rules, October 3, 2008, Volume 73, Number 193, pp. 57567-57580.

2. INTRODUCTION

NG9-1-1 is a term frequently used today. This term is not a fully established set of standards, but is a conceptual vision of the future. Often this term is used to define a vision of where 9-1-1 is going, or at least moving towards, according to various groups. To better understand this subject, Kimball reviews some of the issues and groups with a stake in this vision.

The computer industry developed a method to send voice from computers to other computers using a technology called Voice over Internet Protocol (VoIP). The term "internet" in this title does not mean it has to use the internet as we know it. IP is really a group of protocols used by computers. These protocols are a standard that can be used to integrate various types of equipment.

This technology is not restricted to the internet, but reflects the use of a protocol suite developed for the internet. As this technology became more mature and more widespread, various groups looked at what this meant for 9-1-1 and public safety. For the purpose of this discussion, Kimball only looks at these new technologies for delivery of 9-1-1 calls to the PSAP within the 9-1-1 infrastructure, not callers using VoIP for their telephone service. Callers using VoIP on private phone systems and through phone service provided by internet service providers are being sent to the existing 9-1-1 infrastructure today.

NENA started several working groups that developed a future path plan for 9-1-1 PSAPs and networks. This plan looked at the various sources of information that can be used and how it can be utilized in the PSAP. The objectives of the future path plan are:

- *Any 9-1-1 call originator, voice or text, must be able to access the nation's 9-1-1 systems and have their call delivered to the appropriate answering point, with caller location identification.*
- *The answering point must receive and be able to manage the data, and be able to transfer the 9-1-1 call to a variety of emergency service points, and those entities must have access to the call information for call and incident handling.*
- *In present and future applications of all technologies used for 9-1-1 call and data delivery, maintain the same level or improve on the reliability and service characteristics inherent in past 9-1-1 systems design.*

NENA has developed a set of standards for interim steps to deliver VoIP calls to the PSAP, and have other standards in development for completing NG9-1-1.

The current technology used by the 9-1-1 system is outdated and was technologically behind during the last major new technology change (wireless 9-1-1). In Dale Hatfield's report to the FCC in 2002 titled "A Report on Technical and Operational Issues Impacting the Provision of Wireless Enhanced 9-1-1 Services," he stated:

> *". . . one over-arching issue that immediately emerged in my inquiry is that the existing wire line E9-1-1 infrastructure, while generally reliable, is seriously antiquated. Indeed, it turns out that the existing wire line E9-1-1 infrastructure is built upon not only an outdated technology, but also one that was originally designed for an entirely different purpose. It is an analog*

technology in an overwhelmingly digital world. Yet it is a critical building block in the implementation of wireless E9-1-1."

Other organizations that are involved in the development of standards for this NG9-1-1 system include:

- Network Reliability and Interoperability Council (NRIC), an advisory group to the FCC.
- The Emergency Services Interconnection Forum (ESIF) - a group formed by the Alliance for Telecommunications Industry Solutions (ATIS) and NENA.
- Internet Engineering Task Force (IETF).

It is important to note that the concept of a NG9-1-1 network is supported at the federal level. In fact, the IP-enabled network was the second initiative involving 9-1-1 in which the USDOT has taken an interest.

The US DOT has begun an initiative to examine NG9-1-1. One of the goals of the initiative is to "encourage an open architecture, interoperable inter-network of all emergency organizations." There are many different ways 9-1-1 calls are delivered throughout the United States. Each telephone company called a Local Exchange Carrier (LEC) has one or more ALI formats. There are varying types of circuits, varying speeds, varying costs, and varying types of equipment used to handle calls. The switches used in networks come in various versions; some with limited capability, some with massive capability, some are analog, some are digital. One of the initiative's goals is to encourage standards so there is parity of service. Vendors of proprietary equipment and software are encouraged to develop open architecture systems that can be used nationwide and in conjunction with other vendors' equipment or software. The US DOT has stated:

"The 9-1-1 system is, and will remain, primarily a local government and communications industry responsibility. But this local focus has resulted, in the past, in fragmenting the 9-1-1 system capabilities and limiting the ability to develop and invest in new technologies. The intent of US DOT is to promote the vision for the next generation 9-1-1 system and provide leadership and resources to work with the public and private 9-1-1 stakeholders to lay out the path to achieve a vision of a nationally interoperable emergency services internet work."[2]

The first sentence makes it known that "The 9-1-1 system is, and remains, primarily a local government and communications industry responsibility." US DOT is engaged in establishing a vision and assisting in creating a foundation with open architecture standards for which all IP-enabled systems at a local level can be designed.

Using these visions, in conjunction with the goals of the state of North Dakota for a NG9-1-1 system, allows a plan to be developed to maximize the value and minimize costs. The time required to develop and build these large-scale networks allows the state of North Dakota to begin to prepare for the future using the available technology today.

[2] US DOT Preliminary Concept of Operations document for the NG9-1-1 Initiative.

An ESInet is an advanced network in which the delivery of 9-1-1 calls are routed directly to the appropriate PSAP via a managed, uniform, dedicated, statewide digital network utilizing standardized components and IP technology.

An ESInet supports the direction in which the public safety industry is heading and provides a solid technical foundation for PSAPs of the future. Most public safety industry leaders, both on the PSAP and vendor sides, agree that 9-1-1 is moving toward IP-enabled networks similar in concept to the LANs found in most offices today. It is generally accepted by most in the industry that the amount of data sent to PSAPs today is considerably less than the amount that is sent to PSAPs in the future. While it is difficult to predict the future, services such as telematics, (Automatic Crash Notification (ACN)), Geographic Information Systems (GIS) data, and several types of data offer good examples of the increased data flow that is likely and could be easily supported by an appropriately sized NG9-1-1 system solution.

While this is future technology, it is not far off in the future. NENA has announced that they expect the first NG9-1-1 system will be operational by the fourth quarter of 2009. There are several projects in place today that are using these same technologies to deliver 9-1-1 calls using IP transport, and several vendors have products available today that claim to provide most of the functionality of NG9-1-1.

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3. METHODOLOGY

To prepare this report, Kimball gathered information about the current 9-1-1 system in the state of North Dakota. Kimball then developed a preliminary design and recommendations using the data gathered and current national recommendations for NG9-1-1 established by industry leaders along with Kimball's expertise in the field. Kimball used recognized best practices in the telecommunications field, as well as documents and statements from national organizations such as NENA, APCO and US DOT to develop recommendations for the state regarding this NG9-1-1 system. Information obtained during data collection came from a variety of sources and it occasionally conflicted. This required us to make judgment calls based on our experience and knowledge. Kimball reviewed and verified data when possible.

3.1 FINDINGS - CURRENT SYSTEM

The NDACo, as a part of their ongoing wireless 9-1-1 program, provided the primary source of data on the PSAPs and 9-1-1 system in the state.

Kimball used following methods to gather data:

- Face-to-face meetings
- Telephone interviews
- E-mail exchanges
- Document review
- Research on the internet

3.2 PRELIMINARY DESIGN AND RECOMMENDATIONS

Kimball used recognized best practices in the telecommunications field, as well as standards, documents, and statements from national organizations such as NENA, APCO, NRIC and US DOT to develop recommendations for the state regarding this IP-enabled network plan. Potential issues that could become roadblocks to implementation and some requirements are identified in this document, to the extent possible.

This basic information was combined with the experience and knowledge of the Kimball staff from several other similar projects and work with the standards developing organizations. This experience and knowledge allows Kimball to understand the trends in the industry and apply those trends for the benefit of the state of North Dakota.

Costs were based on current values no calculation of inflation was included. These costs also did not include staffing costs for additional training or staff.

4. FINDINGS - CURRENT SYSTEM

The first task was to complete an assessment of the current infrastructure. This assessment assisted in the development of the conceptual design and planning recommendations.

