ARMER

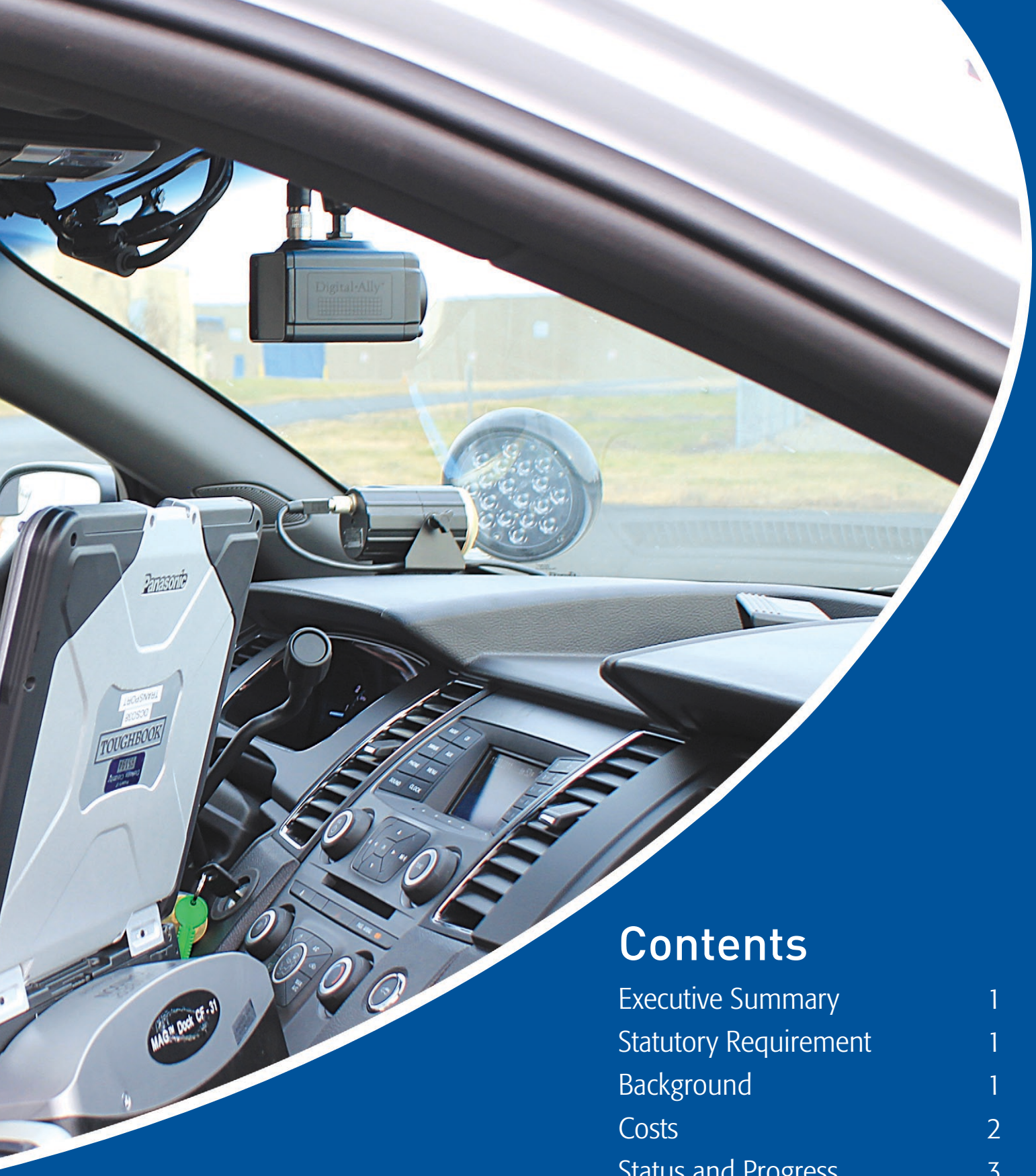
Allied Radio Matrix for Emergency Response

Biennial Report to the Minnesota Legislature

December 2012

Prepared by
Minnesota Department of Public Safety
Emergency Communication Networks Division

DAKOTA COUNTY
DEPUTY
SHERIFF



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Executive Summary

Strong partnerships, positive leadership and productive staff make Minnesota's Allied Radio Matrix for Emergency Response (ARMER) program a model for the nation. The continued support of state and local elected officials reinforces our commitment to improving interoperable communications during disasters and emergencies. It is a matter of critical public safety that emergency responders in every county be able to talk to each other.

