Minnesota Initial Consultation Meeting Preparation Report

Minnesota-FirstNet Consultation Project
MN-SWIFT 70680, Phase 1-Additional Projects

Brandon Abley, Televate, LLC

8229 Boon Blv
Suite 720
Vienna, VA 22182

M.: 703-639-4200
F.: 703-992-6583
www.televate.com

September 23, 2014

Table of Contents

Purpose of this Document 7
Sections 7
Minnesota Overview 7
Minnesota-FirstNet Consultation Project Overview 7
Questions for Consultation 7
Informal Request for Information (RFI) 7
Preliminary Findings 7
Tribal Consultation 8
Outreach and Education 8
Contact 8
Acknowledgements 8
Minnesota Overview 9
Introduction 9
MN Governance Structure 10
Statewide Emergency Communications Board 10
Minnesota-FirstNet Consultation Project 14
Project Overview 14
Project Purpose 14
Project Sponsor 14
Current Status 14
Lessons Learned 15
Lessons from the ARMER Program 17
Questions for Consultation 19
Background 19
The Questions 19
Informal RFI 23
Executive Summary 23
Purpose: 23
Distinction from Formal RFI Process 23
Target Audience: 24
Format: 24
List of Responders 25
Findings 25
Recommendations 28
Response Summaries 30
702 Communications 30
Great River Energy (GRE) 32

AT&T 33
CNS 34
Crown Castle USA 35
Minnesota Telecom Alliance (MTA) 36
Palmer Wireless 36
Kandiyohi County 37
Anoka County 37
Rivada Networks 38
NewCore Wireless 39
Southern Minnesota Broadband 40
Motorola 40
Maximum Communications Cellular 41
Midcontinent Communications 41
Alcatel-Lucent (ALU) 42
CenturyLink 43
Minnesota User Requirements: Preliminary Findings 44
Working Groups 44
Process 44
Devices 45
Applications and NG911 47
Coverage Working Group 50
Web Survey 53
Background 53
Data and Findings 53
Coverage Reviews 56
Summary 56
CAD Incident Data 57
Interactive Sessions 57
QuickStart Program 58
Results for QuickStart Counties 59
Tribal Consultation 62
Overview of Tribal Government in Minnesota 62
Tribal Regional Governance Membership 64
Tribal Consultation Success Story: Leech Lake 65
Televate's Recommendations: 65
Televate's Findings: 66

Outreach and Education 68
Background 68
State and Regional Kickoffs 68
Web-Based Training Modules 69
Minnesota Annual Interoperability Conference 70
Quarterly Newsletters 71
Lessons Learned 72
Appendices 73
1. MnFCP Project Status as of 9/22/2014 73
2. Newsletters 74
a. Newsletter One—Introduction to Program 74
b. Newsletter Two—Introduction to Coverage Reviews 74
3. Presentation Slides 75
a. Coverage Reviews 75
b. Devices 75
c. Applications 75
d. Leech Lake 75
4. Workgroup Information 76
a. Workgroup Roster 76
b. Devices Workgroup Charter 76
c. Applications and NG911 Workgroup Charter 76
d. Coverage Workgroup Charter 76
e. Service Area Workgroup Charter 76
f. Security Workgroup Charter 76
5. RFI Responses 77
1. Motorola 77
2. 702 Communications ("702") 77
3. AT&T 77
4. Cooperative Network Services ("CNS") 77
5. Crown Castle 77
6. Palmer Wireless 77
7. Kandiyohi County 77
8. Anoka County 77
9. Rivada Networks 77
10. Minnesota Telecom Alliance 77
11. NewCore Wireless 77

12. Southern Minnesota Broadband 77
13. CenturyLink 77
14. Alcatel-Lucent 77
15. Maximum Communications Cellular (MCC) 77
16. Great River Energy 77
17. Midcontinent Communications 77
18. STA Narrative for Public Safety Broadband Network Pilot 78

Table of Figures

Figure 1: Urban-Rural Classification in Minnesota[3] 9
Figure 2: Population Distribution in Minnesota[4] 9
Figure 3: Minnesota's Communications Governance Structure 10
Figure 4: Communications Board Regions Map 13
Figure 5: ARMER Participation Map as of September 2014 17
Figure 6: RFI Process 23
Figure 7: Cellular Market Areas in Minnesota overlaid with Minnesota Counties 26
Figure 8: Cellular Economic Areas in Minnesota overlaid with Minnesota Counties 26
Figure 9: LTE Band Classes in 700 MHz 27
Figure 10: Moorhead, Minnesota 30
Figure 11: 702 Fiber Optic Sites in Minnesota 31
Figure 12: Great River Energy Market Areas 32
Figure 13: CNS Fiber Network 34
Figure 14: Crown Castle Sites in Minnesota 35
Figure 15: Estimated Coverage, Portion of Crown Castle Sites in West Metro 35
Figure 16: Kandiyohi Co 37
Figure 17: Anoka Co 37
Figure 18: Requirements Development and Approval Process 44
Figure 19: Workgroup Feedback Cycle 45
Figure 20: Application Distribution by Discipline 47
Figure 21: Data Type Utilization by Category 48
Figure 22: Workgroup Criticism of OEC Coverage Model 51
Figure 23 Agency Commercial Subscriptions Figure 24: Devices in Service 54
Figure 25: Commercial Service Purchasing Vehicles 54
Figure 26: Device Types Figure 27: Tablets Purchased 54
Figure 28: Barriers to Adoption 55
Figure 29: Effects of FirstNet Subscription Costs 55
Figure 30: Coverage Review Process 56
Figure 31: Sample heat map, portion of Hennepin County 57
Figure 32: Clay County, Minnesota Coverage Requirements 57
Figure 33: Minnesota QuickStart Counties 58
Figure 34: Leach Lake Tribe Figure 35: Murray County 60
Figure 36: Stearns County Figure 37: Sherburne County 61
Figure 38: Tribal Lands in Minnesota 62

Figure 39: Tribal Reservations and Communities in Minnesota 65
Figure 40: Communications Board Regions 68
Figure 41: Sample Training Module 69
Figure 42: August 2014 Newsletter 71

Purpose of this Document

This document describes Minnesota's progress under the Minnesota-FirstNet Consultation Project (MnFCP) prior to the initial consultation meeting with FirstNet. It is to be considered supplementary to the consultation meeting itself. The report provides a snapshot of the program prior to the Initial Consultation Meeting on September 24, 2014. This document serves the secondary purpose of reporting MnFCP progress to Minnesota's sponsor and stakeholder groups.

Sections

This document provides status on the following activities under MnFCP:

Minnesota Overview

A description of Minnesota and its governance structure.

Minnesota-FirstNet Consultation Project Overview

An overview of MnFCP project purpose, metrics, current status, and lessons learned.

Questions for Consultation

The State has defined a concise list of specific questions it hopes to have answered throughout the consultation process. This section lists those questions. The purpose of including these questions is to express the State's expectations for the Minnesota-FirstNet consultation process.

Informal Request for Information (RFI)

The State plans to publish a detailed RFI to assess potential partnerships with the State and FirstNet in deployment of the network. In anticipation of the FirstNet Initial Consultation Meeting and to inform development of the RFI, we performed an abbreviated Informal RFI process. This Informal RFI is a preliminary step towards development of the formal RFI scheduled to be released later this year. This section describes the RFI process and our findings to date.

Preliminary Findings

The State is performing detailed assessments of user needs to inform the Minnesota-FirstNet consultation. This section presents the State's preliminary findings in a variety of areas.

Coverage Assessments

The State considers individual coverage requirements one of the most important aspects of the consultation process. This section provides a general description of how the State is performing coverage reviews with each county, a justification for the approach, and progress as well as lessons learned thus far.

Working Groups

A key part of MnFCP are subject-matter workgroups to articulate specific topical requirements for the state. This Section provides the group requirements articulated thus far for the following topical workgroups:

1. Coverage
2. Devices
3. Applications and NG911

Tribal Consultation

This section provides a description of tribal outreach and consultation up to this point, including a particular success story for Leech Lake Reservation.

Outreach and Education

A description of the outreach and education program undertaken for MnFCP including lessons learned.

Contact

Jackie Mines, Director, Emergency Communication Networks
jackie.mines@state.mn.us
(651) 201-7550

Acknowledgements

Portions of this document, in particular the "Minnesota Overview" section are adapted from material originally produced by the State of Minnesota in its 2012 State and Local Implementation Grant Program application.[1]

[1] Available at: https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx

MINNESOTA OVERVIEW

Introduction

Minnesota has established itself as a leader in statewide broadband planning for the past several years. Since 2010, the state has engaged in industry-leading planning on a statewide level to ensure the development of a successful public safety wireless broadband network in the state. The introduction of FirstNet presents the state with a tremendous opportunity to pursue implementation of that network in a manner which meets the needs of all of its stakeholders.

Minnesota's population is approximately 71% urban according to the United States Census Bureau,[2] while only a very small percentage of the state's geography can be considered urban. These population figures introduce a challenge to the State and FirstNet not unlike many other areas of the United States; there is a strong FirstNet business case over a very small geography, but the State and FirstNet have an obligation to cover all or most of the geography of the entire state.

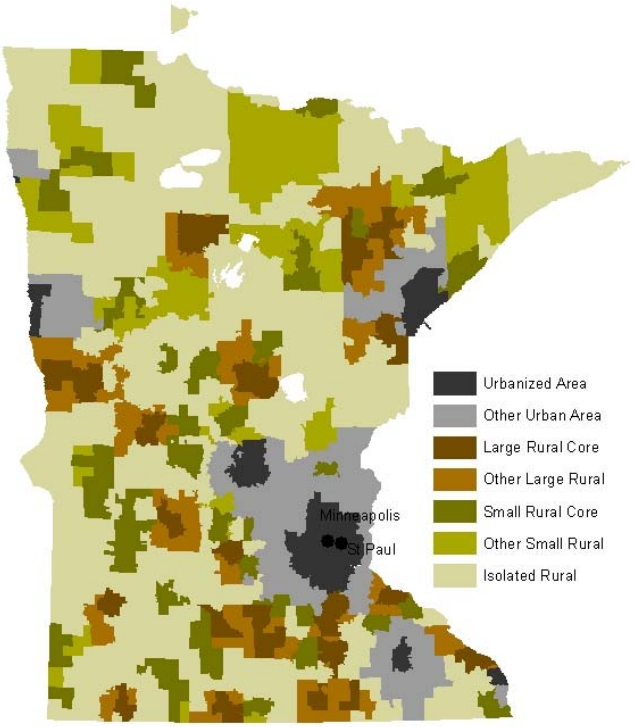


Figure 1: Urban-Rural Classification in Minnesota[3]

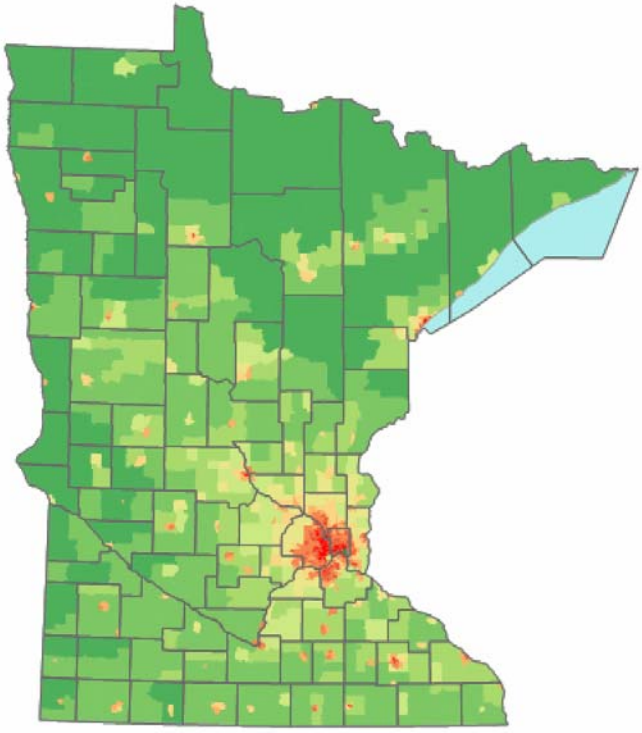


Figure 2: Population Distribution in Minnesota[4]

[2] *See* http://www.census.gov/compendia/statab/2012/tables/12s0029.xls
[3] From http://depts.washington.edu/uwruca/map_7.php
[4] From http://en.wikipedia.org/wiki/Minnesota

MN Governance Structure

Statewide Emergency Communications Board

Minn. Stat. §403.36 establishes the Statewide Emergency Communications Board and §403.382 tasks the Board with "developing and maintaining a plan for the implementation of a statewide public safety wireless broadband network, including the definition of technical and operational standards for that network".[6] This law provides the Board with the legal authority and obligation to consult with FirstNet. Through the Minnesota-FirstNet Consultation Project, the Board has delegated this work to the Minnesota Department of Public Safety, Emergency Communication Networks Division.

The Statewide Emergency Communications Board (SECB) and Regional Emergency Communications Boards (RECB) are at the center of Minnesota's interoperable communications governance structure. As detailed in Figure 3, various sub-committees and workgroups are created as appropriate and are tasked and report to each board.

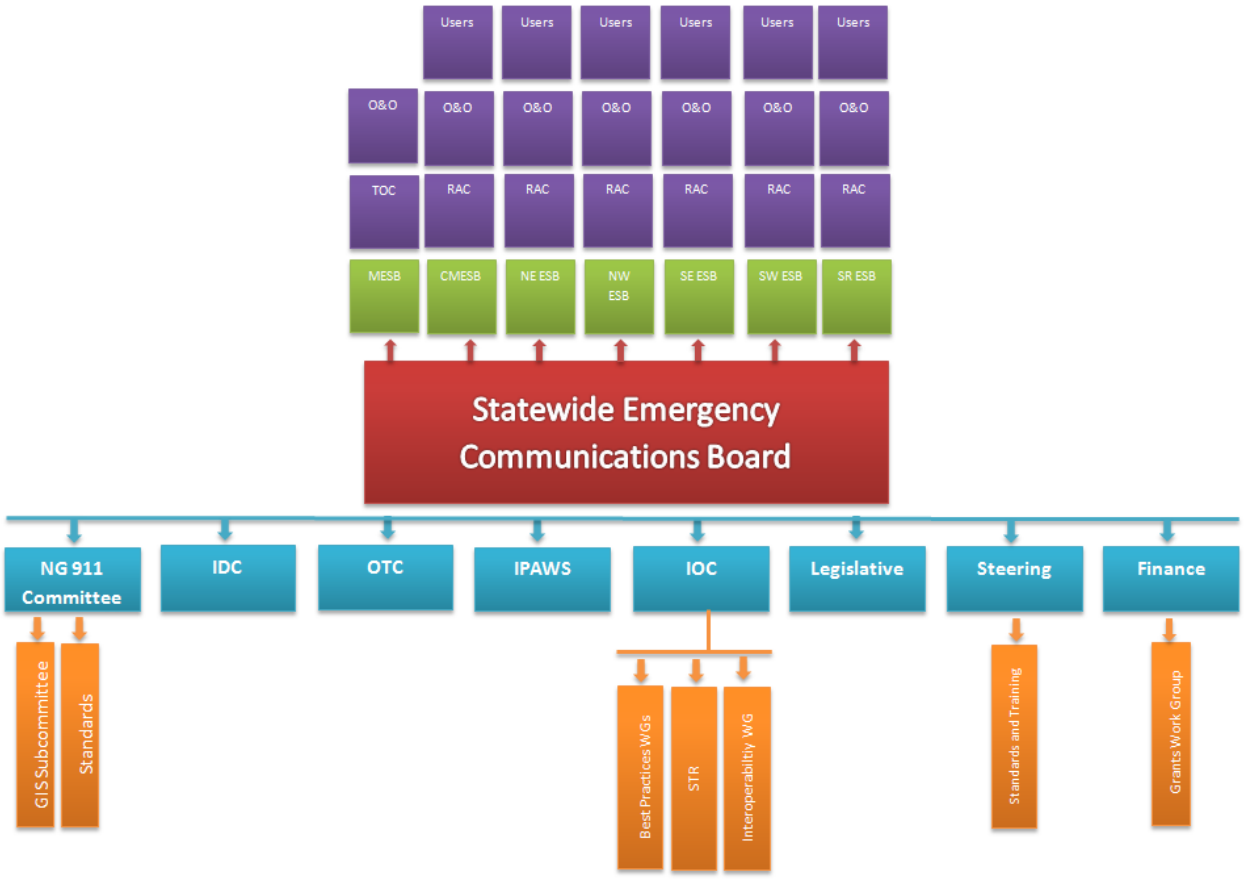


Figure 3: Minnesota's Communications Governance Structure[7]

[6] *See* MN Stat. §403.382 at https://www.revisor.mn.gov/statutes/?id=403&view=chapter#stat.403.20
[7] From https://dps.mn.gov/entity/srb/governance/Pages/default.aspx

SECB committees and workgroups are composed of subject-matter experts who advise the board in rulings pertaining to each committee or workgroup's particular area of expertise. Meanwhile, Regional Boards perform a similar function for each multi-county Region of the state.

This governance structure ensures that the Board acts on issues with the full input of public safety and government officials across Minnesota, and that is best representative of the diverse geographies, disciplines, authorities and areas of expertise through the state.

The SECB includes the following permanent seats:

The Statewide Radio Board includes the following permanent seats:

- The commissioner of public safety (chair)
- The commissioner of transportation
- The state chief information officer
- The commissioner of natural resources
- The chief of the Minnesota State Patrol
- The commissioner of management and budget
- The chair of the Metropolitan Council
- Two elected city officials, one from the nine-county metropolitan area and one from Greater Minnesota, appointed by the governing body of the League of Minnesota Cities
- Two elected county officials, one from the nine-county metropolitan area and one from Greater Minnesota appointed by the governing body of the Association of Minnesota Counties
- Two sheriffs, one from the nine-county metropolitan area and one from Greater Minnesota, appointed by the governing body of the Minnesota Sheriff's Association
- Two chiefs of police, one from the nine-county metropolitan area and one from Greater Minnesota, appointed by the governor after considering recommendations made by the Minnesota Police Chief's Association
- Two fire chiefs, one from the nine-county metropolitan area and one from Greater Minnesota, appointed by the governor after considering recommendations made by the Minnesota Fire Chiefs' Association
- Two representatives of emergency medical service providers, one from the nine-county metropolitan area and one from Greater Minnesota, appointed by the governor after considering recommendations made by the Minnesota Ambulance Association
- The chair of the regional radio board for the metropolitan area
- A representative of Greater Minnesota regional radio boards selected in accordance with ARMER Standard 8.1.0, adopted on January 24, 2011

Interoperable Data Committee

The SECB has established the Interoperable Data Committee to assist the board in the state's consultation with FirstNet. This committee is composed of subject-matter experts specifically to review and approve any major state decisions related to the Minnesota-FirstNet consultation, including the

Minnesota-FirstNet Consultation Project and the State and Local Implement Grant Program. The following mission statement is extracted from the SECB's bylaws:[8]

> *To advise the Statewide Emergency Communications Board on all matters relating to wireless broadband for public safety and to represent Minnesota on a national level.· Membership is comprised of one Primary and one Alternate from each of the following: Minnesota Department of Public Safety, Office of Enterprise Technology (MN.IT Services), Minnesota Management and Budget, Minnesota Department of Transportation, Minnesota Department of Natural Resources, Minnesota State Patrol, Minnesota Sheriff's Association, Minnesota Fire Chief's Association, Minnesota Police Chief's Association, Minnesota Ambulance Association, League of Minnesota Cities, Association of Minnesota Counties, Minnesota Indian Affairs Council, and each regional radio board or equivalent. Membership may also include non-voting seats representing non-government and private industry partners at the discretion of the committee.*

Table 1: Current IDC Membership

IDC Member	Representing	Alternate
Jackie Mines	Dept. of Public Safety	(vacant)
Jim Johnson	MN IT Services	Russ Reilly
Jim Mohn/Tim Lee	Dept. of Transportation	(vacant)
Victor Wanchena	Dept. of Corrections	(vacant)
Thomas Humphrey	Metropolitan Council	Vince Pellegrin
Brian Askin	Dept. of Natural Resources	(vacant)
Steve Bluml	Minnesota State Patrol	Rick Juth
(vacant)	Minnesota Sheriffs' Association	(vacant)
Michael Risvold, CHAIR	Minnesota Police Chiefs' Association	Cari Gerlicher
(vacant)	Minnesota Fire Chiefs' Association	(vacant)
Mary Borst	Minnesota Ambulance Association	(vacant)
Dave Thomson	League of Minnesota Cities	(vacant)
Dave Deal	Association of Minnesota Counties	(vacant)
(vacant)	Minnesota Indian Affairs Council	(vacant)
Jake Thompson	Metro Regional Radio Board	(vacant)
Kristen Lahr	Central Regional Radio Board	Dean Wrobbel
Brian Zastoupil	Northwest Regional Radio Board	Beryl Wernberg
Bruce Hegrenes	Northeast Regional Radio Board	Monte Fronk
Brad Milbrath	South Central Regional Radio Board	Andy Buckmeier
Rick Freshwater	Southeast Regional Radio Board	Dave Pike
(vacant)	Southwest Regional Radio Board	(vacant)

More information on the IDC is available at the Committee's website.[9]

[8] *See* https://dps.mn.gov/entity/srb/governance/Pages/bylaws.aspx
[9] *See* https://dps.mn.gov/entity/srb/committees/Pages/interoperability-data-committee.aspx

Regional Governance

Minnesota has 7 Regional Emergency Communications Boards which represent each county and city of first class in the state, except for the City of St. Paul,[10] which is represented by Ramsey County. Regional boundaries are shown in *Figure 4: Communications Board Regions Map.* The regions are as follows:

- Metropolitan Emergency Services Board
- Central Minnesota Emergency Services Board
- Southeast Minnesota Emergency Communications Board
- South Central Emergency Communications Board
- Southwest Emergency Communications Board
- Northwest Emergency Communications Board
- Northeast Emergency Communications Board

Each regional board, except for the Metropolitan Emergency Services Board, has a Radio Advisory Council (RAC) to advise the board in making technical decisions related to communications interoperability. The Metropolitan Emergency Services Board has a Technical and Operations Committee which fulfills a similar purpose. More information is available at ECN's website.[11]

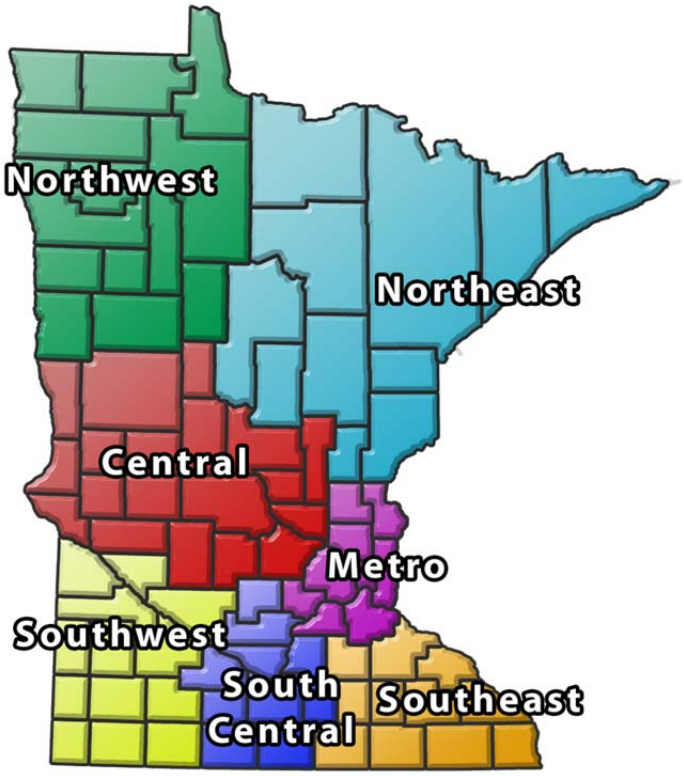


Figure 4: Communications Board Regions Map

[10] Saint Paul, population 290,770, qualifies as a "city of first class" per der Minn. Stat. § 410.01
[11] https://dps.mn.gov/entity/srb/regions/Pages/default.aspx

MINNESOTA-FIRSTNET CONSULTATION PROJECT

Project Overview

Project Purpose

The mission of ECN's Public Safety Wireless Broadband Program is to bring a stand-alone, mission-critical public safety LTE broadband network to first responders in Minnesota. The Minnesota-FirstNet Consultation Project is designed to deliver on that goal to Minnesota's First Responders while fulfilling the State's obligations under the 2012 Middle Class Tax Relief and Job Creation Act and the 2013 State and Local Implementation Grant Program.

Project Sponsor

Jackie Mines, Director, Emergency Communication Networks, Minnesota Department of Public safety is the project sponsor. ECN reports to the Statewide Emergency Communications Board in executing major public safety initiatives, including the Minnesota-FirstNet Consultation Project.

Current Status

MnFCP has made significant progress towards 7 out of 8 SLIGP Phase One deliverables and 2 SLIGP Phase Two deliverables not yet started. As of this writing, the primary focus of the project is gathering user requirements through coverage interviews, workgroup meetings and user population surveys. For a complete list of deliverables see Table 2: MnFCP Deliverables Status September 2014 below. For current status of the project, see MnFCP Project Status as of 9/22/2014

Table 2: MnFCP Deliverables Status September 2014

Task	Description	Status
Governance Recommendation	An analysis of Minnesota's governance structure and its suitability for the consultation with FirstNet.	Underway
Tribal Representation	Evidence that the program has properly represented tribal needs for the consultation process.	Underway
Education and Outreach	Presentations, workshops, and marketing materials to support stakeholder education on the program.	Ongoing
Stakeholder Entity Assessment	A complete list of potential users of the network with a projection of anticipation adoption.	Underway
MOU and MOA	Standardized MOU/MOA to facilitate infrastructure and other asset sharing.	Underway
State and Stakeholder Volunteers (Work Groups)	Established subject matter workgroups to establish specific needs in areas including coverage, devices and applications.	Established
Requirements Gathering	Expression of the state's overall requirements for the network.	Underway
SCIP Recommendations	Recommendations for future updates to the SCIP as required under SLIGP.	Not started
Data Discovery and Collection	Potential network asset data collection and evaluation for incorporation into the network.	Not started
Sustainability Plan	Strategy for managing the consultation and migration to the network in a financially sustainable manner.	Not started

Lessons Learned

1. **Branding and messaging are essential.**
   Throughout our outreach program, we found that there was limited understanding of FirstNet and wireless broadband throughout the state. Some early misconceptions and rumors hindered our original outreach efforts, and we had to double-back to correct these perceptions in order to build a stable foundation for the program. Before we could successfully perform any requirements gathering such as performing surveys or focus group sessions, we had to build a solid brand for the program.

2. **Never underestimate the stakeholder community.**
   Stakeholders including practitioners and technical experts have good ideas! Throughout our outreach we were consistently surprised by the excellent feedback and innovative ideas we heard from unexpected places. We recommend for similar projects to give stakeholders as many opportunities to speak up as possible.

3. **Never overestimate the stakeholder community.**
   Regardless of how much outreach we thought we had performed throughout the project, we consistently encountered basic questions again and again. We have learned throughout the project that regardless of how much we have worked to educate the community we cannot assume that everyone in the audience will have a deep level of built-in knowledge and understanding.

4. **Communication with stakeholders is extremely labor-intensive.**
   The time and effort to identify, organize and communicate with various stakeholder and points of contacts cannot be underestimated.

5. **Leverage the community's expertise.**
   Working groups, technical and tactically focused, are essential to advance the program success. The community is full of good thinking, and structured working groups provide a formal means for the community to express these ideas in a meaningful way. Stakeholders from all areas of the state need to be given a voice and told that their opinions and requirements are valuable. They should be treated equally as many unexpected sources have excellent contributions to provide once asked.

6. **Tribal outreach is extremely challenging.**
   Political, cultural, and historical issues make tribal outreach extremely challenging. There is very little historical success of state-tribal projects throughout the country, and in performing our outreach with the tribes; we encountered many stories of *unsuccessful* state-tribal interactions. History has not built a good foundation for state and tribal relations, and so outreach with the tribes requires a disproportionate amount of care, attention, and labor than with other stakeholders.

7. **Good coverage assessments require many inputs.**
   Tools such as commercial carrier coverage, CAD data, critical infrastructure, field measure data of the commercial carriers, since the maps are not accurate, are valuable for the coverage assessment.

8. **Give them homework.**
   Upfront training better facilitates stakeholder participation and prepares them to state requirements. This way, stakeholders can enter interactive sessions with a minimum level of built-in expertise to make the best use of everyone's time.

9. **Share with your peers.**
   We encourage similar projects to share SLIGP status, progress and findings with everyone in the peer community. We have had outstanding insights from some reviewing similar projects in other states.

Lessons from the ARMER Program

The Minnesota ARMER system represents the most significant piece of incumbent public safety wireless communications infrastructure in the state. This system includes over 300 sites owned and operated by the state of Minnesota and nearly 100 locally-owned sites that provide 95% or greater geographical area coverage in each county of the state.[12]

Encouraging statewide adoption of the ARMER system has been a major focus of the Minnesota Department of Public safety for nearly a decade. Today, 76 of 87 counties in the state currently have primary communications on ARMER, with 9 counties planning to migrate and only 2 counties relying on other systems for primary communications (see Figure 5).[13] The State benefits from three primary ARMER lessons ARMER that inform its broadband strategy today:

1. **Tell a Genuine and Compelling Story**
   ARMER is so popular in Minnesota becauseof the foundation of information shared for each county to make an informed decision, prepatory work to engage stakeholder buy-in and the technology meeting the user's requirement needs. The State focused on building a great service that met the needs of its stakeholders, told that story throughout the state, and let the system—and the data—speak for itself. This same approach is being applied to the wireless broadband program; the State is collecting individual county requirements so that it can consult with FirstNet to build a network that meets their needs. Engaging the stakeholders to define their wireless broadband network requirements will simplify adoption.

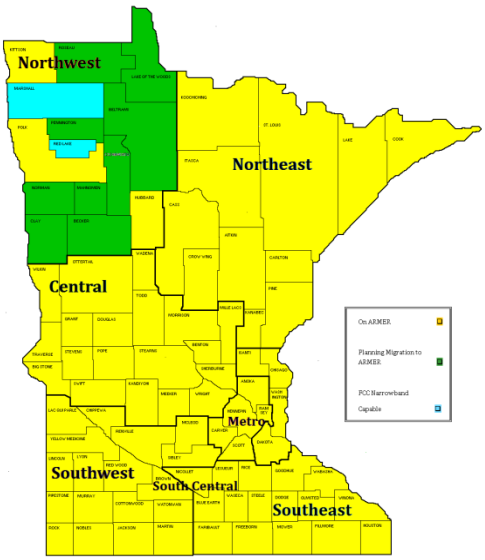


Figure 5: ARMER Participation Map as of September 2014

2. **Focus on County Leadership**
   County Boards make the majority of public safety funding decisions throughout the state. The State respects the influence and knowledge of elected officials such as sheriffs and the subject matter experts they trust. The State works with these leaders to develop a service the counties defined and desired. Even though migration to ARMER was a major investment for many counties, when it came time to make that investment, these leaders had faith in the service and were able to make the case to support and adopt the network.

3. **Relationships, not Politics**
   Relationships and personal trust are core to the success of the ARMER program. The State invests significant effort into ensuring that its representatives act with integrity and carry the trust of their

[12] Excluding the Boundary Waters Canoe Area Wilderness, a 1,090,000-acre wilderness area within the Superior National Forest in northeastern Minnesota under the administration of the U.S. Forest Service
[13] *See* https://dps.mn.gov/divisions/ecn/programs/armer/Documents/armer-participation-map.pdf

stakeholder groups. This personal trust, ultimately, will reflect on how the wireless broadband service is perceived and may be the catalyst for successful outreach and eventually service adoption.

QUESTIONS FOR CONSULTATION

Background

The objective of this set of questions is to address areas of concern related to deployment of the Nationwide Public Safety Broadband Network(NPSBN). Minnesota's objective in preparing the questions is to:

- Clearly communicate the State's and its stakeholders' concerns to FirstNet
- Set the tone for the ongoing Minnesota-FirstNet consultation process.
- Guide early FirstNet consultation in the region toward specific, high-level issues

The State considers the answers to these questions central to an effective consultation process with FirstNet. The State does not expect or require responses to these questions prior to, or during, its initial consultation meeting with FirstNet in September.

The Questions

1. What outcome does FirstNet seek from the FirstNet-state consultation process?
2. What is the timetable for the following:
    a. Issuance of Comprehensive Network Solution Draft RFP?
    b. Issuance of Network Equipment & Services Draft RFP?
    c. 90-Day State Decision window?[14]
    d. Service availability?
3. What is FirstNet's plan, if any, for incorporating findings, requirements and data produced by states under the State and Local Implementation Grant (SLIGP) program into the consultation process and its network design?
    a. What data does FirstNet require that states collect?
    b. When will FirstNet publish requirements and authorize data collection?
    c. How are these findings included in FirstNet's RFP?
4. Does FirstNet anticipate consulting with tribal governments on a government-to-government basis as a Federal entity or does FirstNet expect that state governments will include tribal governments in their consultation? How does FirstNet recognize tribal sovereignty?

[14] Per 42 U.S.C. 1442, §6302 (e) (2), "State Decision".

5. What is FirstNet's envisioned rate structure?

6. What is FirstNet proposed service delivery structure?

    a. Will FirstNet enter into a contract with the State and the State enter into service agreements with subscribers?

    b. Will FirstNet enter into service agreements directly with subscribers?

    c. Will family plans be offered to extend subscription adoption opportunities?

7. What degree of resiliency will the network be built to?

    a. Will FirstNet provide an SLA?

    b. If so, what remuneration is provided if FirstNet does not provide an SLA?

8. Is FirstNet a cellular carrier for legal and regulatory purposes?

    a. Is FirstNet required to provide 9-1-1 service?

    b. Does FirstNet pay 9-1-1 user fees in Minnesota?

9. Will FirstNet enter into agreements to provide BC-14 user terminals (smartphones, wireless USB, tablets, mobile devices, modems, etc.)?

10. Will FirstNet subsidize the cost of user equipment?

11. Are states or other governments expected to contribute capital funds to construct the network?

12. If not cost, what ultimately will compel an end user to adopt FirstNet over commercial service?

13. What applications and services does FirstNet plan to supply?

    a. Will FirstNet curate end-user applications and operate an applications "store"?

    b. Will FirstNet publish standardized network services (e.g., a push-to-talk service or a location service)?

    c. Will FirstNet provide hosted services to support public safety operations such as for CAD or emergency call-taking?

14. What is FirstNet's business case?

    a. How can we prepare our user base to differentiate between FirstNet's business model options?

b. Will States have an opportunity to introduce and directly benefit from local State secondary partners that enter into spectrum franchise agreements with FirstNet?

c. How should we set expectations about what is achievable?

15. How does FirstNet define a "public safety" user eligible to use the network?

16. To what degree will state and local jurisdictions be allowed to augment the coverage of the NPSBN?

    a. Will a jurisdiction be able to add sites using local funds and assets?

17. How much differentiation will there be in the "offers" to the states? Will it only be dependent on, for example, the amount of infrastructure the state makes available for FirstNet's use or will there be a bigger "bargaining" window?

18. What is the status of coordination of BC-14 with Canada? Can we expect that this coordination will be completed in time for the implementation of service in Northern Minnesota?

19. Is there anything that Minnesota should initiate with our Canadian neighbors in anticipation of FirstNet?

20. Is there an expectation that FirstNet coverage will be available at border crossings?

21. Will there be a National "NOC", Network Operations Center, that monitors the system or receives and processes outage information?

22. Will there be a National level tracking and assignment of system phone numbers and system assigned "static IP addresses"? Some operations require "static" IP's.

23. Will there be monthly airtime billing and "Call Detail" level of billing?

24. Will there be multiple "plans" to choose from, National, local, high and low minutes, pooled/shared minute plans, high/low tier data usage plans or unlimited data, etc…?

25. Who would manage and control these plans? Would they be averaged nationally or locally?

26. What happens in the case of over or under collection of operating funds?

    a. Can FirstNet operate at a profit or deficit?

27. Would system maintenance and repair bills be paid directly from FirstNet? How is this budgeted for sustainability?

28. What process would be in place for "porting" a number in or out of this service?

29. Who ensures that a band class band class 1414 phone that is purchased for Public Safety and then "retired" due to wear, or possibly leaves public service with a retiring officer, becomes a "consumer only" access phone?

30. Will band class 14 phones become available for purchase through carrier vendors? If so, what criteria would have to be met for “Public Safety“ authorization to sell a band class 14 capable device to someone? Who tracks these ESN’s?

31. What level of protection is there for “cloned” ESN’s? Without a monthly usage, call detail report, or a monitoring system in place, a cloned number could go unfound without reviewing these key cloned ESN indicators.

32. Many urban areas have better coverage and in-building service due to existing BDA and DAS systems as well as the built in redundant cellular carrier service levels that automatically cover when out of LTE range. The PSBN could not be built as a stand alone network to this level on sites that are not shared with carriers so switching latency and coverage issues between these systems are of great concern. In these areas it may be preferred to have PSBN as a backup system that would not be used until needed. Would a “Pay as you Roam” plan be available charging only for the times the PSBN system is needed for these areas?

33. What questions do you have of our user base?

34. What are FirstNet’s thoughts on the Minnesota wireless broadband and consultation program?

INFORMAL RFI

Executive Summary

Purpose:

The State of Minnesota published a request for statement of interest ("informal RFI") on August 20, 2014. The output of this exercise is a set of recommendations for how to structure the State's formal RFI, which is detailed under the heading "Recommendations" below.

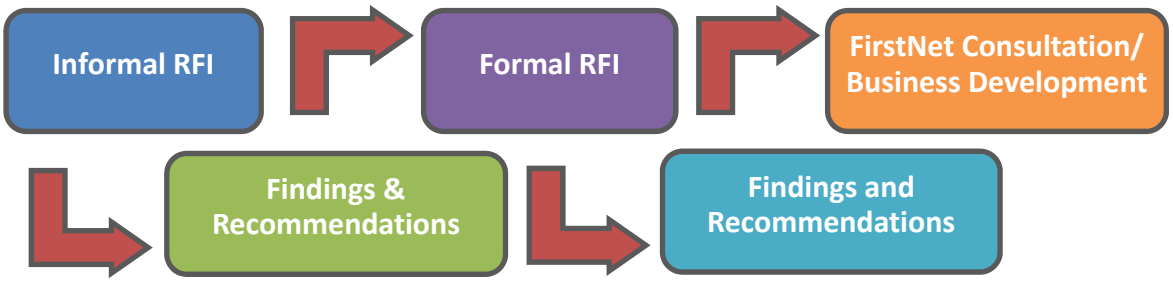


Figure 6: RFI Process

The purpose of this request was to secure a formal statement of interest in public-private partnerships with the State of Minnesota and/or FirstNet. The State plans to utilize information from the informal RFI for three primary purposes:

1. To prepare the State to describe to FirstNet, in general terms, which potential private partners exist, to document a preliminary statement of partnership requirements, and to define what each party may have to offer the other.

2. To educate the State and its stakeholders, and in particular the Statewide Emergency Communications Board.

3. To support the development of a comprehensive, detailed Request for Information (RFI) to be published in Q4 2014.

In publishing the informal RFI, the state sought formal, written statements from potential partners for Public-Private Partnership for development of the Nationwide Public Safety Broadband Network in Minnesota from qualified partners and interested stakeholders. These partnerships are presented to the State and to FirstNet as potential options for build out of the network.

Distinction from Formal RFI Process

The informal RFI varied from a traditional RFI in a number of ways, including the following:

- **Limited Scope**. The informal RFI was very specific to its intentions of collecting only high-level information. Responders were not expected to prepare detailed business models, for example, or to provide any specific quantitative information.

- **Short response window**. Responders were given only two weeks to respond.

- **Short length**. Responders were limited to 750 words and were clearly instructed not to produce complete proposals as they would as part of a formal RFI process. Through this notice the State sought only a very high-level description of the nature of the proposed partnership.

- **Informal**. The informal RFI did not utilize the state's procurement system (responses were submitted directly via email), and all responses are considered public data. The process did not include any follow-up interviews or requests for clarification.

Target Audience:

While the State accepted responses from all interested parties, the State sought input in particular from the following:

- Public Utilities
- Telecommunications Companies and Carriers
- Tribal Nations
- Non-Public Safety Entities

Others that are encouraged to respond include but are not limited to:

- Public safety organizations
- Units of state and local government
- Other government organizations
- Trade associations
- Private companies
- Non-profit entities
- Public utilities
- Members of the public

The majority of responses the state received were from equipment, network, and service providers expressing interest in providing their capabilities to help construct the network. Unfortunately, the State did not receive responses from tribal nations. Televate believes this is most likely a result of the short response window and encourages the State to solicit input directly from tribal nations during the formal RFI process.

Format:

Published Date:	August 20, 2014
Response due Date:	September 2, 2014
Maximum Length:	750 words
Submission:	Directly via email to Televate

List of Responders

1. Motorola
2. 702 Communications ("702")
3. AT&T
4. Cooperative Network Services ("CNS")
5. Crown Castle
6. Palmer Wireless
7. Kandiyohi County
8. Anoka County
9. Rivada Networks
10. Minnesota Telecom Alliance
11. NewCore Wireless
12. Southern Minnesota Broadband
13. CenturyLink
14. Alcatel-Lucent
15. Maximum Communications Cellular (MCC)
16. Great River Energy
17. Midcontinent Communications

Findings

1. **There is tremendous interest in Public-Private Partnerships in the State.**

   Even with only a two-week response window that included a holiday weekend during peak vacation season, we received 16 complete proposals ranging from local companies offering infrastructure[15], cellular carriers,[16] and one network integrator offering to implement the entire network at no cost to the State of Minnesota.[17] The tremendous response illustrates that the market is ready and willing for NPSBN partners in Minnesota.

2. **Minnesota and FirstNet have a wide variety of options to pursue in the state.**

   The volume and variety of RFI responses shows that the State and FirstNet have a wide variety of options and business models to pursue for network integration into the state. The State has Minnesota-based businesses and national and international businesses interestedin supporting the State and FirstNet's objectives to implement the network. The State has firms interested in using the State or FirstNet as an anchor tenant and organizations interested in leasing spectrum. Moreover, it further demonstrates that there is a large community of willing partners.

[15] E.G., NewCore, 702, CNS, et al.
[16] E.G., AT&T
[17] E.G., Rivada

3. **Rural carriers in the state see FirstNet partnership as their primary growth opportunity.**

Several rural cellular companies in the state expressed an inability to acquire additional spectrum as a primary factor inhibiting their future growth opportunities.[18] They cite the primary reasons for their inability to acquire spectrum as 1) cost and 2) configuration of spectrum auctions.[19] Note that Figure 7: Cellular Market Areas in Minnesota overlaid with Minnesota Counties and Figure 8: Cellular Economic Areas in Minnesota overlaid with Minnesota Counties illustrate two common approaches the FCC has previously followed to auction spectrum in the state.

Rural cellular companies in Minnesota argue that FirstNet presents their best opportunity for future growth and provision of 4G service to their customer base. These entities may provide an ideal partnership opportunity as they may be interested in providing actual capital to support the network buildout as well as pay for BC-14 spectrum leasing.

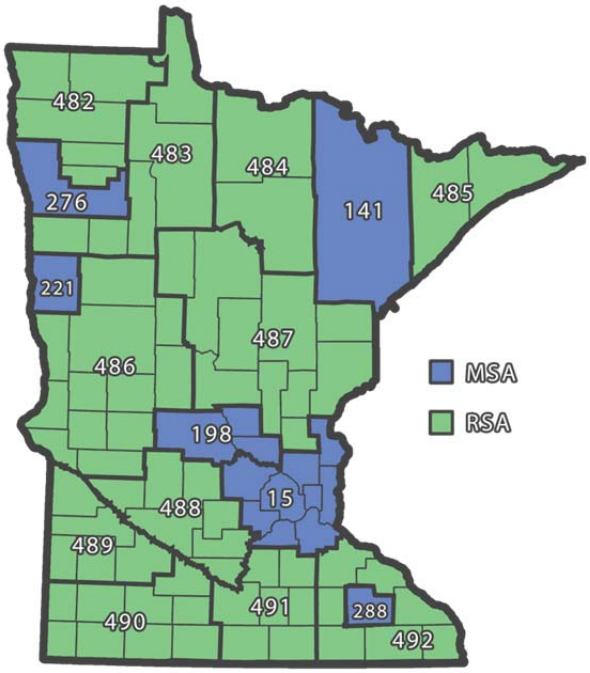


Figure 7: Cellular Market Areas in Minnesota overlaid with Minnesota Counties

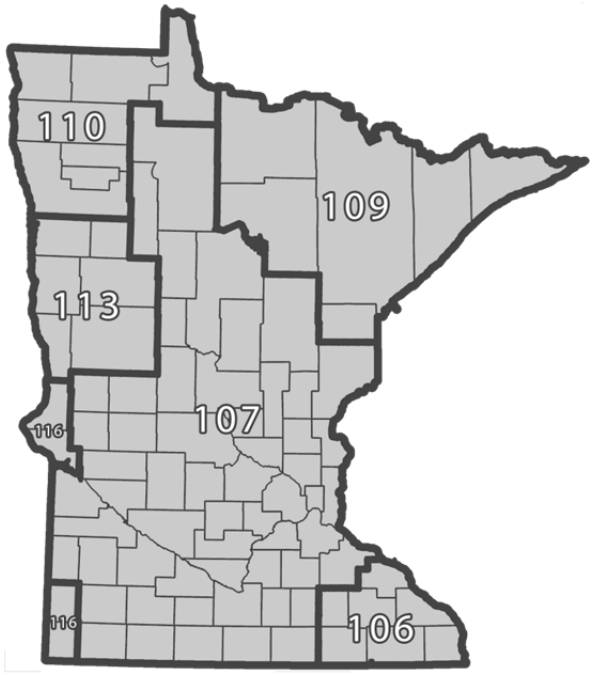


Figure 8: Cellular Economic Areas in Minnesota overlaid with Minnesota Counties

The two figures above show Cellular Market Ares and Cellular Economic Areas in Minnesota which have been used for recent spectrum auctions[20] to assigned spectrum to carriers. These areas do not correspond to state lines, but rather are concentrated on population centers. One

[18] *See* Palmer Wireless Response at pg. 1 and NewCore response at pg. 2.
[19] *See* Palmer Wireless Response at pg. 1.
[20] E.G., Auction 73 for 700 MHz spectrum by Cellular Market Area, Economic Area, and Regional Economic Area Grouping, Auction 96 for 1.9 GHz H block spectrum by Economic Area, Auction 97 for AWS-3 spectrum by Cellular Market Area and Economic Area.

rural carrier argued in its response that this approach prices them out of bidding in auctions as they cannot afford to bid in population centers; the same respondent argued that major carriers are not incentivized to serve their customers outside of these population centers.[21]

4. **Consumer Band-Class 14 Devices are essential to the viability of partnerships.**

Several proposed partnerships related to private-sector utilization of the public safety network; notably, use of the network by consumers[22]. However, consumer-grade devices at present do not support LTE band class-14 (BC-14), which is the spectrum allocated for the public safety broadband network. The figure below depicts public safety BC-14.

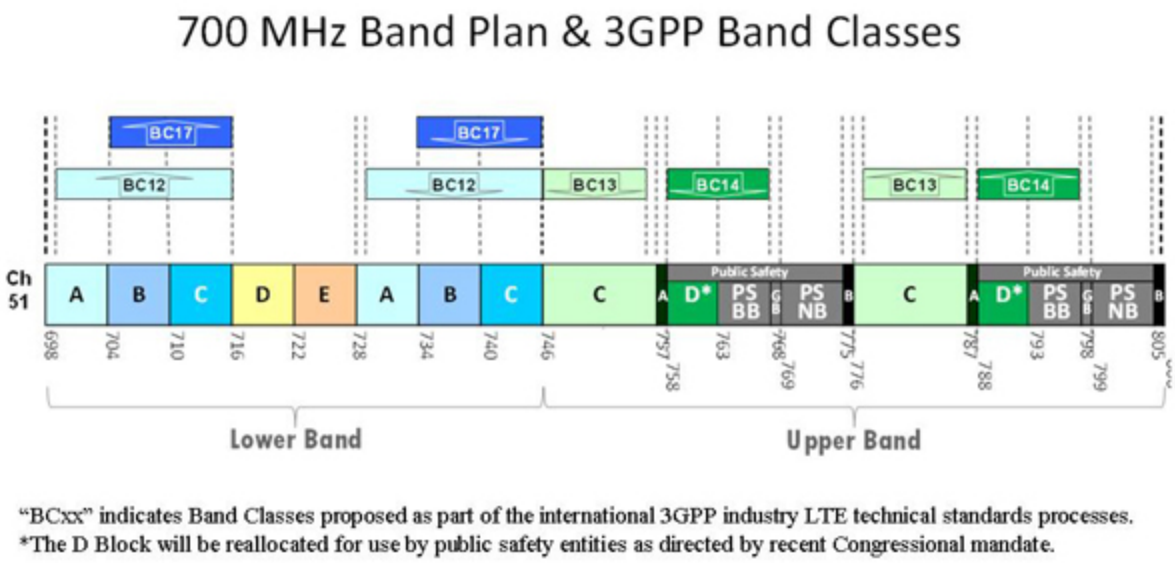


Figure 9: LTE Band Classes in 700 MHz[23]

In the United States, consumer mobile devices in the 700 MHz band operate on LTE band classes 12 (predominately regional carriers), 13 (Verizon, nationwide), and 17 (predominately AT&T).[24]

This fact introduces a significant risk to the proposed partnerships. If consumer devices do not support BC-14, then commercial partners have no meaningful partnership opportunities on the network.

[21] *See* Palmer Wireless Response at pg. 1.
[22] *See* responses from Palmer Wireless, NewCore, and Rivada.
[23] From https://apps.fcc.gov/edocs_public/attachmatch/FCC-13-136A1.pdf
[24] Note that lower A, B, and C blocks were assigned to a variety of entities in FCC Auction 73, and this statement is a simplification. For detail, see FCC Auction 73 results: https://apps.fcc.gov/edocs_public/attachmatch/DA-08-595A2.pdf

Recommendations

1. **The RFI should target respondents who are able to provide capital to build the network.**

   While several respondents offered their infrastructure to support the build of the network[25] or expressed interest in adding customers to the network,[26] only one responder offered to contribute capital for the initial network build.[27] While it is encouraging that there are a large number of parties interested in contributing to the network, the State and FirstNet need to identify sources of initial capital in order to fund construction of the network. Use of existing infrastructure will reduce initial costs, and a broader user base will increase operational income, but they do not solve the fundamental problem of amassing sufficient capital to build the network required by the stakeholders. Therefore, Televate recommends that the State's formal RFI prioritizes the identification of financial capital to support the initial network construction.

2. **The RFI should target the value of secondary access to the network.**

   "Secondary access" is the provision of network services to non-public safety entities through a private partner such as through a Telco or a cellular carrier. Respondents provided dissenting perspectives as to whether the excess capacity on the network would generate enough revenue to factor meaningfully into the business model. Notably, Rivada proposed to privately fund the entire network build using funds generated in this manner, while AT&T professed that these funds would not be sufficient to support the network. Accordingly, Televate recommends that the State targets its RFI specifically to assess the actual dollar value potential partners can contribute to the network through secondary access.

3. **The RFI should investigate suitability and sustainability of various partners for complete network solutions.**

   A number of respondents introduced their ability to provide a complete network solution for the State and FirstNet.[28] However, the scope of the informal RFI was too limited to provide an assessment of these partners' ability to provide a cost-effective and sustainable solution. As such, Televate recommends that the State's RFI targets extracting specific, empirical data that supports a viable business case from potential partners.

   In particular, Rivada proposes to privately fund the entire network build and ongoing operations through revenues generated from the auction of excess capacity on the network at no cost to the state. While this is a compelling offer, the informal RFI process did not provide Rivada with the opportunity to provide the detailed information necessary to prove its case. Rivada carries the burden of proof that its proposal carries real value—that it has interested buyers, that these buyers are able to contribute enough funds to fund the network construction and operation and that the proposal is sustainable long-term.