4.1 PSAP

There are 23 PSAPs that serve North Dakota, 22 PSAPs in North Dakota, and one in South Dakota. A mixture of PSAP CPE equipment is installed and in service. The age of the equipment ranges from the oldest being installed in 1997 to the most recent being installed in 2008. Most PSAP CPE configurations are standalone with only two being remotes functioning as secondary PSAPs. There are five PSAP CPE equipment manufacturers represented in North Dakota, with Zetron having eight sites, Positron six sites, and PlantCML five PSAP sites each, rounding out the top three (see Table A.)

Table A

	PSAP Locations	PSAP Controller		Install Date	Serve as Secondary PSAP
		Brands	Host or Remote		
1	Devils Lake	Zetron		2005	
2	Dickinson	Zetron		1999	
3	Jamestown	Zetron		1999	
4	Hillsboro	Zetron		2002	
5	Washburn	Zetron		2005	
6	Cavalier	Zetron		2002	
7	Stanley	Zetron		2002	
8	State Radio Bismarck	Zetron		2005	
9	Fargo	Positron		2003	
10	Mandan	Positron		2004	
11	Grand Forks	Positron		2004	
12	Williams	Positron		2002	
13	Grafton	Positron		1996	
14	Valley City	Positron		2003	
15	Bottineau	PlantCML	Remote	2005	yes
16	Langdon	PlantCML	Host	2008	
17	Rugby	PlantCML	Remote		yes
18	Bismarck	PlantCML		2003	
19	Wahpeton	PlantCML		1997	
20	Minot	PlantCML		2008	
21	Stanton	Proctor		1997	
22	Watford City	Proctor		1999	
23	Mobridge, SD	Plant/CML		2008	

Most of the PSAP CPE is reported by the vendors to be upgradable to make it IP capable. With most equipment being over two years old, it all requires some type of upgrade to IP. The costs associated with upgrading and the age of the equipment should be evaluated in relationship to the final NG9-1-1 solution of the state to assure that the right financial and technological decision is being made on a case-by-case basis. One type of system that was manufactured by Proctor and is installed at two PSAPs is manufacture-discontinued and should be considered for replacement. Table A shows the manufacture and the date of install. Normally, the workstations for any PC-type workstation system should be considered for replacement at around five years of service. This should also be a consideration when deciding on upgrading versus replacement.

IP-enabled CPE allows for direct connection to an IP network but might not make the PSAP completely NG9-1-1 capable. Many of the NG9-1-1 features and requirements are still being developed and tested and manufacturers have not designed some of these into their systems at this time. Evaluation of each manufacturer's upgrades to make them IP enabled must be completed to determine if the upgrade accomplishes the goal of being NG9-1-1 capable. In some cases, replacement of the system might be the most economical solution.

4.2 INFRASTRUCTURE

Two Qwest-owned selective routers, one in Fargo (5E) and the other in Bismarck (DMS-100), serve the majority of the PSAPs. The Qwest selective routers deliver most wire line and all wireless calls. There are several PSAPs that are served by direct trunks from the wire line central offices and do not have the benefits of selective routing. All of the PSAP trunk lines are Centralized Automatic Message Accounting (CAMA)-type trunks delivering analog voice and Automatic Number Identification (ANI). Some PSAPs receive both wire line and wireless calls on the same trunks while others have separate trunks for each. Qwest has installed router-to-router trunks between their selective routers, enabling PSAPs to transfer fully-enhanced 9-1-1 calls across the network where necessary. NDACo has indicated that all end office trunks that terminate on Qwest's selective routers use Signaling System 7 (SS7) signaling and the end offices that are direct trunked to an on-site ANI/ALI controller use CAMA type trunks (See Table B.)

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Table B

PSAP Location	Wireless Tandem	Wireless Database	Landline Tandem	Landline Database	Local Telephone (PSAP)	9-1-1 Trunks	ALI LINKS
Fargo	Fargo-Qwest	Qwest/ Intrado	Fargo-Qwest	Qwest/ Intrado	Qwest	Three Land Two Wrls	Two Intrado
Bismarck	Bismarck-Qwest	Qwest/ Intrado	Bismarck-Qwest	Qwest/ Intrado	Qwest	Five Combined	Two Intrado
Grand Forks	Fargo-Qwest	Qwest/ Intrado	Fargo-Qwest	Qwest/ Intrado	Qwest	Three Combined	Two Intrado
Bismarck State Radio SE	Fargo-Qwest	Qwest/ Intrado	Fargo-Qwest	Qwest/ Intrado-Local SALI	Qwest	Three Land Two Wrls	Two Intrado
Bismarck State Radio SW	Bismarck-Qwest	Qwest/ Intrado	Bismarck-Qwest	Qwest/ Intrado-Local SALI	Qwest	Three Land Two Wrls	Two Intrado
Minot	Bismarck-Qwest	Qwest/ Intrado	Local Trunks	Local-SALI	Souris River Telephone	Two Wireless	Two Intrado
Bottinueau	Bismarck-Qwest	Qwest/ Intrado	Bismarck-Qwest	Qwest/ Intrado-Local SALI	Turtle Mountain Comm.	Two Combined	
Langdon	Fargo-Qwest	Qwest/ Intrado	Local Trunks	Local-SALI	United Telephone	Two Wireless	Two Intrado
Rugby	Fargo-Qwest	Qwest/ Intrado	Local Trunks	Local-SALI	North Dakota Tele. Co.	Through Langdon	
Devils Lake	Fargo-Qwest	Qwest/ Intrado	Local Trunks	Local-SALI	North Dakota Tele. Co.	Two Wireless	Two Intrado
Dickinson	Bismarck-Qwest	Qwest/ Intrado	Bismarck-Qwest	Qwest/ Intrado	Qwest	Three Combined	Two Intrado
Mandan	Bismarck-Qwest	Qwest/ Intrado	Bismarck-Qwest	Qwest/ Intrado	Qwest	Three Combined	Two Intrado

Jamestown	Fargo-Qwest	Qwest/ Intrado	Fargo-Qwest	Qwest/ Intrado	Qwest	Three Combined	Two Intrado
Williston	Bismarck-Qwest	Qwest/ Intrado	Bismarck-Qwest	Qwest/ Intrado	Nemont Telephone	Three Combined	Two Intrado
Wahpeton	Fargo-Qwest	Qwest/ Intrado	Abercrombi	Local-SALI (IES)	Red River Rural Telephone	Two Land Two Wrls	Two IES/Intrad
Grafton	Fargo-Qwest	Qwest/ Intrado	Fargo-Qwest	Qwest/ Intrado	Qwest	Three Combined	Two Intrado
Valley City	Fargo-Qwest	Qwest/ Intrado	Fargo-Qwest	Qwest/ Intrado	Qwest	Two Combined	Two Intrado
Stanton	Bismarck-Qwest	Qwest/ Intrado	Bismarck-Qwest	Local-SALI	West River Telephone	Two Combined	Two Intrado
Hillsboro	Fargo-Qwest	Qwest/ Intrado	Fargo-Qwest	Local-SALI	Qwest	Two Combined	Two Intrado
Washburn	Bismarck-Qwest	Qwest/ Intrado	Bismarck-Qwest	Local-SALI	West River Telephone	Two Combined	Two Intrado
Cavalier	Fargo-Qwest	Qwest/ Intrado	Fargo-Qwest	Qwest/ Intrado	Polar Communicati ons	Two Combined	Two Intrado
Stanley	Bismarck-Qwest	Qwest/ Intrado	Local Trunks	Qwest/ Intrado	Midstate Tele. Co.	Two Wireless	Two Intrado
Watford City	Bismarck-Qwest	Qwest/Intra do	Bismarck-Qwest	Qwest/ Intrado	Reservation Tele Coop	Two Combined	Two Intrado
Mobridge, SD	Sioux Falls - Qwest	Qwest/Intra do	Sioux Falls - Qwest	Qwest/ Intrado	West River Telephone	Three Combined	Two Intrado

4.3 DATA SERVICES

Qwest/Intrado provides the centralized wireless and VoIP ALI database for all of the PSAPs, and the wire line ALI database for many of the PSAPs. Some of the PSAPs have standalone on-site databases. These standalone databases are updated by the local jurisdictions utilizing telephone company data provided by the participating telephone companies. Selective routers are updated utilizing data from the Intrado ALI database.