Minnesota established the ARMER Program in 2004. It is administered in coordination with the Statewide Radio Board (SRB) 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. Simply put, the ARMER system is the infrastructure upon which emergency responders rely.

Phases 1 and 2 of the ARMER implementation were in the nine-county metropolitan area. Phase 3 provides 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 Statewide Radio Board are completing construction of the system in the remaining 55 counties as one project – Phase 456.

The Statewide Radio Board has set an operating standard for the ARMER system to provide 95 percent mobile coverage in each county by the end of 2012 prior to the Federal Communications Commission (FCC)-mandated narrowbanding deadline.

Statutory Requirement

Minnesota Statutes 403.36, Subdivision 4, requires the Statewide Radio Board to submit a biennial status report to the governor and the chairs and ranking minority members of the House of Representatives and Senate committees with 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.

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, Minnesota 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 will require substantial replacement of legacy communication systems used by local governments and state agencies prior to 2013.

The operating and maintenance costs, and the debt service on the 911 revenue bonds issued to construct the system, are paid for out of the 911 special revenue account. As of November 2012, 86 percent of the 324 towers being built statewide are on the air, and 73 of 87 counties have passed resolutions to migrate to the ARMER system.

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 911 fees. Phase 1 improvements, which included coverage, capacity, mobile and portable radios, in Carver and Hennepin counties 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 Department of Public Safety (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 enhancements for Chisago, Isanti, Scott and Washington counties in the metro area.

Currently, 58 of 59 tower sites in Phase 3 are on the air. There are an additional eight sites in Phase 3 to bring the mobile coverage reliability to 95 percent county-by-county. Currently 3 sites are under construction and expected to be completed by February 2013. The 3 week state government shutdown in July 2011 caused a delay to the construction of the towers.

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 the Phase 456 is $189.75 million.

System design criteria will increase mobile coverage reliability to 95 percent county-by-county, resulting in an additional 40 towers in Phase 456 and approximately 10 additional towers in Phases 1 and 3.

Construction Budget Status as of November 1, 2012

Project Funding	Original Budget	Spent to Date	Balance Remaining	Encumbered	Available Balance
Phase 3*	$45,000,000.00	$44,623,199.00	$376,801.00	$340,638.00	**Complete
SRB Funds (FY 09)	$1,902,831.00	$1,902,831.00	$0	$0	Complete
Phase 456 (FY 09)	$62,000,000.00	$61,958,189.31	$41,810.69	$41,788.31	$22.38
Phase 456 (FY 10)	$62,015,407.77	$58,144,629.28	$3,870,778.49	$3,870,512.72	$265.77
Phase 456 (FY 11)	$61,984,592.23	$7,069,243.48	$54,915,348.75	$6,215,828.92	$48,699,519.83
Total Phase 456	**$186,000,000.00**	**$127,172,062.07**	**$58,827,937.93**	**$10,128,129.95**	**$48,699,807.98**
Projected Contingency as of July 2012					**$15,000,000.00**

* The unemcumbered balance in Phase 3 will be cancelled ($36,163)
** Funding for Phase 3 ended 12/31/10

Bonds Sold

The state of Minnesota issued and sold 911 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 911 Special Revenue account. The rating and sustainable funding contributed to the sale of all bonds even in the current challenging economic period.

911 Fees

The 2007 legislation permitted DPS to raise the 911 fee 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 911 fee was increased to 80 cents. It is anticipated the fee will be increased on July 1, 2014 to 85 cents if necessary.

Status and Progress

In 2005, the Minnesota Legislature provided funding for the continued implementation of the ARMER backbone in 23 counties of central and southeastern Minnesota. Implementation is complete. Implementation in the remaining 55 counties of the state was authorized in 2007; MnDOT completed the detail design and began initial implementation in July 2008.

As the map on page 4 shows:

- 52 counties are now on the ARMER system
- 21 are in the process of migrating to ARMER
- 14 are FCC narrowband capable

The map on page 4 shows the planned location of the more than 300 towers that will comprise the backbone of the ARMER system once implementation is complete. As owner and operator, MnDOT is at various stages in the site development process. The process includes land acquisition, construction of towers, and equipping the towers with microwave and radio frequency equipment. Approximately one year to 20 months is required to construct an operable tower and bring it online.