[25] *See* responses by Kandiyohi County, Anoka County, CNS, NewCore, MTA, CenturyLink, Crown Castle, 702, Midcontinent, and Great River Energy
[26] *See* response by Palmer Wireless
[27] *See* response by Rivada.
[28] *See* responses by Motorola, collective of NewCore, 702 and CNS; AT&T, and Rivada

4. **The RFI should target parameters for valuing privately-owned infrastructure that could contribute to the network.**

   Respondents provided information on extensive assets in the state, including fiber, cellular towers, shelters, rooftops and others.[29] All told, responses to this RFI alone offer thousands of miles of fiber to the cell site and hundreds of cellular site locations[30] throughout the state. However, the scope of the informal RFI did not include specific parameters for identifying the suitability of this infrastructure for inclusion into the public safety network. Televate recommends that the State's RFI be designed to collect information on these assets including specific metrics to assess whether the resources are appropriate for the public safety network. Note that some of this information will fall under SLIGP Phase 2: Data Collection.

5. **The RFI Should Target Device Manufacturers' Plans for Consumer Band Class 14 Devices.**

   The State and FirstNet must rule out any risk related to BC-14 device availability for consumers. While a variety of devices marketed for public safety support commercial bands as well as public safety BC-14[31], there are no devices, at present, marketed towards consumers capable of operating on public safety spectrum. While it is unlikely that major manufacturers will reveal any trade-secret future device plans to the State or to FirstNet, Televate recommends the RFI captures commercial availability of these devices to consumers to the fullest extent possible.

[29] *See* responses by 702, Crown Castle, CNS and CenturyLink, Midcontinent, and Great River Energy
[30] *See* responses by MCC, Crown Castle, AT&T
[31] E.G., Motorola LX and VML series, Harris RF-LTE and MBC series, Sonim "BC14-ready" models

Response Summaries

Following are lists of important points from each response and Televate's recommendations for action to be taken for each response. In some cases, the response was purely informational and Televate does not recommend a specific action to be taken.

702 Communications

Recommendations:

1. Investigate suitability of 702 and partner for complete solution
2. Investigate suitability of network assets for FirstNet

Response Background:

1. Telco based in Moorhead, Minnesota

Figure 10: Moorhead, Minnesota

2. Owned by:
    a. Barnesville Telephone
    b. East Otter Tail Telephone
    c. Loretel Systems, Inc.
    d. Otter Com, Inc.
    e. Red River Telephone
    f. Rothsay Telephone
3. Provides wholesale and transport services
4. Holds contract for transport backhaul to several hundred sites in Minnesota

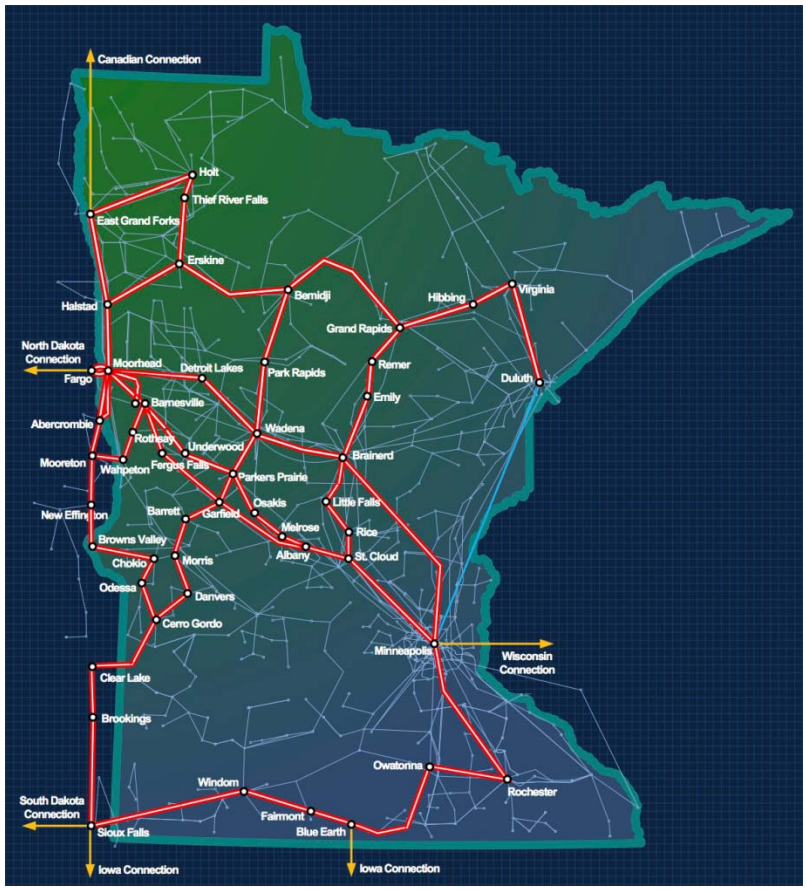


Figure 11: 702 Fiber Optic Sites in Minnesota[32]

5. Through CNS and other telecommunications partners, brings a large fiber transport network spanning much of Minnesota.
6. Hundreds of personnel throughout state.
7. Argument: Best interest of state to build using existing infrastructure
8. Does not seek access to spectrum
9. Is able to provide a complete network solution through New Core Wireless including:
    a. Network transport
    b. Sites
    c. Switching
    d. Engineering
    e. Billing
    f. 24x7 NOC
    g. Wireless/LTE expertise
10. 702 is able to provide transport engineering, network coordination, billing, 24x7 network operations center, and wireless/LTE expertise.

[32] *From* http://www.aurorafonet.com/partners.html

Great River Energy (GRE)

From the response:

> *Great River Energy is a not-for-profit generation and transmission electric cooperative owned by its 28 member distribution cooperatives. Those 28 member cooperatives in turn provide electrical service to approximately 1.7 million people in a 56,000-square-mile area from Minneapolis-St. Paul suburbs to very rural areas of the north shore of Lake Superior to the farmlands of southwestern Minnesota.*[33]

Recommendations:

1. Investigate GRE proposal for M2M devices on the network
2. Investigate suitability of GRE assets for the network

Findings:

1. Utilities do not have access to dedicated spectrum
2. GRE's service area is primarily rural but does cover some suburban areas
3. Seeks a small amount of guaranteed bandwidth for M2M interfaces
    a. Remote Terminal Units
    b. Programmable Logic Controllers
4. GRE owns 64 towers throughout the state of Minnesota
    a. Power and utility poles are potential microcell site

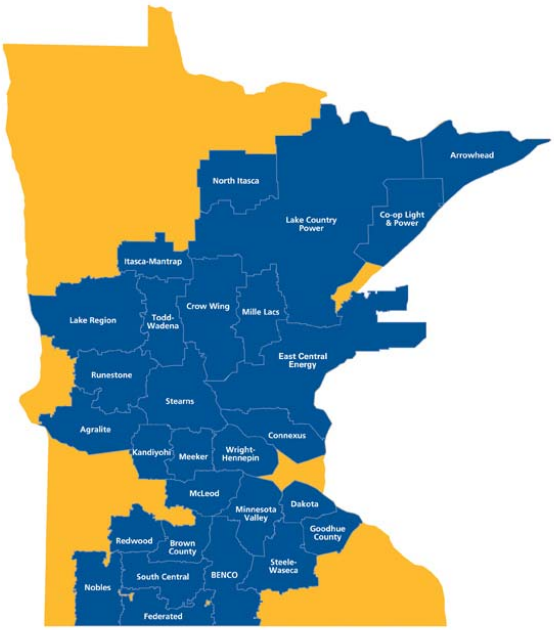


Figure 12: Great River Energy Market Areas

[33] *See* Great River Energy response.

AT&T

Recommendations:

1. No specific action recommended in response.

Response Background:

1. Offers intelligence for the network; not just connectivity.[34]
    a. Scaling
    b. Security
    c. Shared infrastructure
    d. APIs
2. [Redacted]
3. [Redacted]
    a. [Redacted]
    b. [Redacted]
    c. [Redacted]
    d. [Redacted]
4. [Redacted]
5. "Strongly" recommends that the network is used only by users providing public safety service per section 6001(27) and that public safety spectrum is exclusive to public safety entities[35]
6. Encourages public-private partnerships
7. Per Devices:
    a. Recommends legacy technology rev. support (e.g., HSPA) and roaming capabilities
        i. Is interested in assisting with developing the ecosystem for sustainability of BC-14 devices
8. Believes subscriber fees need to be competitive with commercial rates
9. Advocates for a network based on open standards and technologies
    a. Flexible and modular
    b. Multi-vendor strategy, as many carriers presently employ
10. Minnesota and FirstNet should develop a standard set of requirements
    a. Availability
    b. Coverage
    c. Reliability, Hardening
    d. Features
11. In short, AT&T recommends:
    a. Network domain approach using open commercial standards
    b. Single, centrally managed and operated core, that is dedicated to public safety with geographic and equipment redundancy
    c. RANs that share commercial and public infrastructure and that meet Public Safety grade requirements
    d. Common backbone infrastructure and transport, data centers, IP networking
    e. Centralize OSS/BSS with integrated Customer Care
    f. Multi-operator / multi-band devices considerations

[34] *See* AT&T Response, pg. 3
[35] *See* Id. at pg. 4

CNS

Recommendations:

1. Investigate suitability of assets to contribute to the network

Response Background:

1. LLC owned by 20 different telecom cooperatives to create efficiencies otherwise unavailable to them independently
2. Provides backhaul services for over 250 cellular towers in MN
3. Interested in expanding its network
    - Interested in utilizing public safety as an anchor tenant for the network

Figure 13: CNS Fiber Network

Table 3: CNS POP Locations

CITY	CLLI
ALBANY	ALBYMNXA
BARNESVILLE	BRVIMNXR
BEMIDJI	BMDJMNAS
BRAINERD	BRNRMNXA
CAMBRIDGE	POP
EAST GRAND FORKS	EGFKMNWI
EMILY	EMLYMNXA
ERSKINE	ERSKMNXA
FERGUS FALLS	FRFLMNAF
GARFIELD	GRFDMNXG
GRAND RAPIDS	POP
HALSTAD	HLSTMNXH
HOLD	HOLTMNXH
LITTLE FALLS	TFLMN13
MINNEAPOLIS	MPLSMNCD
MOORHEAD	MRHDMN01
PARK RAPIDS	POP
REMER	REMRMNXR
RICE	RICEMNXR
ST. CLOUD	POP
THIEF RIVER FALLS	POP
WADENA	WADNMNUS
LAKE WINNIE	SQLKMNXS

Crown Castle USA

Crown Castle is a wireless Infrastructure provider based in Pennsylvania. It owns, operates and leases towers and other infrastructure in all of the top 100 US markets. Crown Castle has access to over 40,000 towers, thousands of rooftops, 12,000 smell cell nodes and over 6,000 miles of dark fiber. Crown Castle owns over 500 sites in Minnesota, "many" of which are capable of redundant power and backhaul.[36]

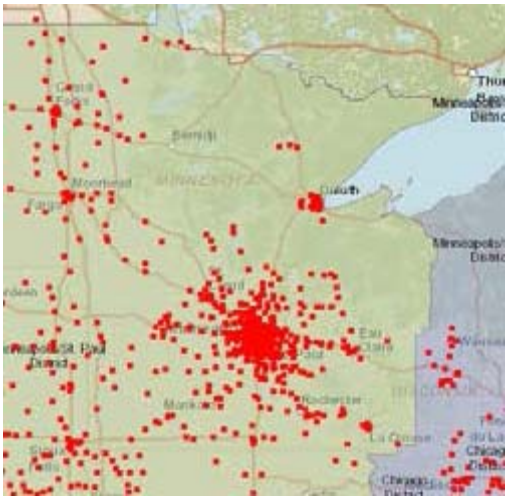


Figure 14: Crown Castle Sites in Minnesota

Recommendations:

1. Investigate suitability of infrastructure available to Minnesota
    a. Note; few assets in rural Minnesota and in particular in tribal lands.
2. Investigate interest in leasing State facilities

Findings:

1. Would offer the State reduced rent in exchange for the rights to market, develop, and manage the State's land, buildings and existing wireless infrastructure to other service providers
2. Does not seek access to FirstNet spectrum.
3. Is willing to lease its infrastructure to the state and/or FirstNet
4. Does not perceive any regulatory or legal challenges in its proposal. Is currently working with many public entities including State of NY, Orange County FL, City of Miami FL, New Castle County DE, Howard County MD, Allegheny County PA, City of Allentown PA, and the City of Bethlehem PA.
5. Owns significant infrastructure in Minnesota, but primarily in urban areas or population centers. Does not have substantial tower assets in rural or tribal areas.

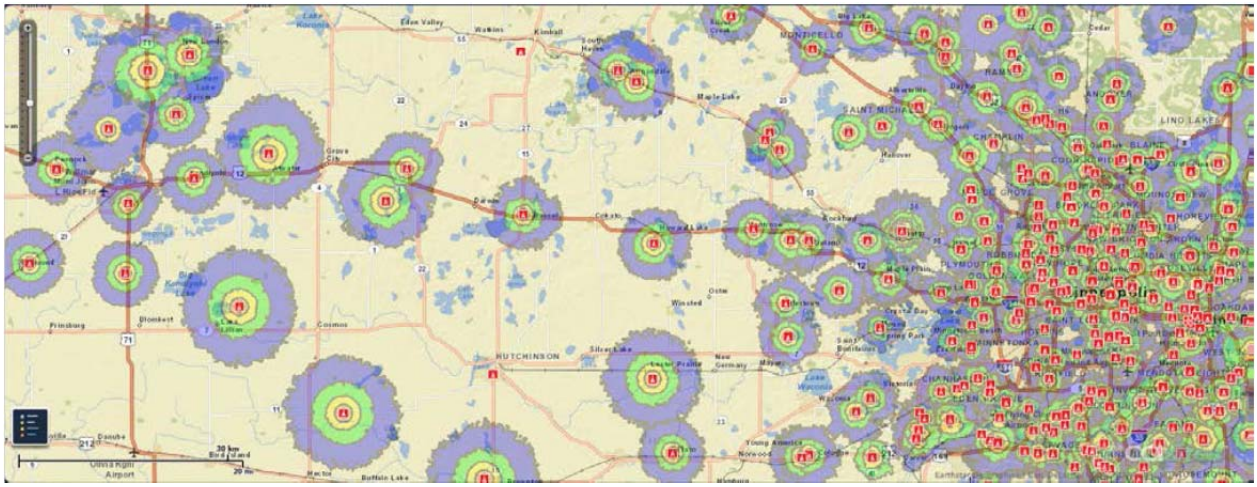


Figure 15: Estimated Coverage, Portion of Crown Castle Sites in West Metro

[36] *See* response from Crown Castle.

Minnesota Telecom Alliance (MTA)

From response:

> *MTA is a trade association that represents over 40 incumbent local exchange carriers throughout Minnesota. Our Members include large, medium, and small companies that serve primarily rural areas of the state.*[37]

Recommendations:

1. Leverage the relationships MTA has with the vendor community to inventory and assess fiber network assets throughout rural Minnesota.

Findings:

1. MTA members have routinely partnered with public safety organizations
2. Points out that rural ILECs have a legal responsibility to keep the most rural parts of Minnesota connected
3. MTA members have built and maintained a robust fiber network that connects the vast majority of PSAPs along with tower locations throughout the state
    - MTA member fiber connects to most points of interest for FirstNet

Palmer Wireless

Voice and internet service provider in Sherburne and Benton Counties. Established in 2006 to meet the needs of communications unserved by major carriers. Low population areas with little business case for major carriers. Uses licensed and unlicensed spectrum to deliver services.[38]

Recommendations:

1. Investigate partnership options for spectrum sharing
2. Investigate case study with Becker Public Schools as a potential model

Findings:

1. Primarily interested in access to spectrum
    - Cannot compete in auctions as their market is included in St Cloud metro and Twin Cities trading areas
    - Sees opportunity to access spectrum through partnership with FirstNet
    - Does not have a roadmap to otherwise serve its customers, who are unserved by major carriers
2. Becker Public Schools partnership
    - Extend campus learning tools to busses at no cost to the public
    - Able to construct a new tower that served the community of Becker
3. Also lists New Core Wireless as a potential partner for LTE core

[37] *See* MTA response pg. 1
[38] *See* Palmer Wireless response, pg. 1.

Kandiyohi County

Kandiyohi County is a rural county located in Central Minnesota. Its population is 42,239 and the county's total land area is 865 square miles.

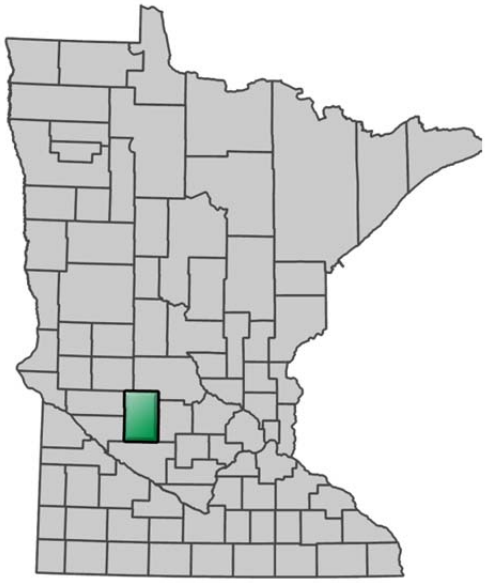


Figure 16: Kandiyohi Co

Recommendations:

1. Assess suitability of Kandiyohi county-owned communications infrastructure for FirstNet.

Findings:

1. Kandiyohi County is willing to share its infrastructure with FirstNet
    a. Has access to several communications towers and secure facilities
    b. Sees no regulatory or legal challenges in accessing its infrastructure
    c. Seeks service credit in kind for contributing infrastructure

Anoka County

Anoka County is a suburban county located in southeastern Minnesota. It has a population of 336,414 and a total land area of 446 square miles.

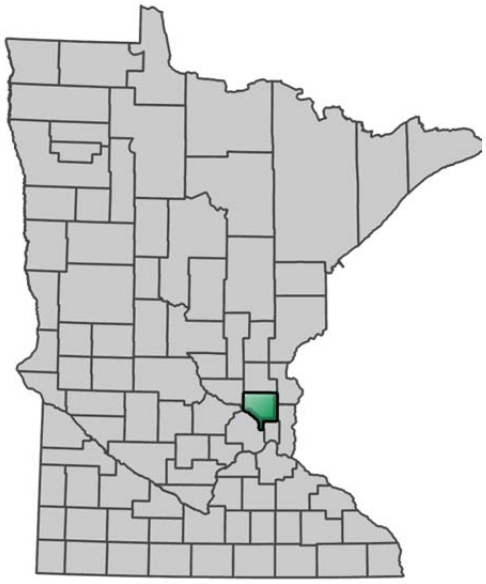


Figure 17: Anoka Co

Recommendations:

1. Assess suitability of Anoka county-owned communications infrastructure for FirstNet.

Findings:

1. Anoka County seeks to lease its radio towers to FirstNet
    a. 8 sites with all microwave and fiber optic backhaul
    b. Fiber optics to two state-owned towers in the county

Rivada Networks

Rivada Networks advertises itself as "a designer, integrator and operator of wireless, interoperable public safety networks at local, state and federal levels".[39] It proposes to dynamically lease public safety spectrum to commercial entities as secondary users to generate revenues for the network. Rivada claims that it can finance the entire network construction through this model.

Recommendations:

1. Target RFI to solicit a budgetary proposal from Rivada.

   Rivada proposes to privately fund the entire network build and ongoing operations through revenues generated by the auction of excess capacity on the network at no cost to the state. While this is a compelling offer, the preliminary RFI did not provide Rivada with the opportunity to provide the detailed information necessary to prove its case. Rivada carries the burden of proof that its proposal carries real value—that it has interested buyers, that these buyers are able to contribute enough funds to fund the network construction and operation and that the proposal is sustainable long-term.

Findings:

1. Rivada proposes to partner with the state and relevant partners to build, operate and manage the network for the state
2. Rivada proposes to privately fund the entire network build
   a. RAN
   b. Core Network
   c. Base Station Infrastructure
3. Rivada proposes selling excess capacity on the network when available to generate funds to build the network
   a. Would allow preemption for public safety
   b. Would be accomplished through proprietary and patented technology
   c. Will return profits generated to the public safety operator, whether the State or FirstNet
   d. Rivada would only lease spectrum during periods when public safety was not using it
      i. Public safety would have complete control over the spectrum
4. Rivada argues that commercial devices must support BC-14 for its proposal to be effective
   a. Otherwise, it cannot market public safety spectrum to commercial entities, as commercial users would be unable to access the spectrum
5. Rivada recommends that the RFI requires respondents to:
   a. Have a detailed answer on how they propose to guarantee immediate access to public safety users when needed. Detail on providing ruthless pre-emption should be requested.
   b. Clearly outline their business plan and provide details on how they fund the network.
   c. Specify how they can guarantee the sustainability of the network.
   d. Address the impact to existing rural public safety communication systems

[39] *See* Rivada Networks response, pg. 2

NewCore Wireless

From the company's response:

> *NewCore Wireless is an LLC headquartered in St. Cloud, Minnesota that provides 3G and LTE hosted switching services in Minnesota, as well as most of the Upper Midwest. NewCore also provides professional services to our partners including project management, construction management, RF engineering, marketing assistance and general wireless consulting. NewCore was founded on the principle of providing operators the ability to offer wireless voice and broadband services economically through a shared switching platform. Our partners own and operate their own local networks, customers and retail operations. NewCore provides the experience, hosted switching platforms and industry partnerships that individual partners do not have the scale to provide.*[40]

Recommendations:

1. Target RFI to include Minnesota companies including NewCore.

Findings:

1. Can provide a network solution through its resources and those of its network partners
    a. Specifically CNS and 702 Communications
2. Proposes to partner with public safety by providing a shared LTE core network solution
    a. Has a fully functioning tier 1 LTE network serving numerous sites throughout the Midwest
    b. Operating platform could be used for testing and demonstration
        i. Has already volunteered its assets to potential trials throughout Central Minnesota
3. Spectrum is prohibitively expensive for New Core and its channel partners
    a. NewCore does not directly seek access to the spectrum

[40] *See* NewCore Response.

Southern Minnesota Broadband

From its response:

> *Southern Minnesota Broadband, LLC is an organization owned by eight Member Companies in southern Minnesota and South Dakota. It is managed by South Dakota Network, LLC. This partnership will result in better and more affordable broadband connectivity and Internet services for businesses in Minnesota.*[41]

Recommendations:

1. No specific action recommended in response to SMB's response.

Findings

1. SMB proposes to offer fiber infrastructure to provide backhaul for the network.
    a. Did not provide any detail

Motorola

From its response:

> *Motorola Solutions has been committed to innovation in communications and electronics since 1928. Our company has achieved many milestones in its nearly 85-year history. We pioneered mobile communications in the 1930s with car radios and public safety networks. We made the equipment that carried the first words from the moon in 1969. And we invest over $1B per year in R&D to develop the next generation of innovative technology and services. In summary, we innovate solutions, creating devices, infrastructure, software and services to help governments build safer cities and enterprises build stronger businesses.*[42]

Recommendations:

No specific action recommended in response to Motorola's filing.

Findings

1. Motorola proposes a private-public partnership (PPP) that includes design, build, finance, operation and maintenance of the network in exchange for a long-term return on its investments.
    a. Motorola has employed a similar model in its land-mobile radio business
        i. E.G., STARCOM in Illinois
    b. In exchange for a monthly fee per user over a multi-year term
2. Motorola can provide for all aspects of the product including infrastructure, end-user devices, and required financial resources
3. Recommends establishment of a Mobile Network Operator (MNO) entity for each state
    a. Would provide greatest flexibility
4. Advocates for marketing secondary access on the network

[41] *See* SMB response, pg. 2
[42] *See* Motorola response, pg. 2

Maximum Communications Cellular

From its response:

> *Maximum Communications Cellular, LLC (MCC) is a MN owned fixed and mobile wireless services carrier operating in the Central MN area and headquartered out of St. Cloud, d/b/a Duet Internet and Phone. MCC is owned by two local telephone companies – Albany Mutual Telephone (AMT) and Benton Communications (BC) in Rice, MN.*[43]

Recommendations:

1. Target RFI to include rural carriers such as MCC.

Findings

1. Proposes to market excess capacity to end-users
    a. Has experience operating as a Sprint affiliate
    b. Would leverage current brand, pricing strategy and experience
2. Has some wireless infrastructure in Central Minnesota
    a. Network: 1900 MHz GSM HSPA
    b. Towers: 25 in Central MN
    c. Switching Vendor: NewCore Wireless, St. Cloud. (hosted)
    d. Pops Covered: ~150,000
3. Seeks access to FirstNet spectrum as it has a limited license area and no LTE spectrum
    a. Limited growth opportunities
4. Espouses the value of staying local

Midcontinent Communications

From its response:

> *Midcontinent Communications is a privately-held, for-profit telecommunications company based in Sioux Falls, SD. Since its beginning with one movie theater in St. Paul, MN in the early 1930's, Midcontinent has sought to bring the advantage of advanced entertainment and communications services to communities in the Upper Midwest.*[44]

Recommendations:

1. Assess the viability of Midcontinent's infrastructure through Phase 2 Data collection

Findings

1. Owns over 7,200 miles of dependable fiber optic cable throughout the upper Midwest

[43] *See* MCC response, pg. 2
[44] *See* Midcontinent response, pg. 1

Alcatel-Lucent (ALU)

From its response:

> *Alcatel-Lucent is a leading telecommunications equipment and solutions provider globally and a recognized industry leader in the design, deployment and operation of wireless networks for Mission Critical Industries and Commercial Service Providers alike. Along with our experience deploying nationwide LTE networks for operators, such as AT&T, Sprint, and Verizon, and rural commercial carriers across the country, Alcatel-Lucent is a market share leader for Mission Critical backhaul for both public safety and utilities.*[45]

Recommendations:

No specific action recommended in response to ALU's response.

Findings

1. Recommends partnering with commercial mobile operators as a "vital first step"[46]
2. Recommends that the state ensures that sharing of public safety infrastructure is uninhibited by state laws and regulations
3. Points to utilities and rural carriers for covering rural areas
    a. Argues that states are in a much better position to coordinate these relationships than FirstNet is on a state-by-state basis
4. Provides the following specific recommendations:
    a. Leverage existing infrastructure assets and converge and consolidate network resources within Minnesota
    b. Demand industry standard transport and routing protocols such as IP/MPLS.
    c. Align state legislation to knock down barriers to use state resources in a public private partnership.
    d. Assure that all resources are sustainable.
    e. Look at all the data and network requirements holistically; there may be many opportunities to leverage existing resources using what is in place more efficiently.
    f. Use of WebRTC and HTML5 should be considered to allow applications to use standards-based device APIs that can provide high levels of security, thus eliminating the need for unique clients that have to be loaded in a device in order to take advantage of a specific application. Additionally these technologies allow for easy application programming, leading to more innovative applications.
    g. Use of OMA-DM for device management will allow consistent device management across the FirstNet network, and provide synergies with what commercial providers in the US are using.

[45] *See* ALU response, pg. 1
[46] *See* Id.

CenturyLink

From its response:

> *CenturyLink is an integrated communications company engaged primarily in providing an array of communications services to our residential, business, governmental and wholesale customers. We strive to maintain our customer relationships by, among other things, bundling our service offerings to provide our customers with a complete offering of integrated communications services.*[47]

Recommendations:

1. Assess the viability of CenturyLink's infrastructure through Phase 2 Data collection
    a. Owns much robust infrastructure throughout the state
    b. Has existing relationships with the state through MnIT and NG911 services

Findings

1. Is "very interested"[48] in exploring viable approaches for leveraging its assets for the benefit of the network.
    a. Provides telecommunications for 376 communities connected to the Minnesota network
    b. Operates a Tier III data center in Shakopee and 55 other cloud hosting data centers
    c. Argues it is Minnesota's best-positioned major telecommunications carrier for secure statewide emergency services
2. Provides NG911 services for the state of Minnesota
3. Proposes the following services for inclusion into the network:
    a. Data Center hosting
    b. Switching services
    c. Cloud and Managed Services
    d. Professional Services
    e. Network connectivity and Fiber To The Tower/Backhaul
    f. CPE equipment
    g. Next Generation 9-1-1 and E-911 services
4. Does not offer retail wireless services, so does not seek access to FirstNet spectrum.

[47] *See* CTL response, pg. 2
[48] *See* Id.

MINNESOTA USER REQUIREMENTS: PRELIMINARY FINDINGS

Working Groups

To support Minnesota's requirements gathering efforts, Televate assisted the State in creating specific subject-matter working groups. These workgroups are staffed by volunteers representing a variety of interests and disciplines in five subject areas of interest to the State. The topical areas are as follows:

- Applications and NG911—applications and application service requirements for the network.
- Devices—requirements for devices that operate on the network.
- System (IT)—architectural and IT requirements for the network.
- Coverage—coverage requirements and coverage classification for the network.
- Security—security requirements for the network; esp. information security.

Televate facilitates these workgroups according to three central tenants; (1) a strong focus on network launch, (2) a strong focus on minimum requirements to adoption, and (3) an assumption that "mission critical" and "public safety grade" service are realized over the long, and not immediate term.

The goal of the working groups is to identify the **minimum improvement** over commercial service that would drive the user to adopt FirstNet service, and not the **maximum potential** of the network that will be experienced over the long term. For example, while there is an underlying assumption that eventually, the network will provide ubiquitous coverage at a public safety grade, there is no assumption that the network will provide this degree of service at or near launch.

For a full roster of workgroup Members, See Appendix 4.

Process

In identifying its user requirements for FirstNet, the State is leveraging its governance structure to ensure that all key stakeholders have a fair voice in developing and endorsing the final set of requirements. The State's process for developing and seeking approval for requirements is illustrated in Figure 18: Requirements Development and Approval Process and elaborated upon below.

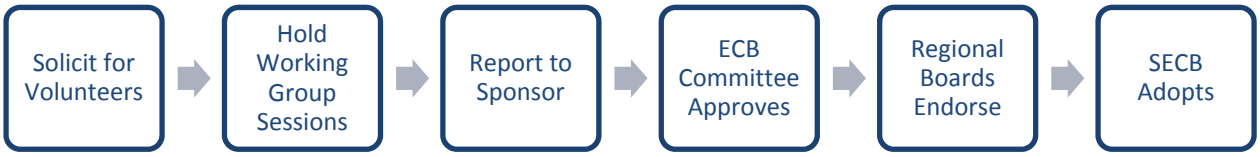


Figure 18: Requirements Development and Approval Process

First, Televate solicited for volunteers during outreach meetings held throughout early 2014, and through the state's existing contact lists for sheriffs, PSAPs, police chiefs and the SECB's announcements mailing list. Televate was able to recruit 43 volunteers for five workgroups, with most volunteers serving in several workgroups for a total of 89 resources.

Presently, Televate is holding working group sessions for the Devices, Applications and NG911, and Coverage Workng Groups. These are facilitated focus group sessions led by Televate staff. To ensure maximum consistency with existing requirements sets, Televate is modeling its requirements development off of NPSTC's *Public Safety Broadband High-Level Launch Requirements Statement of Requirements for FirstNet Consideration*.[49]

Each working group goes through a feedback cycle, which includes holding the meeting, collecting feedback, and Televate incorporating feedback and preparing for the next meeting. Once the workgroup has reached a consensus on its requirements, Televate submits the workgroup's final requirements for approval through the governance structure illustrated in Figure 18: Requirements Development and Approval Process.

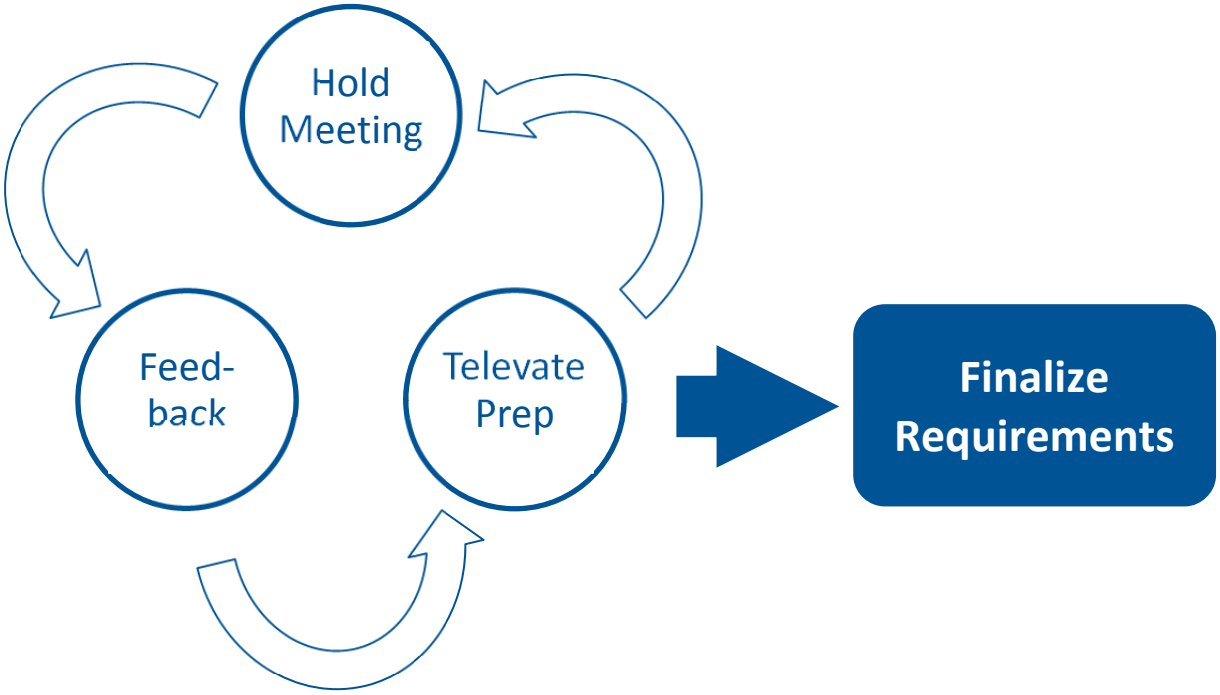


Figure 19: Workgroup Feedback Cycle

Devices

As of this writing the devices workgroup has met twice and has completed two rounds of meetings. Televate anticipates two additional meetings before the workgroup has finalized its requirements. Preliminary findings are detailed below.

Televate has made three major discoveries so far:

1. A strong desire for ruggedized handhelds, but little interest in currently-available models
2. A strong preference for iOS in mobile devices; so much so that it is a requirement for many agencies
3. A strong preference for existing form factors and commercial devices

[49] Available online at: http://www.npstc.org/download.jsp?tableId=37&column=217&id=2609&file=BBWG_SoR_Launch_12112012.pdf

Preliminary Recommendation: Deploy Upon Current Commercially-Available Smartphone Platforms in Rugged Form Factor

We discovered that user agencies strongly desire ruggedized handhelds; these are devices capable of preventing intrusion of water and dust and withstanding shock and vibration.[50] However, during our focus group sessions we determined that there was little interest in the existing rugged handhelds available. In fact, one working group member described having abandoned the Samsung Rugby Pro Smartphone (advertising certification as both IP and MIL-STD-certified for ruggedization)[51] from their agency's fleet in favor of Apple iPhones in water-proof, shock-resistant aftermarket cases. The workgroup member justified this move in explaining that rugged smartphone models are always one or more generations behind in terms of technology, and that to keep current, the best approach was to utilize commercially available devices.

Table 4: Preliminary Device Form Factor Requirements

SHALL	SHOULD	SHALL NOT	SHOULD NOT
Consumer Smartphone	Dual-mode[52] Handheld		Fixed Camera
Vehicular Router[53]	Deployable Camera		
Portable Router[54]	Microphone		
Tablet	Weather Sensors		
Laptop			
Personnel Camera			

[50] Generally acceptable standards include United States Military Standards (MIL-STD) and International Electrotechnical Commission Ingress Protection (IP) certification processes. More information available respectively at http://www.atec.army.mil/publications/Mil-Std-810G/Mil-Std-810G.pdf and http://www.iec.ch/dyn/www/f?p=103:7:0:::FSP_ORG_ID:1256.

[51] Product information available at: http://www.samsung.com/us/mobile/cell-phones/SGH-I547ZKAATT. Note that product information does not specify which ruggedization spec the device meets; E.G., IP-67; only that it meets "environmental protection an enclosure provides".

[52] A mobile device with an embedded P25 and analog radio.

[53] An LTE router that supports multiple devices, from 2-3 to over 100 in some applications. Typically installed in a vehicle, E.G. a patrol car. Occasionally installed on a fixed or temporary fixed basis such as at an emergency operations center.

[54] E.G., "puck" form factor mobile hotspot.

The delay in the availability of current generation devices introduces a dilemma to device manufacturers and network operators; users have an expressed need for current commercial technologies, but specialized mobile devices designed specifically for rugged environments have historically lagged behind the current pace of technology. In order to ensure maximum adoption, the network operator should identify some means to stay lock-step with commercially-available mobile platforms while meeting public safety needs for ruggedization.

This point is further illustrated in Table 4: Preliminary Device Form Factor Requirements above; when evaluating existing and potential form factors, the only *required* ("shall" in the table below) form factors were existing, commercially-available platforms such as consumer smartphones, while potential form factors not currently on the market were only classified as *desired* ("should" below) by the working group. The takeaway is very clear; the network operator will need to support existing commercial platforms in order to be a success at launch.

Next Steps

The next steps for the Devices working group are to:

1. Finalize required device characteristics including requirements, use cases, characteristics of the device and impediments to classification as mission-critical devices
2. Finalize impediments to adoption of the service based on device deficiencies
3. Finish reviewing NPSTC SOR requirements and complete independent, Minnesota-specific requirements

Applications and NG911

The purpose of the Applications and NG911 working group is to express Minnesota stakeholder user requirements for applications and NG911 on the NSPBN that would facilitate adoption of FirstNet services.

Applications inventory

Televate performed an applications inventory of membership agencies. In performing this inventory, Televate asked members of the community to describe the applications they currently utilizing with commercial or private mobile data networks. The objective of this exercise is to identify the types of information first responders are sending today to guide our future requirements development work.

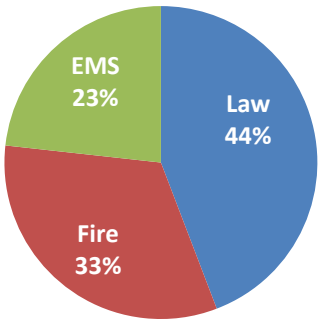


Figure 20: Application Distribution by Discipline

In total, we surveyed 42 separate applications. We found unsurprisingly, that the predominant users of applications were law enforcement users performing database queries, records management, and multimedia transfer related to the use of CAD system databases used for law enforcement. We were surprised to see that only one agency reported using video and no agencies are using voice, in any capacity, over commercial mobile data networks. Note that "voice" in this context does not include

cellular telephony; it does include, for example, an "over-the-top", application-layer push-to-talk applications or a rich communications suite.

These findings represent the current state and represent application use only. While first responders do not report using field video right now, hundreds of surveys performed by Televate in markets across the United States show that, over the long term and provided a highly reliable network, first responders demand the ability to utilize video in the field. For example, refer to the 2011 Minnesota Public Safety Data Network Requirements Study[55], which showed a high demand for incident video[56].

This illustrates to us that, at least at launch, throughput needs on the public safety network in Minnesota are likely to be relatively low, but that these throughput needs will escalate quickly as agencies start to take advantage of the multimedia capabilities of the network. Our findings are illustrated in figures Figure 20 and Figure 21.

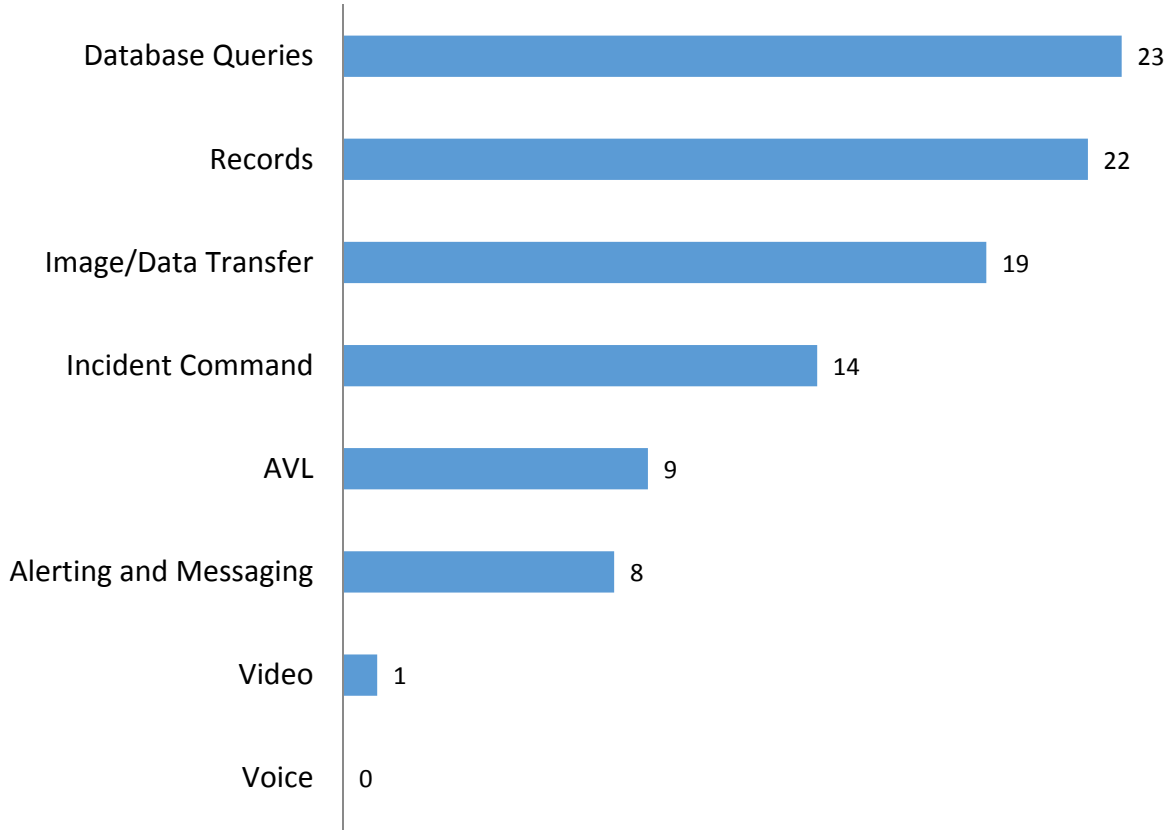


Figure 21: Data Type Utilization by Category

[55] Available at https://dps.mn.gov/divisions/ecn/programs/armer/Documents/Minnesota_Needs_Assessment_Report_FINAL.pdf
[56] *See* Id. At pp. 32, 40-54

Deployment and Enablement

The working group reviewed NPSTC's deployment and enablement requirements for FirstNet. The group evaluated these requirements form four perspectives:

1. Should FirstNet deploy the service at launch?
2. Should FirstNet deploy the service at some point over the long-term?
3. Should FirstNet *enable* (i.e., not block) the service at launch if an agency chooses to deploy it?
4. Should FirstNet *enable* (i.e., not block) the service over the long term if an agency chooses to deploy it?

For the most part, the working group's requirements mirrored those of NPSTC. The workgroup's requirements are summarized in the table below:

Table 5: Minnesota Deployment and Enablement Requirements

Service	NPSTC: Deployed by FN	NPSTC: Enabled by FN	MN: Deployed by FN at launch	MN: Enabled by FN at launch	MN: Deployed by FN long-term	MN: Enabled by FN long-term
Telephony (cell phone)	Yes	Yes	Yes	Yes	Yes	Yes
NG911 Emergency Services	Yes	Yes	No	Yes[57]	Yes	Yes
CMAS	Yes	No	Yes	No	Yes	No
Messaging	Yes	Yes	Yes	Yes	Yes	Yes
Push-to-Talk Voice	No	Yes	No	Yes	Yes	Yes
Mission-critical push-to-talk	n/a	n/a	No	No	Yes	Yes
Video Services	No	Yes	No	Yes	Yes	Yes
Status Web Page	Yes (root only)	Yes	Yes	Yes	Yes	Yes
IPAWS	n/a	n/a	Yes[58]	No	Yes	No
ARMER/P25 Interconnect; non-mission critical	n/a	n/a	No	Yes	Yes	Yes
ARMER/P25 Interconnect; mission critical	n/a	n/a	No	No	Yes	Yes

[57] Assuming availability of NG911 services. "NG911 services" means NG911 services deployed by state and local government per regonized industry standards for NG911.
[58] Assuming service availability

Next Steps

The working group's next steps include:

1. Complete deployment and enablement requirements, especially those unique to Minnesota
2. Review NPSTC launch requirements as they apply to Minnesota
3. Define interoperability requirements for data types
4. Review NG911 roadmap provided by the State and define Minnesota NG911 requirements for FirstNet

Coverage Working Group

The purpose of the coverage workgroup is to define the standards through which coverage offered by the network is evaluated. Additionally, the workgroup provided guidelines for individual stakeholder coverage reviews.

Service Area Classification

The Coverage workgroup defined three classifications of service areas for the purposes of expressing requirements. These areas are (1) Critical Service Area, (2) Required Service Area and (3) Extended Service area.

1. **Critical Service Area**
   This area is defined as the area of highest activity for the agency, any areas with critical infrastructure, and any major freeways or thoroughfares. In these areas, agencies expect highly reliable in-building service on dedicated BC-14 spectrum. Areas of high activity for each agency are justified empirically using historical CAD/RMS data from each PSAP.

2. **Required Service Area**
   This area is defined as the area currently provided by cellular carriers[59] to agencies today, minus any critical service areas. In the case of population centers and major highways it is likely that much of this area overlaps with the "Critical" service area. There is no expectation that at launch there will be highly reliable service on dedicated BC-14 spectrum. It is acceptable, for example, that at launch these areas are covered through a commercial partner. The purpose for this category is that, in order to compel users to switch to the public safety network, it must *at least* exceed the service provided today through a commercial option.

3. **Extended Service Area**
   This area is categorized by current coverage provided by the agency's private wireless services, such as their land-mobile radio and paging systems, as well as any remaining gaps commercial carriers do not cover. In practice, the "extended" area will cover all or nearly all of the agency's geography. There is no expectation these areas are covered at launch, but providing at least mobile coverage in these areas provides added value. For example, if the network provided coverage to these areas the agency could consider replacing a private paging system with a mobile service.

[59] Note—for each coverage review, Televate compared to the cellular carrier that agency uses. For example, if the interviewee agency was a Verizon customer, we would compare to Verizon coverage. If the agency utilized three different commercial carriers, we could compare to all three of the carriers that the agency utilized.

Commercial Failover Required

Notably, the working group expressed commercial failover as a required feature. Specifically, that the public safety network is able to failover to a commercial technology to provide an added layer of redundancy. The working group's Minneapolis delegate cited experience using a citywide wifi network for first responders throughout the city coupled with commercial service from all four major carriers, depending on which provided better service in that particular unit's area of operation. The delegate reported that while coverage and reliability did not fully meet their agency's needs on either network alone, they were able to meet Minneapolis' needs by using both private and commercial data services in tandem. This experience led the workgroup to declare commercial failover as a required feature statewide for the network.

Rejection of OEC Coverage Model

The most significant finding of the Coverage Working Group has been a unanimous statement that the Workgroup rejects OEC's coverage model prepared for the State under the OEC Technical Assistant Program. The workgroup expressed three primary reasons for rejecting the model; (1) poor rural coverage; (2) poor in-building coverage, and (3) the belief that satellite and deployable systems are not acceptable for routine operations.

In general, the working group's thoughts were unified by the experience that they receive better service through a commercial carrier today than is offered by OEC's model. Accordingly, they would have little incentive to migrate to the public safety network if it offered the coverage provided by OEC.

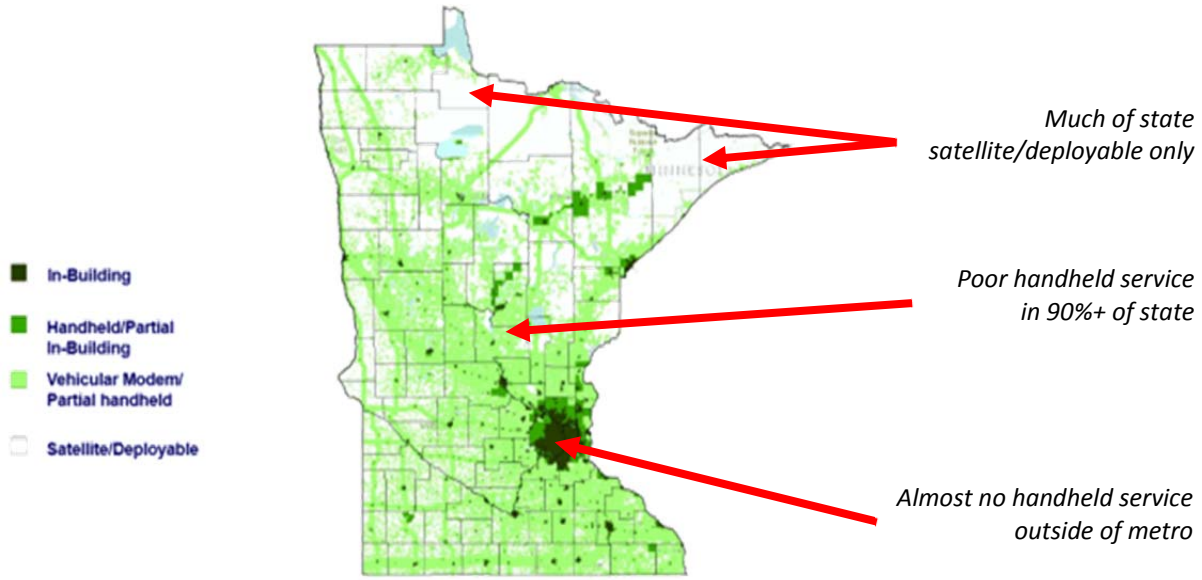


Figure 22: Workgroup Criticism of OEC Coverage Model

The working group's three areas of concern are detailed below:

1. **Poor rural coverage**.
   Throughout approximately 90% of the state, OEC's model shows "vehicular modem/partial handheld" coverage with approximately half of the rural landmass showing

"satellite/deployable". The workgroup felt this level of coverage was unacceptable to meet their needs and in most cases worse than service available to them from a commercial carrier.

2. **Poor in-building coverage.**
   OEC's benchmark for "in-building coverage" is a coverage that "provided to a handheld device through minimum one wall". Metropolitan-area members of the workgroup felt that this was inadequate to meet their needs where cellular providers and building owners provide much greater coverage through distributed antenna systems, BDAs and picocells.

3. **Satellite/deployables are not an acceptable alternative for routine operations.**
   Rural-area members of the workgroup reported that satellite and deployable systems are not acceptable for routine operations. They cited experience using satellite systems and in particular that they were high-latency and weather dependent and can take hours to set up. Additionally they provided experience being unable to get a clear view of the southern sky in heavily-forested areas throughout northern Minnesota. While deployables will be required, deployment is not trivial and the working group did not accept them as a preferred option.

Next Steps

The Coverage Working Group's next steps are to:

1. Establish specific criteria for each class of coverage, such as minimum cell throughput and building penetration
2. Establish coverage and deployment benchmarks, such as rural coverage requirements
3. Review available BC-14 device specifications and any related impacts to coverage expectations

Web Survey

Background

The success of the MnFCP is derived most directly from the participation of the stakeholder community in defining their interests in wireless broadband, in detailing their operational requirements, in describing their barriers to adoption, and from their general support of the objective to deliver the next generation of public safety wireless communications. In securing their ongoing participation and to engage them to the greatest extent possible with the least impact on their day-to-day work schedule, the MnFCP has relied on a series of carefully designed web surveys to obtain the information fundamental to the success of the program.

Beginning with a survey to identify the primary Points of Contact (POCs) from all stakeholder agencies in each State, County, Independent City and Tribal Nation, and a survey to identify all other key program stakeholders, through a series of surveys to identify potential users, define FirstNet adoption critiera and establish requirements for coverage, applications, devices and various other essential information, web surveys have been successfully employed.

