Department of Public Safety
Division of Emergency Communication Networks
2014 Annual Report to the Minnesota Legislature

9-1-1/Next Generation 9-1-1 (NG911)

ARMER System

(Allied Radio Matrix for Emergency Response)

The Statewide Interoperability Program

The Statewide Emergency Communications Board (SECB)

December 2014

Prepared by

Minnesota Department of Public Safety

Emergency Communication Networks Division

Table of Contents

ECN Mission

Fund and support interoperable public safety grade mission-critical communication solutions that allow public safety 911 dispatchers, emergency services personnel, state, local, and federal agencies to communicate easily with each other to provide an immediate response to all Minnesota citizens and visitors requesting emergency assistance.

ECN Overview
The Division of Emergency Communication Networks (DECN) is led by Director Jackie Mines. It encompasses four programs that manage critical public safety communication networks:

- Statewide 9-1-1/Next Generation 9-1-1(NG9-1-1) network
- Statewide shared radio communications network — Allied Radio Matrix for Emergency Response (ARMER)
- Statewide Communications Interoperability Plan (SCIP)
- Wireless Public Safety Broadband project

Services Provided
DECN provides multiple services by collecting 9-1-1 fees that are assessed on each Minnesota wired, wireless and Voice over IP (VoIP) customer access lines, as well as on all prepaid wireless services purchased at the retail level. Those services include:

- Providing a state-of-the-art voice and data communications backbone to 100 percent of Minnesota residents and visitors requesting emergency assistance
- Achieving 95 percent mobile radio coverage across all rural and metro counties, enabling emergency responders to communicate seamlessly with each other, as well as with every Public Safety Answering Point (PSAP) when responding to requests for emergency assistance
- Providing grant dollars to local units of government to purchase necessary equipment for emergency responders
- Developing training applications to support comprehensive region-wide training and exercises for 9-1-1 dispatchers and emergency responders
- Supporting the established statewide and regional emergency communications governance structure to ensure each user has a voice in how Minnesota's interoperable public safety systems function through collaboratively developed and implemented standards

Executive Summary

Emergency communications are more efficient and reliable than they have been at any time in Minnesota history. Constantly changing consumer technology creates an ongoing challenge to maintain up-to-date technological equipment for emergency responders in Minnesota. During the past year, staff members at DECN have demonstrated the ability to productively use taxpayer dollars to ensure that all citizens are able to call for help and that emergency responders have the ability to communicate with one another as they respond to a call.

Milestones

- Migration to the NG9-1-1 Emergency Service IP Network (ESInet) is complete. This is the conversion of an analog voice network to a high-speed voice and data network. This milestone allows DECN to move to the next phase of implementing an end-state NG9-1-1

- Minnesota's Allied Radio Matrix for Emergency Response (ARMER) program continues to be a model for the nation. Ninety-seven percent of the ARMER backbone is on the air. Seventy-eight of 87 counties have migrated to ARMER, with seven of the remaining counties exploring the feasibility of joining

ARMER in the near future. The continued support of state and local elected officials reinforces our commitment to interoperable communications during disasters and emergencies

- Advancing the deliverables for the FirstNet consultation project (State and Local Implementation Grant Program, or SLIGP,) will promote the implementation of a public safety wireless broadband network

DECN Customers

- Primary customers include:
  - Minnesota residents
  - Public safety officials and responders
  - Local units of government
  - Federal agencies
  - Tribal governments
  - State agencies including:
    - Department of Transportation (MnDOT)
    - State IT Department (MNiT)
    - Department of Corrections (DOC)
    - Department of Natural Resources (DNR)
    - Military Affairs (National Guard)
    - Department of Public Safety State Patrol (MSP)
    - Department of Health and Human Services (DHS)

DECN Funding

- DECN programs are funded with revenues collected from a 9-1-1 fee paid by every Minnesota telephone communications customer and deposited in the 911 Special Revenue Account. The radio system infrastructure is provided through revenue bonds sold by the state and paid for through the 9-1-1 fee.

- The 911 Special Revenue Account provides funds for the following:
  - Statewide 9-1-1 program
  - NG9-1-1 network backbone
  - Wireline telephone company costs to connect to the 9-1-1 network
  - Equipment and dispatch proficiency expenses for 104 PSAPs
  - Debt service on the revenue bonds sold to construct the ARMER system
  - ARMER backbone maintenance and operation costs
  - Minnesota's interoperability program
  - Statewide Emergency Communications Board (SECB)

Financial Update

- The 9-1-1 fee is currently $.78 cents per wireless, wireline, VoIP and prepaid wireless subscriber
- $63,571,195 was generated in FY2014 ($2,325,647 of that revenue was from a settlement from TracFone for wireless 9-1-1 fees not submitted in previous years.)
- Beginning balance in the 911 Special Revenue Fund in FY2014 was $19,126,100 providing a total of $82,697,300 in the Special Revenue fund at the start of FY2014
- Total expenses for FY2014 were $63,742,900 of which $681,300 were administrative expenses
- Year-end balance in the 911 Special Revenue Fund was $18,985,400

Minnesota Statutes, Section 403.06, Subdivision 1a, requires that the commissioner of public safety prepare an annual report to the legislature. That annual report must include:

- Details of expenditures to maintaining the 9-1-1 system
- 9-1-1 fees collected
- Balance in the 9-1-1 Special Revenue Fund
- Administrative expenses of the 9-1-1 program

Since the inception of the program, the statute has been updated to include funding for NG9-1-1, ARMER, and other projects necessary for interoperable communications for first responders.

Fiscal Year 2014 Expenditures and Forecast

911 ARMER PROGRAM - SPECIAL REVENUE FUND
FORECAST OF REVENUES AND EXPENDITURES - February 2014 Forecast
($ In Thousands)

	Actual Fiscal Year 2014	Forecast Fiscal Year 2015	--Forecast-- Fiscal Year 2016	--Forecast-- Fiscal Year 2017
Forecast Resources:				
Prior Year Ending Balance	$19,126.1	$18,954.4	$10,417.4	$22,403.1
911 Fee Collections [1]	$63,571.2	$61,914.7	$75,624.7	$75,928.8
Transfers from Other Funds	$0.0	$0.0	$0.0	$0.0
Prior Year Adjustments	$0.0	$0.0	$0.0	$0.0
Subtotal Current Resources	$63,571.2	$61,914.7	$75,624.7	$75,928.8
Total Revenues Plus Prior Year Ending Balance	$82,697.3	$80,869.1	$86,042.1	$98,331.9
Authorized Expenditures & Transfers:				
Appropriation Transfers:				
Debt Service - Metropolitan Council	$0.0	$0.0	$0.0	$0.0
Debt Service - State of MN	$23,261.0	$23,261.0	$23,261.0	$23,261.0
MnDOT- ARMER operating costs	$9,250.0	$9,650.0	$9,650.0	$9,650.0
Medical Resource Communication Center	$683.0	$683.0	$683.0	$683.0
Subtotal Transfers	$33,194.0	$33,594.0	$33,594.0	$33,594.0
Expenditures: [2]				
Compensation	$681.3	$693.0	$710.3	$728.1
Rent / State Operations / 911 Service Providers	$9,256.8	$16,470.7	$15,670.7	$15,652.9
Public Safety Answering Points (PSAPS)	$13,664.0	$13,664.0	$13,664.0	$13,664.0
Next Generation 911	$6,946.8	$0.0	$0.0	$0.0
Grants to Local Units of Government	$0.0	$6,030.0	$0.0	$0.0
Subtotal Expenditures	$30,548.9	$36,857.7	$30,045.0	$30,045.0
Total Transfers and Expenditures	$63,742.9	$70,451.7	$63,639.0	$63,639.0
Fund Balance	$18,954.4	$10,417.4	$22,403.1	$34,692.9

An historical account of 9-1-1 revenue and expenses can be found in Appendix A.

Statewide 9-1-1 Program

Executive Summary

The Minnesota statewide 9-1-1 program provides immediate access from all telephones to critical public safety services. The 9-1-1 program, which has been administered by the Department of Public Safety since December 2003, coordinates the maintenance of 9-1-1 systems, assists counties with implementation and maintenance of their 9-1-1 call centers, and oversees funding part of the costs of delivering 9-1-1 calls to the appropriate city, county, or State Patrol PSAPs.