With towers across Minnesota going on the air in 2011 and 2012, the basic backbone of the ARMER Program has reached 85 percent statewide coverage as of November 2012. The goal of the ARMER Program is to provide 95 percent mobile coverage in each county by the end of 2012, prior to the FCC-mandated narrowbanding deadline.

Risks and Mitigation Strategies

MnDOT and the Department of Public Safety (DPS) have worked to minimize the risk associated with completing the ARMER project on time and on budget.

The biggest continuing risk is legislative utilization of funds from the 911 Special Revenue Account for purposes other than emergency networks.

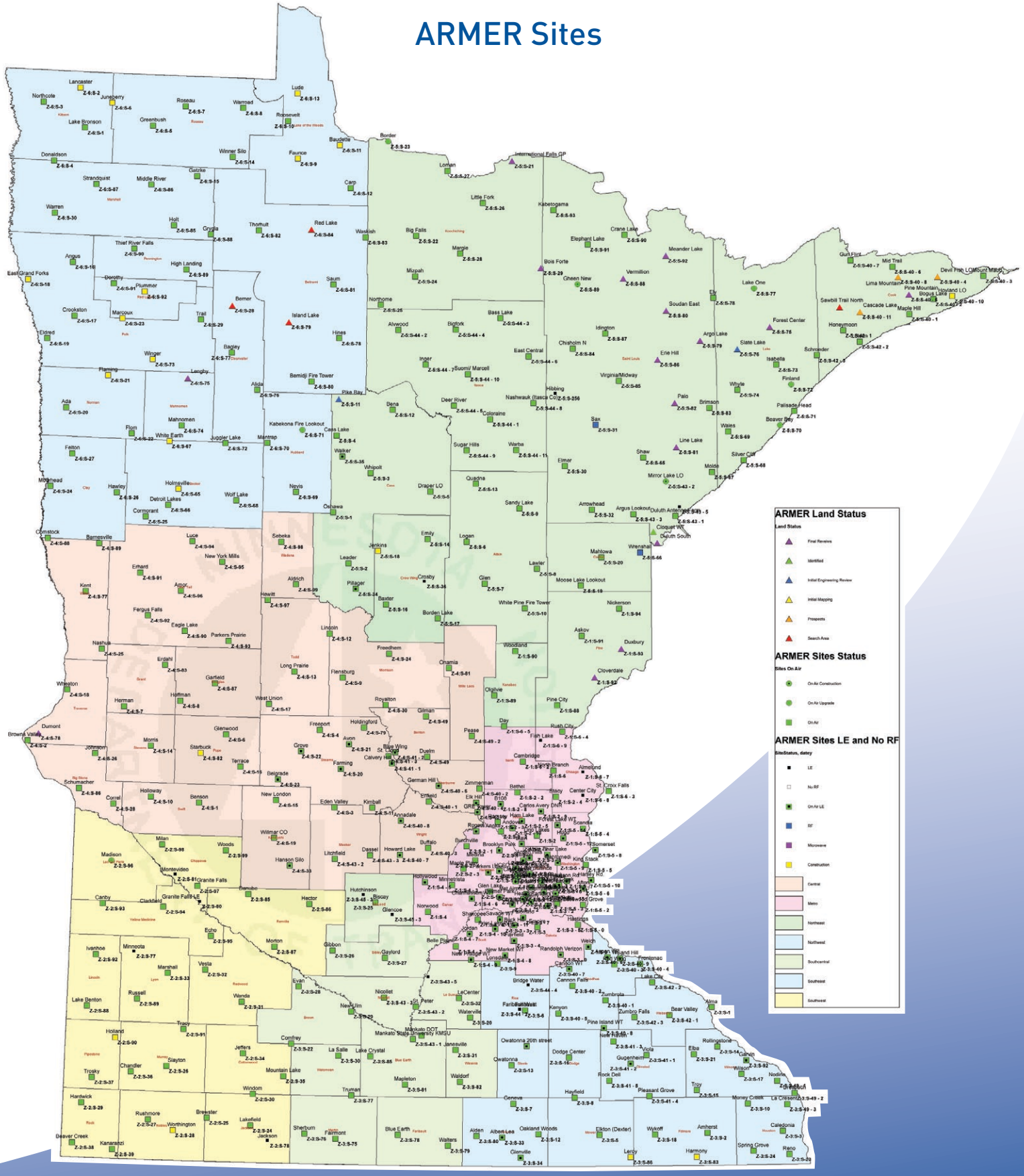
With the passage of the funding package for Phase 456, the Legislature required DPS to validate MnDOT's cost estimates, to ensure the final phases could be completed for the $186 million authorized in the bill.