Data and Findings

The participation of the Quickstart counties, as detailed below, was outstanding, and while a variety of the tasks and requests for information from these Counties, and one Tribal entity, had begun months ago, the recent efforts of the Regional Interoperability Coordinators (RICs) to identify and encourage support from the stakeholders best suited to support the activities ensured greater participation. The results of the effort focused on the completion of the User Population Survey (UserPOP) and in conducting the Coverage Assessment. These tasks involved the following:

- **Point of Contact Survey:** This survey is designed to identify the primary POCs from all stakeholder agencies in each State, County, Independent City and Tribal Nation. The POC guides access to people and information, or who directly provide the information essential to the program. The identification of the individuals is a critical time consuming task, which underlies all stakeholder interaction activities of the program. The POC survey was conducted directly to PSAP Directors and Coordinators and Emergency Managers who we discovered maintain the most current and extensive database of key stakeholders.
- **Stakeholder Survey:** This survey expands the primary POC database to identify and gather the contact information for all other key stakeholders including County Sheriffs, Police Chiefs, Fire Chiefs, Emergency Medical Services Directors, Health Directors, Transportator Director, School Officials, and other critical stakeholders. This database facilitate ongoing MnFCP outreach and information collection and sharing.
- **User Population Survey:** An online suvery distributed to all first responder agencies within the County/Tribe designed to quanity the number of potential subscribers to FirstNet, to define current broadband services, investigate barriers to FirstNet adoption and gather a variety of additional insight into the potential user populations and capture specific operational requirements.
- **Future Surveys:** Future surveys will endeavor to quantify additional requirements and continue to obtain information and insight essential to the development of the State's FirstNet strategic plan.

User Population Survey

Based on the response of nearly 300 respondents from the Quickstart entities (see below for more detail), the following sample findings that address various users population devices numbers, preference and agency investment are presented for consideration. While the results are not conclusive at this time, valuable insight and information can be derived. These preliminary findings will guide further research and will culminate into a final UserPOP report that details and assesses the results and findings.

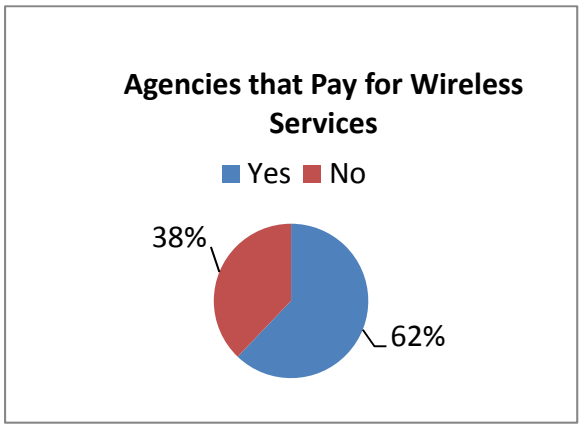


Figure 23: Agency Commercial Subscriptions

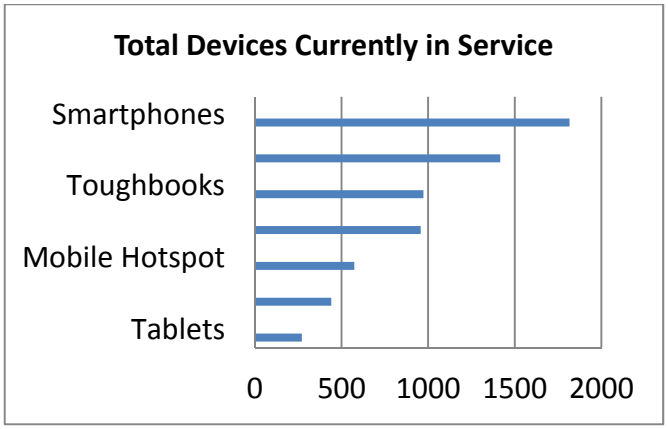


Figure 24: Devices in Service

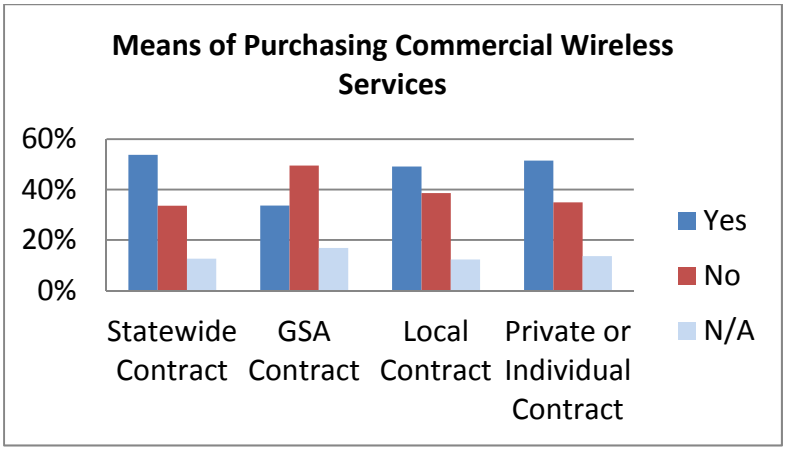


Figure 25: Commercial Service Purchasing Vehicles

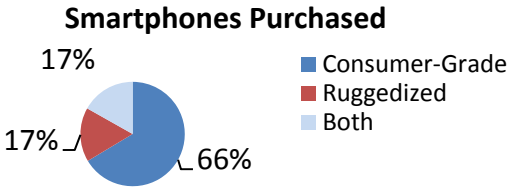


Figure 26: Device Types

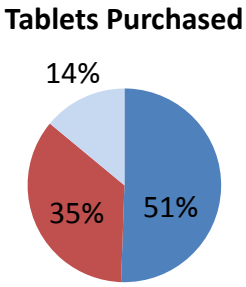


Figure 27: Tablets Purchased

The findings regarding the barriers to FirstNet adoption as illustrated in the figures below and the effects of FirstNet service subscription adoption as comparabler to commercial cellular service (Figure 29) provide an important perspective into the key factors that will drive FirstNet service adoption across the State.

Overall, our preliminary findings show that cost is the biggest barrier to adoption. Agencies report having very little tolerance for a service that is more expensive than the commercial service they are using today. Not only do agencies cite as the top barrier to adoption among agencies surveyed, but nearly 60% of agencies report they would reduce the number of devices deployed if the cost were increased by 50% or more. Approximately 40% of agencies report they would not subscribe to the service if it were even 1-50% more than their current service.

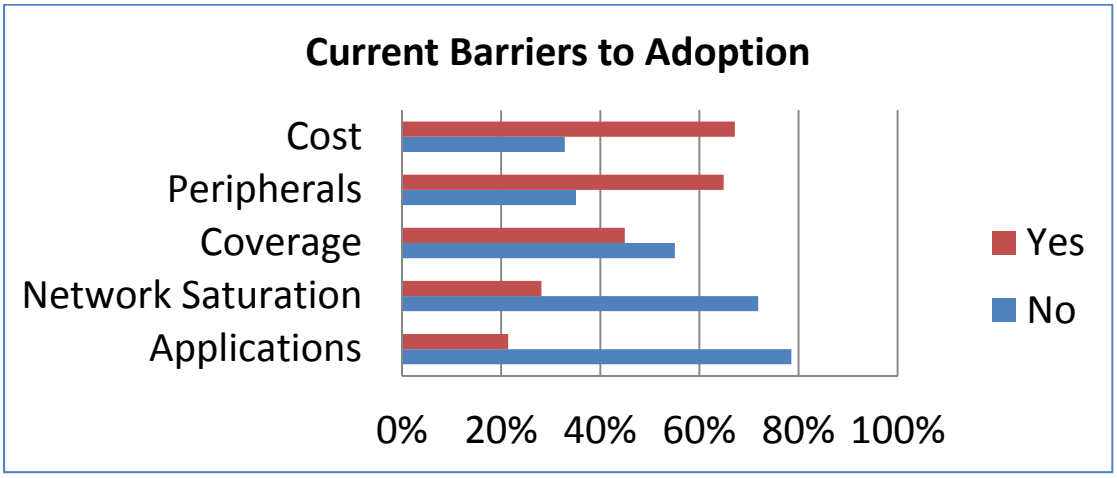


Figure 28: Barriers to Adoption

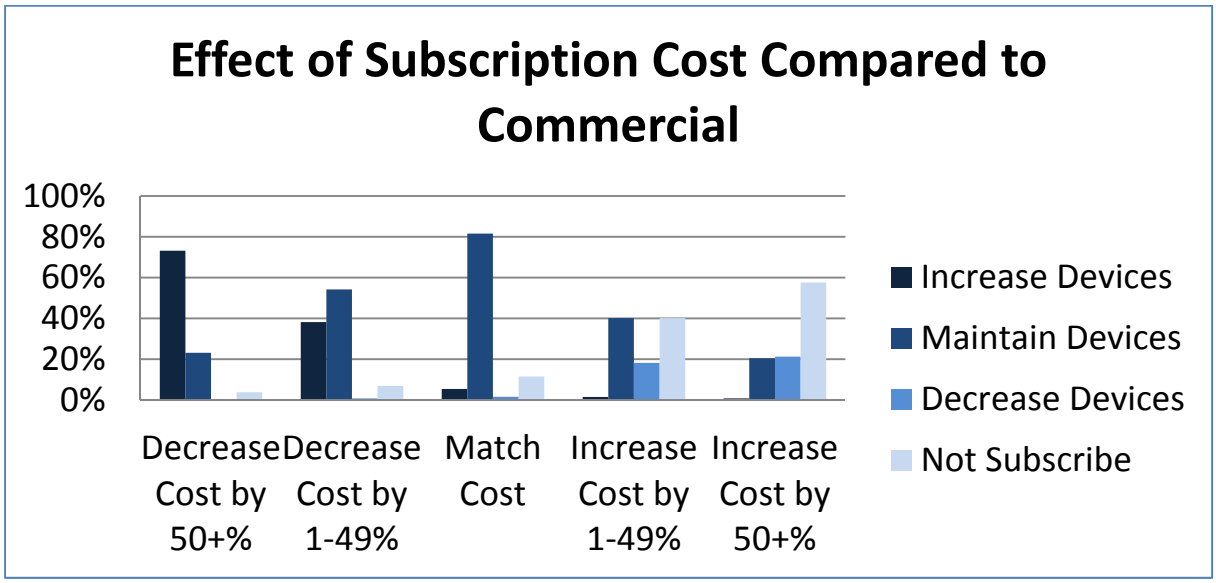


Figure 29: Effects of FirstNet Subscription Costs

Coverage Reviews

Summary

Televate is performing stakeholder-by-stakeholder coverage reviews for each county and each tribal reservation in the state of Minnesota. The coverage reviews include preliminary CAD data gathering and research followed by a two-hour coverage workshop.

The reasoning behind these reviews is based on the State's belief that the wireless broadband network will succeed or fail in Minnesota one county board at a time. County boards throughout Minnesota make the vast majority of public safety communications funding decisions. Therefore, the network needs to perform at a level acceptable to each county so that the county can justify investing in FirstNet's service platform. By performing these coverage reviews with each county, the State feels that it is properly equipped to communicate those coverage needs with FirstNet in such a manner that each county in the state will be compelled to sign up for the service.

QuickStart Program

In anticipation of the Initial Consultation Meeting, the State placed a number of counties into a "QuickStart" program. The coverage reviews for these counties were performed on an accelerated schedule so that the state could communicate its process, successes, and lessons learned to FirstNet. The State is proud to present this is a best practice to other states to inform their outreach and planning efforts for FirstNet and the consultation. QuickStart counties were selected based on:

- Those who provided complete CAD data first
- Those who were available to meet
- Meetings scheduled to include mix of urban, rural and tribal entities

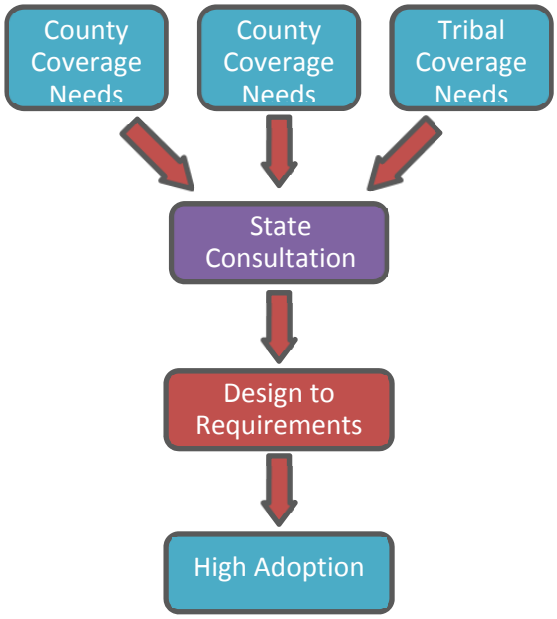


Figure 30: Coverage Review Process

Lessons Learned through Initial Coverage Reviews

1. **Control Messaging**.
   Controlling messaging up-front is essential to a productive meeting. Prior to each meeting, we conduct a short presentation and Q&A session to ensure participant expectations are consistent with the program's desired outcomes. In one case, we failed to properly manage expectations and the coverage review session had to be conducted a second time.

2. **Great opportunity to collect other kinds of information.**
   The coverage review sessions give individuals an excellent opportunity to interact with the wireless broadband program, providing individual anecdotes, case studies and program feedback. While outreach was not one of the stated goals of the coverage review sessions, they turned out to be a very good tool for general education of the stakeholder community.

3. **Time Management is Critical.**
   The coverage reviews are an extremely labor-intensive process. With 87 counties and 11 tribal nations there are a minimum of 99 reviews to conduct. Any wasted time during the coverage review can have significant impact to the program when propagated through the entire program.

CAD Incident Data

To support the coverage requirements review, we collected CAD incident data from each county and tribal government. We requested that all data be provided in a standardized format, to include incident type, units responding, incident priority, geo-location of the incident, and other metrics going back three years. In cases where we had incomplete data—for example, if a county provided data for only one year, or another did not report unit type responding—we utilized trends in the data from entities that *did* provide complete data to normalize any incomplete results. This approach provided us with a like-to-like comparison between data from all reporting agencies.

We use this data and a special algorithm to produce heat maps depicting, through empirical analysis, which areas of each county or tribal lands can be considered "critical" coverage areas. Those areas with a combination of the highest number of incidents, the most units responding and/or the highest level of priority would be depicted as "hot spots" on the heatmap; likewise, those areas with few incidents, low priority incidents and/or low numbers of responding units would appear as empty spaces in the heatmap.

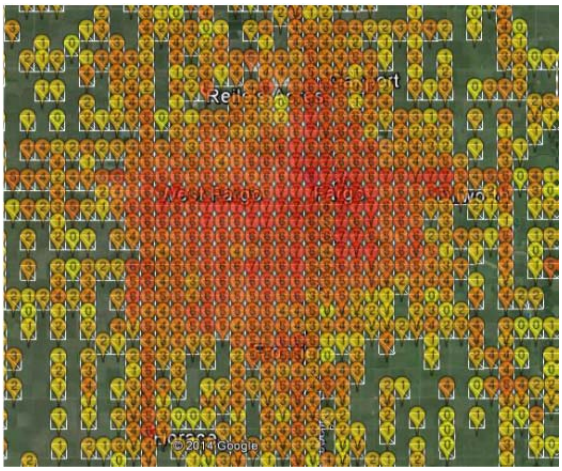


Figure 31: Sample heat map, portion of Hennepin County

Interactive Sessions

We perform interactive reviews with stakeholder counties where we utilize the heatmap as a starting point and discuss coverage priorities of each agency. The heatmaps generally provide initial priority coverage zones, but stakeholders are able to provide additional information on sites with low incident density but very high public safety concern—for example, critical infrastructure sites. An example is depicted in the figure below.

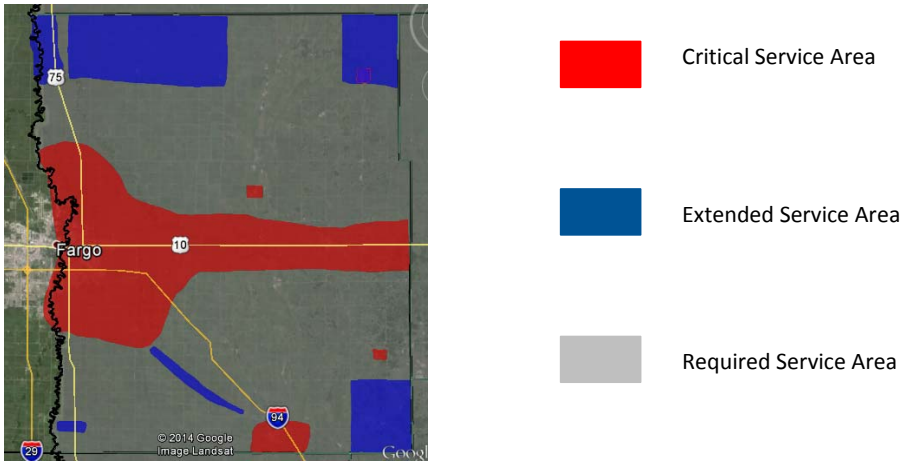


Figure 32: Clay County, Minnesota Coverage Requirements

Our combination of both objective and subjective reasoning allows us to produce coverage requirements that are supported by data, meet less tangible stakeholder requirements that cannot be captured empirically, and, perhaps most importantly, provide the stakeholder with some sense of ownership over the requirements. We believe that this sense of ownership may be a major factor to the future business success of the network; if stakeholders are able to communicate exactly what they want, and the network operator is able to meet that need, then the stakeholder is highly likely to be a future subscriber to the service.

QuickStart Program

The State chose to accelerate a number of its coverage reviews in advance of the initial consultation meeting with FirstNet. The State's objective in doing so is first to demonstrate some progress to FirstNet and to the State's stakeholders, but additionally to document any success and lessons learned and promote this approach as a best practice. Counties chosen for this program were chosen exclusively on their ability to provide CAD data; those who had provided complete data were added to the program. QuickStart county status and demographics are detailed in the figure and table below.

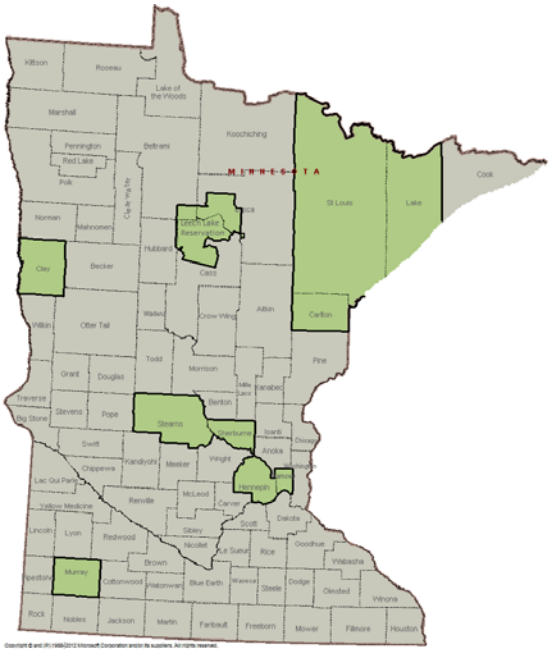


Figure 33: Minnesota QuickStart Counties[60]

Table 6: QuickStart County Demographics

County	Population Estimate	Area (Sq. Mi.)	Population Density	City
Carlton	35,386	861	41	Carlton
Clay	58,999	1,045	56	Moorhead
Hennepin	1,152,425	554	2,082	Minneapolis
Lake	10,866	2,109	5	Two Harbors
Leech Lake	9,372	1,058	9	Cass Lake
Murray	8,725	705	12	Slayton
Ramsey	508,640	152	3,342	St. Paul
Saint Louis	200,226	6,247	32	Duluth
Sherburne	88,499	433	204	St. Cloud
Stearns	150,642	1,343	112	St. Cloud

Future value of Data

While the data collected for MnFCP coverage reviews was exclusively for the purpose of defining user requirements, it has tremendous value for additional technology and non-technology initiatives as well. For the majority of the entities we collected data from, they had never performed an analysis of this type before. This shows us that the counties have not performed statistical analyses of responding units in the past. Accordingly, we believe this data could be useful in the future for initiatives including, but not limited to:

[60] Note: Leech Lake Reservation included

- Cell site placement
- Cell traffic modeling
- Network business planning
- Evaluating/justifying public safety funding requests
- Incident analysis
- Application determination per incident type

Results for QuickStart Counties

The follow maps depict the FirstNet coverage requirements defined by the respective enties identifed.

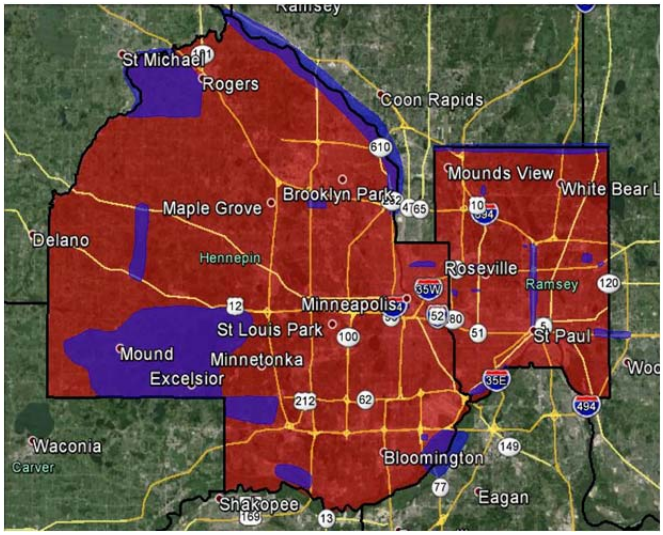


Figure : Hennepin and Ramsey Counties

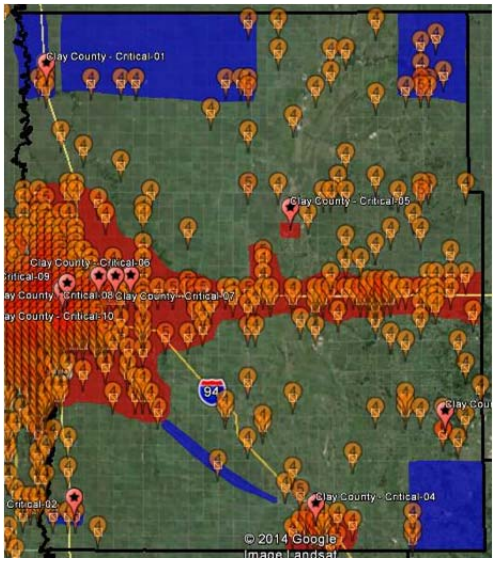


Figure : Clay County

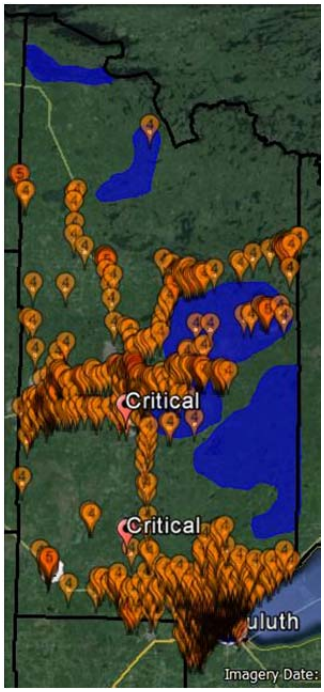


Figure : Saint Louis County

Figure : Lake County

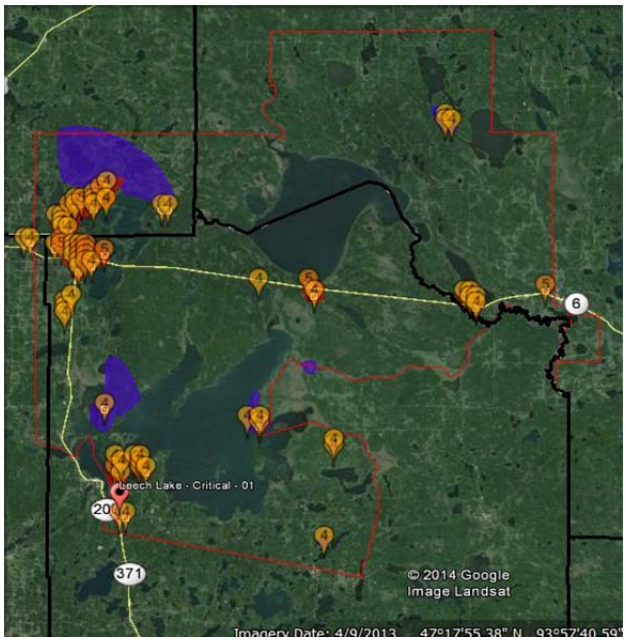


Figure 34: Leech Lake Tribe

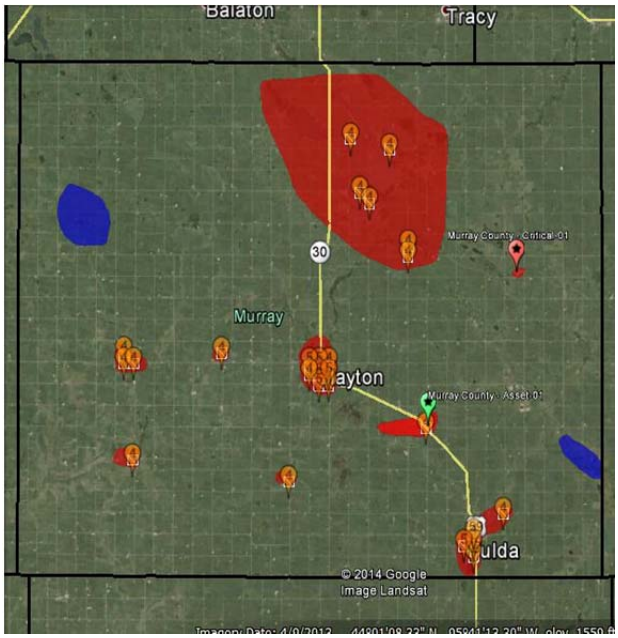


Figure 35: Murray County

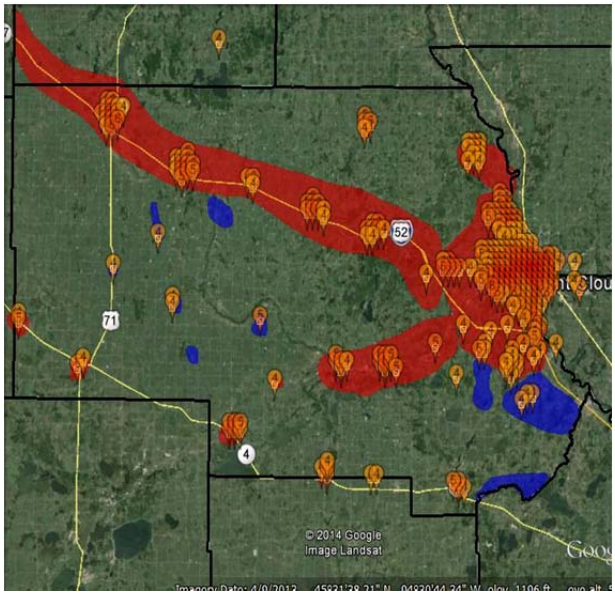


Figure 36: Stearns County

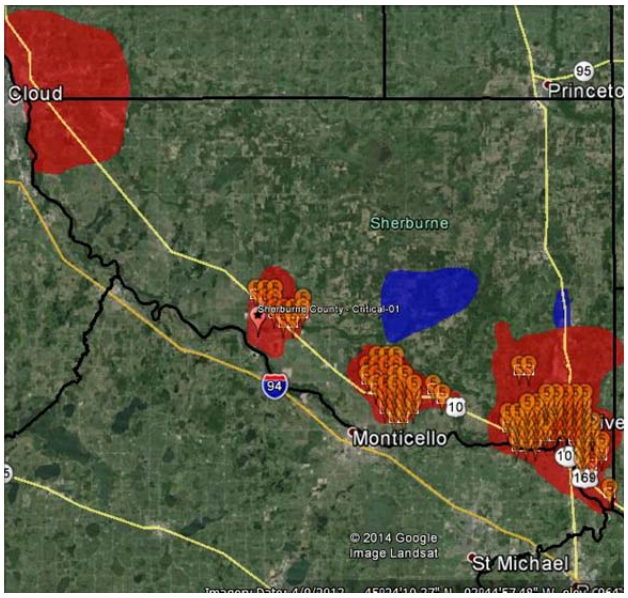


Figure 37: Sherburne County

TRIBAL CONSULTATION

Overview of Tribal Government in Minnesota

In Minnesota, there are seven Anishinaabe (Chippewa, Ojibwe) reservations and four Dakota (Sioux) communities. Tribal lands in Minnesota are pictured in *Figure 38: Tribal Lands in Minnesota*.

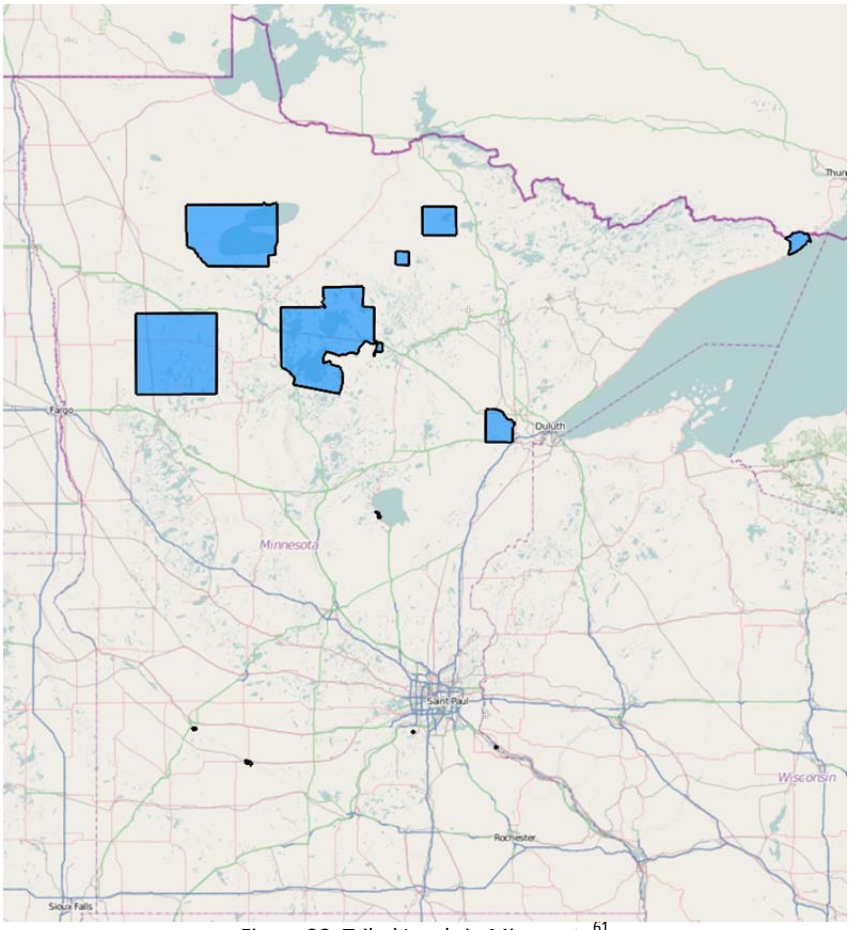


Figure 38: Tribal Lands in Minnesota[61]

For the purposes of preparing for the state's consultation with FirstNet, each tribal nation is treated as a separate jurisdiction or government entity similar to County and State entities. Each nation has varying degrees of organization and governmental responsibilities. These responsibilities extend to property rights and likewise have a direct impact on the development of the NPSBN on tribal lands. In most respects, the process for documenting requirements for tribal entities will be similar to the process used

[61] Information from ESRI *USA Federal Lands* (April 4, 2011) and Minnesota Indian Affairs Council (http://www.indianaffairs.state.mn.us/index.html, retrieved February 27, 2013) used to create this image. Figure is inclusive of most, but not all, tribal lands in the state.

for any other stakeholder entity in the state. The consultation with tribal entities shall follow the following process:

- Identify a primary stakeholder within each tribe
- Document the areas of jurisdiction and level of services offered by the tribe
- Consult with the tribe's jurisdictional agencies
- Coordinate and confer requirements with non-tribal local government agencies (county government(s), neighboring cities, etc.
- Document requirements and coordinate issues of governance

Additionally, the State will leverage its opportunity through MnFCP to encourage those remaining tribal entities who are not already signatories to Regional governance agreements to begin formally participating in the statewide governance structure.

Table 7: Tribal Nations in Minnesota

Anishinaabe Reservations	Grand Portage Bois Forte Red Lake White Earth Leech Lake Fond du Lac Mille Lacs
Dakota Communities	Shakopee Mdewakanton Prairie Island Lower Sioux Upper Sioux

The Minnesota Indian Affairs Council is the formal liaison for interactions between the State and tribal governments. From its website:[62]

> *Established in 1963, the Indian Affairs Council is the oldest council in the nation and serves as a liaison of the Indian tribes and the state of Minnesota. The Indian Affairs Council Offices, located in St. Paul and Bemidji, Minnesota, carry out the mission of the Indian Affairs Council, which is "to protect the sovereignty of the eleven Minnesota tribes and ensure the wellbeing of all American Indian citizens throughout the state of Minnesota."*

It is worth noting that, based on advertised commercial cellular coverage areas, there is a very high degree of overlap between native lands and areas unserved by commercial carriers in the state of Minnesota.

[62] *See* http://www.indianaffairs.state.mn.us/

Tribal Regional Governance Membership

The Leech Lake Band of Ojibwe and Mille Lacs Band of Ojibwe are members of the Northeast Regional Radio Board as signatories to the region's Joint Powers Agreement. As of this writing, Grand Portage Chippewa are currently working to join the Northeast Regional Radio Board and are midway through the overall process.

The White Earth Nation is a member of the Northwest Regional Radio Board as a signatory to its Joint Powers Agreement. Red Lake Nation has expressed interest in joining this board and the State has provided necessary information to do so.

Bois Fort, Fond du Lac, Lower Sioux, Prairie Island, Shakopee Mdewakanton, and Upper Sioux have not expressed interest in joining any Regional Radio Board. The State remains committed to supporting their efforts to participate in communications governance.

Tribal Consultation Success Story: Leech Lake

The Minnesota Department of Public Safety retained Televate to perform direct, one-on-one outreach and education with tribal governments in in the state on an as-needed basis. Televate performed the first of these tribal outreach sessions at Leech Lake Reservation on July 24, 2014.

The Leech Lake Reservation is located in rural north-Central Minnesota. As of the 2010 census, it has a resident population of 10,600. The reservation contains 864,158 acres, including parts of Beltrami, Cass, Hubbard, and Itasca Counties (See Figure 8). The reservation is extremely rural and includes within its contiguous boundaries 300,000 acres of lakes, 120,000 acres of wetlands, and 260 miles of rivers and streams.

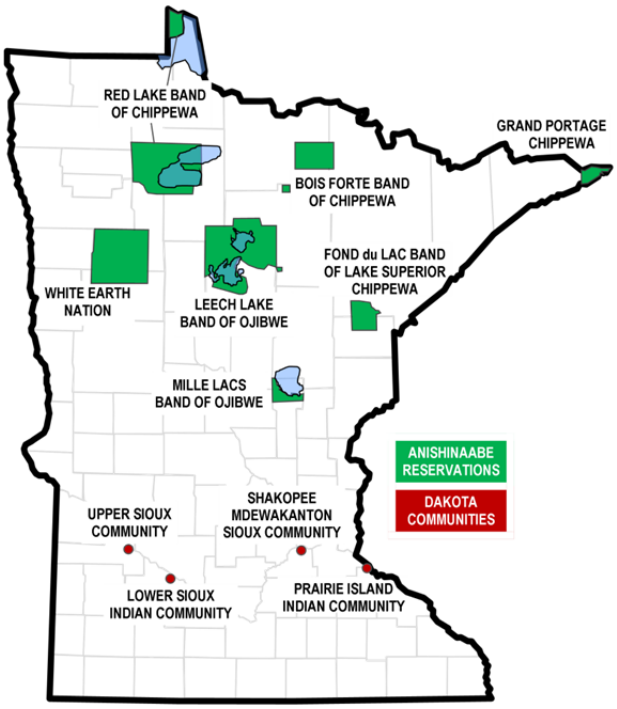


Figure 39: Tribal Reservations and Communities in Minnesota[63]

Televate's Recommendations:

1. **Facilitate the tribe's interest in operating a public/private partnership with FirstNet.**

   Leech Lake is interested in entering into a public/private partnership through tribally-owned Telco Leech Lake Telecommunications Company. As the reservation has a large geography and very few first responders, such a partnership might be essential to FirstNet's business case within the Reservation's boundaries.

[63] From http://www.health.state.mn.us/divs/opi/gov/chsadmin/images/iv_17_aicommunities.png

2. **Resolve legal issues related to tribal sovereignty and Tribal Engagement rules.**

   The tribe has a strong interest in maintaining its sovereignty. However, representatives in attendance seem supportive of the consultation process and the reasoning for including tribes as subordinate public safety entities in Minnesota-FirstNet planning. FirstNet has been relatively silent on how it, as a Federal entity, plans to handle tribal sovereignty as of this writing.

   The tribe expressed concern about whether FirstNet would be required to adhere to FCC Tribal Engagement rules.[64] As a government entity and a cellular provider it is unlikely these rules apply to FirstNet, but FirstNet may be subject to these rules through public-private partnership with a telecommunications carrier such as the Leech Lake Telecommunications Company.

3. **Investigate potential synergies with ONAP.**

   The US FCC Office of Native Affairs and Policy (ONAP)[65] is responsible for promoting the deployment and adoption of communications throughout tribal lands and communities in the United States. ONAP is hosting a workshop from September 9-12, 2014 at the Shooting Star Casino in Mahnomen, MN. This is an excellent opportunity for the State to perform outreach with tribal leaders and telecommunications officials.

4. **Obtain Leech Lake drive-test cellular data.**

   The Reservation performed drive-test data for cellular carriers, which it provided to the FCC in May 2013. Televate recommends that the State consider this data when engaging with the tribe.

5. **Continue to leverage the state's existing governance structure for grant funding initiatives.**

   Tribal leadership expressed concern that they would not receive a "fair cut" of any funding made available to public safety for FirstNet-related initiatives. By continuing to direct any grant funding to county, local, or tribal entity through its regional governance structure, the State can ensure that grant funds are handled in as equitable a manner as is possible at all levels.

Televate's Findings:

1. Generally, representatives were very pleased that the State underwent the additional effort to engage with its leadership.

2. The tribe has not been contacted by FirstNet. Approximately half of those in attendance had attended FirstNet-related events hosted by ECN or had otherwise been reached by ECN's FirstNet education activities and as a result had some familiarity with the Minnesota-FirstNet consultation.

---

[64] *See* FCC 11-161, http://www.fcc.gov/document/fcc-releases-connect-america-fund-order-reforms-usficc-broadband

[65] *See* http://www.fcc.gov/native

3. Publicly-available broadband service maps provided by ConnectedNation report service on a per-census block basis. However, census blocks do not match tribal boundaries and as a result the tribe claims that service availability is significantly inflated in these areas.

4. Leech Lake pursued funds to support wireless broadband deployment in the state under FCC Auction 902, "Tribal Mobility Fund Phase I". This was a reverse auction to award funds to tribes to promote broadband development, but the tribe was unsuccessful in the auction.[66]

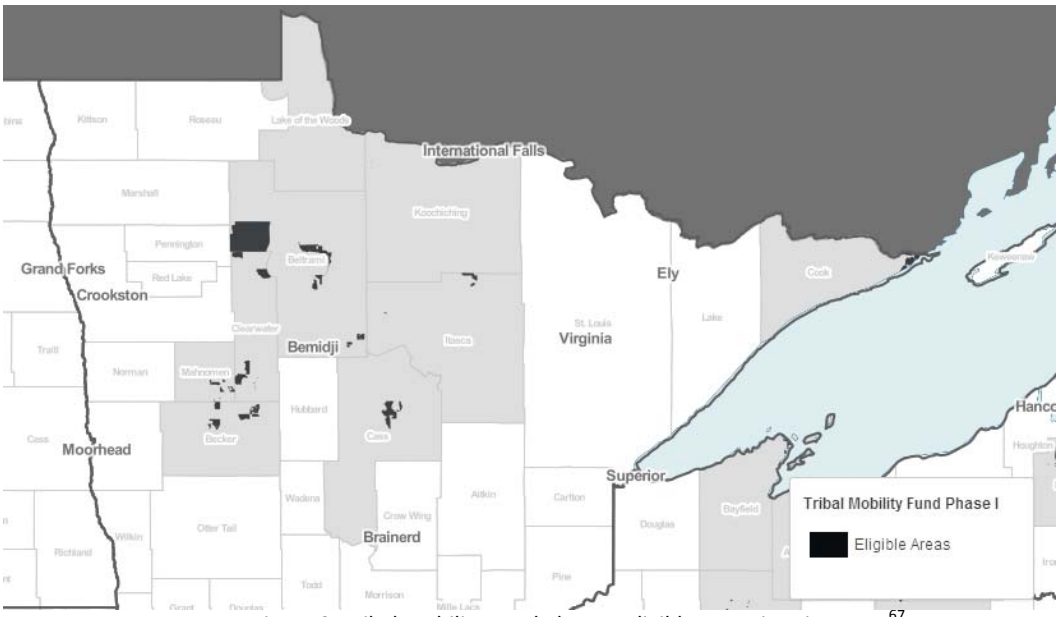


Figure 9: Tribal Mobility Fund Phase 1 Eligible Areas in Minnesota[67]

From US FCC: *This map shows the areas identified as eligible for Tribal Mobility Fund Phase I support as of February 2014. These areas are populated US Census blocks that lack 3G or better mobile coverage at the centroid of the block. These blocks were identified by analyzing 2010 US Census data, January 2013 Mosaik Solutions data, and information submitted by third parties.*

5. Leech Lake has its own telecommunications carrier, Leech Lake Telecommunications Company, LLC, which was incorporated in 2013 with the stated goal of providing ubiquitous mobile and broadband telecommunications services to all citizens in tribal lands.[68]

[66] No funds were awarded to Minnesota entities during this reverse auction. The vast majority of funds were awarded to proposals from tribes within the state of Alaska. *See* http://wireless.fcc.gov/auctions/default.htm?job=auction_summary&id=902

[67] From US FCC: http://www.fcc.gov/maps/tribal-mobility-fund-phase-1-eligible-areas

[68] *See* Leech Lake Tribal Council Resolution No. 2013-128 and *See Also* "Leech Lake Telecommunications Company, LLC, Expression Of Interest", WC Docket 10-90, dated March 4, 2014: http://apps.fcc.gov/ecfs/document/view?id=7521089037

OUTREACH AND EDUCATION

Background

Outreach and Education are core to the success of the MnFCP program and, ultimately, of the future success of the network. Televate developed a robust outreach and education program for MnFCP that consists of four major components: (1) State and Regional Kickoffs, (2) Web-Based Training Modules, (3) Minnesota Annual Interoperability Conference, and (4) Quarterly newsletters. This outreach and education program is designed to target the state's stakeholders through a variety of media and deliver a consistent message, multiple times, to each individual.

State and Regional Kickoffs

The State and Televate performed a series of state and regional kickoff meetings designed to provide an overview of the program. One session was provided to the Statewide Emergency Communications Board in December 2013, and 14 individual sessions were given throughout the Communications Board Regions (two sessions in each region). Session topics included:

- Project Briefing
- What is FirstNet?
- Brief Introduction to LTE
- Project Mission and Goals
- Project Organization
- Project Scope of Work and Tasks
- Support Required
- Next Steps

Figure 40: Communications Board Regions

We held daytime and evening sessions in each region and reached 358 stakeholders total through the outreach program. The objective of holding evening sessions was to provide stakeholders with daytime schedules, and in particular volunteers, the opportunity to attend our outreach sessions. However, we found that while daytime sessions were extremely well attended, evening sessions were either sparsely attended or not attended at all. Approximately 18% of total attendees went to evening sessions.

Notably, the more rural regions had a higher percentage of attendees going to evening sessions. While Central and Metropolitan Regions had the fewest evening attendees, regions throughout Southern Minnesota had a high percentage of evening attendees. For similar projects in the future, we would consider holding evening sessions only in rural areas where they appear to be most effective. For attendance detail for each region, refer to Table 8: Attendees per Region.

Table 8: Attendees per Region

Region	Daytime	Evening
Central	58	0
Northeast	51	8
Northwest	43	7
Southeast	42	11
South Central	46	14
Southwest	23	12
Metro	38	5

Web-Based Training Modules

MnFCP includes four asynchronous, self-paced online training modules published in partnership with Alexandria Community and Technical College. These modules are developed as part of a comprehensive online training program hosted by the State of Minnesota. The training program includes many courses on interoperability, governance, and equipment use; MnFCP modules are included as new content inserted into what is already a robust training platform.

Figure 41: Sample Training Module

MnFCP training modules include:

- **What is Broadband for Public Safety**
  A high-level training module providing an overview of FirstNet and brief introduction to wireless broadband, LTE, and MnFCP. The content is very similar—nearly identical—to the content covered in regional outreach meetings. The intent of this module is to reinforce content reviewed at the outreach meetings. This module is completed and available at the State's training site.
- **LTE Technical Training for Technical Staff**
  A deep-dive technical review of LTE for technical personnel that are not familiar with LTE. The intended audience includes IT staff and radio systems technicians and managers who are technically-minded, but have not studied LTE specifically as it applies to public safety. This module is currently in development.
- **Public Safety Broadband for the PSAP**
  Detail on how public safety broadband will affect the PSAP specifically, including receipt of NG911 multimedia and how it will interface with applications and devices in the field as well as how

multimedia from the field will be utilized by the PSAP and incident command. This module is currently in development.

- **Network Requirements**
  A review of network and data gathering requirements for SLIGP and the FirstNet consultation. This module will be developed in advance of SLIGP Phase 2 data collection activities but after FirstNet publishes its data gathering standards and requirements.

The State's training website can be accessed at http://www.alextech.edu/static/d2l.html. Instructions on receiving access credentials are available at http://www.alextech.edu/static/d2l.html.

Minnesota Annual Interoperability Conference

Televate held a number of presentations in partnership with the State of Minnesota at its annual interoperability conference. This well-attended conference was an excellent outreach opportunity for the program, as project staff had a captive audience attending a multiple-day event with the express intent of learning more about the future of public safety communications. Several of the presentations at this conference were adapted for online training modules later in the program. Sessions held at the conference include:

1. **Public Safety Broadband Pilots—Overview and Lessons Learned**
   An overview of public safety wireless broadband pilots throughout the country, including LA-RICS, Harris County, Texas pilot network, and others.

2. **Wireless Data Technologies: A Technical Primer for the non-Technical**
   An overview of how wireless data technologies work for a non-technical audience. The intent is to provide a very basic understanding of electromagnetism, radio transmission, modulation, and antenna function.

3. **LTE Technology**
   A technical overview of LTE technology intended for a technical audience familiar with radio communications and information technology, but not particularly familiar with IT. The intent was to bridge the knowledge gap between extensive P25 radio expertise and a basic understanding of LTE.

4. **FirstNet**
   A session describing what FirstNet is and an overview of the FirstNet board and state and national responsibilities under federal law to construct the nationwide public safety wireless broadband network. Topics in this session include:
   a. Act establishing FirstNet
   b. FirstNet board duties
   c. State duties
   d. Minnesota/FirstNet consultation
   e. Stakeholder responsibilities.

5. **Public Safety Wireless Broadband for the PSAP**
   An overview of how wireless broadband and NG911 will change the dispatch floor, including example applications and scenarios, including impacts on dispatch business process, impacts on

dispatch tools (CAD, logging, RMS), multimedia from caller to responder, multimedia for situational awareness, and managing of information flow. Intended audience included PSAP staff and stakeholders.

6. **Business Modeling for Public Safety Wireless Broadband**
   An overview of prior research into potential business models for public safety wireless broadband nationwide. These models may or may not be appropriate for Minnesota and neighboring states. Session covered:
   a. Historical models
   b. Public/private partnerships
   c. Pilot projects (e.g., BayRICs)
   d. Televate's white paper on business modeling

7. **Public Safety Wireless Broadband Devices, Applications and Inter-Network Interoperability**
   A session describing how advanced preparation and planning regarding devices, applications and inter-network interoperability will ensure that Minnesota derives immediate benefit from the FirstNet wireless broadband network when implemented. The presentation discussed the current and evolving status of the FirstNet User Equipment (UE) devices, and explored challenges and requirements regarding application interoperability to ensure that applications communicate with one another. The presentation additionally covered inter-networking interoperability opportunities between FirstNet and ARMER and with commercial cellular, Wi-Fi hotspots, the PSTN and other networks.

Quarterly Newsletters

Televate produces for the State quarterly newsletters designed to highlight specific activities of MnFCP. These newsletters are designed as suitable for printing. To date, Televate has produced two newsletters:

1. **May 2014 Newsletter**
   This newsletter was designed to provide a general overview of the Minnesota-FirstNet consultation program, the overall project schedule, next steps and an overall technical brief. It was designed to be printed and handed out at conferences.

2. **August 2014 Newsletter**
   The May 2014 Newsletter was designed specifically to brief participants on upcoming coverage review sessions. The newsletter provided an overview on the coverage sessions, the reasoning behind holding them, a description of the actual process and the types of personnel we expected to attend the session. It was designed first to save time on each individual session by giving each participant a brief before the session started, and second to serve as a second means of receiving information to ensure maximum retention by stakeholders.

Figure 42: August 2014 Newsletter

For copies of the newsletters, see Appendix 2.

Lessons Learned

1. **Less is More.**
   We have learned through our outreach program that less is indeed more. During our initial State and Regional kickoff meetings, we found that there was little to no understanding in the community of FirstNet, cellular communications, or the potential of public safety wireless broadband in general. For many of those in our audience, our outreach sessions were the first time they had heard of FirstNet, were aware of 4G technology or LTE in particular or had any brief in how cellular communications work.

   Were we to repeat this program again in the future, we would eliminate some legal and technical analysis so that we do not lose our audience early on. We would work to translate difficult concepts into high-level, digestible content designed for a general audience.

2. **Evening Sessions are not Well-Attended in Urban Areas**
   Despite our team's best efforts, many of our evening sessions were poorly attended, and one evening session had zero participants. The purpose of the evening sessions was to accommodate volunteers or those with unconventional schedules to attend the meetings. However, most of the attendees were managerial-level employees who work day shifts. We had high attendance at evening sessions only in rural regions. Were we to repeat this program in the future, we could consider holding daytime sessions only in urban areas.

3. **Bring your sponsor with you.**
   During outreach sessions, the State and Televate include the project sponsor in all presentations. This is essential to build a credible identity for the program.

APPENDICES

1. MnFCP Project Status as of 9/22/2014

MnFCP Weekly Status Report

Minnesota Department of Public Safety – **MnFCP**

EXECUTIVE SUMMARY Status Meeting

Status on 22 September 2014	Prior Status	Green	Current Status	Green

Green	The project is within 20% variance of the currently approved baseline for budget and schedule, and is expected to substantially meet all of the business objectives established in the startup report.
Yellow	The project has exceeded 20% variance of the currently approved baseline for budget and/or schedule and is expected to substantially meet all of the business objectives established in the startup report.
Red	The project is at risk of termination, or at risk of not substantially meeting the business objectives established in the startup report.

Attendees/Invitees:

- DPS: Jackie Mines, Dana Wahlberg, Marcus Bruning, Randy Donahue, John Tonding
- Televate/IG: Mark Navolio, Rick Burke, Ken Boley, Elizabeth Herring, Brandon Abley

Meeting Notes & Agenda

- **Task 2 – Governance (Ken):**
  - Outreach Interviews status:
    - All identified, prioritized interviews are complete, except tribal contacts
    - Effort to develop plan for better engaging tribes on governance:
      - Call held with Anna Marie Hill, MN Indian Affairs Council 5/20;
      - Monte Fronk call on 6/4, he proposes that we organize a meeting with the Emergency Manager at Ripley at a date to be determined
      - Also interviewed Greg Hayes 6/18 (Shakopee Mdewakanton Sioux)
      - Others to possibly contact: Mike Keyport (Grand Portage Ojibwe)
      - Outline of Governance Report distributed to team 9/3
      - Team setting date for dedicated call to discuss outline
- Task 6 – MOA (Ken), Standardize Templates:
  - Tim Lee (MnDOT) re MOA -- Call completed (with Shane), documents delivered
  - Jim Johnson (MN.IT) re MOA
    - Per 8/7 call, forwarding sample JPA used for asset sharing (not yet received)
    - Asset sharing w gov't is fine but probably problematic if the asset was commercialized via a private partner, OAG has usually resisted; he will go back to OAG for specific opinion.
  - Outline of Governance issued target date: before Memorial Day
- **Task 6 – MOA (Ken), Standardize Templates:**
  - Tim Lee (MnDOT) re MOA -- Call completed (with Shane), documents delivered
  - Jim Johnson (MN.IT) re MOA
    - Per 8/7 call, forwarding sample JPA used for asset sharing
    - Asset sharing w gov't is fine but problematic if the asset was commercialized via a private partner, would require legislation; he would prefer to not go this route.
- **Task 4 – Education and Outreach:**
  - Training Modules have been defined:
    - *What is Wireless Broadband* – **Delivered**
    - *LTE Technical Review (Deep Dive)* – **Delivered**
    - *Public Safety Broadband for the PSAP* – Pending
    - Network Requirements (just before Phase 2) – Pending

Status on 22 September 2014	Prior Status	Green	Current Status	Green

Green	The project is within 20% variance of the currently approved baseline for budget and schedule, and is expected to substantially meet all of the business objectives established in the startup report.
Yellow	The project has exceeded 20% variance of the currently approved baseline for budget and/or schedule and is expected to substantially meet all of the business objectives established in the startup report.
Red	The project is at risk of termination, or at risk of not substantially meeting the business objectives established in the startup report.