9-1-1 Background

The 9-1-1 emergency telecommunications system provides rapid access to emergency services. It is a simple, concise way to reach police, fire, and emergency medical services. The enhanced 9-1-1 system allows a caller's location to be displayed to the 9-1-1 call taker so help can be sent, even if the caller does not or cannot provide an address, or, as in wireless calls, may be at a location that has no address.

Statewide 9-1-1 answering is provided by 104 call centers that take 9-1-1 calls. These centers are called Public Safety Answering Points, or PSAPs, and are categorized as follows: 85 county PSAPs are operated almost exclusively under the Office of County Sheriff, one tribal PSAP, eight city PSAPs, two State Patrol PSAPs, Minneapolis Airport, University of Minnesota, five secondary PSAPs (EMS), and one Federal Military PSAP. The universal emergency 9-1-1 number is available throughout the state of Minnesota via wireline phones, wireless phone, VoIP services, and prepaid wireless services capable of dialing 9-1-1. For wireless telephones, Federal Communication Commission (FCC) rules (Title 47, CFR 2018) require the wireless carriers to put all 9-1-1 calls through to a PSAP, even if the caller is a non-subscriber. During 2005, the FCC enacted rules requiring access to 9-1-1 from interconnected VoIP services. These requirements include location and callback number, as well as use of the wireless enhanced 9-1-1 technology where available (Title 47, CFR, Par 9). Because Minnesota had already deployed wireless-enhanced 9-1-1 throughout the state, Minnesota PSAPs were prepared for the initial implementation of enhanced 9-1-1 service for interconnected VoIP services.

Effective January 1, 2014, MN Statute section 403.162, subdivision 5, required that all prepaid wireless E911 fees be charged at the retail point of sale (POS) and be administered by the Commissioner of Revenue (MDOR). Retailers are allowed a 3% retention fee to offset the cost of collection. MNDOR is allowed a 2% retention fee of the total collected to offset their costs to administer the collection.

- Wireless revenue collected between July – December 2013: **$19,640,967.17**
    - All fees from wireless carriers remitted directly to DECN in entirety
    - Includes pre-paid sales without any retention fee
- Wireless revenue collected between January – June 2014: **$20,473,961.82**
    - Fees remitted from wireless carriers directly to DECN: $18,199,231.29 (excludes pre-paid sales)
    - Pre-paid fees remitted to ECN from retail POS through MDOR: $2,274,730.53 (retention fees removed)

Comparison:

- Revenue decrease amount to DECN for retentions (3% POS/2% MDOR) between January– June 2014 : $118,285.99

- Had collection/remittance methodology not changed, estimated revenue January – June 2014: $20,592,247.91
- New methodology resulted in a 4% increase for period January – June 2014 over July - December 2013, of which 2-3% is estimated to be the result of the projected trending increase in wireless subscribers.
- Wireline subscriber counts continue to decline at 5% a year.

Things to consider:

- As provisioned in MN Statute 270B.12, subd. 4, DECN is working in partnership with MDOR to develop a process for DECN to receive POS information for the purpose of and to the extent necessary to more effectively administer prepaid POS collections.
  - DECN and MDOR will engage in a formal, Interagency Agreement to facilitate disclosure of information for the purpose of assisting ECN in determining how to best ensure retailers are collecting and remitting as required by statute.
  - Education and training may be required collaboratively between MDOR and DECN to help retailers understand their responsibility.

The 9-1-1 Program provides:

- Technical assistance to the cities and counties implementing, maintaining, and improving 9-1-1 systems.
- Oversight of system standards.
- Payment to telecommunications carriers and 9-1-1 providers for the NG9-1-1 network backbone.
- Administration of payments to counties, cities, tribal, and State Patrol to support the costs of operating the 9-1-1 PSAPs in accordance with Minnesota Statutes, Section 403.113.

The 9-1-1 fee is set by the public safety commissioner with the consent of the commissioner of finance. The fee collections are deposited in the 9-1-1 Special Revenue Fund, and these funds are appropriated by the legislature to the commissioners of public safety and finance to cover expenses authorized by state statute.

9-1-1 Program Initiatives

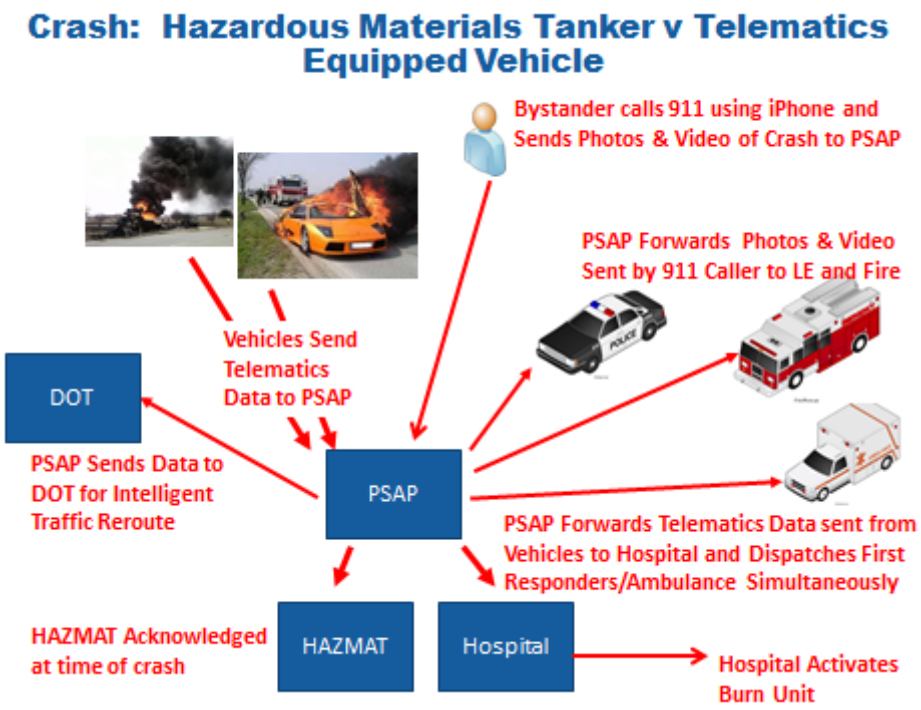
For more than 40 years, the Minnesota 9-1-1 system has served the needs of the public in emergencies. However, the evolution of emergency calling beyond the traditional 9-1-1 voice call has identified that our current E9-1-1 system is no longer capable of supporting future technological advances.

Next Generation 9-1-1 (NG9-1-1) will enhance the 9-1-1- system to create a faster, more flexible, resilient, and scalable system that allows 9-1-1 to parallel the communication technology used by the public today. Today's 9-1-1 networks carry only voice. NG9-1-1 is an Internet Protocol (IP)-based system that allows digital information (e.g., *voice, text messages, photos, videos*) to flow seamlessly from the public, through the 9-1-1 network, and on to emergency responders.

The technology to implement NG9-1-1 systems is available now, but the transition to NG9-1-1 involves much more than just new computers. Implementing NG9-1-1 will include the initiatives of many skilled people, who will coordinate efforts to plan and deploy a continually evolving system of hardware, software, standards, policies, protocols, and training.

