State of Minnesota

03 - 0040

Department of Public Safety
Department of Transportation
Department of Administration
Department of Natural Resources

Public Safety Statewide Radio Project

Project Plan and Scope Statement

Revised
December 2002

Submitted by: Mancel Mitchell
Acting Commissioner, Department of Public Safety
The Public Safety Statewide Radio System Planning Committee

MINNESOTA DEPARTMENT OF PUBLIC SAFETY

Office of the Commissioner

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January 15, 2003

Alcohol & Gambling Enforcement

Bureau of Criminal Apprehension

Capitol Security

Center for Crime Victim Services

Driver & Vehicle Services

Drug Policy & Violence Prevention

Emergency Management/ Emergency Response Commission

State Fire Marshal/ Pipeline Safety

State Patrol

Traffic Safety

The Honorable Governor Tim Pawlenty

The Honorable Leo Foley, Chair
Senate Crime Prevention Committee

The Honorable Jane Ranum, Chair
Senate State Government Budget Division

The Honorable Keith Langseth, Chair
Senate Capital Investment Committee

The Honorable Rich Stanek, Chair
The Honorable Mary Murphy
House Judiciary Finance and Policy Committee

The Honorable Phil Krinkie, Chair
The Honorable Alice Hausman
House Capital Investment Committee

RE: Public Safety Statewide Radio Project Plan

Dear Governor Pawlenty and Members,

As acting Commissioner of Public Safety and the State Homeland Security Director, I am pleased to present to you a plan for a Statewide Public Safety Radio System. Implementation of the plan will improve the safety and security of Minnesota citizens and the state and local government workforce that serves them. It will also improve public safety providers' ability to communicate and respond in a coordinated manner to natural and man made disasters. I encourage you to support the recommendations of the planning committee as outlined in the attached plan.

The attached plan was developed by the Public Safety Radio System Planning Committee, established by the 2002 legislature, with representatives from State and Local government and both metro and out state interests. The plan responds to requirements set fourth in two sections of the anti-terrorism legislation passed in the 2002 session (Chapter 401, Art.1, Sec. 12; and Chapter 401, Art. 2, Sec.1, subd. 8).

The plan:

- Defines a project scope for a state owned and operated radio infrastructure, and identifies other business objectives such as needs, opportunities and benefits.
- Recommends a project approach, which outlines a phased deployment and recommends the Planning Committee established in statute as the governance structure for the system.
- Contains a project description outlining deliverables, risk assessment and mitigation, constraints, dependencies, and measures of project success.
- Establishes project estimates within the phased implementation plan, identified with time lines and itemized costs.
- Establishes project controls to ensure that accepted project management techniques are used for each phase of the project.
- Includes appendices that document established standards and policies for network management, operational management, licensing excess tower space and use of capacity of the radio system.

Nationwide, numerous reports have been developed prior to and since the September 11 terrorist attacks that identify communications and interoperability as critical needs for public safety at the local, State and Federal levels. The State of Minnesota has a proven record of implementing shared interoperable radio systems in the Minneapolis –St. Paul Metro area through development of a Shared Regional Public Safety Radio System. The State has also documented a significant need for improved communications throughout the balance of the state. This state plan, developed for a Statewide Public Safety radio system backbone, is poised to deliver improved services statewide. The total cost to deploy this backbone statewide is estimated at $201 million.

Through the use of advanced technology, users of the Shared System will be capable of interoperable communications that has not been available with our older systems. The Shared System performance and shared infrastructure will provide expanded, improved and more reliable communications at significant savings overall.

Deployment of the system will:

- Improve officer and worker safety
- Improve security of first responders and the public
- Improve Interoperability
- Ensure standardization
- Develop and enhance partnerships
- Encourage shared use of resources
- Provide opportunities for aggregate purchasing and support, resulting in cost savings

In response to the requirements of the 2002 legislation the Public Safety Radio System Planning Committee also proposes the following statutory changes be made to effectively implement and administer the plan:

- Recommend an increase of the 911 sur charge. An additional 27 cents to be allocated to deployment of the radio system.
- Recommend an amendment to the existing statute allowing local government levy authority for public safety radio systems. Extend this authority to all counties statewide.
- Recommend extending current legislation that provides tax-exempt status for purchase of public safety radio system equipment.

In summary, Public Safety communications is a critically important issue to state government and homeland security. Minnesota has a history of success in this area. There are significant needs statewide for improved radio communications. Minnesota is ready to deliver with a defined plan and migration strategy. Your attention to this important public safety issue is greatly appreciated.

Sincerely,

Mancel Mitchell
Acting Commissioner

Cc: Legislative Reference Library
Chief Clerk of Court
Secretary of Senate

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Planning Committee

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Executive Summary (Brief)

State and local government's public safety and services workers use two-way radio on a daily basis to conduct business and serve the public. This includes routine day-to-day business such as traffic stops, investigations, road repair, and other general administrative duties. During times of emergency such as floods, tornados, fires, explosions, and other disasters or incidents, radio systems are a critical component in the communication and coordination of resources.

Issues exist today that jeopardize the effectiveness of many public radio systems:

- Lack of spectrum for radio users causes interference and the inability to expand or develop new systems.
- Problems with interoperability—communications problems exist today between local jurisdictions and units of governments and services, in the future the problem will grow. As the benefits of digital technology are understood and federal regulatory changes push users across the state to upgrade their antiquated systems unilaterally, the technology choices and spectrum issues will further divide public services and hamper their ability to communicate.
- The events of September 11, 2001 have exposed and reinforced the urgent need for modern interoperable public safety communication systems.

The purpose of this project is to provide a reliable communication system to meet the needs of state agencies and their local government partners, and to improve the safety, security, and mobility of the public. By creating partnerships with other units of government and public service organizations we will improve interoperability between the levels of government and share resources to build a statewide communication infrastructure on which to move into the future in an integrated, practical and strategic way.

Over the last several years the State, in partnership with local governments and the Metro Radio Board, has made headway into installation and upgrades within the metro area, and has set up the opportunity for interoperability throughout the state. Many areas throughout the state are using antiquated communications systems, some 30 and 40 years old, including many state agencies and entities. New public safety concerns, federal pressure, and normal wear and tear on equipment is leading many communities throughout the state to pursue changes in their systems. It is an appropriate and prudent action within state government's set of responsibilities to research and establish the standards and infrastructure for public and private public safety entities to utilize throughout the state, leveraging and integrating state and local efforts and investments in pubic safety communications technology.

1. Business Objective

Project Scope

A state-managed, owned, and operated statewide infrastructure is proposed. The positioning of the "backbone" would be statewide, offering the option of state, local public, and private public safety entities as defined by *FCC Rules & Regulations 90.20(a)(1)(2)*, to purchase compatible radio equipment and take full advantage of the ubiquitous system.

The infrastructure must be built with open standards so additional public and private public safety entities have the option, and are in fact encouraged, to plug-in to the statewide infrastructure as it is completed and as capacity is available with full interoperability and integration. The scope of this effort includes all aspects of planning and construction of the greater Minnesota system, fully integrating, leveraging, and encompassing the metro area work to date resulting in the seamless deployment of communication facilities.

The Minnesota Department of Transportation's Office of Electronic Communications has the experience, skills, abilities, and resources to manage and implement the statewide technical infrastructure over the next several years. Full consideration is given to the metro project, and complete integration and interoperability is guaranteed by these continuing and new efforts.

The digital network represents improved communications performance, increased capacity and new capabilities. The system will be capable of supporting not only state operations, but could also be shared with local jurisdictions throughout the state as deemed appropriate by the OEC, and the Project Owners and Sponsor. Excluded from the project scope is the direct provision of services to all comers, public or private—the system will be deployed first to serve the public safety and public services (as defined by *FCC Rules & Regulations 90.20(a)(1)(2)*) communications needs in Minnesota, and secondarily will support local jurisdictions and other public/private interests to the greatest extent possible under the FCC guidelines.

Business Need or Opportunity

A child is reported as missing, lost or abducted. A traffic accident causing multiple injuries requires instant response from paramedics to save lives or prevent further injury. A major fire requires assistance from several fire departments, law enforcement agencies and medical help. A toxic substance is spilled during transit. An instant response is necessary in all these situations to save lives and limit damage to property and the environment. A statewide radio communications system would help city, county, state and some private services coordinate resources and respond to emergencies quickly and effectively.

Some instances where shared communications are essential:

- Terrorist attack or threat
- Chemical fire - Smoke plume drifting to multiple jurisdictions
- Train derailment – Hazardous spill – plume drifting to multiple jurisdictions
- Nuclear Plant Incident – Radiation plume drift – Evacuation
- Hazardous spill on Highway or interstate system
- Tornado and related affects – clean-up and aid
- Explosions
- High speed Pursuit

- Forest Fires
- General fire fighter response
- Manhunt
- Drug Interdiction
- Traffic Control
- Plane crash
- Crowd control – International Society of Animal Geneticists, Political Conventions, Sports

The various agencies of the State of Minnesota who use two-way radios to conduct state business are facing a growing number of issues that are impacting the operation of their radio systems. Following is a partial list of the issues:

- Aging systems
- Many systems will require total replacement, or a partial upgrade to remain in contact
- High costs associated with isolated instances of full system implementation
- Spectrum
- Inadequate number of frequencies
- FCC regulations
- New regulations for spectrum use
- New spectrum opportunities
- Technology/industry
- Narrowband
- Digital
- Interoperability
- Limited ability or complex maneuvering with today's systems

The Minnesota Department of Transportation (Mn/DOT), Office of Electronic Communication (OEC) is the department that designs and maintains a majority of the radio systems used by the state. OEC planners and engineers have been managing these issues for several years. Due in part to its size, and sheer volume of users, the Metro area has had the most immediate problem. After many years of planning and debate, the legislature directed Mn/DOT to implement a jointly owned and operated 800 MHz digital trunked radio system throughout the nine County Metro area. Partners in that system include: Hennepin County, the City of Minneapolis, North Memorial Health System, and Carver County. More users continue to join once the system becomes operational in 2002.

With a solution to the Metro problem at hand, the OEC planners and engineers are turning their attention to greater Minnesota, where problems similar to the Metro are occurring with state agencies. A planning group was formed and over a period of three years explored several options that could potentially meet the challenges. The planning group concluded that a statewide radio system using 800MHz digital trunking technology would best meet the needs of the state agencies. The planning group also discovered that the issues noted above were not unique to state agencies. Many county and city government radio systems were, and are, suffering from the same problems.

The cost to implement a statewide 800 MHz system solely for state use may seem prohibitive, but if the focus is placed on building a shareable infrastructure that could meet the needs of all governmental jurisdictions throughout the state, similar to the concept used in the Metro area, then it seems that the benefits will far outweigh the costs incurred by all.

Business Objectives

- To improve the safety, security and mobility of the public.
- To replace the aging, disparate radio systems across the state with a coordinated, leveraged, communications infrastructure.

- To respond quickly, professionally, and safely to dangerous or threatening situations affecting our citizens.
- To maximize efficiency between units of work by streamlining communications and reducing complexity in operations.
- To save money by aggregating demand and purchasing power, as well as through standardized tools reducing the need for technician and user re-training and re-tooling.

Benefits

General

- Shared resources; spectrum, towers, land, infrastructure equipment
- Enhanced radio coverage
- Better first responder coordination, resulting in improved citizen care.
- Multi agency, multi jurisdictional interoperability
- Capacity to accommodate local units of government as deemed appropriate
- Wide-area communications
- Shared or lowered costs
- Secure channels (digital transmissions make it very difficult for unauthorized monitoring)
- Loss control (lost or stolen radios can be disabled by the agency prohibiting unauthorized use)
- Increased capability of interoperability for all users
- Statewide functionality

Technology

- Open infrastructure to be used via opt-in by locals, and approved non-state entities
- Full integration readiness for CriMNet, and other public safety and transportation applications
- Allows 800 MHz digital, 800 MHz analog, and all other users to communicate

2. Project Approach

The opportunity is rare to get to take advantage of a technology revolution that is perfectly matched and absolutely critical to the quality of life and safety and security of citizens. This opportunity has presented itself in Minnesota. Digital radio is changing the way our wireless communications systems operate. The advent of digital radio communication has changed the way systems are designed and vastly improved the functionality delivered to the users in the field.

The process of moving to a totally digital communication network began approximately ten years ago. One of the primary catalysts driving the process was the public safety communications community. The APCO Project-25 committee was established in October of 1989 with the charter to develop new standards for digital radio. The further development and ever-greening process continues today. In May of 1990 the Public Safety Community documented a strong need for digital radio in their response to the FCC Notice of Inquiry. And finally, the Public Safety Community continues to demand better solutions and enhanced communications to improve operations and their ability to respond to emergency situations. While the need for better solutions continues to be an issue, the current analog technologies are having a difficult time keeping pace. There are several communities throughout the state where the radio systems are literally falling apart around the users.

Recommendations

1. In addition to the established project oversight Planning Committee, establishment of a project team to deploy the project, led by and consisting of the executive steering committee, a core project team, a technology sub-team, and a stakeholder communication sub-team.

2. The development and application of statewide standards and guidelines for a statewide communications infrastructure. (Appendix I)

3. Initiation of an education program around radio usage, and optimization of the benefits and opportunities presented by this statewide shared infrastructure.

4. Exploration of various funding mechanisms that maybe available to support the implementation of this system, including but not limited to 911 fee expansion (Appendix II).

5. State leadership (Department of Public Safety) in the design, implementation, and maintenance of a statewide digital radio system, according to the current processes and practices of the Office of Electronic Communications.

6. Modification of the current statute for project governance to remove the distinction of a metropolitan-only representative from the League of Cities. It is the feeling of the Planning Committee that the project would be well served by the best candidate from anywhere in the state rather than specifically representing the metro region. (Appendix IV)

Approach

The State backbone within the metro area (phase One) is complete. As local government participation in the metro system (Phase Two) continues, the State will proceed with the phased deployment of state backbone systems in greater Minnesota (phases Three-Six). Local governments in greater Minnesota will be welcomed to integrate with or join the State system throughout the phased deployment or after the system is fully completed, at their option. It is critical that the statewide infrastructure is viewed as a migration option for greater Minnesota communities, or it will be less likely to be successful. Acceptance of the strategy and resulting deliverables must be assured up-front by the project organization and communications plans. Equally as important, the greater Minnesota State backbone build out must be fully interoperable with the State's Metro backbone system.

Mn/DOT will design, construct, maintain, and manage the infrastructure of the statewide digital trunked radio system. Infrastructure is defined as: the towers, shelters, backup, power generators, base stations, microwave equipment, and system controllers. In addition Mn/DOT will establish the technical operating standards to which the users of the system must adhere. Local government agencies choosing to participate on the system would contract for services from the state. This method of management is similar to the Department of Administration's existing ITG services. Local units of government would have supervisory control of their portion of the system. Local units of government can form local advisory units within their regions and these groups can develop local operating protocols and procedures (within state standards).

The system will be designed to meet the needs of state agencies first, primarily the State Patrol, Mn/DOT, and DNR. The systems will also be available to other state agencies and stakeholder groups such as BCA, Emergency Management, Fire departments, Department of Corrections, Emergency Medical Services, colleges and universities, state hospitals, and other institutions and agencies

Governance

The membership and structure of the Public Safety Radio System Planning Committee, as described in statute 473.907 subd. 1, shall serve as the governance body for the statewide radio system.

Sec. 12. [473.907] [PUBLIC SAFETY RADIO SYSTEM PLANNING COMMITTEE.]

Subdivision 1. [PLANNING COMMITTEE.] (a) The commissioner of public safety shall convene and chair a planning committee to develop a project plan for a statewide, shared, trunked public safety radio communication system.

(b) The planning committee consists of the following members or their designees:

(1) the commissioner of public safety;

(2) the commissioner of transportation;

(3) the commissioner of administration;

(4) the commissioner of natural resources;

(5) the chair of the metropolitan radio board;

(6) the president of the Minnesota sheriffs' association;

(7) a representative of the league of Minnesota cities from the metropolitan area; and

(8) a representative of the association of Minnesota counties from greater Minnesota.

Additionally, the commissioner of finance or a designee

10.33 shall serve on the committee as a nonvoting member.
10.34

The duties and obligations of the group include:

- Implement the phased project plan to establish a statewide trunked radio system backbone infrastructure.
- To set, monitor and audit compliance with the standards, protocols, and procedures necessary for the smooth operation of the expanding statewide shared radio system.
- To expedite and manage with the Department of Transportation the technical design process, the contracting for and leasing of sites, and the negotiating of cooperative agreements among agencies, jurisdictions, and municipalities.
- To review, approve and administer implementation of moves, additions, and changes to the backbone system.
- To have governance authority over and responsibility to coordinate activities of the Metropolitan Radio Board, and will strive to integrate and leverage the learnings and accomplishments of that Board to date. (Appendix III)
- To provide core training for constituent agencies and interoperability training for non-participating agencies.
- To allocate system costs fairly among participants
- To resolve complaints, disputes, and grievances from system users.
- To provide a structure for managing the system's growth and expansion.
- To administer the ongoing business of the system such as making lease and utility payments
- To manage and facilitate communication among users on issues affecting system participants at all levels.

3. Project Description

Deliverables

- Electronics/technology physical build-out and on-going support agreement
- A phased migration strategy that will provide a digital radio system to be live at the end of phase Three in 2009, with all other Districts in the state completed by 2012.
- Demonstrated and consistent radio-to-radio communication at scene of incident in simplex mode
- Tower and electronics deployment in accordance with the statewide planning map.
- Technical white papers describing:
    - Technology research and strategy validation paper
    - Standards,
    - Architecture,
    - Infrastructure technology,
    - Interoperability requirements,
    - Implementation process replication,
    - Expansion opportunities and process,
    - User and system documentation.

Completion Criteria

The project will be segmented into six phases to facilitate budgeting, management and resourcing. The shared radio infrastructure will be completed when the digital radio infrastructure is completed and adequate to support state agency needs. Additionally, maximum capacity will be provided wherever possible to facilitate plug-ins by local governments and private public safety service concerns. The infrastructure will be deployed in such a way to allow and encourage integration of non-state entities where appropriate, and full support will be provided to the integration needs of those wishing to interoperate within the state system.

- Digital communications infrastructure physically built throughout the state, beginning with Phase Three (Rochester and St. Cloud State Patrol districts), and continuing in phases until statewide coverage is achieved (approximately 2012).
- Validated open architecture allowing for full interoperability among public and private public safety entities and future expansion and optimization of the system.
- Enhanced stability in the first responders, network and reductions in error or complexity in emergency response.

Risk Assessment and Mitigation

1. Project discipline through traditional a project management approach is essential for success in a project of this complexity and breadth. It is necessary to install a project manager at the program level, with oversight for all aspects of the project including the technology, communication and marketing plans, budget responsibility, integration with the metro project, legislative interface, and scope and change control.

Mitigation Strategy: Assign a dedicated project manager with full funding, span of control, and executive support to construct a project team of appropriately skilled resources to carry out completion of the multi-year project.

2. Risks associated with a build-out of this infrastructure because it will span a number of years.
   a) Vendor/contractor sustainability
   b) Dedicated project staff resource
   c) Project staff continuation

Mitigation Strategy: Evaluate and select standard tools and technologies to position the system within the mainstream industry and vendor offering. In addition, a reliable funding stream must be established now for the future, and dedicated to support the project resources and activities until the year 2012.

3. The costs associated with the build-out are substantial.
   a) Project expenses are significant for this phase
   b) Future funding for subsequent phases is unreliable but essential for full infrastructure benefits

Mitigation Strategy: Where possible and prudent, vendor and technology pricing should be acquired on a fixed bid basis to anticipate future funding needs. In addition, a strategy for leverage, integration, and re-use must be well established and required by the project leadership and system builders.

4. The technology could become stagnant or obsolete over the multi-year life of the project and against architectural requirements.
   a) Dangerous and costly missteps in design and implementation may occur
   b) Even if proved necessary, shifts in direction are difficult, costly, and time consuming

Mitigation Strategy: The technology builder (Mn/DOT) must commit to an "ever-greening" process whereby it is validated repeatedly over time against architectural and functional requirements

5. Collaborative methods can be time-consuming and difficult, though the potential for an extraordinary result is much greater—the value of purposeful and energized partnering efforts cannot be shortchanged.

Mitigation Strategy: Diligent management oversight by the cross-functional representation of the Planning Committee will assure collaboration and integration between agencies and stakeholders that is critical to project success.

6. The state must take the lead in conveying to rural jurisdictions that this build-out is a benefit to them, and encourage them to partner with the state to leverage their purchasing choices and spending and the power of aggregated demand.

Mitigation Strategy: Diligent management oversight by the cross-functional representation of the Planning Committee will assure collaboration and integration between system architects and builders with local jurisdictions agencies and stakeholders that is critical to project success.

7. Local jurisdictions and stakeholders may not have either faith in the recommendations of the infrastructure project or the capability to implement the recommended solutions.

Mitigation Strategy: The state must be available and supportive, as well as stand behind (post-implementation) the choices it is guiding others to make relative to standards in tools and technologies.

Constraints

Cost:
Cost constraints will guide choices that are made, and diligence must be strictly maintained to achieve the greatest value proposition for the project.

Standards:
Must comply with existing Project 25 standards, FCC rules and regulation, and interoperability architecture established in the Project (see Conceptual Plan Document).

Resources:
Resources in each department, local municipality and board membership will have other demands on their time and attention. Adequate resources must be made available to the project as defined in project plan at every level of involvement and effort. Project management resources are critical, and must be made available to the project. Policy, and possibly statute, must be modified so the acquisition of land for the construction of towers can be completed in a timely manner.

Stakeholders:
In some instances stakeholder cooperation and coordination of disparate goals may be difficult to manage, and constraints will be placed on the project by special interests.

Dependency Linkages

- Seamless integration with Metro Radio Board technology infrastructure and feature set
- Standards organizations continue to endorse and support selected technology standards
- Vendor strategic direction continues to support technology installation
- State agencies commitment to this project evidenced via departmental prioritization
- Appropriate levels of financial support required for infrastructure build-out in each phase of completion must be made available
- Metro, local and regional jurisdiction cooperation
- Land is available for tower construction or shared space is available
- Staff resources remain available and dedicated to completion project goals

Measures of Project Success

- Complete implementation of infrastructure statewide
- Buy-in and integration to the greatest degree possible with state agencies as well as local jurisdictions
- Full integration with metro project activities and results
- Seamless interoperability within metro, greater Minnesota and each subsequent phase completion
- Continued proliferation, acceptance and support of selected technology standards
- Statewide radio infrastructure built within specified time and budget expectations
- Statewide radio infrastructure feature set delivered meets expectations of stakeholders and project administration
- Statewide radio infrastructure positioned to continue expansion throughout the state with each phase completion.

Critical Success Factors

The successful and timely outcome of the project described in this document is dependent on the following:

- Where suitable state land is available, the state should be allowed to exercise the powers provided in MSS 394.24, Subd. 3. A "meet and confer" meeting should take place with the local unit of government with zoning responsibility to inform at body of government (not the public) of the state's intent. The state will attempt to mitigate local concerns when and where practical and feasible as determined by sound engineering principles. The state should proceed with construction after said meeting.

- Policy must be developed whereby State agencies/departments owning land suitable for the construction of towers must respond to Mn/DOT OEC within 30 days after contact is made with an analysis of facilities, capacity and shared use opportunities, and construction schedules--provided that the proposed tower will not interfere or conflict with planned future use of the land, and not conflict with environmental policies.

- Adequate funding must be made available over the life of the project by the legislature for the construction of the system infrastructure. In addition, supplemental funding alternatives must be explored and resources made available for the purchase of mobiles and portables for state agency radio users.

- The proposed system must be fully compatible and interoperable to the existing radio system implemented in the metro area. This means that components of the system are interchangeable, and fully functional.

- The existing state contract between the State and Motorola must be considered for extension to include Greater Minnesota. Not allowing this will result in higher costs, and likely incompatible equipment/functionality.

- The state must be allowed to initially construct the system infrastructure for State use. This does not preclude state representatives from meeting with local officials to discuss planning strategy and design considerations.

- For expansion of the system beyond state use the legislature must make funding mechanisms available to local units of government that will allow locals to join the system. This can be in the form of low/no interest loans, or through legislative requests.

Roles and Project Stakeholders

Roles

The following role definitions are being applied to the resources assigned to this project:

Project Sponsor	Provides executive team approval and sponsorship for the project. Has budget ownership for the project and is the major stakeholder and recipient for the project deliverables.
Project Owner	Provides policy definition to the Project team. Resolves all policy issues with the appropriate policy owners in order to provide a clear, decisive definition. Makes final decisions and resolves conflicts or issues regarding project expectations across organizational and functional areas. The project owner and the project manager have a direct link for all communication. The project manager will work directly with the project owner on all policy clarification.
Project Manager	Provides overall management to the project. Accountable for establishing a Project Charter, developing and managing the work plan, securing appropriate resources and delegating the work and insuring successful completion of the project. All project team members report to the project manager. Handles all project administrative duties, interfaces to project sponsors and owners and has overall accountability for the project.
Planning Committee	Provide assistance in resolving issues that arise beyond the project manager's jurisdiction. Monitor project progress and provide necessary tools and support when milestones are in jeopardy.
Stakeholder	Key provider of requirements and recipient of project deliverable and associated benefits. Deliverable will directly enhance the stakeholder's business processes and environment. Majority of stakeholders for this project will be agency heads, CIO's and project management representatives.
User Support Analyst	Working project team member who analyzes, designs and ultimately improves or replaces the business processes. This includes collaborating with teams to develop high level process designs and models, understanding best practices for business processes and partnering with team members to identify appropriate opportunities, challenging the old rules of the business and stimulating creating thinking, and identifying organizational impact areas.