Today, CAMA trunks serve all PSAPs whether it is from a selective router or an end office. These CAMA-type trunks do not support the more enhanced features of NG9-1-1. In a migration plan, with being NG9-1-1 capable as the end result, CAMA can be considered and could be utilized during the transition. CAMA can be supported on an IP network, utilizing gateways at each end to convert between IP and analog CAMA. These are called legacy gateways.

As stated above, the end office trunks that terminate on Qwest's selective routers are currently SS7 signaling. Today, SS7 is the most efficient and fastest method for delivering E9-1-1 traffic to a traditional TDM-type selective router and is supported by most, if not all, end offices, whether it is a landline, wireless or VoIP carrier. Having all SS7 trunks from the end offices to the selective routers is today's best choice that most carriers can support.

In the event of a delay of the deployment of NG9-1-1, those PSAPs that are supported by direct end office trunks with no connection to a selective router utilizing CAMA trunks should consider connecting to one of the legacy selective routers. These PSAPs also have stand alone ALI systems which means they only have access to ALI records that reside solely in their jurisdictions. As seen in Table B, there are 11 PSAPs that have standalone ALI systems. A standalone ALI system normally has a major limitation - only the PSAP that houses the system can view the ALI information. The ALI information cannot be shared with another PSAP in the event of a transferred 9-1-1 call or a misrouted call to another PSAP.

Without a connection to a selective router and a shared ALI database, these PSAPs lack the ability to transfer wire line enhanced 9-1-1 calls to a neighboring PSAP. All wireless calls are routed through a selective router for the PSAPs and data can be transferred to another PSAP. This arrangement allows for ALI data to also be shared between any PSAPs for calls that are routed to them through one of the Qwest selective routers or transferred to another PSAP that is served by one of the Qwest selective routers. Another major deficiency in direct trunking is the inability to automatically reroute 9-1-1 calls to a designated alternate PSAP in the event of a network or PSAP outage.

A critical data source in the NG9-1-1 environment is GIS. These databases hold the key for the advanced routing of the calls to the correct PSAPs and response agencies. Currently each PSAP develops their own map data. There is a project to develop a statewide map and GIS database. As that project is developed, NG9-1-1 needs should be included in the final project plans and the types of data that are developed and stored in this statewide GIS.

NDACo provided Kimball manufacturer data on current mapping and CAD systems that are deployed across North Dakota. All PSAPs that answer Phase II wireless calls have a mapping system in place while only seven have a CAD system (see Table C.)

Table C

PSAP Location	Mapping	CAD
Bismarck	GeoTechGrp	Sunguard HTE
Bottineau	Seatol	
Cavalier	Bullberry	
Devils Lake	Seatol	
Dickinson	Bullberry	Archonix
Fargo	Positron	Bidding on New
Grafton	Bullberry	
Grand Forks	AccuGlobe	CISCO
Hillsboro	Seatol	
Jamestown	Bullberry	CIS
Langdon	Seatol	
Mandan	Bullberry	Archonix
Minot	Bullberry	New World
Rugby	Seatol	
Stanley	Bullberry	
Stanton	Seatol	
State Radio Bismarck	Bullberry	
Valley City	Bullberry	
Wahpeton	Bullberry	CIS
Washburn	Seatol	
Watford City	Mapjoin	
Williams	Power Map	
Mobridge, SD	Bullberry	Custom Micro/Justice

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5. PRELIMINARY DESIGN

NENA defines an ESInet as "an IP-based inter-network (network of networks) shared by all agencies which may be involved in any emergency." Interconnection to hierarchical ESInets that exist in other states requires interconnection to the ESInet being planned for North Dakota. The ability to share public safety information between states is in the public's best interest. Some PSAPs receive calls from neighboring communities across state lines. It is essential to have the ability to transfer calls to the correct responding agency.

Transfer of voice information using the Session Initiation Protocol (SIP) has already been defined as a standard for voice communications between ESInets. Data standards for location information associated with the call have also been defined.

The goals and objectives of the North Dakota ESInet are to provide a faster and more efficient transport system for the exchange of data and delivery of 9-1-1 call information between all state 9-1-1 entities. The network infrastructure should be redundant and provide interoperability via NG9-1-1 applications while supporting legacy features for all PSAPs in the state.

Upgrading to a NG9-1-1 network eliminates several problems that exist in today's environment. Currently some of North Dakota's PSAPs are provisioned with direct trunks and are not serviced through a selective router. All ALI information is provided either by a standalone system or through a carrier, depending on location of PSAP and the call type. While the calls may be transferred between PSAPs, the associated emergency call information may be lost in the transfer. The fully implemented NG9-1-1 system allows all emergency calls to be transferred between PSAPs with the associated emergency call data and define the call type.

The conceptual design is based on several basic strategies. The network should be implemented using a phased-in approach. The network infrastructure should be installed first and thoroughly tested. The NG9-1-1 applications should then be transitioned in gradually. Network-to-network integration needs to be included in the transition plan since some 9-1-1 entities in other states are also planning their own regional ESInet. The ESInet architecture allows access to and transport of data throughout the state. Integration of current shared databases such as mapping data can be designed into the architecture to expedite data exchanges. Detailed descriptions of an IP-enabled network and interfaces are described in the NENA document 08-002, NENA Functional and Interface Standards for Next Generation 9-1-1 Version 1.0 (i3) and the U.S. Department of Transportation Next Generation 9-1-1 System Initiative.

The communications network transport speeds are determined by the vendor and sized appropriately to handle all proposed applications and a 100 percent growth factor. As described in NENA 08-002, packet prioritization must be available in the network. This prioritization is used to make sure that the voice is delivered to the end location quickly. Several IP-transport methodologies could be incorporated to meet the specifications. Multi-protocol Label Switching (MPLS) is one of these technologies. There are, however, several other technologies available in the state that meets the specifications for an ESInet.

Several service levels must be met for a public safety ESInet. Scheduled down time for maintenance is not acceptable and may not be considered in a public safety network. The infrastructure must also be robust and provide redundancy. A single point of failure shall not cause a network outage. A conceptual

network design is attached as Appendix B of this document. The network provider should comply with and be familiar with applicable NG9-1-1 recommended technical standards and documents from the organizations listed, and track new standards that are under development.

- National Emergency Number Association (NENA)
- US Department of Transportation NG9-1-1 Initiative
- Network Reliability and Interoperability Council (NRIC)
- Internet Engineering Task Force (IETF)
- Emergency Services Interconnection Forum (ESIF)

The NG9-1-1 system for North Dakota should include:

- IP transport
- NG9-1-1 services
- Call termination functions

5.1 IP TRANSPORT

The IP transport provides the method that carries the calls from the call origination to the PSAP. This is similar to the CAMA trunks that are in use today, but IP allows for more diverse types of data and diversity in routing of that data that CAMA trunks do not provide. The key elements of IP transport are:

- Bandwidth
- Network management
- Service levels

5.1.1 Bandwidth

Bandwidth is dependent on many things in the NG9-1-1 network. The numbers of PSAPs, busy hour calls, types and number of data sources, etc., all have an impact. The procurement process should develop this more specifically. For this project, it was assumed that the bandwidth would be DS-1 (1.54 Mbps) to each PSAP and 100 Mbps at the core of the network.