- **Next Generation 9-1-1 (NG9-1-1) Conceptual Architecture** consists of the following:
  —Design and implementation of new high-speed IP network infrastructure
  —Network support for voice, data, and video
  —Fully interoperable emergency network
  —Combined local, state, and national approach
  —Elimination of call transfer data problems
  —Enhanced capabilities for persons with disabilities
  —Remote network access and enhanced redundancy

NG9-1-1 Conceptual

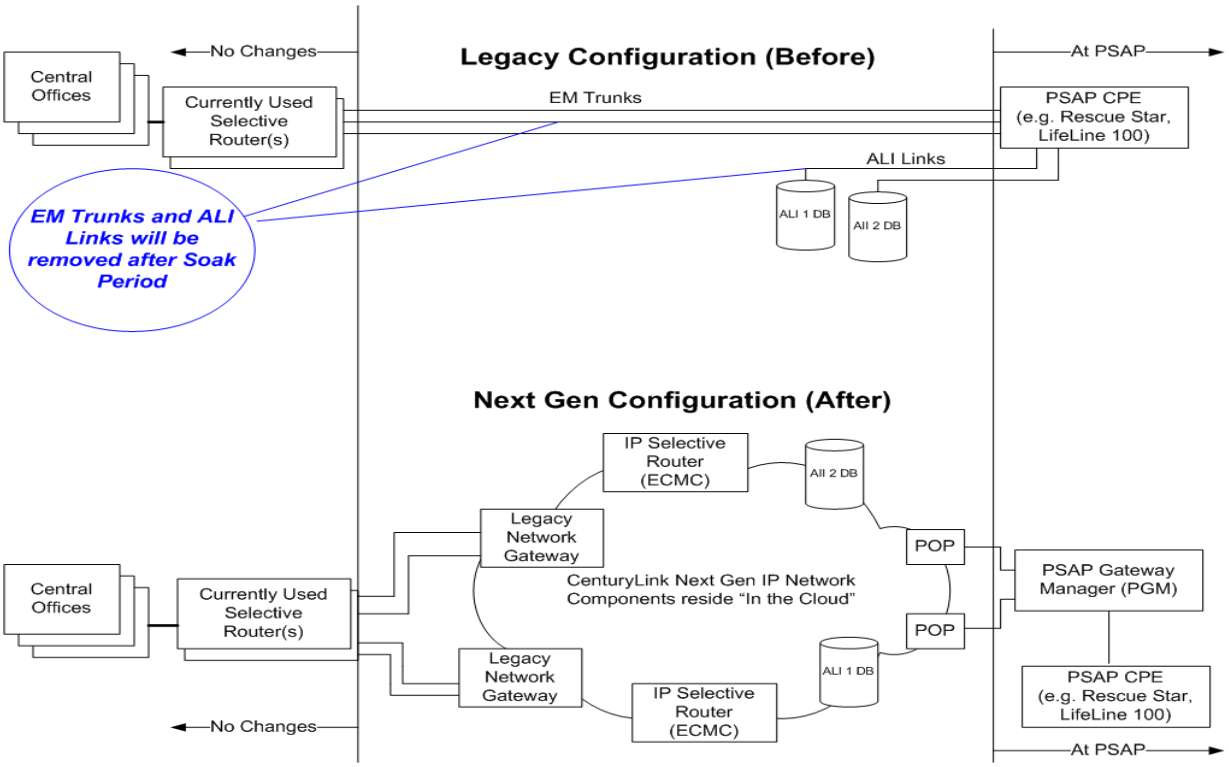


9-1-1 Goals and Status

Goal: Maintain Reliability and Dependability of the 9-1-1 Network

The statewide legacy 9-1-1network has evolved from a basic 9-1-1 system to an enhanced 9-1-1 system and is now undergoing implementation of a statewide Emergency Service IP Network (ESInet), a high speed, fully interoperable redundant and diverse IP network designed ultimately to support voice, data, and video. The current legacy 9-1-1 system is being asked to perform functions it was not designed to handle and is in need of a significant overhaul. Demands to modernize the 9-1-1 system are coming not only from national leaders including the President, Federal Communications Commissions (FCC) and U.S. Department of Transportation but also from the general public who expect to be able to communicate with the 9-1-1 system on their personal communication devices, such as laptops, "smartphones", iPads, and other non-traditional landline telephones.

Implementation of an ESInet will provide a more robust network with improved flexibility for managing Requests for Emergency Assistance (RFEA) from diverse mediums. The 104 public safety answering points (PSAPs) within the state of Minnesota handle more than 2 million calls annually. The ESInet provides for concepts, methods and procedures which will improve the operation, monitoring, reporting and maintenance of the 9-1-1 network. Included in the design of the ESInet is redundancy and diversity of the network and selective routers that was not experienced in much of the legacy E9-1-1 network.



Status: Ongoing. Implementation of a Next Generation 9-1-1 capable ESInet requires a complete overhaul of existing network. As illustrated in the network diagram, the configuration of the IP selective routers, the legacy network gateways (LNGs), and diverse fiber network to each PSAP has incurred additional expenditures. During this implementation, portions of the legacy network must remain operational for a period of time. The existing legacy network for each PSAP will remain in place until the PSAP has been successfully migrated, tested and accepted on the new ESInet.

Goal: Migrate All Minnesota's PSAPs to the Next Generation High Speed Network

- As of February, 2014, 100% of Minnesota PSAPs (104) are operating on the NG9-1-1 ESInet.
- Refer to our website www.ecn.state.mn.us for the latest project status.

Status: Complete

Goal: Cost Containment Resulting from Partnerships

The Next Generation 9-1-1 network is extremely complex and the process of administering changes and controlling the associated costs has been a challenge. Providing network resiliency and diversity to the PSAP is also a primary goal of the project and is a significant contributor to the cost to the project.

- Partner with MN.IT SERVICES for the provisioning of a diverse network path for PSAPs identified as being deficient in diversity connectivity. DPS engaged in service agreements for diverse network paths for 52 PSAPS.
    - Utilization of MN.iT network results in new opportunities for DPS to meet diversity challenges, particularly in rural areas of Minnesota where CenturyLink, the contracted ESInet vendor and system integrator is not able to provide sufficient diversity.
    - Utilization of MN.iT network results in a cost sharing with the BCA and in turn a reduction to BCA's overall network costs.
- As the 104 PSAPs migrated from the legacy environment to the ESInet, the legacy network circuitry that previously delivered 9-1-1 calls with location information to PSAPs was eliminated.

- Legacy EM trunks and ALI links between the selective router and the PSAP are disconnected providing for a cost savings of recurring monthly charges.

Status: Ongoing. As MNiT services continue to build out network throughout the state, ECN will utilize this network for the remaining 52 PSAPs if there is complete diversity in the network path available.

Goal: Efficient Use and Consolidation of Resources

A number of Minnesota PSAPs have taken advantage of the opportunity to engage in a full consolidation (two or more PSAPs combining to make one PSAP) or in a virtual consolidation (sharing technology resources and/or personnel using a unique hybrid).

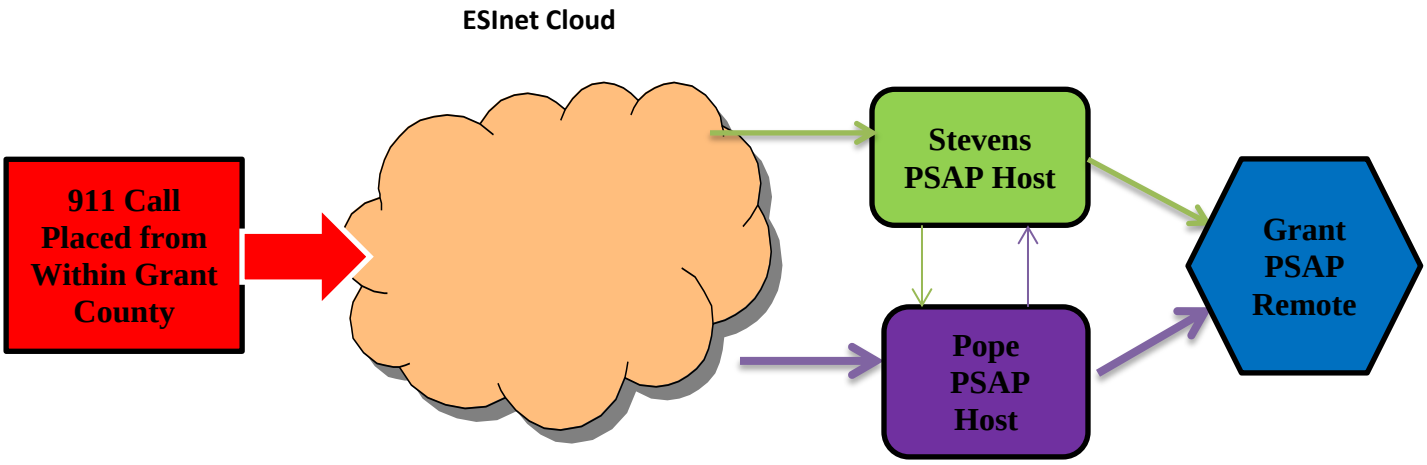
PSAP Full Consolidation:

- St Louis County consolidated their Virginia and Duluth PSAPs into one regional PSAP in November 2011.
- Hopkins PD PSAP merged into the Hennepin County PSAP in August, 2012.
- Minnesota State Patrol consolidated 10 PSAPs into 2 PSAPs.