Stakeholders and Communication Plan Requirements

Agency/ Area	Name, Title	Role	Communication
Department of Public Safety	Commissioner	Project Sponsor	Monthly Report Quarterly Presentation
Department of Public Safety	Commissioner	Project Owner	Monthly Report Quarterly Presentation
Department of Transportation	Commissioner	Project Owner	Monthly Report Quarterly Presentation
Department of Natural Resources	Commissioner	Project Owner	Monthly Report Quarterly Presentation
Department of Administration	Commissioner	Project Owner	Monthly Report Quarterly Presentation
		Project Manager	
Department of Public Safety	Commissioner	Planning Committee Member	Semi-monthly Report Monthly Presentation
Department of Transportation	Commissioner	Planning Committee Member	Semi-monthly Report Monthly Presentation
Department of Administration	Commissioner	Planning Committee Member	Semi-monthly Report Monthly Presentation
Department of Natural Resources	Commissioner	Planning Committee Member	Semi-monthly Report Monthly Presentation
Metro Radio Board	Chair	Planning Committee Member	Semi-monthly Report Monthly Presentation
League of Minnesota Cities	Representative	Planning Committee Member	Semi-monthly Report Monthly Presentation
Association of Minnesota Counties	Representative	Planning Committee Member	Semi-monthly Report Monthly Presentation
Minnesota State Sheriffs' Association	Representative	Planning Committee Member	Semi-monthly Report Monthly Presentation
	User Team State Patrol representative Sheriff's representative Police and Fire representative Technology Team Mn/DOT Public Safety Office of Technology Additional TBD…	*Core Project Team*	*Weekly Meetings*
	Mn/DOT Additional TBD…	*Technical Sub-Project Team*	*Weekly Meetings/as needed*
	User Community Additional TBD…	*Stakeholder Sub-Project Team*	*Weekly Meetings/as needed*

Stakeholders and Communication Plan Requirements, continued

Agency/ Area	Name, Title	Role	Communication
	DPS *State Patrol* *BCA* *DEM* *Fire Marshal* *Alcohol and Gambling Division* *Additional TBD…* **MN Chiefs of Police Assoc.** **MN Police and Peace Officers** **"First Responders"** **Local elected officials** **Governor's Office** **DNR** *Enforcement Division* *Forestry* *Parks* *Trails and Waterways* **DHS** *State Hospital System* **DOT** *Maintenance Operations* *Construction* *ROW* *Surveys* *Additional TBD…* **University of MN** **MNSCU** *Security* *Maintenance* **Military Affairs** **State Legislature** **CriMNet Project leadership** **Other Project leadership**	*Stakeholders:*	*Quarterly Written Updates* *Community Meetings as appropriate.* *Individual Stakeholders as appropriate.*

4. Project Estimates

Phased Implementation Plan and Schedule

Implementation of the new 800 MHz trunked system in Greater Minnesota will occur in four (4) phases. Each phase will consist of implementing components of the system within two to three complete Patrol districts. For operational purposes, it is highly recommended that complete districts be converted to the new system, rather than portions of a district or specific highway corridors. The tables below show the cost details of each phase.

The work to be completed during each phase consists of constructing and or installing the following components: towers, 800 MHz base stations, Interop base stations (VHF), controllers, switching equipment, and microwave transmitters/receivers.

Specific tasks that must be completed in each phase are as follows:

Form planning group with local government/public safety entities within district

- Locate suitable existing local government towers in required areas. If none then;
- Identify land parcels for tower construction
- Purchase land
- Prepare specifications for towers and shelters
- Bid for towers and shelters
- Prepare site for tower erection
- Erect towers and place shelters, generators
- Prepare specifications for trunked radio system and microwave
- Bid for trunked radio system and microwave
- Finalize detailed design with successful vendor
- Order trunked radio equipment (base stations) and microwave
- Factory staging of all electronic components
- Equipment delivery and installation
- Testing
- Acceptance

Special consideration will be given to the interoperational system (Interop) that will be needed to permit communications between users of the new 800 MHz trunked system and the users who chose not to migrate or join the new system. See page I-7 in the Conceptual Plan Document for a more detail description of the Interop requirements.

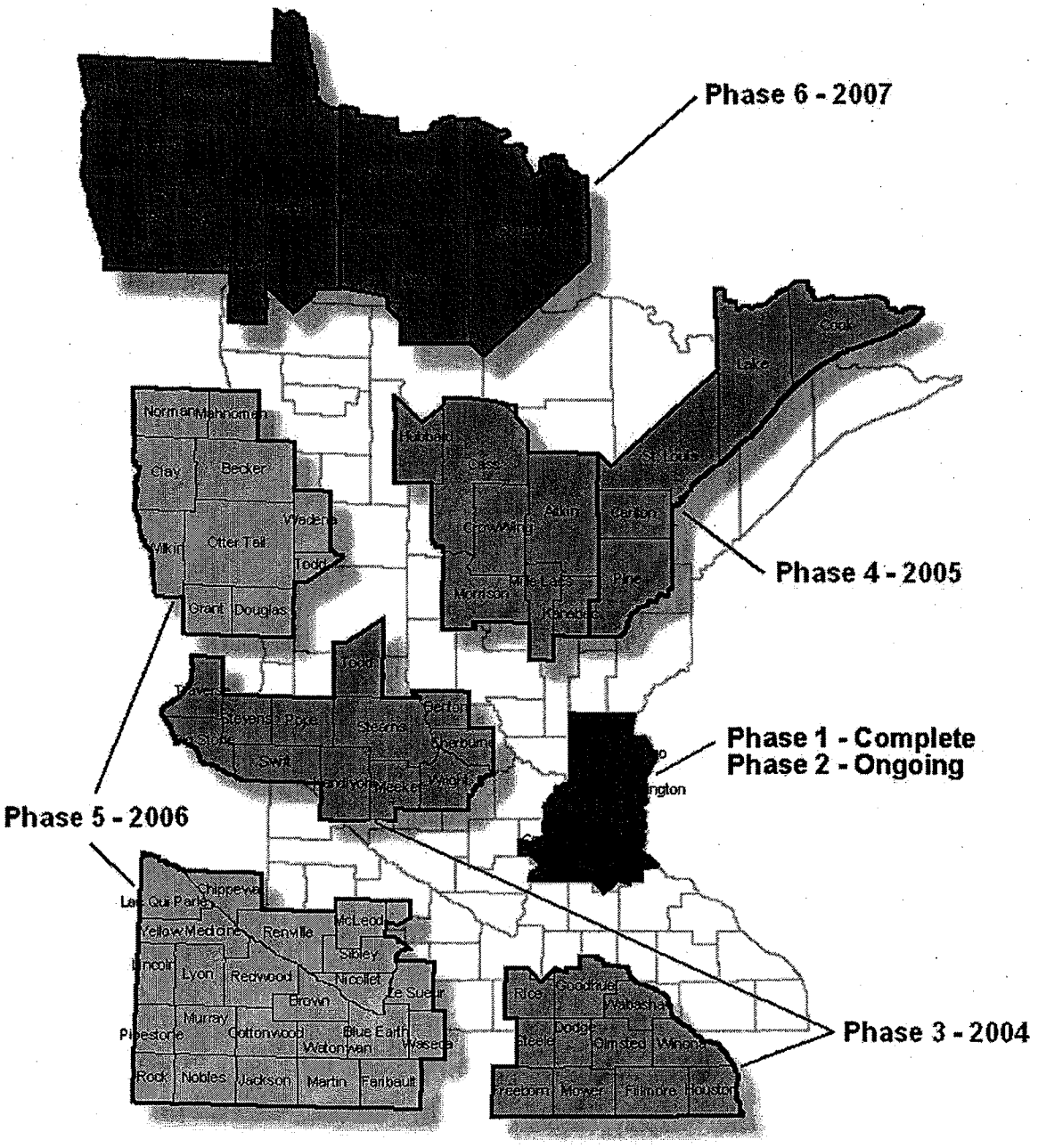
Phase Three- Phase Three will begin in FY2004 if funding is made available. This phase will provide coverage throughout 23 counties in the Rochester and St. Cloud Patrol districts.

Phase Four – Phase Four, which will begin in FY2005 or one year after the start of Phase Three. This phase will cover the Duluth and Brainerd Patrol districts. The two districts cover 12.5 counties (half of St. Louis Co.)

Phase Five – Phase Five will begin in FY2006 or 1 year after the start of Phase Four. This phase encompasses three Patrol districts – Mankato, Marshall, and Detroit Lakes. This phase will include 31 counties.

Phase Six – Phase Six, will begin in FY2007 or 1 year after phase Five begins. This phase will cover the Virginia and Thief River Falls Patrol districts. These two districts include 11.5 counties.

Statewide Plan Implementation Areas



Timeline Activities and Expenditures

	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11
Land Purchase PHASE 3	$500,000	$500,000	$550,000	----------	----------	----------	----------	----------
Tower, Shelters, Generators, & Site Prep work PHASE 3	----------	$2,980,000	$2,980,000	$3,278,000	----------	----------	----------	----------
Tower Modifications PHASE 3	$385,462	$384,462	$384,462	$511,614	----------	----------	----------	----------
Design & Engineering 800 MHz Trunked & Microwave PHASE 3	$1,300,000	$1,300,000	$1,300,000	$1,300,000	$1,300,000	----------	----------	----------
Purchase 800 Eqp. PHASE 3	----------	----------	$10,561,690	----------	----------	----------	----------	----------
Purchase Microwave PHASE 3	----------	----------	$9,984,340	----------	----------	----------	----------	----------
Interop & Control Eqp. PHASE 3	----------	----------	$4,000,000	$728,000	----------	----------	----------	----------
TOTAL PHASE 3	**$44,228,030**	----------	----------	----------	----------	----------	----------	----------
Land Purchase PHASE 4	----------	$650,000	$650,000	$650,000	----------	----------	----------	----------
Tower, Shelters, Generators, & Site Prep work PHASE 4	----------	----------	$3,840,668	$3,840,668	$3,840,664	----------	----------	----------
Tower Modifications PHASE 4	----------	$166,000	$166,000	$166,000	----------	----------	----------	----------
Design & Engineering 800 MHz Trunked & Microwave PHASE 4	----------	$1,300,000	$1,300,000	$1,300,000	$1,300,000	$1,300,000	----------	----------
Purchase 800 Eqp. PHASE 4	----------	----------	----------	$10,669,200	----------	----------	----------	----------
Purchase Microwave PHASE 4	----------	----------	----------	$13,065,000	----------	----------	----------	----------
Interop & Control Eqp. PHASE 4	----------	----------	----------	$4,000,000	$966,000	----------	----------	----------
TOTAL PHASE 4		**$49,170,200**	----------	----------	----------	----------	----------	----------
Land Purchase PHASE 5	----------	----------	$650,000	$650,000	$700,000	----------	----------	----------
Tower, Shelters, Generators, & Site Prep work PHASE 5	----------	----------		$3,874,000	$3,874,000	$4,172,000	----------	----------
Tower Modifications PHASE 5	----------	----------	$196,858	$196,858	$295,284	----------	----------	----------
Design & Engineering 800 MHz Trunked & Microwave PHASE 5	----------	----------	$1,300,000	$1,300,000	$1,300,000	$1,300,000	$1,300,000	----------
Purchase 800 Eqp. PHASE 5	----------	----------	----------	----------	$9,727,800	----------	----------	----------
Purchase Microwave PHASE 5	----------	----------	----------	----------	$15,640,000	----------	----------	----------
Interop & Control Eqp. PHASE 5	----------	----------	----------	----------	$4,000,000	$868,000	----------	----------
TOTAL PHASE 5	----------	----------	**$51,344,800**	----------	----------	----------	----------	----------
Land Purchase PHASE 6	----------	----------	----------	$500,000	$500,000	$600,000		
Tower, Shelters, Generators, & Site Prep work PHASE 6	----------	----------	----------	----------	$2,980,000	$2,980,000	$3,576,000	----------
Tower Modifications PHASE 6	----------	----------	----------	$348,572	$348,572	$522,856	----------	----------
Design & Engineering 800 MHz Trunked & Microwave PHASE 6	----------	----------	----------	$1,300,000	$1,300,000	$1,300,000	$1,300,000	$1,300,000
Purchase 800 Eqp. PHASE 6	----------	----------	----------	$8,315,700				
Purchase Microwave PHASE 6	----------	----------	----------	$12,200,000				
Interop & Control Eqp. PHASE 6	----------	----------	----------	$4,756,000				
TOTAL PHASE 6	----------	----------	----------	**$44,127,700**				
YEARLY EXPENDITURES	**$2,185,462**	**$7,280,462**	**$37,864,018**	**$72,949,612**	**$48,072,320**	**$13,042,856**	**$6,176,000**	**$1,300,000**
SALES TAX	**$ 142,055**	**$ 473,230**	**$ 2,461,161**	**$ 4,741,724**	**$ 3,124,700**	**$ 847,785**	**$ 401,440**	**$ 84,500**
YEARLY TOTALS	**$2,327,517**	**$7,753,692**	**$40,325,179**	**$77,691,336**	**$51,197,020**	**$13,890,641**	**$6,577,440**	**$1,384,500**
GRAND TOTAL	**$201,147,325**							

Resource Requirements – Team and Support Resources

Resource	Phase III	Phase IV	Phase V	Phase VI
Oversight (>FTE)				
Sponsor	X	X	X	X
Steering Committee	X	X	X	X
Dedicated FTE				
Project Management Team	X (3)	X (3)	X (3)	X (3)
User Design Team	X (3)	X (3)	X (3)	X (2)
Technical Development Team	X (7)	X (9)	X (11)	X (9)
Total Dedicated FTE	**13**	**15**	**17**	**14**

Estimated Cost

(In 000's)

Type of Cost	Phase III	Phase IV	Phase V	Phase VI
Staff Resource	$ 975	$ 1,125	$ 1,275	$ 1,050
Equipment and Infrastructure	$44,228	$49,179	$51,345	$44,128
Estimated Total	$45,203	$50,304	$52,620	$45,178

5. Project Controls

Risk/Contingency Management

This project's overall risk management strategy is guided by a commitment to risk management as a project management best practice and by risk assessment requirements in Minnesota statute. Risk assessment and risk mitigation planning are part of the program throughout its phases. The Project will conduct a formal risk assessment and risk management planning effort, engaging an outside consultant when appropriate or necessary. The risk identification and analysis and risk response plans will be available to project stakeholders in separate documents. The effort will include an identification and assessment of project risks and a framework for proactive decision making to:

- *Assess continuously what could go wrong (risks)*
- *Determine which risks are important to deal with (impact and prioritization)*
- *Implement strategies to deal with those risks (mitigation)*
- *Monitor and control (tracking)*

Issue Management

The purpose of the issues management process is to provide a mechanism for organizing, maintaining, and tracking the resolution of issues that have an impact on achieving the objectives of the project, that is, issues related to the information integration effort as well as issues that have an impact beyond the scope of any specific component.

A description of the issues management process and mechanisms will be posted on a website to be established once the project has been formally launched, and communicated to all program personnel. The approach is to capture and document discussion points that arise in meetings or are brought to the attention of the program team by other means. The project manager is responsible for separating out action items, open points, or other items that may be captured in the same settings, but are not in fact issues.

Documentation consists primarily in a project issue log. When an issue is complex, an additional "issue description" document may be created as well. The project team will use the issue log to:

- Identify each issue and the impact on the project, including any pertinent details such as the date and who reported it.
- Determine a priority for the issue. Label it as high, medium, or low.
- Assign the issue to a team member.
- Set a target date for resolution.
- Track the status of the resolution. Label it as open, in progress, or closed.
- Document the process by which the issue was resolved. This will help the team note any lessons that can be learned from the problem's solution.

The project manager is accountable for managing issues and will aggressively act to resolve issues as rapidly as practicable. The project manager may assign other team members to resolve specific issues. The project manager reports on issue status to the Planning Committee. If the project manager cannot resolve an issue, the issue is presented to the Planning Committee for resolution.

Change Management

The purpose of change management for the project is to provide a process and mechanisms to ensure that program scope; budget and schedule changes are understood and agreed to by the Planning Committee. The approach is to use change control procedures for the project that are consistent with project management industry best practices and include the following tasks:

- Identify potential scope change through the use of a *Change Request* document and *Change Request Log.*
- Evaluate impact of potential scope change.
- Determine if additional funds, resources and time will be required.
- Ensure that the scope change is beneficial.
- Planning Committee discuss the potential change and its anticipated impact on the project and determines whether to authorize the change.
- Changes that are agreed upon must be documented and signed as a matter of formal scope control.
- Update planning documents with scope change impacts.

Communication Management

The project manager in cooperation and with support from the Planning Committee and the core project team will facilitate the communications plan according to the standards established for project management and as indicated in the *Stakeholder and Communications Plan Requirements* section of this document.

6. Authorizations

The Scope Statement will be approved by:

The Project Manager

The Planning Committee

The Project Sponsor

Project changes will be approved by:

The Planning Committee

The Project Manager

Project deliverables will be approved/accepted by:

The Planning Committee

The Project Sponsor

The Project Manager

Stakeholders

Specific task responsibilities of project resources are defined as indicated in the Project/work Plan.

7. Scope Statement Approval Form

Scope Statement Approval Form

Project Name:

Project Manager:

The purpose of this document is to provide a vehicle for documenting the initial planning efforts for the project. It is used to reach a satisfactory level of mutual agreement between the project manager and the project sponsors and owners on the objectives and scope of the project before significant resources are committed and expenses incurred.

I have reviewed the information contained in this Scope Statement and agree.

Commissioner of Public Safety	Date
Commissioner of Transportation	Date
Commissioner of Natural Resources	Date
Commissioner of Administration	Date
Metro Radio Board Chair	Date
League of MN Cities Representative	Date
Association of MN Counties Representative	Date
MN State Sheriff's Association Representative	Date
Commissioner of Finance	Date
Project Manager	Date

8. Scope Change Approval Form

Scope Change Approval Form

Project Name:

Project Manager:

The purpose of this document is to provide a vehicle for documenting the changes to the initial scope for the project. It is used to reach a satisfactory level of mutual agreement between the project manager and the project sponsors and owners on the cost and other project impacts before significant resources are committed and expenses incurred.

I have reviewed the information contained in this Change Request Statement and agree.

Commissioner of Public Safety	Date
Commissioner of Transportation	Date
Commissioner of Natural Resources	Date
Commissioner of Administration	Date
Metro Radio Board Chair	Date
League of MN Cities Representative	Date
Association of MN Counties Representative	Date
MN State Sheriff's Association Representative	Date
Commissioner of Finance	Date
Project Manager	Date

9. Appendices

APPENDIX I

Source: SECTION III of the Mn/DOT OEC *Conceptual Plan and Design Document*

STANDARDS AND POLICIES

NETWORK MANAGEMENT STANDARDS

There are two types of standards that are needed to implement a shared statewide trunked radio system. The first is the "network architecture" standards. For the purpose of this document this standard is defined as Project 25, described later in this section. The second required standard involves the operation and administration of the system. These standards will establish the protocols, and procedures for users of the system. The topics covered by the standards manual will include, but not limited to, the areas listed below. While most standards have already been written, they are too lengthily to include in this document.

PROTOCOL & PROCEDURES STANDARDS

1. Management
    a. Agency roles in operational management of system
    b. Network management
    c. Database management
    d. Maintenance of names and naming standards
    e. Changing policy & standards
    f. Security
    g. Equipment standards
    h. Moves, additions and changes
    i. Managing participation issues
    j. Training standards
2. Configuration and Allocation
    a. Naming conventions
    b. Talk-group and radio ID allocations
    c. Fleet-mapping standards
    d. Use of shared Talk-groups
    e. Talk-group & radio user priorities
    f. Telephone interconnect
    g. Subsystem roaming
    h. Scanning
    i. Recording/Logger ports
    j. Private call
    k. Status & message transmission/warning signals/AVL/text messaging
    l. Emergency button
    m. Multi-group announcement
3. Interoperability Guidelines
    a. MINSEF
    b. Statewide Fire Mutual Aid
    c. MIMS
    d. Statewide EMS
    e. Recording common interagency Talk-groups
4. Guidelines for Project 25 Trunked Users
    a. Talk-group and Multi-group ownership
    b. Interoperability between statewide 800 MHz system and other 800 MHz systems
    c. Statewide tactical Talk-groups

d. Interoperability between statewide 800 MHz and federal agencies

5. Guidelines for Conventional Users
   a. Connecting into the Interop System
   b. RF control stations and portables
   c. Radio to radio cross band repeaters
6. Maintenance
   a. Agency maintenance plans
   b. Develop standards for preventive maintenance
   c. Record-keeping requirements
   d. Contact information & procedures
   e. Spare equipment
   f. Equipment configuration information
   g. Software location
   h. Notification of maintenance activities
   i. Outage responsibility/Time standards/Repair Standards
7. Media Policy
   a. Media access to Talk-groups
   b. Selling radios to the media
   c. Programming media radios
8. Agency Billing & Cost Allocation
   a. New Users
   b. Fees for service
   c. Operational costs
   d. Billing management
   e. Insurance
9. Compliance & Conflict Resolution
   a. Auditing and monitoring process
   b. Non-compliance
   c. Appeal process
10. Disaster recovery Plan
   a. Contingency procedures
   b. Procedures/responsibility for system restoration
   c. Levels of response

STANDARDS FOR OPERATIONAL MANAGEMENT

The purpose of these Standards is to define each agency's role in the operational management of the Statewide Shared Digital Trunking System.

Each User of the System will formally designate a Local System Administer (LSA) who will have the authority to represent their respective Agency(s) interests and make decisions on issues related to the day-to-day operation on their portion of the system and any urgent or emergency system operational or repair decisions. The Mn/DOT System Administrator will represent the statewide infrastructure portion of the system. Each LSA shall designate a backup who shall have the authority to represent their respective portion of the System in the absence of the primary LSA.

An urgent or emergency situation would be one where immediate decision authority is needed to allow the System as a whole, or any of the Subsystem components, to continue supporting normal wide-area communications services. It is recognized that each Local Systems Administrator (LSA) may have to obtain authorizations from higher levels of their own organization to make longer-term or non-emergency capital or repair expenditure decisions.

Each LSA will be responsible for the day-to-day management, operation and oversight of the system components within their portion of the System. Specific duties will not be detailed in this document. However, the general duties will include, but are not limited to, the following:

1. ***Monitoring the system and its components for normal operations.***

2. Participating in the diagnosis of system performance problems and the development of corrective action recommendations.
3. Dispatching appropriate repair services in the event of a malfunction in the system equipment.
4. Managing the database elements including Subscriber IDs, talk-group IDs, and the various parameters that relate to their effective operation.

Due to the complexity and distributed administration & maintenance of the System, typical problems can appear when changes are made to hardware or software. In order to keep all representatives informed of any updates, notifications will need to be sent to all primary & alternate Local System Administrator (LSA) representatives in the event of any of the following:

a. Any planned maintenance work being done on the Statewide or Local Systems that would affect the System performance for the other users would be preceded with reasonable notification of the maintenance work being done.
b. Any equipment malfunctions or failures that would affect system performance for the other users of the local systems or statewide system.
c. Any configuration changes in equipment or software by any one of the users that may affect system performance for the other users.

In addition to the responsibilities as a Statewide System Administrator, the Mn/DOT System Administrator will also be responsible for:

a. Arranging for System Administration meetings at least monthly to review operations of the System and share ideas or issues that have arisen in local subsystems that may be of interest to the other Local System Administrators.
b. Being available to work with any of the other Local System Administrators or the technical staff of any of the local systems to diagnose and resolve any system operational problem that involves parameter changes, maintenance or repair of the regional equipment.
c. Being the identified point of contact with the vendor for issues related to the statewide network equipment.
d. Providing timely information to the other Local System Administrators on any System issue that arises or repair/maintenance issue related to the system equipment.
e. Monitoring the performance of the entire network for normal operations, particularly the performance of the statewide infrastructure equipment.
f. Monitoring the configuration of the system database for normal operations, particularly the properties of the statewide equipment & database objects. And conducting the periodic database backups.

The Local System Administrators along with Mn/DOT's System Administrator will be the representatives forming the System Managers Group (SMG). The SMG is responsible for the operational management of the entire statewide system.

STANDARDS FOR NETWORK MANAGEMENT

The statewide network consists of, but not limited to, channel banks, hubs, switches, routers, servers, Local Area Networks at the equipment locations, and Wide Area Links connecting sites together consisting of the microwave & fiber optic equipment, and the network management tools provided by the equipment manufacturer.

The System architecture is primarily constructed around an Internet Protocol based network.
The network is composed of industry standard equipment, which also provides flexibility and a large variety of management & diagnostic tools.

The vendor will provide equipment configuration information as part of the system documentation. The system network is complex and unusual problems may be difficult to identify and resolve. The system documentation will have to be kept up to date or will lose its value in supporting the system network.

The system network is protected from other agency data networks, and shall remain so. This is to protect the security and functionality of the system. If there is a connection to another data network, it shall be through an appropriately designed & maintained firewall.

The components of the network shall be considered as "owned" by the State of Minnesota, unless otherwise designated as a local component, in which case that component would be owned by the local unit of government. The individual owners will then be responsible for the maintenance of the sites & equipment that they own. Agreements between the Owners and/or Maintenance Contractors are at each agency's discretion, but the Owner is still ultimately responsible for their portion of the system.

The Backbone system is structured on an integrated network; any infrastructure hardware and software upgrades or changes that may impact the system network will need reasonable discussion and subsequent approval by the System Managers Group.
All maintenance work being scheduled that may affect the statewide system and/or a local system performance shall be preceded by reasonable and appropriate notification to the other Local System Managers.

The equipment configurations of the components of the network will need to be documented. This is primarily for the purpose of maintenance, but also affects future planning. The vendor will provide the original "as built" documentation.

The methods for performing detailed network operations will be defined in the technical resource manuals and training for the system. The technical resource manuals will be classified as "Security Information" and "General Non-Public Data" pursuant to Minn. Stats. §13.37 Subd. 1a.

The details on procedures not otherwise defined will be at the discretion of the System Managers Group.

The MnDoT System Administrator and Local System Administrators are responsible for managing the data attributes that they are individually responsible for. The Mn/DOT System Administrator shall be responsible for the statewide portion of the network.

NETWORK ARCHITECTURE

TECHNOLOGY STANDARDS

APCO Project 25 is a joint effort of U.S. federal, state, and local government, with support from the U.S. Telecommunications Industry Association (TIA). State government is represented by the National Association of State Telecommunications Directors (NASTD) and local government by APCO. The

standards process is called "APCO Project 25" and the standards themselves are called "Project 25." Of the three groups of users, APCO (i.e., local government) members are the largest group of users of Land Mobile Radios (LMR).

The primary objectives of the APCO Project 25 (P25) standards process are to provide digital, narrowband radios with the best performance possible, to meet all public safety user needs, and to permit maximum interoperability. Secondary objectives include obtaining maximum radio spectrum efficiency, ensuring competition throughout the life of systems, and ensuring that equipment is user-friendly. During the process, the needs of the user have been put first. Performance and meeting user needs were always placed higher in priority than spectrum efficiency or reducing technical complexity.

The Project 25 documents were developed by TIA, based on user needs, and then approved by the APCO Project 25 Steering Committee (representing federal, state, and local governments) before being published as TIA documents.