DPS hired L. Robert Kimball & Associates in 2008 to perform an independent cost audit for Phase 456. The cost audit was required before the 911 fee, which is the funding mechanism to pay the debt service on the bonds, could be raised.

Kimball developed a cost projection model based on these factors most likely to affect MnDOT's cost estimates:

- Motor gasoline
- Steel mill products
- Real estate costs
- Consumer price index
- Employment cost index
- Producer price indexes for ready-mix concrete, materials and components for construction, and long-distance freight.

ARMER Sites


ARMER Land Status
Land Status
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Identified
Initial Engineering Review
Initial Mapping
Prospects
Search Area
ARMER Sites Status
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Southcentral
Southeast
Southwest

The narrowbanding deadline of December 31, 2012, is the date when the ARMER backbone must be sufficiently operational to allow all agencies wishing to migrate to the system to do so rather than narrow band their VHF equipment. The Phase 456 build-out of 225 sites is scheduled to be near completion by December 31, 2012. It is estimated that approximately 25 sites may not be completed by that date due to complications with acquiring land. More than 86 percent of the backbone towers are already on the air, providing sufficient coverage to migrate state agencies and local governments to ARMER well in advance of the 2012 narrowbanding deadline. The implementation schedule of ARMER has been sufficient to meet the DHS National Emergency Communications Plan goals.

Benefits

The ARMER Program will ultimately provide 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 in an event response.

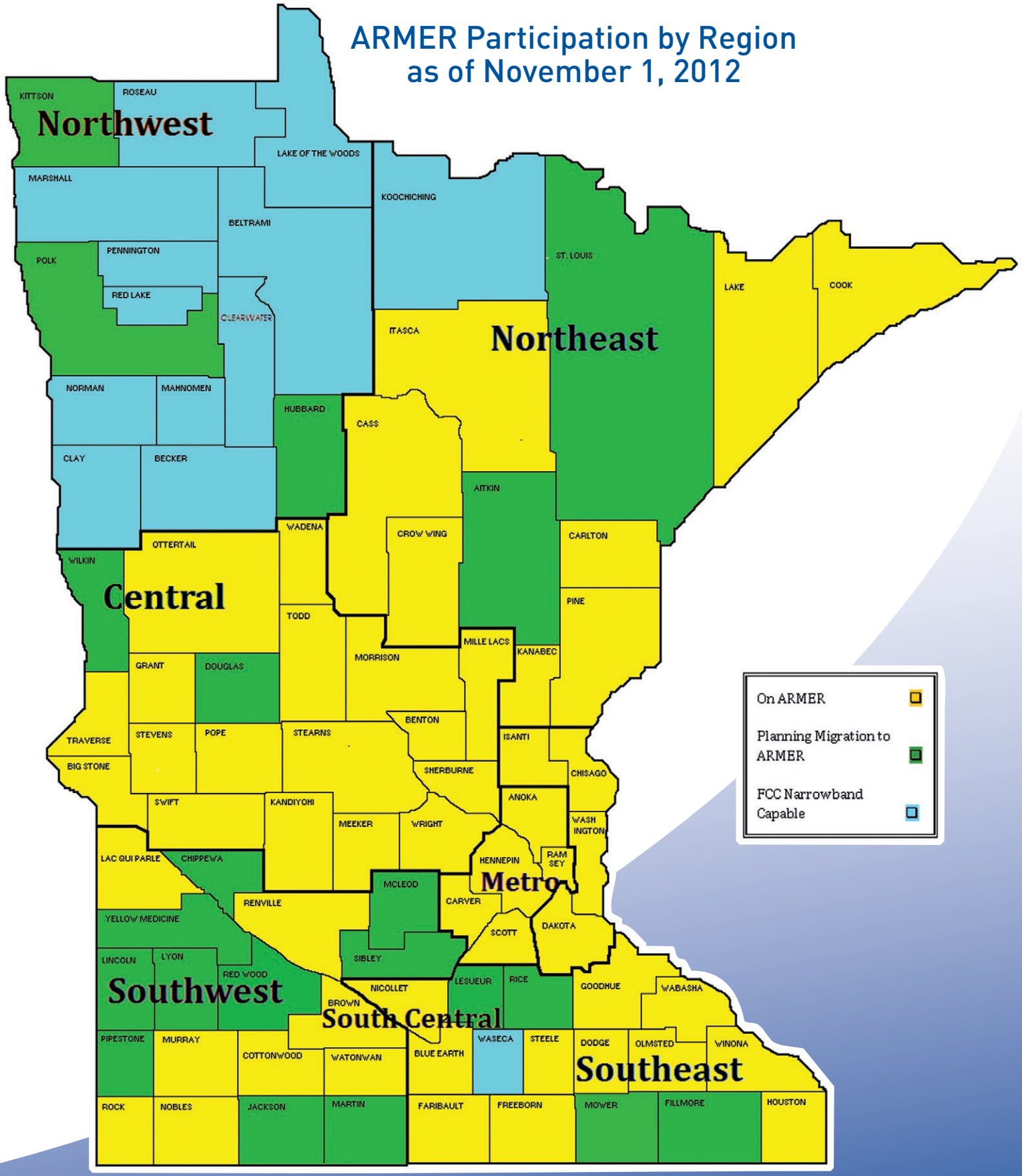
Local and state government investment in the ARMER system has yielded a high return relating to performance at large-scale planned and unplanned events see page 7. However, it is most critical to note that the system provides continual, day-to-day benefits to emergency responders on routine calls. While the benefit the firefighter gains by being able to communicate three floors below ground or the benefit the police officer has to instant communication with officers from another jurisdiction in a felony pursuit is not easily quantifiable, ARMER does result in enhanced public safety for emergency responders as well as the citizens they serve.