- Newsletter – "Coverage Assessment Process" – **Delivered**

- **Task 5 – Stakeholder Entities & CAD Data Status**
  - **User POP+ Survey:**
    - Follow up underway for all quick start counties; final push prior to the FirstNet consultation meeting
    - After surveys are sent, Televate will follow up with recipients to accelerate the response rate
  - Fire Marshall's Office: several fire departments have claimed no knowledge about the program. Proposed steps forward:
    - Schedule another meeting with Bruce West to enlist Regional Fire Marshalls
    - Get data on Fire Department formations to use as fallback in case they have not completed the UserPOP survey

This Week's Tally

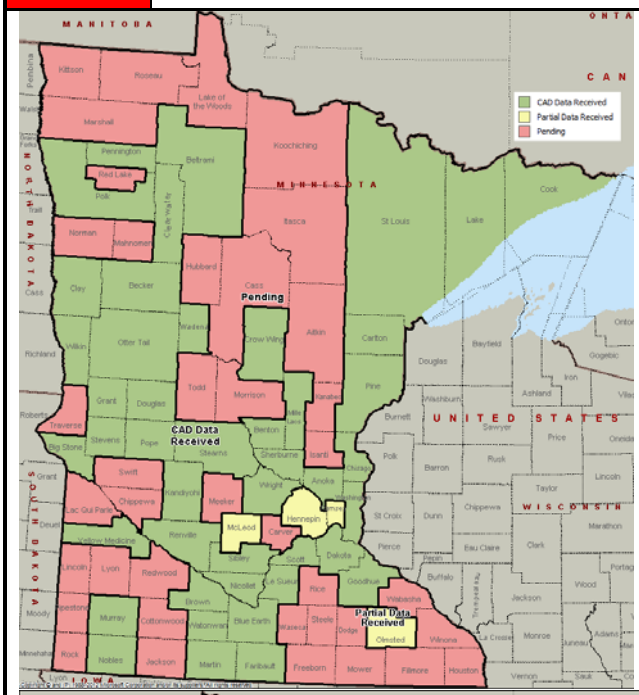
Task	Sub-Tasks & Status							
	POC Data Received	CAD Data Received	POC Survey Sent	User POP Survey Sent	Utilization Survey	CAD Geocoded	KML Created	Coverage Review Completed
John Tonding	84%	74%	42%	11%	0%	68%	68%	11%
Marcus Bruning	44%	48%	40%	16%	0%	48%	48%	16%
Randy Donahue	43%	57%	0%	3%	0%	38%	32%	3%
Count Totals:	46	55	26	9	0	52	50	9

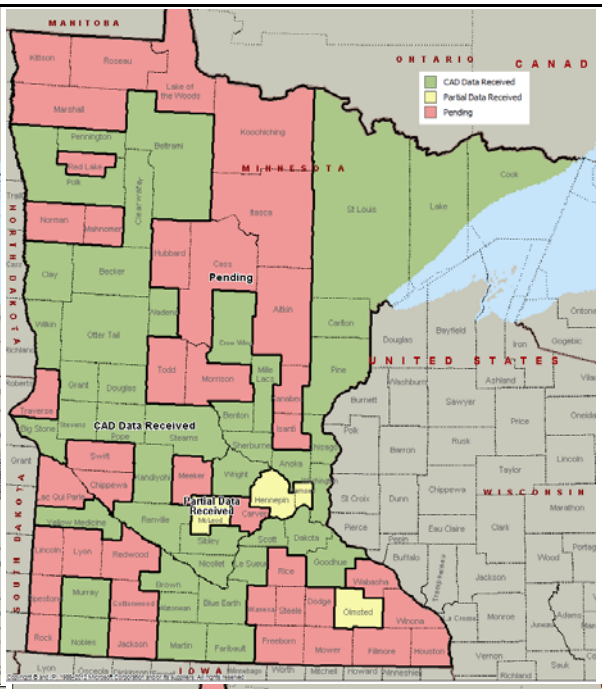
Previous Week's Tally

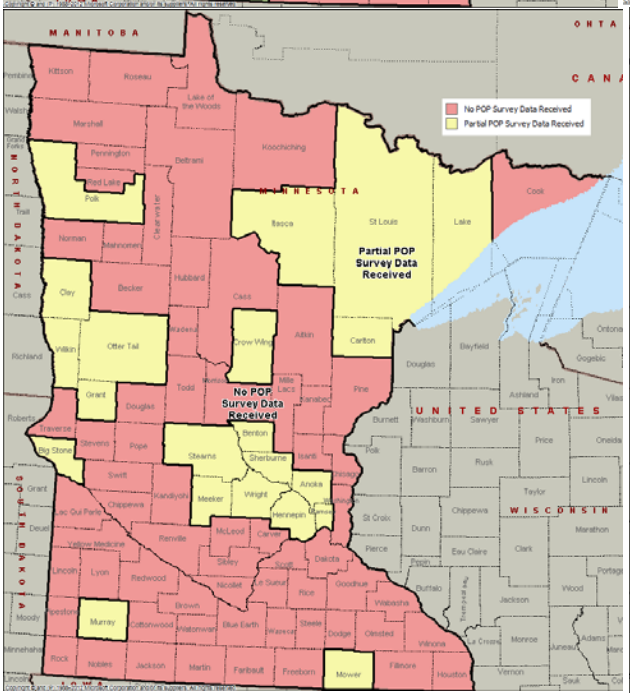
Task	Sub-Tasks & Status							
	POC Data Received	CAD Data Received	POC Survey Sent	User POP Survey Sent	Utilization Survey	CAD Geocoded	KML Created	Coverage Review Completed
John Tonding	84%	74%	42%	8%	0%	68%	68%	8%
Marcus Bruning	44%	48%	40%	16%	0%	36%	36%	16%
Randy Donahue	43%	57%	0%	3%	0%	35%	30%	3%
Count Totals:	46	55	26	8	0	48	46	8

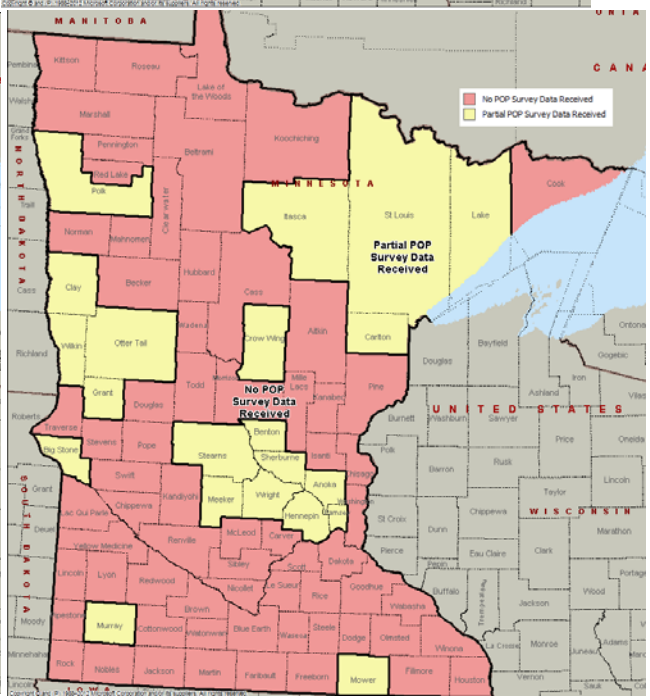
Status on 22 September 2014	Prior Status	Green	Current Status	Green

Green	The project is within 20% variance of the currently approved baseline for budget and schedule, and is expected to substantially meet all of the business objectives established in the startup report.
Yellow	The project has exceeded 20% variance of the currently approved baseline for budget and/or schedule and is expected to substantially meet all of the business objectives established in the startup report.
Red	The project is at risk of termination, or at risk of not substantially meeting the business objectives established in the startup report.









Status on 22 September 2014	Prior Status	Green	Current Status	Green

Green	The project is within 20% variance of the currently approved baseline for budget and schedule, and is expected to substantially meet all of the business objectives established in the startup report.
Yellow	The project has exceeded 20% variance of the currently approved baseline for budget and/or schedule and is expected to substantially meet all of the business objectives established in the startup report.
Red	The project is at risk of termination, or at risk of not substantially meeting the business objectives established in the startup report.

- **Task 8 – Coverage Reviews**
  - Hennepin County - Underway
  - Reschedule Sherburne County – CAD data from the Sheriff's Office needs to be rendered; reschedule coverage review
  - Reschedule Ramsey County – Several people were unable to attend due to conflicts, need to reschedule
  - Reschedule St Louis County – Pending
- **Task 8 – Subcommittees (Work Group)**
  - Summary for FirstNet Meeting has been completed
- **Task 12 – - Informal RFI**
  - "Request for Expression of Interest"
  - Results published in the MnFCP FirstNet Consultation Report
- **Other Items:**
  - FirstNet Consultation meeting participants
  - Examples of Wireless Data Usage
  - IDC Meeting
- **Upcoming Events/Travel:**
  - 24th September - FirstNet Consultation has been confirmed (6hrs)
    - 2hr session - Summary with governor's office
    - 4hr session – detailed review of tasks (Televate to be there)
- **New Business:**
  - New Business?

1 Notes to Keep

- Wireless Contracts:
  - State Contract – check back with Dale Stevens concerning the number of subscribers on each contract
  - GSA Contract – Mark to check in with contract administrator; no luck yet
    - Add questions on PSAP applications to the NG911 Survey; (from working group)
- PSAP coordination with Dana Wahlberg;
  - Add questions on PSAP applications to the NG911 Survey; (from working group)
- Legislative Activities are potentially coming.
  - Met with legislator, not likely to be capital costs
  - Legislature is not necessarily involved in the program
- Website: https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx;
- POC Survey Releases:
  - Process: Brandon/RIC to email hyperlink and message to all stakeholders on a PSAP-by-PSAP basis; Mark to send out reminders every Tuesday

- Additional Newsletter Topics:
  - Coverage & Radio Propagation Basics
  - Differences between NPSBN LTE, Commercial Services & P25
  - Capacity Basics
  - Quality of Service Basics
  - Coverage Augmentation Strategies & Advantages/Disadvantages
  - Public Safety Broadband Devices
- Great River Outreach conference call on 12 May with Kathleen
  - Reaffirmed their interest; UTC is enthusiastic, but waiting for more direction from FirstNet
  - Kathleen to help coordinate; to forward relevant contacts relative to the data gathering when needed
  - Need to follow up for Device numbers & types
- **GIS Data**
  - Will need to coordinate with Danna Mackenzie, Danna.Mackenzie@state.mn.us, with regard to the phase 2 infrastructure assessment; however, the data will likely come from NTIA as GIS has restriction its release
- **Task 3 – Tribal**
  - Continue updates to "Tribal Consultation Recommendations"; to include output from Governance
- **Fire Chief Association:** Summary of key data points:
  - Bruce: will distribute the letter to every fire departments throughout the state
  - 780 fire departments throughout the state ~20,700 fire fighters
  - We can send a message through the state Fire Marshall's office
  - Address letter to the State Fire Marshall's office
  - Some money available from old grants for travel expenses; volunteer only
  - Brandon: Will try to get refreshments available for the evening meetings;
  - Bruce: can send us a link that contains the name and address for every fire department thought out the state of Minnesota
- **Bureau of Criminal Apprehension**; keep on the horizon when it comes time to assess applications
- **Tribes:**
  - Need to keep a running list of coordination activities with the tribes as proof of our outreach efforts.
- **NTIA Officer:** Caroline Dunn
- **Task 3 – Tribal**
  - In the context of the Governance and MOA/MOU tasks, FirstNet does not expect the State to resolve all issues with regard to the tribes. FirstNet does expect:
    - The States to summarize what exists and to "characterize" the relationship with each Tribe
    - Indicate the level of tribal participation in the State's governance structures
    - Highlight the issues that would impact the implementation of the network on tribal lands
    - We are expected to collate the points of contact at each tribe
    - We are expected to quantify the number of potential users at each tribe
  - Background Materials on tribes that were suggested for review:
    - Review of the United States Code, Title 16, Supremacy Clause
    - Review of the State's Constitution wrt tribes
  - Keep running list of outreach efforts for the Tribes (Mark)

- Summarize attendance from tribal areas; Outline gaps
- Send summary Cassandra O'Hearn

2. Newsletters

a. Newsletter One—Introduction to Program

b. Newsletter Two—Introduction to Coverage Reviews

MAY 2014

MnFCP

Minnesota-FirstNet Consultation Project

MINNESOTA DEPARTMENT OF PUBLIC SAFETY – DIVISION OF EMERGENCY COMMUNICATION NETWORKS

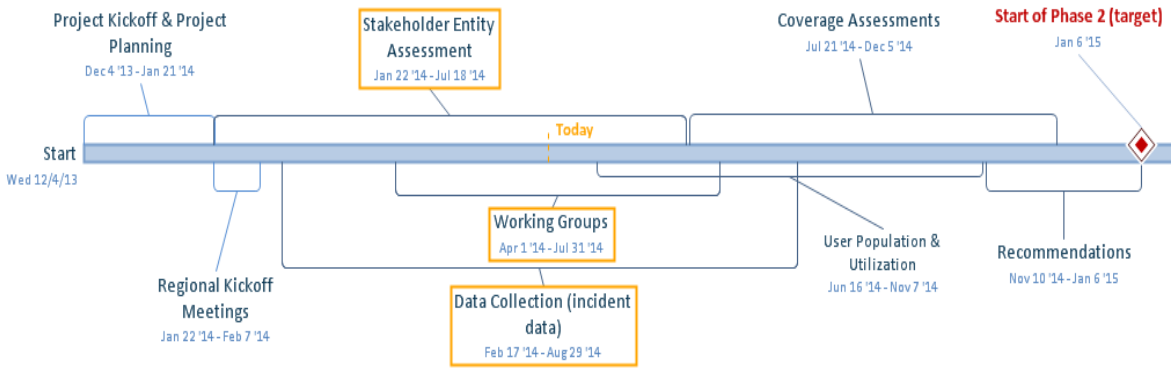
The Department of Public Safety (DPS) – Division of Emergency Communications Networks (ECN) is pleased to launch this inaugural edition of the State of Minnesota FirstNet Consultation Project (MnFCP) Newsletter. The Newsletter will be published quarterly over the next two years to provide our statewide stakeholders insight and status into the MnFCP and to better familiarize the community on the Nationwide Public Safety Broadband Network (NPSBN), and the work that FirstNet, the authority tasked with implementing the NPSBN, is undertaking to advance the implementation.

The MnFCP project team is leading our State effort to define stakeholder requirements, and to assemble information regarding the size of the network end user population, types of devices and applications, to assess governance implications, and to develop a strategic plan to support the State's consultation with FirstNet regarding the rollout of the NPSBN within the State.

MnFCP/FirstNet News

The State of Minnesota FirstNet Consultation Project (MnFCP) was initiated in January of 2014 with regional kickoff meetings being conducted throughout the State to introduce the MnFCP, to familiarize our stakeholder community with the Nationwide Public Safety Broadband Network (NPSBN) and FirstNet. Since the completion of the regional meetings, the project team has advanced the program schedule as illustrated in the MnFCP Working Schedule. The current emphasis is focused on the next series of important tasks highlighted in the timeline and detailed below:

1. Stakeholder Entity Assessment
2. Working Group Recommendations
3. Incident Data Collection



Stakeholder Entity Assessment: In conducting the Stakeholder Entity Assessment, the project team is reaching out to all Public Safety Answering Points (PSAP) to confirm the primary points of contacts (POC) for all public safety response entities within the State. We are tallying both first responders (e.g., Law Enforcement, Fire & EMS, and Emergency Management) as well as secondary responder support agencies (e.g., Departments of Health, Transportation, etc.). The Regional Interoperability Coordinators (RICs) are leading the effort and interacting with the PSAPs to identify and collect the POC information. The POCs will act as a gateway into their respective agencies to gather relevant information on wireless broadband utilization including the end user population, the number and types of devices (smartphones, mobile routers, pads, wireless cards, etc.), applications/use cases and the network coverage priorities. The project team looks to the POCs to further advance the MnFCP outreach efforts by disseminating news about the project and in gathering the required information.

Incident Data Collections: In addition to the identification of the stakeholder entities, the RICs are busy collecting Computer Aided Dispatch (CAD) Incident Data from the PSAPs. The project team will process the incident data to complete the MN-PSBN coverage assessment and requirements tasks. Three years of incident data is being collected, 2011, 2012 and 2013. All incidents will be geocoded to map their location per incident type. As the stakeholders identify the applications used to support each incident type, we will then be able to translate these to specific network requirements regarding coverage and capacity. This data will provide a statistical justification for the coverage priorities as defined by the local jurisdictions. Thus far, we have made good progress in collecting the data; we now have valuable incident data from over 15 different PSAPs. For PSAPs who are unable to comply or facilitate the request for data, the project team is investigating alternative options to support this information gathering effort.

Working Group Recommendations: Five (5) distinct Working Groups have been established to define statewide recommendations and requirements with regard to: Applications, Coverage, Devices, System and Security. The Working Groups are made up of volunteers from all corners of the state. There are 46 participants in all from state, city and local government agencies and include a mixture of all public safety disciplines. The Applications and Coverage working groups have already made considerable progress. The Devices Working Group is set to kickoff shortly, and will be followed by the Systems and Security Working Groups later in the summer. For additional information on the MnFCP Working Groups, please visit https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx. If you are interested in joining a Working Group, please contact a member of the project team.

What's next? *User Population Assessment & Utilization Criteria. Once the points of contacts are established at the stakeholder entity level, the project team will release short and easy to complete surveys that seek to establish the likely and potential user populations. Stakeholders will also be queried about their preferred devices, how they intend to use the new network, and obtain other information critical to the success of the MnFCP.*

FirstNet News

Minnesota Delivers State Consultation Package

FirstNet delivered the consultation package that included guidance and a readiness checklist designed to increase FirstNet's understanding of state's unique requirements in developing the underlying state plans to support the implementation of the NPSBN. The State of Minnesota was the first in the nation to respond, submitting a 99-page report to FirstNet on May 2, 2014.

To read the FirstNet press release and obtain additional information, please visit:

http://www.firstnet.gov/news/firstnet-delivers-state-consultation-packages

For additional information and news on FirstNet, please visit: http://www.firstnet.gov/

Technical Brief

What is Wireless Broadband?

Broadband commonly refers to high-speed communications to content and information over the internet or the office intranet. It is typically described by the amount of data transferred as bits per second or "bps." Wireless broadband provides ***mobile*** access to the internet. There are many short-range standards for wireless broadband such as the 802.11, or WiFi, family of standards (a, b, g & n) that many of us use at home or in the office to provide mobile access.

There are many additional wireless standards that support wide area nationwide broadband services, including those delivered over the cellular telephone network. There is one predominate worldwide standard, LTE or Long Term Evolution. LTE is referred to as the 4th generation of cellular standards; in fact "4G" has become synonymous with the term "LTE" and is often referred to as "4G LTE."

Why wireless broadband for Public Safety?

In the last 10 years, more and more public safety agencies have integrated commercial wireless broadband, and the applications supported by these networks, into their daily operations. First Responders are often equipped with smartphones, mobile data terminals, laptops, and tablets which communicate wirelessly with their home networks (intranets) and that provide access to the internet. Robust broadband communications improves the safety and efficiency of the responder community in the field, and it also provides them many new capabilities and access to data applications that compliment radio communications.

These new capabilities aid efficiency (email, remote reporting, e-ticketing), provide greater situational awareness (real-time location tracking of assets and personnel, streaming video), provide access to important databases (NCIC lookups, incident reporting), and facilitate access to the many varied resources required to support the response and mitigation of emergency events that threaten life or property.

The Nationwide Public Safety Broadband Network (NPSBN), to be implemented by FirstNet, will inspire new ways of preforming public safety functions that are more effective and efficient. In the future, public safety will have purpose-built applications and a new ecosystem that will provide agencies with incredible opportunities to improve service to their communities.

Your Project Team

You are encouraged to contact the project team at any time! We would be happy to answer your questions or hear your concerns.

Jackie Mines
Director
jackie.mines@state.mn.us
(651) 201-7550

John Tonding
Central/Metro RIC
john.tonding@state.mn.us
(763) 587-8234

Marcus Bruning
Northern RIC
marcus.bruning@state.mn.us
(218) 232-3762

Randy Donahue
Southern RIC
randy.donahue@state.mn.us
(507) 360-2660

Mark Navolio
Televate PM
mnavolio@televate.com
(301) 922-6691

For more information on the MnFCP, the NPSBN and FirstNet, please visit ECN's website for all project news and access to in-depth training modules on this subject and others: https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx

Minnesota-FirstNet Consultation Project

August 2014

FirstNet Coverage Reviews

The State is set to perform interactive FirstNet coverage review for each county in Minnesota. The objective of the coverage review is to document the areas of highest priority for first responders and those areas where FirstNet can augment the broadband coverage where it does not exist today.

The process will begin with "Quickstart" counties. These counties have been able to accelerate their project through the quick reception of their CAD/RMS data and their enthusiastic participation in the MnFCP Project. Quickstart county reviews begin in August and will roll out to the rest of the state beginning in mid- September.

Why?

Coverage is King.

If you don't have coverage where you want or need it, you won't sign up for FirstNet's service. It won't matter how good tomorrow's public safety applications will be, how reliable the network is, or how great the service is if you don't have the coverage you need.

FirstNet Needs You.

Nobody can force you to subscribe to FirstNet's service. FirstNet needs you—whether you need FirstNet is up to you. In order for FirstNet to build a network you want, it needs to know what you need. So we are collecting your coverage requirements before a single site breaks ground.

It's YOUR Network.

This network is for first responders. It's for you, and it will be built to your needs. We have designed these sessions to empower you to communicate your coverage requirements to FirstNet: where you don't have it now, where it is most important to have it, and where you need to have it first.

Leech Lake and Waseca County Pilots

In 2012, the state of Minnesota, in partnership with Televate, piloted workshops to assess the wireless broadband coverage requirements of Waseca County and Leech Lake Reservation. For this pilot, we rendered three years' worth of CAD data over their jurisdictions to assess the areas of highest priority. The process allowed us to identify assets that could potentially be used by FirstNet to meet the coverage objectives of the first responders.

You can review our findings here:

https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx

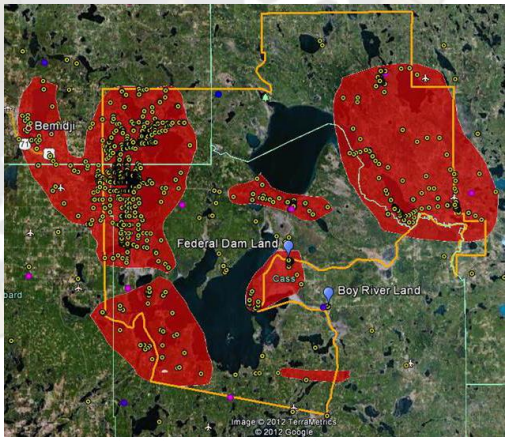


Figure 1: Leech Lake Reservation Priority Coverage Zones

Minnesota-FirstNet Consultation Project

August 2014

The Process

1. Collect CAD Data

The project team has been collecting CAD/RMS incident data from every PSAP. We then render the data in a manner that takes into account the severity of the incident, the number of units and the agencies responding. The analysis produces a visualization that shows the statistical important service areas based on 3 years' of activity.

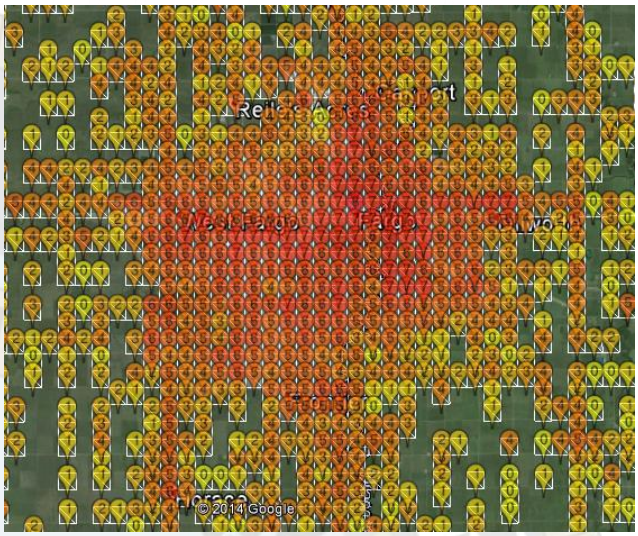


Figure 2: Example Visualization of CAD Data

2. Perform Coverage Review

The team executes interactive, web-based sessions where the project team collects the coverage requirements with local and county stakeholders.

Call Current Address Latitude	Call Current Address Longitude	Call Priority	Call Type
44.83	-93.40	3	Intoxication
44.83	-93.40	3	Intoxication
44.86	-93.41	3	Motorist Assist
44.86	-93.41	3	Motorist Assist
44.85	-93.44	3	Bar Check/Liq Compliance
44.85	-93.46	3	City Center Security Check
44.85	-93.46	3	911 Hang Up
44.85	-93.46	3	911 Hang Up
44.85	-93.46	3	911 Hang Up
44.85	-93.46	3	911 Hang Up
44.88	-93.49	1	Medical - Other
44.88	-93.49	1	Medical - Other
44.82	-93.51	2	Alarm - Intrusion
44.82	-93.51	2	Alarm - Intrusion
44.82	-93.51	2	Alarm - Intrusion
44.88	-93.41	2	Suspicious Vehicle
44.85	-93.44	3	Public Assist
44.85	-93.43	2	DWI
44.85	-93.43	2	DWI
44.85	-93.43	2	DWI
44.85	-93.43	2	DWI
44.84	-93.45	3	Lock Out
44.84	-93.44	1	Alarm - Fire
44.84	-93.44	1	Alarm - Fire
44.84	-93.44	1	Alarm - Fire
44.84	-93.44	1	Alarm - Fire

Figure 3: Sample Historical CAD Data

3. Verify Conclusions

The team assesses the coverage requirements and produces a statistical analysis based on the three years of CAD incident data. The coverage assessment will then be harmonized statewide to ensure consistency.

4. Finalize Requirements

After the project team has completed the statistical analysis, the county will be given a second opportunity to review and modify their coverage objectives. This last step is vital because this information will be presented by the State to FirstNet to design and build the network.

What to Expect Next

- We will contact you to schedule a review session
- We will work with you to make sure the correct stakeholders are represented at the event
- We will provide data to review ahead of time
- We will schedule and execute your coverage review sessions sometime through Fall 2014

Minnesota-FirstNet Consultation Project

August 2014

Who Should Attend?

- Law Enforcement
- Sheriff
- Fire
- Radio/communications
- EMS
- PSAP/Dispatch
- Emergency Management
- Other Key Stakeholders
- You Decide!

Your Project Team

Jackie Mines, Director
Emergency Communication Networks
jackie.mines@state.mn.us
(651) 201-7550

John Tonding Central/Metro Interoperability Coordinator
Emergency Communication Networks
john.tonding@state.mn.us
(763) 587-8234

Marcus Bruning Northern Interoperability Coordinator
Emergency Communication Networks
marcus.bruning@state.mn.us
(218) 232-3762

Randy Donahue Southern Interoperability Coordinator
Emergency Communication Networks
randy.donahue@state.mn.us
(507) 360-2660

Mark Navolio Minnesota-FirstNet Project Manager
Televate, LLC
mnavolio@televate.com
(301) 922-6691

For more information visit ECN's website:
https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx

Defining Public Safety Grade

FirstNet has no defined standard for "public safety grade" coverage for its broadband network yet, beyond that it will be "better than cellular commercial service".

These coverage review sessions provide you with the opportunity to define YOUR idea of "public safety grade" coverage for broadband.

Figure 4: Borden Lake ARMER Tower; potential FirstNet site

Coming August 13, 2014: Minnesota-FirstNet User Population Survey

ECN will publish the important Minnesota-FirstNet User Population Survey on August 13. This survey will assess the potential number of users, preferred device types, current spending and barriers to adoption for FirstNet. The information from this survey will be a cornerstone of a sustainable business case for FirstNet in Minnesota.

3. Presentation Slides

a. Coverage Reviews

b. Devices Workgroup

c. Applications Workgroup

d. Leech Lake

State of Minnesota FirstNet Consultation Project (MnFCP)

MN Public Safety Broadband Network (MN-PSBN)

Coverage Assessment

Agenda

- Introduction and purpose
- Discuss your public safety requirements and needs – how do you leverage wireless data? and how do we make the solution more effective for your operations?
- Interactive session: define coverage needs and identify assets
- Broadband Case Study
- Q&A on the Program

Program Introduction

The Middle Class Tax Relief and Job Creation Act of 2012

- FirstNet
  - 20 MHz of spectrum for public safety broadband
  - Up to $7 Billion dollars
  - Tasked to create the Nationwide Public Safety Broadband Network (NPSBN)
  - Public private partnership
  - Built to public safety requirements
  - Public safety priority over "secondary" users
- State and Local Implementation Grant Program (SLIGP)
  - Captures each state's requirements

Minnesota FirstNet Consultation Project (MnFCP)

- Minnesota awards a contract to Televate to manage the program (Dec 2013)
- MnFCP Project Scope:
  - Education and Outreach
  - Statewide Requirements Working Groups
  - Local Requirements - Coverage Assessments
  - Surveys: User Population & Utilization Requirements
  - Strategic plan development
  - RFI Local Partners
  - Governance

Program Goals

- NPSBN (FirstNet) service will be priced competitively with commercial carriers

- **Short term:** Define minimum requirements for you to adopt FirstNet service for your mobile data requirements
  - Network will be improved and built out as it matures

- At launch, NPSBN service <u>will not</u> replace your ARMER radio
  - In the future, NPSBN service *may* be capable of replacing your radio
    - Lifecycle of incumbent systems, a major consideration
    - Presently, not a priority for MN FirstNet planning
    - Requires changes to the standards

Goal Today

We will identify the level of coverage that would convince you to adopt the FirstNet service.

- Do you use cellular data service today through a major carrier? Which do you use? Would you define this as your minimum requirement for adoption?
- We are focusing on early, **launch window** requirements

User Population Data

Incomplete

- Bloomington Fire Department
- Edina Fire Department
- Hennepin County Emergency Management
- Hennepin County Sheriff IT
- Hennepin County Sheriff's Office
- Hennepin EMS
- Maple Grove Fire Department 27115
- Minnetonka Police Department
- MSP Airport Emergency Communications
- Plymouth Police Department
- University of Minnesota
- Wayzata Fire Department

No Data

- Administrative Services Director
- Allina Medical Transport
- Augsburg College
- Bloomington PD
- Brooklyn Center FD
- Brooklyn Ctr PD
- Brooklyn Park FD
- Brooklyn Park PD
- CART Ambulance Svcs
- Champlin PD
- Crystal PD
- Dayton FD
- Dayton PD
- DHS
- Eden Prairie
- Eden Prairie FD
- Eden Prairie PD
- Golden Valley Dept of Public Sfty
- Golden Valley FD
- Health East
- Hennepin Cnty Emer Preparedness
- Hennepin Cnty Medical Ctr EMS
- Hennepin County Medical Center
- Hennepin County Sheriff'S Radio
- Hopkins School District
- Life Link III
- Loretto Vol FD
- MAC PSAP
- Maple Grove PD
- Maple Plain FD
- Medical Abbott NorthWestern
- Medical Childrens Mpls
- Medical Fairview
- Medical Fairview Southdale
- Medical Maple Grove
- Medical Mdewakanton
- Medina PD
- MESB
- MetCouncil - Metro Mobility
- MetCouncil - Transit & LRT
- Metro area wide
- Metro Maintenance Dispatch
- Metro Region Emergency Managers
- Metro Regional Radio Board
- Metro Traffic Dispatch
- Metro Transit
- Metro Transit PD
- Metropolitan Airports Commission
- Metropolitan Emergency Services Board
- Metropolitan State University
- Minneapolis
- Minneapolis Community & Tech Colg
- Minneapolis PD
- Minneapolis-St Paul Intl Airport
- Minnesota Ambulance Association
- Minnetonka City
- Minnetonka FD
- Minnetonka School District
- Minnetrista Public Safety Dept
- MN State Patrol Dispatch
- MnAng/Msp FD
- Mound PD
- Mpls/StPaul Int'L Airport FD
- MSP
- MSP Emergency Communications
- MSP MAC Airport
- Minnesota State Patrol-Rochester
- Minnesota State Patrol-Roseville
- Normandale Community College
- North Hennepin Community College
- Osseo FD
- Osseo PD
- Plymouth FD
- Richfield FD
- Richfield PD
- Richfield Public Safety Department
- Robbinsdale FD
- Robbinsdale PD
- Rochester
- Rogers FD
- South Lake Minnetonka PD
- St. Bonifacius FD
- St. Louis Park FD
- St. Anthony FD
- St. Anthony PD
- St. Louis Park
- St. Louis Park PD
- Three Rivers Park District
- United States Federal Reserve System
- University of Minnesota
- University of Minnesota PD
- US Customs and Border Protection
- West Hennepin Public Safety Dept
- West Metro Fire-Rescue District FD

Defining the MN-PSBN Service Types

- **Critical Service Area (Highest Priority Area)**
  - Where you want FirstNet coverage **first** and where you need it **most** (public safety grade service)
  - High-activity areas based on CAD data and other defined areas
  - Points of interest (critical infrastructure, anchor institutions, etc.)

- **Required Service Area "Need"**
  - The minimal service area required to adopt the service
  - At minimum: compare to existing cellular service

- **Extended Service Area "Want"**
  - Where commercial carriers do not cover, but where you need coverage
  - Where deployable or satellite is not acceptable

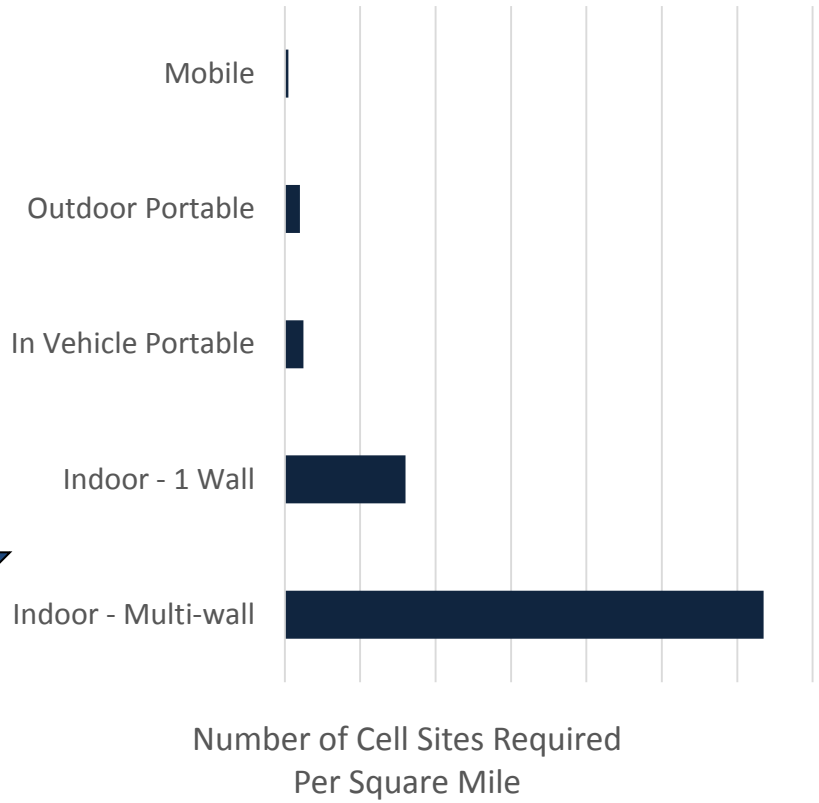
Why Coverage Is Critical

Types of Coverage

- Mobile: Vehicle based modem/router with external antenna
- Outdoor Portable: same as above with operation outside the vehicle
- In Vehicle Portable: handheld (smartphone/tablet), or PC based modem operated inside vehicle
- Indoor Portable: handheld (or equivalent) with additional losses incurred from walls/windows
  - The more walls, density of construction, the more signal is required

Stronger Signals Required

Impacts On Cost



It is critically important to understand the type of coverage required!

Types of Coverage

Mobile Coverage	Outdoor Coverage	In-Vehicle Coverage	Indoor Coverage
• External Antenna	• Hand-held device	• No External Antenna	• Varying degrees of building loss

Stronger Signal Required = more sites, more $$$

Coverage Assessment Process

Wireless Data Case Study

Consider a recent major incident:

- **Describe the incident.**
- **Did wireless data play a major role at the incident?**
  - Describe the data system utilized at the incident.
  - If so, how?
  - If not, why not?
- Were your responders satisfied with their data service?
- How could the service have been improved to have resulted in a better outcome?
- Which kinds of information flow to and from the incident could have resulted in a better outcome?

Closeout

Closeout

- Other Needs:
  - What are your other requirements for the FirstNet service?
  - What other impediments and opportunities exist for FirstNet with your agency?
  - Is satellite acceptable?
- Q&A
- How can we improve this process?

Minnesota-FirstNet Consultation Project

Devices Working Group Meeting 2

Facilitator:
Brandon Abley, Televate

August 22, 2014

© 2014 Televate, LLC. All rights reserved.

Agenda

- Read-aheads:
  - NPSTC SOR
    - Devices Section (4.5.1)
- Overview and Introduction
- Task 1: Review Device Types
  - Present
  - Future
- Task 2: Identify Impediments to Adoption
- Task 3: Review of NPSTC SOR

© 2014 Televate, LLC. All rights reserved.

Workgroup Mission:

To express Minnesota stakeholder user requirements for devices on the NSPBN that would facilitate adoption of FirstNet services.

© 2014 Televate, LLC. All rights reserved.

Goals Today

- To identify what would convince you to adopt the service.
  - To identify characteristics of present devices that you need if and when you adopt the service
  - To identify characteristics of future devices that would convince you to adopt the service

- We need to articulate:
  - What do you like now?
  - What would you like to have?
  - What don't you realize you would like to have?

- Key motivator: FirstNet Initial Consultation Meeting
  - September 24th

TELEVATE

© 2014 Televate, LLC. All rights reserved.

Interactivity

- These sessions are INTERACTIVE
- Televate will present recommendations based on:
  - Our experience
  - Previous WG Meeting
  - Suggestions from WG members
- We need YOUR input
- You are encouraged to:
  - Disagree with our recommendations
  - Introduce your own recommendations

© 2014 Televate, LLC. All rights reserved.

Assumptions:

- NPSBN (FirstNet) service will be priced competitively with commercial carriers
- NPSBN service will be as or more reliable than your radio
  - The value is in improved service
  - Mission-critical coverage and availability
- At launch, NPSBN service will not replace your radio
- In the future, NPSBN service may be capable of replacing your radio, but:
  - Consider lifecycle of incumbent systems first
  - Not a present priority for MN FirstNet planning
- We are adding capabilities, not displacing them

TELEVATE

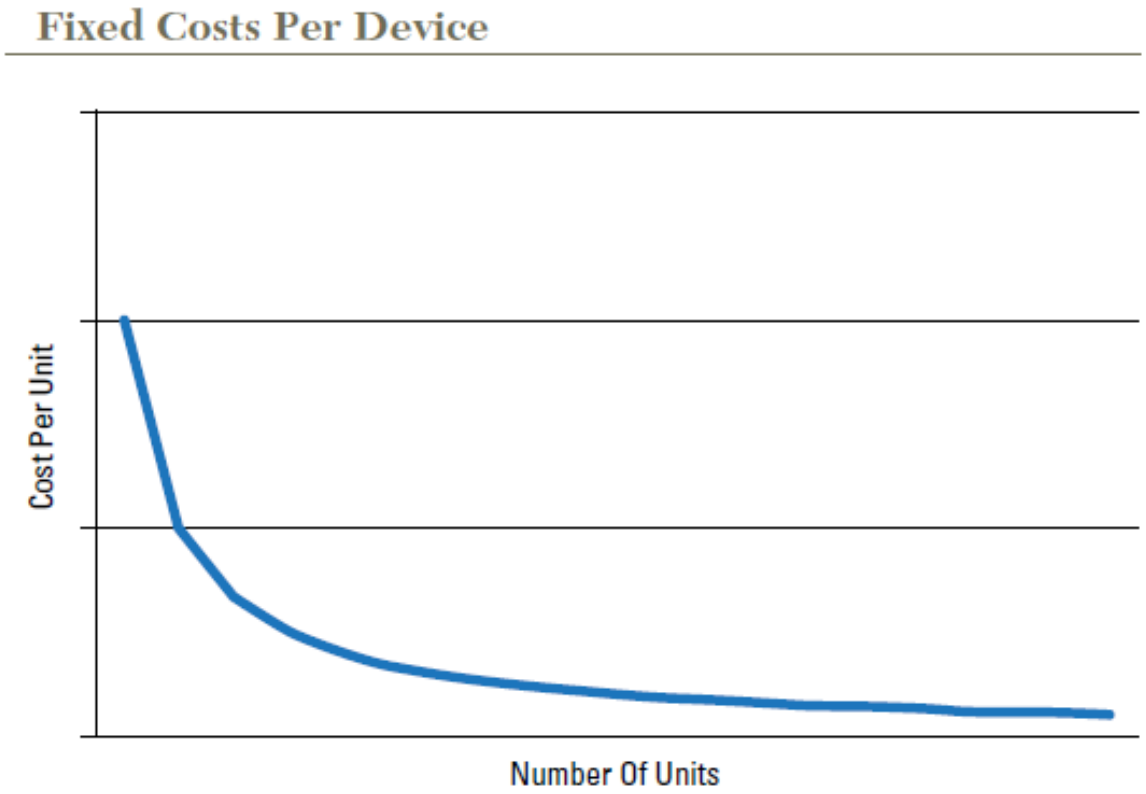
© 2014 Televate, LLC. All rights reserved.

Some Implications:

- If our devices are too specialized, they will be too expensive
- Manufacturers must sell enough devices to support R&D
  - Special form factors for public safety
  - Special band configuration (700 MHz Public Safety+D Block)
- FirstNet must support the right mix of devices at the right price
- User device requirements will drive manufacturer and FirstNet economy of scale

© 2014 Televate, LLC. All rights reserved.

Economy of Scale



© 2014 Televate, LLC. All rights reserved.

Expressing Requirements

- SHALL
  - These are the things you need.
- SHOULD
  - These are best practices or useful features that you can live without.
- SHALL NOT
  - These are characteristics you would refuse to accept.
- SHOULD NOT
  - These are detrimental characteristics that you can live with, but prefer to live without.

TELEVATE

© 2014 Televate, LLC. All rights reserved.

Task 1: Device Types

© 2014 Televate, LLC. All rights reserved.

Device Requirements

- Best case scenario; Devices that are:
  - As reliable as your radio
  - As useful as your radio
- Your requirements are what you “require” of the devices to adopt the service
- If the devices are not compelling, you won’t want the service
- Identify requirements by:
  - Inventorying today’s cellular devices
  - Define what they do
  - Define what changes you need out of a mission-critical device

© 2014 Televate, LLC. All rights reserved.

“Needs”

- Tools don’t make the responder
  - Good tools make the responder more effective
  - Good tools make the responder safer
  - Good tools are integrated into SOPs, and become inseparable from the job

- What are your needs?
  - And what are your wants?

© 2014 Televate, LLC. All rights reserved.

What is a “characteristic”?

- A characteristic is what it does or what it is like
  - not what it is

- E.G., Typical Android Phone:
  - Handheld
  - Touchscreen
    - No keypad
  - Portable
  - Wearable
  - Voice-activation

© 2014 Televate, LLC. All rights reserved.

Task 2: Impediments to Adoption

© 2014 Televate, LLC. All rights reserved.

Impediments to Adoption

- What would be impediments to your adopting the service?

- Consider technology and communications projects you have worked through before—
  - Radio projects
  - PSAP/911/dispatch/CAD projects
  - IT and telecom projects

- Where did you get burned?
- What mistakes won't you repeat again?
- What negotiating points do you recommend?

© 2014 Televate, LLC. All rights reserved.

Task 3: NPSTC SOR

© 2014 Televate, LLC. All rights reserved.

NPSTC SOR:

- Subject matter experts across public and private industry produced requirements for FirstNet at launch
  - Publication date: December 2012
- Hundreds of requirements listed
  - Televate has scrubbed those appropriate for this workgroup
- Premise: To express LAUNCH requirements for NPSBN
  - SHALL requirements: Public safety will only adopt service it is has these requirements
  - SHOULD requirements: Best practices, or desired features
    - Best practices, or
    - Higher adoption rate if these are supported
- Workgroup task: SOR Review
  - Determine if Minnesota concurs with requirements
  - Identify any new requirements

TELEVATE

© 2014 Televate, LLC. All rights reserved.

INTERACTIVE SESSIONS

TELEVATE

© 2014 Televate, LLC. All rights reserved.

Next Steps

- Televate to clean up input from interactive sessions
- Send to group for review/approval
- Televate to transmit final requirements to ECN and IDC/SECB
- Preliminary requirements shared with FirstNet in anticipation of initial consultation meeting
  - September 24th

© 2014 Televate, LLC. All rights reserved.

Thank you!

https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx

Jackie Mines, DPS
Jackie.mines@state.mn.us
651 201 7550

John Tonding, Central/Metro RIC
john.tonding@state.mn.us
(763) 587-8234

Marcus Bruning, Northern RIC
Marcus.Bruning@state.mn.us
(218) 232-3762

Randy Donahue, Southern RIC
Randy.donahue@state.mn.us
(507) 360-2660

Mark Navolio, Televate PM
mnavolio@televate.com
(301) 922-6691

Brandon Abley, Televate
babley@televate.com
(703) 639 4200

TELEVATE

© 2014 Televate, LLC. All rights reserved.

Minnesota-FirstNet Consultation Project

Applications and NG911 Working Group Meeting 2

Facilitator:
Brandon Abley, Televate

August 22, 2014

© 2014 Televate, LLC. All rights reserved.

Agenda

- Read-aheads:
  - NPSTC SOR
    - User Services (4.1)
    - Network Service (4.2)

- Overview and Introduction

- Task 1: Review Data Types
- Task 2: Review Deployment and Enablement
- Task 3: Review SOR Requirements

© 2014 Televate, LLC. All rights reserved.

Workgroup Mission:

To express Minnesota stakeholder user requirements for applications and NG911 on the NSPBN that would facilitate adoption of FirstNet services.

© 2014 Televate, LLC. All rights reserved.

Goals Today

- We need to articulate:
  - What do you like now?
  - What would you like to have?
  - What don't you realize you would like to have?

- Key motivator: FirstNet Initial Consultation Meeting
  - September 24th

© 2014 Televate, LLC. All rights reserved.

Interactivity

- These sessions are INTERACTIVE
- Televate will present recommendations based on:
  - Our experience
  - Previous WG Meeting
  - Suggestions from WG members
- We need YOUR input
- You are encouraged to:
  - Disagree with our recommendations
  - Introduce your own recommendations

© 2014 Televate, LLC. All rights reserved.

Assumptions:

- NPSBN (FirstNet) service will be priced competitively with commercial service
- NPSBN service will be as or more reliable than your radio
  - The value is in improved service
  - Mission-critical coverage and availability
- We are adding capabilities, not displacing them
- We will use today's applications on the new network
- We will have mission-critical applications on the new network

TELEVATE

© 2014 Televate, LLC. All rights reserved.

Expressing Requirements

- SHALL
  - These characteristics are mandatory.
- SHOULD
  - These are best practices or useful features that you can live without.
- SHALL NOT
  - These are characteristics you would refuse to accept.
- SHOULD NOT
  - These are detrimental characteristics that you can live with, but prefer to live without.

TELEVATE

© 2014 Televate, LLC. All rights reserved.

“Needs”

- Tools don’t make the responder
  - Good tools make the responder more effective
  - Good tools make the responder safer
  - Good tools are integrated into SOPs, and become inseparable from the job

- What are your needs?
  - And what are your wants?

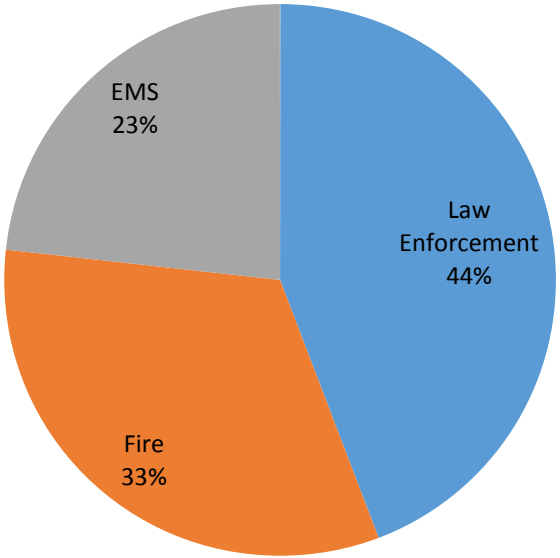
© 2014 Televate, LLC. All rights reserved.

Task 1: Data Types

© 2014 Televate, LLC. All rights reserved.

Applications Inventory

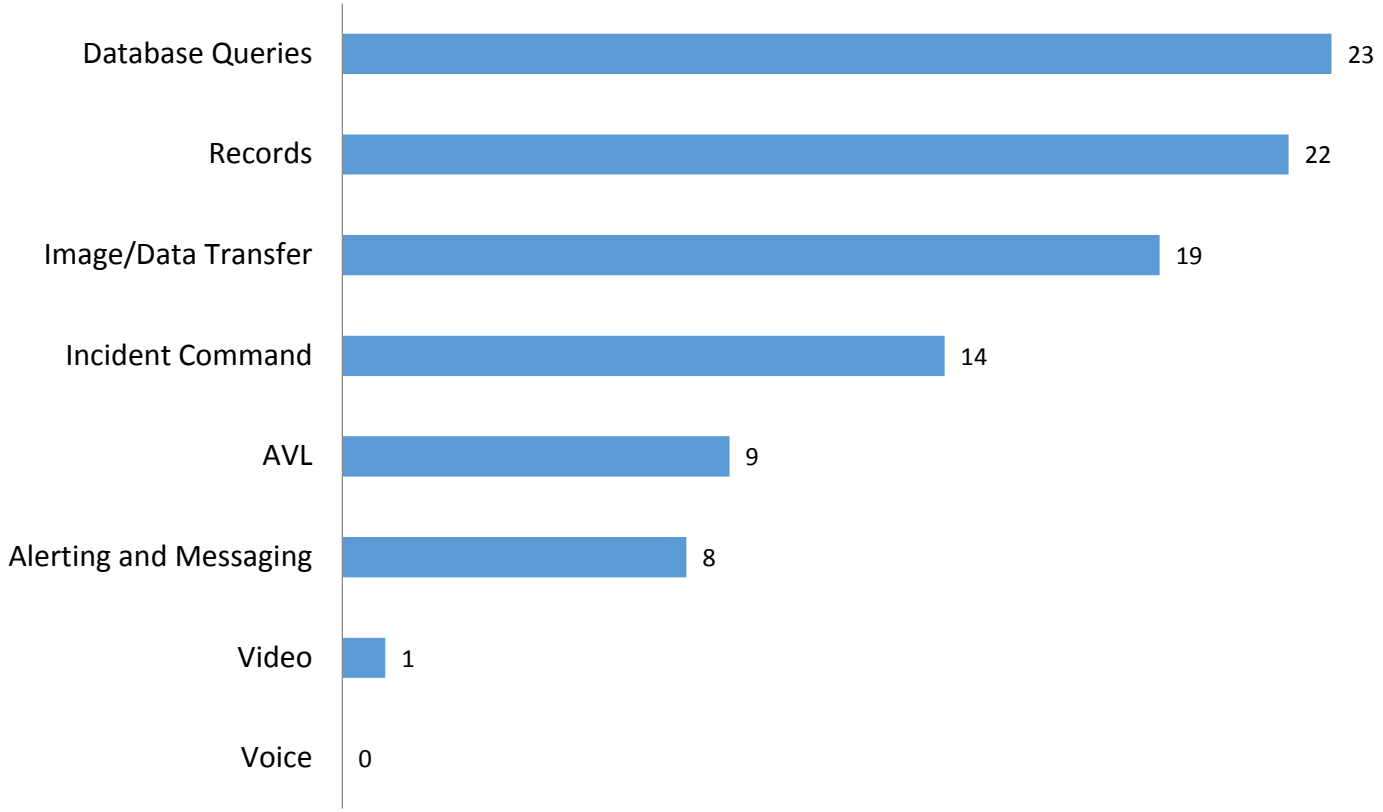
- 42 applications assessed
  - 38 used by law enforcement
  - 28 used by fire
  - 20 used by EMS



- Start with applications,
  Work backwards:
  - Define data types
  - Define Mission-critical and priority use cases
  - Define interoperability requirements
  - Define related NG911 requirements

© 2014 Televate, LLC. All rights reserved.