Project 25 Phase I (12.5 kHz bandwidth) is essentially complete, 30 of the 32 Phase I Project 25 documents have been published by TIA, containing more than 1,800 pages of technical information. The two remaining documents are on inter-sub-system interface conformance and network management conformance. These documents are expected to be published shortly.

The basic characteristics of Project 25 radios are these:

- A Phase I emission designator 8K10F1E (C4FM [compatible four-level frequency modulation]) for operation in a 12.5 kHz channel and a Phase II emission designator of 5K76G1E (CQPSK [compatible quadrature phase shift keying]) for operation in a 6.25 kHz channel.
- Use of a common receiver for both C4FM and CQPSK to ensure full interoperability between the two signals.
- Encryption defined for the U.S. Data Encryption Standard (DES) algorithms, but other techniques can also be employed.
- Use of an IMBE (improved multiband excitation) vocoder with 4400 bits/s of digitized voice, 2800 bits/s of error correction on the voice, and 2400 bits/s of signaling overhead, for an aggregate bit rate of 9600 bits/s.

Project 25 Migration Strategy and Phase II Plans Project 25 has a well-planned migration strategy, both in the forward and backward direction. It was assumed in the basic planning that (1) no virgin spectrum was available and (2) users would need to affect a gradual phase-in and phase-out of equipment.

For the transition from 25-kHz to 12.5-kHz digital, all Project 25 Phase I radios will be capable of both 25 kHz analog FM and 12.5-kHz digital C4FM operation. Radios can thus be procured gradually, and channels or talk-groups converted to P25 operation whenever all the radios on them are P25

The primary track of Project 25 Phase II has been announced to be 6.25-kHz CQPSK. The only difference between Phase I C4FM and Phase II CQPSK is the modulation method in the radio transmitter. A smooth transition is possible since Phase I radios can be gradually replaced by Phase II radios. The Project 25 Steering Committee is currently receiving proposals for a secondary TDMA [Time Division Multiple Access] track for Phase II. Here are two requirements for such.

A TDMA radio:

- To have a Phase I mode of operation (non-trunked mini mum), for operation with other P25 radios.
- To be able to patch digital audio (i.e., have a common vocoder) and signaling information to/from other P25 radios.

Other Standards Planned for Project 25 Phase II the U.S. Telecommunications Industry Association is pursuing standards for more than a basic radio air interface as a part of the APCO Project 25 Phase II standards process. One of these efforts is to develop a standard interface to consoles.

Another standard that TIA plans to develop as a part of Project 25 Phase II is a standard interface between repeaters and other subsystems (e.g., trunking system controller). This will allow users to purchase equipment from multiple manufacturers for a single site, rather than being locked into the offerings of any one company.

Users should consider their individual situation in making procurement decisions. Overall, the users in the United States have concluded that FDMA is the preferred solution for the vast majority of their needs.

Project 25 standards were designed primarily for the public safety user, with range and performance given high priority. Also, unique flexibility has been designed into the standards to enhance interoperability, privacy, gradual phase-in of new technologies, and the reliable transmission of voice and data. Several other of the seven techniques provide greater spectrum efficiency, and several are less complex (with potentially lower costs). However, the Project 25 Steering Committee believes none of the others provides greater performance, at greater range, or has more public safety-oriented features.

REF: A complete copy of the Standards described in this document may be obtained from the MN/DOT-OEC library. Contact the Office of Electronic Communications at (651) 296-7421 for further information.

LICENSING EXCESS TOWER SPACE

Minnesota Statute 174.70 Subdivision 2 empowers the Department of Transportation to enter into agreements to permit privately owned communications equipment on Mn/DOT owned communications towers. The following process has been created to enable the Lease of excess space.

PROCESS

Following is the process that is followed to lease space on Mn/DOT towers to commercial wireless providers or other eligible private companies. At the recommendation of the Dept. of Administration, Real Estate Management Div. it was agreed upon that Mn/DOT will enter into License Agreements, rather than a Lease. This process is not necessary when dealing with local units of government, or federal government requests.

STEP 1 – The Department of Administration (DOA) publishes annual notice to potential lessees.

STEP 2 – Mn/DOT, Office of Electronic Communications will review each requests to License space on MnDoT towers. Criteria for selecting who will be granted a License are described below. Requests must be submitted to DOA in writing.

Criteria:

1. Licensing will be done on a first come, first served basis. The date of receipt at DOA will establish the receipt date. If more than one request is received on the same day, then the time indicated on the postmark will be the next criteria for establishing the date of receipt.
2. Technical compatibility of the requested system with existing or planned systems at the tower site.
3. Agreement by requesting company to accept published fee and all other terms of the License Agreement

Written request must include as a minimum, the following data:

a. A statement indicating the desire to install antennas, and house equipment, or construct a shelter (platform) at a Mn/DOT tower.
b. The request should include a site plan that describes the specific number, size, make and model of the antenna(s), the desired height and azimuth on the tower, type of coax cable, shelter, power, and other utility arrangements.

STEP 3 - Mn/DOT's Office of Electronic Communications will request an intermodulation (intermod) study from the commercial carrier. The intermod study will consider all existing and planned frequencies for the site, against the frequencies proposed to be used at the site by the carrier. This study must be submitted in a format that can be easily reviewed by the OEC engineering staff.

STEP 4 - If the intermod study is deemed satisfactory by the OEC engineering staff, then the requesting commercial carrier must submit a structural analysis of the Mn/DOT tower. The analysis must be completed and certified by a licensed engineering firm qualified to do structural analysis in the State of Minnesota. This report must be in a format that is easily read and interpreted by engineering staff.

STEP 5 – If the structural analysis is favorable, then the process to develop the License Agreement will begin.

a. If the structural analysis is not favorable, then a letter will be sent to the requesting carrier informing them that they cannot install their equipment as proposed. They would have the option to modify their request, or withdraw.

b. If withdrawn, the state would consider the next request as determined in STEP 2, and begin the process over again.

STEP 6 – Draft License Agreement Terms

a. License term for a five-year period, with the option to renew for three (3) additional five-year periods.
b. Fees – As published annually. Once an Agreement has been signed then the rate in effect at that time will remain for the entire License Term.

STEP 7 – Execute License documents as prescribed by policy/law.

REVENUE ISSUES

The revenue received as a result of Licensing Mn/DOT towers will be used to operate and maintain the communications systems of the State of Minnesota. This includes but is not limited to:

- Mn/DOT, State Patrol, and DNR two-way radio system equipment.
  - Tower maintenance (reinforcement, painting, lighting, and new construction)
  - ITS wireless applications (road signs, cameras, sensors, R/WIS etc.)
- Microwave system

Ref: A complete copy of the Policy and Licensing Package described in this document may be obtained from the Mn/DOT-OEC library. Contact the Office of Electronic Communications at (651) 296-7421 for further information.

EXCESS CAPACITY OF RADIO SYSTEM

This discussion pertains specifically to Public Safety Agencies. Public Safety for the purpose of this plan is defined as: Law Enforcement, Fire, Emergency Medical Services, and Highway Dept's. Public Works, Forestry Conservation, School Districts, and any other service provided for and funded by government agencies. Herein after referred to as: "local(s)", "local government" or "public safety agency".

As noted previously in this Plan, the Radio System will be planned and implemented to meet the needs of the State. However, attempts will be made to design the system to meet local needs where and when feasible. This may involve moving a planned tower to an area that will meet local coverage needs while still meeting the needs of the state. However, it must be noted that this must be done at no additional cost to the state. If the local government needs exceed or expand the system beyond that needed by the state, then that portion of the system will be the fiscal responsibility of the locals. As a minimum this plan recommends the following:

- The expanded local portion of the system must still meet the Network and Operational Standards as stated in this plan. This will ensure compatibility to the statewide system.

There may be times when the state system as planned and implemented may meet the local needs. As a minimum this plan recommends the following when and where this occurs:

- A policy be developed that prescribes the manner in which local units of government will be allowed to use the excess capacity of the system.

LOCAL INVOLVEMENT

Early on in the Planning Process for each phase as described in Section I, local government agencies will be involved in the planning process through information exchange meetings. These meetings will assist planners in determining where local resources can be used in the system. It will also identify local agency radio requirements that may be resolved by the proper placement of the state infrastructure. The infrastructure of the statewide system will be available to local government agencies that chose to use the system. Locals may accept the system performance as provided by the state, or add enhancements to the system to meet their specific needs. This plan recommends the following:

- Local use should be on a voluntary basis.
- Enhancements will be the fiscal responsibility of the affected local unit of government.
- Locals will be responsible for purchasing and maintaining their subscriber units (mobiles and portables).
- Locals using the system will pay an annual subscriber fee. The fee will be based on the previous year cost to maintain the system. The total number of mobiles and portables on the statewide system would then divide this cost. Each agency would then be charged this amount based on the number of mobile and portable radios used by that agency.

Other tasks of the Planning Team working with locals:

- Explain project goals and benefits of system to local representatives
- Determine local interest in system participation
- Review Plan to determine if local needs can be met, and or what changes could be made to meet local needs while still satisfying state needs at no additional expense.
- Inform local representatives of how state will proceed and how the plan may or may not fulfill local requirements.

TYPICAL PROCESS WITH LOCAL ENTITIES

- State Engineers target area

- State arrange meeting with local officials of targeted area(s)
    - Meeting
        - Discuss local communication status
        - Discuss what state is proposing
        - Look for common areas

- State engineers develop detail design for targeted area
    - Meeting
        - Present plan to locals
        - Adjust plan if necessary
        - Work out details of shared resources (if any)
        - State begins process to acquire land (if necessary)
        - Modifications to existing facilities if necessary
            - Work with locals if involves their facility
        - State Bid letting for tower(s) shelter(s) etc
        - Site construction
            - Meet with locals to keep informed of progress
        - Specifications for radio equipment developed
        - Bid letting
        - Negotiate contract
        - Award contract
        - Negotiate Service Agreements with Locals for use of system
            - What system will do for locals State responsibilities
            - Local responsibilities
            - Rates
            - Maintenance
            - Training
            - Administration

911 FEE INCREASE

The Public Safety Radio System Planning Committee recommends an increase of 27 cents in the existing 911 surcharge to fund the expansion of basic infrastructure to support a statewide shared public safety radio system that would be compatible with the existing metropolitan system. Currently Minnesota Statute 403.11 provides that the 911 fee may be not less than eights cents nor more than 33 cents per month for each customer access line.

A total of $189 million is needed to cover the costs of the radio system infrastructure, including telecommunication towers, digital radio system fixed equipment, microwave backbone equipment and interoperability equipment. A one cent increase on each wire line and wireless line in Minnesota generates $700,000 in revenue to the 911 fund and would fund $7 million in capital improvement bonds. Debt service costs for out years have not been determined.

METROPOLITAN RADIO BOARD PROPOSAL

Proposal submitted by the Metro Radio Board as accepted by the Statewide Public Safety Radio System Planning Committee on December 18, 2002.

The Metropolitan Radio Board, as a political subdivision of the State of Minnesota, is, by law, responsible for overseeing the planning, development, implementation, and operation of the First Phase of a region-wide public safety radio communications system in the Minneapolis-St Paul metropolitan area. Among its duties and responsibilities are to set standards, procedures, and protocols for the operation of the system, to provide partial financing for the capital costs of the first phase system, to review the plans of metropolitan counties for deployment of their public safety radio system and to review and approve such plans for compatibility with the First Phase system. In the 2002 legislative session a new enactment defined the Second Phase as "The Metropolitan Radio Board building subsystems for local units of government in the metropolitan area that did not build subsystems in the First Phase." That language, which appeared in the senate version of the anti-terrorism legislation, anticipated full funding by the Metropolitan Radio Board of a system-wide metropolitan region build-out. In the conference bill that became law, the definition remained. Although the Board is limited to providing 30 percent of the funding, the Board's policy is to take the lead in encouraging local units to participate and take a broad view of fostering the metro build-out. In keeping with this responsibility, the Board has commissioned the development of detailed design specifications for those jurisdictions in the metropolitan area that did not participate in the First Phase. Integration of the Second Phase system with the First Phase system is necessarily a Board responsibility.

Because the First Phase system will serve as an initial backbone for region-wide public safety radio communications system in a portion of the State of Minnesota and both the First and Second Phases will integrate with and be fully compatible with the Statewide System, the Planning Committee recommends that the Metropolitan Radio Board continue to exist in its present form until the Planning Committee considers the metropolitan area build-out to be complete or the Planning Committee determines or develops a more efficient or effective method of governance for the metro area, as well as the whole state.

PROPOSED CHANGE TO GOVERNANCE STATUTE

The membership and structure of the Public Safety Radio System Planning Committee, as described in statute 473.907 subd. 1, shall serve as the governance body for the statewide radio system.

Sec. 12. [473.907] [PUBLIC SAFETY RADIO SYSTEM PLANNING COMMITTEE.]

Subdivision 1. [PLANNING COMMITTEE.] (a) The commissioner of public safety shall convene and chair a planning committee to develop a project plan for a statewide, shared, trunked public safety radio communication system.

(b) The planning committee consists of the following members or their designees:

(1) the commissioner of public safety;

(2) the commissioner of transportation;

(3) the commissioner of administration;

(4) the commissioner of natural resources;

(5) the chair of the metropolitan radio board;

(6) the president of the Minnesota sheriffs' association;

(7) a representative of the league of Minnesota cities from greater Minnesota, and

(8) a representative of the association of Minnesota counties from greater Minnesota.

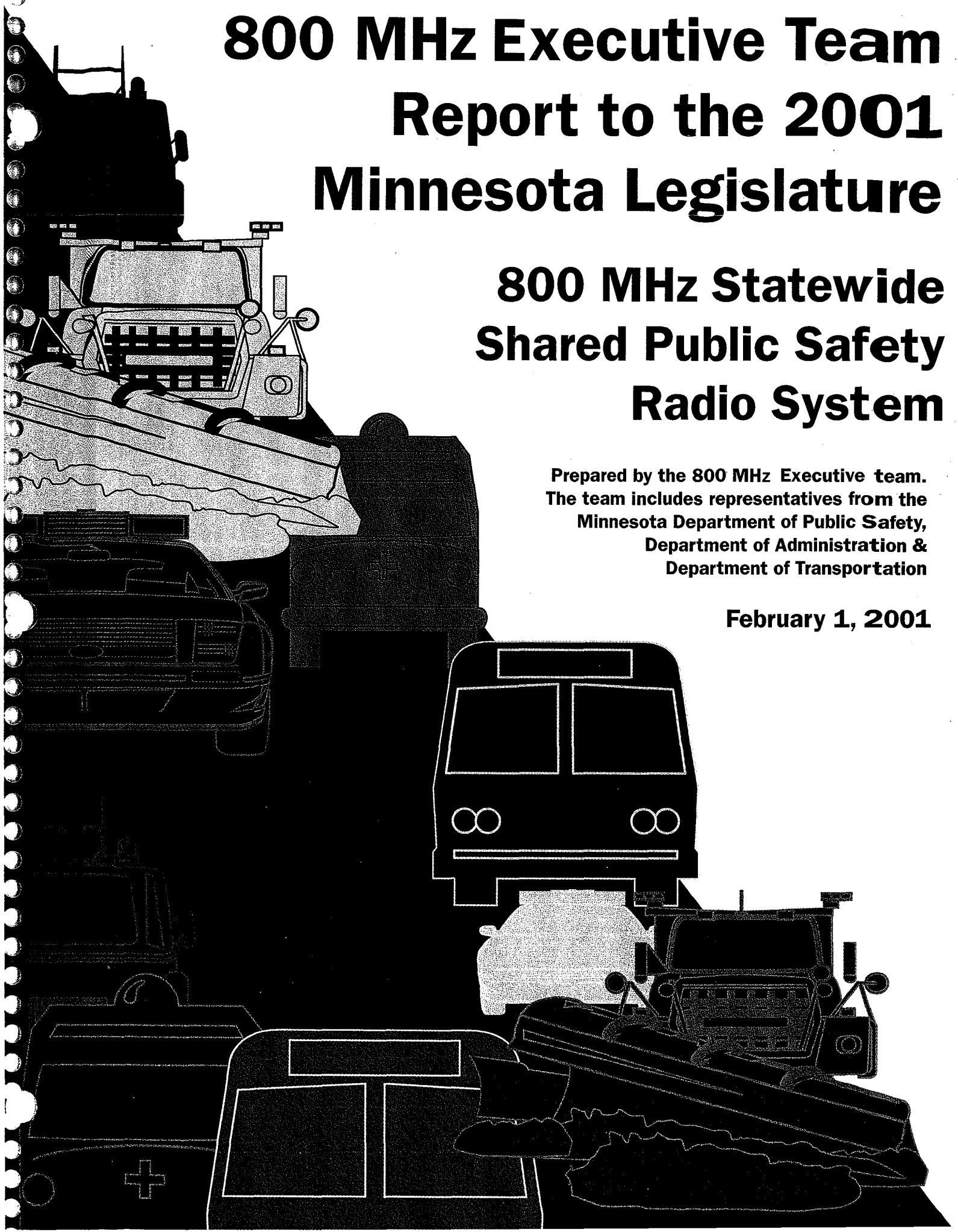
Additionally, the commissioner of finance or a designee shall serve on the committee as a nonvoting member.

800 MHz Executive Team Report to the 2001 Minnesota Legislature

800 MHz Statewide Shared Public Safety Radio System

Prepared by the 800 MHz Executive team. The team includes representatives from the Minnesota Department of Public Safety, Department of Administration & Department of Transportation

February 1, 2001



Commissioners:
David Fisher, Department of Administration
Elwyn Tinklenberg, Department of Transportation
Charles Weaver, Department of Public Safety

800 MHz EXECUTIVE TEAM MEMBERS

Michelle Beeman, Department of Natural Resources, Legislative Director

Anne Beers, Chief, Minnesota State Patrol

Bill Bernhjelm, Department of Natural Resources, Director, Enforcement Division

Laura Bishop, Department of Administration, Director of Legislative Affairs

David Bye, Department of Corrections, Project Manager

Kevin Corbid, Association of Minnesota Counties, Policy Analyst

Joe Cosgrove, Department of Corrections, Security Director

Barbara Cox, Department of Public Safety, Director of Public Affairs

Jeff Davidman, Department of Corrections, Assistant to the Commissioner

Bill Dean, Metropolitan Radio Board, Executive Director

Michael Hogan, Department of Transportation, Planning Director, Office of Electronic Communications

Patrick Hughes, Department of Transportation, Assistant Commissioner, Director, Program Support Group

Tim Lee, Department of Transportation, 800 MHz System Manager

Mancel Mitchell, Department of Public Safety, Deputy Commissioner

Marthand Nookala, Department of Transportation, Assistant Director, Program Support Group

Betsy Parker, Department of Transportation, Government Relations

Jack Ries, Department of Administration, Telecom Support Intertechnologies Group

Doug Selbee, Department of Administration, Senior Planner

Andrew Terry, Chair, Department of Transportation, Director, Office of Electronic Communications

Donald Wicklund, Department of Transportation, Assistant Director, Office of Electronic Communications

Tim Worke, Department of Transportation, Director, Government Relations

Jack Yarbrough, Department of Administration, Assistant Commissioner Intertechnologies Group

Special thanks to the following groups for their participation in the development of the communications survey:

Rochester/Olmsted County Communications
Rochester Public Works & Parks Department
St. Cloud Information Technology Group
Owatonna/Steele County Pearl Street Communications
St. Louis County Communications
Moorhead/Clay County Communications

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Figures and Table

February 2001

Pursuant to 2000 Minnesota Session Laws chapter 475, Section 15, I am pleased to submit the planning committee report of the 800 Megahertz (MHz) statewide shared public safety radio system. The planning committee, also referred to as the 800 MHz Executive Team (E-Team), is comprised of individuals designated by the commissioners of Administration, Public Safety and Transportation, but also includes representatives from other agencies, including the Departments of Natural Resources and Corrections, the Minnesota State Patrol, the Metropolitan Radio Board and the Association of Minnesota Counties.

Over the past eight months, the E-Team developed a survey with input from local users, officials and radio system managers to determine the common issues facing public safety radio users. This survey was distributed to radio users in over 800 cities and 80 counties. The survey results assisted the E-Team in determining the current status and needs of public safety radio users, and is the basis of this report and recommendations.

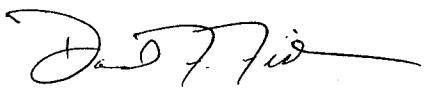
In addition, this report, in draft form, was distributed and discussed among local users in ten community meetings across the state. Nearly 100 individuals attended the meetings. Individuals included representatives from police and fire departments, sheriff's offices, State Patrol, highway and transit departments, emergency management divisions, utilities divisions, city and county administrators and state agency representatives. The feedback received from these meetings, as well as other comments received after the report was more widely distributed by those in attendance, has been incorporated into this report. Comments include views expressed by over 50 local agencies and 37 communities throughout the state.

E-Team recommendations recognize the benefits of a shared statewide radio system, as well as training and transmission standards required should the 800 MHz radio project advance. In addition, the report outlines options for governance structure and funding, but does not include recommendations in these areas until further research is conducted and local input can be incorporated.

The Ventura Administration is not requesting funds in the FY 2002-03 budget to implement a statewide 800 MHz radio system. Instead, state agency and local government representatives should work together over the next two years to explore options for a statewide system that addresses the needs of users outside the seven county metropolitan area. This work includes performing additional design and cost analysis of system options, exploring and refining alternatives for shared financing of a statewide system and establishing a framework for governance that responds to local concerns outside the Metropolitan area as well as within it. The active cooperation of radio system users at all levels of government will be necessary if this project is to go forward.

The goal of the Department of Administration is to assure that any investment in technology such as the public safety radio system adds value to the state and its users. I look forward to your own comments regarding this project.

Sincerely,



David Fisher
Commissioner
Department of Administration

Chapter No. 475
H.F. No. 2891

Sec. 15. [PUBLIC SAFETY RADIO SYSTEM STUDY.]

Subdivision 1. [PLANNING COMMITTEE.] The commissioners of administration, transportation, and public safety shall convene a planning committee to report to the Legislature on a plan for development of an 800 megahertz statewide shared public safety radio system. The planning committee must provide a means for inclusion of input from representatives of local governments and major system user groups.

Subd. 2. [REPORT CONTENTS.] The committee shall review:

(1) current and future needs and capacities of radio systems in outstate areas;

(2) the potential for implementation of a multi-agency and multijurisdictional shared radio system;

(3) potential guidelines for governance and system participation by state and local units of government; and

(4) statutory changes required to implement a statewide 800 megahertz shared public safety radio system.

Subd. 3. [REVIEW CONSIDERATIONS.] In performing the duties under this section, the planning committee may consider:

(1) assessment of current uses, needs, and capacities, including growth and expansion capacities, by each local government and by each major user group;

(2) estimates of future needs by each local government and by each major user group;

(3) estimates by each local government and by each major user group of the anticipated level and timeline for utilizing the radio system;

(4) analysis of the expected costs of implementing the radio system; and

(5) proposed funding mechanisms, including options for allocating costs among local governments and user groups.

Subd. 4. [PUBLIC MEETINGS.] After completing its duties under subdivisions 2 and 3, the planning committee shall prepare a draft report to local governments and major user groups in all outstate areas. The draft report must also be made available to the public. After preparing and disseminating the draft report and before presenting the final report to the Legislature, the planning committee shall meet with representatives of local governments and user groups in each department of public safety radio communication district to explain the report and seek comment.

Subd. 5. [REPORT.] By February 1, 2001, the commissioner of administration shall report to the Legislature on the findings and recommendations of the planning committee. The report must also identify any changes in statutory authority and funding options necessary to provide for implementation of the statewide, 800 megahertz, shared, public safety radio system.

Sec. 16. [EFFECTIVE DATE.]

Sections 2 to 11 and 13 to 15 are effective the day following final enactment.

800 MHz Statewide Shared Radio System Initiative

Origins of the Initiative

In the early 1990s, cities, counties and state agencies (primarily in the Twin City Metro area) experienced rapid growth in radio communications. The increased radio traffic on the public safety systems in the Metro created a severe interference problem among existing users. All FCC radio frequencies within the Metro area were in use, which limited system expansion and, in some cases, prohibited growth of radio systems. Interoperability among public safety agencies was hampered and cumbersome. The 1996 Minnesota Legislature funded the construction of a Metro-wide 800 MHz regional backbone system (Chapter 463, Sec.19, Subd. 3) to meet the demands of the Metro area, and provide capacity for local subsystems to join the network. The implementation of this system is in progress and will be operational in 2002. The problems in Metro are not unique to the area. Outstate public safety communications systems are facing many of the same problems that Metro faced ten years ago. For that reason, the 2000 Legislature directed the commissioners of the departments of Administration, Transportation and Public Safety to convene a planning committee to report to the Legislature on a plan for the development of a statewide, shared public safety radio system. The legislation further directed the planning committee to develop a means to include input from representatives of local governments and major system user groups. As a result of the legislative directive, an 800 MHz Executive Team was formed to study and assess the current and future wireless communication requirements, needs and concerns of the local units of government and major system user groups such as the state of Minnesota, the Emergency Medical Services (EMS) community and school districts.

Local Involvement in Developing Report

From the beginning, the 800 MHz E-Team recognized that implementing a statewide radio system would require a collaborative approach because of the common issues and overall benefits for all public safety radio users. Members from the 800 MHz E-Team conducted briefings with radio system managers, users and local officials around the state to communicate the technical and regulatory issues that are facing wireless users in each region. In order to determine the current status and needs of public safety wireless communication users throughout Minnesota, the 800 MHz E-Team developed a communications survey. To ensure that the survey was understandable and contained the appropriate questions, members from the E-Team conducted several focus group meetings with public safety officials in selected communities to identify issues and refine survey questions. The survey was then mailed to all cities, counties and other major wireless user groups (excluding the Metro area). The responses to the survey helped determine the level of need for improved communications and also helped develop recommendations for this project.

A draft report was developed by the 800 MHz E-Team and then distributed to local governments throughout Minnesota. Ten (10) regional meetings were held throughout Minnesota. With the assistance of organizations such as the Association of Minnesota Counties, League of Minnesota Cities, Minnesota Sheriff's Association, Association of Minnesota Chiefs of Police and the Association of Minnesota Fire Chiefs, the 800 MHz E-Team sent invitations to county and city

administrators requesting their agency's and department's participation at the nearest regional meeting to review and discuss the draft report to the Legislature. The comments received as a result of the regional meetings are reflected in Appendix D of this report. In addition, the report is posted on the Office of Electronic Communications Web page at: www.dot.state.mn.us/oec/os800Report.html.