PSAP Virtual Consolidation: Host/Remote CPE

- Grant, Pope and Stevens counties are engaged in a hosted Customer Premise Equipment (CPE) consolidation which will resulted in a sharing of a hosted 911 call answering system operational in 2013.
- Hennepin County, City of Minneapolis and Edina and secondary PSAPs Allina and HCMC are engaged in a hosted Customer Premise Equipment (CPE) consolidation which will result in a sharing of a hosted call answering system fully operational in 2015.

As illustrated in the Host/Remote CPE configuration below, a 911 call placed from a location within Grant County may be directed through the ESInet to be answered at any one of three PSAPs. Stevens and Pope County are Hosted CPE locations, with Grant County being a Remote CPE location. Depending on circumstances within the three PSAPs, 911 calls may be automatically routed to any of the three PSAPs. The 911 call taker answering the call in any one of the three PSAPs will know prior to answering the call that it is generated from Grant County by noting the dedicated location on the CPE display when the call is presented.



The network between the two host sites and the remote site is being provisioned through a MNIT SERVICES partnership.

- Similar Host/Remote CPE discussions are considered by other PSAPs throughout the state.

Status: Ongoing. The state of Minnesota's financial responsibility for network and infrastructure is decreased each time a PSAP or group of PSAPs either fully consolidates or works together to share technology resources. Not only have consolidation efforts produced a decrease to the legacy recurring network costs but will also decrease ongoing ESInet costs.

Next Generation Initiatives

Goal: Development of a Text-to-9-1-1 Application Accessible by all Minnesota Citizens

With the deployment of the ESInet to all 104 PSAPs in Minnesota, text-to-9-1-1 is now an achievable reality. Declaring 9-1-1 access as a core value of American life, the FCC has restated its goal of quickly implementing text-to-9-1-1 throughout the United States.

"*The industry has done its part, the FCC has done its part. Now it is up to the PSAPs to do their part," according to the FCC Chairman Tom Wheeler*.

The National Emergency Number Association (NENA) praised the FCC's actions: "to better serve individuals with hearing and speech disabilities, better protect victims of domestic violence and home invasions, and better connect with consumers when voice service is overloaded, text-to-9-1-1 must be made available as widely as possible and as soon as possible."

Both carriers and PSAPs must move swiftly to bring this new adaptability to consumers.
In Minnesota, the goal is to integrate a statewide deployment of a ubiquitous solution with the NG9-1-1 network if funding is approved for the 2016-2017 biennium. However, text-to-9-1-1 is a complement to, and not a substitute for, the existing 9-1-1 voice-based call. **Call if you Can! Text if you Can't!**

Minnesota Vision

- Statewide implementation using a well-planned and coordinated deployment approach, perhaps starting at a regional level
- Statewide public education campaign to precede implementation
- Single vendor solution for all of Minnesota
- Accept text-to-9-1-1 from all four major wireless carriers and any smaller carriers capable of provisioning
- Integrate the solution directly into PSAP call answering equipment to the greatest extent possible
- Implement a single web-based solution for text-to-9-1-1 when PSAP answering equipment cannot integrate
- Ability to transfer text messages between PSAPs

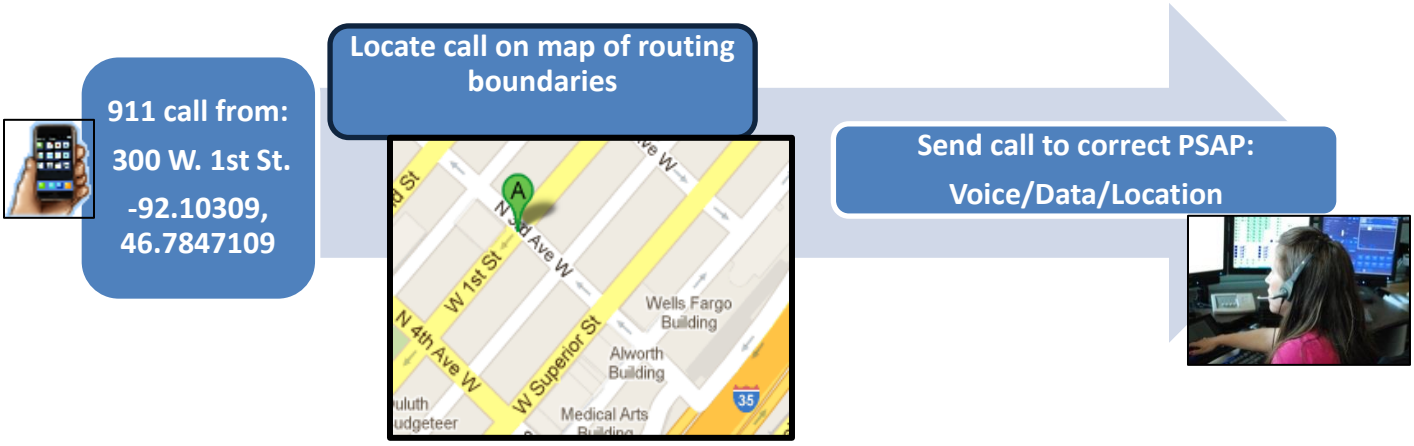
Goal: Development of a Statewide Geographical Database Accessible by all PSAPs

Geographic Information Systems (GIS) plays a supporting role in today's PSAPs and will become increasingly more important in the advancement of NG9-1-1. GIS will become the data source for the routing of 9-1-1 calls, assisting with location of the 9-1-1 caller, and determining the appropriate responding agencies.

- Today's E9-1-1 is based on the phone number of the 9-1-1 caller
- NG9-1-1 is based on the location of the calling device and allows for voice calls, along with all types of communications media, to connect with PSAPs and first responders
- With NG9-1-1, all requests for emergency assistance are associated with a location. The location can be a street address, a geodetic shape, or a latitude and longitude coordinate

"As we shift focus to the future, GIS will become the hero in the next-generation world and the basis for a lot of what happens. It's really shifting the role from being a supporting role to being perhaps the heart and soul of call routing and many of the other functions." - Sean Petty , Director of Technology Practice, Mission Critical Partners

The synchronization of the street address database and geospatial database will improve the accuracy of GIS data, the MSAG, and ALI displays in the PSAP, which will accordingly improve PSAP map displays for all types of emergency calls.



Minnesota's Vision

- Identify core geospatial data required to support the on-going operation of NG9-1-1 throughout the state. Whenever possible, leverage recent and on-going investments in geospatial data being made by federal, tribal, state, regional, and local governments to reduce costs.
- Construct a viable path to obtain and/or develop, maintain, update, aggregate, and standardize these data.
- Actively engage PSAPs, local, regional, state, federal, and tribal Minnesota jurisdictions in the collection, standardization, updating aggregation, and maintenance of geospatial data required for NG9-1-1 and related PSAP and emergency responder needs.
- Establish a long-term communications plan to keep participants informed.
- Identify transition plan to incorporate GIS data into NG9-1-1 geospatial call routing.
- Coordinate with existing state of MN NG9-1-1 providers and DPS/DECN and determine the requirements to interface with ECRF/LVF solution vendor(s) according to NENA GIS Standards
- Develop business case for migration from tabular MSAG legacy 9-1-1 call routing to NG9-1-1 geospatial-based routing.
- GIS Data Collection and assessment of data with discrepancy reports sent to the providers and maintainers of the GIS data to allow continuous improvement of the data quality and data integrity.
- Identify short-term development, long-term maintenance requirements, and data custodians.
    - Promote updating, maintenance, collaboration, and coordination at local, regional, and state agencies to nurture ongoing relationships for the sake of a maintained set of data that supports NG9-1-1, public safety, and other defined operations
    - Define and implement a program, process, and funding for ongoing maintenance and management of the data needed to support NG9-1-1, public safety, and other defined operations.