Data Types



© 2014 Televate, LLC. All rights reserved.

Task 2: Impediments to Adoption

© 2014 Televate, LLC. All rights reserved.

NPSTC Deployment and Enablement

- NPSTC has defined which services FirstNet should deploy and which services FirstNet should enable
- Televate has recommended additional services specific to Minnesota
- We seek your input on:
  - What needs to be added to the list
  - What needs to be removed
  - What your requirements are compared to NPSTC's

TELEVATE

© 2014 Televate, LLC. All rights reserved.

Task 3: NPSTC SOR

© 2014 Televate, LLC. All rights reserved.

NPSTC SOR:

- Subject matter experts across public and private industry produced requirements for FirstNet at launch
  - Publication date: December 2012
- Hundreds of requirements listed
  - Televate has scrubbed those appropriate for this workgroup
- Premise: To express LAUNCH requirements for NPSBN
  - SHALL requirements: Public safety will only adopt service it is has these requirements
  - SHOULD requirements: Best practices, or desired features
    - Best practices, or
    - Higher adoption rate if these are supported
- Workgroup task: SOR Review
  - Determine if Minnesota concurs with requirements
  - Identify any new requirements

© 2014 Televate, LLC. All rights reserved.

INTERACTIVE SESSIONS

TELEVATE

© 2014 Televate, LLC. All rights reserved.

Next Steps

- Televate to clean up input from interactive sessions
- Send to group for review/approval
- Televate to transmit final requirements to ECN and IDC/SECB
- Preliminary requirements shared with FirstNet in anticipation of initial consultation meeting
  - September 24th

© 2014 Televate, LLC. All rights reserved.

Thank you!

https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx

Jackie Mines, DPS
Jackie.mines@state.mn.us
651 201 7550

John Tonding, Central/Metro RIC
john.tonding@state.mn.us
(763) 587-8234

Marcus Bruning, Northern RIC
Marcus.Bruning@state.mn.us
(218) 232-3762

Randy Donahue, Southern RIC
Randy.donahue@state.mn.us
(507) 360-2660

Mark Navolio, Televate PM
mnavolio@televate.com
(301) 922-6691

Brandon Abley, Televate
babley@televate.com
(703) 639 4200

TELEVATE

© 2014 Televate, LLC. All rights reserved.

FirstNet and Minnesota Tribes

Speaker:

Brandon Abley
Televate, LLC

for State of Minnesota Emergency Communication Networks

Agenda

1. FirstNet Basics-Legal

2. FirstNet Basics-Technical

3. Tribal Issues

About ECN

Emergency Communication Networks is a division of the Minnesota Department of Public Safety

- The statewide 9-1-1 program
- Allied Radio Matrix for Emergency Response (ARMER)
- Communications Interoperability
- Statewide Emergency Communications Board standards and projects
- Minnesota/FirstNet Consultation

About Televate

Company Overview

Founded in 2001, Televate is a leading engineering consultancy delivering innovative communications and IT services and solutions for public safety and critical infrastructure industries. Our technology and program management experts design sustainable, interoperable land mobile radio, wireless broadband networks and applications, and advanced information technology solutions.

Our Expertise

- Broadband Networks (700 MHz, 4.9 GHz, LTE, Wi-Max, Wi-Fi, Microwave, Fiber)
- Land Mobile Radio (P25 Voice & Data, Narrowbanding, RF Testing)
- Network Planning and Project Management
- Business Modeling and Development
- Interoperable Communications
- Strategy and Planning

FirstNet Basics-Legal

Background on FirstNet

FirstNet was created by Middle Class Tax Relief and Job Creation Act of 2012, passed Congress on February 17, 2012

- Will build, maintain Nationwide "Public Safety" Broadband Network ("NPSBN") for use by first responders
- FirstNet adopted LTE as the standard for the NPSBN
- The Act doubled the amount of spectrum allocated to public safety from 10 MHz to 20 MHz, which will roughly double the performance of the network

$7 billion in funding to build out the NPSBN;

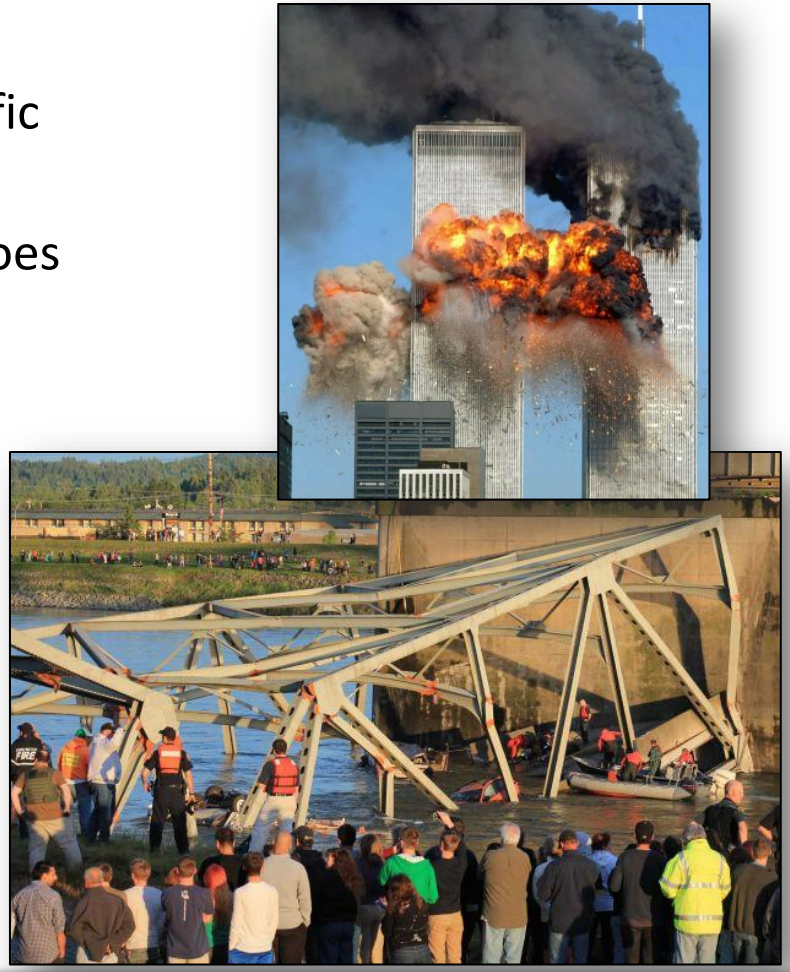
- $2B available now
- $5B after successful FCC spectrum auctions

FirstNet Advantages

- Public safety agencies have been relying more and more on wireless data services (Verizon, AT&T, etc.), but there have been problems:
  - **Lack of Availability**
  - **Lack of Reliability**
  - **Lack of Coverage**
- Benefits
  - Better Price & Choice: adopting a commercial standard (LTE) provides a much greater marketplace (2 billion vs. 25 million public safety worldwide)
  - Keeps Pace with Technology; with a great emphasis on backward compatibility

Why is it better than commercial services?

- Carrier networks are often overwhelmed with commercial traffic during emergency events
- For obvious reasons public safety does not want to preempt this communication



Why is it better than commercial services?

- Carrier networks are often overwhelmed with commercial traffic during emergency events
- For obvious reasons public safety does not want to preempt this communication

FirstNet's Mission

From their website:

- First responders deserve the best network
- Reliability must be built-in
- Public safety needs priority access
- Special events attract big crowds
- Rural emergencies pose coverage challenges
- Flying blind is dangerous
- Sharing one network improves communications
- Mass markets fuel innovation
- Budgets are tight
- Battling enemies requires coordinated response

http://firstnet.gov/why-firstnet

Guiding Principles

From their website:

- Public safety-grade network built to meet the needs of our nation's first responders
- Provide public safety users with priority access to the network
- Withstand natural disasters, incidents and man-made threats
- Deliver mission-critical data and applications
- Keep incident commanders in control
- Be judicious with taxpayer dollars
- Effective security controls
- A backhaul approach that keeps the network up and running
- Leverage existing infrastructure where it makes economic and engineering sense

http://firstnet.gov/about/guiding-principles

FirstNet Organization

Board of Directors

Samuel (Sam) Ginn, Chair
Sue Swenson, Vice Chair
Barry Boniface
Tim Bryan
Sylvia Mathews Burwell (OMB)
Charles (Chuck) Dowd
F. Craig Farrill
Paul Fitzgerald
Eric Holder (U.S. Attorney General)
Jeff Johnson
Jeh Johnson (DHS)
Kevin McGinnis
Ed Reynolds
Teri Takai
Wellington Webb

GENERAL MANAGER
Bill D'Agostino

DEPUTY GENERAL MANAGER
TJ Kennedy

Chief of Staff

Program Management and Strategy
Mark Daley

Deputy General Manager | User Advocacy
TJ KENNEDY

Government Affairs (Ed Parkinson)
Communications (Corey Ray)
Outreach (Amanda Hilliard)
Product Management
Offering and Pricing
Project Management
State Consultation (David Buchanan)
State Plans (Richard Reed)
Strategy and Business Planning

FirstNet™
U.S. DEPARTMENT OF COMMERCE

FIRSTNET OFFICES AND DIVISIONS

Chief Administrative Officer
FRANK FREEMAN

Human Resources (Jamesa Moone)
Recruitment & Staffing
Payroll & Benefits
Workforce Development
Facilities Management
Emergency & COOP
Operations Support
Records Management & Training

Chief Financial Officer
RANDY LYON

Deputy CFO (David Socolof)
Budget and Finance
Budget Operations & Controls (Alice Suh)
Finance & Accounting
Strategic Fin. Planning (John Quinlan)
Performance Measurement & Risk Management (Lea-Ann Bigelow)

Office of Chief Counsel
STUART KUPINSKY

Board Secretary & Deputy Chief Counsel (Uzoma Onyeije)
Commercial Division
Compliance Division
Regulatory Division
NEPA (Genevieve Walker)
Regulatory Affairs
Spectrum Management (Lance Johnson)

Chief Information Officer
Starts March 24th

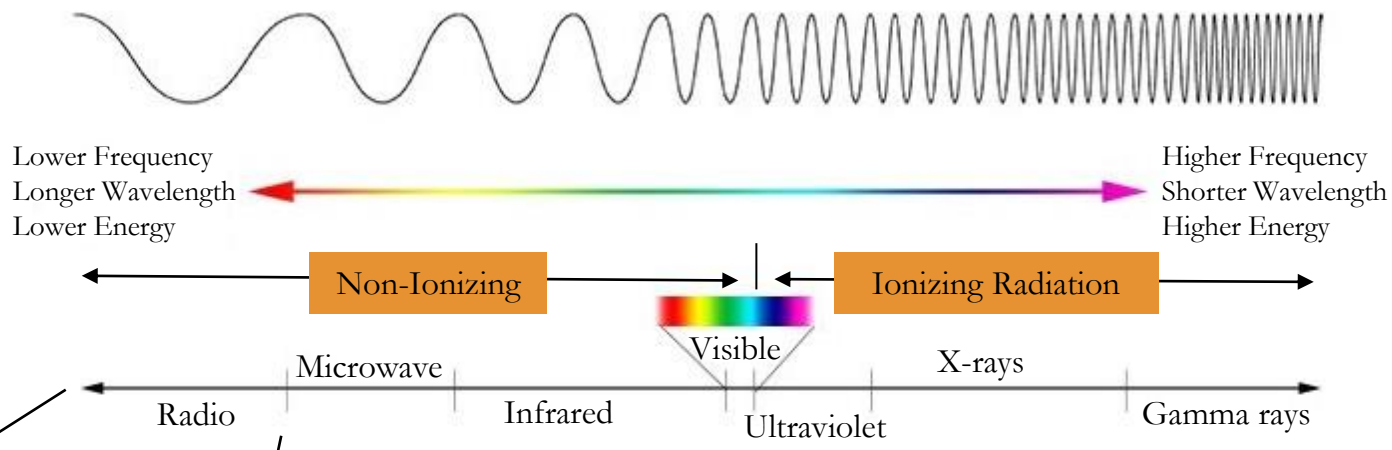
IT Services
Office Systems and Applications
IT Network Security
ERP

Chief Technical Officer
JEFF BRATCHER (Acting Deputy)

Applications
CORE Network and Service Platform
Deployable Systems
Quality / Tech Performance
Device Development Standards
RAN Planning & Engineering
Standards & Research & Development
Technical Project Management
Technical Support to State Plans

FirstNet Basics-Technical

Electromagnetic Spectrum

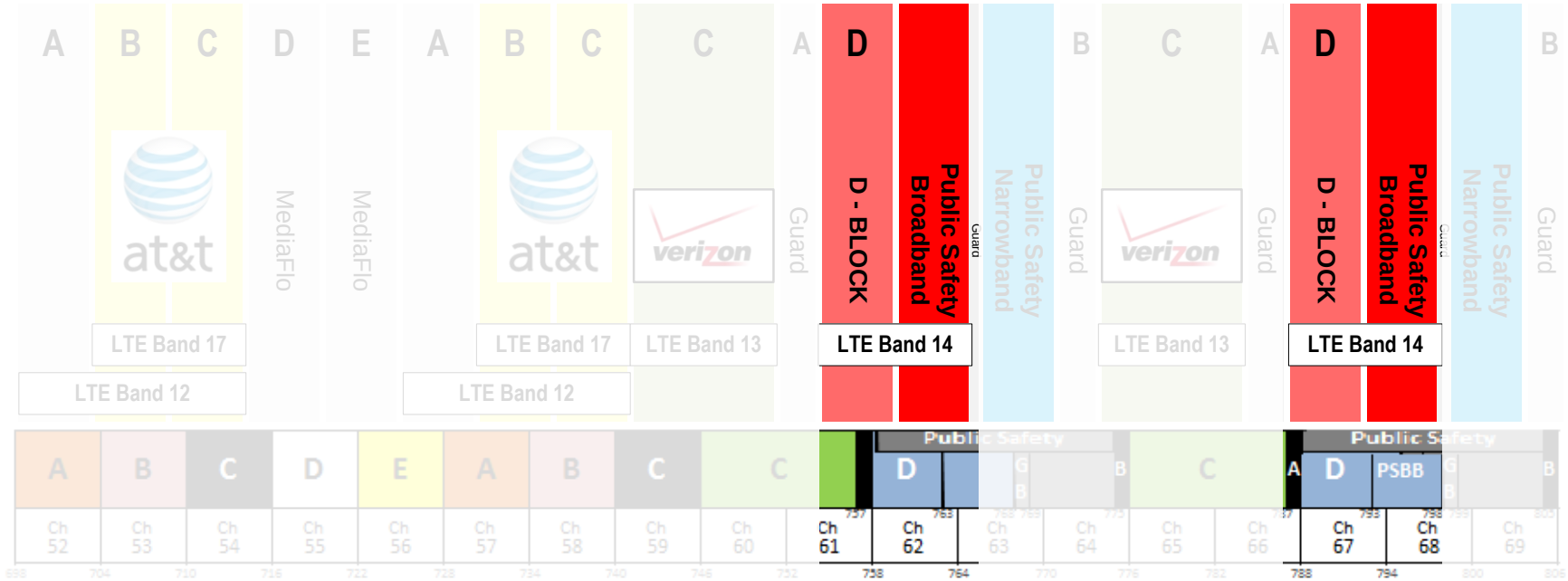


Radio Spectrum	Frequency	Usage
Low Frequencies "LF"	30 - 300 kHz	
Medium Frequencies "MF"	300 - 3000 kHz	
High Frequencies "HF"	3 - 30 MHz	
Very High Frequecies "VHF"	30 - 300 MHz	
Ultra High Frequencies "UHF"	300 - 3000 MHz	700 MHz (FirstNet) 800 MHz (ARMER)

- **ARMER and FirstNet frequencies are in the "Radio" portion of the electromagnetic spectrum**

Dedicated Frequencies

- Dedicated Frequencies: the FirstNet NPSBN will utilize dedicated frequency channels, Band Class 14.
  - Two (2) paired 700MHz channels of 10MHz each for total of 20 MHz
  - Do not compete with commercial users during emergencies



Dedicated Frequencies

Why is the spectrum such a big deal?

Dedicated Frequencies

Why is the spectrum such a big deal?

- **Consider Auction 73 in 2008-2009, or, "The 4G Auction":**

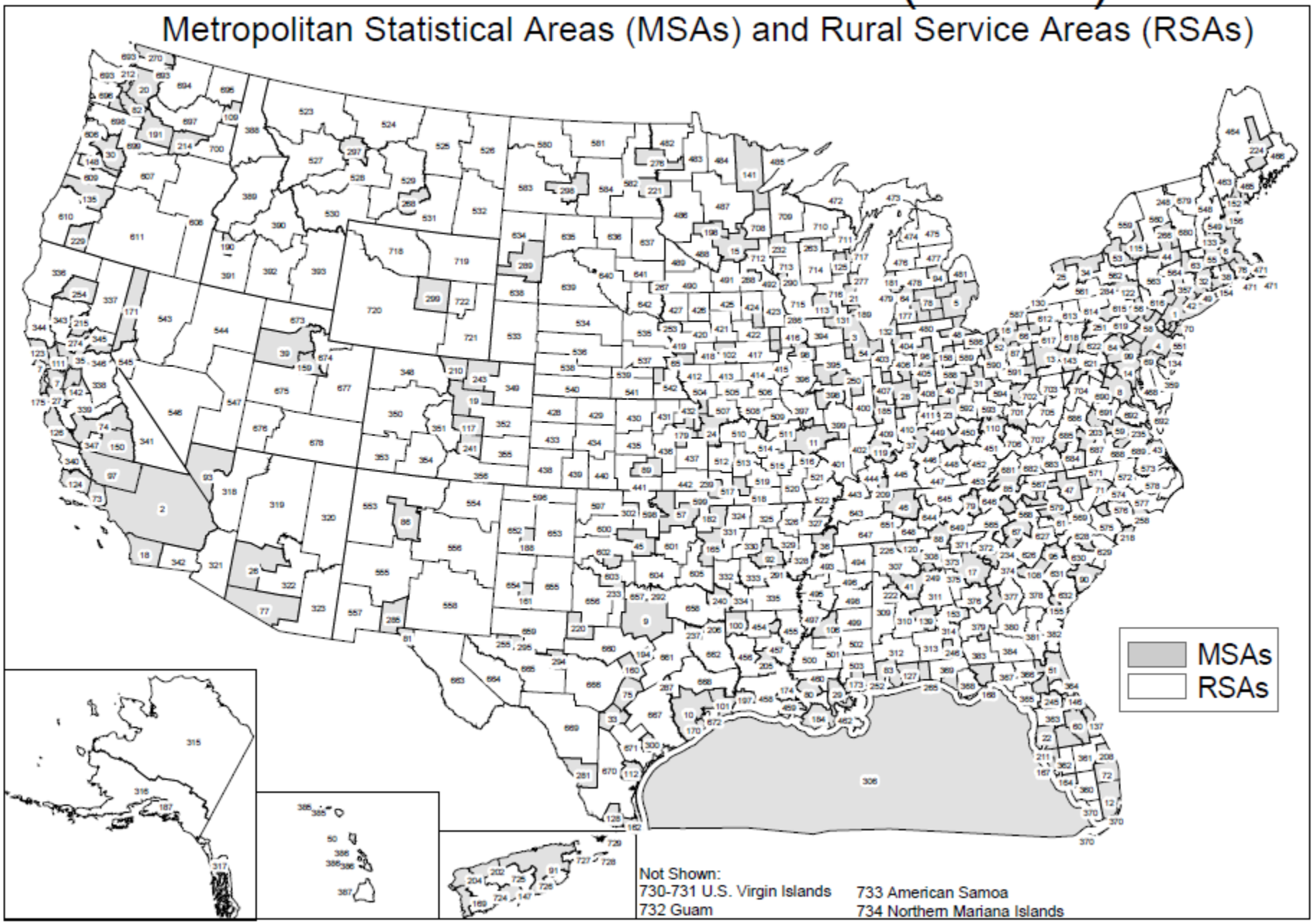
- Digital TV transition freed up about 100 MHz of spectrum (698-806 MHz; "700 MHz band")
- This spectrum was auctioned for wireless data in 2007-08
- Generated $19 billion in revenue
- The Upper D Block, set aside for a public safety public/private partnership, did not meet its reserve price (approx. $1.5 billion)

Other Auction 73 Facts

Rounds:	261
Bidding Days:	38
Qualified Bidders:	214
Winning Bidders:	101
Licenses Won:	1090
Licenses Held by FCC:	9
Gross Bids:	$19,120,378,000
Net Bids:	$18,957,582,150

Cellular Market Areas (CMAs)

Metropolitan Statistical Areas (MSAs) and Rural Service Areas (RSAs)



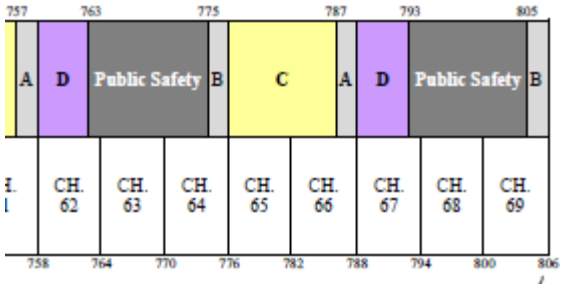
Federal Communications Commission, Wireless Telecommunications Bureau, Auctions and Spectrum Access Division

Dedicated Frequencies

The D Block

- The Upper D Block failed to auction (top bid under $500 million; reserve was $1.3 billion); it remained unallocated ever since
- D Block required bidder to enter into public/private partnerships with public safety organizations ("strings attached")
- Was reallocated in 2012 to public safety and assigned to FirstNet

Upper D Block:
758-763/788-793 Mhz

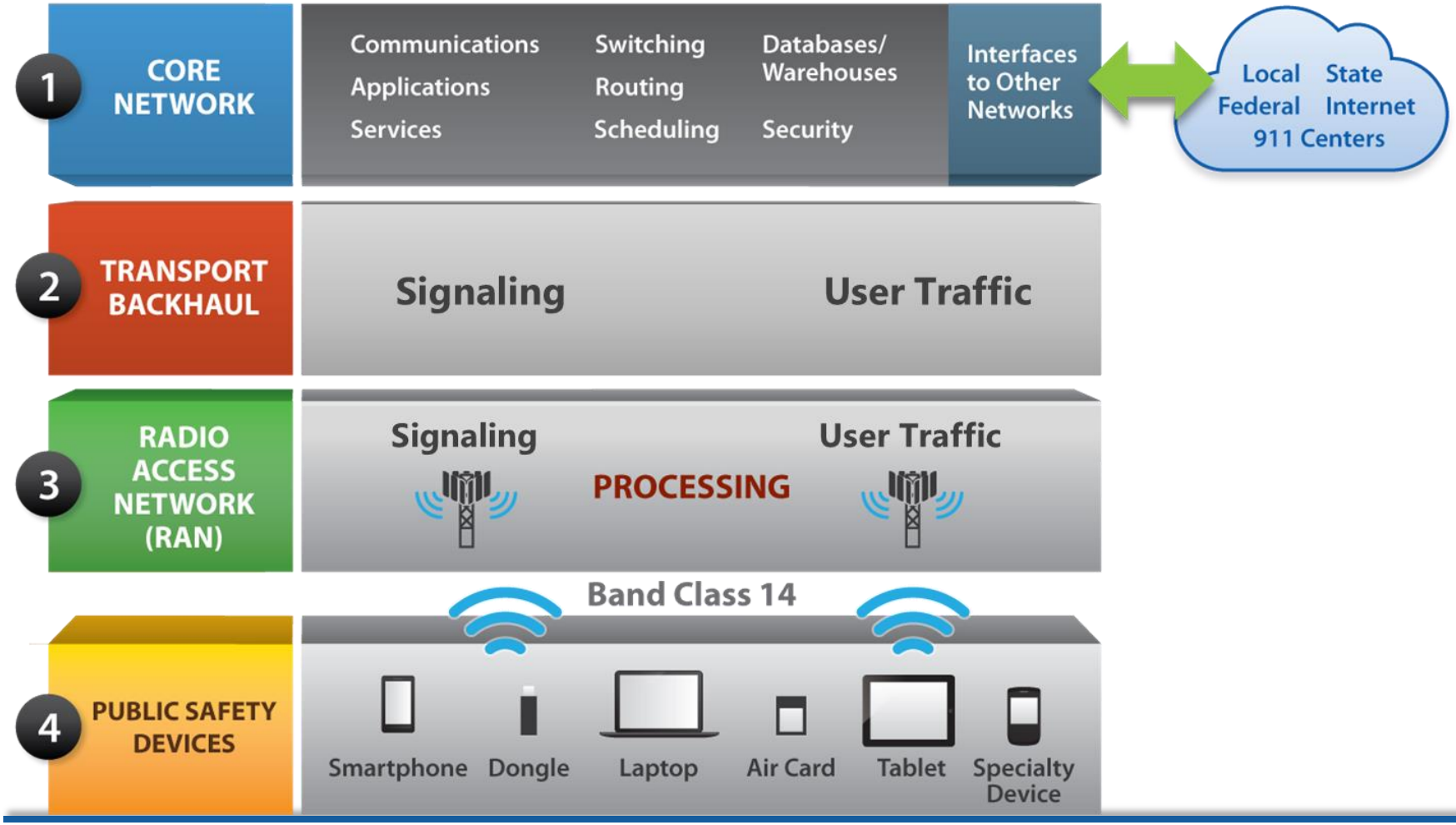


Dedicated Frequencies

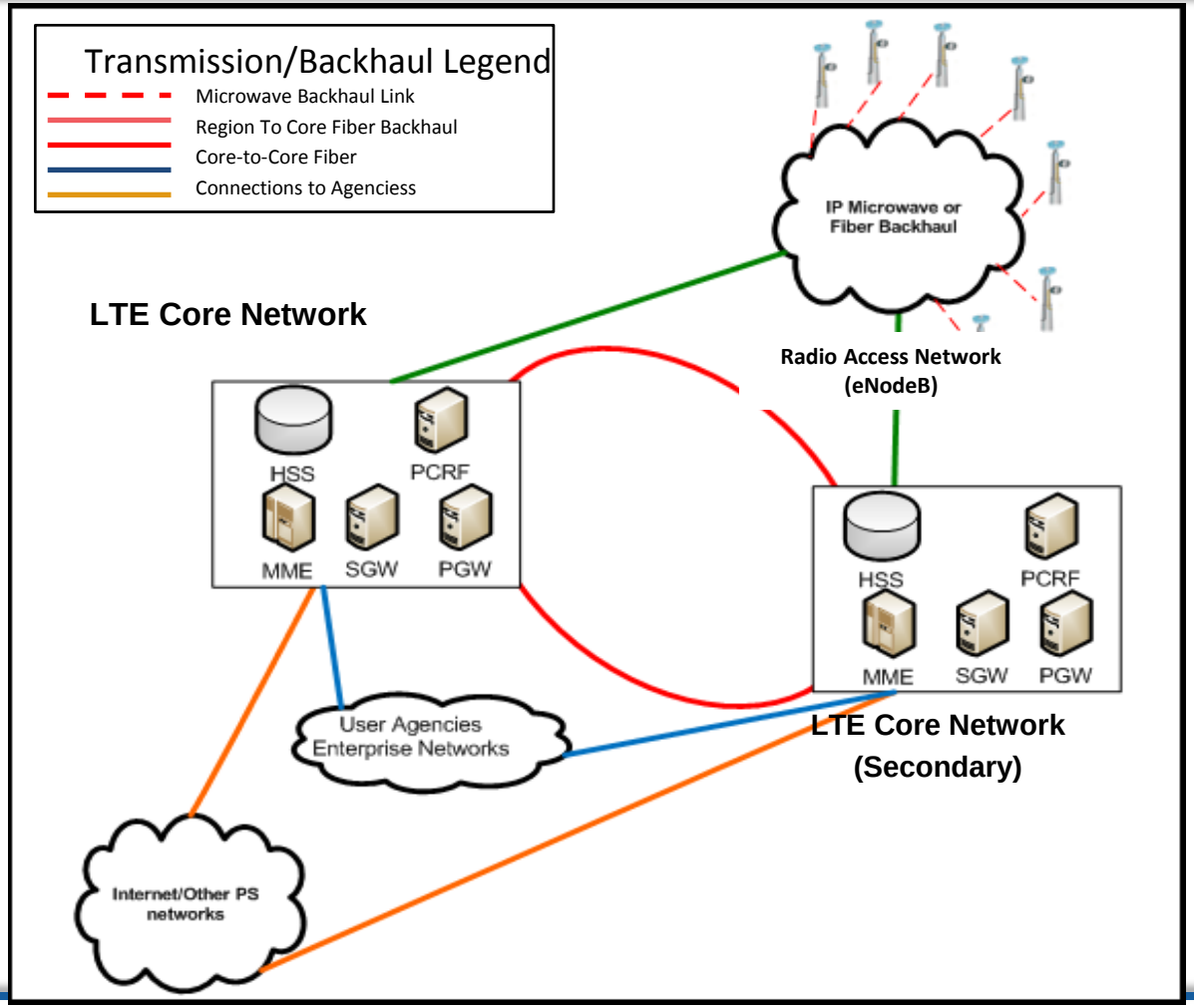
Takeaway:

FirstNet has the same capabilities on the airwaves as Verizon and AT&T, but exclusive to public safety.

LTE Technology



Typical LTE Architecture



Desired Public Safety Form Factors

Modems

- MiniPCI Express (embedded)
- USB
- ExpressCard
- Vehicular Router

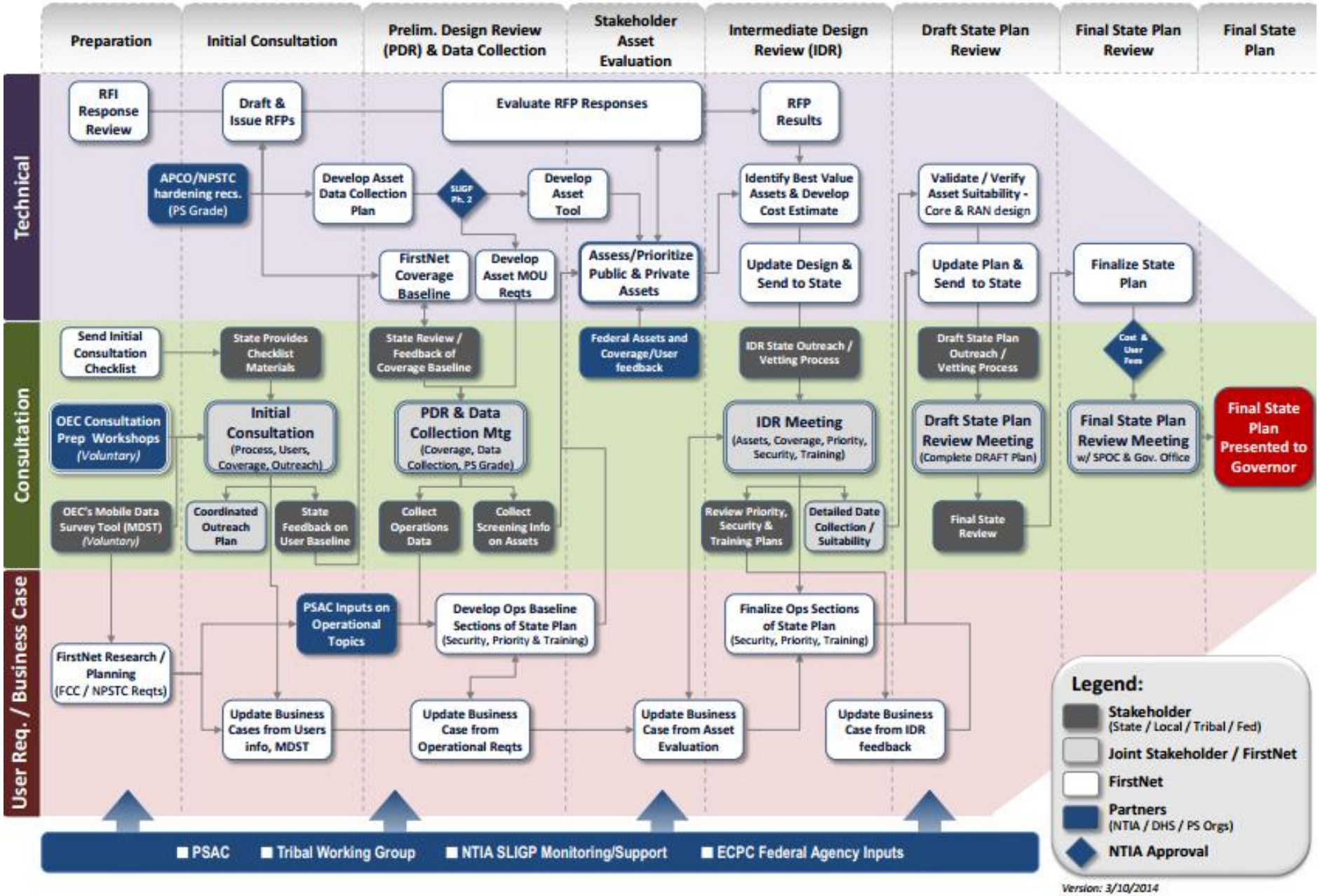
End User Devices (Rugged and Non-Rugged)

- Notebook Computers
- Smartphones
- PDAs
- Tablets
- Custom

The Consultation Process

FirstNet Consultation

- FirstNet is required to consult with states in design and build of the network
  - Governor “signs off” on each state’s plan
- FirstNet will operate like a cellular carrier, so:
  - FirstNet needs a business plan that meets your needs
  - FirstNet needs to be competitive
  - FirstNet needs your input
- State of MN is executing on the consultation to:
  - Articulate stakeholder needs
  - Help build a sustainable business case for FirstNet
  - Advise the governor


Preparation
Initial Consultation
Prelim. Design Review (PDR) & Data Collection
Stakeholder Asset Evaluation
Intermediate Design Review (IDR)
Draft State Plan Review
Final State Plan Review
Final State Plan
Technical
Consultation
User Req. / Business Case
RFI Response Review
Draft & Issue RFPs
Evaluate RFP Responses
RFP Results
APCO/NPSTC hardening recs. (PS Grade)
Develop Asset Data Collection Plan
SLIGP Ph. 2
Develop Asset Tool
Identify Best Value Assets & Develop Cost Estimate
Validate / Verify Asset Suitability - Core & RAN design
FirstNet Coverage Baseline
Develop Asset MOU Reqts
Assess/Prioritize Public & Private Assets
Update Design & Send to State
Update Plan & Send to State
Finalize State Plan
Send Initial Consultation Checklist
State Provides Checklist Materials
State Review / Feedback of Coverage Baseline
Federal Assets and Coverage/User feedback
IDR State Outreach / Vetting Process
Draft State Plan Outreach / Vetting Process
Cost & User Fees
OEC Consultation Prep Workshops (Voluntary)
Initial Consultation (Process, Users, Coverage, Outreach)
PDR & Data Collection Mtg (Coverage, Data Collection, PS Grade)
IDR Meeting (Assets, Coverage, Priority, Security, Training)
Draft State Plan Review Meeting (Complete DRAFT Plan)
Final State Plan Review Meeting w/ SPOC & Gov. Office
Final State Plan Presented to Governor
OEC's Mobile Data Survey Tool (MDST) (Voluntary)
Coordinated Outreach Plan
State Feedback on User Baseline
Collect Operations Data
Collect Screening Info on Assets
Review Priority, Security & Training Plans
Detailed Date Collection / Suitability
Final State Review
PSAC Inputs on Operational Topics
Develop Ops Baseline Sections of State Plan (Security, Priority & Training)
Finalize Ops Sections of State Plan (Security, Priority, Training)
FirstNet Research / Planning (FCC / NPSTC Reqts)
Update Business Cases from Users info, MDST
Update Business Case from Operational Reqts
Update Business Case from Asset Evaluation
Update Business Case from IDR feedback
PSAC
Tribal Working Group
NTIA SLIGP Monitoring/Support
ECPC Federal Agency Inputs
Legend:
Stakeholder (State / Local / Tribal / Fed)
Joint Stakeholder / FirstNet
FirstNet
Partners (NTIA / DHS / PS Orgs)
NTIA Approval
Version: 3/10/2014

Consultation Process

State Decision Process

FirstNet will collaborate with states to develop and deliver a RAN plan that meets their needs.

Consultation
- Regional Workshops
- State Visits
- Ongoing Dialogue

RFP Process

FirstNet Presents Plan to Governor

State Decision
2 Options

90 days to decide and notify FirstNet, NTIA and the FCC

Accept FirstNet Plan

FirstNet builds the RAN.

Opt Out

State seeks approval to construct its own RAN

State Requirements:
- Submit alternate plan to FCC and gain FCC approval
- Complete an RFP
- May apply for grant funding from NTIA
- Must apply to NTIA to lease FirstNet spectrum
- State RAN must connect to the FirstNet Core
- State must pay user fees to FirstNet

Key MnFCP Tasks

MnFCP; “Minnesota-FirstNet Consultation Project

- Governance Recommendation
- Tribal Representation
- Education and Outreach
- Stakeholder Entity Assessment
- MOU and MOA
- State and Stakeholder Volunteers (Work Groups)
- Requirements Gathering
- Financial Sustainability Plan
- SCIP Recommendations
- Data Discovery and Collection

Design Process

Preliminary Design Review	Intermediate Design Review	Draft State Plan Review
Based on coverage and users from coverage baseline Preliminary infrastructure estimates	Incorporates revisions from Preliminary Design Review Targets best value sites from asset data collection Incorporates RFP/ partnering information	Incorporates revisions from Intermediate Design Review Includes tradeoffs/ prioritization based on state plan

State Objectives

- Prepare the State of Minnesota and its public safety communications governance for FirstNet consultation.
  - Governance Recommendations
  - MOA / MOU Sharing Agreements
  - SCIP Recommendations
- Equip the State with the necessary information to engage with FirstNet; that accurately supports the needs of its stakeholders and sustainability.
  - Stakeholder Working Groups
  - County-by-County Assessments
  - Partner Evaluation / Sustainability Plan
- Perform the Minnesota-FirstNet consultation process required under The Act.
  - Collect and Aggregate Stakeholder Entities Statewide
  - Tribal Outreach
  - Education and Outreach
- Facilitate the deployment of the NPSBN
  - Data Discovery and Collection

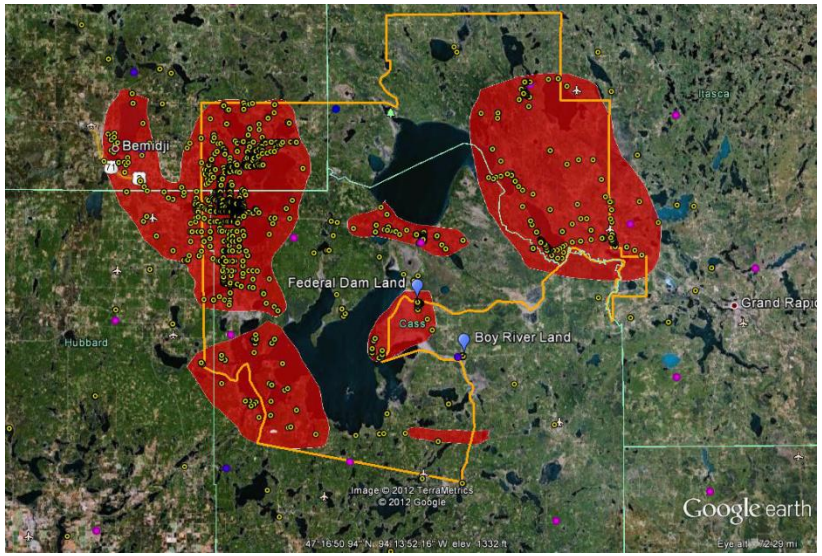
Tribal Issues

Tribal Issues

- Limited history of successful intergovernmental projects between tribes and state governments
  - “I’m with the state and I’m here to help”
- Tribal sovereignty
  - FirstNet requires FirstNet to consult with and receive each governor’s approval
  - Tribal sovereignty says tribes work directly with Federal government

Leech Lake Pilot

- In 2013, MN engaged Televate to perform broadband planning for two sample agencies



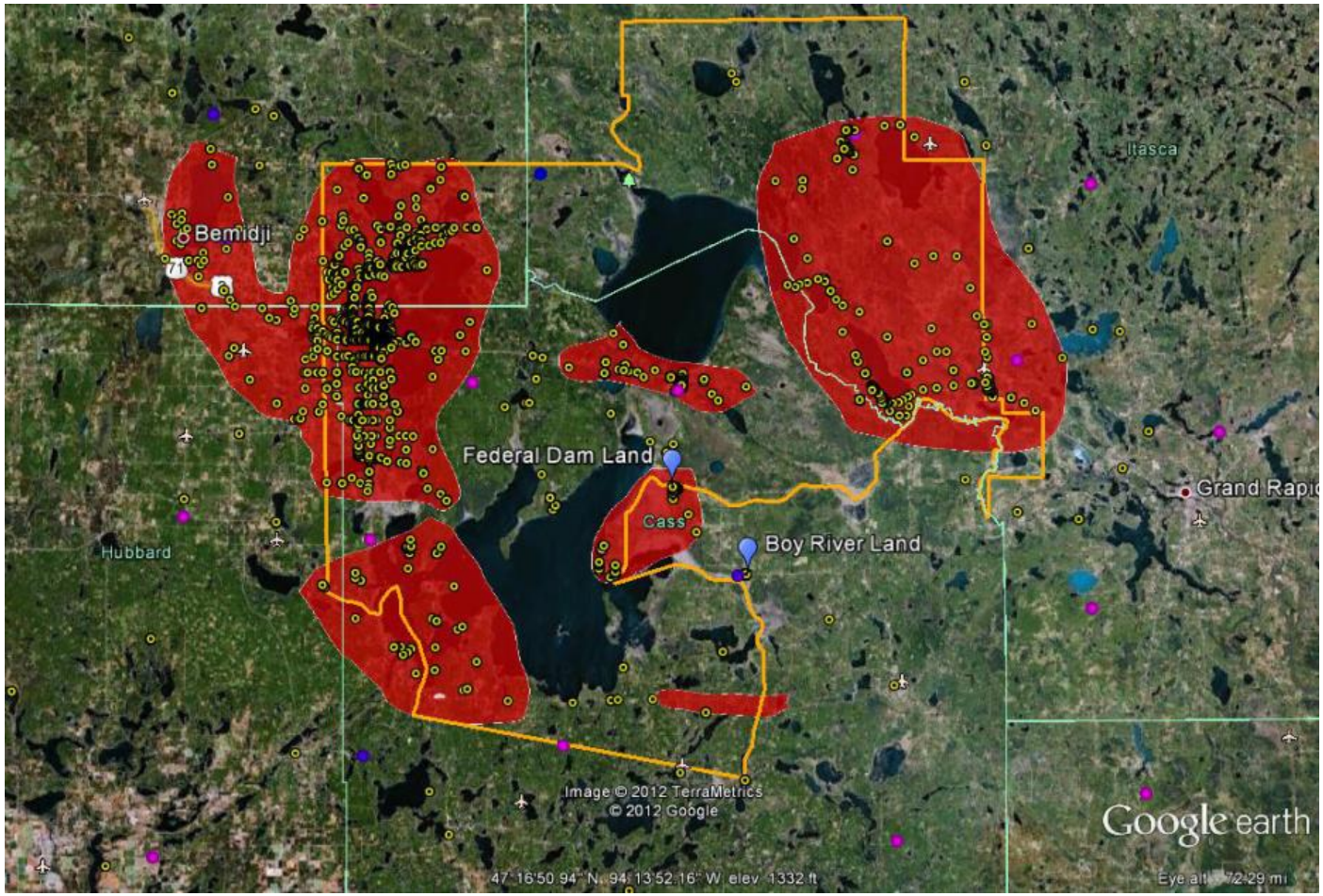
- The state chose Leech Lake Reservation and Waseca County

Leech Lake Pilot

Process:

- Identified and verified points of contact
- Collected incident data from CAD
- Reviewed coverage requirements with agency
- Interactive review sessions
- Identified potential FirstNet Assets

Leech Lake Pilot



Leech Lake Pilot

Outcomes:

- MN built a solid model for assessing FirstNet coverage needs
- Leech Lake and Waseca Co pilots served as prototypes for the entire state's FirstNet consultation program
- As a national leader in FirstNet planning, Minnesota's model has served as an example for the entire United States
- A relatively small project performed in partnership with Leech Lake has made a major impact on public safety communications across the entire country!

You Tell Me

You tell me:

- What are your current issues and gaps with data service?
- What do you want out of public safety communications?
- What are the issues you see with the consultation process?
- How does Minnesota's public safety governance work for you?
- What have you heard from FirstNet? The State?
- What do you hope to get out of this?
- What else?

An Ecosystem for Innovation & the Future

Ten years ago, would you have asked for these?

- Mobile email
- Social media
- Snapchat
- An app that maps constellations in the night sky

A new ecosystem

- Ten years ago, consumers would not have asked for the apps that have transformed modern life
- Likewise, public safety is not asking for the apps that will transform first response
- A nationwide, shared public safety network is a new ecosystem in which unexpected, innovative ideas will flourish—and save lives

Questions?

Brandon Abley
Consultant
Televate, LLC
babley@televate.com
(703) 639-4232

4. Workgroup Information

a. Workgroup Roster

b. Devices Workgroup Charter

c. Applications and NG911 Workgroup Charter

d. Coverage Workgroup Charter

e. Service Area Workgroup Charter

f. Security Workgroup Charter

Region	County	Agency	WG Volunteers	Email	Phone	Apps (NG911)	Devices	System (IT)	Coverage	Security
Televate	Televate	Televate	Abley, Brandon	babley@televate.com		Apps (NG911)	Devices	System (IT)	Coverage	Security
NW	Becker	White Earth Police Department	Bradley Houglum	bradleyh@whiteearth.com		Apps (NG911)	Devices	System (IT)	Coverage	Security
NW	Becker	White Earth Police Department - Administra	Jeremy Cossette	jeremy.cossette@whi	(218) 849-8831	Apps (NG911)	Devices	System (IT)	Coverage	Security
State	State	RIC - Central / Metro	John Tonding	john.tonding@state.n	763-587-8234	Apps (NG911)	Devices	System (IT)	Coverage	Security
State	State	RIC - Northern Region	Marcus Bruning	marcus.bruning@state.mn.us>		Apps (NG911)	Devices	System (IT)	Coverage	Security
State	State	RIC - Southern Region	Randy Donahue	randy.donahue@state.mn.us		Apps (NG911)	Devices	System (IT)	Coverage	Security
Televate	Televate	Televate	Rick Burke	rburke@televate.com		Apps (NG911)	Devices	System (IT)	Coverage	Security
NW	Beltrami	911 Supervisor/ Emergency Comm. Director	Beryl Wernberg	beryl.wernberg@co.beltrami.mn.us		Apps (NG911)			Coverage	
NE	St. Louis	St. Louis County Sheriff's Office	Bruce Hegrenes	hegrenesb@stlouiscountymn.gov			Devices	System (IT)	Coverage	
State	State	Emergency Communication Networks	Jackie Mines	Jackie.mines@state.mn.us			Devices		Coverage	
SW	Murray	Tracy Ambulance Service	Kevin Haney	Kevin@murraycountyares.org			Devices	System (IT)	Coverage	Security
Metro	Hennepin	City of Minneapolis Manager of Radio Comm	Rodney A. Olson	Rodney.Olson@minne	612-673-5672		Devices	System (IT)	Coverage	
NE	Lake	IS Director	Angie Palmer	angie.palmer@co.lake.mn.us					Coverage	
NW	Clay	Red River Regional District	Brian Zastoupil	bzastoupil@rrrdc.com					Coverage	
Metro	Ramsey	Office of Broadband Development - DEED	Diane Wells	diane.wells@state.mn.us					Coverage	
Central	Stearns	Stearns County Information Services	Joel Robak	joel.robak@co.stearns.mn.us					Coverage	
State	Private	Principal Telecommunications Engineer, Gre	Kathy Nelson, PE	knelson@grenergy.co	763-445-5559				Coverage	
Central	Stearns	Stearns County	Kathy Struffert	kathy.struffert@co.stearns.mn.us					Coverage	
Metro	State	Metro Airport Commission (MAC) Manager	Chris Kummer	Chris.Kummer@mspmac.org		Apps (NG911)	Devices			
Central	Stearns	Stearns County Sheriff’s Office	Kristen Lahr	Kristen.Lahr@co.stearns.mn.us		Apps (NG911)	Devices			
SW	Jackson	Jackson County	Brandon Hendrickson	brandon.hendrickson@co.jackson.mn.u		Apps (NG911)				
SE	Olmsted	Olmstead IT Director	David J Nault	nault.david@co.olmst	507-328-7775	Apps (NG911)				
State	State	DPS	Jackie Mines	jackie.mines@state.mn.us		Apps (NG911)				
S-Central	Mower	LEC Communications Supervisor	Marti Higgs	martih@co.mower.mn.us		Apps (NG911)				
NW	Polk	911 Dispatch Supervisor, Polk County Sheriff	Nancy Schafer	nancy.shafer@co.polk.mn.us		Apps (NG911)				
S-Central	Blue Earth	South Central MN EMS	Scott Reiten	scott@rndc.org		Apps (NG911)				
Central	Douglas	Dispatch	Tina McPherson	tinamc@co.douglas.mn.us		Apps (NG911)				
NW	Beltrami	Greater Northwest EMS, Director	Tom Vanderwal	tom.gnwems@midconetwork.com		Apps (NG911)				
NE	St. Louis	St. Louis County Sheriffs Dept.	Vince Regan	Reganv@stlouiscount	218-726-2937	Apps (NG911)				
State	State	MNIT	Brian Askin	brian.askin@state.mn.us			Devices			Security
Central	Stearns	Stearns County Information Services	Corey Zack	Corey.Zack@co.stearns.mn.us			Devices			
Metro	Hennepin	Hennepin County Emergency Management	Dan Anderson	daniel.anderson@hennepin.us			Devices			
Central	Kandiyohi	IT for Kandiyohi County	Heather Bonnema	Heather_B@co.kandiyohi.mn.us			Devices	System (IT)		
NE	St. Louis	Duluth Police Department	Jayme Carlson	jcarlson@duluthmn.gov			Devices			
NE	St. Louis	MIS ManagerCity of Duluth	Kate Anich	kanich@duluthmn.gov			Devices			
Metro	Washington	Washington Co. Sheriff's Office	Sgt David Deal	Dave.Deal@co.washington.mn.us			Devices			Security
NW	Roseau	I.T. Administrator	Chris Stauffer	chris.stauffer@co.roseau.mn.us						Security
NE	St. Louis	City of Duluth	Dan Filipiak	dfilipiak@duluthmn.gov						Security
Central	Stevens	Emergency Management	Dona Greiner	donagreiner@co.stevens.mn.us				System (IT)		
NE	Chisago	M.I.C.S. Director	Jon Eckel	JMeckel@co.chisago.mn.us				System (IT)		Security
S-Central	Rice		Kevin Schmidt	kschmidt@co.rice.mn.us				System (IT)		
Vendor	Vendor	Motorola	Mike Fink	Mike.Fink@motorolasolutions.com						
Metro	Hennepin		Rich Engel	rich.hanoverfire@gmail.com						Security
NW	Kittson	Kittson County Ambulance	Terry Anderson	terry.anderson@kmhc.net				System (IT)		Security
Metro	Dakota	City of Burnsville - IT Director	Tom Venables	tom.venables@ci.burnsville.mn.us				System (IT)		
NE	Isanti		Travis Martilla	t.marttilla@co.isanti.mn.us				System (IT)		

MnFCP Working Group Charter – Devices

Vision/Mission:

The Subcommittee will assess the device requirements, including functionalities, quantities and timeline, to be used by subscribers on the National Public Safety Broadband Network (NPSBN) for the state of Minnesota. Requirements will be assessed for each public safety agency or other organizational type with subscribers on the NPSBN that defines a user group. A sampling of more specific requirements includes:

Action Items/Goals

- Review cost versus device functionality
- Review & comment on various resources
    - NPSTC SOR (earlier versions)
    - FirstNet RFI for devices
- Review preferred device type by incident type and user group
    - What do they do with their personal devices at the incident?
    - Expected Cost; assess tolerance of different price points
- Primary Purpose: Develop an inventory of all devices types complete with a summary features and functionality:
    - Device Types; and what are the specific requirements for each:
        - Smartphone
        - Tablet with embedded modem
        - Computer with embedded modem
        - Vehicular Modem, & Router (trunk mounted with Ethernet connection)
        - USB Modem
        - Other?
    - Form Factor Characteristics
        - Hardening, Buttons, (e. g., PTT , emergency), Qwerty Keyboard, Glove-friendly, Screen size
    - Functionality
        - Bluetooth, Wi-Fi, WLAN, Commercial Carrier Roaming
        - Dual mode LMR/P25
        - Supported Operating System (OS)
        - Geolocation (GPS, GLONAS, dead reckoning, altimeter, and others)
        - Tethering, Serial Port, Near-field communications
    - Review of Risks and assess the Tolerance by the State: Will the public safety device keep pace with the commercial technology in the marketplace?
- Assess BYOD device requirements for those agencies that will be purchase their own device
    - Open vs. Close Garden approach for BYOD devices

        - Dual personality (separate workspace/profile/functionality)
- Priority of device Types; which ones would they like to have on the market first?