Major Survey Findings

1 Spectrum Issues

The VHF and UHF radio frequency bands are heavily used by public safety agencies throughout Minnesota. This congestion makes using these bands for today's radio systems very difficult. Expansion of these systems, while maintaining a relatively clear channel, is nearly impossible. Not only do co-channel assignments cause interference, adjacent channel assignments also cause harmful interference to existing users.

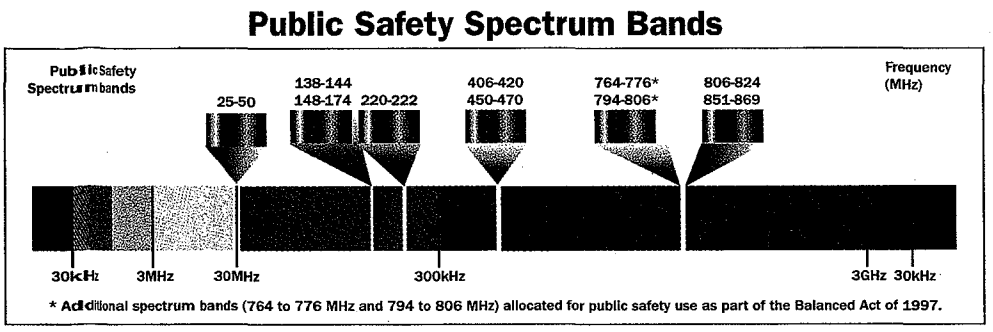


Figure 1

"On a daily basis too many agencies using one frequency. During any multi-agency response radio system almost becomes useless." – Fire Department –

- Nearly 90% of all respondents to the survey indicated that they operate on either the VHF or UHF frequencies. Comment: *This finding lends support to the argument that VHF/UHF frequency bands are saturated with users, thus limiting system expansion for many agencies and departments.*

"When Fire, EMS, Sheriff's and Police cars are involved in a major incident or if separate incidents occur at the same time we only have one frequency that we all can communicate on (sheriff's frequency). Individuals begin to interfere with each other as well as the dispatch. The adjustment (if you want to call it that) is to use different frequencies that are unique to Fire and EMS. This eliminates dispatch and law enforcement cars being able to communicate with them." – Sheriff –

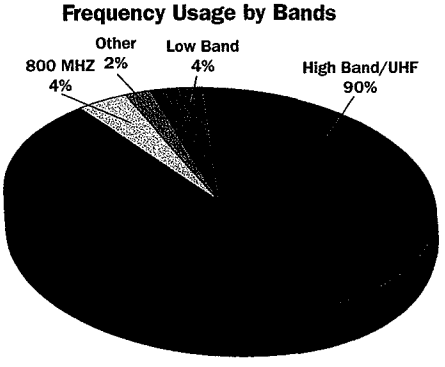


Figure 2

- Almost half of the respondents indicated that the lack of sufficient VHF/UHF radio channels was a problem.

- At least 77% of those questioned share their radio frequencies with other departments or agencies to obtain the necessary level of interoperability. Sharing also occurs as a result of partnerships in order to save money.

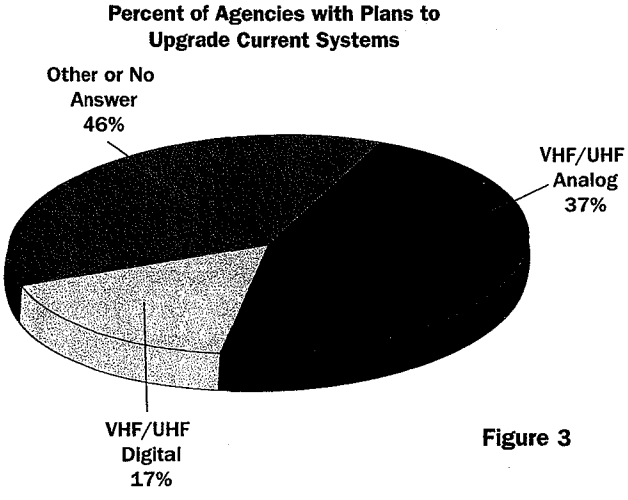


Figure 3

- Nearly 30% indicated that they are planning to upgrade their radio systems within the next six years.

- Thirty-seven percent of the agencies that plan to upgrade plan to stay within the VHF/UHF frequency band. Of those who plan to upgrade, 46% do not know which frequency band they should use for their next system. Comment: *Based on survey responses, it appears that a lack of knowledge of technological advances in radio, a lack of funding and the need to remain compatible with agencies in surrounding communities are key*

factors for community radio systems to remain in the congested VHF/UHF frequency bands.

- The conversion from the heavily used VHF/UHF radio spectrum seems more prevalent in larger departments and coincides with a growing national trend. Individual states and larger communities realize that there are not enough frequencies in these bands to accommodate their growing needs. (Source: U.S. Department of Justice, National Institute of Justice Report "State and Local Law Enforcement Wireless Communications and Interoperability: A Quantitative Analysis".

- Nearly 50% of survey respondents indicated that frequency congestion is now occurring within their area of operation in rural Minnesota.

2 Technology Issues

New technological advances in radio will help resolve the frequency congestion problems noted above. However, the vast majority of public safety radio systems used in Minnesota today are the old analog wideband technology and not the new digital narrowband technology. Although the migration from analog to digital has been underway for nearly four years, few departments outside of the Metro area have migrated to the new digital narrowband technology.

- The average age of radio system infrastructure (when the system was designed and first installed) in Greater Minnesota is 18.1 years. Systems range from 1 to 50 years old. The actual equipment (mobiles, portables and base stations) used on those systems also vary over a wide range from 1 to 45 years old, with the average age of 15.4 years.

- Nearly 55% of those responding to the survey indicated that outdated equipment was a problem for their operations. Another 40% indicated that they did not have enough equipment to adequately outfit employees in their department or agency. Comment: *The survey responses suggest that outdated or insufficient equipment is a contributing factor to the declining performance of radio systems in Greater Minnesota. Many agencies in Minnesota cannot integrate the new digital technology available in radio systems today into their existing infrastructure. This is due mainly to the fact that a majority of the systems use wideband analog technology and the two technologies are not compatible.*

- Sixty-three percent indicated that their radio systems have dead spots within their jurisdictions. Another 60% said that their systems had inadequate range, 53% stated that frequency interference was a major problem to their systems and atmospheric skip caused problems to over half of those who responded to the survey question. Comment: *These findings suggest that technical problems plague a majority of the systems in operation today.*

"Our system's city channel is shared by utilities, public works, police and fire departments. During emergencies communicating is difficult to impossible we all need to support separate channel use." – Utility Department –

"There is a lack of technology in greater Minnesota. State and federal agencies have different radio frequencies than local agencies." – Sheriff –

"On a rescue call and a house fire that were both about 4 miles from town we could not communicate with our base station or our trucks." – Fire Department –

Problems with Existing Radio Systems

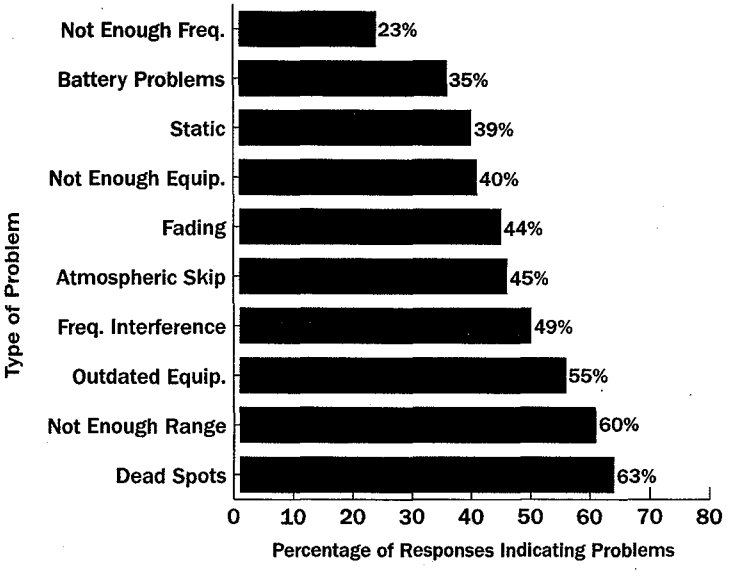


Figure 4

3 Regulatory and Standards Issues (FCC and Industry)

Rapidly advancing technology in radio communications systems, coupled with the introduction of several competing and non-compatible digital standards, has made it difficult for radio-systems managers to navigate through the maze of options available for modifying or replacing their present systems. To keep pace with the technological advances, the Federal Communications Commission made rule changes to deal with these new technologies. Most significant of these changes is FCC Docket 92-235, also known as the "Refarming Docket." This docket was adopted to create additional spectrum through the use of a technology called "narrowband" (see glossary). Other regulations that are influencing public safety radio communications systems are restrictions on system antenna heights and limits on transmitter power.

The Refarming Docket has been successful in creating the new frequencies. However, in order to use the new frequencies, radio users must purchase radio equipment that uses the new narrowband technology. The FCC did not set mandatory dates for radio users to change-out or replace older, existing radio equipment. In fact, the existing equipment can be used indefinitely. However, older equipment is not capable of operating on the new frequencies. Also, the Refarming Docket includes a second equipment migration that will open the door to even more radio frequencies in 2005. However, this migration will require manufacturers to develop radios that use another new technology called "digital" (see glossary).

"It should be mandatory for all agencies in Public Service to have the same emergency statewide channel to operate on in a large emergency." – Sheriff –

In response to the requirement for a digital product, a national effort was undertaken to define a digital industry standard that the marketplace would embrace. Communications officials and organizations from across the country have defined a standard known as Project 25. There are five objectives of the Project 25 standard: a) Frequency efficiency using narrowband channels b) Interoperability among agencies and different levels of government c) Backward compatibility d) Graceful system migration (forward and backward) and e) Scaleable trunked and conventional capabilities.

In spite of the FCC's efforts at "refarming," it has made little impact on the radio frequency shortage problem that exists not only in Minnesota, but nationwide. Why? For whatever reason, radio users have been reluctant to migrate to the new narrowband technology required to use the new frequencies, opting to stay with their existing crowded analog systems. Another contributing factor is the uncertainty among manufacturers about specific technical details of the Project 25 standard. This has delayed the certification by the American National Standards Institute (ANSI) and thus slowed the introduction of affordable digital equipment. Another factor that may be affecting the migration to the new technology is the lack of knowledge or understanding of these issues. Many managers may not be sure how these changes will affect their departments; nor do they understand how these new technologies and standards will benefit them.

So, what is the impact of these two issues? Some users may choose to stay with their existing equipment indefinitely. However, manufacturers now have a standard to follow and are manufacturing narrowband digital equipment. Since the current allotments of existing frequencies are used up, the manufacturers see little economic value in continuing

to manufacture the older equipment. Users will eventually have problems finding equipment compatible to their older technology radios. Parts to repair their equipment will become harder and harder to find. Interoperability will be harder to accomplish, if not impossible, with the various non-compatible technologies in use.

- Findings show that nearly 90% of the respondents were either not familiar, or had little familiarity, with industry standards such as Project 25 and TErrestrial Trunked RAdio (TETRA). Predictably, 90% also indicated that industry standards were of little importance to their agencies. Of the respondents who indicated that industry standards were very important to their systems, all were very familiar with the industry standards issues. Comment: *The findings suggest that there is a direct correlation between knowledge of standards and the importance of standards to their systems.*

Percent of Agencies Familiar with Standards

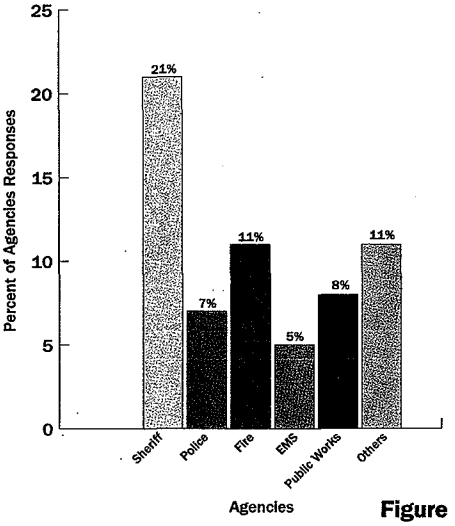


Figure 5

- The majority of individuals (75% of those polled) responsible for making decisions related to the operation, maintenance and upgrading of their agency radio system are not familiar with industry standards and their relationship to their current and future radio systems.

- Only half of the individuals who are responsible for daily management of their radio system have any involvement in the decision-making process for that system.

- Only 27% of the agencies with plans to upgrade their radio systems within the next six years plan to implement systems using the newer digital technology.

- Over half of the agencies that plan to upgrade their systems did not know if they would adopt Project 25 or TETRA standards in their next radio system.

- Almost 90% of respondents indicated that interoperability was an important or extremely important feature for their next radio system. Comment: *System standards are significant for agencies trying to obtain interoperability.*

- The majority of respondents to the survey did not know what frequency band, or how many frequencies, they would need to implement or upgrade their system.

"Use a frequency that is easy for all types of equipment to access and that is affordable for small community." – City Administrator –

4 Funding Issues

The vast majority of comments received from survey respondents indicated that funding is their biggest concern. Many survey respondents, especially from smaller agencies and/or departments, indicated in their comments that participating in a statewide, shared system was not feasible due to cost considerations.

- Only 57% of all respondents indicated they had a budget for their radio system. They ranged from $25 to $1.25 million. The median

range was approximately $2,300. The average budget overall was approximately $38,000. However, if the top 15 budgets for the larger state and county departments are removed, the average budget is cut in half, or $16,000 per year.

- Larger government agencies (state, county and city) tend to have larger budgets, while smaller agencies have little or no budgets.

- A majority of those polled (70%) share radio systems with other governmental agencies. While at least 77% of those questioned share their radio frequencies with other departments or agencies. Comment: *This finding would appear to be significant as it indicates a willingness to share resources in order to save money already exists.*

- The primary concern of respondents was adequate funding for the statewide shared system. Many respondents stated that their communities are concerned that the state will mandate the system and require the local units of government to pay for a share of the infrastructure regardless of their participation in the system. Ongoing operational costs are also a concern of the local units of government, especially the smaller departments.

5 Governance Issues

At present, few formal linking mechanisms exist to encourage and support coordination and partnership between local jurisdictions and the state. Strengthening the partnership between state and local units of government will require a comprehensive strategy. There is no simple solution to address the full range of obstacles.

"Our concern is funding for small County and Local Agencies to acquire the new technology." – Sheriff –

- A large majority (71%) of respondents to the survey stated that they would be willing to participate in a multi-agency, multi-jurisdictional shared radio system.

- The method of governance most preferred (51%) by those responding was state government with local governance representation by those agencies participating on the radio system within the same region. State governance, along with some fashion of local involvement, accounted for another 17%. While 32% of those responding indicated that this decision would have to be made at a higher level than the individual completing the survey. Comment: *Based on written comments, it was clear that outstate local units of government did not feel that they could get equal status and representation if there was Metro involvement in the governing structure within their region.*

'If planning and implementation take place local entities not just metro entities must be involved." – Sheriff –

6 Interoperability Issues

The ability to intercommunicate (interoperability) with other local and state agencies today is difficult and, in some cases, non-existent. The requirement for interoperability among multiple agencies and jurisdictions is a critical component of today's radio systems. With our fast pace and the need to exchange information among agencies and beyond jurisdictions, interoperability is a key piece in any communication system.

- A large majority (71%) of respondents to the survey stated that they would be willing to participate in a multi-agency, multi-jurisdictional

shared radio system. Comment: *This demonstrates a need and the desire for interoperability.*

- Interoperability was important to 88% of those responding to the survey. Comment: *This is extremely significant.*

- In order to obtain some level of interoperability, nearly 70% of those surveyed indicated that they share their radio infrastructure with other public safety agencies.

- Nearly 80% of local units of government in Minnesota made it clear that interoperability was very important and some form of multi-jurisdictional interoperability would best meet their needs. Another 20% said that statewide interoperability is required. A small number of respondents felt that interstate communications was essential.

"During St. Peter tornado, interoperability was a problem with locals. It was difficult to manage crisis. – State Agency –

- The survey sought information on the amount and frequency of interoperability that now exists among local units of government and state and federal government agencies. It was found that nearly 71% of all respondents have communications on a daily basis with other local government agencies. Day-to-day communications between local jurisdictions and the state happens less frequently with 22% indicating that this is a need, while 44% indicated that they never talk to the state. A mere 2% indicated that they have a need to talk to the federal agencies on a daily basis and 80% said they never have a need to talk to these agencies.

"A major train derailment in Otter Tail County involved several departments not on our radio system." – Sheriff –

- Nearly 80% indicated that they share their frequencies with other departments and agencies. Comment: *This finding suggests that agencies share frequencies in order to be able to intercommunicate with one another.*

Recommendations

The State Should Take the Lead in Planning and Design

An 800 MHz digital trunked radio system is proposed to replace the current collection of stand-alone radio systems. The state should take the lead in the design, implementation and maintenance of an 800 MHz digital trunked radio system that will be available to all jurisdictions across the state. This system will serve as a key to ensuring that public safety entities across the state have an effective, reliable tool to perform their duties today and well into the 21st century.

Why the State Should Take the Lead

The state should take the lead for this project because the three major state radio users (the Minnesota State Patrol, the Department of Natural Resources and the Department of Transportation) have the most significant need for statewide radio communications. In order to meet this requirement, the state will have to construct the infrastructure to provide the necessary services. The single infrastructure of the state could be capable of supporting all local government services as well as the state's. Designing and implementing a statewide system to meet both state and local needs will require close cooperation and coordination among local agencies responsible for wireless communications in their jurisdictions and the state (primarily Mn/DOT).

"Don't make mandates or Laws without making sure there are monies available for Local government agencies to use."
– Fire Department –

However, some local agencies, such as Rochester/Olmsted County, St. Cloud, Moorhead, Rice/Steele Counties, etc. have already begun the process of building partnerships with others and, in some cases, to coordinate and share systems or components of their systems. In order to achieve the vision of a shared statewide interoperable radio system, coordination will be required on a statewide basis, and the state of Minnesota is in the best position to oversee or lead this process.

The following recommendations are the first steps in facilitating the cooperation and coordination, and ultimately the construction and operation, of a shared, statewide radio system.

1. Based on the findings from our research, an incremental approach is recommended, beginning with efforts to achieve voluntary participation among governmental jurisdictions. Stronger intervention through legislative mandates to obtain participation is not recommended.

2. Education, training and technical support are essential first steps that may go a long way toward achieving the necessary level of cooperation and consistency among the jurisdictions on a voluntary basis.

3. Develop a governance system that will give local units of government in Greater Minnesota fair and equal representation. Establish regional planning committees of state, county and municipal officials to incorporate local needs and concerns into the initial planning of the system and the identification of necessary next steps.

4. Full statewide consistency among jurisdictions may not be achievable through education and voluntary cooperation alone. The Legislature should mandate adoption of industry standards for the radio system, and give the state technical oversight of local decisions impacting access to the system, the design of the system and the overall implementation of the system.

5. Cooperative cost participation guidelines and associated procedures for the proposed outstate 800 MHz trunked radio system will need to be developed. Costs associated with the project should be borne by the unit of government benefiting from the element of the project.

Start with Standards, Preliminary Design and Education

1. **Establish Radio System Standards as Guidelines**
   To provide a common basis for decision-making by all jurisdictions, the state should establish the standards and recommended guidelines for components of the system. The state should consult with the affected local jurisdictions to communicate the fundamental benefits of the standards or guidelines to the overall system and users.

2. **State Develop Preliminary Design**
   The state, in cooperation with local units of government, should appoint a committee of engineers, planners and others involved in communications for each of the yet-to-be-determined regions of the state. These committees are intended to ensure that all aspects of

the system design are considered and appropriate input from local jurisdictions is received.

3. **Provide Education to Potential Users of System**
The state should initiate an education program for state and local officials that will be affected by the implementation of the statewide radio system. The education effort should include, but not be limited to, the following: FCC rules and regulations, Industry Standards, public safety market, technology, partnership/governance.

4. **Planning and Transition**
Implementation of the new 800 MHz digital trunked radio system needs to be carefully planned for orderly growth. A complete network infrastructure including towers, base stations, controllers, switching equipment, microwave links and fiber optics (Connecting Minnesota) must be installed in order to provide a functioning system. The initial system technical design must take future growth into consideration to ensure that adequate facilities are implemented to accommodate future requirements, Therefore, a great deal of the planning effort will be directed toward the transition from the current radio system over to the new 800 MHz trunked system.

"There should be uniform radio language protocol and protocol for radio procedures (operations)." – Ambulance –

While it may appear to be financially desirable to extend the implementation of the entire system over a period of seven to 10 years, that may not be practical from a technical standpoint. Implementing portions of the 800 MHz system in limited areas around the state, while leaving other portions of the state still operating with the old VHF/UHF systems, could pose some challenging operational problems. Additionally, maintaining two distinct radio systems places a large technical and financial burden on state resources. Realizing that agencies will be at different stages of budgetary readiness for the transition to the new system presents additional difficulties.

"Smaller agencies lack the personnel with enough knowledge to properly operate radio systems and the money to properly maintain them."
– Public Works –

Therefore, the 800 MHz E-Team recommends that the system should be implemented in phases over a five year period. This implementation plan will reduce the amount of time and money the state must invest in maintaining two radio systems. The system should first be installed in areas where there is already interest from the communities (Rochester/Olmsted County and St. Cloud).

Governance Alternatives

Introduction

There are several options that could be considered for governance of a statewide public safety radio system. These include:

- Establishing a statewide board that would incorporate the functions of the existing Metropolitan Radio Board.

- Assigning the responsibility for either the non-Metropolitan area or the entire state to an existing state agency (e.g., the Department of Transportation, the Department of Public Safety or the Department of Administration).

- Establishing a separate board for the counties, cities and other local units of government outside of the Metro area.

Alternative 1

Statewide Board

A board could be created with responsibility for planning, technical oversight, coordination among users, financial administration and other functions. This organization could receive revenue, including legislative appropriations and authority to issue bonds, for construction of a statewide public safety radio system. Members would include representatives of the state agencies most affected – the Department of Transportation, the Department of Natural Resources, the Department of Public Safety and representatives of local governments. It could be given powers of a state agency, such as the power to enter into contracts, incur debt and the like. The board would employ an executive director and staff. Depending on the funding options chosen, the board could be the organization empowered to make grants and/or loans to local units of government for costs attributable to those organizations. The Metropolitan Radio Board would be abolished and the newly created statewide board would assume all of its responsibilities. The Metropolitan area could be represented by an organization of its own choosing, or Metropolitan counties and cities could determine how they would be represented in the same manner as outstate local units of government determined their representation.

Advantages:

1. This could provide a single statewide focal point for leadership and coordination of this program.
2. Broad representation and participation in decision making could occur through membership on the board by representatives from a variety of organizations.
3. Decisions would have greater local involvement, resulting from participation by persons who may better understand local needs and concerns.

Disadvantages:

1. The new board could be so large that it would be hard to make decisions by consensus.
2. There could be some difficult transitional problems associated with abolition of the Metropolitan Radio Board (note that the Board is scheduled to sunset on July 1, 2002).

Alternative 2

State Agency Leadership

Under this alternative, the overall planning, technical oversight and related functions could be assigned to a state agency – e.g., the Department of Transportation, the Department of Public Safety or the Department of Administration. This agency could establish various advisory and planning committees to assure participation by local government and other affected interest groups.

Advantages:

1. The responsibility for the development and leadership for the 800 MHz system would be clearly defined so that accountability is clear.
2. Legislative appropriations could be directed to the chosen state agency, whose commissioner would report directly to the governor.
3. Relying on an existing state agency could reduce the start-up difficulties and the need to establish basic administrative processes (e.g.,

accounting and human resource functions).

Disadvantage:

1. There may be a perception that a board directed by a state agency in St. Paul would be less receptive to addressing the concerns of local governments, particularly those outside of the Metropolitan area.

Alternative 3

Separate Board for Non-Metropolitan Counties

This option is similar to Alternative 1, except that the Metropolitan Radio Board would continue to handle its existing responsibilities for the seven county Metropolitan area. A separate board could be created with responsibility for planning, technical oversight, coordination among users, financial administration and other functions. This organization could receive revenue, including legislative appropriations and authority to issue bonds for construction of a statewide public safety radio system. Members would include representatives of the state agencies most affected – the Department of Transportation, the Department of Natural Resources, the Department of Public Safety and representatives of local governments. It could be given powers of a state agency, such as the power to enter into contracts, incur debt and the like. The board could employ an executive director and staff. Depending on the funding options chosen, the board could be empowered to make grants and/or loans to local units of government for costs attributable to those organizations. Different areas of the state could form regional committees for consolidating planning and choosing representatives to serve on the non-Metro statewide board.

Advantages:

1. A separate organization representing the non-Metropolitan area could deal with the concerns of the rest of the state.
2. Broad representation and input to decision making would occur through membership on the board by representatives from a variety of organizations.
3. Decisions would have greater local involvement, providing for participation by representatives from outside the Metro area who may better understand local needs and concerns.

Disadvantages:

1. The greatest difficulty would be ensuring the compatibility and interoperability of public safety radio systems across the geographic boundary between the Metro and non-Metro systems. Having two separate systems would require careful timing of funding and extensive negotiation and coordination of infrastructure and equipment selection decisions.
2. The new board might be so large that it would be hard to make consensus decisions.
3. Since the Metropolitan Radio Board would continue to exist, the two separate boards would compete for available funding (the Metropolitan Radio Board is scheduled to sunset on July 1, 2002).

Funding Alternatives

Introduction

The discussion of funding options is divided into three parts:

I. Initial infrastructure needs;

II. Initial equipment needs; and
III. Ongoing maintenance requirements.

Under each part, several possible funding alternatives are presented. There are probably other alternatives that could be developed.

I. Initial Infrastructure Needs

This discussion assumes that state revenues will be used to pay for the initial capital infrastructure costs associated with a statewide public safety radio system, except for costs incurred specifically to meet needs that are unique to a local government (Final financing plans may make a different assumption). Infrastructure includes land, towers and shelters and will cost an estimated $183 million over five years.