Migration of telecom end offices to the NG9-1-1 network

ECN is actively engaged in completing an end to end circuit inventory and current network needs assessment on all existing carriers' 9-1-1 network throughout the state of Minnesota. In parallel to the circuit inventory project, ECN is shifting from a manual billing process to a web based telecom expense and asset management software system which will significantly streamline and optimize invoice and asset management.

ECN is preparing for another initiative to solicit and procure the most viable vendor solution through the RFP process to migrate all telecom end office network elements from the existing twelve legacy selective routers located throughout the state to new aggregation points supporting advanced technology. All twelve legacy selective routers are approaching end of service end of life. An alternative network configuration is essential to our ability to deliver 9-1-1 calls to our Minnesota PSAPs.

Conclusion

The state of Minnesota has historically maintained a national leadership role in the deployment of 9-1-1 services. We continue to maintain ourselves on the forefront as it relates to the migration to NG9-1-1. To ensure the integrity of our 911 system going forward, the following objectives are important for the state.

1. It is essential that policymakers at all levels commit to the ongoing development and deployment of the interoperable statewide ESInet and supplemental applications as a fundamental 9-1-1 and emergency communications policy objective.
2. Statutes and regulations to enable a fully functioning ESInet with NG9-1-1 applications must be actively supported by 9-1-1 authorities and emergency service authorities. Existing legislation and regulations must be reviewed to ensure there are no barriers to, and that sufficient authority is provided, for the ongoing development of the NG9-1-1 system
3. Statewide ESInet and applications identified as core to its optimal function.
4. State, regional and local 9-1-1 and emergency service authorities must continue to work cooperatively toward establishing a statewide ESInet, including efforts to integrate those emergency applications identified as essential for enhancing the response to RFEAs.

The Department of Public Safety 9-1-1 Program continues to build on its strategy and plan for the migration to a Next Generation 911 (NG911) network, as identified by the Public Safety Act of 2007, the success of which requires a continued cooperation amongst all stakeholders: Legislators, regulators, state, regional, and local government administrators, and the telecommunications industry.

Allied Radio Matrix Emergency Response (ARMER)

Executive Summary

Minnesota established the ARMER Program in 2004. It is administered in coordination with the Statewide Emergency Communications Board and manages the implementation of the 700/800 megahertz (MHz) shared, digital trunked radio communication system.

The ARMER backbone is owned and operated by the Minnesota Department of Transportation (MnDOT). It is a robust, scalable, state-of-the-art system capable of servicing the radio communications needs of every city, county, state agency, tribal government, and non-government public safety entity in the state. It is the infrastructure upon which emergency responders rely.

Statutory Requirement

Minnesota Statute 403.36, Subdivision 4, requires the SECB to submit a biennial status report to the governor, committee chairs, and the ranking minority members of the House of Representatives and Senate committees who have jurisdiction over capital investment and criminal justice funding and policy.

The report must include a substantive assessment and evaluation of each significant part of the implementation of the statewide public safety radio plan with:

1. An update on risks and mitigation strategies
2. Quantitative information on the status, progress, costs, benefits, and effects of those efforts.

Status

- To date, 78 of the 87 Minnesota counties have migrated to ARMER. Seven additional counties have or will be creating a participation plan to assess the feasibility of migrating to ARMER within the next few years
- 315 out of 324 tower sites are on the air; however, some of these sites are supported on old or temporary towers. They are counted as operational but require construction of new tower sites.
- 10 sites are pending deployment, due to delays for land acquisition in difficult to reach bog or forest land (three areas in the northwest and seven areas northeast.)

Results

95% mobile coverage achieved

97% of ARMER sites on the air

ARMER Site Status

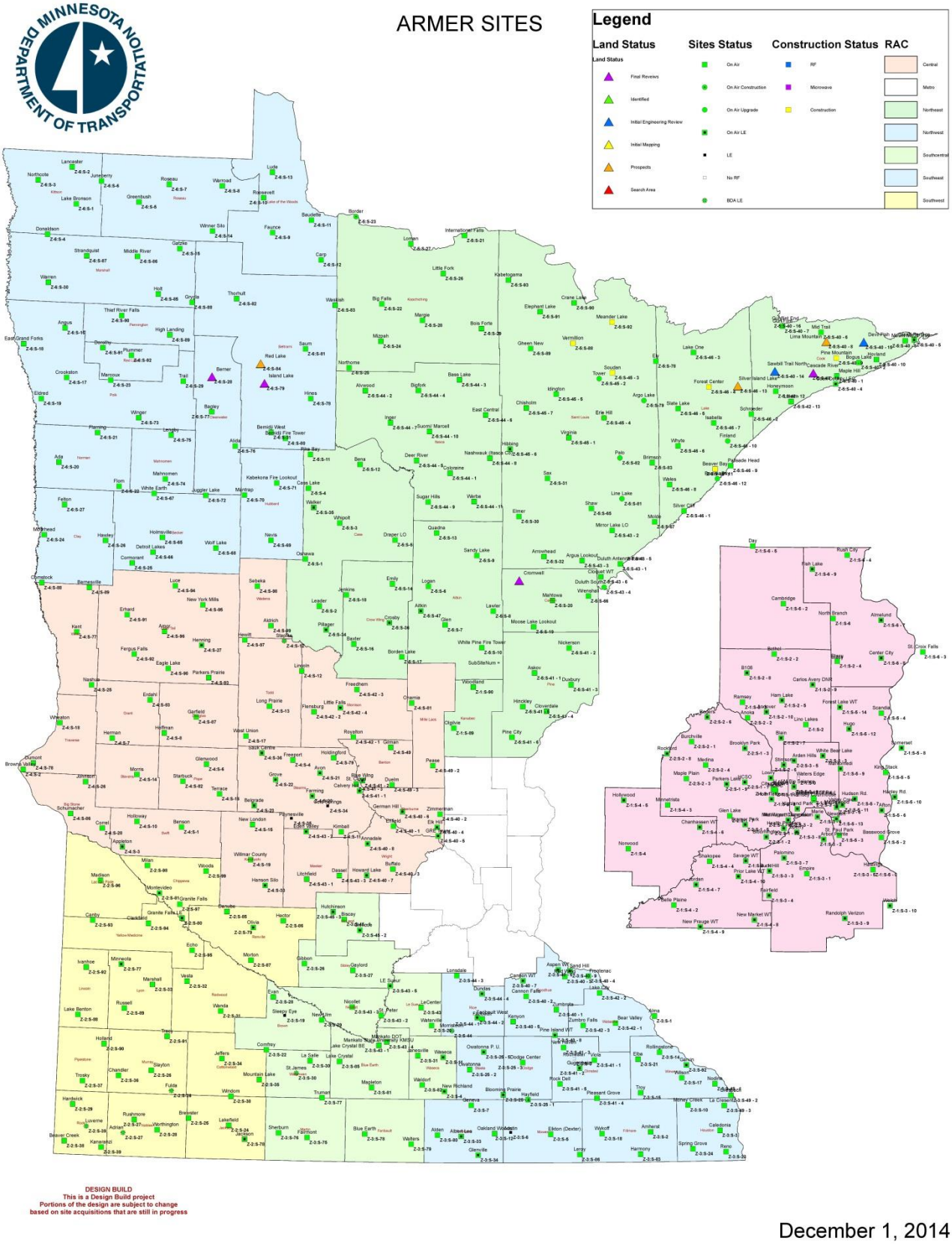
Reporting Period December 1, 2014 through January 1, 2015

	Total Original Planned MNDOT ARMER	Total ARMER Sites with Additional Added to	Total MNDOT ARMER RF Sites Currently	To Be Built	Local Enhancement Sites on the Air

	RF Sites	Address Holes in Coverage	on the Air		
Northwest Region	**58**	**59**	**56**	**3**	**0**
Northeast Region	**96**	**103**	**94**	**9**	**6**
Central Region	**52**	**52**	**52**		**16**
Metro Region	**28**	**28**	**28**		**46**
Southwest Region	**31**	**31**	**31**		**5**
South Central Region	**22**	**22**	**22**		**4**
Southeast Region	**37**	**37**	**37**		**12**
TOTAL:	**324**	**332**	**320**	**9**	**89**

Additional Project Improvements:

- A VHF Interop Overlay has been installed to ensure interoperability with agencies operating on VHF systems.
- Redundant routers will be added to all sites. This redundancy will improve the instances of site outages related to weather and other atmospheric conditions. The SW, SC, and SE regions are complete; work is progressing in Central, NE, and the NW regions.
- A number of towers are on the air on old towers that were constructed in the 1950's. Although the towers are not at risk for immediate replacement, the ARMER budget allows for new towers to be built in these locations. This work is ongoing, as other projects permit and as contingency funds remain.
- MnDOT continues to review high-capacity routes and outage records to implement microwave redundancy, space diversity, and realignment of towers to improve functionality.