Deliverables:

1. Identify preferred Form Factor and Functionality Requirements per Device Type; any specific requirements per device
    a. Requirements for BYOD devices
2. Final Device Recommendation

Deliverables will feed into Surveys & Report.

MnFCP Working Group Charter – Applications

Vision/Mission:

With the advent of a common National Public Safety Broadband Network (NPSBN) the level of interoperability will be determined by data and applications standards. The Applications Subcommittee is responsible for identifying applications and their requirements for the NPSBN. While the NPSBN can and should support all broadband applications found on commercial wireless networks, a distinction between those generally used and those uniquely required by public safety must be made. The applications subcommittee will be tasked with the following:

Action Items/Goals

- Assess the typical applications required by the public safety personnel; examples:
    - Records Management System, Incident Command support, Prioritization/traffic management/data flow/QOS, Logging/storage/records/legal discovery support, Video & Photographs, Telemetry, Biometrics, Fingerprints, Vital Sign/Biometric Monitoring, Radio-over-LTE, VoLTE,
    - Identify Minnesota specific applications
    - Review potential future applications
- Review CAD-RMS incident data and identify incident types
- Assess each incident type and identify the type of application that would be used during the incident
    - Correlate all incidents with applications
    - Assess the priority of incident
    - Assess the application performance requirements
    - Identify unique requirements such as assigning
        - the priority of uses and secondary users
    - Assess general usage cases and likely devices per incident type
- Develop a list of NPSBN public safety applications
    - Assess whether the application is mission critical to supporting the incident

Deliverables:

1. Initial list of NPSBN PS applications
2. Table Incidents vs. Applications vs. Priority
3. User Group Survey Question Recommendations
4. Application Recommendations

MnFCP Working Group Charter – Applications

Vision/Mission:

With the advent of a common National Public Safety Broadband Network (NPSBN) the level of interoperability will be determined by data and applications standards. The Applications Subcommittee is responsible for identifying applications and their requirements for the NPSBN. While the NPSBN can and should support all broadband applications found on commercial wireless networks, a distinction between those generally used and those uniquely required by public safety must be made. The applications subcommittee will be tasked with the following:

Action Items/Goals

- Assess the typical applications required by the public safety personnel; examples:
    - Records Management System, Incident Command support, Prioritization/traffic management/data flow/QOS, Logging/storage/records/legal discovery support, Video & Photographs, Telemetry, Biometrics, Fingerprints, Vital Sign/Biometric Monitoring, Radio-over-LTE, VoLTE,
    - Identify Minnesota specific applications
    - Review potential future applications
- Review CAD-RMS incident data and identify incident types
- Assess each incident type and identify the type of application that would be used during the incident
    - Correlate all incidents with applications
    - Assess the priority of incident
    - Assess the application performance requirements
    - Identify unique requirements such as assigning
        - the priority of uses and secondary users
    - Assess general usage cases and likely devices per incident type
- Develop a list of NPSBN public safety applications
    - Assess whether the application is mission critical to supporting the incident

Deliverables:

1. Initial list of NPSBN PS applications
2. Table Incidents vs. Applications vs. Priority
3. User Group Survey Question Recommendations
4. Application Recommendations

MnFCP Working Group Charter – System

Vision/Mission:

The NPSTC Statement of Requirements provides detailed network requirements regarding control of the network by incident commanders and system administrators. For incident commanders, the System workgroup is broadly tasked with identifying the functionality needed for the efficient operations at an emergency event. For system administrators, the workgroup will review and prioritize the functionality they require for the management of their devices and personnel. The scope includes:

- Review of NPSTC SoR recommendations
- Assessment of real-time priority and preemption requirements during emergency events
- Assessment of administrator functionality for the management of devices, personal, priority, and security
- Assess the control and deployment factors required for potential coverage augmentation solutions in highly remote areas

Deliverables:

1. Incident Commander requirements for changing priority and preemption levels
2. Administrator requirements for the management of devices and personnel
3. Preferences and preferred strategy for the deployment of coverage augmentation solutions

MnFCP Working Group Charter – Service Areas

Vision/Mission:

The Service Area workgroup will determine the basis for evaluating the National Public Safety Broadband Network (NPSBN) coverage or service areas within the State. In addressing coverage this workgroup will need to include the outputs of the applications and devices workgroups; because the both affect the availability of coverage, the sufficiency of throughput and the usage requirements. The workgroup will assess the requirements for mobile / portable, indoor / outdoor coverage for each application category (voice, video) and each user group. Coverage augmentation strategies and other temporary coverage enhancement options, for use in primarily rural areas, will be reviewed, assessed and evaluated. The process includes:

Action Items/Goals

- Review key NPSBN user groups
- Review key device categories
- Review application categories and their usage scenarios
- Review Coverage Augmentation Strategies:
    - In-vehicle and other based portable relays, femtocells, gateways, COWS
- Determine bandwidth requirements
- Determine Indoor/Outdoor coverage types
- Determine Mobile/portable coverage types

Deliverables:

1. Draft Coverage Categories
2. Draft preferred strategies and requirements for Coverage Augmentation

MnFCP Working Group Charter – Security

Vision/Mission:

The NPSTC Statement of Requirements provides detailed network requirements regarding the level of security needed for certain applications. The workgroup is broadly tasked with identifying the security constraints or requirements associated with accessing specific data sources that will be used by first responders in the State. The workgroup will include the outputs of the applications workgroup; specifically, the workgroup will review all applications that have specific security requirements. Issues of interoperability as well as roaming will also be reviewed. Tasks include:

- Review NPSTC SoR recommendations
- Assess NPBN applications list and review the security requirement for each
- Assess network requirements as it pertains to roaming
- Assess VPN requirements for roaming and Interoperability

Deliverables:

1. NPSBN general security requirements for applications and data source
2. Outline of local security requirements

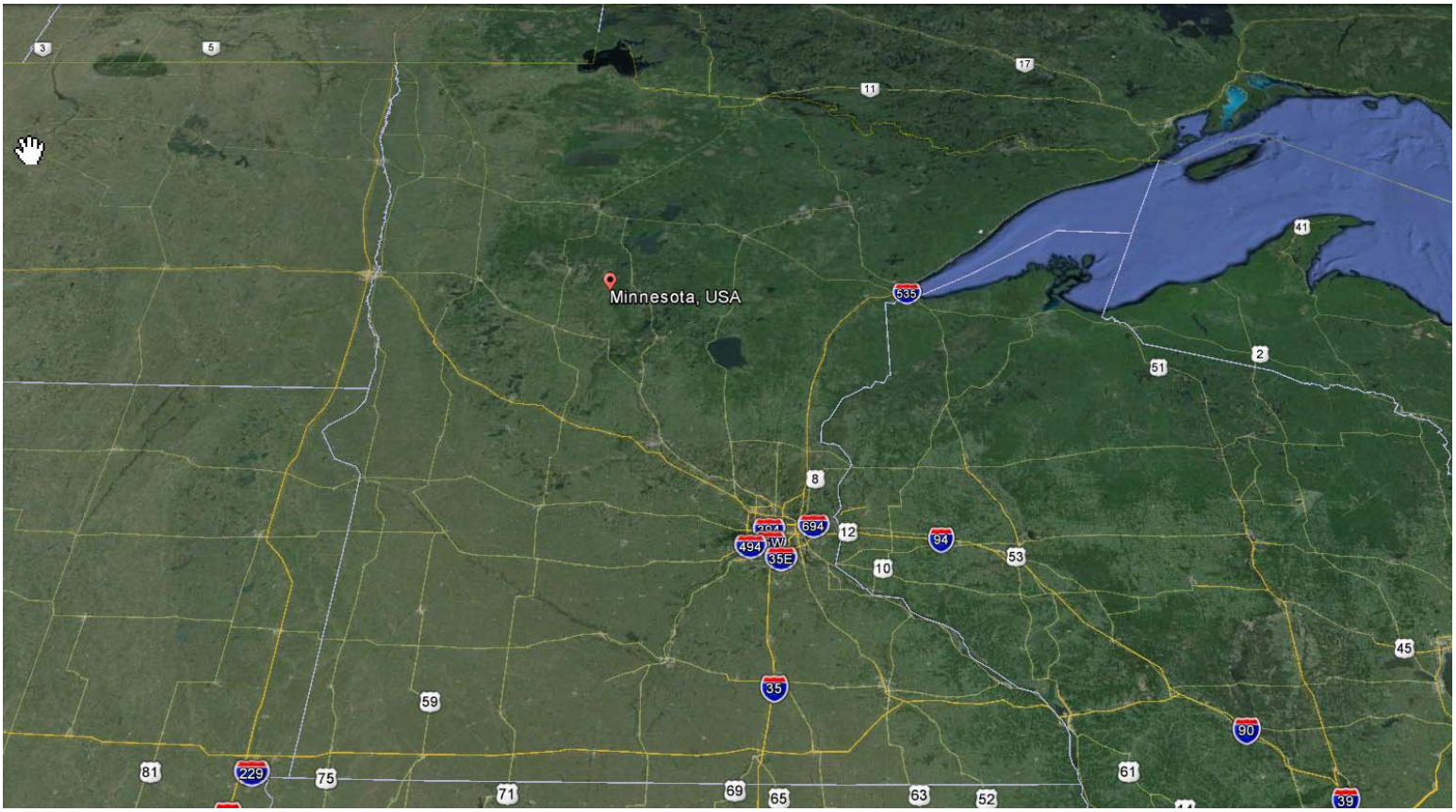
5. RFI Responses

1. Motorola
2. 702 Communications ("702")
3. AT&T
4. Cooperative Network Services ("CNS")
5. Crown Castle
6. Palmer Wireless
7. Kandiyohi County
8. Anoka County
9. Rivada Networks
10. Minnesota Telecom Alliance
11. NewCore Wireless
12. Southern Minnesota Broadband
13. CenturyLink
14. Alcatel-Lucent
15. Maximum Communications Cellular (MCC)
16. Great River Energy
17. Midcontinent Communications

MOTOROLA RESPONSE TO
STATE OF MINNESOTA

STATE OF MINNESOTA PUBLIC SAFETY BROADBAND NETWORK RFI

SEPTEMBER 2014



MOTOROLA SOLUTIONS

COMPANY PROFILE:

1. Name of the organization:

Motorola Response

Motorola Solutions Inc.

---

2. Nature of the organization (e.g., government entity, non-profit company, for-profit company):

Motorola Response

For profit company.

---

3. Sector (e.g., law enforcement, public utility, telecommunications carrier):

Motorola Response

Telecommunications

---

4. Organizational purpose and mission (under 50 words):

Motorola Response

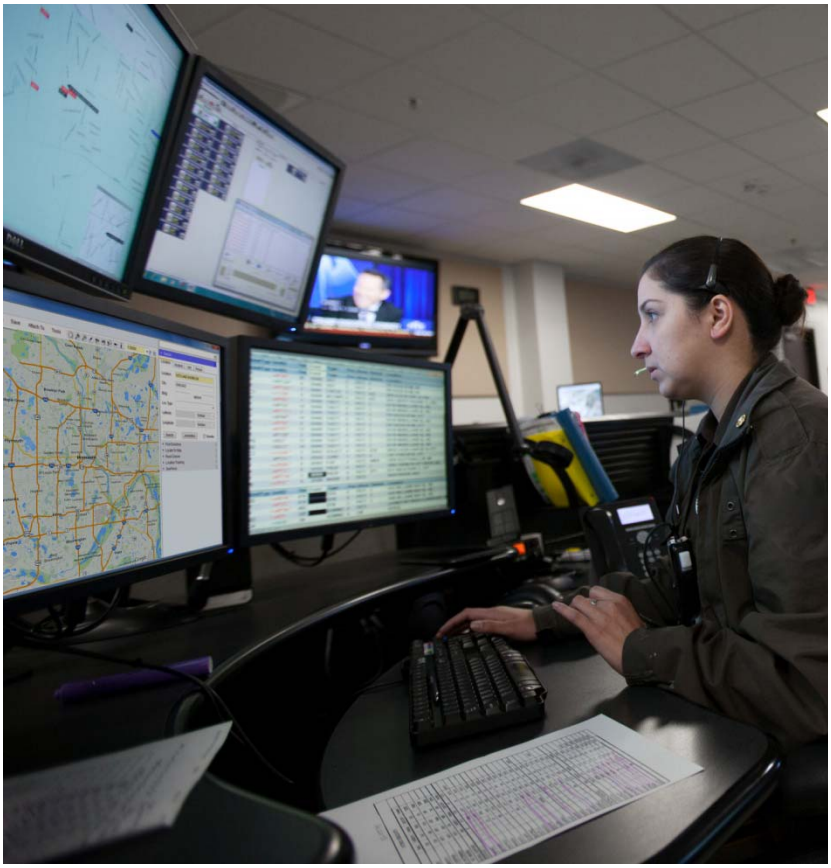
Motorola Solutions has been committed to innovation in communications and electronics since 1928. Our company has achieved many milestones in its nearly 85-year history. We pioneered mobile communications in the 1930s with car radios and public safety networks. We made the equipment that carried the first words from the moon in 1969. And we invest over $1B per year in R&D to develop the next generation of innovative technology and services. In summary, we innovate solutions, creating devices, infrastructure, software and services to help governments build safer cities and enterprises build stronger businesses.

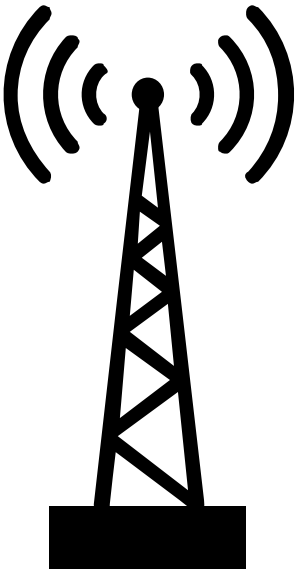
---

5. Contact for followup regarding Firstnet and/or this request

Motorola Response

Please contact your Motorola Solutions Account Manager Mike Fink at 612-567-2911 for any additional information or questions regarding our RFI response.





The mission and operations of today's first responders has become increasingly complex and requires skills that are advanced and tools that are intelligent, highly reliable and resilient. Minnesota recognizes that it is essential that its first responders have the best available tools to be more efficient and safer while protecting people and property.

By becoming an early adopter of Long Term Evolution (LTE), the State of Minnesota is undertaking an initiative that truly introduces a paradigm shift in how Public Safety communications are delivered. While LTE is still in its formative years, this technology offers the State of Minnesota a unique opportunity to transform its critical communications by increasing situational awareness and response, improving operational efficiency, and offering public-safety-grade features, applications, and services. Through rich multimedia applications over mobile broadband, the State's agencies and first responders will be able to share voice, video, and data—enabling them to make decisions with real-time knowledge and speed. By strategically connecting public-safety LMR reliability requirements to the more robust capabilities of a modern LTE system, the State of Minnesota will be well-positioned as the vanguard in providing an unmatched mission-critical communications system, fulfilling current and future communications needs of the States' public safety professionals, while setting the foundation for FirstNet's nationwide network.

Motorola stands ready to be the best possible solution partner to the State of Minnesota, for this highly critical and urgent project. Leveraging our experience and knowledge of the commercial, operational, political, governance, technical, and customer support complexities of the public safety marketplace, we will provide the resilient, turnkey solution that the State of Minnesota requires and public safety demands. With the most experience deploying 3GPP networks globally, we have the expertise and the capability to help the State create and deliver the differentiation that will promote the adoption by the State's public safety users and grow into the foundation of a statewide and nationwide network.

Motorola understands how critical it is for the State of Minnesota to deploy a PSBN, which will become essential components of a nationwide mission critical first responder network. As the National Public Safety Broadband Network (NPSBN) architecture requirements are defined by

City Skyline Photo by: Bobak Ha'Eri, http://commons.wikimedia.org/wiki/File:2008-0712-MPLS-panorama.JPG

FirstNet, Motorola's LTE solution will integrate into the FirstNet 3GPP certified network at the level required by the State of Minnesota. Motorola is fully committed to ensure that the State of Minnesota broadband network will interoperate with and fit into the larger FirstNet nationwide network once it is deployed .We welcome this opportunity with the State of Minnesota and FirstNet with firm commitment to continuously evolve the broadband solution in response to Public Safety's needs, aligned with the advancement of technology and standards.

The convergence of these components with common interfaces including location, presence, priority, provisioning, security, unified PTT, messaging, and device management gives the Command Center complete control and end-to-end visibility across networks and devices to give the officer in the street all of the tools in a collaborative manner. Additionally a move towards a converged environment not only optimizes the total cost of ownership of the system but helps realize future cost savings by significantly reducing on-going operations and support costs. The convergence needs to extend beyond the network, devices, and interfaces to the applications that will be used in the field. MSI continues to lead the vision of a single unified mission critical communications platform – Voice, Video and Data for Public Safety. As such we are committed to enabling convergence across LMR and LTE at all levels, namely –

- **Core Infrastructure.**
- **Backhaul**
- **Operations and Management**
- **Radio Network**
- **End-User Devices**

Motorola's success is the commitment and capabilities of our resources and local partners. Motorola will be by the State's side through all major and minor events with all of our dedicated resources that are 100% committed to the mission of Public Safety Communications. Motorola stands ready to be the best possible solution partner to the State of Minnesota.

ANSWERS TO QUESTIONS:

1. What is the nature of the partnership that the respondent proposes?

a. What value and benefits does the respondent seek to gain from the partnership?

MOTOROLA RESPONSE

There are various ways to structure a Public-Private Partnership (PPP) for a project like Public Safety Broadband Network (NPSBN) in the State of Minnesota. As a partner to Minnesota, Motorola would consider a public-private partnership with Minnesota that involves the Design, Build, Finance, Operation and Maintenance of the network in exchange for a long-term return on our investments. Our analysis indicates that structuring a PPP which allows for a realistic and feasible venture with limited complexity, and which results in quickly establishing a Minnesota State broadband network in conjunction with the FirstNet National Core with an obvious business case for the private partner, is achievable in the near term. We know that FirstNet is conducting user outreach and will be determining coverage and capacity requirements on a state by state basis. In advance of that output, Motorola is studying the impact to the overall business model and PPP structures when we include the Radio Access Network(s) in a single PPP.

---

b. Meaning, which resources does the respondent seek to utilize, and how?

MOTOROLA RESPONSE

From a funding perspective, we believe that the biggest challenge will be securing funding to support the build out of the network prior to any revenue stream becoming available. Based upon our experience, potential funding sources include, but are not limited to, bank loans, investments by infrastructure investment funds, government grants, investments by suppliers, prepaid subscriptions, and other customers of the network. The availability of funding from outside sources and the cost of that funding will vary depending upon the business model that is created to support the project. Greater certainty over revenue streams and cost structures attracts reasonable funding terms and lower costs. Uncertainty over these same areas creates challenges for obtaining the necessary funding for build out and increases the overall cost. Motorola envisions providing its experience and expertise to engage in discussions to obtain the capital from potential funding sources. Furthermore, Motorola is committed to supporting a public-private partnership structure and business model to meet the needs of FirstNet and the State of Minnesota.

---

c. What value does the respondent seek to offer to the public safety community, to the State, and to FirstNet from use of the network? Meaning, which resources does the respondent seek to contribute (i.e., subscribers, tower and backhaul assets, others)?

MOTOROLA RESPONSE

The business model would assume full access to the BC14 Spectrum and the use of existing Local (municipal/city/county), State, Tribal and Federal Communications Sites, Buildings and Backhaul. Access to these existing communications facilities will provide a valuable contribution to the success of the public-private partnership. Existing space, power, and other site facilities can be leveraged to reduce the cost of deployment and ongoing operations costs, and they can also significantly reduce the time necessary to complete the network deployment and begin network operation .We also envision use of other Local, State, Tribal and Federal buildings and facilities which may not be utilized today as communications sites, as well as the extensive assets of Secondary Users. In many cases, these buildings and other facilities could work quite well for the deployment of the LTE technology and offer significant additional resources (power, including back-up power, back-haul connectivity, facility construction/durability, ease of regulation), that make them attractive to us as a Network Partner as we work to keep deployment & operational costs to a minimum.

---

2. Does the respondent seek access to FirstNet spectrum?

a. If so, how does the respondent seek to utilize and assign the spectrum?

MOTOROLA RESPONSE

Build the network with enough sites and capacity to handle Public Safety's projected load over time on less than the full 10 + 10 MHz of 700 MHz spectrum. The unused spectrum could then be marketed to public, private, or commercial entities for deployment on their networks to provide a stream of revenue that can be used to pay for the increased number of sites on the FirstNet network, as well as contribute to the cost of initial network deployment.

---

b. If so, how does the respondent propose assigning and managing priority access to the network or to the spectrum?

MOTOROLA RESPONSE

Motorola Solutions' Public Safety LTE QoS Solution includes the controls necessary to successfully manage data flows to ensure that the most important information is delivered to the right personnel. It meets public safety quality-of-service and prioritization requirements and provides more functionality and availability than carrier-grade LTE networks. The QoS solution gives agencies or regional authorities the ability to prioritize data based on users' roles, agency affiliation and applications. Priorities can also be dynamically elevated via Computer Aided Dispatch (CAD) for all responders assigned to an incident or for personnel assigned to an incident out of jurisdiction (mutual aid). A Web-based portal enables triggering and monitoring the dynamic priority elevation. The components of Motorola Public Safety LTE QoS Solution are Priority Management (PM) and Policy Charging and Rules Function (PCRF).

---

3. Does the respondent seek to contribute to the network buildout?

a. If so, how does the respondent seek to contribute to the network buildout? For example, does the respondent offer:

i. Infrastructure (towers, backhaul, switching or data center facilities)?

ii. Financial resources (financing, capital funds)?

iii. Users or devices?

iv. Any other resources?

MOTOROLA RESPONSE

Motorola does have the capabilities of contributing in all of these areas to ensure success of the public safety broadband network in the State of Minnesota, but to determine the level and type of contribution will depend on the business model and the partnership that is eventually finalized for this network.

---

4. Does the responder consider any of its personnel "first responders"?

a. If so, which personnel and under which circumstances?

b. If so, would the organization consider these personnel "primary" first responders, or "secondary" first responders?

c. How does the respondent seek to allocate priority and access to the network?

MOTOROLA RESPONSE

Not applicable.

---

5. Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?

MOTOROLA RESPONSE

Although Motorola does not anticipate any legal or regulatory challenges, we believe that serious consideration should be given to the establishment of a MNO (Mobile Network Operator) entity for each State, or Coalition of States or Regional Entity that choose to participate with FirstNet on a regional level, whereby each of the State or Regional MNOs are then interconnected and integrated into a nationwide interoperable network mosaic, which would be designed and maintained to FirstNet standards. We believe that this deployment model provides the States and FirstNet with the greatest degree of flexibility and offers a diverse approach that will ensure higher levels of reliability, resiliency and security than a typical commercial carrier would implement. A network such as this would address the need for "a layered approach to fall-back" that could include FirstNet National LTE, FirstNet State/Regional LTE, FirstNet Deployable Network, Commercial LTE, Commercial 3G and Satellite (for back-haul and/or access).

---

6. What unique business relationship considerations to forge the private-public partnership with FirstNet are envisoned?

MOTOROLA RESPONSE

Motorola suggests, but is not limited to, one possible structure for such a partnership. In a public-private partnership "Public Safety Mobile Network Operator model", The Alliance would partner with FirstNet and what will likely be multiple Network Partners to design, deploy, integrate, optimize, operate and maintain the network. We envision delivering these services in accordance with mutually agreed upon specifications and service level commitments related to system availability and user access, in exchange for a share of the monthly fee per user over a multi-year term.

---

7. Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?

MOTOROLA RESPONSE

With unique public safety application and device needs under consideration, Motorola has co-developed a public safety oriented approach to Dynamic Prioritization and Pre-emption. This capability can be leveraged to enable secondary users to subscribe to and use the FirstNet network while ensuring that high priority first responder communications are not compromised. Our solution also offers connectivity and interoperability with many existing Public Safety P25 LMR Networks and multiple vendors. This provides the user with cross-network PTT voice communications capabilities and the ability to further leverage existing investments while taking advantage of new capabilities that FirstNet will deliver.

---

8. Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, does the respondent envision that a special pricing schedule would apply to its particular unique use-case?

MOTOROLA RESPONSE

To achieve the vision of viable public-private partnership based on a self-sustaining business model which derives a self-sustaining revenue stream from the user subscription fees from first responders, critical infrastructure users/secondary government users, and also fixed devices such as meters and traffic cameras. The actual pricing will depend on the selected business model, but we do anticipate different tiers of pricing for the different categories of the users.

---

a. Does the respondent envision that its partnership may be supported by franchising or leasing FirstNet spectrum, in whole or in part?

Motorola Response

Build the network on the full 10 + 10 MHz of 700 MHz spectrum with excess capacity marketed by one or more MVNOs to secondary users under a covered leasing agreement. Covered lease agreements as provided for in the Act allow the leasing of excess capacity to public, private or commercial entities to provide a stream of revenue that can be used to pay for operations and maintenance of the network and any needed system expansion, as well as contribute over time to the initial cost of the network.

---

b. If so, does the respondent see any unique business, legal, or regulatory challenges in franchising or leasing the spectrum?

Motorola Response

As the business model with spectrum leasing or franchising models can be setup in many different ways. In order to truly understand the business, legal, and regulatory challenges, the business/financial model will first have to be defined.

---

9. Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. Does the respondent have any suggestions that the State may consider supporting this future RFI?

Motorola Response

State of Minnesota should emphasize the requirements for a partner to collaborate and lead the planning, preparation, management and execution of a successful Public Safety LTE implementation from start to finish. The selected partner should have the resources, experience, depth and desire to take on this challenge in partnership with FirstNet and the State of Minnesota with the end goal of providing our nation's Public Safety users with a statewide, interoperable, and a state of the art public safety grade broadband network.

REFERENCES:

Motorola's comprehensive portfolio of services offerings is built on a lifecycle approach that encompasses Professional, Integration, Support and Managed Services. We currently have a number of LTE customers here in the US and around the globe with networks consisting of infrastructure, devices, applications, and services.

Our expertise in government and enterprise technologies along with more than 6,100 service professionals and 25,000 world-class channel partners gives us the unique ability to provide our existing LTE Customers with best in class service and support. In addition on the hardware and software, the LTE customers are utilizing professional services, integration services, and managed & support services to support their mission critical LTE broadband networks.

Detailed information regarding our LTE customer base can be provided upon request.

WORLD LEADER IN MISSION CRITICAL COMMUNICATIONS

90
COUNTRIES

34
STATEWIDE SYSTEMS

2M
P25 RADIOS SHIPPED

350+
P25 SYSTEMS IN THE U.S.

MOTOROLA SOLUTIONS

MOTOROLA, MOTO, MOTOROLA SOLUTIONS and the Stylized M Logo are trademarks or registered trademarks of Motorola Trademark Holdings, LLC and are used under license. All other trademarks are the property of their respective owners. ©2014 Motorola

Company Profile – 702 Communications

Val-Ed Joint Venture dba 702 Communications is a locally owned and operated telecommunications provider based in Moorhead, MN.

Formed in 1989, 702 Communications is owned by:

Barnesville Telephone	Otter Com, Inc.
East Otter Tail Telephone	Red River Telphone
Loretel Systems, Inc.	Rothsay Telephone

In addition to retail services in our market, 702 provides wholesale/transport services across the state of MN to networks similar to the one being requested for FirstNet.

Specifically, we currently hold the contract for transport backhaul to several hundred cell sites in the state of Minnesota. An idea of the scope of our reach can be seen here: http://www.aurorafonet.com/map.html. While that map is not all-inclusive, it should serve to illustrate what we have done and can do with our partners.

Your primary contacts for this project should be:

Jim Walter	Brian Crommett
President/CEO	Sales and Service Manager
jwalter@702com.net	bcrommett@702com.net
218.284.5702	218.284.5702

Questions

1. What is the nature of the partnership that the respondent proposes?

Response: For our own part, 702 Communications, in partnership with CNS and other telecommunications carriers, brings a large fiber-optic transport network that spans much of Minnesota. In addition, our partnerships bring hundreds of geographically local support personnel throughout the state.

We believe it's in the best interest of the state and its taxpayers to utilize existing infrastructure for this project, where possible. We're certain there will be areas that need to be built to bridge network gaps, but there will be a definite overall savings if we can avoid building an entire network on top of existing infrastructure.

2. Does the respondent seek access to FirstNet spectrum?

Response: 702 is not seeking access directly. We believe we have an opportunity to present a complete solution via partnership New Core Wireless (NCW) who is requesting access to this spectrum.

3. Does the respondent seek to contribute to the network buildout?

Response: As stated, 702 already has access to substantial transport network. Areas without current coverage could be built to provide a more robust transport solution.

702 provides backhaul and access to telco central office facilities (data center) through our partners.

With our partners, 702 is able to provide transport engineering, network coordination, billing, 24x7 network operations center, and wireless/LTE expertise.

9. Minnesota plans to publish ... **Does the respondent have any suggestions that the State may consider supporting this future RFI?**

Response: Yes. In order for the state to get the best possible responses, please provide as much time as possible for respondents to properly research and design a proposal. When this gets into the RFP stage, it will be especially beneficial to provide adequate response time.

Minnesota Department of Public Safety
Minnesota-FirstNet Consultation Project

Request for Statement of Interest: Public Private Partnerships

MN-SWIFT 70680, Phase 1-Additional Projects

Submitted to:

Brandon Abley at babley@televate.com

Submitted by:

AT&T Corp.
1120 20th Street NW
Washington, DC 20036

Primary Point of Contact:
Scott Agnew, Director of Public Safety
Phone Number: 301-275-3746
Email: sa5289@att.com

DUNS Number: 62-159-9893 **CAGE Code:** 0LUL1
Tax ID: 13-4924710 **NAICS:** 517210

RESTRICTION ON DISCLOSURE AND USE OF DATA

This Statement of Interest includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed – in whole or in part – for any purpose other than to evaluate this document. If, however, a contract is awarded to this offeror or quoter as a result of – or in connection with – the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction is contained in all pages that

carry the legend of *"Use or disclosure of the data on this page or screen is subject to the restrictions on the title page or opening view screen of this proposal document or file."*

Additional restrictions appear on the following page, which shall be considered part of this title page.

AT&T - PROPRIETARY

This document contains confidential, trade secret, commercial or financial information owned by AT&T Corp. and is voluntarily submitted for evaluation purposes only. It is exempt from disclosure under the Freedom of Information Act (5 U.S.C. 552) under Exemption (b) (4), and its disclosure is prohibited under the Trade Secrets Act (18 U.S.C. 1905).

CONTRACTOR BID OR PROPOSAL INFORMATION

This Statement of Interest shall not be disclosed to evaluators outside the Government, except pursuant to a nondisclosure agreement between the evaluator and AT&T.

Company Profile

1. Name of the organization: AT&T Corp., on behalf of itself and its affiliates and subsidiaries

2. Nature of the organization: For Profit

3. Sector: Telecommunications/Information Technology

4. Organizational purpose and mission (under 50 words): AT&T's mission is to connect people with their world, everywhere they live and work, and do it better than anyone else. We're fulfilling this vision by creating new solutions for consumers and businesses and by driving innovation in the communications and entertainment industry.

5. Contact for follow-up regarding Firstnet and/or this request: Scott Agnew, Director of Public Safety, sa5289@att.com (301) 275-3746

Questions

1. **What is the nature of the partnership that the respondent proposes?**

a) What value and benefits does the respondent seek to gain from the partnership?
b) Meaning, which resources does the respondent seek to utilize, and how?
c) What value does the respondent seek to offer to the public safety community, to the State, and to FirstNet from use of the network? Meaning, which resources does the respondent seek to contribute (i.e., subscribers, tower and backhaul assets, others)?

AT&T Response: Mobile Network Operator's ("MNOs"), such as AT&T can offer the intelligence of the Network (e.g., dynamic scaling, embedded security, embedded shared infrastructure, unique application programming interfaces), not just the connectivity of the Network. MNOs can provide the integration platform for devices, software and services. As well as capabilities to implement and develop this intelligence, such as common backbone transport, data centers, IP networking, and professional services.

2. **Does the respondent seek access to FirstNet spectrum?**

a) If so, how does the respondent seek to utilize and assign the spectrum?
b) If so, how does the respondent propose assigning and managing priority access to the network or to the spectrum?

- **[REDACTED]**

AT&T PROPRIETARY
Use or disclosure of the data on this page or screen is subject to the restrictions on the title page or opening view screen of this proposal document or file.

3. **Does the respondent seek to contribute to the network build-out?**

a) If so, how does the respondent seek to contribute to the network build-out? For example, does the respondent offer:

i. Infrastructure (towers, backhaul, switching or data center facilities)?
ii. Financial resources (financing, capital funds)?
iii. Users or devices?
iv. Any other resources?

[REDACTED[

4. **Does the responder consider any of its personnel "first responders"?**

a) If so, which personnel and under which circumstances?
b) If so, would the organization consider these personnel "primary" first responders, or "secondary" first responders?
c) How does the respondent seek to allocate priority and access to the network?

AT&T Response: AT&T does not believe AT&T personnel qualify as First Responders based on the definition provided in the Middle Class Tax Relief Act. AT&T believes the primary use of the FirstNet Network should be limited to entities that directly provide public safety services, as outlined in the Act; AT&T feels strongly that the FirstNet Network should be utilized only by users providing public safety services, as defined in Section 6001(27) of the Act. Limiting Network use in this manner will simplify management of the Network and insure that the Network is available to public safety users when needed. It is also consistent with explicit Congressional intent to limit the use of the 700 MHz D-block to public safety entities. Further, funds from the Public Safety Trust Fund or the Network Construction Fund should be used only to support public safety, not to facilitate the deployment of commercial wireless services

5. **Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?**

AT&T Response: AT&T does not see any legal or regulatory challenges to potential public-private partnerships. In fact, AT&T believes the Act encourages public-private partnerships. Specifically the Act references leveraging existing commercial wireless infrastructure to maximize economies of scale and speed deployment.

6. **What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?**

AT&T Response: N/A

AT&T PROPRIETARY
Use or disclosure of the data on this page or screen is subject to the restrictions on the title page or opening view screen of this proposal document or file.

7. **Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?**

AT&T Response: Devices for use on the FirstNet Network must be developed to support public safety band class 14 in addition to the band classes that support MNO devices. The devices must also support access to technologies like Universal Mobile Telecommunications System ("UMTS")/High Speed Packet Access ("HSPA") in addition to LTE to enable a global roaming footprint (e.g. roaming on AT&T's band class 17 LTE network).

Multi-operator, multi-band devices will be technically challenging to develop and may result in low scale, high cost devices. Stimulating band class 14 device ecosystem is a significant investment and should be a financial consideration when evaluating sustainable business models. AT&T is interested in assisting with developing the ecosystem.

8. **Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, does the respondent envision that a special pricing schedule would apply to its particular unique use-case?**

a) Does the respondent envision that its partnership may be supported by franchising or leasing FirstNet spectrum, in whole or in part?
b) If so, does the respondent see any unique business, legal, or regulatory challenges in franchising or leasing the spectrum?

AT&T Response: AT&T believes subscriber fees would need to be competitive with commercial rates for services being provided in order to attract customers and generate enough revenue to sustain the network.

AT&T does not believe any business model can be sustained on secondary spectrum revenues alone. FirstNet has three forms of funding 1) $7 Billion from congress 2) Users Fees & 3) Secondary Spectrum Access. FirstNet will need to leverage all funding sources in order to create a sustainable model.

9. Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. Does the respondent have any suggestions that the State may consider supporting this future RFI?

AT&T Response: In planning and designing the Network architecture, Minnesota and FirstNet should follow a basic set of guiding principles. The overriding principle should be to deploy a Network that is based on open standards technologies, which the Act recognized by identifying LTE as the basis for all technical standards. Implementing a network based on LTE and other open standards based technologies is critical, as it will promote interoperability among public safety agencies and drive down costs. An architecture approach based on open standards will provide a clear business model that incents public participation.

The Network must not be viewed as a monolithic network; it should be built as a flexible and modular platform, which would be scalable and easy to operate. The Network should be secure and have geographic and equipment redundancy. Minnesota and FirstNet should not rely on any single equipment vendor, but should instead adopt a multi-vendor strategy, an approach that is followed by

AT&T PROPRIETARY
Use or disclosure of the data on this page or screen is subject to the restrictions on the title page or opening view screen of this proposal document or file.

carriers around the world. However, the number of vendors should be reasonably finite to simplify testing for inter-operability among various components of the Network.

It is also critical that the Minnesota and FirstNet develop and publish a standard set of requirements around network availability, coverage, reliability, hardening, features, etc., as these requirements will drive the ultimate cost of the Network construction and operations. Core network design parameters like bandwidth and latency expectations can also influence Network element placement and topology decisions. A Network design that uses existing commercial operator infrastructure and that is geographically aligned with AT&T's footprint density can speed deployment and reduce cost. In short AT&T recommends:

- Network domain approach using open commercial standards
- Single, centrally managed and operated core, that is dedicated to public safety with geographic and equipment redundancy
- RANs that share commercial & public infrastructure and meet Public Safety grade requirements
- Common backbone infrastructure and transport, data centers, IP networking
- Centralize OSS/BSS with integrated Customer Care
- Multi-operator / multi-band devices considerations

AT&T PROPRIETARY
Use or disclosure of the data on this page or screen is subject to the restrictions on the title page or opening view screen of this proposal document or file.

Cooperative Network Services
14 Main Street SW
PO Box J
Menahga, MN 56464

September 2, 2014

Company Profile

Cooperative Network Services, LLC (CNS) is a limited liability company owned by 20 telephone cooperatives to create efficiencies otherwise unavailable to them independently. CNS provides IP/TDM transport, wholesale Internet bandwidth, engineering and consulting, marketing management, human resource and graphic design services to its members and to the telecommunications industry at large. CNS is currently providing backhaul services to over 250 cellular towers in MN. Please reference www.cooperative-networks.com for additional background, company ownership and maps.

Contacts:

Dean Bahls – Network Services Manager; dean.bahls@cooperative-networks.com; 218-346-3635
Jason Dale – CEO; jason.dale@cooperative-networks.com; 218-298-0264

1. What is the nature of the partnership that the respondent proposes?

CNS brings a large fiber-based network connecting the northern reaches of MN back to the metro area. In addition, CNS brings the support of several hundred telecom personnel through its ownership structure. Those owners include:

AcenTek (Ace Communications Group)	Houston, MN
Albany Mutual Telephone Association	Albany, MN
Benton Cooperative Telephone Company	Rice, MN
Consolidated Telecommunications Company	Brainerd, MN
Emily Cooperative Telephone Company	Emily, MN
Acira (Federated Telephone Cooperative & Farmers Mutual Telephone Company)	Chokio, MN
Garden Valley Telephone Company	Erskine, MN
Gardonville Cooperative Telephone Association	Brandon, MN
Halstad Telephone Company	Halstad, MN
Interstate Telecommunications Cooperative, Inc.	Clear Lake, SD
Mabel Cooperative Telephone Company	Mabel, MN
Otter Com, Inc.	Underwood, MN
Paul Bunyan Communications	Bemidji, MN
Red River Communications	Abercrombie, ND
Roberts County Telephone Cooperative Association	New Effington, SD
Runestone Telecom Association	Hoffman, MN
Spring Grove Communications	Spring Grove, MN
Sytek Communications (Upsala Telephone Company)	Upsala, MN
West Central Telephone Association	Sebeka, MN

a. What value and benefits does the respondent seek to gain from the partnership?

CNS is interested in growing our network to reach additional areas in MN. The successful award of this project will afford CNS the opportunity to grow into additional areas using the Department of Public Safety as an anchor tenant on the network.

Cooperative Network Services
14 Main Street SW
PO Box J
Menahga, MN 56464

2. Does the respondent seek access to FirstNet spectrum?
Not independently. However through a proposed partnership with 702 Communications (702) and New Core Wireless (NCW), access to this spectrum may be desirable.
a. If so, how does the respondent seek to utilize and assign the spectrum?
Access to the FirstNet spectrum would allow our partners to improve services to communities where unlicensed spectrum is currently utilized. The spectrum in many of those areas are currently at full capacity and are unable to grow.

3. Does the respondent seek to contribute to the network buildout?
Response: Yes, CNS already has a large network (reference http://www.cooperative-networks.com/#!transport-network/cgvz) that can be utilized for transport from the rural areas of MN back to the metro or to other parts of the state.

a. If so, how does the respondent seek to contribute to the network buildout? For example, does the respondent offer:

i. Infrastructure (towers, backhaul, switching or data center facilities)?
CNS offers backhaul and access to telco central office facilities (data center) through our owner/partners. Additionally, many of our owners have tower assets that may be available for this project.

iv. Any other resources?
CNS has extensive expertise in transport engineering. Through our proposed partnership with 702 and NCW, we will be able to offer network coordination, billing, 24x7 network operations center, and wireless/LTE expertise.

4. Does the responder consider any of its personnel "first responders"?
Not directly. However, many of our owner/partners have first responders on staff.

9. Does the respondent have any suggestions that the State may consider supporting this future RFI?
Yes. In order for the state to get the best possible responses, please provide as much time as possible for respondents to properly research and design a proposal. When this gets into the RFP stage, it will be especially beneficial to provide adequate response time.

9/2/2014

Minnesota-FirstNet Consultation Project – Request for Statement of Interest: Public Private Partnerships

Prepared for: Minnesota – Department of Public Safety RFP Number: MN-SWIFT 70680, Phase 1 – Additional Projects

The Foundation for a Wireless World.

Table of contents

Company Profile. _____ 2
Name of Organization _____ 2
Nature of Organization _____ 2
Sector _____ 2
Organizational Purpose and mission _____ 2
Contact Informanation _____ 2
Questions _____ 3
1. Nature of Partnership _____ 3
2. Access to FirstNet Spectrum _____ 4
3. Contribution to Network _____ 4
4. First Reponder Personnel _____ 4
5. Legal and/or Regulatory Challenges _____ 5
6. Unique Business Relationships _____ 5
7. Unique Applications _____ 5
8. Per Device Fee _____ 5
9. Formal RFI _____ 5

Company Profile

Each respondent should complete a brief profile, including:

1. **Name of the organization**

   Crown Castle USA Inc.
   2000 Corporate Drive
   Canonsburg, PA 15317

2. **Nature of the organization (e.g., government entity, non-profit company, for profit company)**

   Crown Castle USA Inc. (Crown Castle) is a corporation registered in the Commonwealth of Pennsylvania. Crown Castle's parent company is Crown Castle International Corp. (Crown).

3. **Sector (e.g., law enforcement, public utility, telecommunications carrier)**

   Wireless Infrastructure Provider

4. **Organizational purpose and mission (under 50 words)**

   Crown Castle owns, operates, and leases towers and other infrastructure for wireless communications. Crown Castle offers significant wireless communications coverage in all of the top 100 US markets and to substantially all of the Australian population. In the US, Crown Castle owns, operates and manages over 40,000 towers, thousands of rooftops, over 12,000 small cell nodes and over 6,000 miles of dark fiber routes. For more information on Crown Castle, please visit www.crowncastle.com. Specifically related to Public Safety, you might find the video posted at www.crowncastle.com/publicsafety to be of interest.

5. **Contact for follow up regarding FirstNet and/or this request**

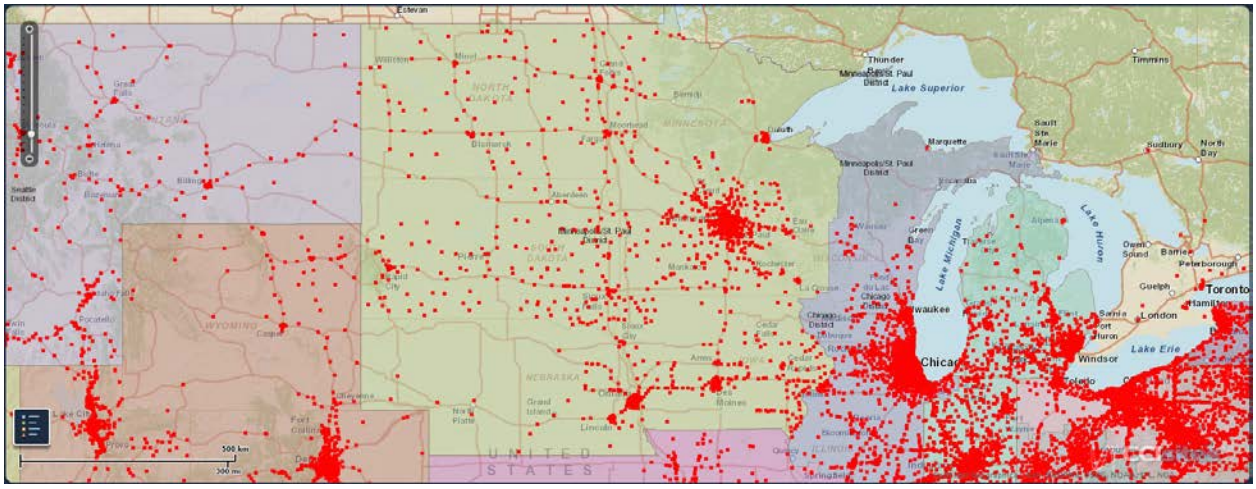
Name:	Paul Gannon, Director of Finance, National Sales
Phone Number:	(724) 416 2401
Email Address:	Paul.Gannon@crowncaslte.com

Name:	Todd Bailey, National Sales Director
Phone Number:	(615) 771 1549
Email Address:	Todd.Bailey@crowncaslte.com

   Todd Bailey

   Crown Castle's operational headquarters and Midwest Area are located near Pittsburgh, PA, and our Minneapolis/St. Paul District is located in St. Louis Park, MN. The district

office is staffed with industry professionals including Project Managers, Regulatory Specialists, and Construction Managers, Sales and Operational staff.



Questions

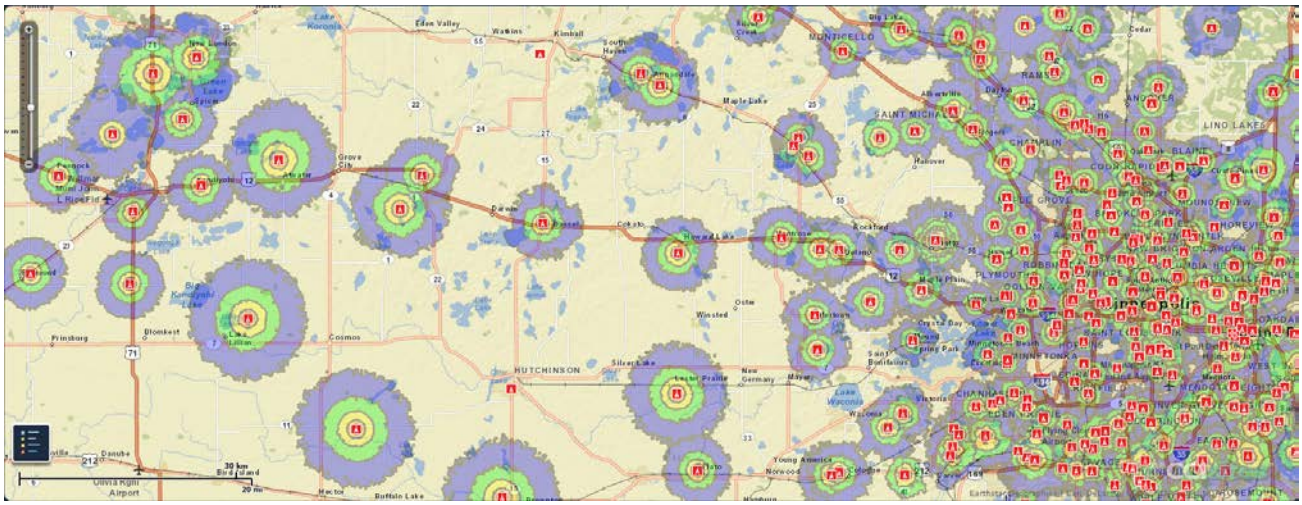
1. **What is the nature of the partnership that the respondent proposes?**

   a. **What value and benefits does the respondent seek to gain from the partnership?**

   b. **Meaning, which resources does the respondent seek to utilize, and how?**

   c. **What value does the respondent seek to offer to the public safety community, to the State, and to FirstNet from use of the network? Meaning, which resources does the respondent seek to contribute (i.e., subscribers, tower and backhaul assets, others)?**

   FirstNet mandates the Nationwide Public Safety Broadband Network (NPSBN) should leverage existing infrastructure and Crown Castle has over 500 wireless infrastructure sites in the State of Minnesota ("State") that FirstNet could co-locate its equipment on. Many of the tower and rooftop locations can accommodate redundant power and telco. Using these existing sites, the State would have a strong foundation for the public-safety grade 700 MHz LTE wireless broadband data network that will ultimately be capable of transporting data, video, and voice. See the example 700 MHz propagation map for a snapshot of estimated coverage from a portion of Crown Castle's sites in Minnesota (next page.)



As part of this agreement, Crown Castle would offer the State reduced rent (for the placement of their equipment on Crown Castles towers and rooftops) in exchange for the rights to market, develop, and manage the State's land, buildings and existing wireless infrastructure to other wireless service providers.

2. Does the respondent seek access to FirstNet spectrum?

a. If so, how does the respondent seek to utilize and assign the spectrum?

b. If so, how does the respondent propose assigning and managing priority access to the network or to the spectrum?

Crown Castle does not need access to the FirstNet spectrum.

3. Does the respondent seek to contribute to the network build out?

a. If so, how does the respondent seek to contribute to the network build out? For example, does the respondent offer:

i. Infrastructure (towers, backhaul, switching or data center facilities)?

Crown Castle will make available space/capacity to the state and FirstNet on its portfolio of shared infrastructure (towers, rooftops and fiber). In some scenarios Crown Castle would be willing to build new sites with the state and/or FirstNet as the anchor tenant.

ii. Financial resources (financing, capital funds)?
iii. Users or devices?
iv. Any other resources?