Scheduled Milestones/Deliverables

Milestone	Total Sites	Sites Not Started	Sites in Progress	Sites Complete
ARMER Backbone Construction	324 Sites			
Tower Site Acquisition	324	0	25	299
Tower Construction and Site Development Work	324	25	19	280
Microwave Connectivity and RF Deployment	324	44	2	278 On the Air

As of November 2012

ARMER Participation by Region as of November 1, 2012



Performance Highlights

May 2012 VERSO Paper Mill Fire

When a major explosion and fire occurred at the VERSO Paper Mill in Sartell, Minnesota 14 mutual aid fire departments initially responded to calls for assistance. By the time the fire was extinguished – a full week later – 92 fire departments had responded. The ARMER 800 MHz Radio System handled the communications which began on the Sartell fire main, progressed to a Central Minnesota Regional talkgroup and later advanced to Statewide Fire Tactical. There were more than thirteen thousand push-to-talks in the first hour. Individuals on site said they did not feel the system was overworked. They did say without the ARMER 800 MHz Radio System there would have been no ability to communicate between agencies.

December 2011 Lake City Police Officer Shooting

The Lake City Police Department and Wabasha County Sheriff's Office migrated to the ARMER 800 MHz Radio system just one week before Lake City police officer Shawn Schneider was shot and killed responding to a domestic dispute. Dispatchers did an excellent job of implementing the new system to ensure law enforcement from surrounding state, county and local agencies were able to communicate following the tragic shooting. The ARMER 800 MHz Radio was also used during Schneider's funeral. Parking was a major issue but with the use of Scene Of Action (SOA) talkgroups other radio resources were not tied up.

Then and Now

Forty-eight months ago, Minnesota had two regional radio boards: the Metropolitan Emergency Services Board and the Central Minnesota Regional Radio Board. Only five counties were operating on the ARMER system. Today, 73 counties are either on the ARMER system or have committed through county board resolution to join. The level of local participation puts Minnesota in the top five states in the country in terms of local and state collaboration.

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 boards' mission is to fill the inter-operability gaps on a regional level and manage local migration to the ARMER system. The Regional Advisory Committees and Regional Radio Boards are the core of Minnesota's governance structure.

Local officials across our state readily recognize that a lack of communications interoperability is a significant public safety issue for their citizens and emergency responders. As a result, many elected officials have willingly embraced participation on joint powers boards, and joint powers agreements that have been reached among many county and city attorneys – clear testament to the value and importance of the ARMER system and the goal of achieving seamless statewide interoperability.