ARMER SITES
Legend
Land Status
Sites Status
Construction Status
RAC
Central
Metro
Northeast
Northwest
Southcentral
Southeast
Southwest
DESIGN BUILD
This is a Design Build project
Portions of the design are subject to change
based on site acquisitions that are still in progress
December 1, 2014

History

Phases 1 and 2 of ARMER implementation included the nine-county metropolitan area. Phase 3 provided coverage in 23 additional counties in central and southeastern Minnesota. With the passage of full funding to complete the ARMER system by the 2007 Legislature, the state Departments of Public Safety and Transportation, with approval from the SECB, are completing construction of the system in the remaining 55 counties as one project — Phase 456.

Background

Planning for a Twin Cities metropolitan area interoperable radio communication system started in the 1980s. In 1993, a request for proposal was developed through the Metropolitan Council for the construction of a region-wide, shared radio system in the metropolitan area. In 2001, a plan was developed to extend the metro system into a statewide system.

Use of the metro system began in 2002 when Minneapolis, Hennepin County, metro operations of the State Patrol and Department of Transportation (MnDOT), Metro Transit, Carver County, and several suburban agencies in Hennepin County transitioned on the shared communication system.

There are a number of important factors driving the national effort to coordinate public safety interoperability. Foremost is the critical need for emergency responders to communicate with each other at emergency events. Additionally, the FCC narrowbanding mandate required substantial replacement of legacy communication systems used by local governments and state agencies prior to 2013.

The operating and maintenance costs, as well as the debt service on the 9-1-1 revenue bonds issued to construct the system, are paid for out of the 9-1-1 Special Revenue Account.

Costs

Phase 1
The planning and development of Phase 1 began in 1995, with the formation of the Metropolitan Radio Board (MRB). The statute creating the MRB provided that MnDOT would own, operate, and maintain the shared, trunked radio system. The initial backbone, which included basic communication and interoperability infrastructure, cost approximately $36 million. It was funded by the state and through revenue bonds supported by a dedicated portion of the 9-1-1 fees. Phase 1 improvements, which included coverage, capacity, and mobile and portable radios in Carver County, Hennepin County, and Minneapolis cost approximately $32 million. This was paid for by the local entities.

Phase 2
Phase 2 implementation was aided by the allocation of $7.5 million from 2003 federal Homeland Security funds, which purchased public safety portable and mobile radios for local communities. Additional funds from the Minnesota DPS Division of Homeland Security and Emergency Management (HSEM) were allocated to cover a portion of local costs for developing the interoperable radio system.

Phase 3
In 2005, the Legislature appropriated $45 million for Phase 3 construction. Another $9.5 million was made available to local governments for local enhancements in Phase 3. The same funding package also contained $8 million in local enhancement grants for Phase 2 updates for Chisago, Isanti, Scott, and Washington counties in the metro area.

Phase 456
The state has authorized $186 million for the completion of the Phase 456 backbone, with an additional $3.75 million appropriated for advanced Phase 456 site work. The total available funding for Phase 456 is $189.75 million.

System design criteria increased mobile coverage reliability to 95 percent on a county-by-county basis, resulting in 40 additional towers in Phase 456 and approximately 10 additional towers in Phases 1 and 3. A total of 332 tower sites are currently planned.

Construction Budget Status as of January 1, 2015

Project Funding	Original Budget	Spent to Date	Balance Remaining	Encumbered	Available Balance
Phase 3	$45,000,000	$44,952,397.19	$47,602.82	0	***Complete
SRB Funds (FY09)	$1,902,831	$1,902,831	0	0	Complete
Phase 456 (FY 09)	$61,996,957.89	$61,981,069.99	$15,887.90	$15,887.90	0
Phase 456 (FY 10)	$62,015,407.77	$61,826,943.53	$188,464.24	$188,464.24	$0
Phase 456 (FY 11,12,13)	$61,987,634.34	$41,126,887.65	$20,860,746.69	$7,245,933.55	$13,614,813.14
Total Phase 456	$186,000.000	$164,934,901.17	$21,065,098.83	$7,450,285.89	$13,614,813.14
Contingency as of July 2015**					$729,813.14

- ***Phase 3 remaining balance cancelled ($36,163) after funding for Phase 3 ended 12/31/10.**
- ****As mentioned above some sites were placed on older towers. Any contingency money will be used to build new towers to replace old towers as needed.

Bonds Sold
The state of Minnesota issued and sold 9-1-1 revenue bonds for the ARMER system in the following years:
2008: $42,205,000
2009: $60,510,000
2011: $60,308,000

The bonds, which received a high 3-A rating from all bond-rating agencies, are backed with a dedicated funding source in the 9-1-1 Special Revenue account. The rating and sustainable funding contributed to the sale of all bonds even during the challenging economic period of the mid 2000's.

9-1-1 Fees

The 2007 legislation permitted DPS to raise the 9-1-1 fee by 10 cents on July 1, 2008, 2009, and 2010. After July 1, 2010, per Minnesota Session Law, Chapter 54, the fee may be raised — not to exceed 95 cents. DPS chose not to raise the fee in 2008 because there was no need at that time to generate revenue for debt service on bonds. In 2009, the fee was increased from 65 cents to 75 cents. On August 1, 2010, the 9-1-1 fee was increased to 80 cents. It is anticipated the fee will be increased on July 1, 2015, to 95 cents to support SECB five-year plan initiatives, which include a major infrastructure upgrade in the Metro, St. Cloud, and Rochester areas on end-of-lifecycle equipment.

Risks and Mitigation Strategies

MnDOT and DPS have worked to minimize the risk associated with completing the ARMER project on time and on budget. MnDOT has worked with local and tribal governments to find land for those hard-to-acquire locations. This partnership continues to locate land for the last nine sites. Other solutions have been put into place to assist during the interim, such as the mobile, satellite-enabled ARMER communications site on wheels (SAT-COW), as well as other mitigation strategies.

The biggest continuing risk is legislative utilization of funds from the 9-1-1 Special Revenue Account for purposes other than emergency networks.

Benefits

The ARMER program provides Minnesota with the infrastructure and resources to allow its emergency responders to communicate with each other at any time, regardless of the nature or scope of an event.

The availability and efficiency of this specific communication structure — interoperability — is not only a safety issue for emergency responders, but it also can be a life-or-death issue for those requiring assistance.

Interoperability is also a force multiplier; it allows personnel that would otherwise be dedicated to communications to be used more effectively and efficiently while responding to an event.

Local and state government investment in the ARMER system has yielded a high return relating to performance at large-scale planned and unplanned events, however, it is most critical to note that the system provides day-to-day benefits to emergency responders during routine and emergency calls. While the benefit of a firefighter being able to communicate while three floors below ground or a police officer making instant communication with officers from another jurisdiction during a felony pursuit is not easily quantifiable, ARMER does result in enhanced public safety for emergency responders and the citizens they serve.

Success Stories

Basswood Lake Boy Scout Rescue

The weather was cold and windy on June 12, 2014 as five Boy Scouts and three adult chaperones canoed on Basswood Lake in the Boundary Waters Canoe Area. One of the canoes capsized, and the campers became separated in the high wind and waves.