Alternative 1

General Obligation Bonds of the State of Minnesota

The state could issue general obligation bonds (in most cases 20-year repayment scheduling) and use the bond proceeds to fund these capital costs. The bonds could be repaid with state general fund revenues. Proceeds from the sale of trunked highway bonds could be used to pay for infrastructure directly related to trunk highway system needs. The trunk highway bonds would be repaid with revenues from the trunk highway fund (e.g. gas tax revenues) or a combination of general obligation and trunk highway bonds could be used.

Advantages:

1. Bonds carry a known repayment schedule and provide predictable cash flow.
2. Bonds could provide an up-front commitment of funds for the entire project.
3. The money provided by the sale of bonds would reduce the need for cash general fund appropriations.

Disadvantages:

1. Interest on bonds adds to the cost of the project.
2. Bond proceeds can be used only to purchase capital assets, not consumable items such as equipment.
3. Because the Legislature has a policy that only 3% of state revenues may be used for debt service, the total amount of state general obligation bonds that may be authorized each biennium is limited, resulting in intense competition to have projects included in the state bonding bill.

Alternative 2

Direct Appropriation by the Legislature

Direct appropriations from the state's general fund and/or trunk highway fund could be made to fund the infrastructure costs. Under this scenario, a state agency, such as Mn/DOT, Department of Administration or Public Safety, could receive and expend or distribute the funds so appropriated. Since appropriations are made on a two-year budget cycle, and expenditures for this project are planned over a five-year time period, it would be necessary to return to the Legislature for financial resources in future years.

Advantages:
1. Statewide needs could be met with state funds.
2. There would be no interest payments.
3. State funding would relieve local governments of the need to find money they will be unable to obtain individually.

Disadvantages:
1. Competition for state funding is intense and this project would compete with other important needs such as school aid, human services and tax reduction strategies.
2. Trunk highway funds could be used to fund only the parts of the infrastructure that served a trunk highway purpose.

Alternative 3

Public Facilities Authority

The state Public Facilities Authority operates similar to a traditional banking institution in that it makes low-interest loans to public entities, principally local governments, to finance public works projects. This option would require some "seed money" to provide capital for initial loans. A specific governmental body could enter into a loan agreement and commit to repayment based on revenues at its disposal, which could include a dedicated revenue source such as 9-1-1 fees, future federal funds, property tax levies or user fees. This option would require amending Minnesota Statutes, chapter 446A to allow the PFA to make loans for costs or projects associated with the construction of the statewide public safety radio system.

Advantages:
1. Loans could be made for both capital and consumable equipment.
2. This would allow borrowers to avoid the competition for general obligation bonding authority.
3. The PFA offers lower interest rates to borrowers than state general obligation bonds.

Disadvantages:
1. This would require statutory amendments
2. Interest on the bonds would add to the total project cost.

Alternative 4

Lease Agreements with Private Sector for Tower Capacity

With a change in state law, the state could lease its excess tower capacity and use those receipts to offset the trunk highway system costs of the public safety radio system.

Advantages:

1. This would provide a new, non-tax source of revenue.
2. There would be a direct relationship between this revenue and the public safety radio system.
3. Sharing tower space could potentially reduce the proliferation of towers.

Disadvantage:

The amount of revenue that could be derived from tower leases is unknown.

II. Initial Equipment Requirements

This discussion assumes that a combination of state and local dollars, depending on ownership of the equipment, will be used to fund the initial equipment requirements. Equipment requirements are defined as antenna systems, repeaters, controllers, receivers, consoles, microwave dishes and radio units. The initial equipment costs for complete conversion are estimated to be $36.5 million. State bond proceeds cannot be used for these costs, since the life cycle for this equipment is less than would qualify for state bonding.

Alternative 1

State General Fund Loan Account

The Legislature could create and fund an account to provide loans, grants or both to state agencies and local governments to pay for equipment. Loan repayments would be deposited in the general fund as non-dedicated receipts (to avoid creating a revolving account). Direct appropriations could be made to fund this account.

Advantages:

1. This would provide up-front funding for local governments and allow them to spread repayment over a longer time period.
2. Grants to local governments would provide an incentive for them to participate in the statewide system.
3. Grants could be directed to local government entities with the greatest need.

Disadvantages:

1. Competition for state funds is intense.
2. Trunk highway funds could be used only for the part of the radio system that served the trunk highway system.

Alternative 2

Public Facilities Authority

The PFA, as described above, could be used to fund the initial equipment requirements up to the expected lifetime of that equipment. The advantages and disadvantages are the same as described in that section.

Alternative 3

9-1-1 Fee

Currently, a portion of the statewide 9-1-1 fee collected by the Department of Administration is made available to the Metropolitan Radio Board for 800MHz operations in the Metropolitan area. The Legislature could increase this fee to provide additional funds for the construction and operation of a statewide public safety radio system.

Advantages:

1. This would provide an ongoing and broad-based revenue source.
2. The cost to an individual telephone customer is small.

Disadvantages:

1. An increase in the 9-1-1 fee may be seen as an indirect tax increase.
2. The amount of funds that can be raised through an increase in the 9-1-1 fee may not be large enough to fund both debt service and on-going maintenance.

Alternative 4

Special Taxes/Fees

Any one or more of a variety of new fees, surcharges and/or special taxes could be used to generate revenue to purchase needed equipment. Approaches used by other states to fund 800MHz initiatives have included emergency room surcharges, ambulance surcharges, special excise tax on radio equipment and traffic violation surcharges. Any new special tax or fee would likely need to meet the test of a direct, or at least indirect, relationship between benefits received from the new system and payment of the tax, fee or surcharge. The Legislature could enact a new fee or surcharge or could authorize local governments to impose or raise fees or special taxes.

Advantage:

There is a strong relationship between the local benefits of the public safety radio system and fees to taxes imposed to construct and maintain it.

Disadvantage:

There may be resistance to the imposition of new taxes for fees at both state and local government levels.

Alternative 5

Federal Grants

There are a number of federal programs that provide grants to states, counties and cities for public safety purposes. The following list of federal programs is illustrative only:

COPS MORE
Edward Byrne Memorial State and Local Law Enforcement Assistance
Local Law Enforcement Block Grant
Rural Outreach Network Development Program
FEMA Grants
TOPS Grants
DOJ Assets Forfeitures Funds

Advantage:

Reduce the need for state or local financial resources.

Disadvantages:

1. This program would compete with other criminal justice and law enforcement programs for these funds.
2. It is unknown whether the public safety radio system would be eligible for the kinds of grants listed above.

III. Ongoing Maintenance Requirements

This discussion assumes that local units of government will be responsible for the ongoing maintenance of the subscriber equipment. Subscriber equipment refers to mobile and portable equipment and other components directly benefiting their jurisdiction. The state will be responsible for maintaining its subscriber and dispatch-related equipment. The following alternatives are methods that can be used to generate revenue to pay for the ongoing maintenance and upgrade of the infrastructure that is being used by all users of the system. This includes items such as infrastructure component repairs, software upgrades to the system controller(s), but does not include system

expansion for new transmitter locations.

Alternative 1

Annual Radio Fee for Users of the 800 MHz System

If the state were responsible for maintaining the statewide public safety radio system (infrastructure), it could charge an annual radio user fee. The fee could be cost averaged based on the number of subscriber radios used on the entire statewide system by all agencies including the state.

Advantages:

1. An annual fee lowers the ongoing operational and maintenance costs for all users of the system. The more users, the lower the annual fee.
2. Since the annual fee is fairly constant (adjusted periodically based on the number of system users), entities can budget each year for the cost of operating on the radio system as opposed to incurring costs on a case-by-case basis.

Disadvantage:

1. Local governments would have to find a way to generate the revenue needed each year to pay the annual fee.

Alternative 2

General Local Revenues

As stated above, it is assumed that a local unit of government would have responsibility for maintaining its radios and component equipment. This alternative discusses ways that local units of government could obtain revenue to pay for the annual fee as well as money to pay for the repair of their subscriber equipment. This alternative could involve direct payment of these expenses from a local revenue source. The predominant source of local revenue is property taxes.

Alternative 3

Subscription Charges

This option would involve the local unit of government assessing local users of the system who are operating on the system under the authority of the local unit of government, a one-time (or recurring) subscription fee. These receipts could then be used to pay for local equipment maintenance or perhaps offset future equipment replacement costs. Examples of "local users" that could be assessed the subscription charge may include schools districts, private tow truck operators under contract with a governmental entity, the media, private hospitals or it could even include all agencies within their jurisdiction.

Summary

Funding options and governance options should not be viewed in isolation. In order to create a system that serves both state and local needs, a governance structure that addresses and responds to local concerns and needs outside the Metropolitan area must be developed. Because of the large capital costs of the radio system and the widely varying sizes and budgets of its potential users, a combination of approaches will be necessary to provide adequate funding. These two issues are both very complex and very political. Additional discussions and plan-

ning that includes representatives of radio users outside the Metropolitan area will be necessary to move this project forward.

800 MHz Digital Trunked Radio System Benefits

What is Trunking?

First, what is a trunk? A trunk is a communications path between two locations. Communication needs of a large number of users can be provided for by efficiently sharing a small number of trunks. In the context of this report, trunking means the automatic sharing of a group of communication paths (trunks) among a large number of users. A trunked radio system simply uses multiple radio repeaters controlled by a central processor device that allows a large number of mobile or portable radio users to share the repeaters. This is similar to the technology used by the telephone companies for the shared use of telephone lines. A single radio system can be shared by a number of different user groups, eliminating the need for each group to own, operate and maintain its own system.

Spectrum Considerations

The 800 MHz digital trunked radio system will make optimal use of spectrum that is already assigned to the state and local jurisdictions through a previous frequency plan. The 800 MHz trunked system will provide 95% reliable coverage for "on the street" portable radios throughout the state. The statewide system will be fully compatible with, and utilize components implemented in, the Metro 800 MHz system.

Technology Changes

The proposed system is a quantum leap in technology, going from the old 1965 technology, to the state of the art system for the next century. The digital network represents improved performance, increased capacity and new capabilities. The proposed system will meet the current industry standards for digital trunked radio systems. The central processor devices (Zone Controllers) that will be used in the Metro 800 MHz system can be used to control many of the transmitter sites throughout Minnesota. This will reduce the number of controllers required for the outstate system. Units (radio users) traveling from outstate Minnesota to the Metro area will be able to communicate while en-route as well as within the Metro area. The same holds true for Metro users traveling throughout Minnesota.

Interoperability Issues

The statewide shared system or network will enable instantaneous interoperability among multiple state agencies as well as those jurisdictions routinely working with state agencies. The proposed 800 MHz digital trunked radio system will enable users in one area of the state to communicate to another individual, or group of individuals, in another area of the state. It will create a seamless statewide system or network. This single shared system could gradually replace the hundreds of individual radio systems currently operating and could provide for a high degree of reliability and interoperability among state agencies as well as among local, state and federal agencies.

Direct Benefits

The digital network represents improved performance, increased

capacity and new capabilities. The system would be capable of supporting not only state operations, but could also be shared with local jurisdictions throughout the state.

- Shared resources such as frequencies, towers, land and infrastructure equipment
- Enhanced radio coverage
- Multi-agency, multi-jurisdictional interoperability
- Capacity to accommodate local units of government
- Wide-area communications
- Shared or lowered costs
- Digital transmissions that make it difficult for unauthorized monitoring of frequencies
- Lost or stolen radios can be disabled by the agency that will prohibit unauthorized use

Approaches to a Statewide Radio System

Why 800 MHz? Why not cellular or personal communication services? Has satellite been considered? What about leasing radio services from a commercial system? These are commonly asked questions that the E-Team heard when meeting with local officials from across the state. The answer is yes; all of the above have been given consideration, as well as some other options that are discussed below. Each of the above options has its pros and cons and a niche that it fulfills. However, because of the unique requirements of public safety, each was dismissed from consideration.

Why is public safety unique? Public safety radio systems provide communications to and among fleets of vehicles, officers and or employees. Interoperability among dissimilar departments is critical to public safety operations. Many departments operate their communications equipment on a 24-hours-per-day/seven-days-per-week basis. Therefore, the equipment used in a public safety system must meet very high standards for reliability and durability along with a high degree of functionality. Public safety systems must be versatile and capable of meeting daily operational and administrative needs. They must also meet the needs of special operations such as S.W.A.T. units, drug interdiction units, undercover operations and emergencies such as floods, tornadoes, aircraft accidents and acts of terrorism. Law enforcement systems are typically designed to provide 90 to 95% reliability and coverage within a department's geo-political boundaries.

Following is a brief explanation of why the options noted above were dismissed:

Cellular/PCS –PCS is basically a digital version of the older analog cellular systems, only PCS has greater capacity and functionality. Cellular/PCS commercial systems have developed comprehensive systems that provide service or coverage to a large portion of the population of Minnesota. However, cellular and PCS services are mainly concentrated in urban areas and along the main highway systems of the state. This is especially true for digital PCS services. Cellular and PCS services are primarily a one-to-one mode of communications. A public safety dispatcher communicating to a fleet of officers or employees

with cellular/PCS would have to generate numerous calls to communicate a single message to each officer. Precious time would be lost informing police officers that shots have been fired, or a dozen firemen that a burning building must be evacuated using cellular/PCS technology.

Satellite –Satellite has found a niche in the wireless communications market. The trunking industry has found satellite communications to be a useful means of keeping track of shipments and truck drivers on a national basis. However, satellite has a major drawback for public safety, because it does not work if the radio unit is not within line-of-sight to the satellite. Buildings, parking garages, tunnels and large stands of trees can all obscure a radio's ability to communicate to the satellite. This would not be acceptable for critical communications such a police, fire and emergency medical incidents. Satellite is not frequency efficient for land mobile operations contending for channels against users from all over the U.S. or worldwide.

Leased service – Several wireless companies now provide wireless radio systems that use much of the same technology that this report is recommending for the statewide 800 MHz system. These systems are sometimes referred to as Specialized Mobile Radio Systems. SMRS are widely used by contractors, other non-critical business operations and private citizens for communications. SMRS are implemented in highly populated urban areas where there is a high financial return on the investment of constructing and operating such a system. These systems are not designed to provide the degree of reliability and coverage required by public safety. This is not to say that a commercial wireless provider could not design and build a system that would meet user needs. However, the cost to do so would undoubtedly be passed onto the subscriber through monthly lease rates. Since SMRS are primarily used by thousands of non-public safety users, there is always a chance that the system would not have a channel available during critical situations. A busy channel, even if only for three seconds, could be like an eternity for an officer calling for help.

The E-Team gave consideration to three additional options. Each of these options involve making use of existing systems or constructing a new dedicated private system.

State and local officials can take three basic approaches to upgrade or replace their aging radio systems:

I. Do nothing
II. Upgrade to VHF/UHF digital radio systems
III. Upgrade to 800 MHz digital trunked systems

Each of these approaches has its strengths and limitations. All three approaches provide different levels of performance, interoperability, functionality and cost.

I. Do Nothing Approach

Agencies, including the state, that have new or adequate systems may choose the wait-and-see approach. However, planners and managers should be aware that purchasing replacement equipment in the future will become complicated and expensive due to FCC type acceptance

requirements (Refarming Docket 92-235) for future narrowband and backward compatible radios. While it may appear to be more cost effective to do nothing now, eventually the current radio systems will become old and obsolete. Therefore, replacement is inevitable.

Drawbacks to this approach are:

- The current analog systems cannot deliver the new features that are offered with the new digital radio systems.
- Current radio systems are unable to meet user needs of delivering fast, reliable, secure communications to the officer or employee in the field.
- Equipment failures will become more common and repair costs will increase as system components become more difficult to obtain.
- Interference from co-channel and adjacent channel users will increase due to frequency congestion.
- Opportunities will be lost for partnerships and for sharing resources and costs.
- Interoperability will continue to rely on a patchwork of systems.

II. Upgrade to VHF/UHF Digital System

This approach involves replacing the current VHF or UHF wideband analog system with a digital VHF or UHF narrowband system. This requires that all components of the existing system be replaced. Although this approach will provide a new system, there will still be some inherent problems typical of the VHF and UHF frequency bands. This approach incorporates all of the current FCC requirements for type acceptance for narrowband systems. However, the FCC has mandated one additional type acceptance migration to take place on January 1, 2005. Therefore, this approach could require considerable upgrading in just a few short years.

Drawbacks to this approach are:

- Co-channel and adjacent-channel interference from existing and new users
- Expensive system change-out.
- FCC mandated migration to 6.25 kHz in 2005
- Inherent characteristics of VHF band will still be present and users will still be plagued with atmospheric skip.
- Interoperability remains a patchwork of systems.

III. Upgrade to 800 MHz Digital Trunked Radio System

As with the VHF/UHF digital upgrade, changing to 800 MHz also requires a complete system change-out. Therefore, it is also an expensive option. However, this is the best option when considering the performance and features offered compared to VHF/UHF conventional or trunked digital systems or 800 MHz conventional or trunked analog systems. This type of system offers clear channel assignments and greater expansion opportunities. An 800 MHz trunked system offers interoperability to all participating agencies, as well as simulcast capability for better spectrum efficiency. FCC rules have already been incorporated into the design of 800 MHz subscriber equipment. Therefore, there is no type acceptance migration to contend with at a later date.
Drawbacks to this option are:

- Expense

Additional towers required to obtain the high level of coverage desired (95% for portables on the belt, on the street).

System Costs

Costs

Due to its size, there are certain economies of scale and predicted cost savings that can be realized by sharing in the implementation and use of the statewide 800 MHz system. There is not a specific detailed design for the 800 MHz digital trunked radio system. Preliminary planning has been completed for budgetary and general guideline purposes. Specific detailed engineering planning will be completed at a later date.

Preliminary Cost Estimates Are As Follows:

Infrastructure equipment (land, towers, shelters, generators, antenna systems, repeaters, controllers, microwave)

Infrastructure sub-total $183,124,000.00

Subscriber Equipment (mobile and portable radios)
The exact number of radios required cannot be determined at this time. Therefore, 8,500 radios was used for budgetary purposes. The number of radios was based on estimated users for the state of Minnesota agencies (State Patrol, Mn/DOT, DNR, BCA, Emergency Management, colleges, hospitals, etc.) only.

Subscriber sub-total..... $20,000,000.00

Additional Costs:
*The exact number of Zone Controllers cannot be determined until the system design and number of users has been determined. Therefore, the following costs are estimates for budgetary purposes.

ITEM	NUMBER REQUIRED	COST
Zone Controller with Omni link	*3	$12,000,000.00
Interoperability costs		$ 4,500,000.00
STATEWIDE GRAND TOTAL		$219,624,000.00

Unified Approaches to a Statewide Radio System

A trend that has continued since the early 1990's is that public safety and local government radio communications needs throughout the state have grown steadily and are expected to grow significantly. At the same time that communications needs are growing so rapidly, the ability of governmental and public safety agencies to upgrade their existing VHF/UHF systems is limited due to the lack of available frequencies, lack of funding and limitations caused by the aging technology of their equipment and system design in general (refer to findings).
For these reasons, the 800 MHz E-Team believes that a single system can best meet the needs of all governmental and public safety entities at significant savings to the taxpayers of Minnesota.

Individual Systems (Alone)

Without a doubt, the cost for the state to design and build a single system will cost in the hundreds of millions of dollars. However, if each agency designs and installs it's own system the cost to tax payers could, by some estimates, come close to one billion dollars. Worse yet, independent systems will be islands unto themselves with little or no capability for interoperability with other governmental agencies. Or, at best, agencies will have to continue with the patchwork of systems to obtain the desired level of interoperability.

Taxpayer monies are used to purchase multiple systems within a jurisdiction. For example, city "A" may have a police radio system, a fire system and public works system that taxpayers will eventually have to pay for. The county that city "A" resides in may also have three systems: county sheriff, highway department and parks radio systems that will be paid for with city and county taxes. The state of Minnesota also maintains multiple radio systems such as the State Patrol, Mn/DOT and DNR systems that are funded by city, county and state taxes.

Table 1 reflects cost projections for system replacement or upgrade based on typical costs for systems serving a general range of population. These projections exclude the nine-county Metro area and state of Minnesota government agencies

Table 1 Cost Projections if Agencies Upgrade Alone

No. & Pop. of Community	# of Radios	Min/Max.Cost
3 entities w/pop over 100k	600 + radios	$14 million
30 entities w/pop between 50k–100k	450-600 radios	$ 75 million
48 entities w/pop between 25k–50	350-450 radios	$ 48 - $120 mil.
60 entities w/pop between 10K–25K	250-350 radios	$ 60 - $150 mil.
949 entities w/pop under 10k	50-250 radios	$ 475 - $ 949 mil.
TOTAL 1,090 entities		**$672 mil - $1.30 bil.**

Typical industry costs based on numbers of radios:
System upgrade costs include fixed & subscriber equipment:
System serving 600 + radios @ $4.7 million each
System serving 300-600 radios @ $2.5 million each
System serving 100-300 radios @ $1 million each
System serving 100 or less radios @ $500,000 each

Source: Motorola C&E and Transcrypt Intl.

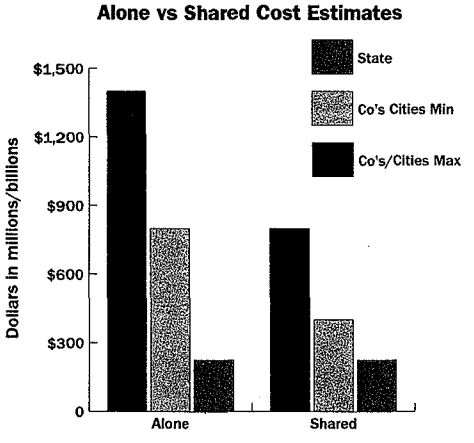


Figure 6

Shared System

Using the shared system approach, there is only one infrastructure, resulting in significant savings to taxpayers. With either scenario, the state cost remains constant. There may be a slight savings to the state with the shared approach due to sharing of land or tower facilities. The costs reflected in Figure 6 for the shared approach represents the cost of mobiles, portables, console upgrades and other enhancements required or desired by the local jurisdictions.

Obstacles to a Shared Statewide Radio System

Many local communities around the state are willing to work closely with the state to develop a comprehensive plan for a shared, statewide radio system. But the degree of coordination and cooperation is not sufficient for a successful plan and eventual implementation of a system.

Our investigation has identified a variety of obstacles to developing this project with local communities and impeding the progress of this project.

Many players

Planning for a statewide radio system involves many players - landowners, neighborhood groups, local elected officials and the state - each having somewhat differing goals and perspectives. Each tries to maximize its benefits and minimize its costs, often seeking to shift costs from one to another or even to future generations by postponing or rejecting recommended changes to their current systems.

Time lags

Large problems arise over time, from many small, uncoordinated decisions. Many local officials are simply not aware of the problems that can result from poor decisions made with regard to the present radio systems. Radio system problems may not show up immediately. But when the problem becomes apparent, the best solution is no longer available, and they must struggle with their prior decisions.

Knowledge

While we do not have any concrete evidence, it appears from our discussions with representative from local units of government that many local elected officials are not aware of the importance of the radio systems used by their agencies. They may not be fully acquainted with the strategies, technology and regulatory changes that impact their radio systems

Staffing

Because the radio communications planning function is not a core business for most local units of government, staff resources always seem to be in short supply. Based on discussions with communications managers in smaller communities, the management of communication systems is handled by staff that have other major responsibilities or have not been trained to deal with wireless communication issues.

Cost-effective

A shared statewide system may be cost-effective in the long run, but it requires significant up-front investment. Local communities may have inadequate funding for planning and construction of a system. Local funding options through assessments or general taxes may be limited.

Glossary of Terms

ANSI – The American National Standards Institute. ANSI facilitates the development of national standards by establishing consensus among qualified groups. ANSI promotes the use of U.S. standards internationally, advocates U.S. policy and technical positions in international and regional standards organizations, and encourages the adoption of international standards as national standards where these meet the needs of the user community.

APCO – Associated Public-Safety Communications Officers, Inc., International

AVL – Automatic Vehicle Location – a technique using radio frequency energy to automatically determine the location of vehicles and to report their positions to a central control facility. Typically done via global positioning system.

Analog – Analog is the way humans hear the human voice over most broadcast radio, television, telephones and two-way radios.

Digital – The radio converts the analog voice information into 1's and 0's in much the same way as a computer handles data. The radio then transmits the digitized data packets over the airwaves. This process is then reversed at the receiving radio.

FCC – Federal Communications Commission

GHz – Gigahertz unit of frequency measurement; one Gigahertz is equal to one billion events (cycles) per second. Frequencies in this range are usually called microwaves.

Industry Standards – Standards such as TETRA and Project 25 are examples of industry standards. Standards are established for a frequency efficient digital trunked radio communication system and provide integrated voice/data services on one secure digital trunked radio system.

Interoperability – The ability of radio users in one agency to talk to radio users of another agency.

kHz– The abbreviation for Kilohertz - 1000 cycles per second.

MHz – Megahertz a unit of frequency measurement; one Megahertz is equal to one million events (cycles) per second.

Multi-site – Multi-site is a trunking technique using multi-site controllers. These controllers track the location of every mobile or portable unit and determine which transmit site has coverage. This allows wide area coverage without using simulcast. Multi-site technology can connect several different trunked systems, some of which are simulcast and some not. (In effect, a multi-site controller treats a simulcast system as if it were a single site system.) Multi-site systems require more frequencies to cover a specific geographical area than does a simulcast system.

Narrowband – A channel plan that splits existing VHF frequencies

from 15 kHz spacing to 7.5 kHz and UHF frequencies from 25 kHz spacing to 12.5 kHz. After Jan 1, 2005, the channel will be further split to 6.25 KHz spacing.

Project 25 – Project 25 was developed within the standards process driven by the Project 25 Steering Committee, which is made up of customer representatives from federal, state and local public safety organizations. The Project 25 standards are developed under the guidance of the Telecommunications Industry Association whose standard formulating committees include manufacturer representatives. There are five objectives of the Project 25 standard:
a) Spectral efficiency using narrowband channels.
b) Interoperability between agencies and different levels of government.
c) Backward compatibility.
d) Graceful system migration (forward and backward).
e) Scaleable trunked and conventional capabilities

Repeater – A fixed radio transmitter/receiver device operating on two separate frequencies. One frequency to transmit and one to receive. This device is normally located at an equipment shelter at the base of a communications tower. The repeater is connected to an antenna via a coaxial cable. A repeater receives the transmission from one radio and relays (repeats) that transmission to another mobile radio. Repeaters are used to obtain a wider area of coverage for mobile and portable radios.

SMRS – Specialized Mobile Radio Systems.