4. Does the responder consider any of its personnel "first responders"?

a. If so, which personnel and under which circumstances?

b. **If so, would the organization consider these personnel "primary" first responders, or "secondary" first responders?**
c. **How does the respondent seek to allocate priority and access to the network?**

None of Crown Castle's employees in their job functions are considered first responders. However, we support numerous departments and agencies from local to federal government with our suite of services and with our infrastructure.

5. **Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?**

Crown Castle does not perceive any legal or regulatory challenges to a public-private partnership. Crown Castle is already working with many government agencies including states, municipalities, school districts and other government agencies. Our customers include: State of New York, Orange County, FL, City of Miami, FL, New Castle County, DE, Howard County, MD, Allegheny County, PA, the City of Allentown, PA, the City of Bethlehem, PA.

6. **What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?**

In return for reduced rent, Crown Castle would like the rights to market the State's properties and develop new wireless communication sites on the State's properties (new towers, rooftop installations, fiber routes). In addition, Crown Castle could manage/market the State's existing wireless telecommunication facilities on the State's properties for a percentage of any new revenues.

7. **Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?**

None at this time.

8. **Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier; does the respondent envision that a special pricing schedule would apply to its particular unique use-case?**

a. **Does the respondent envision that its partnership may be supported by franchising or leasing FirstNet spectrum, in whole or in part?**

b. **If so, does the respondent see any unique business, legal, or regulatory challenges in franchising or leasing the spectrum?**

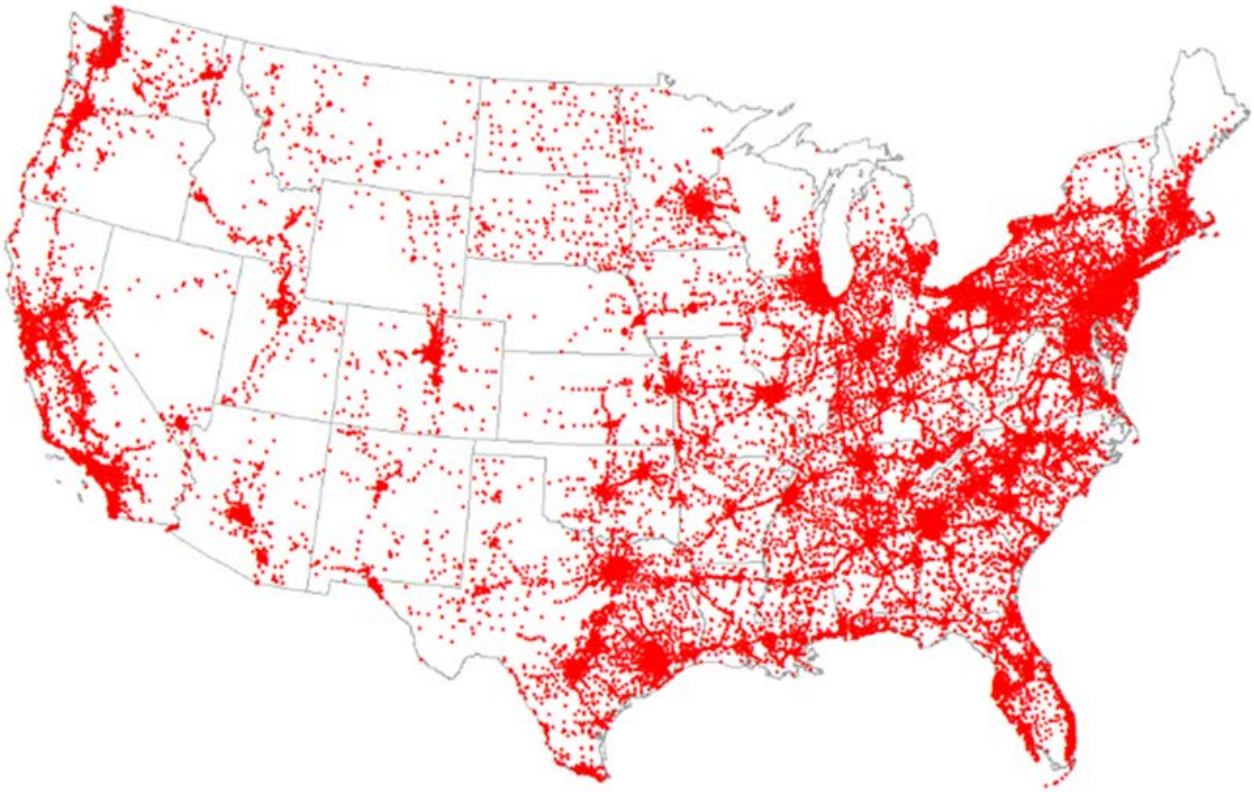
N/A – Crown Castle would work with FirstNet to develop a monthly fee for rental space on our assets. This fee would be based upon different variables including tower loading, center lines and ground space needed.

9. **Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. Does the respondent have any suggestions that the State may consider supporting this future RFI?**

   Crown Castle recommends that the State develop specific sections to allow for each of the potential partners to properly respond to the RFI. The RFI should separately address the following sectors:

   - **Equipment Providers**
   - **Installation/Site Service Vendors**
   - **Radio Service Providers**
   - **Wireless Infrastructure Providers**

   Crown Castle is positioned like no company in the United States to assist with the deployment of a public safety grade LTE network. Crown Castle has the largest portfolio of wireless infrastructure sites (towers, rooftops, small cell nodes and fiber optics), along with the strategically located and decentralized District offices that are staffed with tenured professionals. We offer a full suite of services from site identification, A&E, Zoning/Permitting all the way through construction management and scheduled maintenance.



August 31, 2014

Company Profile

Palmer Wireless is a wireless voice and internet service provider that currently serves areas in Sherburne and Benton counties. Palmer Wireless was established in 2006 to meet the needs of our communities due to lack of broadband access and to bring a local service provider to our communities. Palmer Wireless uses a combination of licensed spectrum and unlicensed spectrum to deliver services to our customers. We pride ourselves on being able to deliver exceptional customer service and usually we are on a first name basis with our customers as they are our friends and neighbors. We deliver a 3G and 4G network to our communities where many of the Nationwide Cellular operators have passed by due to their low population. Many of these areas are also poorly served by the landline service provider and we have delivered broadband services to customers that could not receive services from any provider at any cost.

Contact: Laura Kangas, President lkangas@palmerwireless.com 320-743-5110

Nature of the Partnership

Palmer Wireless would look at a partnership that is mutually beneficial. We would look to gain access to spectrum, tower assets, transport and an ecosystem of end devices. The contributions we would make could be access to our transport, towers and revenue associated with our end users.

Access to FirstNet Spectrum

Access to the FirstNet spectrum is a very important need for Palmer Wireless. Because we are a small carrier, we haven't been able to financially compete for spectrum in our area with it being included in the Minneapolis and St. Cloud Metro trading areas. We are currently using PCS spectrum for our 3G network and 3.65 GHz for our 4G network. While this spectrum is serving our needs today, we do not have a good roadmap to continue growing our footprint and bringing services to our communities and the 700 MHz FirstNet spectrum would be a provide us that roadmap.

Contributing to the Network Build out

We would consider multiple options to contribute to the network build out. We are operating a network currently and many of the same resources could be used. We also lease space from the public sector on existing site locations and efficiencies, such as transport could be taken advantage of on shared site locations. We would consider capital contributions for the sites we would be sharing so that the network is more cost effective for the State and Palmer Wireless.

Are the companies personnel "first responders"?

Not at this time.

Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?

Not at this time.

What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?

We have already partnered with the Becker Public Schools in a true private-public partnership where we have delivered internet service to all of the Becker school busses in exchange for locating a tower on the school campus. This partnership enabled the Becker School system to extend the campus learning tools to the busses at no cost to the public. In exchange, Palmer Wireless was able to construct a new tower that served the community of Becker and enhanced wireless communications for the community. This is an example of what can be done when a company with local community interest partners with the public sector. We envision that a similar partnership can be established with the State of Minnesota that benefits all levels of government, as well as the members of our community and our company.

Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?

Devices that can support band class 14, as well as band classes 4, 2 and 12 would be helpful to support the ecosystem of high quality low cost devices. Without the access to routers, handsets and tablets the cost of the end user equipment could make the solution cost prohibitive.

Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier; does the respondent envision that a special pricing schedule would apply to its particular unique use-case?

Palmer Wireless is open to various options, as long as there is an opportunity to generate positive revenue and continue to serve our communities.

a. Does the respondent envision that its partnership may be supported by franchising or leasing FirstNet spectrum, in whole or in part?

Access to the FirstNet Spectrum is of great importance to Palmer Wireless.

b. If so, does the respondent see any unique business, legal, or regulatory challenges in franchising or leasing the spectrum?

The greatest concern is how the spectrum will be allocated for use and the impact to both first responders and our customers upon prioritization.

Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. Does the respondent have any suggestions that the State may consider supporting this future RFI?

It would be advantageous to demonstrate the system and how it would operate in a partner situation by conducting an experiment in one of our communities. We have access to a commercial LTE core network with NewCore Wireless and we are currently located on two ARMER towers. This would allow us to respond to the RFI more accurately and provide the greatest opportunity for a successful partnership.

Kandiyohi County response to:

Minnesota Department of Public Safety
Minnesota-FirstNet Consultation Project

Request for Statement of Interest:
Public-Private Partnerships

MN-SWIFT 70680, Phase 1-Additional Projects

Company Profile: Our organization is Kandiyohi County. We are a local government entity working in conjunction with other potential local partners, Law Enforcement, Fire, EMS, Public Safety, and Utilities. Our mission is to provide services to our citizens which enhance the quality of life in an efficient and responsible manner contingent on the availability of human, natural, and economic resources. Our main point of contact is Sheriff Daniel Hartog at the Kandiyohi County Sheriff's Office at 2201 NE 23rd Street, Willmar, MN 56201. His contact number is 320-212-6700 extension 3301.

Responses to questions:

1. The nature of the partnership we propose is to utilize FirstNet as a priority service for public safety. We hope to use the data network for things such as mobile data, smart phones, GPS, SCADA transmissions and wireless video. With our partners (Municipal Fire Departments, EMS, Utilities) we have several towers throughout the county that may prove beneficial. We also have many potential subscribers interested in participating, dependent on cost etc.
2. We do not seek direct access to FirstNet spectrum.
3. We seek to contribute to the network build out in any way we can. We have access to several towers in the county as well as secure facilities.
4. Our personnel are considered "First Responders". We are made up of Law Enforcement, Fire and EMS. However during a large scale event, Street and Utility workers also become First Responders, providing services to restore order and get things back to normal. We would consider these personnel both primary and secondary First Responders, dependent on the incident. More discussion would have to take place with our partners to determine how to allocate priorities and access to the network. However, having worked together in the past, we foresee no problems determining priorities.
5. In response to any legal or regulatory challenges to public/private partnerships, we see no challenges locally.
6. Regarding the relationship considerations to forge private/public partnerships, our local groups have met as needed in the past. We would possibly need to formalize our partnerships and meet more frequently. We may also want to join with other regional, state and federal partners in working to develop the best solutions we can achieve.
7. Currently IPhones and 4G or greater speeds are needed. Ensuring compatibility and no speed reductions would be essential to a successful partnership.
8. Concerning special pricing schedules, if any agency or partner contributes tower or building space to the project, it would be nice if they were given some credit as far as contributing. For example, if our county provides multiple tower sites to the system and neighboring county provides none, we would expect either a lower price on monthly subscriber fees, or to receive some compensation for use of the tower and/or buildings. We do not envision the partnership being supported by franchising or leasing FirstNet spectrum, in whole or in part and we do not see any unique business, legal or regulatory challenges in franchising or leasing the spectrum.
9. As far as suggestions regarding a possible future RFI, our suggestion is to allow more time to provide a response. Getting partners educated on what exactly FirstNet is and why it should be important to them is challenging. It is hard to get commitment when there are so many unknown factors and so many potential participants involved.

COUNTY OF ANOKA

CENTRAL COMMUNICATIONS – RADIO SERVICE

Radio Shop • 13595 Hanson Blvd NW • Andover, MN 55304
(763) 450-4580 • Fax (763) 755-2035

Request for Statement of Interest: Public-Private Partnerships

Mr. Abley,

This letter is in response to the query that was sent out. Anoka County Central Communications is a local government entity that both provides emergency dispatching for Sheriff, Police and Fire Departments as well as owning / maintaining mission critical infrastructure and subscribers for the above listed agencies and other County departments.

Contact Information:

PSAP Manager:
Linda Hanson
763-323-5826
Linda.Hanson@co.anoka.mn.us

Radio System Coordinator:
Jake Thompson
763-450-4581
Jake.Thompson@co.anoka.mn.us

Question Responses:

1. What is the nature of the partnership that the respondent proposes?
   - We are seeking affordable and reliable LTE service for our public safety responders within Anoka County and adjacent counties. We envision utilizing this service for CAD, video upload/download, weather siren alerting & fire department alerting

2. Does the respondent seek access of FirstNet spectrum?
   - Anoka County would like the State of Minnesota to be the license holder for the spectrum. The state would be able to add Anoka County radio sites that are leased for use by FirstNet.
   - Anoka County would want the right for the Radio System Manager to manage access levels of subscriber on the system.

3. Does the respondent seek to contribute to the network buildout?
   - Anoka County owns 8 radio sites (tower & shelter) that are equipped with both

microwave and fiber optic backhauls. We also have fiber optics at two state owned radio sites within the county. All locations are equipped with UPSs and generators. Anoka County would look to enter in a lease agreement for the use of these facilities and backhaul equipment.

4. Does the responder consider any of its personnel “first responders”?
    - We consider the majority of our users first responders. The majority of our users are the primary responders to an incident. We do also provide service to other “non-first responders”. We would control access levels similar to the ARMER radio system. First Responders would have a higher priority than a non-first responder.

5. Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?
    - We can perceive there being a challenge with allowing CJIS and Public data to flow on the same network. There would need to be separation and security in place and enforced.

6. What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?
    - I would envision a private-public partnership between the State of Minnesota and Great River Energy to help offset the expense but also to offer backhaul support for greater Minnesota.

7. Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?

8. Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, does the respondent envision that a special pricing schedule would apply to its particular unique use-case?

    - I would envision that the charges per device would be less than the major cellular carrier. I would hope that there would be some extra incentive to infrastructure and backhaul owners to reduce their rates.

9. Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. Does the respondent have any suggestions that the State may consider supporting this future RFI?

Response to

Minnesota Department of Public Safety

Minnesota-FirstNet Consultation Project

Request for Statement of Interest: Public-Private Partnerships

2 September 2014

Name of the organization
Rivad Networks LLC

Nature of the organization (e.g., government entity, non-profit company, for-profit company)
For-Profit company

Sector (e.g., law enforcement, public utility, telecommunications carrier)
Telecommunications solutions provider

Organizational purpose and mission (under 50 words)
Rivada Networks is a leading designer, integrator and operator of wireless, interoperable public safety networks at local, state and federal levels. Our technologies enable public safety agencies to retain absolute control over dedicated broadband networks, while enabling the generation of valuable revenues from unused capacity, when available.

Contact for follow up regarding Firstnet and/or this request

Vince D'Onofrio

vdonofrio@rivada.com

Tel: 703 969 8622

1. What is the nature of the partnership that the respondent proposes?

Rivada proposes that it partners with the relevant agencies to build, operate, and manage the public safety network for the state. Rivada would privately fund the network build and operation, and would sell excess capacity on the network when available, with instantaneous preemption of radio resources for public safety use.

Rivada Networks' patented DSATPA technology enables public safety broadband networks to monetize spectrum allocation in real time to private sector users when it is not needed by Public Safety. In making surplus bandwidth dynamically available to wholesale commercial users during the significant periods of fallow time when the bandwidth is not being used by emergency responders, the Rivada Networks model ensures the financial sustainability of these Public Safety networks and delivers the highest Return on Investment for Public Safety communications.

a. What value and benefits does the respondent seek to gain from the partnership?

Rivada is proposing a solution that will fund the build and operation of the public safety network in return for non-priority use of the spectrum.

b. Meaning, which resources does the respondent seek to utilize, and how?

Rivada will seek to use the 700MHz spectrum when not being used by Public Safety. Additionally, Rivada will seek to co-locate or re-use existing infrastructure where appropriate.

c. What value does the respondent seek to offer to the public safety community, to the State, and to FirstNet from use of the network? Meaning, which resources does the respondent seek to contribute (i.e., subscribers, tower and backhaul assets, others)?

Rivada will privately fund the entire network build. This includes everything related to the network build including RAN, Core network, base station infrastructure, etc. Additionally, Rivada will return any profits that it generates on the network to the public safety communication mission, be it the state or FirstNet.

2. Does the respondent seek access to FirstNet spectrum?

Yes

a. If so, how does the respondent seek to utilize and assign the spectrum?

Rivada plans to sell excess capacity on the network when not being used by Public Safety. Public Safety will have absolute control over the spectrum and over the network. When not being used by Public safety, Rivada plans to sell excess capacity on the network. Public Safety has ruthless pre-emption on the network ensuring that they have guaranteed access to the network whenever it is needed.

Rivada's unique technology (DSATPA) provides unrivaled value in several categories that include: standards compatibility, millisecond level preemption for critical users, broad end user prioritization capability, failover management, multi-network concurrence, assignable quality of service control, comprehensive network management features, and opportunities for self-funding through integration with the spectrum bandwidth marketplace.

b. If so, how does the respondent propose assigning and managing priority access to the network or to the spectrum?

Public Safety will have ruthless pre-emptive rights to the network ensuring that they have guaranteed access to the network when needed. With Rivada Networks' technology, Public Safety always has absolute priority on its network, and will have permanent access to the entire allocation of spectrum and network capacity when needed. However, when the entire capacity of the network is not required by Public Safety, our technology enables commercial subscribers to use the network by dynamically leasing any excess capacity on a wholesale basis. Rivada Networks' technology instantaneously matches spectrum demand and spectrum availability, using any excess capacity on the public safety network to provide sub-priority commercial service to paying customers.

3. Does the respondent seek to contribute to the network buildout?

Yes

a. If so, how does the respondent seek to contribute to the network buildout? For example, does the respondent offer:

i. Infrastructure (towers, backhaul, switching or data center facilities)?
ii. Financial resources (financing, capital funds)?
iii. Users or devices?
iv. Any other resources?

Rivada will finance and build the network to the requirements and specifications demanded by public safety. This includes all aspects of the network build, including RAN and CORE equipment, leasing of towers and infrastructure, and any other infrastructure required.

4. Does the responder consider any of its personnel "first responders"?

NO

a. If so, which personnel and under which circumstances?

N/A

b. If so, would the organization consider these personnel "primary" first responders, or "secondary" first responders?

N/A

c. How does the respondent seek to allocate priority and access to the network?

Public safety will own and have complete control of the network. Access to the network will be on a priority basis, exercising ruthless pre-emption to ensure that public safety will always have access the network when needed. In the event of an unexpected demand surge, radio resources can be reassigned to ensure the highest priority users have complete and uninterrupted service. The reassignment of prioritized bandwidth can happen at the millisecond level, even to the extent that all radio resources can be instantly secured for the highest priority user.

5. Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?

No

6. What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?

- Agreement on spectrum access and duration
- Agreement on business plan, and sustainability of the network
- Agreement on cost of service provision by FirstNet

7. Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?

Yes. Devices must have access to multiple spectrum bands. Commercial devices must be loaded with the band 14 chip in order for non –public safety users to access the band 14 network, in order to maximize the revenue generated from the network.

8. Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, does the respondent envision that a special pricing schedule would apply to its particular unique use-case?

No.

a. Does the respondent envision that its partnership may be supported by franchising or leasing FirstNet spectrum, in whole or in part?

Potentially. As Rivada is paying for the network build, we would need access to the spectrum on a secondary, sub-priority basis in order to offset the significant investment in the network build.

b. If so, does the respondent see any unique business, legal, or regulatory challenges in franchising or leasing the spectrum?

No

9. Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. Does the respondent have any suggestions that the State may consider supporting this future RFI?

Respondents should:

- have a detailed answer on how they propose to guarantee immediate access to public safety users when needed. Detail on providing ruthless pre-emption should be requested.
- clearly outline their business plan and provide details on how they fund the network.
- specify how they can guarantee the sustainability of the network.
- address the impact to existing rural public safety communication systems

Minnesota-FirstNet Consultation Project Response

Request for Statement of Interest:

Public-Private Partnerships

Company Profile

Each respondent should complete a brief profile, including:

1. **Name of the organization:** Minnesota Telecom Alliance
2. **Nature of the organization (e.g., government entity, non-profit company, for-profit company)** Non-profit trade association
3. **Sector (e.g., law enforcement, public utility, telecommunications carrier)** Telecommunications
4. **Organizational purpose and mission (under 50 words)** The MTA is a trade association that represents over 40 incumbent local exchange carriers throughout Minnesota. Our Members include large, medium, and small companies that serve primarily rural areas of the state.
5. **Contact for followup regarding Firstnet and/or this request** MTA President/CEO Brent Christensen; bchristensen@mnta.org or 651-288-3723

Questions

Respondents are encouraged to answer only the questions that apply to them. Respondents are not required to answer all questions. Respondents may supplement their answers with graphics and figures, charts, tables and/or other supporting data.

1. **What is the nature of the partnership that the respondent proposes?**

    a. **What value and benefits does the respondent seek to gain from the partnership?**
    Rural critical infrastructure, transport, and service providers have an established history of support for and partnership with public safety. MTA members have successfully partnered with state and local entities for public safety communications deployments. Further, rural infrastructure and service providers' obligations to serve already are imbued with the responsibility for public safety. For example, Rural Incumbent Local Exchange Carriers ("ILECs") have a legal responsibility to keep the most rural parts of Minnesota connected. After major disasters, MTA members work alongside public safety to restore critical infrastructure services.

    b. **Meaning, which resources does the respondent seek to utilize, and how?**
    MTA members have built and maintain a robust fiber network that currently connects the vast majority of public safety answering points (PSAPs), along with existing tower locations throughout the rural parts of the state.

c. **What value does the respondent seek to offer to the public safety community, to the State, and to FirstNet from use of the network? Meaning, which resources does the respondent seek to contribute (i.e., subscribers, tower and backhaul assets, others)?**
MTA members have an extensive fiber network with existing customers that connect many of the end points that FirstNet seeks to connect to. It is our belief that it is the best interest of the State of Minnesota and FirstNet to utilize existing infrastructure and partner with MTA members to identify and build to those few end points that do not currently have connectivity.

2. **Does the respondent seek access to FirstNet spectrum?**
While there have not been discussions by the MTA members as a whole on the use of FirstNet spectrum, it is conceivable that individual MTA members may desire to use the spectrum to better serve their customers.

   a. **If so, how does the respondent seek to utilize and assign the spectrum?**

   b. **If so, how does the respondent propose assigning and managing priority access to the network or to the spectrum?**

3. **Does the respondent seek to contribute to the network buildout?**

   a. **If so, how does the respondent seek to contribute to the network buildout? For example, does the respondent offer:**
The MTA cannot comment on specific contributions by MTA members, but we can envision partnership opportunities with individual members to lease existing infrastructure and build out needed infrastructure. Most of this infrastructure would consist of backhaul and switching, but could also include towers and data center facilities.

Request for Statement of Interest:
Public-Private Partnerships

4. **Does the responder consider any of its personnel "first responders"?**

    a. If so, which personnel and under which circumstances?

    b. If so, would the organization consider these personnel "primary" first responders, or "secondary" first responders?

    c. How does the respondent seek to allocate priority and access to the network?

5. **Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?**

6. **What unique business relationship considerations to forge the private-public partnership with FirstNet are envisoned?**

7. **Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?**

8. Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, **does the respondent envision that a special pricing schedule would apply to its particular unique use-case?**

    a. Does the respondent envision that its partnership may be supported by franchising or leasing FirstNet spectrum, in whole or in part?

    b. If so, does the respondent see any unique business, legal, or regulatory challenges in franchising or leasing the spectrum?

9. Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. **Does the respondent have any suggestions that the State may consider supporting this future RFI?**

Minnesota-FirstNet Consultation Project Response

Request for Statement of Interest:

Public-Private Partnerships

BACKGROUND

Purpose of this Request

The State of Minnesota, acting through the Department of Public Safety, Division of Emergency Communication Networks, is seeking statement of interest for Public-Private Partnership in development of the Nationwide Public Safety Broadband Network in Minnesota from qualified partners and interested stakeholders.

The purpose of this request is to secure a formal statement of interest in public-private partnerships with the State of Minnesota ("the State") and/or the First Responder Network Authority ("FirstNet"). The State will primarily utilize information collected from this request for three initiatives:

1. To prepare the State to describe to FirstNet, in general terms, which potential private partners exist to documuent a preliminary statement of partnership requiements, and to define what each party may have to offer the other.

2. To educate the State and its stakeholders, and in particular the Statewide Emergency Communications Board[2].

3. To support the development of a comprehensive, detailed Request for Information (RFI) to be published in Q4 2014.

This request is motivated primarily by the Minnesota-FirstNet Initial Consultation Meeting currently planned for September 24th, 2014. This meeting is the first official interaction between the State and FirstNet in the state's consultation process. It is the State's objective to have a complete report summarizing the findings of this inquiry prior to Initial Consultation meeting.

Who May Respond

While anyone may respond to this request, the State *in particular*, is seeking responses from the following:

- Public Utilities
- Telecommunications Companies and Carriers
- Tribal Nations
- Non-Public Safety Entities

Others that are encouraged to respond include but are not limited to:

- Public safety organizations
- Units of state and local government

- Other government organizations
- Trade associations

[2] More information available at https://dps.mn.gov/entity/srb/Pages/default.aspx.

- Private companies
- Non-profit entities
- Public utilities
- Members of the public

The Minnesota-FirstNet Consultation Project

The Minnesota-FirstNet Consultation Project (MnFCP) is a Statewide Emergency Communications Board sponsored project to prepare the state of Minnesota to consult with FirstNet and to develop a sustainable business case for the Nationwide Public Safety Broadband Network (NPSBN) in the state. The ultimate objective of this project is to ensure that the NPSBN is deployed in Minnesota.

More information about this project is available at:
https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx

The Consultation Process

Under Federal law, FirstNet is required to consult with each state before beginning construction of the public safety broadband network with in that state. At the end of the consultation process, FirstNet will submit a plan to each governor for approval. The governor will then either 1) approve of the plan, permitting FirstNet to begin construction or 2) opt-out of FirstNet's plan and submit to FCC an alternate plan for an independent state-led buildout.

More information on the consultation process is available at: http://www.firstnet.gov/consultation[3] –

Minnesota-FirstNet Consultation Project Response

Request for Statement of Interest:

Public-Private Partnerships

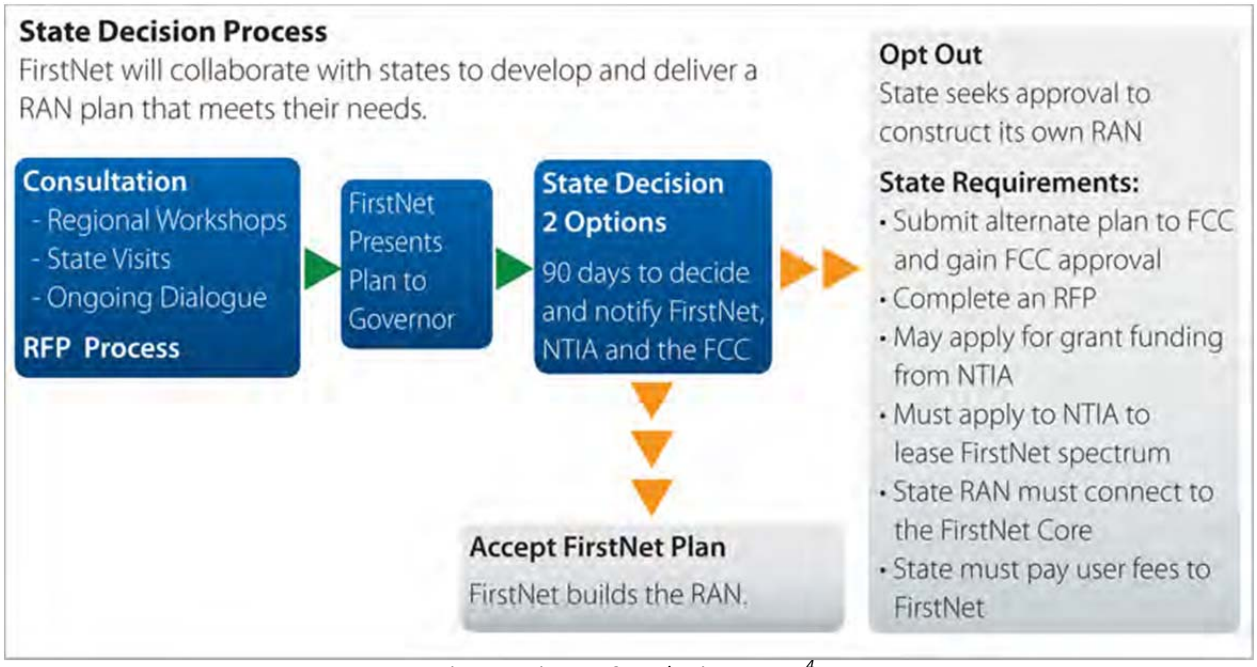


Figure 1: FirstNet Consultation Process[4]

[3] The RAN is the Radio Access Network (RAN), which constitutes the wireless communications subsystem of the 4G Long Term Evolution (LTE) network.

MINNESOTA TELECOM ALLIANCE

Minnesota-FirstNet Consultation Project Response

Request for Statement of Interest:

Public-Private Partnerships

Key Parties

About ECN

Emergency Communication Networks (ECN) is a division of the Minnesota Department of Public Safety. It's primary responsibilities include managing the statewide 9-1-1 telecommunications backbone, administering the 9-1-1 fund, implementing the Allied Radio Matrix for Emergency Response (ARMER), statewide communications interoperability initiatives, Statewide Emergency Communications Board standards and projects, and consulting with FirstNet to implement the Nationwide Public Safety Broadband Network in Minnesota.

More information is available at https://ecn.dps.mn.gov.

About FirstNet

The landmark Middle Class Tex Relief and Job Creation Act of 2012 established FirstNet, an independent Federal entity tasked with building a nationwide private cellular network exclusive to public safety. In building its business case for the network, FirstNet is required to consult with each state and, ultimately, to secure consent from the governor of each state before operating in that state.

More information is available at http://firstnet.gov.

About the Statewide Emergency Communications Board

The Statewide Emergency Communications Board was created by the Minnesota Legislature in 2004 to implement the Statewide Interoperable Public Safety Radio and Communication System Plan.

Since then, the SECB's responsibilities have expanded to include goverance over public safety communications in the state form a holistic perspective, including interoperable radio communications, Next-Generation 911 governance, and the consultation with FirstNet. The SECB is supported by seven emergency communications regions across the state to represent regionalized communications interests across the state.

The SECB is widely-respected in the public safety community and is considered a model for public safety governance in the nation and worldwide.

More information about the SECB is available at: https://dps.mn.gov/entity/srb/Pages/default.aspx

Figure 2: Minnesota Interoperable Communications Regions

[4] *From* http://firstnet.gov/consultation

Minnesota-FirstNet Consultation Project Response

Request for Statement of Interest:

Public-Private Partnerships

CONTACT

DPS, ECN, or the Minnesota-FirstNet Consultation project:

Jackie Mines
Director, Emergency Communication Networks
jackie.mines@state.mn.us
651.201.7550

Minnesota-FirstNet Consultation Project Manager:

Mark Navolio
Televate, LLC
mark.navolio@televate.com
703.639.4205

Questions about this document and the request for statement of interest:

Brandon Abley
Televate, LLC
brandon.abley@televate.com
703.639.4200

September 2, 2014

Company Profile

NewCore Wireless is an LLC headquartered in St. Cloud Minnesota that provides 3G and LTE hosted switching services in Minnesota, as well as most of the Upper Midwest. NewCore also provides professional services to our partners including project management, construction management, RF engineering, marketing assistance and general wireless consulting. NewCore was founded on the principle of providing operators the ability to offer wireless voice and broadband services economically through a shared switching platform. Our partners own and operate their own local networks, customers and retail operations. NewCore provides the experience, hosted switching platforms and industry partnerships that individual partners do not have the scale to provide.

Contacts: Albert Kangas, General Manager akangas@corewg.com 320-492-7510

Stephanie Court, Project Manager Stephanie.court@corewg.com 320-492-8141

Nature of the Partnership

NewCore Wireless is proposing to partner with the public sector by providing a shared LTE core network solution along with contributing years of experience in engineering and operating wireless networks. NewCore's network architecture is configured to support fully partitioned solutions for operators. The solution that is proposed for Minnesota's FirstNet system will include the core components of an LTE system including MME, HSS, PCRF, OSS and S and P gateway functions that support the FirstNet RAN network. NewCore will provide fully partitioned access including delivery of data call records, network management, customer IP routing and the ability to interface to other LTE networks through diameter routing mechanisms.

NewCore offers a unique partnership to the proposed FirstNet system that can provide the core network elements and access to partner networks throughout the State of Minnesota as well as adjacent states. The location of the NewCore LTE core provides access to many private transport networks throughout the state such as CNS and 702 Communications. NewCore also has current partners who are leasing space from the State of Minnesota owned towers and already have fiber or microwave transport to our St. Cloud data center from those towers that could lower the cost of the needed IP backhaul.

Access to FirstNet Spectrum

NewCore's main purpose is to provide the core services and professional services to support the highest quality and lowest cost solution possible, and access to the spectrum is not directly required. However, our current and future network partners throughout the state would benefit from access to the FirstNet spectrum. The cost of spectrum is cost prohibitive for most of our partners and many are exceeding the capacity of the spectrum they use today or are forced to use unlicensed spectrum to meet the needs of the communities they serve. With access to the FirstNet spectrum, our partners could deliver higher quality services to areas in the state. Network prioritization is an important solution in our platform, and we continue to work with our vendors to test and deploy this feature.

Contributing to the network build out

NewCore has a fully functional Tier 1 vendor LTE core network already in place that is serving numerous sites throughout the Midwest. This would allow FirstNet to begin operations faster and more efficiently than if a core network was built from the ground up. NewCore's network is already being integrated to other LTE networks throughout North America. NewCore's platform could also be used in experimental projects immediately that could evaluate the use of LTE in Minnesota and how it can benefit public and private sectors. We are working with the public sector in Minnesota and have already volunteered our assets to potential trials in Central Minnesota. We have been coordinating with the City of St. Cloud to utilize city assets such as water tanks and city owned fiber to cost effectively provide an evaluation network that would meet the needs of the communities and the State. Indirectly through our partners such as 702 Communications and CNS, we have the potential to contribute to the network build out through access to fiber transport and tower assets.

Are the companies personnel "first responders"

NewCore is a privately held company that has multiple owners throughout the communities we serve. Our owners do have employees who are part of the first responder network.

Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?

None perceived at this time.

What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?

There will be a need for very secure access to the databases and network elements. We believe that we have much of that in place for our current partners, however this will be critical for this solution. Some of the network elements may need to be split out into virtual or physical elements to accommodate this need.

Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?

Devices that can support band class 14 as well as band class 4, 2 and 12 would be helpful to support the ecosystem of high quality low cost devices. Without the access to routers, handsets and tablets the cost of the end user equipment could make the solution cost prohibitive. Many of our partners have networks already in place using different bands and by having devices that can use the FirstNet system as well as other networks, FirstNet and NewCore can be more successful.

Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, does the respondent envision that a special pricing schedule would apply to its particular unique use-case?

A fee structure that is currently in place today for our network partners is a per site and per user fee. It will be important to deliver a solution to both the public and private sectors that is competitive with the current offering through commercial carriers, while at the same time offering high bandwidth, high availability networks to meet the needs of the first responder user base.

a. Does the respondent envision that its partnership may be supported by franchising or leasing FirstNet spectrum, in whole or in part?

Access to the FirstNet spectrum would be a great opportunity to many of our partners.

b. If so, does the respondent see any unique business, legal, or regulatory challenges in franchising or leasing the spectrum?

The biggest challenge will be the network prioritization and how that would impact the end users.

Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. Does the respondent have any suggestions that the State may consider supporting this future RFI?

Sufficient time would be beneficial so that the most accurate response can be provided. Of particular interest would be the design associated with interconnecting with other FirstNet systems as well as other LTE carriers for roaming. Network prioritization requirements are important to understand to ensure that we can comply.

Agenda Item #4
FirstNet RFI (Shlanta)

Company Profile

1. Southern Minnesota Broadband, LLC headquartered in New Ulm, MN and its eight Member Companies:

   BevComm
   123 W 7th ST
   Blue Earth, MN 56013

   Jaguar Communications
   Provincial Real Estate Holdings, LLC
   704 North Main Street
   Le Sueur, MN 56058

   Kasson & Mantorville Telephone Company
   18 2nd Ave NW
   Kasson, MN 55944

   Communications 1 Network, Inc.
   105 South Main
   PO Box 20
   Kanawha, IA 50447

   Woodstock Telephone
   337 Aetna Street
   Ruthton, MN 56170

   Ace Telephone Association
   207 East Cedar Street
   Houston, MN 55943

   New Ulm Telecom
   27 N. Minnesota Street
   New Ulm, MN 56073

   SDN Communications
   2900 W 10th Street
   Sioux Falls, SD 57104

2. For-profit

3. Telecommunications

4. Southern Minnesota Broadband, LLC is an organization owned by eight Member Companies in southern Minnesota and South Dakota. It is managed by South Dakota Network, LLC. This partnership will result in better and more affordable broadband connectivity and Internet services for businesses in Minnesota.

5. Contacts:
   Mitch Elfstrand, VP of Engineering and Operations
   (605)978-3587
   Mitch.elfstrand@sdncommunications.com

   Tom Durfee, Director Business Development
   (605)978-3581
   Thomas.durfee@sdncommunications.com

1. What is the nature of the partnership that the respondent proposes?

Southern Minnesota Broadband, LLC seeks a partnership with Minnesota Department of Public Safety for purposes of the Minnesota-FirstNet Consultation Project. This partnership would allow for Southern Minnesota Broadband, LLC and its Member Companies to deliver connectivity to location identified in the network design within its network footprint.

2. Does the respondent seek access to the FirstNet spectrum?

To be determined

3. Does the respondent seek to contribute to the network buildout?

Southern Minnesota Broadband, LLC and its Member Companies have fiber based infrastructure in place to support broadband Ethernet services to communities in its regional footprint of southern Minnesota. This fiber based infrastructure can deliver broadband connectivity between and to PSAP, first responder, related government, hub and tower locations.

4. Does the responder consider any of its personnel "first responders"?

Southern Minnesota Broadband, LLC and its Member Companies have a number of employees serving in various capacities including firefighters, EMT's, and certified first responders.

5. Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?

To be determined

6. **What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?**

   A service agreement would be established between Southern Minnesota Broadband, LLC and its Member Companies and Minnesota Department of Public Safety to define pricing methodology and service definition for the products provided by Southern Minnesota Broadband, LLC and its Member Companies to support the FirstNet Network.

7. **Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?**

   We would envision a state of the art based network infrastructure to be a key component for connectivity needs within the designed FirstNet network. Southern Minnesota Broadband, LLC and its Member Companies are capable of providing this solution.

8. **Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, does the respondent envision that a special pricing schedule would apply to its particular unique use-case?**

   To be determined

9. **Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. Does the respondent have any suggestions that the State may consider in supporting this future RFI?**

   Inquire about availability of tower, broadband facilities and the redundancy thereof.

Minnesota Department of Public Safety
Minnesota FirstNet Consultation Project
Statement of Interest

September 2, 2014

Submitted by:

CenturyLink

600 Stinson Blvd

Minneapolis MN 55413

http://www.centurylink.com

Company Profile

1. Name of the organization: CenturyLink Communications, LLC (f/k/a Qwest Communications Company, LLC)

2. Nature of the organization: publicly-traded for profit company (NYSE: CTL)

3. Sector: Telecommunications & Data Services Carrier

4. Organizational purpose and mission: CenturyLink is an integrated communications company engaged primarily in providing an array of communications services to our residential, business, governmental and wholesale customers. We strive to maintain our customer relationships by, among other things, bundling our service offerings to provide our customers with a complete offering of integrated communications services.

5. Contact for follow up regarding this request:

   Max Tite
   Senior Account Manager for State of Minnesota
   600 Stinson Blvd., 2nd Floor
   Minneapolis, MN 55413
   612-499-7428 (m)
   Max.Tite@centurylink.com

CenturyLink's position regarding ECN's Public Safety Broadband Network Program is that we are very interested in exploring viable approaches for public-private partnering to leverage our assets for the benefit of Minnesotans.

These assets are highlighted by the following:

- Today, CenturyLink provides data communications and/or telecommunications services for **376 communities** currently connected on our Minnesota network.

- In addition, CenturyLink operates an Uptime Institute Tier III Design and Build Certified **Data Center in Shakopee**, and +55 other cloud hosting data centers.

- As an **ETC-certified telecommunications carrier** with robust last-mile subscribership, comprehensive middle-mile trunking, enhanced fiber connectivity to multiple vendor

wireless towers, and extensive backhaul and interoffice facilities – CenturyLink is Minnesota's best-positioned major telecommunications carrier for secure state-wide emergency services provisioning. CenturyLink is very well-positioned to provide the scalable, fiber-rich broadband-capable network state-wide in Minnesota as contemplated by this preliminary RFI.

- With regard to the NPSBN data, CenturyLink's general broadband availability throughout the State of Minnesota is now **publically available on ConnectMN's website** as well as at the federal government level for NTIA broadband mapping. Additional specific documentation can be provided at the formal RFI stage**.**

- CenturyLink has strong interest in collaboration with future ECN and core public safety services and has a history of successful public-private partnering as demonstrated in its strong participation and **success in securing significant public-private funding for Minnesota in the federal Connect America Fund (CAF) program**.

- CenturyLink also provides Next Gen911 services, gigabit fiber connections, and vital **infrastructure and services for the State of Minnesota** and its agencies, municipalities, cities and counties. Our services are deployed in all seven SECB regions today.

- CenturyLink employees currently support over **3,000 families** living in Minnesota.

We are confident that utilization of CenturyLink's technology and telecommunications presence can contribute cost-effectively to the successful planning and deployment of the NPSBN in Minnesota.

Questions

1. What is the nature of the partnership that the respondent proposes?
    a. What value and benefits does the respondent seek to gain from the partnership?
    b. Meaning, which resources does the respondent seek to utilize, and how?
    c. What value does the respondent seek to offer to the public safety community, to the State, and to FirstNet from use of the network? Meaning, which resources does the respondent seek to contribute (i.e., subscribers, tower and backhaul assets, others)?

Response: The deployment of the FirstNet NPSBN provides CenturyLink the opportunity to support the first responder community on local, state and national level. The ability to create value for FirstNet and the states will be found in our existing infrastructure and our expertise in the design of secure hardened networks. CenturyLink will determine contribution types or business models once FirstNet enters into the RFP phase and FirstNet completes individual state consultations.

CenturyLink provides a number of services that may be beneficial for inclusion in the FirstNet infrastructure:

- Data Center hosting
- Switching services
- Cloud and Managed Services
- Professional Services
- Network connectivity and Fiber To The Tower/Backhaul
- CPE equipment
- Next Generation 9-1-1 and E-911 services

2. Does the respondent seek access to FirstNet spectrum?

Response: At this time, CenturyLink does not anticipate needing access to the FirstNet wireless spectrum. Currently, CenturyLink does not have a retail wireless offering. CenturyLink has chosen to participate in the wireless market place as provider of Fiber to the Tower Services.

3. Does the respondent seek to contribute to the network buildout?

   Response: CenturyLink believes in the value of public-private partnerships and is interested in participating in the FirstNet effort. CenturyLink offers infrastructure products and services (backhaul, switching, and data center facilities), and other resources that will assist FirstNet and the states with the deployment of this network. CenturyLink will be evaluating different business models as the FirstNet procurement process continues and will make decisions based on the FirstNet RFP that is expected to be issued 1Q 2015.

4. Does the responder consider any of its personnel "first responders"?
   a. If so, which personnel and under which circumstances?
   b. If so, would the organization consider these personnel "primary" first responders, or "secondary" first responders?
   c. How does the respondent seek to allocate priority and access to the network?

   Response: CenturyLink does not consider its personnel to be "first responders".

5. Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?

   Response: CenturyLink responds that the potential for legal or regulatory challenges to such partnerships for the NPSBN will be dependent upon the statutory framework under which the project is undertaken. The legal and regulatory issues that arise will likely be addressed by the Middle Class Tax Relief and Job Act of 2012 and the applicable sections of that Act.

6. What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?

   Response: CenturyLink will make decisions regarding private-public partnerships based on information to be released by FirstNet during upcoming board meetings and the release of their RFP in 1Q2015.

7. Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?

   Response: The undertaking of a Nationwide 4G LTE network that provides, voice, video and data services creates many considerations for FirstNet as they collaborate with industry. One example is the establishment of standards for Voice over LTE and the delineation of commercial grade voice versus first responder grade voice. While FirstNet will evolve over time in its deployment of technologies, consideration will need to be made as it pertains to Land Mobile Radio (LMR) traffic and the associated equipment needed to transmit LMR over the FirstNet network. Another example for consideration will the development of Mobile applications to provide LMR functionality or advanced services such as real-time

transmission of video from crime scenes. These types of considerations can and will be solved through FirstNet's interaction with industry technology leaders and service providers.

8. Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, does the respondent envision that a special pricing schedule would apply to its particular unique use-case?

   Response: CenturyLink will turn to FirstNet for guidance as it pertains to any future price schedules.

   a. Does the respondent envision that its partnership may be supported by franchising or leasing FirstNet spectrum, in whole or in part?

      Response: No.

   b. If so, does the respondent see any unique business, legal, or regulatory challenges in franchising or leasing the spectrum?

      Response: N/A

9. Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. Does the respondent have any suggestions that the State may consider supporting this future RFI?

   Response: Not at this time.

In summary, CenturyLink is looking forward to participating further in the Minnesota-FirstNet Consultation Project, and ultimately providing meaningful value toward the success of NPSBN deployment throughout the State.

On behalf of CenturyLink Communications, LLC, I thank you for the opportunity to respond with our preliminary Statement of Interest.

Respectfully,

C. Max Tite

Max Tite
Strategic Account Manager
Government & Education Solutions
Office: 612-499-7428 | Email: max.tite@centurylink.com

Televate
Attn: Brandon Abley
8229 Boone Blvd
Suite 720
Vienna, VA 22182

Wednesday, September 23, 2014

Brandon,

Alcatel-Lucent USA, Inc. is pleased to respond to your RFI for Public-Private Partnerships for the State of Minnesota. We are willing to discuss in further detail some of the various options available to the State of Minnesota from a Public-Private Partnership as well as discussing the build out of IP/MPLS Networks today that can be leveraged by a FirstNet Network tomorrow. We look forward to having the opportunity to discuss the RFI and we stand ready at any time to answer questions regarding our solutions described in our response.

Regards,

Terry Osland
ALCATEL-LUCENT USA, Inc.
Account Director
terry.osland@alcatel-lucent.com
763-428-1983

Company Profile

Each respondent should complete a brief profile, including:

1. Name of the organization

Alcatel-Lucent

2. Nature of the organization (e.g., government entity, non-profit company, for-profit company)

Alcatel-Lucent is a publicly listed, for-profit company at the forefront of Global Communications.

3. Sector (e.g., law enforcement, public utility, telecommunications carrier)

Alcatel-Lucent is a leading telecommunications equipment and solutions provider globally and a recognized industry leader in the design, deployment and operation of wireless networks for Mission Critical Industries and Commercial Service Providers alike. Along with our experience deploying nationwide LTE networks for operators, such as AT&T, Sprint, and Verizon, and rural commercial carriers across the country, Alcatel-Lucent is a market share leader for Mission Critical backhaul for both public safety and utilities.

4. Organizational purpose and mission (under 50 words)

With its specialist focus on IP and Cloud Networking and Ultra-Broadband Access, Alcatel-Lucent provides products and innovations to service providers and addresses the telecommunications needs of customers in key segments such as: Public Safety, Cable, Large Enterprises, Oil and Gas, Transportation, Utilities, Public Sector, and Government Driven Broadband Initiatives.

5. Contact for followup regarding Firstnet and/or this request

Michael J. Hardiman
VP, FirstNet Team
Alcatel-Lucent
617-669-1930
Michael.Hardiman@Alcatel-Lucent.com

Questions

Respondents are encouraged to answer only the questions that apply to them. Respondents are not required to answer all questions. Respondents may supplement their answers with graphics and figures, charts, tables and/or other supporting data.

1. What is the nature of the partnership that the respondent proposes?

Alcatel-Lucent has been a steadfast supporter of the public-private partnership framework to implement an interoperable, Nationwide Public Safety Broadband Network ("NPSBN"). Pursuant to the Act, FirstNet is authorized to employ a wide range of infrastructure and spectrum sharing mechanisms through public-public and public-private partnerships to achieve its goals of an interoperable NPSBN. Among those potential infrastructure and spectrum-sharing partners are existing commercial mobile operators. Nationwide LTE networks are currently being deployed by national, regional, and rural commercial mobile operators. Wherever feasible, partnering with them to facilitate deployment of the NPSBN is a necessary and *vital* first step toward FirstNet's success. 3GPP-based LTE already contains the tools necessary to meet public safety requirements, with respect to priority/preemption, quality of service, reliability, resiliency, and security. Carriers already deploying LTE, or preparing to do so, could hypothetically serve as a FirstNet rapid entry point into service.

a. What value and benefits does the respondent seek to gain from the partnership?

Alcatel-Lucent Response: As a stakeholder and experienced LTE and IP network infrastructure vendor Alcatel-Lucent intends to demonstrate that leveraging the existing infrastructure investments within the State and using open standard equipment can lead to a successful nationwide public safety network that is cost-effective and provides mutual benefit to all partners.

b. Meaning, which resources does the respondent seek to utilize, and how?

Alcatel-Lucent Response: Please refer to question 3

c. What value does the respondent seek to offer to the public safety community, to the State, and to FirstNet from use of the network? Meaning, which resources does the respondent seek to contribute (i.e., subscribers, tower and backhaul assets, others)?

Alcatel-Lucent Response: Not Applicable

2. Does the respondent seek access to FirstNet spectrum?

a. If so, how does the respondent seek to utilize and assign the spectrum? Alcatel-Lucent Response: Not Applicable

b. If so, how does the respondent propose assigning and managing priority access to the network or to the spectrum?
Alcatel-Lucent Response: Not Applicable

3. Does the respondent seek to contribute to the network buildout?

a. If so, how does the respondent seek to contribute to the network buildout? For example, does the respondent offer:

i. Infrastructure (towers, backhaul, switching or data center facilities)?
Alcatel-Lucent Response: As an infrastructure provider to 8 of the 10 largest wireless providers, including all three major US providers, Alcatel-Lucent plans to contribute its complete portfolio of LTE equipment, including Band 14 eNodeBs. We also have an extensive portfolio of mission critical backhaul equipment, which includes world class IP switching and routing equipment, microwave equipment, as well as optical switching products.

ii. Financial resources (financing, capital funds)?
Alcatel-Lucent Response: Not Applicable

iii. Users or devices?
Alcatel-Lucent Response: Not Applicable

iv. Any other resources?
Alcatel-Lucent Response: To complement our equipment portfolio our extensive services organization can be leveraged to deploy the network and provide integration with existing state and local networks. In particular, given our long history in deploying wireless networks using the same bands in distinct markets our RF design and optimization services are experienced to help mitigate interference to and from Canadian operators. Operation and management of the State's component of the greater network is another function which our Services organization can handle. Further, our Bell Labs organization has extensive experience in performing business modeling and recommending evolution strategy for our large and small customers. In the context of a public private partnership framework our business team can be engaged to design, assess and recommend the best way forward for the State

4. Does the responder consider any of its personnel "first responders"?

a. If so, which personnel and under which circumstances?
Alcatel-Lucent Response: Not Applicable

b. If so, would the organization consider these personnel "primary" first responders, or "secondary" first responders?
Alcatel-Lucent Response: Not Applicable

c. How does the respondent seek to allocate priority and access to the network?
Alcatel-Lucent Response: Not Applicable

5. Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?
Alcatel-Lucent Response: As an initial matter, FirstNet has not finalized its Standard Operating Procedures, Memorandums of Understanding and Service Level Agreements to states and commercial carriers establishing criteria e.g. network roaming, traffic prioritization and preemption. As such, it is difficult to fully anticipate the legal and regulatory challenges that public-private partnerships will face. That said, it is anticipated that, prior to implementation of the NPSBN, clear and binding agreements on the operations and responsibilities of all responsible parties will be established. Many states also have infrastructure that was funded by grants for a specific purpose (e.g. education, health and welfare). These grants often preclude use of the applicable infrastructure by other agencies that were not the grant recipient or for use other than the specified purpose. Minnesota should ensure, to the extent possible, that sharing of public safety infrastructure with other

State government agencies, instrumentalities of the state, and non-government entities is not unduly restricted. States will have to inventory all of their communication resources to identify those resources that have potential restrictions of use and make the determination to either include or exclude these resources from the overall NPSBN architectural design.