Three members of the group were able to get to land and use radios they carried for safety to call the Boy Scouts of America (BSA) base camp in Ely and report the emergency. They informed base officials that they were on an island in Canada, but they were not sure about the location of the other canoeists. The BSA base called the Ontario Provincial Police, who called the Minnesota State Patrol (MSP) for assistance. Within minutes, eight agencies — county, state, and federal — were working together to save the lives of the stranded scouts and their chaperones.

In one of the most remote areas of Minnesota, they used the ARMER system to talk directly to each other.

In this case, responders had to find the correct talkgroup on their radios in order to communicate with other agencies. The Lake County dispatcher did an outstanding job coordinating talkgroups and patching

ARMER talkgroups to VHF frequencies in order to maintain interoperable communications. This is a great example of why continued training and pre-planning through annual exercises is so important.

Agencies involved were the Lake County Sheriff's Office, Lake County Rescue, U.S. Forest Service dispatch and float-plane pilots, MSP dispatch, MSP Trooper 8 helicopter and crew, the Minnesota Aviation Rescue Team (MART) through the St. Paul Fire Dept. ,St. Louis County dispatch and rescue, Minnesota Department of Natural Resources, the Ontario Provincial Police, and Ely and Babbitt ambulance services.

Once all stranded canoeists were located, the MSP helicopter crew lifted two of them and transferred them to a DNR boat. The rest of the group was transported to safety by a U.S. Forest Service Beaver floatplane.

B.J. Kohlstedt, Lake County Emergency Management Director, expressed gratitude for the ARMER system. "In our large, remote counties with low population and scarce staffing resources, we rely heavily on mutual aid with our neighboring jurisdictions. Having us all on a common, statewide radio system is an immeasurable improvement."

Kohlstedt added that Lake County switched from VHF to ARMER when only five of the county's 10 ARMER sites were on the air. She says that, although there were still dead spots in the system, it was already better than the previous system that ARMER replaced.

Gunflint Lake Rescue

On Gunflint Lake, a nice August day can turn dangerous very quickly, as two teenaged resort guests discovered the hard way.

The boys rented a small boat and headed out about noon. Soon after, the waves turned so rough that the motor fell off their boat, leaving them adrift. The pair washed up onshore far from their resort, where they spent the night in an empty cabin with no way to let anyone know they were safe.

The resort owner, a member of Cook County Search and Rescue, began looking for the pair when they did not return as scheduled. He requested additional resources, and responders in six boats extended the late-afternoon search into the night. The next morning, a U.S. Forest Service aircraft spotted a person waving a shirt from a dock. It was one of the boys. They were cold, wet, tired, and grateful to be brought to safety.

The Cook County Sheriff's Office, Cook County Search and Rescue, Gunflint Trail Volunteer Fire Dept., U.S. Forest Service, U.S. Border Patrol, Minn. Department of Natural Resources, and Minn. State Patrol assisted with the search, using the ARMER system to communicate with personnel in search boats, ground vehicles, and air support vehicles.

Today, all 87 counties and a number of cities and tribal governments are participating in regional governance structures. These legally recognized Joint Powers Boards are made up of elected county commissioners and city council members. The mission of these Boards is to support and address the interoperability communication gaps on a regional level, encourage training/exercises, and manage local migrations to the ARMER system and NG9-1-1. The Regional Advisory Committees (RACs) and Regional Emergency Communications or Services Boards (RECBs) are the core of Minnesota's governance structure.

Local officials across our state readily recognize that a lack of interoperable communications is a significant public safety issue for the citizens and emergency responders. A formalized, statewide governance structure provides a unified approach across multiple disciplines and jurisdictions; this approach aids the funding, effectiveness, and overall support for interoperable communications. Governance describes a support system that helps decision-makers generate informed decisions that meet stakeholder requirements. It also encourages cooperation among public safety responders. For SECB committees and workgroups go to:
https://dps.mn.gov/entity/srb/governance/Pages/default.aspx

SECB Strategic Direction
In September 2014, the SECB held a strategic planning session. The SECB stakeholder meeting was designed to elicit advice from a wide variety of public safety stakeholders on possible strategic directions to be considered by the SECB. The invited participants included law enforcement, fire, EMS, other first responders, technology users, health care representatives, elected public officials, a subset of the SECB, and state agency and legislative staff.

The two-day meeting was designed to do the following:

- Provide in-depth opportunities for all stakeholders to learn about current and potential technologies
- Review the changes in public safety challenges and communications methods that have taken place over the past quarter-century
- Identify public safety communication gaps and challenges that exist today
- Anticipate trends and challenges that will face public safety in the future
- Suggest criteria or values that the SECB should keep in mind as it plans for the future
- Elicit advice from each individual participant on the strategic direction the SECB should consider
- Identify funding options for the future

Information on the following page outlines the SECB's strategic direction for 2015-2019.

MINNESOTA STATEWIDE EMERGENCY COMMUNICATIONS BOARD

SECB STRATEGIC DIRECTION

STATEWIDE GOAL: Provide reliable interoperable communications for public safety responders, Minnesota citizens and visitors.

VISION : The safety of Minnesota's emergency responders, citizens and visitors is accomplished through state-of-the-art interoperable public safety communications systems.

MISSION: Enable emergency responders and citizens to communicate easily and respond immediately in critical emergency situations by providing reliable and robust systems for interoperable communications across counties, state, federal and tribal regions.

Goal 1: Evaluate technology to provide optimal systems to secure paramount public safety solutions for Minnesota citizens, visitors and emergency responders.

ARMER

- Evaluate and implement software upgrades to ensure efficient system performance and avoid large upgrade costs at a later date
- Provide seamless interoperable communication to all 87 counties and 11 tribal nations
- Create matching equipment grant funding to support upgrades for end-of-lifecycle equipment and software upgrades

Next Generation 9-1-1

- Implement a statewide interoperable Text-to-9-1-1 solution to meet FCC mandate by spring of 2016 and provide an alternate method for those who are deaf or hard of hearing , as well as in situations where speaking might create a dangerous situation (i.e. burglary in progress, domestic, adult/child abduction)
- Implement statewide Geographical Information Systems (GIS) database to support location-based routing of current technology devices for 9-1-1 that will enable emergency responders to locate a wireless caller with more speed and accuracy

Integrated Public Alert and Warning System (IPAWS)

- Promote statewide deployment and adoption of IPAWS to facilitate communications to the public when the need arises. This alerting system has uses ranging from severe weather alerts to mass communications in situations requiring citizens to take protective action, such as an active shooter scenario, train derailment or nuclear power plant incident

Wireless Broadband for Public Safety

- Evaluate the requirements and features of a reliable dedicated public safety broadband which would guarantee access to data in high-demand situations when commercial carriers are not available
- Continued consultation with FirstNet regarding the Nationwide Public Safety Broadband Network
- Advise the Governor about the risks and benefits of participating in the FirstNet Nationwide Public Safety Broadband Network (NPSBN)

Values:
Fairness
Integrity
Consistency

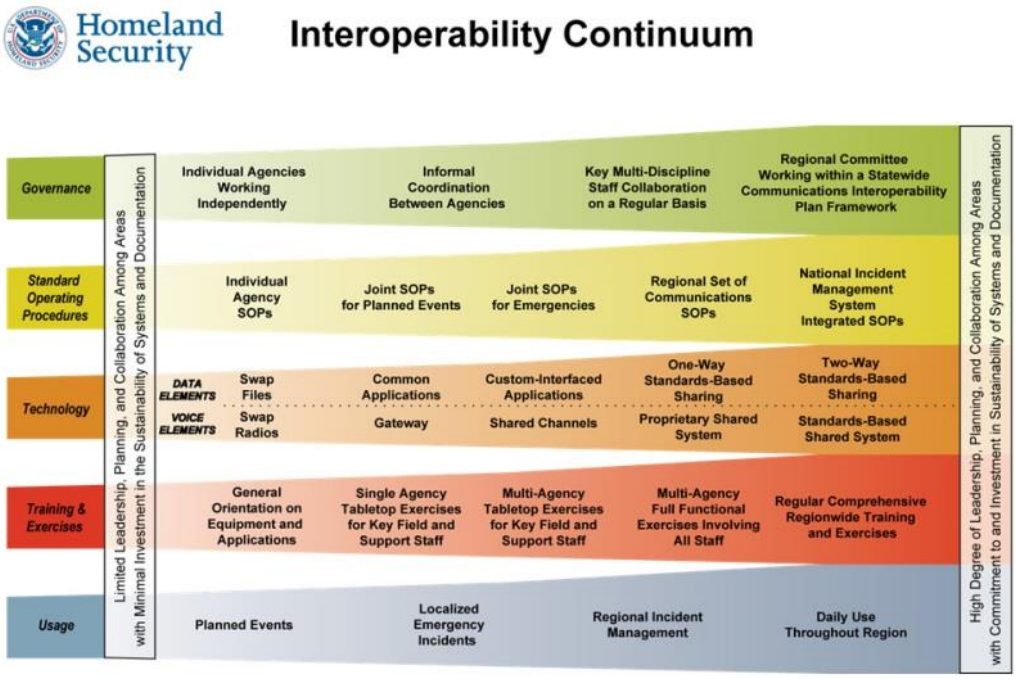
Goal 2: Secure funding for state and local units of government to support the most efficient, reliable and cost-effective public safety communications systems.