5.1.2 Network Management

North Dakota requires a fully-managed architecture to meet public safety best practices. Recommended service levels are outlined in this document. North Dakota relies on this network for public safety, consequently, network outages and poor network performance directly affects the ability of first responders to react to an emergency situation. The monitoring of the network and associated reporting must encompass these areas:

- **Performance Management** - Performance management measures the variables that affect network performance. The state of North Dakota requires a reactive performance monitoring system with user-defined thresholds that meet the service levels defined. Network performance reports describing corrective action when thresholds are not met should be required on a monthly basis.
- **Configuration Management** - Configuration management monitors the ESInet system configuration. Changes in configuration can cause network outage situations and poor network performance. The configuration management process should store copies of the various hardware and software configurations in place and track network-affecting changes.
- **Configuration Restoration** - If changes adversely impact public safety grade standards, then the provider must initiate immediate corrective action and restore the previous working configurations.
- **Fault Management** - Fault management detects, logs, and notifies the state of North Dakota of ESInet problems. If the failure immediately corrects itself, notification is not required, but the event should be logged and reported.
- **Root Cause Analysis (RCA)** - For major outages, the network provider should provide the state of North Dakota with a RCA within five business days; and for minor outages provides an RCA upon request.
- **Security Management** - Security management must control access to network resources according to public safety network security guidelines to prevent sabotage (intentionally or unintentionally) and compromise sensitive information. Security management must use public safety network security standards to monitor users logging into the network resources and refuse access to those who enter inappropriate access codes. The ESInet should support standard security policies that may include the use of anti-virus software, Virtual Local Area Networks (VLANs), Virtual Private Networks (VPNs), and secure sockets layer protocols.
- **Physical Security** - Network hardware and software must reside in a secure area that complies with industry standard physical security policies. The network provider must grant to the state of North Dakota or their authorized representatives 24/7 escorted physical access to the secure area.
- **Internet Firewall Management** - Firewalls supporting internet remote access to the state of North Dakota ESInet must provide protection from hostile intrusion. The firewall design should incorporate the following features:
  - Stateful intrusion detection
  - VPN support for remote users
  - Network Address Translation (NAT) routing for integration into the inside network
  - DES, 3DES, or 256-bit AES encryption
  - Logging, analysis, and reporting firewall activity
  - Real-time notification of serious attacks and intrusions
  - DMZ support
  - SPI to stop Denial of Service (DoS) attacks

- **Hardware Maintenance** - Hardware components used in the network require 24/7 hardware maintenance. Available spares should be identified for each location and component.
- **Preventative Maintenance** - The provider should include preventative maintenance activities that are included as part of a maintenance contract. This should address how preventative maintenance is handled, as well as the frequency of preventative maintenance activities. The provider should use support logs to drive the development of solutions to recurring issues and follow industry best practices.
- **Scheduled Maintenance** - Scheduled maintenance, including upgrades to the system, must be coordinated in advance with the state of North Dakota and conducted in a manner that does not interrupt operations at more than two remote or one-core location locations simultaneously. The network provider should make all attempts to assure that a remote location and its designated back up are not affected at the same time.

5.1.3 Service Levels

The state of North Dakota must have the flexibility to respond to new communication technologies and to maintain different Quality of Service (QoS) schemes to accommodate all current and future forms of emergency requests. The future forms may include, but are not limited to, the following:

- Short Message Service (SMS) messaging
- Instant messaging (IM)
- Text messaging
- Satellite personal locator beacons
- Future development in TTY/TDD type devices
- Video and image
- Automatic crash notification

While it is not possible to design a system that anticipates every possibility, North Dakota requires a system architecture that is modular and based on open standards. To accomplish this, service levels should be defined with the vendor that provides the IP transport network.

This section identifies the service level criteria that North Dakota should have. These service criteria are not typical of the general telecommunications industry but they are required for public safety communications.

The network provider should provide various monthly network management reports for Fault Management, Performance Management, Configuration Management, and Security Management. The Service Level Agreements (SLA) should address the following:

- **Core Backbone Availability** – The core backbone network infrastructure of the North Dakota ESInet shall have a minimum monthly network availability factor of 99.999 percent based on a 30-day month. The network availability factor must be calculated for the entire core backbone network infrastructure and not on a per-circuit basis.

- **Remote Location to Core Backbone Availability** - That part of the network infrastructure consisting of Wide Area Network (WAN) circuit connections and the edge devices managed by the network provider as part of the availability requirement shall have a minimum monthly network availability factor of 99.999 percent based on a 30-day month.
- **Future Connectivity** - The network provider should include in the network design, the capability to support future redundant and diverse connections from the remote locations to the host locations. Design should accommodate connectivity to support T1, microwave, Synchronous Optical Network (SONET), point-to-multipoint, or other diverse infrastructure solutions deemed necessary by the state of North Dakota.
- **Average Jitter Measurement** - Jitter is a measurement of the delay variations in the transport of the packets in a network. A reading should be taken every five minutes, 12 samples per hour. The samples, minus any five-minute samples where the average bandwidth utilization is >= 80 percent or minus any samples that where otherwise unavailable, is then averaged together for the daily measurement.
  - Edge Device to Network Access Point (NAP)-average jitter is =< 15 ms
  - Average Jitter Measurement, NAP–to-NAP-average jitter is =< 2 ms
- **Average Hourly Packet Loss** - A reading should be taken every five minutes, 12 samples per hour. The samples, minus any five-minute samples where the average bandwidth utilization is > = 80 percent or minus any samples that where otherwise unavailable, is then averaged together for the daily measurement.
  - NAP to NAP average hourly packet loss is =< .5 percent
  - Hourly average round-trip response time delay, edge device to the first hop in the core should be =< 20 ms
  - Average hourly round trip latency, remote location to host location is =< 125 ms
  - Average hourly round trip latency, NAP to NAP is =< 10 ms
- **Hourly Average Bandwidth Utilization** - The average hourly inbound bandwidth utilization and the hourly average outbound bandwidth utilization: =< 80 percent average bandwidth utilization per 24-hour day per calendar month. In the event this 80 percent hourly average bandwidth utilization factor is exceeded for a given location, the network provider must determine and recommend corrective action.
- **Critical Problem Identification and Resolution** – Identification of a critical problem shall result in an immediate action such as maintenance ticket opened, work log entry within ten minutes, subsequent entries into work log within 30 minutes, first critical notification to the state of North Dakota within 30 minutes, and subsequent critical notifications every hour until the problem is fixed. Critical problems should be resolved in two hours or less.
- **Minor Problem Identification and Resolution** – Identification of a minor problem should result in an immediate action such as maintenance ticket opened, work log generated within 30 minutes and subsequent entries logged within four hours. Minor problems should be fixed within 12 hours or less.
- **Installing and Testing New or Upgraded ESInet Connectivity** – All equipment should be maintained and replaced as needed. Installing, testing, and configuring new or upgraded host or remote location's core network connection should take place in 30 calendar days or less, with the

exception of a remote location's unavailability. Prior notice to the state of North Dakota should be made for all new equipment and upgrades.

- **Configuration Management Services–Major** - Any configuration management issue that isolates a critical network component, a host, or a remote location is considered to be "major" and requires immediate corrective action and notification to the state of North Dakota. The network provider gives the state of North Dakota a final RCA within five business days.
- **Configuration Management Services–Minor** - The network provider must respond to "minor" issues within two hours or less. The network provider must place a courtesy call to the state of North Dakota on-call personnel and provide periodic status reports until the configuration issue is resolved. The network provider must provide the state of North Dakota a final root cause analysis (RCA) upon request.
- **Configuration Management Services–Proactive** - The network provider must notify the state of North Dakota three business days in advance of changes in remote access configuration services that affect the ESInet.

Adherence to industry accepted guidelines and best practices provides many advantages including protection from obsolescence, improved supportability, reduced costs, and improved interoperability.

Several nationwide carriers, the Dakota Carrier Network and North Dakota StageNet, are possible vendors to use for the IP transport of the ESInet. Public safety networks require strict adherence to service level guarantees and the coordination between vendors far exceeds that required in other communication networks. A vendor should not clear a trouble ticket simply because they have verified it is not on their equipment. All vendors must cooperate until a full resolution is accomplished. Testing between vendors also must be coordinated.

Service levels for network performance must be established and management parameters of the network must be defined. Management must encompass security, configuration, fault and performance.

The selection of an ESInet backbone carrier does not only include adherence to service levels, but also adherence to public safety policies and practices.

5.2 NG9-1-1 SERVICES

The network is a transport mechanism for the NG9-1-1 system. The NG9-1-1 services provide the functionality for the system. These services are subject to change as new services are developed and added to the ESInet. The minimum functional elements that should apply in the North Dakota ESInet include:

- Border control
- Emergency call routing function
- Location validation function
- Legacy gateway

These elements and functions only address the minimum requirements in a broad-based manner for an ESInet. The solution must support commonly used IP-based telecommunications, messaging, image, and video protocols in order to maintain interoperability with IP applications. Other services may be needed for new technologies as they are deployed on the ESInet.