Simulcasting – A technique of transmitting from two or more separate sites simultaneously on a common frequency. Careful control of both audio and radio frequencies at each site is required to preclude destructive interference in regions covered by more than one simulcasting transmitter. Simulcast systems use fewer frequencies to cover a specific geographical area than does a multi-site system.

Site – A location that accommodates the transmitter and receiver equipment for the radio system. Typically, a site consists of a tower, equipment shelter, back-up generator with LP tank, antennas, coax cable and other ancillary equipment. A site can also be the roof-top of a building.

TDMA – Time Division Multiple Access. In TDMA, the channel is accessed in separate slots in a time sequence. Users have different time slots for each call that is set up.

TETRA – TErrestrial Trunked RAdio is a European open digital trunked radio standard. It is defined by the European Telecommunications Standards Institute under the cooperative development of manufacturers, users, operators and other experts. TETRA, which defines standardized interfaces to a digital trunked radio system, is not a product or a system platform. TETRA's main objectives are to establish standards for a frequency efficient digital trunked radio communication system and provide integrated voice/data/telephony services on one secure digital trunked radio system. TETRA uses four time slot Time Division Multiple Access technology to achieve four channels in a single 25 kHz bandwidth.

Trunked System – A trunk is a communications path between two locations. Trunking in the context of this report: Trunking is the automatic sharing of a group of communication paths (trunks) among a large number of users. A trunked radio system simply uses multiple radio repeaters controlled by a central processor device that allows a large number of mobile or portable radio users to share the repeaters. This is similar to the technology used by the telephone companies for the shared use of telephone lines. A single radio system can be shared by a number of different user groups, eliminating the need for each group to own, operate and maintain its own system.

UHF – Ultra High Frequency (450-470 MHz) Public Safety

VHF – Very High Frequency (150-170 MHz) Public Safety

Wideband – A channel plan that assigns frequencies using 15 kHz spacing between frequencies in the VHF frequency band and 25 kHz spacing between frequencies in the UHF band.

800 MHz–Frequency band most commonly used for trunked radio systems (806-859 MHz) Public Safety

Appendix "A"
Statewide Radio Communications Survey Results and Respondents' Comments (September, 2000)

Response Statistics:
The overall response was outstanding with a total 648 survey forms returned:

Survey forms sent out to:
862 Cities
80 Counties (did not include the seven-county Metro area)

Survey responses returned from:
Counties: 70 out of 80 Greater Minnesota counties (88% of total) representing 138 county departments.
Cities: 273 cities representing 483 city departments
Independent School Districts: 16
State agencies/education institutions: 11

SECTION I. ADMINISTRATIVE INFORMATION

Q1: Survey responses returned from:

County responses:	**138 surveys returned**
County sheriff's office:	57
County public works (Highway Dept)	47
County administration:	16
County transit:	8
County hospital:	5
County ambulance:	4
County parks:	1
Total:	138

City responses:	**483 surveys returned**
Volunteer fire department:	122
City police:	20
City public works (Street Dept):	92
City administration:	55
City ambulance:	29
City fire:	22
City utilities:	18
City parks:	12
City transit:	6
City hospital:	5
Special police department	2
Total:	**483**
Independent School District responses:	16
State agency/educational institutions:	11
GRAND TOTAL RESPONSES RETURNED:	**648**

Q2: Dispatch for multiple agencies, or dispatch for agencies outside of your agency, or no dispatch center.

Consolidated dispatch center serving both city and county agencies:	274 (44%)
Consolidated dispatch center serving either the city or county only:	110 (18%)
None of the above pertain to my operation:	237 (38%)

Comment: *Almost half (44%) have consolidated dispatch centers serving both city and county agencies. Only 18% have dispatch centers serving only their local government entity.*

Q3: Number of full-time employees. Including volunteers. Average size

The average number of full-time employees of the departments responding to this survey was 31 people.

Q4: Population served. Broken into categories.

Community size	Number of Communities
1000 or less	45
1001-10,000	110
10,001-50,000	77
50,001-1000,000	5
Over 100,000	8 (Include state responses)

Q5: Existing radio systems: (Most local units of government have some type of radio systems.

589 91% of 648) have radio systems

59 (9% of 648) did not have a radio systems
- 50 city agencies
- 9 county agencies

Q6: Familiarity with Industry Standards: (603 responses to this question).

1. (Not Familiar) 363 cities 91 counties 5 state institutions (colleges, hospitals, park)	459 (76%)
2. (Little Familiar) 61 cities 21 counties 1 state (college)	83 (14%)
3. (Familiar) 26 cities 17 counties 2 state (courts & state patrol)	45 (7%)
4. (Very Familiar) 3 cities 4 counties	7 (1%)
5. (Extremely Familiar) 3 cities 3 counties 3 state agencies/institutions	9 (1%)

Comment: *90% of all respondents were either not familiar or had little familiarity with the industry standards such as Project 25 and TETRA. 89% (536/603) of the respondents were local government entities who were either not familiar or had little familiarity with the industry standards.*

Q8: Are Industry Standards Important: 521 (438 +83) responses or 90% (521/581) stated that industry standards were not important or were little important. Direct correlation between familiarity of industry standards and whether believe standards are important. Of the 521 (438 + 83) responses who stated that industry standards were not or little important, 230 (44%) had no or little familiarity with industry standards. To the contrary, of the 16 responses that stated that industry standards were very or extremely important, 13 (81%) were very or extremely familiar with the industry standards.

1. (Not important)	438
Familiarity with Industry Standards:	
Not familiar	147
Little familiar	54
Familiar	135
Very familiar	53
Extremely familiar	49
2. (Little important)	83
Familiarity with Industry Standards:	
Not familiar	5
Little familiar	24
Familiar	22
Very familiar	22
Extremely familiar	10

3.(Important)	44
Familiarity with Industry Standards:	
Not familiar	2
Little familiar	3
Familiar	20
Very familiar	10
Extremely familiar	9
4.(Very important)	7
Familiarity with Industry Standards:	
Not familiar	—
Little familiar	—
Familiar	2
Very familiar	2
Extremely familiar	3
5.(Extremely important)	9
Familiarity with Industry Standards:	
Not familiar	—
Little familiar	—
Familiar	1
Very familiar	1
Extremely familiar	7

Q9: Average annual budget to operate, maintain and upgrade owned radio system).

Responses	374
Range:	$25 to $1,250,000
Median:	$2,300
Average:	$38,143
Average (w/o top 15):	$16,346

Comment *The largest counties and cities skew the average results due to their size and cost compared to the smaller counties and cities. Most of the counties and cities annual budget for radio systems is $2,000-$3,000.*

Q10: Average annual budget to lease radio system.
Comment: *26 departments responded to this questions. The highest annual lease was $265,000. This figure skewed the results to obtain the average annual lease budget. Discounting the above noted lease, the average annual lease rate for those responding was $3,400.00 Based on other data contained in each of he responses that indicated that they leased communication services, we assume that these figures reflect fees for cellular, and paging and in some instances for two-way radio services.*

SECTION II. OPERATIONS

Q1: Number of agencies that share radio frequencies with other organizations.

YES	381 (77%)
NO	113 (23%)

COMMENT: Most of the entities (77%) share frequencies with other organizations.

Q2: How often does your agency have radio communications with the following levels of public safety and/or public service organizations?

	Day to Day	Weekly	Monthly	Yearly	Never
Local Level:	341 (71%)	59 (12%)	35 (7%)	12 (3%)	35 (7%)
State Level:	104 (22%)	60 (13%)	54 (11%)	49 (10%)	205 (44%)
Federal Level:	9 (2%)	12 (3%)	24 (5%)	47 (10%)	380 (80%)

Comment: *By far the major requirements are at the local level on a day-to-day basis. There is some requirement at the state level and minimal at the federal level. Most of the requirements are driven by the type of emergency situation or disaster.*

Q3: What level of interoperability would best serve your agency?

No. of Responses	
Local region (multi-jurisdiction):	351 (76%)
State-wide:	87 (19%)
Multi-state:	9 (4%)
Nation-wide:	2 (1%)
Total:	**459 (100%)**

Comment: *The major requirements (76%) are at the local level. There is some requirement at the state level (19%) and multi-state (4%) for the border towns and counties. Most of the requirements are driven by the type of emergency situation or disaster.*

Q4: Does your agency have the ability to patch across frequencies?

YES	76 (18%)
NO	353 82%)

Comment: *Most entities (82%) DO NOT have the ability to patch across frequencies.*

Q5: If answered NO to question above, do you feel that having capability to patch across frequencies a useful feature?

YES	166 (47%)
NO	187 53%)

Comment: *Almost half (47%) believe this would be a useful feature.*

Q6: Does your agency currently use encryption or scrambling devices on your current radio system?

YES	36 (8%)
NO	397 (92%)

Comment: *Most entities (92%) DO NOT use encryption or scrambling devices on their current radio systems.*

Q7: If answered NO to question above, do you consider encryption or scrambling important to your agency?

YES	131 (33%)
NO	266 (67%)

Comment: *Only one-third of the entities consider encryption or scrambling important.*

Q8: Does your agency share radio system infrastructure (towers, base stations/antenna systems, etc.) with other organizations?

YES	330 (70%)
NO	141 (30%)

Comment: *Over two-thirds (70%) share radio system infrastructure with other organizations.*

Q10: How involved is your agency in the decision-making process related to the operation of the shared system noted in the question above?

Extensively	98 (23%)
Considerably	51 (12%)
Somewhat	66 (15%)
Little	76 (18%)
Not at all	140 (32%)

Comment: *About half of the entities are somewhat to considerably involved with the decision making process related to the operation of the shared system.*

SECTION III. Communications

Q1: Frequencies Used:

Frequency	Number of Responses	% of Total
Low Band VHF (25 – 50 MHz)	14	4%
High Band VHF (150 – 174 MHz)	308	79%
UHF (450 – 470 MHz)	43	11%
800 MHz (806 – 869 MHz)	15	4%
Other	8	2%

Comment: *The frequency used by a vast majority of the respondents is high band VHF reported by 79% . The second highest frequency was UHF, which was far behind with 11% of the respondents.*

Q2: Age of Oldest Piece of Equipment: 401 Responses

401 Responses	
Range of age:	1 – 45 years
Median age:	15 years
Average age:	15.4 years

Comment: *The radios being used today are fairly antiquated with an average age of 15 years.*

Q2a: How long used current radio system:

400 responses	
Range of age:	1-50 years
Median age:	18 years
Average age:	18.1 years

Comment: *The radio systems being used today are analog and are also antiquated with an average age of over 18 years.*

Q3: Number of radio units in agency:

No. of Radios	Responses	% of Total
Less than 10 radios	147	33%
Between 11 – 20 radios	134	30%

No. of Radios	Responses	% of Total
Between 21 – 30 radios	65	15%
Between 31 – 50 radios	51	12%
Between 51 – 60 radios	17	4%
Between 61 – 70 radios	4	1%
Between 71 – 80 radios	5	1%
Between 81 – 90 radios	5	1%
Between 91 – 100 radios	6	1%
Between 101 – 150 radios	5	1%
Between 151 – 200 radios	0	<1%
Between 201 – 250 radios	1	<1%
Between 251 – 300 radios	1	<1%
Between 301 – 400 radios	2	<1%
Between 401 – 500 radios	2	<1%
Greater than 500 radios	2	<1%

Q4: Problems with current radio system: (Listed in order of most serious)

1. Dead spots:

Seriousness	Number of Respondents
5. Major problem	97 (24%)
4. Significant problem	81 (20%)
3. Problem	78 (19%)
2. Minor problem	72 (17%)
1. Not a problem	84 (20%)
Total:	**412 (100%)**

2. Not enough range:

Seriousness	Number of respondents
5. Major problem	92 (22%)
4. Significant problem	70 (17%)
3. Problem	89 (21%)
2. Minor problem	58 (14%)
1. Not a problem	105 (26%)
Total:	**414 (100%)**

3. Outdated equipment:

Seriousness	Number of Respondents
5. Major problem	55 (13%)
4. Significant problem	70 (17%)
3. Problem	101 (25%)
2. Minor problem	74 (18%)
1. Not a problem	112 (27%)
Total:	**412 (100%)**

4. Frequency interference:

Seriousness	Number of Respondents
5. Major problem	51 (13%)
4. Significant problem	63 (15%)
3. Problem	85 (21%)
2. Minor problem	100 (24%)
1. Not a problem	112 (27%)
Total:	**411 (100%)**

5. Atmospheric skip:

Seriousness	Number of Respondents
5. Major problem	40 (10%)
4. Significant problem	54 (13%)
3. Problem	88 (22%)
2. Minor problem	101 (25%)
1. Not a problem	126 (30%)
Total:	**409 (100%)**

6. Fading:

Seriousness	Number of Respondents
5. Major problem	45 (11%)
4. Significant problem	45 (11%)
3. Problem	88 (22%)
2. Minor problem	86 (21%)
1. Not a problem	145 (35%)
Total:	**409 (100%)**

7. Not enough equipment

Seriousness	Number of Respondents
5. Major problem	32 (8%)
4. Significant problem	40 (10%)
3. Problem	90 (22%)
2. Minor problem	89 (22%)
1. Not a problem	161 (39%)
Total:	**412 (100%)**

8. Static:

Seriousness	Number of Respondents
5. Major problem	16 (4%)
4. Significant problem	48 (12%)
3. Problem	91 (23%)
2. Minor problem	106 (26%)
1. Not a problem	139 (35%)
Total:	**400 (100%)**

9. Battery problems:		10. Not enough frequencies:	
Seriousness	Number of Respondents	Seriousness	Number of Respondents
5. Major problem	24 (6%)	5. Major problem	29 (7%)
4. Significant problem	28 (9%)	4. Significant problem	19 (5%)
3. Problem	81 (20%)	3. Problem	47 (11%)
2. Minor problem	99 (24%)	2. Minor problem	75 (18%)
1. Not a problem	167 (41%)	1. Not a problem	239 (59%)
Total:	**409 (100%)**	**Total:**	**409 (100%)**

Comment: *The most serious problem experienced by users is that of "dead spots" where their radios won't work. Sixty-three (63%) percent of the respondents indicated this was a problem. Forty-four (44%) percent indicated this was a significant or major problem.*
The second most serious problem listed was "not enough range". Sixty (60%) percent indicated this was a problem. Thirty-nine (39%) percent indicated this was a significant or major problem.

The third most serious problem was "outdated equipment". Fifty-five (55%) percent indicated this was a problem for them. Thirty (30%) percent indicated this was a significant or major problem. This probably reflects the fact that the average age of the oldest piece of radio equipment is 15.4 years and the average age of the radio systems is 18.1 years.

SECTION IV. FUTURE CONSIDERATIONS

Q1: Plan to replace or substantially upgrade radio system: (470 responses)

Yes:	125 responses (27% of total)
No:	345 responses (73% of total)

Q2: Approximate time frame for replacement or upgrade:

Time Frame	Number of Responses	% of Total
1-2 Years	59	47%
3-4 Years	32	26%
5-6 Years	26	21%
7+ Years	8	6%
Total	**125**	**100%**

Comment: *A little more than one fourth of the respondents stated they plan on replacing or substantially upgrading their radio system* within the next seven years.

Q3: Preference for next radio system: (125 responses)

Type of Radio System	Number of Responses	% of Total
VHF or UHF Analog (150 or 450 MHz)	46	37%
VHF or UHF Digital (150 or 450 MHz)	21	17%
Trunked Digital (800 MHz)	13	10%
Trunked Analog(800 MHz)	5	4%
Unknown	40	32%

Comment: *The large number of unknown preferences and the preferences for analog systems seems to be a reflection of the fact that there is a definite lack of knowledge and understanding regarding this technology, standards, and future trends.*

Q4: Likelihood agency will adopt Project 25 or TETRA Standards for next radio system:

Likelihood	Number or Responses	% of Total
5. Highly likely	6	4%
4. Somewhat likely	7	5%
3. Likely	7	5%
2. Maybe	4	3%
1. Highly unlikely	9	7%
U. Unknown	76	56%
Don't know about Project 25/TETRA	26	19%
Total:	**135**	**100%**

Comment: *Only 14% of the respondents indicated they were likely to highly likely to adopt Project 25 or TETRA standards. This coupled with the high number (19%) of respondents who indicated they didn't know about Project 25 or TETRA standards indicates the limited knowledge that most have regarding this technology and trends.*

Q5: How important will interoperability issues be to your agency when purchasing a new radio system?

Importance	Number or Responses	% of Total
5. Extremely important	84	45%
4. Somewhat important	49	27%
3. Important	29	16%
2. Little importance	16	9%
1. Not important	5	3%
Total:	**183**	**100%**

Comment: *88% of the respondents indicated that interoperability is important to extremely important for radio systems. This is an indicator of the end user requirements rather than a knowledge of the technology. Per the notes from the survey forms, there is a need for interoperability among local police, sheriff, highway department (snow plows, etc.), ambulances, etc. especially during an emergency or a disaster situation.*

Q6: Identify the radio frequencies your agency needs for its next system.

Low Band/# of Dept.	VHF/# of Dept.	UHF/# Dept.	800 MHz/# of Dept.
15/4	413/67	40/12	197/14

Q7: Would your agency/department consider participating in a multi-agency, multi-jurisdictional shared radio system?

YES	326 (71%)
NO	136 (29%)

Comment: *Overwhelming majority of responses said they would be willing to participate in a share radio system.*

Q8: Preferred method of governance for shared radio system.

State government only:	2 (<1%)
State & county government:	49 (13%)
State & local government participants in same region:	187 (51%)
State & regional government representation, including non-participating agencies:	5 (2%)
Governing board including state & local government and Metro Radio Board:	6 (2%)
Decision would have to be made on a higher level:	118 (32%)
Total:	**367 (100%)**

Comment: *Of those that responded to this question, a majority (51%) indicated the governance should be state and local government participants in the same region. 13% indicated that governance should be at the state and county level. These two categories indicated that 64% of the respondents feel that governance should be between the state and some local level of participation.*

SECTION V. COMMENTS

Following are the comments received as a result of the survey.

Question 1: Has your agency experienced a situation where the ability to inter-operate with other agencies was impeded? Yes or No If yes, briefly describe the situation and adjustments that were made. NOTE: Please do no include 9-1-1 issues, this question pertains to radio situations only.

Municipal Fire Department

- Multiple users on the only county fire frequency.
- Mutual aid fire operation – departments did not have shared channels – the East Range Fire Department coalition has developed a radio system, which provides multiple channels for fire department operations. So far, we have developed 5 channels including 2 repeaters for use. The DNR and USFS have access to these channels.
- Over loaded channel on mutual aid calls
- Our jurisdiction has mutual aid with a fire department in another state (Wisconsin).
- On a daily basis too many agencies using one frequency. During any multi-agency response radio system almost becomes useless.
- Unable to talk to other departments at mutual aid calls. Only shared channel is the county paging channel. We also have some bad areas in our territory where a radio or pager will not work.

Volunteer Fire

- Trying to work with state DNR and Federal Fire departments.
- Departments are on different frequencies could not match them.
- We are in need of more radio towers. The hills and bluffs hamper our ability to communicate with the Winona law enforcement center and also our mutual aid, fire and EMS departments.
- In 1997 a tornado hit our area causing power outage. Were unable to communicate with anyone. Has been corrected by installation of back-up generator.
- On a rescue call and a house fire that were both about 4 miles from town we could not communicate with our base station or our trucks.
- Multi jurisdictions – Multi agency situations. Major fires and emergencies.
- The frequencies are too busy when multiple agencies are using it. The other county's system dominates our counties system. (both counties share the same frequency) They broadcast over other users on the system without regards.
- We have too many spots in our County where the signal is not strong enough for good transmissions. We use the Sheriff's channel for relay if needed and even then sometimes there are still dead spots.
- Range has been a problem, we are on the far end of our County, problems reaching dispatch.
- Major barn fire – trucks could not communicate with Iowa fire personnel. Found one portable radio with one matching frequency.
- There are times that we respond to areas outside our normal response area and work with the fire Departments that do not have the same radio frequencies.
- Inability to communicate with New Prague Police Department & New Prague Ambulance at some training sessions.
- Inability to talk from truck to truck in our own Fire Dept area.
- Statewide fire does not utilize repeater in our area. This hinders communications with other departments.
- Ability to communicate on mutual aid fires. Received permission to use neighboring Department frequencies.
- Ambulance service has trouble switching to fire frequencies.
- Have difficulty communication with neighboring towns with whom we have mutual aid agreements.
- Communication with DNR for wildfires situation was made better with newer multi channel radios.

School District
- None

Ambulance
- Could not talk point to point because of poor radio reception. Putting in a repeater.
- Due to the large rural area we serve there have been times when radio communications was impeded because we were simply to far from the base station or repeater tower.
- In 1997 a tornado hit our area causing power outages. We were unable to communicate with anyone. Has been corrected by installation of back-up generator.
- Limited range at present. Need repeater or relay tower which will hopefully be erected soon. Designated telephone communications should be better soon hopefully reducing expense.
- County law enforcement frequencies vary and many times the only communications we have is through our dispatch center to the other counties dispatch center and eventually down to the other counties or city law enforcement level.

Hospital
- None

Utility
- Interoperability is not desired or substantially beneficial.
- Radio system is city channel shared by utilities, public works, police and fire departments. During emergencies communicating is difficult to impossible we all need to support separate channel use.
- Not able to patch to other frequency users.

County Emergency Management
- During a major disaster (Tornado).
- I can not answer for sheriff's dispatch.
- Communication among inter-state units and among federal, state and county units.

City Administration
- Coordination among Police, Fire, Ambulance, as well as airport and public works functions. Dead spots police radio systems. No local emergency operations center all distributed separate radio systems and locations. No facility with backup electrical power capabilities.

Animal Control
- None

City Parks Department
- None

Transit
- Only when cell phone does not have enough signal.
- Communication with maintenance workers from other governmental agencies during snow removal operations. Call between offices and rely messages.
- City crew and police departments along with 3 members of ambulance have the very same 16 channel radios. Fire department has radios that are older then 20 years – communication is very limited. Batteries on fire radio don't last over 2 years.
- We have installed the frequencies of neighboring counties in our mobile units.
- Unable to communicate with Sheriff vehicle and snowplow during emergency situation in snowstorm.
- Too much traffic.
- Major storm clean up. The lack of ability to communicate directly with other agencies to coordinate the clean up efforts.

Public Works
- During storm disasters communication among highway departments, police and fire departments would have been helpful – rare occurrences.
- Yes, at times getting hold of Sheriff dispatcher has been problems busy monitor set low.

- County highway would have liked the ability to inter-operate with Mn/DOT but they would not allow the county to access their TX frequency.
- Surrounding city carries our emergency channel we can usually receive but not send to their radio system many dead spots.
- Sometimes the law enforcement center does not scan our city frequency, therefore it is impossible to contact them other than by phone line.

Civil Defense.
- Only do during emergencies and have no communication unless they have one of our radios
- Fire department and City maintenance have to work together.
- Smaller agencies like Townships and smaller cities lack the personnel with enough knowledge to properly operate and maintain radio systems within FCC rules. They also do not or cannot allocate money to properly maintain the system or share costs.

Sheriff's Department
- The Minnesota River Valley presents lay of the land problems. In the process of installing a repeater system to help with this problem.
- Otter Tail County was the site of a major train derailment that involved several departments not on our radio system. The command center programmed monitors to cover the other frequencies, borrowed portables and used the cell phone extensively.
- When Fire, EMS, Sheriff's, and Police cars are involved in a major incident or if separate incidents occur at the same time we only have one frequency that we all can communicate on (sheriff's frequency). Individuals begin to interfere with each other as well as the dispatch. The adjustment (if you want to call it that) is to use different frequencies that are unique to Fire and EMS. This eliminates dispatch and law enforcement cars being able to communicate with them.
- State money for county and local agencies to update equipment for law enforcement and emergency services.
- Skip from other agencies. Lack of technology in Greater Minnesota. Different radio frequencies that state and federal agencies have compared to local agencies.
- Inter-agency cooperation in criminal cases is impeded due to lack of common radio frequencies to encryption devices. At the present time only unencrypted radio frequencies are available, telephone, cell phones are also utilized.
- Repeater on main sheriff's channel failed. Difficulty occurred when trying to make radio contact with officers out in the field due to distance of office from sheriff's dispatch. (Repair repeater). Uninterrupted power source (UPS) did not provide radio support. Equipment adjusted, problem solved no problems since equipment adjusted.
- VHF Skip.
- In house portable coverage – funding from state for system.
- During tornado (07-25-00) could not talk to state emergency management and other state agencies.
- We have problems talking to our own jurisdictions.
- Forest fires 1999 blow down
- We have had situations where local deputies were unable to talk to Federal officers who were working in our area.
- When we need to talk to a trooper by radio, we sometimes can't get a hold of them because they need to be monitoring our frequency to hear us and they can't always do that. In order to resolve this we must call State Patrol dispatch and ask them to contact the trooper.
- Dispatch problems during transition. Not familiar with new equipment (dispatcher training).
- St. Cloud PD uses 800 and we don't so we can't communicate on portable or in squads. We can now use MDC's and share portables on special operations.

Municipal Police Department
- Due to not having enough repeaters in the county it is often difficult to communicate with other agencies in the county including the Sheriff's deputies who may be on the other end of the county
- In trying to communicate among Fire, Ambulance and Police during an emergency drill at our airport we found the command post was not getting all traffic and as the drill started the first personnel on scene were not able to communicate to these other agencies to coordinate set-up measures.
- Other agencies in other parts of the state and other states having the same frequencies. Skipping over our communications. Main terminal "county dispatch" complete new system our agency also upgrade our radios with

new frequency. Dead spots within community – upgrade our entire radio system put in trip repeater prior to county upgrade.