- Raise the 9-1-1 fee from $.78 cents to $.95 cents, as allowed by statute, to support SECB initiatives
- Encourage regional funding prioritization
- Create on-going grant programs to support local regional priorities
- Pay off ARMER bonds early to prepare for future funding expenditures in later years
- Explore other possible funding mechanisms, such as other technologies that can initiate a 9-1-1 request for assistance but do not currently collect 9-1-1 fees

Goal 3: Educate decision-makers about the criticality of public safety communications systems and changes necessitated by consumers' changing technology behaviors. Train system users to ensure first-rate performance on new and infrequently used technologies.

- Conduct annual training for elected officials at pertinent conferences and quarterly meetings
- Foster a core group of legislators to champion public safety communication initiatives
- Provide quarterly updates via newsletters and email distribution lists
- Update training materials on our online training website annually
- Provide grant funding opportunities to local units of government and public safety entities to promote on-going training and exercises

Statewide Interoperability Program



Established by Congress in 2007, the Department of Homeland Security (DHS) Office of Emergency Communications (OEC) partners nationwide with emergency communications personnel and government officials at all levels of government, to address challenges and develop solutions that address public safety operability, interoperability, and continuity of communications. OEC created the National Emergency Communications Plan (NECP), the Nation's first strategic plan to drive measurable improvements in the areas of interoperability, operability, and continuity of communications for emergency responders. This effort is not possible without the engagement of local, state, and tribal governments. To this end, each state is responsible for implementing and maintaining a Statewide Communication Interoperability Plan (SCIP) in coordination with the emergency response community.

Minnesota SCIP Mission

The Minnesota Statewide Interoperability Plan reflects the SECB's mission to enable emergency responders and citizens to communicate easily and respond immediately in emergency situations by providing reliable and robust systems for interoperable communications across counties, state, federal, and tribal regions.

All agencies supporting public safety in Minnesota will:

- Operate on or have access to a standards-based, shared voice and data system that has integrated National Incident Management System (NIMS) standard operating procedures
- Supported by regional committees working in conjunction with the SECB that provides comprehensive training and regional exercises

Public Safety Wireless Broadband Network - FirstNet

The landmark Middle Class Tax Relief and Job Creation Act of 2012 secured radio spectrum and federal grant funding for the development of a Nationwide Public Safety Broadband Network (NPSBN), and created an independent authority, FirstNet, to oversee the implementation and operations of the NPSBN —a dedicated Wireless Broadband Network for Public Safety.

FirstNet's ultimate goal is to deploy the NPSBN to meet the requirements of emergency responders nationwide. To assist FirstNet in the gathering of public safety requirements, and to support the development of a strategic plan, the State of Minnesota received a grant award under the State and Local Implementation Grant Program (SLIGP).

The resulting Minnesota FirstNet Consultation Project (MnFCP) is focused on identifying the wireless broadband needs of our State, County, Local and Tribal public safety agencies. The primary goals of the project are:

- Conduct education and outreach on FirstNet
- Accurately assess public safety user requirements
- Develop a fiscal sustainability plan for the network
- Gather the necessary information to assist FirstNet with designing and deploying the network
- Prepare the state and its public safety governance structure for the Minnesota FirstNet consulation
- Develop a memorandum of understanding to facilitate asset sharing
- Provide support for the deployment of the NPSBN in the State of Minnesota

Providing a new communications tool to first responders will benefit Minnesota greatly, which is why our state is leading the way toward a dedicated public safety wireless broadband network. This network will bring a stand-alone, mission-critical public safety Long Term Evolution (LTE) broadband network to first responders in Minnesota.

Milestones

- In January and February 2014, DECN held 14 "kick off" meetings in Minneapolis, Rochester, Mankato, Marshall, St. Cloud, Thief River Falls, and Duluth. These workshops provided an overview to stakeholders
- Developed Web-based training modules
- Presentations at Minnesota Annual Interoperability Conference
- Gathering user requirements
    - Coverage interviews
        - Commercial carrier coverage
        - Computer Aided Dispatch (CAD) data
        - Critical infrastructure
    - Workgroup meetings
    - User population surveys

Appendix A: Historical ECN 9-1-1 Revenue/Expenses

911 ARMER PROGRAM - SPECIAL REVENUE FUND
HISTORICAL FISCAL YEAR FUNDING
($ IN THOUSANDS)

	Fiscal Year 2008	Fiscal Year 2009	Fiscal Year 2010	Fiscal Year 2011	Fiscal Year 2012	Fiscal Year 2013
Resources:						
Prior Year Ending Balance	$17,952.3	$22,553.5	$22,905.6	$25,399.8	$28,432.2	$25,262.3
911 Fee Collections	$50,751.0	$51,269.5	$58,821.9	$61,966.9	$61,885.6	$63,263.8
Transfers from Other Funds	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Prior Year Adjustments	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Subtotal Current Resources	$50,751.0	$51,269.5	$58,821.9	$61,966.9	$61,885.6	$63,263.8
Total Revenues Plus Prior Year Ending Balance	$68,703.3	$73,823.0	$81,727.5	$87,366.7	$90,317.8	$88,526.1
Authorized Expenditures & Transfers:						
Appropriation Transfers:						
Debt Service - Metropolitan Council	$1,311.2	$1,410.0	$1,410.0	$1,410.0	$1,410.0	$1,410.0
Debt Service - MMB	$6,149.0	$11,853.0	$17,557.0	$23,261.0	$23,261.0	$23,261.0
MnDOT - ARMER operating costs	$3,110.0	$3,110.0	$5,060.0	$5,060.0	$8,300.0	$8,650.0
Medical Resource Communication Center [1]	$683.0	$683.0	$683.0	$683.0	$683.0	$683.0
Subtotal Transfers	$11,253.2	$17,056.0	$24,710.0	$30,414.0	$33,654.0	$34,004.0
Expenditures: [2]						
Compensation	$506.7	$614.1	$651.8	$656.6	$609.8	$719.1
Rent / State Operations / 911 Service Providers	$15,324.4	$17,097.4	$14,208.9	$13,616.5	$14,198.0	$12,846.5
Zone controller/ Project Dev./ Systems Design	$5,401.5	$2,485.9	$2,854.0	$0.0	$0.0	$0.0
Public Safety Answering Points (PSAP)	$13,664.0	$13,664.0	$13,664.0	$13,664.0	$13,664.0	$13,664.0
Next Generation 911	$0.0	$0.0	$239.0	$583.4	$92.2	$3,003.9
Grants to Local Units of Government	$0.0	$0.0	$0.0	$0.0	$2,837.5	$5,162.5
Subtotal Expenditures	$34,896.6	$33,861.4	$31,617.7	$28,520.5	$31,401.5	$35,396.0
Total Transfers and Expenditures	$46,149.8	$50,917.4	$56,327.7	$58,934.5	$65,055.5	$69,400.0
Fund Balance	$22,553.5	$22,905.6	$25,399.8	$28,432.2	$25,262.3	$19,126.1