5.2.1 Border Control Function

The border control function provides several services. These services include but are not limited to:

- Interconnection to other systems (informational and operational)
- Security

Border control functions interconnecting with other ESInet requires equipment and standards be implemented. Security of an independent ESInet needs to be maintained while interoperability for information transfer is available. Interfaces should be scalable to accommodate interconnections with other ESInet's across state lines or across the country. Security policies should be established initially, and interconnecting agencies have to adhere to these polices which should be based on NENA standards, local regulations, and industry best practices.

Security between the ESInets is required with firewalls and a public key infrastructure to maintain identities of entities allowed access to information. Internally, in each ESInet encryption design, technologies may be implemented between interconnected agencies to keep data secure. When attaching to external ESInets and other agencies, an authorization matrix must be developed to maintain data confidentiality. Interconnection between state agencies has a different set of security criteria than agencies outside the state boundaries. A different logical interface is recommended. Global policies on the equipment vary between in-state agencies and out-of-state agencies. Both configurations could also supply redundancy from a logical and physical perspective.

North Dakota's ESInet design is based on the interconnection of all PSAPs in the state. Since ESInets are IP-based, such interconnections allow any agency to communicate with any other agency or service on any of the interconnected ESInets. The IP-enabled PSAP is a PSAP that is capable of receiving IP-based signaling and media for delivery of emergency calls and for originating calls.

5.2.2 Emergency Call Routing Function

The Emergency Call Routing Function (ECRF) is one of the major functions that make NG9-1-1 different from the current systems. The ECRF is an advanced system for routing calls for service to the best location to handle the call. This also involves several other systems outside of the ECRF for data.

An Emergency Service Routing Proxy (ESRP) performs call routing. There may be several of these within the network to properly deliver calls to the proper location and for redundancy. The ESRP makes use of the location information stored in the Location to Service Translation (LoST) database to determine the route to the proper PSAPs.

This also involves a new function called policy-based routing function. This uses policies of the destination PSAP, and the ESInet owner to route calls. This routing can be based on the PSAP state (in-

service, busy, etc.), congestion state, time of day, or most other new data information that is provided with the call for service. This function can also use supportive information such as crash information to make routing decisions.

5.2.3 Location Validation Function

The Location Validation Function replaces several systems in use today such as the master street address guide. This is basically a geographic information system with various sets of data related to the provision of 9-1-1 service in the area. This information can be used to route calls by the ESRP or to verify data to the service providers. The function must be able to look up information based on geographic or civic information provided directly by the call origination network.

The major component of this function is the LoST database. The LoST database stores location information in a GIS format and is used to translate a location, both geographic and civic, to the proper response agency and PSAP.

5.2.4 Legacy Gateway

The Legacy Gateway is not a part of the NG9-1-1 system, but is included in the architecture of the NG9-1-1 system with the realization that the legacy systems will remain in place for some time to come. The legacy gateway is used to take a legacy system such as the traditional phone system and convert it to a format that can be used by the NG9-1-1 system. Over time, fewer of the traditional systems remain and the need for this diminishes.

The legacy gateway may allow for the reduction of the number of 9-1-1 trunks and ALI links that are needed. Many PSAPs use two 9-1-1 trunks as a minimum. This is to provide for diversity. A true calculation of the needed trunking may be much less, but the PSAP still needs to have two trunks. By combining these trunks to a data center the number of trunks can be reduced, and still allow the PSAP to function.

5.3 CALL TERMINATION FUNCTION

The call termination function provides the equipment and functions that the 9-1-1 call taker uses to receive calls for service from the public. This equipment can be as simple as a workstation to as complex as an Automatic Call Distribution (ACD) system and local databases. The call termination functions can be hardware installed in the PSAP or a managed service model. This function replaces the traditional PSAP controller hardware. The traditional PSAP hardware was used to retrieve the location information about a call. The NG9-1-1 system sends the location with the call, eliminating the need to retrieve it at the PSAP.

Call termination can include:

- Remote location ACD incorporating transfer and call bridge capabilities
- Business rules database
- Call record database

- Supplemental data access
- Remote location workstations

5.4 DATA SERVICES

Centralized data services are key in creating an effective and efficient NG-9-1-1 system. Developing a centralized GIS mapping system on an NG9-1-1 network increases the quality and consistency of data at the PSAPs. Updates and maintenance can be done more efficiently and less costly. The increased capacity of the new network would allow quick and efficient transfer of mapping, CAD, and CPE call data.

Mapping, applications, and data traditionally reside at each PSAP to minimize network bandwidth requirements. Several technologies currently available allow centralized network based map data to be accessed without creating significant network bandwidth use. Mirrored copies could be stored locally at the PSAPs or applications can be designed to minimize network utilization. As North Dakota migrates to a NG-9-1-1 network, more of the applications may be network centric. Management and monitoring of bandwidth is essential in the design.

5.5 POTENTIAL SHARED INFRASTRUCTURE

Using shared infrastructure with common carriers and private networks is acceptable in a public safety network if criteria providing network security and bandwidth allocation as specified in the service levels are maintained.

Developing bandwidth segmentation including network addressing space and quality of service must be maintained. Several of the current network providers under contract with state of North Dakota already adhere to these practices.

Several state agencies have contracts in place that may be used to provide network services for the North Dakota ESInet. These in-place network contracts do not require a RFP and allow any state agency to purchase services. These contracts have pricing schedules and set service levels associated with them. Current contracts should be reviewed to determine if the service levels meet public safety network requirements. Shared backbone infrastructure must also have sufficient bandwidth and management in place to assure required service levels are met.

5.6 TRANSITION AND DEPLOYMENT ISSUES

Plans for statewide ESInet do not take away the autonomy of the local PSAPs. The flexibility of the IP network impacts operations for day-to-day events and extraordinary situations. The infrastructure design allows for local information control and access while storing the data and services in core locations. The flexibility of an IP network allows for the development of contingency plans for all major and minor events.

While the benefits are undeniable, there are challenges the state would have to address. Through work with other states, Kimball has a keen understanding of the issues that North Dakota is likely to encounter as it proceeds to implement a statewide IP-enabled network supporting NG9-1-1 applications.

Local exchange telephone carriers support the NG9-1-1 initiatives but may be reluctant to change their internal support systems because a business driver for such an initiative may not exist yet. Several of the databases currently residing with the carriers may require access from the ESInet to support NG9-1-1 applications. Standards to interconnect with these databases are established and are operational in other areas of the country. The carriers may require legislative influence to change their internal procedures and allow interconnection to these databases. They currently have no reason to change their procedures from a business perspective.

Standards are still evolving for NG9-1-1 applications. Guidelines are well established but, as with all technologies, standards are evolving. The NG9-1-1 applications service providers have to be committed to supporting the NG9-1-1 standards as they evolve.

Projects of this size and complexity require proper oversight to be successful. Kimball recommends development of a detailed transition plan to include:

- Implementation management
- Technical consulting
- Project management

In the event of a delay of the deployment of NG9-1-1, those PSAPs that are supported by direct end office trunks with no connection to a selective router, utilizing CAMA trunks, should consider connecting to one of the legacy selective routers. These PSAPs also have stand alone ALI systems which means they only have access to ALI records that reside solely in their jurisdictions. As seen in Table B, there are 11 PSAPs that have standalone ALI systems. A standalone ALI system can usually only send the ALI information to the PSAP that houses the system and cannot be shared with another PSAP in the event of a 9-1-1 call transferred to another PSAP.

We are confident that North Dakota public safety stakeholders, who understand the importance of moving forward, not only help PSAPs improve their ability to handle everyday emergencies, but also assure that information can be instantly shared across jurisdictions in the event of an extraordinary emergency.

After connecting to the statewide ESInet, agencies may need to make changes at the operational level:

- PSAP personnel require additional trainings to handle the new types of information that an IP-enabled network may deliver to them and the new applications that make this possible.
- PSAPs do not only improve their ability to handle everyday emergencies, but also assure that information can be instantly shared across jurisdictions in the event of an extraordinary emergency, whether it is a natural disaster or a man made one.
- Some 9-1-1 entities may have newer types of equipment that will require different skill sets than they have today. This may result in additional staff or retraining of existing staff.