- Our radio system uses VHF frequency channels. The portables cannot receive or transmit on many occasions. They are useless at times. Portables are static and garbled. The squad trunking radio sometimes is weak and scratchy at times.
- For several years our county had different frequencies. Several times officers in our area on major incidents that affect safety. We had to upgrade to scan radios so we could monitor. The same situation is beginning to happen, presently; due to small departments not able to upgrade to mobile computer equipment due to costs of yearly maintenance.
- When monitoring city channel we have problems with paging tones on our frequency. At times unable to locate source and channel can not be left in scan mode on portable units or base when monitoring channel.
- Lack of frequencies. Congested existing frequencies. Unable to talk directly to State Patrol on our main frequency.
- Currently the department is dispatched by the Pearl street dispatch center out of Owatonna. At times it is very difficult to get airtime due to the radio traffic. Officers also cover one another. Also as a smaller agency we are not given enough input verses the larger agencies in Rice and Steele Counties.
- Transmission dead spots within the city limits atmospheric conditions affect transmission and receiving.
- Frequently distance between cars is too great and lack of repeater towers make it difficult to communicate. Problem is even more pronounced with portable hand-held radios.
- Mutual aid situations where no common frequency other than statewide existed.
- Dead spots within county. Inability to communicate with other agencies/officers with hand held and mobile radios except when in close proximity.
- Portables are not able to communicate with dispatch both. Hearing dispatch and transmitting to dispatch.
- Mainly in hand held use not good enough reception.
- Interop during flooding was difficult.
- Worked around by having dispatch relay for us. Or we will go to the cell phone and use that for communication purposes. Some time it may be a dead spot and by moving the vehicles it helps.
- On certain specific days and evening we get a lot of "skip" from the Metro departments we cannot hear our dispatcher at times and some departments that are coming across on skip have the same call numbers as ours. Therefore were not sure if dispatch is calling or not!
- Not for a long time. 911 dispatch center and radio frequencies, inter-operating with 5 other law enforcement agencies pretty much problem free.
- Can't talk directly to state patrol on the radio unless they have our channel in their radio. They won't allow us to program their frequency into our radio.
- City administration support, City council support, County board support, Township support, state legislative support, financial support (city and state), technological changes, fee change to digital, governance issues (control).
- Out of the area radio skips.
- Our most common problem is monitoring and communicating with the LaCrosse, Wisconsin Police department, which we border. We operate on high band. The LaCrosse police department operates on 800 MHz.
- Local agencies in St. Louis County are unable to communicate on our frequencies. This sometimes hinders our ability to get information to them.
- The radio was bad, had it fixed
- Worn out Radio System. Skip Interference.
- Problems with range and dead space.
- Outstate, and Iowa.
- Distance factors
- Repeater tower failed.
- Police and Fire Department were involved in a mock disaster drill. Fire Department does not monitor police car to car frequency. Police do not monitor Fire Departments. On scene frequency. Not able to interact or assist each other as well as we could. Adjustments: making sure we can contact each other on one known channel.
- RFI problems or problems in radio and scanning priorities.
- Sometimes the county West of us overpowers our communication and interferes with our communication with dispatch.
- Several situations where units have been out of Dispatch area and have been unable to communicate with other Departments.

- It is difficult for us to communicate with dispatch on portable from inside structures, such as The City Hall, the Local schools, etc. It is almost impossible. Portables "hear" but do not transmit with enough strength.
- Flood of 1997 inundated our base, rendered our system useless. State and Private Radio people got a system set up in a matter of a few hours.
- Current Rice County Radio shop cannot adequately manage all the users. We have had situations where officer safety was jeopardize because officers can't get on the radio to request help. The joint dispatch project for Rice and Steele Counties is dysfunctional. There have been no corrective actions taken.
- Being on the Western border of Minnesota, we many times need to contact agencies from either North Dakota or South Dakota. With different bands and frequencies we find ourselves going through dispatch and calling on the telephone, as it is the quickest. This should not be, we should have direct contact.
- Can't use Statewide channel 4.
- We can no longer hear the Ely Police Departments frequencies from the squads.

Special Police
- None

State Government
- Numerous cross-jurisdictional surveillances where communications were not possible with involved jurisdictions due to differences in frequency bands. Numerous surveillances with federal counterpart with same problem as listed above.
- St. Peter tornado – interoperability was a problem with locals. Difficult to manage crisis.
- Among states at our borders, land, water and air. Disasters – St. Peter, Granite Falls, floods.

Question 2: What operational, technological or political issue do you or your agency think should be considered in the planning and implementation of a statewide radio network for public safety and emergency preparedness entities at all levels of state, and local government, including the federal government?

Municipal Fire Departments
- A statewide radio system would infringe on the radio rights of the private operators.
- Multiple frequencies available. Separate paging frequency, not for operations.
- It's the old adage: Too many chiefs spoil the broth. I have tried to work with state, federal, county and local units of government to establish radio networks and there were major issues over jurisdiction, use of the network, which operations had priority. The development of networks should be done regionally with a clear "up front" understanding of these types of issues.
- Cell phone systems, Fax from dispatch to land and mobile.
- Maintain local involvement. Listen to rural and local government needs.
- During any multi-agency response radio system almost becomes useless.
- Ease of using. Better quality. Products / availability open to departments. Cost efficiency.
- There needs to be multiple channels for Fire departments to use on fire ground to communicate to each other.

Volunteer Fire
- What impact it well have on each entity. Their current system and the need to upgrade, if any. The frequency (how often) there is a need to communicate with other agencies that they aren't communicating with already. The ability to finance the upgrade. How compatible their existing system is versus the new system. Is there a real need to go statewide versus Metro?
- Funding for low budget emergency service providers.
- We need to be able to keep our own radio communication frequency.
- The cost – who pays for it- making sure it is simple – easy to operate.
- A cooperative where small departments like us could purchase communication equipment including hand held and pagers.
- Many outstate volunteer departments do not have the funds or the knowledge to upgrade and or operate to their current equipment. If a higher level of government gets involved, ROI may get too cumbersome for some members.
- Operationally – at least for the fire service we're pretty will set at least in Lake City. Those organizations that need a state implemented system – fine, for those that don't leave well enough alone.

Fire and Law Enforcement people that went through the tornadoes in the past 2 years state that there was so many people using state and local channels often no one could communicate. Will this be a problem when a major situation occurs.

- It should be mandatory for all agencies in Public Service to have the same emergency statewide channel to operate on in a large emergency.
- Try and keep agencies on their own frequency. Eliminating all of the skip static. Also try to regulate scanner capabilities.
- I believe it would be very easy to complicate the fire and rescue process with to much information being monitored at once. I believe the current county wide network works very well.
- I think we have this. We need to train more on this and hold agencies accountable to use the correct frequencies.
- I would request additional information on this prior to commenting.
- Try to use equipment that can upgrade easily. Keep the politics out of it completely. Try to keep it cost effective for us small entities.
- Will be in on 800 MHz trunking system approximately 4-2000 with Carver county fire department.
- Keep dispatch center with county sheriff departments.
- Keep it easy to use.
- Political issues should have no part of public safety or emergency preparedness. As a small department (Fire) that in a years time we use our radio's very little. We just hope that our radio's work when we need them. With a very limited budget, we have to do with what we got.
- Many outstate volunteer departments do not have the funds or the knowledge to upgrade and/or operate their current equipment. If a higher lever of government gets involved, ROI may get too cumbersome for some members.
- What impact it will have on each entity. Their current system and the need to upgrade, if any. The frequency (how often) there is to communicate w/other agencies that aren't communicating with already. The ability to finance the upgrade. How compatible their existing system is versus the new system. Is there a real need to go statewide versus Metro?
- Multiple channels should be considered that cross emergency response teams. One for on-site personnel, another for voice traffic associated with the incident command to handle site team and other response teams independent of each other.
- Funding is #1. When re-farming of radios comes into effect funding could be a key.
- Make the system affordable and accessible to local fire departments. We are currently not given 1st priority when comes to paging system use.
- The implementation needs to be done with all users involved in decision making. There needs to be special note that this is a statewide deal and not done with the METRO area in mind only with the outstate lost in the shuffle.
- Issues should be left to local units of government to work out. The more units of government involved the bigger the communication problems become. If local units need to communicate with state units, it is best to follow chain of command, i.e. local to county to state and back.
- Whatever it takes to get the job done. Regional fire districts communications committees, which would recommend to a "state" Committee.
- Statewide won't work, leave at County level.
- Most of our radios don't have the new bandwidth spacing.
- Keep Local control with County being one point of contact with the state.
- Don't make mandates or Laws without making sure there are monies available for Local government agencies to use.
- Making sure that carry over does not happen from radio traffic. Keeping frequencies apart from areas in close areas (such as some frequencies a town or two away).
- Must have enough towers/transmitters for adequate range for radios 20-25 mile radius.
- Full funding @ state level
- State or Federal funding for radio and pager upgrades.
- Local resources able to operate the radio system, many have volunteers and have limited contact.

School District

- None

Ambulance

- Availability, simplicity used in instructions, a phone number or help to understand the system.
- Cost for small services to upgrade radios to meet new standards
- Make sure that radio contact can be made anywhere.
- Scrambling signals so scanners can't pick it up.
- It would need to be affordable. Also would need to be tested extensively in rural areas. Too often things are simply for Metropolitan areas and simply do not work well in the rural setting.
- Police, Fire, EMS should have a better radio system then our highway department.
- It is important with a volunteer service that operation channels and frequency selection be simple. Many don't have the experience and time for training is limited with state mandated training already required for EMTs.
- Cost is probably the most important issue. Any cost share from where?
- Leave under local control. State and Federal people do not understand local needs.
- Any mandate needs to be fully funded.
- More towers eliminating dead areas where communications not good.
- Anytime statewide regulations are mandated to control local issues political problems arise – they are far too numerous to list here.
- Uniform radio language protocol and protocol for radio procedures (operations).
- Confidentiality

Hospital

- Need to work set-up Metro (Pls./St. Paul) first and work your way out to rural areas. Digital radios for clarity is a must.

Utility

- Operational/Political. Our utility does not want to be forced to participate and spend money for a system that won't substantially enhance operations.
- I've felt for some time that a statewide utility channel would greatly enhance mutual aid.
- Number 1 issue is cost. Our current system allows for us to adequately communicate for our needs. We also communicate with other city departments on their system, which works quite well. The various city agencies have their systems at various sites which avoids the "all eggs in one basket" scenario. In law enforcement, hospital, or another agency would move from the VHF band to say 800 MHz, and extreme burden would be placed on all other agencies should they deem it necessary to continue communications. If we were forced to change frequency bands, we would be abandoning a 3-4 year old VHF repeater system along with portable and mobile radios, which are mainly less the 7 years old. We are very pleased with our current system. And communications abilities with all other city government agencies.

County Emergency Management

- Adequate portable and paging coverage in remote rural areas. High level of responsiveness to local needs. Strong local control.
- Able to communicate with all agencies during emergencies and amateur radio also is a must.

City Administration

- I think it would be very important especially in care of flood and tornadoes. Presently we rely on a bar that closes at 1 p.m. to react when one of the above conditions arises.
- Use a frequency that is easy for all types of equipment to access. Make it affordable for small communities.
- Our radio system needs to be kept to local radio traffic only. Too much radio traffic would cause confusion during normal day to day operations.
- Remember we have unique problems in rural Minnesota especially in Bluff County.
- The system should be dependable, it should have full capabilities of radio communication. It should be easily accessible.
- Separate frequency just for Emergency Management. Standardized frequencies each community.
- Training, shared resources.
- Need for inter-agency communication in disasters and day to day response. Need for local emergency operations center with backup electrical power and capabilities to communicate with local (and mutual aid) assistance.

How much will it cost local tax payers; sounds like a good idea; how many frequencies would we have to add; we can presently dispatch/communicate with Fire, Ambulance, County Sheriff, through Fire and Ambulance Frequency.

Animal Control

- In helping other cities, a statewide channel would be helpful.

City Parks Department

- None

Transit

- Our Transit repeater shares a local Government repeater with the County Highway department and county school districts. We have no other control or planning issues.
- Cost to local units of Government.
- Keep it simple with no new costs to counties.
- Cost and compatibility with all equipment both new and existing privacy.
- Maintain a local attitude for response to local situations in a timely manner.
- Funding for equipment. Full coverage of all areas. Develop technology to use cell phones instead of radios. Everyone will be carrying some type of communication devise. Cell phone tower coverage is in-place. We are developing to many parallel redundant systems. Radio tower, cell phone towers, pager towers. Consolidate technology to eliminate the need to carry a fire, pager, cell phone, two-way radio etc. In order to communicate with various entities. Are two-way radios going to be around 5 to 10 years from now?
- Better communications among different cities within local area mutual aid for whatever most departments are able to talk to each other more towers are needed.
- Responsibility for maintenance and the ability of other agencies using the system to get their problems resolved. (The state is non-responsive in dealing with other problems under their responsibility is some cases). Priority usage during emergency operations. Designated inter-agency contact people. (Authority) specific procedure as to when inter agency contact should be made (under what circumstances)
- Cost is a major factor.
- The level of flexibility each agency would have percent of cost to each agency would there be a priority agency or equal?
- Make sure it is extremely easy to use, any complications in ease of use will bring down time. Consider separate systems for emergency or public safety purposes and local government use purposes.
- This looks like a very large system with many control problems. It will be interesting to watch this develop.
- Provide enough frequencies so each unit can keep outside "chatter" to a minimum.
- A better paging system.
- Have no comment and am not interested in joining with others e.g. state.
- To assure an open and enough frequencies to ensure use of all times.
- To make this affordable for all participants and not send down some mandate that is not supplied by money to help pay for it! The system works now does bigger government have to interfere to try to fix something that isn't broke.
- A pager with voice attachment.
- The true effectiveness and advantages of this system. The current conditions and life expectancy of the existing system. The ability for entities to pay for a new system.
- We would be concerned about the costs.
- If a statewide radio network is implemented. I wonder if the equipment costs and the maintenance costs are going to be excessive for a small community like ours.
- Do not mandate participation and protect frequencies.

Public Works

- It would be and extreme waste of money.
- Participation in planning and development.
- Not that knowledgeable.
- Do not have any comments at this time.
- In cases of mutual aid a statewide channel would be helpful.

- There should be the ability of different levels of Government to be able to communicate in times of emergencies. It is very hard to effectively communicate with different government agencies unless we can all go to a specific frequency that all can use. It would be nice if there was one statewide frequency that all agencies could use during emergencies. You would have to train how to use them and have a designated net control operator when using that frequency.
- The ability to communicate with all agencies in our region for emergency work and sharing of resources.
- I don't believe we have a need for a statewide radio system in our department because our radio system is adequate for our use.
- Keep it simple to use, have a statewide channel for all agencies to use in situations where different levels of government are working together.
- The cost of implementing a statewide radio network would have to be kept within reason.
- The decision would have to be made on a higher level.
- The emergency response personnel are able to use our frequency when situations such as disasters occur. So that we may monitor forecast and local emergency channel when necessary.
- The safety of our staff is also important.
- No mandates with out funding. If a statewide network is institutional it should be an addition to and not a replacement for local systems outside the Metro area. I believe that there is a better way to use the resources we now have. There is more than enough equipment cluttering the landscape already.
- Need frequency of use, cost/ benefit.
- Interference.

Sheriff's Department

- The monies needed to pay for a statewide radio network would be a huge problem for outstate agencies with limited budgets. We just installed new consoles and updated mobile radios. We cannot afford more updates for a long time. However we also believe it is important to be able to communicate with all other entities and are working on this issue.
- Local control over policy issues, state funds to defray costs take extreme care not to end up with to much radio traffic on the same frequency.
- Rural regional planning needs to be considered as to the individual needs of that area. I'm not sure if a Metro Radio Board has the ability to recognize the uniqueness of the individual agencies.
- If planning and implementation take place local entities not just Metro entities must be involved. Many agencies such as our county have already upgraded their systems. How would these effect agencies such as ours? Counties such as ours won't support unfounded mandates or negative changes to our current system
- If the system is going to be implemented then it should be for all public safety agencies not just a select few. However it is a good idea for larger jurisdictions to go to the 800 MHz system that will add a lot new frequencies for those who don't change cost would be a major factor for this county it would be over 5,000,000.00 from a previous survey/study. Renting towers and equipment maybe a cheaper route.
- In the rural areas of the state the State Patrol district boundaries could be utilized to make it more workable on a local level. State government needs to set-up the parameters that all systems will operate on with impute from the sheriff's associations.
- The two issues that come to mind are will this system work in certain areas, with hills, valleys, etc. Is it right for everyone? Financing without state and or federal money many small emergency services, cities etc. Including my agency will not be able to afford changing out all the portables, mobiles, dispatch stations etc. Matching funds aren't much help.
- Law enforcement, Fire and EMS are all on the same repeater system in our county. When an emergency occurs we have problems because different agencies are using the repeater at the same time. When we design our new system law enforcement will have its own repeater system that is encoded or digital for privacy. EMS needs a statewide repeater system Fire needs a statewide repeater system.
- I don't have a problem with a state network. I'm not interested in regional dispatch. We have our own local concerns and I don't want an outside agency telling us what to do or how to do it.
- Geographic location, knowledge of dispatchers, elimination of 'skip" and bleed over. The state has been running a surplus for some time while local jurisdictions have had to rely on property tax increases to provide the most basic of services. This has left no money to improve infrastructure that is vital for new equipment such as radios etc. Maybe it is time to set priorities right.
- The problems I see with a statewide radio system are many. Unable to get on air because of heavy usage. Lack of control as for us usage, equipment etc.

- Cost, size, area
- All agencies should be able to talk to each other
- Money
- What do you get? Who pay for it? Funds not available on local levels. Frequency coordination throughout state.
- For us and one statewide frequency with us for federal department.
- Something that works and isn't out dated before it's installed.
- The interests of public safety need to be considered and needs and interests must be balanced with available resources.
- Funding new system is a problem. Control of the system could cause political problems. I'm sure it could be done with current technology but the funding and political barriers are considerable.
- If a change is made for pager frequencies all small town Fire and ambulance services would need to buy pager and radios. Political Price tag!
- Radio networking across state lines
- Who will maintain equipment? Who will manage traffic on frequencies?
- The cost of implementing a shared system who is going to pay for all new equipment such as 800 MHz.
- The system cannot be so complex that the user has to stop what they are doing to figure out how to operate it.
- I feel MDT needs to be installed in all outstate law enforcement vehicles better communications will save lives and save money.
- Allow for local government impute prior to decisions being made.
- Cost and who will pay. Fairness in allocating resources. Big city / small county
- The main concern I have is that this does not end up being another non-funded mandate from the federal or state government down to the local level this seems to be the way the state is doing business these days.
- The majority of the funding and at a minimum regional change over not just 1 or 2 counties or cities.
- Not able to cross talk to border patrol.
- Cost to local government.
- Consider leaving Northwest Minnesota as is, thing are working fine.
- Left up to local government.
- Funding – who is going to fund the project.
- Need for many frequencies. Coverage for all jurisdictions. Who will administrate and how will representation be chosen.
- To be sure all radios work for all agencies consistently. Cost carefully for reception

Municipal Police Department

- Keep it regional in division. Too many departments on same frequency would cause delays in radio traffic.
- First I see a problem with budget and money allocated for such projects in outstate. In our present leadership outstate appears to be left out. Our area presently has an 800 MHz tower operated privately that has better communications abilities then our present system. Teaming with private industry in our area could prove helpful.
- I'm assuming this statewide network would be similar to law enforcement's statewide frequency. Educating when to use network. Who picks up the cost of upgrading systems in operation now.
- Keep the planning and implementation at a county level
- Consider having representatives from smaller agencies on the planning and implementation committee. Use as much of the existing equipment each agency has. Should upgrades or outdated equipment need to be replaces, financial assistance should be provide to smaller agencies that have limited funds for the costly changeover
- I do not want to wait for 10-28 and 10-US (plate registration and DL information). What will the wait be on a statewide system? The cost to our small low budgeted department? Will everyone on the system would on each other? How many users per area or region.
- Make it affordable to the smaller agencies. Metro departments obtain many from Legislature; leaving small departments behind.
- Each department works the radio/communication system differently. Such as running vehicle registrations or drivers license checks or use of dispatchers for phone calls and notifications. Local dispatchers also know the communities they serve as well as the people who live in that community. Problems with dispatch outside the area may arise and the public may not get or feel they were given the same type of service as in the past.

Keep all operational technological issues as local as possible. Poetically I can't see how system could work beyond local area. Too much impute to operation and budget if system to broad. Smaller departments such as ours would have hard time with cost of operation of large system if we had no say where system located.

- Strict users guide for all with local involvement in planning. Will there be enough frequencies. What will be the cost? Who will pay? Will it be "mandated" by state.
- Consider multi-channels for talk around Versus Emergency traffic get everyone's impute. Have policies in place and guidelines up before starting or going live.
- Funding – federal – state- vs. city. If the city has to purchase the equipment give us notice so that there is time to convince council the need and budget for the equipment.
- Trunked, digital, non-800 MHz. In our part of the state skip/congestion is minimal. But in a consolidated dispatch S.O. put everyone on one frequency. We have enough frequencies that could be pooled and provide much better coverage to field units. Too spread out for cost effective 800 towers.
- Smaller local government municipalities – will not be able to fund for this Fire, Police.
- Too complex to describe here.
- Cost, timing
- Staffing competency. Users and techs make decisions they should rather than some know nothing politician.
- All areas of the state should have access/coverage regardless of population.
- Just so they do not overcrowd the airways so people walk all over each other's conversations.
- Co-operation with Stearns County Sheriff's department would have to be must. Also cost would be a large factor.
- Severe weather alerts need to be addressed.
- More repeaters and towers. Ability to communicate with all emergency service entities from all hand held and mobile radios.
- Each unit of government is unique each has its own operational methodology as well as different missions. Attempting to coordinate the different methodology will be difficult at best.
- Cost to small agencies, reliability of system, we are looking for something better than what we have.
- Affordable for all agencies
- Consider all agency and government to the same don't let state or fed take command and do it their way. Don't let only one big name radio company try telling everyone what's needed.
- Due to the increasing radio traffic with the volume of police calls- more dispatchers – for the reason of officer safety.
- Outstate regions represented equally with Metro area. Under operations - who pays for maintaining system/updating. Would there be cost to any all who use system. Don't see much benefit to a statewide system as far as our department.
- It should have enough repeaters so that local and outlying areas are covered unlike MNSEF.
- The facts need to be set in stone prior to any agreement. "Financial and control of system.
- HIGH PRIORITY! Mobile data terminals access for rural agencies.
- System needs to be kept simple and easy to operate.
- Digital technology at no cost to municipality.
- You would need to sell local councilmen and to have money or grant to pay for system if it is a high cost to Small City it will not happen.
- I don't think it an issue.
- Expand the number of statewide frequencies that can be used for Public Safety.
- Range of towers, the ability to communicate with agencies further than 6 miles.
- I believe it is very important to be able to access all other agencies with one radio. There must be enough channels for every one to have access to, without having to wait. Funding to pay for it.
- Enough channels and distance for rural Minnesota.
- Involvement or representation from each entity involved for the implementation process. Technological consideration for future updates, expansion. Provide privacy/security for transmissions.
- Frequencies that are not scannable to the Public. Laws prohibiting Public from scanning any Law enforcement activity.
- Constant access and method of payment.
- Do not believe this to be an issue. I believe we should have this technology already.
- Keeping in mind that smaller agencies don't have the capital to keep up with technology. If changes are mandated, make sure there are grants available so we can afford it.

One of the biggest issues will be money. Will there be state or federal monies made available for small agency upgrades?

- Solve communication problems listed above.
- I would worry that dispatchers would give certain agencies priority because they are perceived as bigger and more powerful rather than priority given to the seriousness or potential seriousness of the call.
- We would just like to have a safe, clear line of communications.
- Low Band Frequencies on mobile units so one does not cover other units in use. A strict guide policy using the radio network only in emergency use.
- Funding for small County and Local Agencies to acquire the new technology.
- System should be an open-ended design with the flexibility to adapt to specific locales. Should integrate both voice and data systems. Politically, a lot of turf issues will have to be resolved. 800 trunked systems handle volume of traffic but you still have to spend money to staff adequate levels of dispatchers.
- It should be "inter"-state.
- Don't forget remote Rural areas where numbers of possible officers for response are limited.
- What considerations are to be given Greater Minnesota outside the 7 County Metro area? Will there be regional operations points? What are cost factors to be considered for rural small communities?

Special Police

- A statewide radio system would infringe on the rights of the private radio operators.

State Government

- Data privacy
- Should have full state coverage with seamless operation to radio user. Should include in building coverage should have a high level of voice security available in all areas. System should permit secure in-agency communications and seamless secure interoperability with local and federal jurisdictions. A continuing funding source not dependent on specific agency budget should provide equipment and other system costs. Operations standards should be uniform throughout the state.
- Funding, staffing, equipment (compatibility with existing)
- We will follow the lead of the state patrol. Cross communications are very important to us.

Question 3: Place additional comments here.

Municipal Fire Department

- None

Volunteer Fire

- I have been Fire Chief for 8 months and this is reflected in my response. I have a concern of having multi-users on our radio channel. I would like to maintain our present system.
- We are a very small town, with a number of calls each year. Radio Communication is very important as we are out as far as possible in one County. Pagers, Radios, and our current radio system is not that old (we have spent a lot of money to update in the last 5 years). Refarming of Radios is beyond our budget, but know that it is needed to improve our system. Waseca County is currently trying to upgrade their system, which is going to put a major strain on our budget.
- More funding to small fire departments

School District

- Radios need to be small and mobile so they can be used beyond the vehicle and accessible 100% of the time. They need to be on the person, not the vehicle.
- To be able to have long-range communication that is clear and static free without the ability of home scanners to listen. Also to be able to communicate with local authorities.
- Our system is simply for our bus operators to communicate with the school office and bus contractors base and garage.

Ambulance

- Need a radio system that works and a service department that does work for police ambulance fine on a timely basis. More frequencies with repeaters more towers all over our area, to many dead spots.

- Our biggest problem is with 911 paging. We are near the county line and the only ways Douglas County can page us is by telephone/encoder or calling Otter Tail county dispatcher and having them relay the information. Either way is out of normal dispatch procedures and delays our being dispatched. In regard to section 3 Question 4 our biggest problem with range is on our local government frequency on our local tower. More then 3-4 miles out we have to shift to Otter Tail Sheriff Vining tower, which is already a very busy channel.

Hospital

- We are a hospital, which operates an ambulance service we use the standard HEAR radio system for base and mobile operations. We also operate a paging base for internal use.

Utility

- Due to organizational control and operational money benefit issues, Rochester public utilities would limit its participation to having its independent dispatch center participate on a trunked system. For emergency needs only if at all. All mobiles and portables would remain on our own VHF and UHF frequencies. Our dispatch center is staffed 24/7 and is in a better position to relay instructions rather than interoperability directly to individual units.

County Emergency Management

- The maintenance department use two-way portable radios for communications between two buildings and a total of 41,000 square feet.

City Administration

- We are a small community of 52 people. We contract all our services and have no full time employees. Work that can be done by council members is done for pay by the hour otherwise its hired done. Police and Fire protection is contracted.
- We have one radio in the car and one radio in the office – shared system with Highway department.
- We have a CB radio between the City Hall and the Grader operator. We can also call Pine County and a garage in Pine City with this CB. We have no plans for any other type radio.
- Approximately 3 times a year – depends on if assistance is needed by other city personnel.
  Share a repeater station with Fire, Ambulance when operating on these frequencies.