6. What unique business relationship considerations to forge the private-public partnership with FirstNet are envisoned?

Alcatel-Lucent Response: Many commercial mobile operators already provide broadband services to public safety agencies across the U.S. While not typically "mission-critical," that does not mean commercial entities do not understand and appreciate the distinctions between commercial and mission-critical networks. The challenge will be to identify PPP opportunities and related SLAs that create a win-win for all stakeholders while reducing deployment costs, and leveraging a broad set of services, spectrum sharing, and roaming opportunities. One strategy that will help the overall business case is leveraging a network architecture that enables single subscriptions allowing handover between the B14 LTE network and the commercial partner's wireless as well as Wi-Fi networks. This is supported in the 3GPP standards, and doing so could eliminate the need for multiple wireless subscriptions (one in the FirstNet B14 network and one in the commercial network) as well as the need for a mobile VPN application that today handles roaming between multiple wireless and Wi-Fi networks. Where needed technologies such as https can be leveraged to provide highly secure access to sensitive information such as CJIS.

7. Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?

Alcatel-Lucent Response: Alcatel-Lucent has been advocating standards-based interfaces. This is also true when it comes to devices and applications. A key device consideration is the set of wireless technologies and bands supported by the device. The larger this set is the broader the device use will be, thus increasing the device volume and lowering its cost.

8. Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, **does the respondent envision that a special pricing schedule would apply to its particular unique use-case?**

Alcatel-Lucent Response: Not Applicable

a. Does the respondent envision that its partnership may be supported by franchising or leasing FirstNet spectrum, in whole or in part?

Alcatel-Lucent Response: Alcatel-Lucent envisions numerous partnerships leveraging the FirstNet spectrum. In addition to National Partnerships, it may be the case that public-private partnerships are created at the state or regional level. Building a public safety network across nation requires covering large swaths of rural and open lands. Much of that geography is served by organizations like Utilities and Rural Carriers. These organizations have a regional footprint unlike the four national carriers, which may make it difficult for FirstNet to rely solely on nationwide partnerships. But if states take the lead, they are likely in a much better position to coordinate partnerships on a more granular level — sub-state, statewide, and partnerships matching regional coalitions of states.

b. If so, does the respondent see any unique business, legal, or regulatory challenges in franchising or leasing the spectrum?

Alcatel-Lucent Response: There are a number of unique challenges posed in franchising/leasing public safety spectrum, although such leases could be key to sustaining the network. As an initial matter, the legislation that created FirstNet gives FirstNet the ultimate say on spectrum leases. FirstNet has not yet publicly shared an official business plan or strategy for spectrum leases, creating uncertainty as to what types of state-initiated spectrum leases would be approved by FirstNet, if any. It also may be difficult for the parties to a spectrum lease to agree on their respective rights to the spectrum. Law enforcement should have priority and preemption rights in times of emergency, but the degree of those rights and the processes in place to exercise those rights must be clearly set forth in any lease document. Depending on demands by the State or FirstNet, prioritization and preemption rights may significantly diminish the value of the spectrum to potential partners.

9. Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. **Does the respondent have any suggestions that the State may consider supporting this future RFI?**

Alcatel-Lucent Response: Alcatel-Lucent offers the following suggestions:

- Leverage existing infrastructure assets and converge and consolidate network resources within Minnesota
- Demand industry standard transport and routing protocols such as IP/MPLS.
- Align state legislation to knock down barriers to use state resources in a public private partnership.
- Assure that all resources are sustainable.
- Look at all the data and network requirements holistically; there may be many opportunities to leverage existing resources using what is in place more efficiently.
- Use of WebRTC and HTML5 should be considered to allow applications to use standards-based device APIs that can provide high levels of security, thus eliminating the need for unique clients that have to be loaded in a device in order to take advantage of a specific application. Additionally these technologies allow for easy application programming, leading to more innovative applications.
- Use of OMA-DM for device management will allow consistent device management across the FirstNet network, and provide synergies with what commercial providers in the US are using.

MAXIMUM COMMUNICATIONS CELLULAR, LLC.

TELEVATE

MN Department of Public Safety: MN-SWIFT 70680, Phase I-Additional Projects

Carl Koehn

9/2/2014

Maximum Communications Cellular, LLC.
2484 2nd Street S, Suite 195
St. Cloud, MN 56301

Company Profile

Maximum Communications Cellular, LLC (MCC) is a MN owned fixed and mobile wireless services carrier operating in the Central MN area and headquartered out of St. Cloud, d/b/a Duet Internet and Phone. MCC is owned by two local telephone companies – Albany Mutual Telephone (AMT) and Benton Communications (BC) in Rice, MN.

Technical

- Network: 1900MHz GSM HSPA
- Towers: 25 in Central MN
- Switching Vendor: Newcore Wireless, St. Cloud. (hosted)
- Pops Covered: ~150,000

Sales/Marketing

- d/b/a: Duet Internet and Phone
- Fixed Wireless Internet
- Traditional Cellular Phones
- Reseller: Dish Network, prepaid cellular.
- Current Employee Count: 9 (7FT-2PT)

Company Context

BC, AMT, MCC, and hosted switching vendor Newcore Wireless have a long history of wireless communications going back to 1991. Both BC and AMT organizations were participating owners of St. Cloud Wireless Holdings (SCWH) which offered local CDMA services via Cellular 2000 of St. Cloud (1991-2005), and CDMA services throughout MN within Northern PCS (NPCS) (1999-2007) an affiliate relationship with Sprint. Cellular 2000 was sold to Verizon in 2005 and NPCS was sold to Sprint in 2007.

An important part of the company profile is the NPCS affiliate relationship to Sprint. Within this relationship NPCS provided network and sales points of presence throughout outstate MN, while Sprint provided network/sales in the MSP/St. Paul Metro area. NPCS points of presence operated under Sprint branding and all marketing guidelines. Customers were not aware of the brand NPCS: our customers were “Sprint” customers.

Half of the current MCC team and almost all of the Newcore Wireless team held leadership positions within the Sprint affiliate relationship, and the current ownership group has funded/supported an organization very similar to the envisioned TELEVATE/FirstNet structure with employee counts over 250 and at least 60 points of presence outside the Minneapolis metro area. This potential concept for MN LTE has a very close fit to the history of the team at MCC.

Questions

1. **What is the nature of the partnership that the respondent proposes?**
    a. Partnership Concept: MCC would provide the Point Of Sale presence throughout non-MSP metro areas as Duet Internet and Phone where likely LTE excess capacity will be

Maximum Communications Cellular, LLC.
2484 2nd Street S, Suite 195
St. Cloud, MN 56301

available. TELEVATE/FirstNet program would most likely stand-alone in the MSP metro area as available excess capacity would likely be significantly less.

b. MCC currently has a limited license area, and no LTE spectrum. Thus, our growth opportunities are limited. This potential partnership could provide the growth mechanism for MCC while bringing leadership experience in building a very similar network/relationship throughout MN.

c. MCC, AMT, BC understand the importance of being local. Outside of the MSP/St. Paul Metro area, local sales and support teams are viewed as favorable, and if funds can stay within the local community it is even better. This relationship structure 'privatizes' the product and brand to MN private ownership organization.

2. **Does the respondent seek access to the FirstNet Spectrum?**
   a. Under the envisioned relationship FirstNet would own/operate the network and spectrum.
3. **Does the respondent seek to contribute to the network buildout?**
   a. Potential capital funds investors.
4. **Does the responder consider any of its personnel "first responders"?**
   a. No.
5. **Does the respondent perceive any legal or regulatory challenges to private-public partnerships for the NPSBN?** No.
6. **What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?**
   a. A government-run telephone network would likely be viewed negatively by the general public. However, if the brand Duet Internet and Phone were the customer facing brand, supporting private business with a focus on local customer service, the product and brand would likely be received much more favorably. This is the goal of MCC, to utilize a current brand, pricing strategy, and experience to complement the FirstNet program.
7. **Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?**
   a. No.
8. **Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, does the respondent envision that a special pricing schedule would apply to its particular unique use-case?**
   a. No. MCC envisions either a reseller-type agreement where FirstNet provides the network, MCC provides the sales mechanism to capitalize on excess capacity. Another option would be a partnership with Newcore Wireless (filing separately) in which Newcore Wireless and MCC come together to facilitate the outstate network buildout, and MCC then would lease the LTE spectrum from FirstNet.
   b. No spectrum leasing challenges anticipated.
9. Minnesota plans to publish an extensive, form RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. **Does the respondent have any suggestions that the state may consider supporting this future RFI?**
   a. None at this time.

Maximum Communications Cellular, LLC.
2484 2nd Street S, Suite 195
St. Cloud, MN 56301

Prepared by:

Carl Koehn Jr.
Maximum Communications Cellular, LLC.
General Manager

Great River Energy respectfully submits this response to Televate and the State of Minnesota ECN's request for Statements of Interest for Public-Private Partnerships.

Name of Organization:	Great River Energy
Nature of Organization:	Non-profit company
Sector:	Electric utility cooperative
Organizational Purpose and Mission:	To provide members with reliable energy at affordable rates in harmony with a sustainable environment.
Contact for followup regarding FirstNet and this request:	Kathy Nelson, Principal Telecommunications Engineer Great River Energy 12300 Elm Creek Blvd Maple Grove, MN 55369 763-445-5559 knelson@grenergy.com

Company Profile

Great River Energy is a not-for-profit generation and transmission electric cooperative owned by its 28 member distribution cooperatives. Those 28 member cooperatives in turn provide electrical service to approximately 1.7 million people in a 56,000-square-mile area from Minneapolis-St. Paul suburbs to very rural areas of the north shore of Lake Superior to the farmlands of southwestern Minnesota. The loads served by the member systems are primarily residential, seasonal and agricultural loads. GRE owns and operates 12 power plants which generate more than 3,500 megawatts (MW) of electricity. GRE's generation capability is a diverse mix of baseload and peaking power plants, including coal, refuse-derived fuel, natural gas and fuel oil, as well as wind generation.

GRE owns and operates nearly 4,600 miles of transmission lines and owns or partly owns 109 transmission substations. GRE interfaces with 28 distribution cooperatives at over 500 distribution substations and has over 150 downline motor-operated switches to which it communicates. All substations and motor operated switches require telecommunications for Supervisory Control and Data Acquisition (SCADA). Additionally, the 28 member distribution cooperatives require telecommunications for Distribution Automation of downline switches, regulators, reclosers, and motor operated capacitor banks. They also use telecommunications for Advanced Metering Infrastructure (AMI) and Automated Meter Reading (AMR).

Responses to Specific Questions

1. **What is the nature of the partnership that the respondent proposes?**

   GRE, the State of Minnesota, and other utilities can partner to build out the FirstNet network within Minnesota. Utilities do not have access to dedicated spectrum and their communications needs are growing. FirstNet and the State of Minnesota need

partners to fund the buildout of the FirstNet network. GRE's service area is primarily rural although it does cover some Minneapolis/St. Paul suburban areas. FirstNet and the State of Minnesota need partners in rural areas in particular where there are fewer public safety users.

3. **Does the respondent seek to contribute to the network buildout?**
   a. **If so, how does the respondent seek to contribute to the network buildout?**
      i. **Infrastructure**

         Utilities have infrastructure such as communications towers which typically have generator backup and shelters. Utilities also have power towers and power poles which can be used to provide additional eNodeB sites, particularly in cases where microcells are warranted. GRE owns approximately 64 communications towers throughout Minnesota. GRE and its member cooperatives own thousands of power towers and power poles throughout the state.

      iii. **Users or Devices**

         Utilities have many devices that could be installed on the FirstNet network. However, many of these are machine to machine interfaces such as substation monitoring devices including Remote Terminal Units (RTU)s or Programmable Logic Controllers (PLC)s. They could be downline monitoring and controlling devices such as reclosers, regulators, switches, capacitor bank controllers, and synchrophasors; or they may be commercial, industrial, or business meters. Each of these devices has a different level of criticality and data usage profile. The most critical data are control messages and a subset of monitoring messages at substations and downline switches. This is a very small amount of data (on the order of bytes per message), but is extremely critical and cannot be preempted. It is imperative to know if a power line is energized or not when utility workers are working on it or in the case of a disaster if those utility lines are on the ground or around the public. As one moves from substations, down the line, and finally to the meter, data becomes less critical, generally.

4. **Does the responder consider any of its personnel "first responders"?**

   The amount of data that is absolutely critical to get through during a disaster is very small and could be practically implemented by either traffic prioritization or providing utilities with a small amount of guaranteed bandwidth. This small amount of guaranteed bandwidth could be very small, approximately 10 – 20 Mbps aggregated statewide. This small amount of guaranteed bandwidth should not adversely affect public safety users even in the event of a disaster which would most likely be localized.

   In some cases, such as a disaster where power lines are downed, electric utilities can be first responders or need to work closely with first responders. By using a shared

network where utilities and public safety personnel can communicate directly if needed, downed power lines can be located, isolated, and de-energized faster to restore safety to the public.

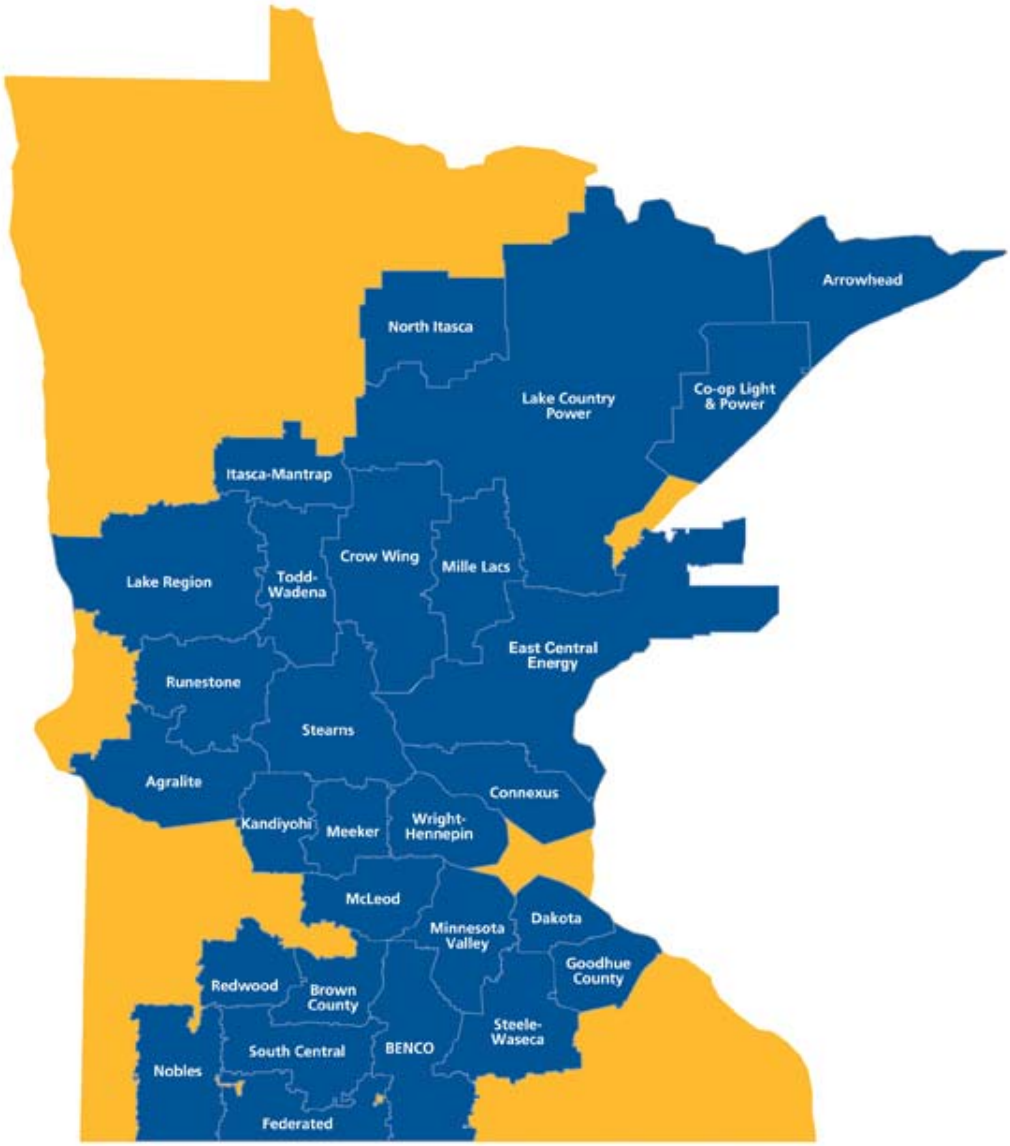
6. **What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?**

   There are several states that have shared public safety and utility land mobile radio networks. GRE envisions those governance models and the governance models used by the State of Minnesota on their ARMER system could be expounded upon for a joint utility/FirstNet network as well.

8. **Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, does the respondent envision that a special pricing schedule would apply to its particular unique use-case?**

   Some of these devices, particularly downline devices such as meters, need to have very low user fees in order to make it economical for utilities to use the FirstNet network. The quantity of devices that potentially could be on the FirstNet network and the fact that many of these devices can be preempted during emergencies should be able to make a solid financial case for partnership. Instead of tens of thousands of devices using the FirstNet network, there is the potential for millions of devices to use the network.

Great River Energy welcomes the opportunity to explore the possibility of a shared broadband data network with FirstNet and the State of Minnesota. There are many synergies that can be capitalized on for the benefit of both entities.



Great River Energy Service Area

To: Brandon Abley

From: Steve Johnson

RE: Initial Televate Response

Midcontinent Communications Mission Statement:

> *"Valuing our customers as honored guests by creating and delivering high-quality services that customers want in exchange for a fair price, developing our employees and treating them fairly, and contributing to the communities of which we are a part."*

Midcontinent Communications is a privately-held, for-profit telecommunications company based in Sioux Falls, SD. Since its beginning with one movie theater in St. Paul, MN in the early 1930's, Midcontinent has sought to bring the advantage of advanced entertainment and communications services to communities in the Upper Midwest.

Midcontinent began branding its Northern Plains Network (NPNet™) in 2009. NPNet is the region's biggest, most reliable fiber optic network providing the fastest speeds and greatest bandwidth in the Upper Midwest region with more than 7,200 miles of dependable fiber optic cable. NPNet is a fiber-rich network with redundant loops connecting most of Midcontinent's communities for enhanced residential and business services. This network is designed to facilitate the availability of advanced broadband services for residential customers, as well as provide for economic development infrastructure for communities. NPNet offers a dedicated team of professionals who can assist business customers in applying highly sophisticated and advanced applications to their business processes.

Midcontinent would propose endpoint access via fiber in which we would construct, maintain, terminate, light, monitor and support the fiber-delivered and/or cable modem services to each site within the NPNet footprint. Each service will allow decision makers to select from a variety of bandwidth packages for connectivity to the network infrastructure. Midcontinent solutions would provide a robust transport network infrastructure in support the mission of FirstNet.

Contact Information:

Steve Johnson
Business Development Manager
Midcontinent Communications
402 N Red River Ave.
Cold Spring, MN 56320
Steve_johnson@mmi.net
(320) 686-0021 desk
(320) 980-3515 cell

Below are the responses to the questions applicable to the services Midcontinent can offer and the requirements of Televate.

1. What is the nature of the partnership that the respondent proposes?

   Midcontinent would provide Ethernet access and transport services through the use of our Northern Plains Network fiber footprint, along with our broadband facilities in the state of Minnesota.

2. Does the respondent seek to contribute to the network build out?

   Midcontinent through NPNet, would respond with Ethernet backhaul transport and Ethernet last mile via fiber or cable modems within our network markets.

3. What unique business relationship considerations to forge the private-public partnership with FirstNet are envisioned?

   Midcontinent can provide a reliable role in the transport infrastructure requirements of FirstNet in the State of Minnesota.

Statement of Interest
for
State of MN & FirstNet

9/2/2014

Submitted by: Arvig Enterprises, Inc.

Company Profile

Arvig Enterprises Inc. (d.b.a. Arvig)

150 2nd Street SW
Perham, MN 56573

Nature & Sector of Organization

Arvig is a family- and employee-owned, for-profit company that provides business and residential telecommunications services.

Purpose & Mission

Our vision, “to be the best service provider anywhere,” guides everything we do. As a community-based provider, Arvig takes pride in offering advanced communications services to customers throughout Minnesota. The Arvig team of more than 600 employee-owners is dedicated to serving the needs of our customers with dependable and progressive communications, information and entertainment services.

Contact

Mark Birkholz
Director of Southern Markets
218-346-8868 | Mark.Birkholz@arvig.com

Andy Klinnert
Director of Network Operations
218-346-8247 | Andy.Klinnert@arvig.com

Questions & Answers

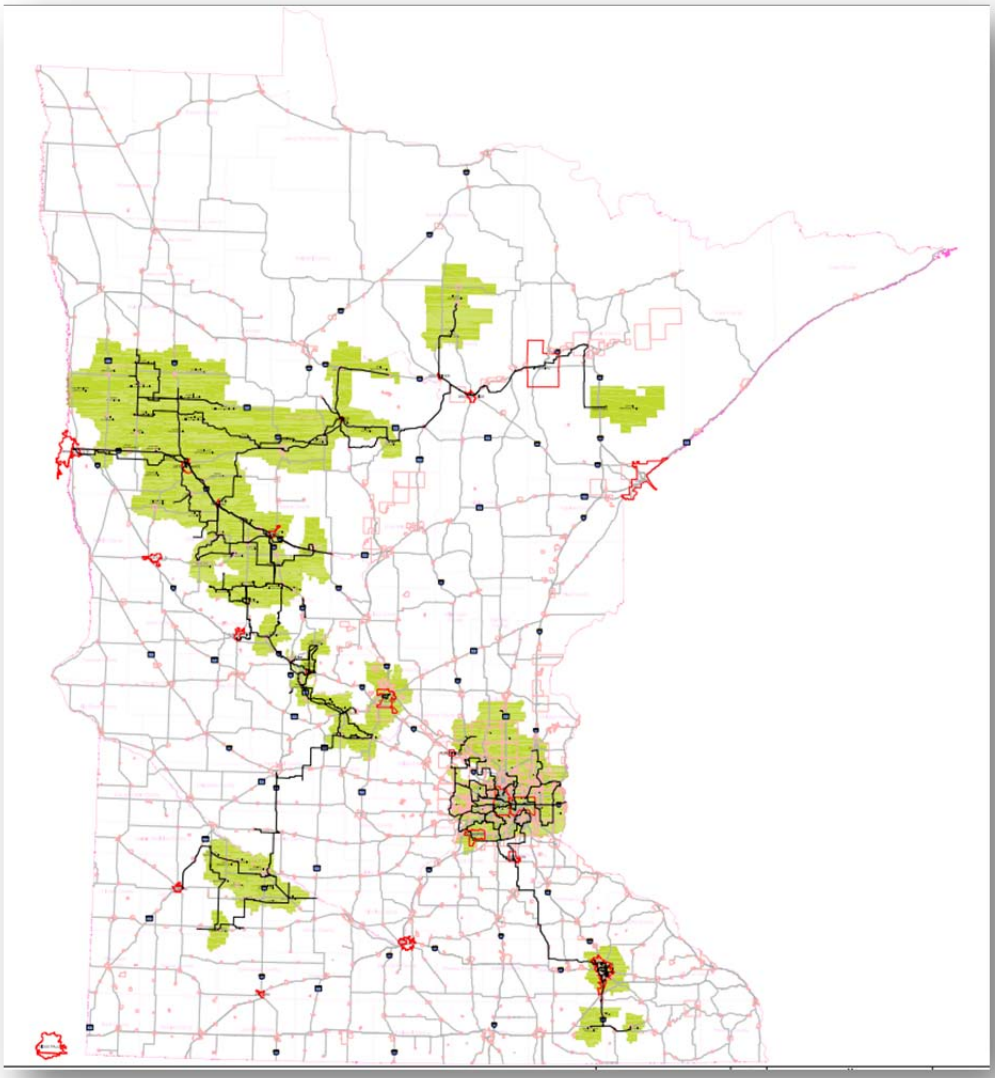
1. What is the nature of the partnership that the respondent proposes?

a. What value and benefits does the respondent seek to gain from the partnership?
b. Meaning, which resources does the respondent seek to utilize, and how?
c. What value does the respondent seek to offer to the public safety community, to the State, and to FirstNet from use of the network? Meaning, which resources does the respondent seek to contribute (i.e., subscribers, tower and backhaul assets, others)?

As of today, Arvig Enterprises, Inc., serves 26 counties throughout the state of Minnesota, offering traditional phone, video, high-speed Internet, security and home automation, business phone systems and managed ethernet and transport services to both residential and business customers. We have fiber that connects to 132 towers throughout our service area with wireless backhaul to all towers, as well as 73 ILEC exchanges and 14 CLEC data centers. This current infrastructure puts us in the right position to partner with FirstNet to bring enhanced services to all corners of Minnesota.

Arvig's Fiber Network & Service Area

2.



Does the respondent seek access to FirstNet spectrum?

a. If so, how does the respondent seek to utilize and assign the spectrum?
b. If so, how does the respondent propose assigning and managing priority access to the network or to the spectrum?

We are interested in participating; however, we feel we need to better understand the project, its benefits and costs in order to make an educated decision on our level of participation.

3. Does the respondent seek to contribute to the network buildout?
a. If so, how does the respondent seek to contribute to the network buildout? For example, does the respondent offer:
i. Infrastructure (towers, backhaul, switching or data center facilities)?
ii. Financial resources (financing, capital funds)?
iii. Users or devices?
iv. Any other resources?

Arvig feels it is in the right position to contribute to the network buildout by leasing of our current infrastructure, as described in Question 1. We are also interested in entertaining facility swaps.

4. Does the responder consider any of its personnel "first responders"?
a. If so, which personnel and under which circumstances?
b. If so, would the organization consider these personnel "primary" first responders, or "secondary" first responders?
c. How does the respondent seek to allocate priority and access to the network?

There are several employees throughout our company who are involved in local community governments and emergency organizations. Because of our strong community connections, we're familiar with our areas' emergency procedures and can work closely with these groups to help them gain access to the network.

5. Does the respondent perceive any legal or regulatory challenges to public-private partnerships for the NPSBN?

With our broad experience in serving public etntities, local and state units of government, schools, hospitals and other community organizations, we are familiar with the regulations associated with these groups and feel confident in our ability to negotiate our arrangement with these public entities.

6. What unique business relationship considerations to forge the private-public partnership with FirstNet are envisoned?

Under consideration.

7. Does the respondent envision any unique application or device considerations that would be essential to a successful partnership?

We feel that our experience and ability to transport traditional voice, IP traffic and high-capacity data flow makes us a unique partner.

8. Assuming FirstNet charges a per-device fee in a manner similar to a major cellular carrier, does the respondent envision that a special pricing schedule would apply to its particular unique use-case?
a. Does the respondent envision that its partnership may be supported by franchising or leasing FirstNet spectrum, in whole or in part?
b. If so, does the respondent see any unique business, legal, or regulatory challenges in franchising or leasing the spectrum?

Our experience in traditional communications makes us familiar with purchasing and leasing electronics and communication devices to end-users. We are capable of providing any needed user-equipment, and have experience in handling the subletting process..

9. Minnesota plans to publish an extensive, formal RFI later in the year regarding FirstNet, NPSBN implementation and in particular public-private partnerships. Does the respondent have any suggestions that the State may consider supporting this future RFI?

Once the state has established the participants and their sectors, Arvig would like to see refined questions that would allow us to contribute more accurately to the State's information database.

6. STA Narrative for Public Safety Broadband Network Pilot

NARRATIVE STATEMENT

Request for Special Temporary Authorization

Public Safety Broadband Network
Public/Private Partnership Governance and Technology Proof of Concept

Prepared by:

Great River Energy,
Minnesota Department of Public Safety
and Televate, LLC

August 26, 2014

Table of Contents

(1) Key Contact Information 1

(2) Justification for Spectial Temporary Auhority 2

(3) Description of the Operation to be Conducted 3

Project Goals 5

State of Minnesota, Department of Public Safety: 5

City of Elk River 5

Great River Energy 6

Connexus Energy 6

NewCore Wireless 6

Motorola 6

Specific Applications to Be Evaluated 7

Video from Substation to Public Safety Vehicles 7

Photos from Public to Public Safety and Utility Devices 7

Computer Aided Dispatch (CAD) 7

Substation Supervisory Control and Data Acquisition (SCADA) 7

Down-line Automation on Distribution Network 7

Project Budget 8

Project Evaluation 8

Stakeholders 9

City of Elk River 9

State of Minnesota – Emergency Communication Networks 10

Great River Energy 10

Connexus Energy 10

NewCore Wireless 10

Motorola Solutions 11

(4) Time and Dates 11

(5-11) Technical Parameters 12

(1) Key Contact Information

The Commission's single point of contact for this request shall be:

Jackie Mines, Director
Emergency Communication Networks
Minnesota Department of Public Safety
445 Minnesota Street, Suite 137
St. Paul, MN 55101-5137
Phone: 651-201-7550
jackie.mines@state.mn.us

(2) JUSTIFICATION FOR SPECIAL TEMPORARY AUHORITY

The State is seeking Special Temporary Authority to support a locally-driven effort to deploy a single-site public safety broadband network pilot through public-private partnership using Public Safety Broadband and D Block spectrum in Central Minnesota. This project is in the public interest as it provides opportunities to:

- Evaluate public/private partnership in public safety broadband network deployment
- Execute an MOA between the State and a private entity for network deployment in a way that will provide meaningful inputs into the state-FirstNet consultation process
- Allow public safety in Minnesota in a non-urban area to experience the benefits of public safety LTE, which will increase support for the Nationwide Public Safety Broadband Network and FirstNet in Minnesota

The majority of public safety LTE trials to date have been in metropolitan areas. While these large city pilots have provided valuable information to many public safety agencies, manufacturers and FirstNet, rural public safety agencies have a difficult time relating to them. A fire department made up of a few volunteer fire fighters has a difficult time understanding how an LTE network for LA-RICS which has over 1,000 fire fighters, hundreds of trucks, and over a hundred fire stations has any application to their very small fire department made up of a few volunteer fire fighters, one or two trucks, and one fire station.

The City of Elk River and surrounding area blended with of exurban and rural areas. Elk River is a third tier suburb to Minneapolis/St. Paul. Its fire department consists of a full time fire chief, 3 full time fire fighters, 43 on-call fire fighters, 11 fire trucks, and 2 fire stations. They are an on-call fire department.

The size of the City of Elk River and its location puts them in a unique position to pilot a small LTE network to test and demonstrate broadband data applications that may be more applicable to smaller, rural towns. Additionally, Elk River has very poor commercial cellular coverage and, as such, broadband applications that could potentially be used over a public network cannot be deployed successfully in the city. In addition to demonstrating public/private partnerships, this pilot can be a showcase for how FirstNet can bring technology that enables public safety personnel in small towns to do their jobs safer, better, faster, easier and have more information to make better decisions.

This project will facilitate a small LTE pilot in the city of Elk River, Minnesota. The intent of this pilot is to demonstrate the feasibility of public/private partnerships between public safety and utilities and identify and resolve any governance challenges. This project is a public/private collaboration between the State of Minnesota, City of Elk River, Great River Energy, Connexus Energy, NewCore Wireless and Motorola Solutions.

(3) Description of the Operation to be Conducted

The proposed pilot will consist of one eNode B, utilizing two omni-directional antennas, located on a tower, connected to an LTE core using existing OC-48 SONET backhaul. The eNode B will communicate with devices in police and fire vehicles. These devices will service a sub-fleet of the officers and not the entire fleet. LTE devices will also be installed at a small number of electrical substations and on down-line distribution electrical devices. The eNode B and devices will be provided by Motorola.

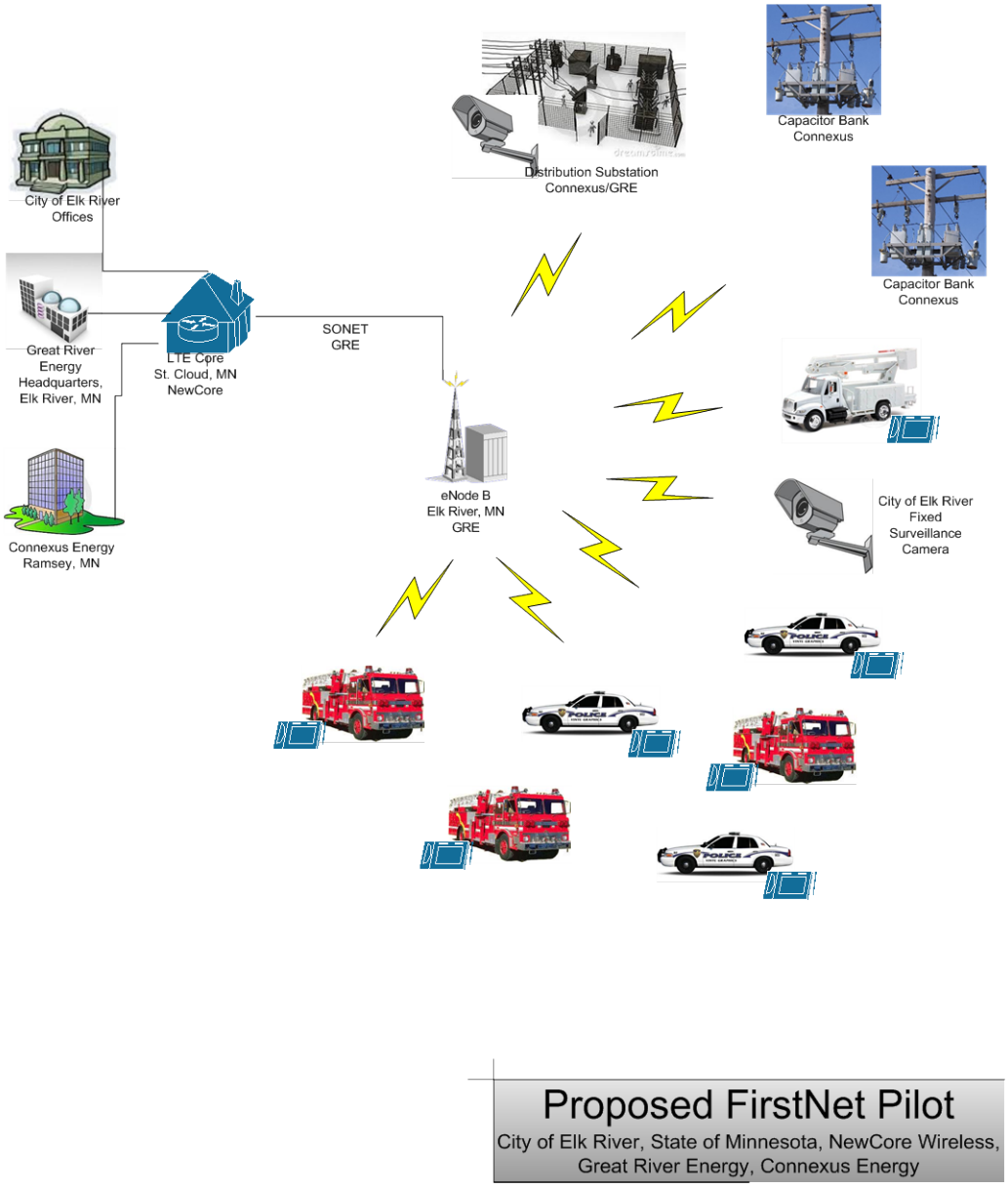


Figure 1: Pilot Diagram

Because this system will utilize an omni antenna, propagation will be slightly reduced and throughput will be lower than what could be accomplished with a sectorized, panel antenna solution. Due to the low number of users on the pilot, the goal of testing prioritization and/or guaranteed bandwidth on a loaded network, and tower loading, the omni antenna and single eNode B configuration seemed to be the most practical.

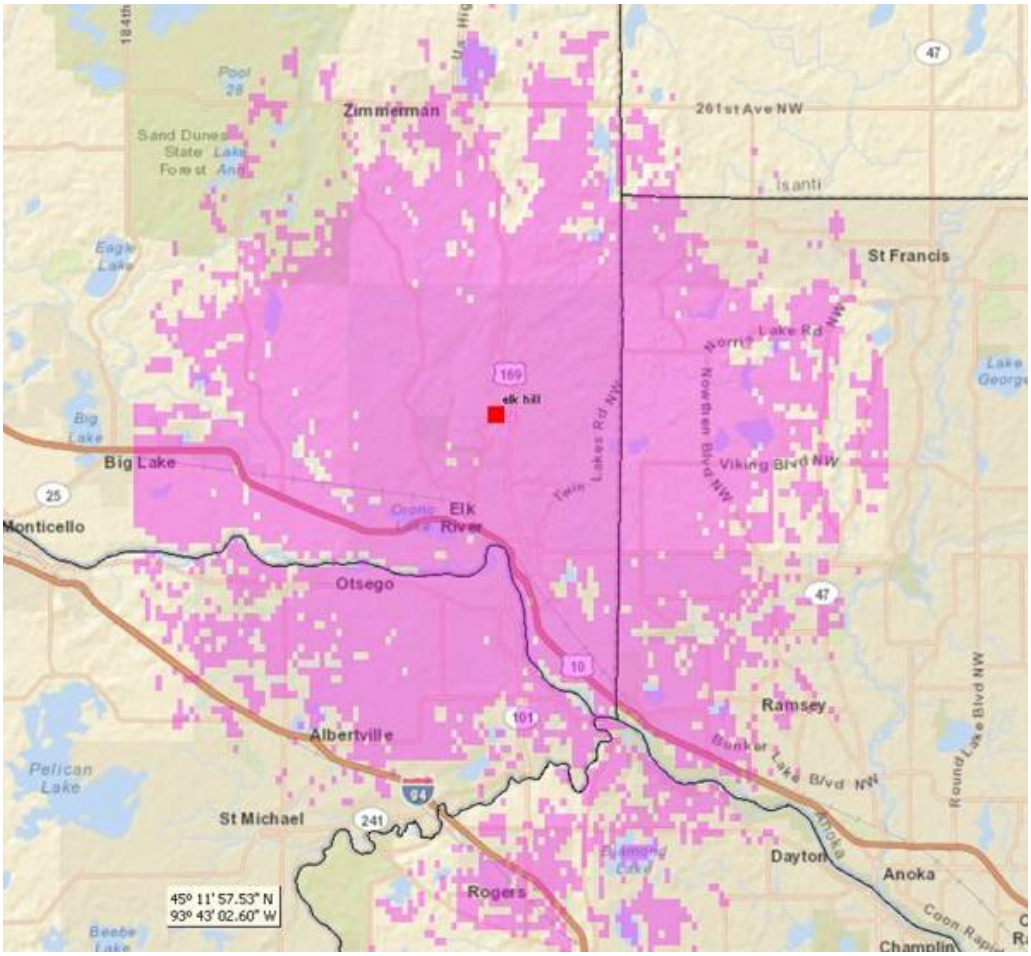


Figure 2: Predicted Coverage

In addition to demonstrating the benefit of public/private partnerships that have been discussed in other arenas, such as leveraging assets, user fees on the network, etc., it is intended that this pilot will expand upon that and also demonstrate potential benefits a high speed, broadband data network can provide that can allow public safety and utilities to better work together during emergencies to keep the public safe and to allow for faster restoration of critical infrastructure services, such as electricity.

Due to the small size of this pilot, there is a lot of flexibility to try different applications. Some of the intended applications, such as video in vehicles and remote body cameras have already been piloted on other systems. There are applications that can be leveraged to provide better coordination between public safety and utilities, particularly during disasters. One of these applications is the ability to provide

video from an electrical substation directly to police and fire vehicles. In the event of a disaster such as a fire at a substation, a video camera located at a substation could be activated to send live video to police and fire so they would have the ability to assess the situation before arriving at the scene. This would demonstrate video going from a utility network to the public safety network when needed. Security would be implemented for this pilot to demonstrate that only desired traffic and data would be shared between users on the FirstNet network.

This pilot could test both prioritization and the concept of a small segment of guaranteed bandwidth for utilities' critical data. In order for utilities to use a network for mission critical data such as control and substation monitoring (SCADA), there needs to be a mechanism for ensuring this small amount of data gets through a network without delay or preemption.

Because Elk River is located about 50 miles from the Minneapolis St. Paul Airport, this pilot could be a test bed for manufacturers to test LTE devices and applications for either public safety or utilities. Minnesota has extreme weather conditions – both cold and hot and high humidity, so the ruggedness and durability of outdoor devices could also be tested. Because the deployment is only intended for a handful of public safety devices and a handful of electrical devices, this will not be a production network. As such, this network can be a test bed for both LTE manufacturers and potential users without causing any work disruptions to the agencies.

By providing access for other agencies to view this network, the State of Minnesota, and other states for that matter, can use it as an educational and marketing tool to garner support by public safety agencies for FirstNet. Both the FirstNet concept and LTE technology is still very foreign to many agencies, particularly in outstate areas, and this pilot has the opportunity to bridge that gap and demonstrate what the network can offer to agencies.

Project Goals

State of Minnesota, Department of Public Safety:

The State of Minnesota has two goals for this pilot:

- Gain insight into governance and organization issues and models for a public/private partnership.
- Leverage the pilot to educate other public safety agencies on FirstNet and LTE.

City of Elk River

The City of Elk River wants to gain knowledge and understanding of what a FirstNet network will be able to provide. The majority of this knowledge and understanding will come from user experience including devices and applications and how they can be leveraged for a private network. Elk River would also like to test performance capabilities, such as throughput and coverage. There are some applications that cannot be used over a commercial network that will be tested on this pilot system as well.

Great River Energy

Great River Energy seeks to demonstrate how utilities can partner with FirstNet and public safety agencies to successfully facilitate the build-out of the FirstNet network, particularly in rural areas. Utilities have infrastructure that can be leveraged, devices that could be users on the network to help build and sustain the network, and have personnel that has expertise in building and maintaining highly reliable telecommunications networks.

GRE wants to demonstrate how a small amount of guaranteed bandwidth can be used on the FirstNet network by utilities for critical utility applications even during emergencies without an adverse impact to first responders on the FirstNet network. GRE also wants to demonstrate how prioritization may be used to achieve this same result.

Connexus Energy

Connexus Energy wants to compare the FirstNet pilot results with other small pilots it is participating in in conjunction with GRE and an Electric Power Research Institute (EPRI) Field Area Network (FAN) demonstration project. These pilots will be comparing similar small installations with different communications technologies and will hopefully lead Connexus and GRE to a better understanding of these technologies and what the best solution will be for a network build-out.

NewCore Wireless

NewCore has several goals for this pilot including:

- Verify the ability to prioritize service for public safety
- Ability to access reasonably priced devices
- Ability for partners to manage customers and sites (KPI's, OSS access, performance, and provisioning)
- Verify spectrum usability
- Determine ability to provide mobile voice solutions on top of the LTE network
- Verify roaming capabilities with other carriers and the FirstNet system
- Determine the amount of metering required (CDR or policy control)
- Determine resources being used on a per site/per sector basis
- Manage coverage (predicted vs. actual)
- Determine what happens when the network is more utilized
- Latency/Backhaul performance

Motorola

Motorola has expressed interest in donating equipment to support this project. Motorola's goals include device testing and customer feedback on different user devices. Motorola would also like to test priority of service and application response. It is intended that this pilot could serve as a test bed for device testing by Motorola.

Specific Applications to Be Evaluated

While there are many potential applications that could be demonstrated on a broadband, wireless pilot on the FirstNet network, it is important to keep the scope small and have clearly defined goals.

Video from Substation to Public Safety Vehicles

Provide video from an electrical substation directly to police and fire vehicles. In the event of a disaster such as a fire at a substation, a video camera located at the substation could be activated to send live video to police and fire so they would have the ability to assess the situation before arriving at the scene.

Photos from Public to Public Safety and Utility Devices

An application that would provide the ability for a public user to take a picture of an event, such as a downed power line, that could be uploaded to public safety personnel on the FirstNet network.

Computer Aided Dispatch (CAD)

The primary application for police and fire will be computer aided dispatch and communication for their mobile data applications which are currently served using commercial carriers over an air card.

Substation Supervisory Control and Data Acquisition (SCADA)

While this application is not new nor does it tax the capabilities of a LTE network as it is typically a small amount of data, it will provide the capability for providing video for the application mentioned above. It will also provide data that can be used to perform tests as mentioned above such as guaranteed throughput and prioritization as this data is critical for utilities.

Down-line Automation on Distribution Network

As with the above application, down-line automation does not tax the network, but will provide data for testing guaranteed throughput and prioritization. Down-line distribution automation is also one the areas of tremendous growth for utilities and is a key area that utilities are looking for potential wireless solutions.

Project Budget

One of the unique challenges of this project is how to handle the project costs. No government funds are commited to this project. States are unable to buy LTE equipment to put on the FirstNet network. Great River Energy and Connexus are not planning to install this system as production equipment at this time and as such need to minimize their investment. The following table details estimated project costs and who is responsible for those costs:

Table 1: Project Budget

Item	Estimated Cost	Responsibility
eNode B	$65,000	Motorola
Antennas/Coax	$5,000	NewCore
Tower	Existing	GRE
Tower Work	$5,000	GRE
Backhaul	Existing	GRE
LTE Switch	Existing	NewCore
Police Dept Devices	$800-$1500 (ea)	Motorola
Fire Dept Devices	$800-$1500 (ea)	Motorola
Utility LTE Devices	$800-$1500 (ea)	Motorola
Electrical Devices that connect to network	$800-$1500 (ea)	GRE and Connexus
Substation video camera	$500 (ea)	GRE

Project Evaluation

The testing and evaluation of this pilot will be the longest phase of the project. There will be subjective and objective testing and evaluation. Since LTE is a technology that has already been deployed and tested, the testing and evaluation of the network will not be to test the technology. The testing and evaluation will focus on network sharing, guaranteed throughput, prioritization, security, backhaul and applications.

It is intended to allow others to have access to some part of the network in order to showcase the capabilities of a future FirstNet network to other public safety agencies within the State of Minnesota.

Stakeholders

City of Elk River

Elk River is a city in Sherburne County, Minnesota, located approximately 34 miles northwest of Minneapolis and 37 miles southeast of St. Cloud, MN. It is situated at the convergence of the Mississippi and Elk Rivers. At the 2010 census, the population was 22,974.

Elk River is considered to be a third tier suburb of the Twin Cities of Minneapolis and St. Paul and many of its residents commute to the Twin Cities to work. While being close to the Minneapolis/St. Paul area, Elk River borders the edge of rural Minnesota.[1]

Elk River has been known as "Energy City" since 1997 when the Minnesota Environmental Initiative chose it from over 30 other applying communities to act as a geographical focal point for the demonstration of efficient and renewable energy products, services, and technologies. In 2006, Energy City was trademarked by the Minnesota Secretary of State's Office and also received a federal trademark in 2008.[2]

Elk River Police Department

The Elk River Police Department is comprised of 31 sworn officers, nine non-sworn support staff and approximately 15 volunteer Police Reserves. They are a full service Police Department providing 24-hour police service to over 23,000 residents within the 44 square miles of the City of Elk River. They respond to over 20,000 calls for service annually.

Elk River Fire Department

The Elk River Fire Department is a full-service emergency response and public safety agency, offering a wide range of services to provide for a healthy and safe community. As a function of city government, the fire department is customer focused and committed to providing the residents of Elk River and its contractual partners with prompt, professional service.

The fire department, formally established in 1881, is a distinguished public service entity. Over the years, the department has transitioned from a single-mission of fire suppression, to providing many additional life-safety and value added services to the community. The modern-area fire department is focused on four specific service areas: mitigation, preparedness, response and recovery.

[1] http://en.wikipedia.org/wiki/Elk_River,_Minnesota

[2] www.elkrivermn.gov

State of Minnesota – Emergency Communication Networks

The Emergency Communication Networks Division oversees three programs:

- Statewide 911 Program – Manages the 911 and Next Generation 911 (NG911) network.
- Allied Radio Matrix for Emergency Response (ARMER) radio communications network – A shared, statewide, digital 700/800 MHz radio communications network capable of servicing the needs of every city, county, state agency, tribal government and non-government public safety entity operating in the State of Minnesota.
- Interoperability Program – aims to improve the communications of Minnesota's first responders regardless of the radio systems they have in place.
- Governance Structure - The Statewide Emergency Communications Board (SECB) is a representative board of all major stakeholders of Public Safety Communications. All 87 Minnesota Counties and a number of cities are participating in regional governance structures which manage Public Safety Emergency Communications interoperability in the State of Minnesota. These legally recognized joint powers boards are made up of elected county commissioners and city council members. The boards' mission is to fill the interoperability gaps on a regional level and manage local migration to the ARMER system as well as manage local migration to the NG911 network. The Regional Advisory committees and Regional Emergency Communication's Boards are the core of Minnesota's governance structure. Resolving public safety communications interoperability gaps is fundamentally changing how emergency services are delivered across Minnesota.

Great River Energy

Great River Energy is a not-for-profit electric generation and transmission electric cooperative owned by its 28 member cooperatives. Great River Energy's member distribution cooperatives are located in the outer-ring suburbs of the Twin Cities up to the Arrowhead region of Minnesota and down to the farmland region in the southwestern portion of the state. Our member cooperatives distribute electricity to approximately 650,000 homes, businesses and farms. GRE is the second largest electric power supplier in Minnesota and one of the largest generation and transmission (G&T) cooperatives in the country.

Connexus Energy

Connexus Energy is Minnesota's largest electric cooperative, providing electricity and related products and services to homes and businesses in portions of Anoka, Chisago, Hennepin, Isanti, Ramsey, Sherburne, and Washington counties. Connexus Energy serves over 126,000 members and has 250 employees.

As an electric cooperative, Connexus Energy belongs to its members, not shareholders and is governed by a Board of Directors, elected by its members.

NewCore Wireless

NewCore Wireless is the leading hosted full-service GSM/UMTS/LTE wireless switching provider, affording rural carriers the ability to offer wireless services to their subscribers through a shared

switching platform. Their services and solutions are chosen by rural carriers nationwide as they expand their business to meet their subscribers' next generation needs. They invest in the capital and operational expenses of owning the wireless switch so their business partners do not have to.

Motorola Solutions

Motorola Solutions serves both enterprise and government customers with core markets in public safety government agencies and commercial enterprises. Their leadership in these areas includes public safety communications from infrastructure to applications and devices such as radios as well as task-specific mobile computing devices for enterprises. They produce advanced data capture devices such as barcode scanners and RFID (radio-frequency identification) products for business. They make professional and commercial two-way radios for a variety of markets, and also bring unlicensed wireless broadband capabilities and wireless local area networks – or WLAN – to retail enterprises.

The State of Minnesota has a large, state wide, multi-agency mobile radio system and has developed governance models to finance and support it. This pilot could help the State, and FirstNet, further develop governance models for public/private partnerships as well.

(4) Time and Dates

The State of Minnesota is requesting STA to operate for a period of six months beginning March 2015. The following table is a proposed time frame based upon the assumption of the STA authorized prior to October 2014 with approval to go on-air beginning March 2015.

Task	Date
STA Granted	September 2014
Detailed Pilot Design	October 2014
Installation	October 2014 – February 2015
Evaluation and Testing	March 2015 – September 2015
Decommissioning of Pilot	October 2015

(5-11) TECHNICAL PARAMETERS

The following table lists technical parameters as required by the Commission:[3]

Table 2: Technical Parameters

Parameter	Value
Number of Fixed Stations:	1
Fixed Station Location:	45.346273° N, 93.565288° W
Operational Area:	15 km
eNode B Configuration:	Single eNode B
Call Sign	N/A (will require new call sign)
Mobile Stations, Public Safety:	16
Mobile Stations, Utility:	6
Operating Frequency:	Uplink: 788-798 MHz Downlink: 758-768 MHz
Emission Designators:	10M0G2D 10M0W7W 10M0D7D 10M0G7D
Antenna Height:	300’, 270’
Antenna Type:	Omni whip
Power out eNode B:	20 W
Power out End Device:	200 mW

[3] *See* 47 CFR Ch. 1 § 5.63