5.7 COSTING

The vendor selected will determine the final costing. For budgetary costing, several assumptions were compiled from the survey data collected. There are 22 PSAPS in the state and 64 trunks for an average of 2.78 trunks per PSAP currently. Round up to three and add expansion of 100 percent uses six trunks per PSAP for budgetary design.

Network bandwidth requirements are directly dependent on applications being supported and the requirements set forth by the applications providers. Network costing is dependent on those factors.

The applications supplied by a vendor are a substantial portion of the cost involved in the design. Coordination of the applications and network services are critical in the operation of this network. Strict parameters must be adhered to assuring coordination of services.

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6. PLANNING RECOMMENDATIONS

There are several areas that North Dakota should look at carefully when deploying a NG9-1-1 system. These areas can be important to the success of the deployment.

6.1 STATEWIDE COORDINATION

Experience in deploying 9-1-1 initiatives across the county has revealed one fundamental lesson—states with central coordination deploy 9-1-1 enhancements faster than those that do not. This is clearly shown in the deployment of wireless 9-1-1 in North Dakota. The successful wireless deployment in North Dakota also shows another important point related to coordination. This is needed, but it does not require regulatory authority to accomplish a great deal of success.

The NDACo has a history of coordinating with the counties for the delivery of information technology services as well. The NDACo can help to provide the coordination of NG9-1-1. Most of the PSAPs are county or city run agencies; the league of cities can also provide coordination with the municipal agencies, and work cooperatively with NDACo to develop the plans needed to deploy NG9-1-1 in North Dakota.

The notice of proposed rule-making for the 9-1-1 grant funding that is released in 2009 by the National 9-1-1 Coordination Office has indicated that the grants are disbursed through a state coordinator appointed by the governor.

This has worked well in the deployment of traditional and wireless 9-1-1. The NG9-1-1 environment also requires a certain level of governance to be successful. This is demonstrated in the fact that there are several options available and coordination of a central ESInet to provide for interoperability across the state and between states is critical.

6.2 GOVERNANCE

Governance plays a major role in the NG9-1-1 environment. The NG9-1-1 architecture involves a network-of-networks topology. Each of these networks should have policies in place to assure interoperability. These policies can include:

- Connection requirements by call delivery providers
- Data management
- Data maintenance
- Data access
- Interconnection requirements
- PSAP or regional ESInet interconnection requirements

Governance is necessary to develop policies and procedures for the statewide system. All users are required to adhere to these policies and procedures. These policies should be developed with the input of the user community and providers. They require updating over time, and there should be some method of enforcing these policies and procedures.

One model that may work well is a committee or council similar in nature to the statewide interoperability committee. The Department of Homeland Security document titled "Creating a Charter for a Multi-Agency Communication Interoperability Committee: Template and Questions to Consider" is a good reference to begin this process.

This structure makes use of a group of stakeholders to develop the policy for the benefit of all the groups represented. When forming a committee it is best to look at getting a good representation of the stakeholder, but keep the size of the committee limited to 15 or less to keep things progressing. The selection of these representatives is also important. Each representative must want to be on the committee and be willing to work towards the greater good of the state's residents and visitors.

Governance can be contractual or regulatory. The usual reaction is to pass a law to provide governance, but there are other ways of providing governance. Using Memorandums of Understanding (MOUs) and contracts can be effective also. Developing policies for the NG9-1-1 system and then using the contracts of the users to enforce those policies may be faster than the legislative process. In addition, contracts with the call origination networks eliminate the need for regulatory actions such as tariffs. One last advantage is that contracts are easier to adjust as needed. This allows a more flexible system that can adjust quicker to the changing environment.

There are disadvantages to the use of contractual governance. The major disadvantage is that this may result in some entities not using the system. The use of contracts is voluntary whereas regulations are requirements. This can lead to an incomplete system, or more than one system with interconnection issues.

The NDACo's use of MOUs and relationship to assist the local governments with the wireless 9-1-1 project, and the ongoing information technology support services that they provide to local governments, are examples of a successful use of contractual over regulatory methods.

6.3 LEGISLATIVE AND REGULATORY ISSUES

This report did not undertake a review of the legislative and regulatory environment in North Dakota. The state should examine the following areas to address with legislative, regulatory, or executive action as may be appropriate within the State's constitutional authority and needs of the state:

- **Coordination** - Appoint a statewide coordinator and outline the authority of that position in line with the requirements of the 9-1-1 grant program guidelines.
- **Governance** - After investigating and choosing a governance model, formalize this and appoint members.
- **Funding** - Develop funding streams to provide service to the public at a standard level statewide.

- **Delivery of calls to NG9-1-1 system** - Examine the tariffs and regulations on the provisioning of 9-1-1. Change or add language to reflect newer technologies and to enable competition.
- **Liability protection for providers** - Look at the liability protections afforded to 9-1-1 providers, and possibly extend this protection to the new service providers
- **Establish rules** - Grant the governance entity, statewide coordinator, or other entity the authority to promulgate rules in the following areas:
  - o Ability to select method of call delivery from the origination networks
  - o Fee structure and rules
  - o Interconnection requirements

6.4 DEPLOYMENT MODELS

One of the advantages of the NG9-1-1 concept is that it uses open standards and interfaces. This has resulted in a situation where there are many ways to provide the needed functionality to achieve or at least prepare for true NG9-1-1. The major methods are:

- IP enabled network
- ESInet
- Centralized equipment
- Managed services

6.4.1 IP Enabled Network

An IP-enabled network is what many of the early adopters have put into place today. This simply provides the IP transport of the calls to the PSAP. It does not provide most of the NG9-1-1 services and advanced features that are NG9-1-1. These networks were often deployed early in the process before many of the NG9-1-1 standards were developed. These networks can be used as the NG9-1-1 services are added to the network to provide NG9-1-1 functions.

6.4.2 ESInet

An emergency services IP network follows the NENA standards for an i3 network. These standards are still being finalized, but all of the basic functions have been defined. This is a system of network and services working in concert to process any device type in a standard format. This is the most complete design and the reigning entity can control the services that are connected to this network.

6.4.3 Centralized Equipment

Many regional systems are looking at using centralized equipment to deliver the calls. This option involves using a large device that would normally be placed at each PSAP, and provide workstations only at the PSAP. This may save some funds with the reduction of back room equipment, but may not provide

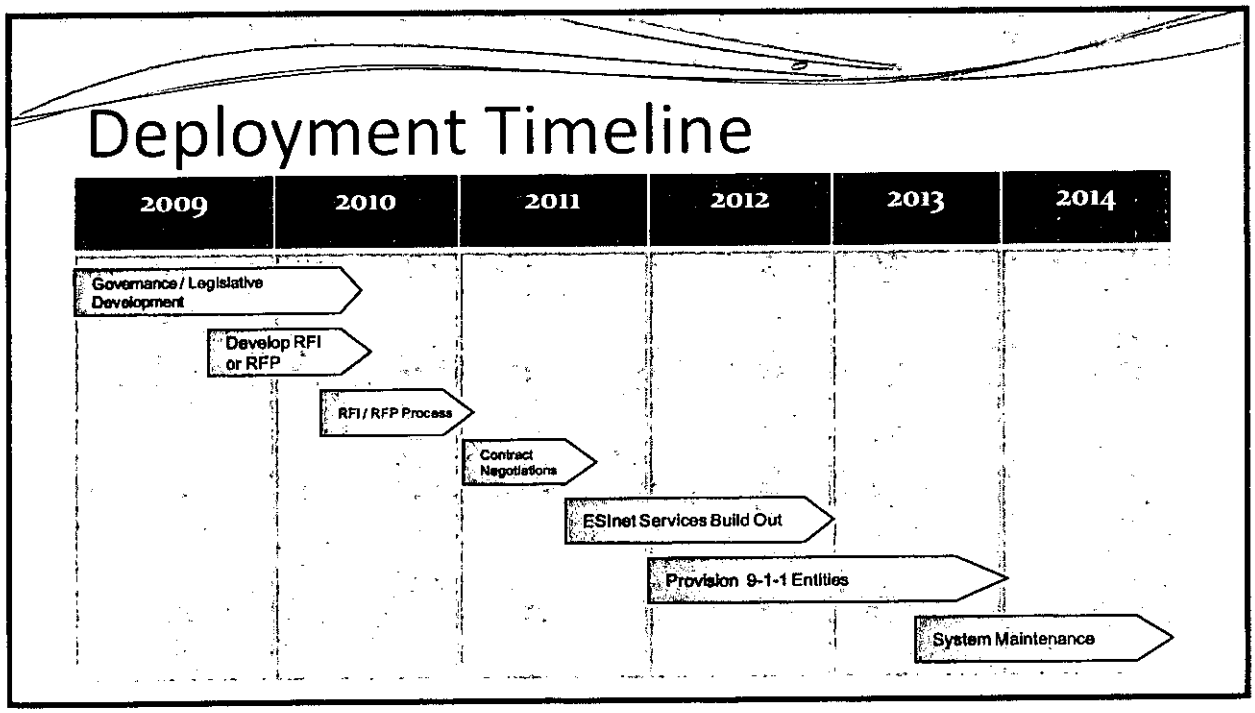
full NG9-1-1 functions depending on the equipment selected. This equipment must still be connected to the call origination providers. This equipment should support all connection types expected in an NG9-1-1 environment, and be able to transport these calls in a standard format.