Animal Control

- The city of Madelia, Animal Control does at times use the police channel in which the county law enforcement has the licenses.

City Parks Department

- We prefer cell phones. Hearing constant talk on the radios is very annoying and when you need it the most you are out of range.

Transit

- We believe that some kind of center based radio dispatch system will be needed soon in order to take our small system to the next level of expansion or to consolidate it with neighboring systems.
- Our transit system has vehicle units of the highway department two-way radios but we seldom use them. We deal with cellular phones.
- The public safety departments – Police, Fire and County Sheriff have much more of a need to talk to outside agencies – any communication with the street department (during an emergency or disaster) can be through those departments. Street department needs are simple with no need to scramble (all those scanners have to have somebody to listen to it might as well be street) and no need to communicate with state or federal agencies over a two-way radio. In the last 2 disasters of recent years the record flood of 1197 and the windstorm in 1998. Any contact the street department had with the state or federal agencies would not have taken place over the radio.

Public Works

- The city of Madelia – street department does use the city channel for our use this channel does belong to the city of St. James, Minnesota
- There have been times when we could have used the state DOT frequency when working with them during times of emergencies. When we installed our new radio system we went multi- channel with some room for additional channels for just such future use. We went this route for emergency preparedness reasons, so that all county

agencies could use some frequency in case one system went down due to tornadoes etc. This way all county and city units can be radio controlled on any frequency by the CD director and Sheriff department. It would be nice to have that capability with the state agencies also.

- This survey was difficult to complete because of a lack of expertise involving the technical end of radio communications.
- We currently use cellular telephones for communications.

Sheriff's Department

- Grant planning needs to start including the entire state not just Metro. I'm not aware of any grants going outstate except for Olmsted County.
- Maintenance over all according to radio area experts would be costly but they all agree would be an over all good system. Clear better distance and fit the modern technology changes. Public works need to stay in the VHF system.
- I answered some of the questions "never plan to use". It doesn't mean that we "never" will plan to use them. We just don't have plans in place to use them "within" 5 years. The MDT and MDC is something that I would believe we could use and be of benefit to my department. Again it is money that prevents us from either having them or planning for them.
- While no plans are made to replace the "system" we are finding the need to replace units. The older units do not have the capabilities of the newer models. I would say that within a few years replacing base stations might need to be addressed.
- #8 - As sheriff I'd expect to remain in control of our radio and dispatching services for our county. As an elected official I'm responsible for all emergency services in the county.
- A regional dispatch study was done 4 years ago. Project was rejected for lack of saving money, staff, cross training to do multi-task jobs. Loss of efficiency. Loss of contact with community. Loss of economy. Concern from public on loss of local control.
- Instead of returning the money in the form of refunds and other quick fixes, money that is already been paid in the form of taxes should be used to upgrade vital emergency services functions.
- We communicate well with other agencies using the statewide radio frequency for our area that's all we need.
- While this department utilizes the listed # of radios other public safety providers use the same radio frequencies.
- A trunked system capability is certainty desirable. Will the 800 MHz system work here?

Municipal Police Department

- Section I – because of the immensity of the county and that the county seat (Dispatching Center) is so far away, we have difficulty communicating with the Sheriff's office with our portable radios. Most of our calls for service come through civilian answering service hired by the city. The answering service does not have radio contact with us they page us on our pagers and then we call them by phone, either cellular or landline. We feel this works better for us because the Sheriff's office couldn't handle the additional workload plus it would be a long distance phone call for a resident to call the S.O. In summary, the radios systems is archaic at least, certainly unreliable.
- The New Prague Police department utilizes radio frequencies from Scott, Rice and Le Sueur Counties due to our geographical location. A 800 MHz trunking system would not be feasible for our agency. If Scott county was included in a 800 MHz trunking system (Scott County is our primary dispatch) we would have to maintain two systems in area to communicate with Rice and Le Sueur counties who may not be included in 800 MHz trunking.
- Will there be grounds for small, low budgeted departments? The cost? Is it necessary to consolidate? What is the benefit? What is the plan if the system fails? Down time etc.
- Great need to help smaller agencies get at least MDT's in not MCTs
- Unsure at this time.
- Technology is changing so fast and so rapidly updating seems to be a situation where we are running only to stand still. By the time the seed is planted to the time some new system gets implemented could be five years. Within that time frame tech. Could be much more advanced.
- I think a very good system can be built and work, but it needs time and work to be put together. Planning for 20 or 30 years down the road. I remember the last radio program back in the 70's and it was only good for 2 years before department went on their own.
- Cooperative efforts of all governments

- I think that local, county and state government should all provide shared funding to have enforcement agencies equipped with MDT or MDC devices.
- HIGH PRIORITY! We would like to see mobile data terminal access for rural Minnesota.
- Access to surrounding law enforcement records via MDT's would be of great help. Today's society is very mobile. Anything that can be done to assist in obtaining or disseminating information among law enforcement agencies would enhance our effectiveness for enhancing public safety.
- APCO is too involved in the allocation of Public Safety radio systems. At minimum, all Police frequencies should reside at the UHF range of better. All equipment, like Radar Units, Mobile Video, and remote transmitters operate between 122.00 – 165.00 UHF. This interfered with mobile radio operations as does high power transmission lines and peripheral electronic devices and computers. I've been told that all the frequencies are used up in our area and we can't obtain additional ones. I don't understand this as I was led to believe that Police had priority for radio frequencies. The state needs to lobby the FCC directly for more available frequencies.

Special Police

- None

State Government

- We are a statewide agency and work with federal, state and local counterpart's everyday. We need interoperability with them on a secure radio system, which has in-building coverage throughout the state. We also need statewide secure car to car coverage among our investigators on a daily basis.

Appendix "B"
Statewide Public Safety Radio Communications Initiatives in Other States

Statewide Public Safety Radio Communications Systems in Other States
Submitted by Pam Newsome, Mn/DOT Library

October 17, 2000

The object of this project to gather information from several states regarding safety radio communications systems, in order to determine: whether there is a trend toward the implementation of statewide systems; how systems are authorized and funded; how system governance works and how the relationship among member agencies works; what technology is being used; and how migration from older systems is handled.

Among the states that were successfully contacted, Delaware, North Dakota and South Carolina have systems in place. Colorado, Florida, Michigan and Ohio are well along in the implementation process for new systems. Alaska, Nebraska and Wisconsin are in preliminary or planning stages. Kentucky, Louisiana and Washington state do not have statewide systems.

Statewide public safety radio communication systems provide interoperability among state, federal and local public safety agencies in a state. They include law enforcement, corrections, natural resources, transportation, fire and emergency medical personnel. Some states have, or are implementing, such all-inclusive systems and some are more limited in scope. The following table gives a summary of each state that was included in the study. A state-by-state narrative is available upon request.

Statewide Public Safety Radio Communications Systems in Other States

The table below summarizes the status and characteristics of statewide public safety radio systems in ten other states. Seven are fully or partially implemented; three are in the planning stages. Of the systems that are in place or being implemented, most use 800 MHz technology. The North Dakota system, which has been operational since 1977, uses VHF. In four of the states, the agency responsible for the system is the agency that handles telecommunications/technology for the state. Two systems are under the State Police/State Patrol, two are under Management & Budget & Control Boards, and one is governed by a multi-agency steering committee. In Delaware, implementation was under the Department of Administrative Services and ongoing maintenance is under the Department of Public Safety. Most of the systems were funded with state bonds and one through a state trust fund. Only one system has any federal funding. Several of the systems have or are planning user fees to help pay for equipment and/or ongoing operation and maintenance costs.

State	State Governance	Advisory Bd./User Group	Status of System	System Users	Technology	Funding Sources	Cost	Web site URL
Alaska	Dept. of Admin, Info. Technology Group		Engineering evaluation being done	State, Local, Federal	To be determined	To be determined		
Colorado	Dept. of Personnel, Telecom. Services	Cooperative Communication Network of Colorado	In Phase 3 of implementing	State, Local	800 MHz	Public safety trust fund;local users purchase their equip.	$150-200 million est.	http://www.state.co.us/gov/dir/gss/cits/comm/dtrs/dtrsinde.htm
Delaware	Dept. of Telecom. & Tech; Dept. Public Safety	Informal user committee	In place since 1998	State, Local	800 MHz	Bonds; general fund and local funds for ongoing cost	$52 million	http://www.state.de.us/pscomm/800a.htm
Florida**	State Technology Office	Joint Task Force	50% of state is covered	State law enforcement	800 MHz	$1 of each vehicle registration and voter registration fee	$220 million est.	http://www.stste.fl.us/dms/tools/plnpol/r9p1n10.pdf
Michigan	State Police	Local user meeting; planning a formal user committee	In Phase 4 of implementing	State, Local, Federal	800 MHz	Bonds (State Bldg. Authority); user fees and general fund of upgrades.maintenance	Approx. $200 million	http://www.mpscs.com/
Nebraska	Dept. of Admin. Services	Public Safety Wireless Communication Advisory Board	Planning the system	Sate, Local	Will be either VHF or 800 MHz	To be determined; will include state funding and user fees	$210 million est.	http://www.doc.state.ne.us:80/radiotf/intro-towebpage.html
North Dakota	Office of Mgmt. & Budget, Radio Communications Div.	N.D. Peace Officers Communication Committee	In place since 1977	State, Local, Federal	VHF	75% federal grant, 25% general fund to implement. Ongoing from general fund and county 9-1-1 rev-		http://www.state.nd.us/radio

** The state of Florida information above may no longer be applicable. Florida has made an administrative decision to privatize their state radio facilities. Information not available as of this writing.

State	State Governance	Advisory Bd./User Group	Status of System	System Users	Technology	Funding Sources	Cost	Web site URL
Ohio	Six-agency Steering Committee	No local users yet	Beginning to implement	State, open to local	800 MHz	Bonds (State BLDG. Authority);member state agencies pay ongoing costs	$275 million	http://www.state.oh.us/das/dcs/marcs
South Carolina	Budget & Control Bd., Info. Resource Office	Users advisory committee	75% of state covered	State, Local	800 MHz	Paying fees to share infrastructure owned by utilities; seeking leg. approp. to purchase	$16 million est. tp purchase sites form utilities	
Wisconsin	State Patrol	State /local committee	Planning the system; conducting pilots	State, Local	Leaning toward VHF	To be determined		

Appendix "C"
800 MHz Executive Team Methodology

In order to determine the current status and needs of public safety wireless communication users throughout Minnesota, the 800 MHz Executive Team met once every month. The process began by educating 800 MHz E-Teammembers on the issues that are, or will impact, wireless communication users. The 800 MHz E-Team then identified main categories that they felt needed to be addressed. Those issues include:

1. Spectrum (radio frequencies)
2. Technology issues
3. FCC regulatory issues
4. Funding
5. Governance
6. Interoperability

The 800 MHz E-Team then determined that additional information would be required to assess the impact of a shared statewide wireless system. The 800 MHz E-Team listed the following:

1. What are other states doing?
2. Is there any interest in a shared statewide system by the local public safety agencies in Minnesota?

In order to get a better understanding of the above issues, the 800 MHz E-Team developed a questionnaire with specific questions pertaining to each issue. The survey was mailed to all city, county and other major wireless user groups on August 4, 2000. The survey responses were used to help the 800 MHz E-Team gain a better understanding of several of the issues raised in the legislation. Those issues include:

1. Current and future needs and capacities of radio systems in outstate areas.
2. The potential for implementation of a multi-agency, multi-jurisdictional shared radio system.
3. Potential guidelines for governance and system participation by state and local units of government
4. Statutory changes required implementing a statewide shared public safety radio system.
5. Expansion capacities of each local government and major user group.
6. Estimates of local government and major user groups of the anticipated level and timeline for using the radio system.
7. Analysis of the expected costs of implementing the radio system.
8. Proposed funding mechanisms, including options for allocating costs among local governments and major user groups.

The survey data was compiled and analyzed by members of the 800 MHz E-Team. (See Appendix A for an itemized account of each question contained in the survey.) The 800 MHz E-Team developed proposed recommendations based on the findings from the survey and other data gathered. Those final recommendations are included in this report.

A draft report was developed by the 800 MHz E-Team and then distributed to local governments throughout Minnesota. Ten (10) regional meetings were held throughout Minnesota. With the assistance of organizations such as the Association of Minnesota Counties, League of Minnesota Cities, Minnesota Sheriff's Association, Association of Minnesota Chiefs of Police and the Association of Minnesota Fire Chiefs, the 800 MHz E-Team sent invitations to county and city administrators requesting their agency's and department's participation at the nearest regional meeting to review and discuss the draft report to the Legislature. The comments received as a result of the regional meetings are reflected in Appendix D of this report

Appendix "D"
Local Input to Draft Report

Local Reaction to Statewide, Shared 800 MHz System Report

The final component of preparing this report entailed a series of meetings with local entities. Ten meetings were held throughout the state to review the draft report findings and recommendations. Notices were again sent out to county and city administrators. They were asked to distribute the meeting notice to any radio users within their jurisdictions. The meetings were conducted in informal settings and attendees were encouraged to give verbal feedback during the meetings. The attendees were also given comment sheets that they could fill out anonymously and send back to the 800 MHz E-Team. They were also asked to take additional copies of the report back to their communities for further distribution to any other stakeholders they felt may have an interest in the issue of a shared statewide radio system.

There were approximately 90 attendees at the regional meetings. There was representation from the following departments at all meetings: sheriff's office, police department, fire department and Minnesota State Patrol. There was also representation from the highway departments, utility departments, park departments, public works departments, city and county administrators and school districts at some of the meetings. As of January 3, 2001, fifty (50) of the departments represented at the meetings have sent their comment sheets to the 800 MHz E-Team.

Metro Input

Although the report is centered around Greater Minnesota communications issues, it was pointed out to the E-Team that the governance alternatives included discussions about the Metro area and specifically the Metropolitan Radio Board. Because of this, the E-Team met with members of the Metropolitan Radio Board, and other government and communications officials from within the seven (7) county Metro area, to discuss this report. Comments from the Metro meeting are also included in this appendix.

Comments:

Six specific questions were asked on the comment sheet as well as to the participants at the regional meetings. These questions with responses follow:

1. **Which of the governance options presented in the report do you believe would be best suited for your type of government service?**

Of those responding, 42% indicated that a Statewide Board that included the Metro Area (Alt. 1) would best suit their needs.
8% said that the State Agency Leadership (Alt. 2) would be the best governance board.

40% indicated that Two Separate Boards (Alt. 3), one for Greater Minnesota and one for the Metro, would be best suited to their needs.

10% indicated that some other alternative should be explored.
- Three (3) boards based on geographic locations.
- We have no options, we are too small.
- Needs to have equal representation from Greater Minnesota
- Three (3) boards; one Metro, one for small agencies and one for large agencies. All three coordinate for legislation and funding.
- Can have separate subcommittees, Metro, non-Metro, state. Also must have non-participants in the planning to facilitate growth and coordination.

2. Which of the funding options presented in the report do you believe would be best suited for your type of government service? This pertains to Item II, Initial Equipment Requirements.

16% selected the State General Fund Loan Account (Alt. 1) as the best method.

10% indicated that the PFA (Alt. 2) would be the best source of funding for their equipment.

18% indicated that 9-1-1 Fees (Alt. 3) would be best suited to fund their equipment needs.

0% Alt. 4.

0% Alt. 5.

Of those responding, 50% believed that Federal Grants (Alt. 6) would be the best way to obtain money to fund the purchase of the equipment they would need.

6% felt that some other method should be examined.
- The state pays for everything.
- Use a combination of the three alternatives.
- Some type of lease arrangement.

2a. Which of the funding alternatives presented in the report do you believe would be best suited to your type of government service? This pertains to Item III, Ongoing Maintenance Requirements.

Of those responding, 34% indicated that Annual Radio Fees (Alt. 1) would best suit their needs.

22% selected General Local Revenues (Alt. 2) as the best method to cover maintenance costs.

36% believed that Subscription Charges (Alt. 3) would best meet their needs.

8% offered other methods to obtain maintenance revenues.

- Time for federal government to step in and help the local governments in updating their system.
- State pays for everything.
- Combination of local revenues and annual fees.

3. Based on the recommendations in the report, do you believe that your government agency could get fair representation in the planning and operational control of the system?

80% believed that their agency could get fair representation based on the board make-up described in the governance section of the report.

20% indicated that they did not believe their agency could get fair representation. All indicated that because of their small community size that they would be at an unfair advantage.

Reasons why they felt they could not get fair representation:

- Too small of a department (to get equal representation).
- You should have one entity leading the charge on this issue. It should be responsible to all on an equal basis.
- We're not really sure why at this point.
- Outstate Minnesota is insignificant.
- Smaller agencies get run over by the larger ones. It all comes down to dollars and is evident in the report.

4. Based on the report, would your agency/department give serious consideration to participate in a shared statewide 800MHz radio system?

68% indicated that they would consider participation in a shared statewide radio system.

32% indicated that they would not participate. Comments on why they would not participate:

- Need more information on costs. (Several comments)
- Just bought a new VHF radio system.
- Somebody else fund it.
- Need more local input. Too much is decided in the Metro. Needs to be better representation in Greater Minnesota.
- Just spent money to upgrade our current radio system

5. Does the report address all of your (agency) concerns and or issues?

56% indicated that the report addressed all of their issues.
44% indicated that the report did not satisfy all of their issues.

Concerns:

- Where will the money come from? How much will it cost locals?
- Are there plans to be able to talk across state borders with the new system? We need to be able to talk to North Dakota officials. (Several comments)
- The report doesn't discuss funding for small departments.

- Will the system talk across state lines?
- We could not afford the expense of changing over to a new 800 system.
- The report does not present any clear funding mechanism.
- The report does not explain how the education will be done and how the money will be made available.
- Should discuss data issues.

6. Other comments or concerns?

- Needs to provide for equal partnership responsibilities. Local participation is critical for success.
- A mixture of alternatives for funding and governance would be best. Any federal funds would be positive, but I think there is limited availability.
- Our radio budget is $8,000. A shared 800 system is not sensible due to cost considerations without a state or federal grant.
- No interest lease arrangements may be necessary to provide for local participation.
- The state doesn't have to stay completely out of the governance. Just leave local decisions to local officials and keep the locals informed throughout the process.
- I believe, at least in NW Minnesota that you should look at a public/private partnership in setting up the system. With the vast area that needs to be covered and the low population, I believe that this can be more effectively done through this type of a partnership.
- We are interested, but only if we have some control of policy and funding choices.

The Following Comments Were Received Through Discussions at the Regional Meetings Held in Greater Minnesota.

Tabulated below are the comments, both verbal and written, from representatives of the local units of government. The comments are sorted into categories matching the recommendations of the report.

State Take the Lead Allowing for Voluntary Local Participation:

- Can this (the radio project) happen based on Governor Ventura's administration cutting back on other services to cities and counties (dollars and cents)?
- The vision for project is good. There needs to be some global direction set by the state.
- Need to sell other advantages of the system such as Mobile Data Computers, officer safety, tools and capabilities.
- Must have phased in process.
- Why is state sending back rebates when locals need to raise money to fund participation?
- What is time frame for the statewide shared radio system?

Education and Technical Assistance:

- What are the capabilities of the system, will it provide coverage to fill in holes?
- You will have no problem selling law enforcement on the idea. However, you need to hit (make presentations to) the county boards.

Education- your presentations will have to go way back to basics of radio and how the system will meet the needs. Your education program should be targeted on decision makers.

- Are controllers located in counties?
- Did your survey find out how important communications is within the total scheme of things on a day-to-day basis verses an emergency or critical incident?
- VHF band has problems with interference.
- Operationally will it be easy to use for officers and dispatchers (patches, channel selection, etc.)?
- Does the trunking concept work with analog or digital technology?
- Have you talked with Association of Minnesota Counties?
- What about cellular (is this a viable option)?
- What about statewide roaming?
- What about coverage with 800 MHz verses VHF?
- What about private industry systems, will they have better foundation?
- What about the present equipment on our systems, can it be used on the new network?
- How will small agencies like ours get educated on the features and capabilities of the system?

Establish Local Planning Committees:

- What is your plan for migration from the old systems to the new system?
- Who's responsible for coverage guarantees?
- How will all this participation take place and what is the timing?
- Does everyone need to talk statewide or just on a regional basis?
- Need migration strategy, from now and into the future so we can prepare for this.
- Need a migration plan to address timing of people joining the system.

Establish Standards:

- What if some departments go onto the system and some don't? What happens if all surrounding agencies go on system, but our agency does not? How will the new system work? We need migration options.
- Will this system give us in-building coverage?
- This system must form a solid technical foundation so locals can use for the next 20 years.
- What is the back-up scenario? Is the proposed system fail-safe?
- Will there be two radios in vehicles?
- Will we be able to join later to use mobile data but not the voice system? (unbundle)

Develop Cost Participation Guidelines:

- What will the system cost the local units of government?
- How will you use tower space to generate revenue? What will that money be used for?

Cost figures need to look at the size of the geographic areas, especially in large areas like St. Louis Co. There will be cost differences due to greater hardware demand.

- Needs migration plan and put money aside to make the leap.
- What does it cost?
- Why do the locals have to pay maintenance on backbone or infrastructure of the system?
- The state should pay for everything and run the whole system.
- The feds should help the locals out like they did with the L.E.A.A grants.
- Our community has no money for participation in a system like this. What will the state do to provide assistance?
- Who will pay for this?
- The report does not discuss how small departments can generate revenue to support the use of this system.
- Our department just bought a new system, do you expect us to come over to this new system and just throw out our new system?

Determine Governance Structure:

- What about breaking state into regions?
- Can we use different alternatives in different regions? Needs in geographic areas may dictate different solutions. However, the state should still provide the overall plan and vision for this project.
- Different regions may get by with different approaches.
- What about the layout of the board and who will be on it? We need equitable representation.
- What about the 60% of survey respondents that have no plans to change out their radio systems within the next six years, do they pay now or later after the system is up and running?
- If Metro is funded separately, they will get more money than Greater Minnesota, we want equal representation.
- Because of the size of this system and the governing board, the small local agencies will have no input into the design and operation of the system. (At least six (6) comments were received stating the same thing)
- Why don't you consider making three boards? One for northern Minnesota, one for southern Minnesota and one for the Metro area.

Determine Funding Options:

- Would join if they could lease radios (Fillmore Co.).
- How will small local agencies pay for installing the equipment?
- Planners and legislators cannot separate the concept from the cost. Local agencies need to know how much to put aside to make the transition.
- Do not want to dip further into 9-1-1 fee (there are other needs that are tapping 9-1-1 fees).
- Some counties have more money than others.
- Is there a possibility of a joint public/private partnership in the rural areas? Wouldn't this offer a lower cost system?
- A word of caution about using grants. Look at what happened in the L.E.A.A. days. Federal grants were given to locals. However, the grant money could not always be used for what the county felt was

best. Some grant programs have hooks that restrict how the grant money can be used.

- Money issue needs to be defined like back in L.E.A.A. days.
- It all comes down to money.
- Let's not battle over funding like we did with 9-1-1.
- Our utility department does not see a need and cost justification for a system like this.
- What is typical cost for county/city?

Other General Comments:

- Will the system be phased in to provide mobile data capacity?
- A northern county sheriff supports the shared radio system concept and he needs a replacement system. He needs to somehow inform his county board of what the state is working on. Will we (E-Team members) be available to discuss this with his board?
- Will Mobile Data Computers operate on this system?
- Please keep in mind as you plan the system that day-to-day service is vital to most public safety operations.
- If our system is working good today, how can I justify going to the new system?
- Will paging be a part of the new system?
- A southwest sheriff has lots of problems with radio system, has to do something soon! Is now leasing services on a commercial analog 800 MHz trunking system.
- Most of the systems installed in 1974 are still in operation today.
- Interference on VHF channels is getting worse.

Metro Comments

Following are comments received at the Metropolitan area meeting that was held on January 5, 2001.

- Why is there such a negative perception of the Metro and the Radio Board in Greater Minnesota?
- At what level were the regional meetings held? Were policy makers involved, or were the meetings with supervisory or below staff members?
- Developing standards for the radio system are well underway in the Metro, do you plan to use these standards in Greater Minnesota or create new ones?
- Whatever the governance model selected, the Metro area needs significant representation.
- Your efforts need to streamline governance and have representation balanced with power base and money.
- Consider three (3) governing boards, north, south and central.
- This discussion today on governance is mirroring what occurred in the Metro ten (10) years ago while we were developing the Metropolitan Radio Board. The Greater Minnesota governance will need a lot of work. You need to assure balanced representation.
- You need to involve a core group of decision-makers to resolve the governance issues.
- All cities and counties need money. Funding issues are not unique to entities in Greater Minnesota; money issues are still pertinent in the Metro.
- Alternatives presented in the report do set the stage for discussion. However, a governance structure does exist here in the Metro, it is called the Metropolitan Radio Board. This Board could be modified

to be representative of the entire state. Their powers already exist. Representation could be drawn from the regions in dealing with local operational and technical issues.

- The report recommended education campaign – you need to get the League of Minnesota Cities and the Association of Minnesota Counties involved in your process.
- Representatives of the Metro feel that the financial benefits given to Greater Minnesota local government entities, needs to be equitable with the investment government entities have put into the Metro system.
- Eight or nine separate regions/districts would be difficult to manage in terms of convening and coordinating local input and decision making. No more than four local user regions should be established. Consider organizing local governance groups around the four State Tourism Districts: south, north central/west, northeast, and Twin Cities.
- Only one statewide system "policy board" is needed, not one in each region/district and not a separate one for the Metro area. The policy board should primarily be made up of local elected officials accountable directly to the voters and should be "evolved from" the current Metro Radio Board by statutory changes.
- Each region/district should have a "user group/technical operations committee" that recommends policy and makes local decisions. The regional group should be made up of government administrators and user agency representatives.
- There should be one statewide "system managers group" made up of the technical managers accountable to the "system owners" who administer the system and implement policy.
- Implementation of two State Patrol districts at a time over four to five years is a good plan. A better plan would be to first implement along the major freeway corridors and the top four or five population centers. This would provide the greatest benefit to the largest number of citizens the fastest and cheapest and would be the easiest initial deployment plan to support from a political perspective.

Survey information and copies of the report are available upon request.
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Or visit our Web site at www.dot.state.mn.us/oec/os800Report.html

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Layout and graphics by Kim Lanahan-Lahti, Office of Communication and Public Relations and staff.