6.4.4 Managed Services

Lastly, there are vendors who offer a managed service. This service uses the vendor's equipment to complete the interconnection and NG9-1-1 functions, and the PSAPs have workstations with which they handle the calls. This option is low on initial costs, but high on recurring costs. This also requires stringent service level agreements that include the control of the entities that can connect to the system.

6.5 TIME LINE

The following time line would position the state of North Dakota well for NG9-1-1 systems. This timeline can be adjusted as needed to provide the best solution for the state. Each time segment phase is described below. The time line takes into account the legislative cycle of North Dakota and the development of the NG9-1-1 standards.



6.5.1 Governance/Legislative Development Phase

During this phase, the state should develop a governance structure and assign a statewide coordination point. This begins the process of developing the specific needs of the 9-1-1 entities within the state. This is an important step in the process, as there needs to be input from the 9-1-1 entities as to the specific

functions of the new system they require. This also allows for the integration of the various 9-1-1 entities that may have worked independently in the past to begin to work in a coordinated environment.

The coordination with the various stakeholders allows time to educate the 9-1-1 stakeholders on NG9-1-1. This education assists to develop the functional requirements of the various processes that are needed to deploy this technology. By gathering information from all of the stakeholders up front, some issues during deployment can be eliminated.

Also during this phase, there needs to be a review and possible update of the legislative and regulatory environment. The management, funding, and maintenance of the NG9-1-1 system needs to be reviewed. In addition, there may be a need to address issues related to call initiation. For example, there may be new devices that users want to connect to the statewide ESInet. Rules have to be developed for these devices that include, among other things, the same level of liability protection as traditional 9-1-1 calls are afforded.

6.5.2 Develop RFI/RFP Phase

A great deal of the information acquired in the governance/legislative development phase is used to develop a procurement process. In this phase, a more detailed requirements list is developed to be included in a procurement document.

This process can use a Request for Information (RFI) to gather more information. The information gained from the RFI assists the state to make further decisions as to the specific solution that is best for the state.

If there is a clear direction based on the detailed requirements, a Request for Proposal (RFP) can be developed. This should contain the specific functional requirements needed for the NG9-1-1 system to include the statewide ESInet and the call termination equipment at the PSAPs.

6.5.3 RFI/RFP Phase

The RFI/RFP phase includes publishing the RFI and/or RFP, review of the responses, and the selection of the final vendor. This can be scheduled for just before the 2011 legislative session. This allows for accurate pricing and a clear solution to be deployed for the state.

6.5.4 Contract Negotiation Phase

The procurement phase includes the RFI or RFP review, the selection of the final vendor, and contract negotiation. This negotiation should include a detailed review of the contract and service level agreements, all parts lists, and the services associated with the system.

6.5.5 ESInet Services Build-out Phase

The build-out phase is when the vendor begins to build the network and NG9-1-1 services on the core network and data centers. This includes detailed testing of all components and the system as a whole. These tests should be developed based on the functional requirements developed during the procurement.

6.5.6 Provision 9-1-1 Entities Phase

At the completion of the ESInet build-out and testing, the PSAPs can then be connected. Each component of the PSAP systems and the interconnectivity to the ESInet must be tested, as well as the system as a whole, before going live.

6.5.7 System Maintenance Phase

At the completion of all PSAPs being connected to the ESInet, the maintenance phase begins. This phase includes the network, network services and all recurring costs to the vendors. This includes maintenance agreements to repair problems and update systems. The maintenance agreements should also provide preventative maintenance and monitoring of the systems to correct issues before they get to the level of a major outage.

6.6 COSTS

Based on the conceptual design, Kimball prepared budgetary costs for the NG9-1-1 system. These costs are budgetary in nature, and reflect the system being owned by the state. These prices can be reduced through the use of shared infrastructure and competitive procurement. The pricing of other models is not included as these models are usually proprietary to the vendor.

The pricing is broken down as follows:

- Non-recurring cost
- Recurring costs
- Professional services

Non-recurring costs are those paid one time for equipment, installation or software. These costs are outlined in Appendix B. The cost of replacement of equipment is not included in this budgetary cost as that should not need to occur in the time frame discussed.

Recurring costs are the monthly or yearly costs to provide the maintenance of the various equipment, software and connectivity. There is not an inflation rate associated with these costs.

Professional services include the professional assistance to develop final functional requirements of the NG9-1-1 system based on the cooperative efforts of all agencies. It also includes this assistance in the development of procurement documents, contract negotiation, and project oversight of the project.

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	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013	Year 2014
Non-recurring Equipment Costs	$0	$0	$5,200,000	$6,775,000	$1,575,000	$0
Recurring Service Costs	$0	$0	$1,377,600	$4,364,400	$4,364,400	$4,364,400
Professional Services	$184,880	$101,179	$209,006	$114,475	$57,238	$0
TOTAL	**$184,880**	**$101,179**	**$6,786,606**	**$11,253,875**	**$5,996,638**	**$4,364,400**

An important factor in the cost of the NG9-1-1 network to be considered is the 9-1-1 grant funds that are available in 2009 from the National 9-1-1 Coordination Office. The notice of proposed rule-making was published in the Federal Register on October 3, 2008. This grant makes available at least $500,000 in funds that must be matched as a 50/50 grant with state or local funds or in-kind matching. This amount may increase as it is based on all states applying for and receiving their funds. Not all states may be eligible to apply for these funds, as the grant requires the applying states to:

- Have a statewide coordinator appointed by the governor
- Have a state 9-1-1 plan with specific items covered
- Provide a project budget and a supplemental budget for reallocated funds
- Certify that the state meets the conditions of the grant to include the use of 9-1-1 funds

The State should apply for these funds when they become available, and also submit a supplemental project budget for additional funds that may become available. The funds that are received from this grant must be spent by September 30, 2012. This would be in line with the planed timeline.

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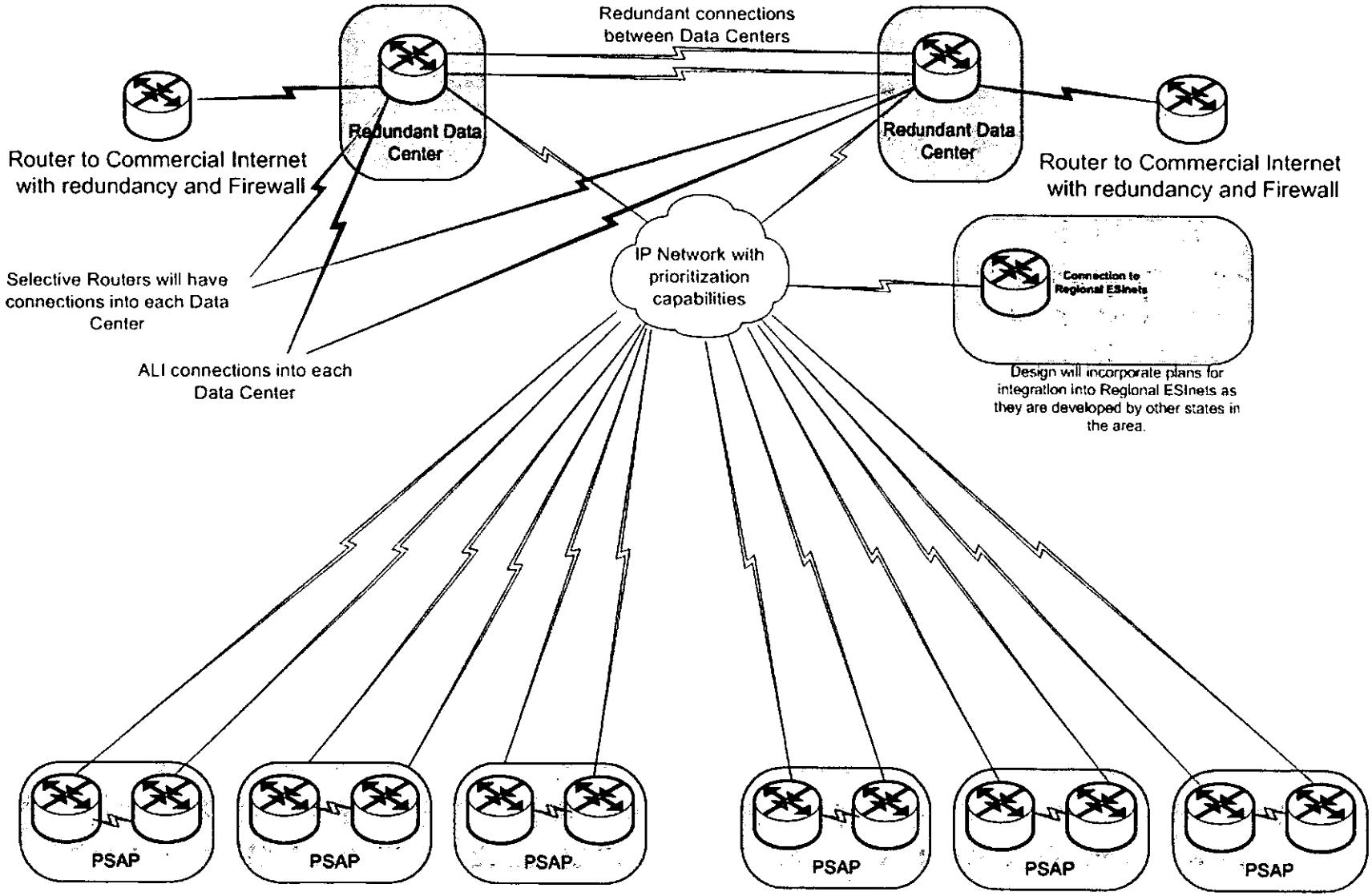
APPENDICES

APPENDIX A – CONCEPTUAL NETWORK DESIGN DIAGRAM

The diagram can be found on the following page.



22 connected PSAP's
with a connection to another
PSAP for redundancy

APPENDIX B – BUDGETARY COST WORKSHEETS

The worksheets can be found on the following pages.

Border Gateway Functions Non-Recurring Costs			$0	$450,000	$450,000	$0	$0
Item	**Description**	**Assumptions**	**2010**	**2011**	**2012**	**2013**	**2014**
Call Access							
Border Control Equipment	Equipment Installation/Configurat	500,000/one time		250,000	250,000		
IP Routing	Redundant Routers	2 @ 200000		200,000	200,000		

Border Gateway Functions Recurring Costs			$0	$206,400	$412,800	$412,800	$412,800
Item	**Description**	**Assumptions**	**2010**	**2011**	**2012**	**2013**	**2014**
Call Access							
IP Routing	DS-1 at $1100/month	7 @ 1100		46,200	92,400	92,400	92,400
CAMA Gateways	Gateway to CAMA Trunks	7 @ 1100		46,200	92,400	92,400	92,400
ALI Circuits and Gateways	Connection to 3 ALI Circuits	3 @ 1000		18,000	36,000	36,000	36,000
Commercial Internet Access	DS-3 Connection to Internet	7000/month		42,000	84,000	84,000	84,000
Firewall Capabilities	Firewall Management	1900/month		11,400	22,800	22,800	22,800
Data Center Hardware	Rack space, power, etc. in two data centers	2100/month		12,600	25,200	25,200	25,200
Border Control Maintenance	System Monthly Maintenance Fee	5000/month		30,000	60,000	60,000	60,000

ESRP Functions Non-Recurring Costs			$0	$4,750,000	$4,750,000	$0	$0
Item	**Description**	**Assumptions**	**2010**	**2011**	**2012**	**2013**	**2014**
Call Routing							
Routing Servers	Hardware	2,500,000		1,250,000	1,250,000		
Routing Servers	Software	1,500,000		750,000	750,000		
Vendor Software		3,500,000		1,750,000	1,750,000		
Vendor Services	Professional Services/Installation	2,000,000		1,000,000	1,000,000		

ESRP Functions Recurring Costs			$0	$1,171,200	$2,342,400	$2,342,400	$2,342,400
Item	**Description**	**Assumptions**	**2010**	**2011**	**2012**	**2013**	**2014**
Call Routing							
Call Routing Infrastructure	6 Racks at two locations	12 @ 2100		151,200	302,400	302,400	302,400
Network Interconnection	2 OC-3 connections to Data Centers	2 @ 10000		120,000	240,000	240,000	240,000
Call Routing Vendor Software	Software Licenses	20,000/month		120,000	240,000	240,000	240;000
Call Routing Vendor Software	Maintenance	80,000/month		480,000	960,000	960,000	960,000
Call Routing Hardware	Maintenance	50,000/month		300,000	600,000	600,000	600,000

Notes: for budget planning used OC-3 pricing to interconnect two diverse data centers which the ESRP servers will be located in. Other network services are available.

PSAP Call Termination Functions Non-Recurring Costs			$0	$0	$1,575,000	$1,575,000	$0
Item	**Description**	**Assumptions**	**2010**	**2011**	**2012**	**2013**	**2014**
PSAP Workstations	Workstation Hardware	$1,300,000			$650,000	$650,000	
PSAP Workstations	Workstation Software	$950,000			$475,000	$475,000	
PSAP Workstations	Installation/Professional Services	$900,000			$450,000	$450,000	

PSAP Call Termination Functions Recurring Costs			$0	$0	$1,609,200	$1,609,200	$1,609,200
Item	**Description**	**Assumptions**	**2010**	**2011**	**2012**	**2013**	**2014**
NetTN DS-1 PSAP	Connection to an estimated 23 individual PSAPs. One DS-1 each	22 @ $1,100			$290,400	$290,400	$290,400
DS-1 PSAP Redundancy	These provide connectivity between neighboring PSAPs for redundancy.	22 @ $1,100			$290,400	$290,400	$290,400
End Site Router	24 Ports with POE	22 @ $200			$52,800	$52,800	$52,800
End Site Firewall	Managed Firewall for each end site with 48 port switch	22 @ $650			$171,600	$171,600	$171,600
Site Maintenance	Maintenance for network equipment and workstations at 22 sites	67,000/month			$804,000	$804,000	$804,000

Professional Services			$184,880	$101,179	$209,006	$114,475	$57,238	$0
Item	**Description**	**Assumptions**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Planning	Planning assistance to develop coordination and governance. Develop legislative language and final tranistion plan.	$184,880	$184,880					
Procurement Support	Development of Procurement documents, Evaluation of the Procurement responses, and contract negotiation.	$101,179		$101,179	$151,769			
Implimentation Support	Project management of the instalation, coordination and conflict resolution with various vendors, Teting and change management during the implimentation	$171,712			$57,237	$114,475	$57,238	