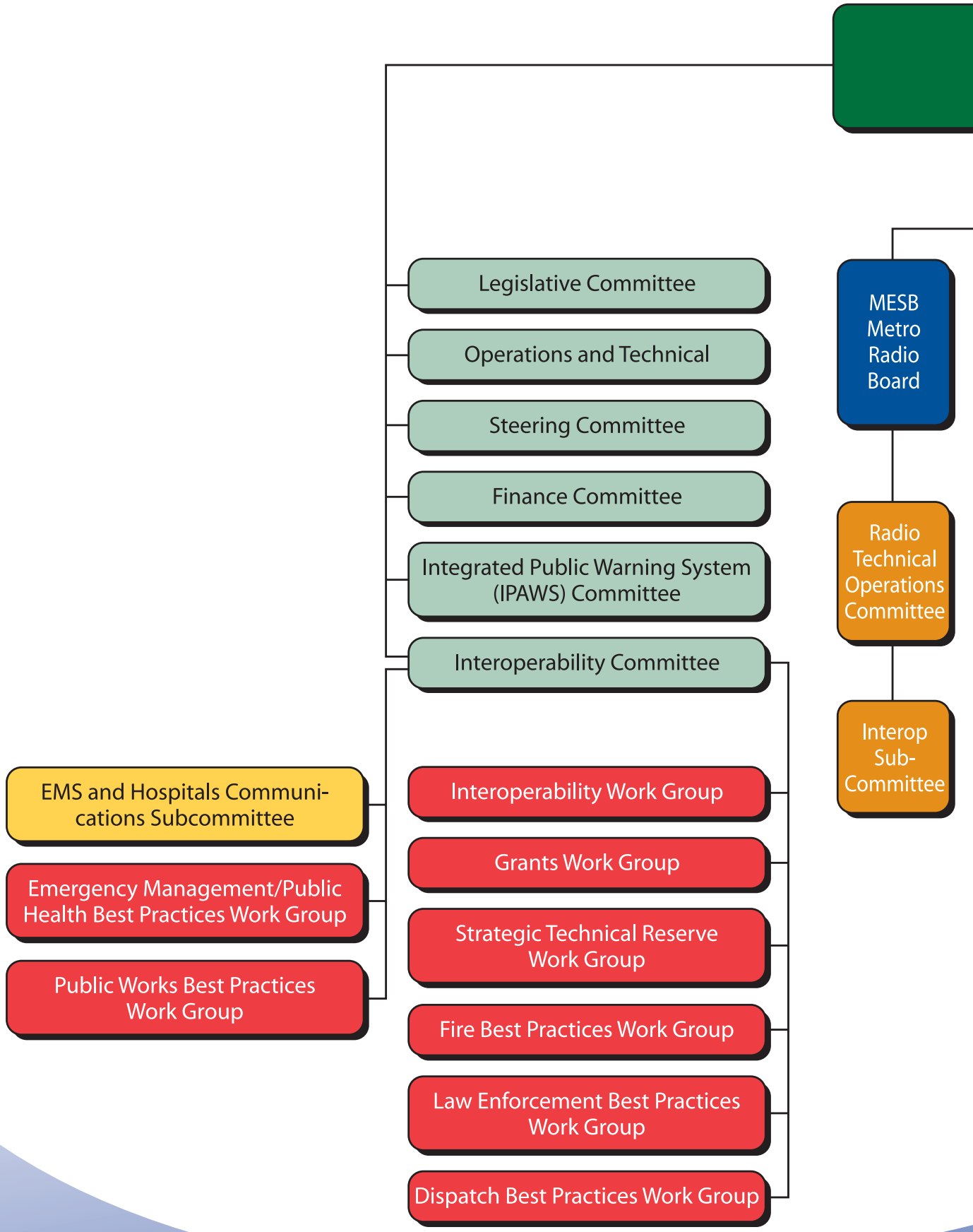
Minnesota is a nationally acknowledged leader in inter-operable public safety communications as evidenced by the ARMER system. Emergency Communication Networks (ECN) has assisted states such as Iowa and Missouri as they attempt to model their governance and radio systems on Minnesota's success. Additionally, ECN staff has addressed inquiries about the ARMER system and governance from the states of Alabama, Arizona, Arkansas, Idaho, Montana, Nebraska, Oregon, Utah, Virginia and Wisconsin.

It is of particular financial note that in the worst lending marketplace in decades, the ARMER system has been able to keep moving forward because the debt service for its bonds is backed by the 911 funds, a dedicated source of funding.

Most other states and entities trying to replicate ARMER's functionality have relied heavily on federal influence and funding to move their processes along. In Minnesota, the implementation was initiated long before the well-documented communications problems of September 11, 2001 in New York City, with no federal directive or funding. The availability of federal funding incentives has allowed the state and local agencies to accelerate the already envisioned implementation and growth of ARMER.

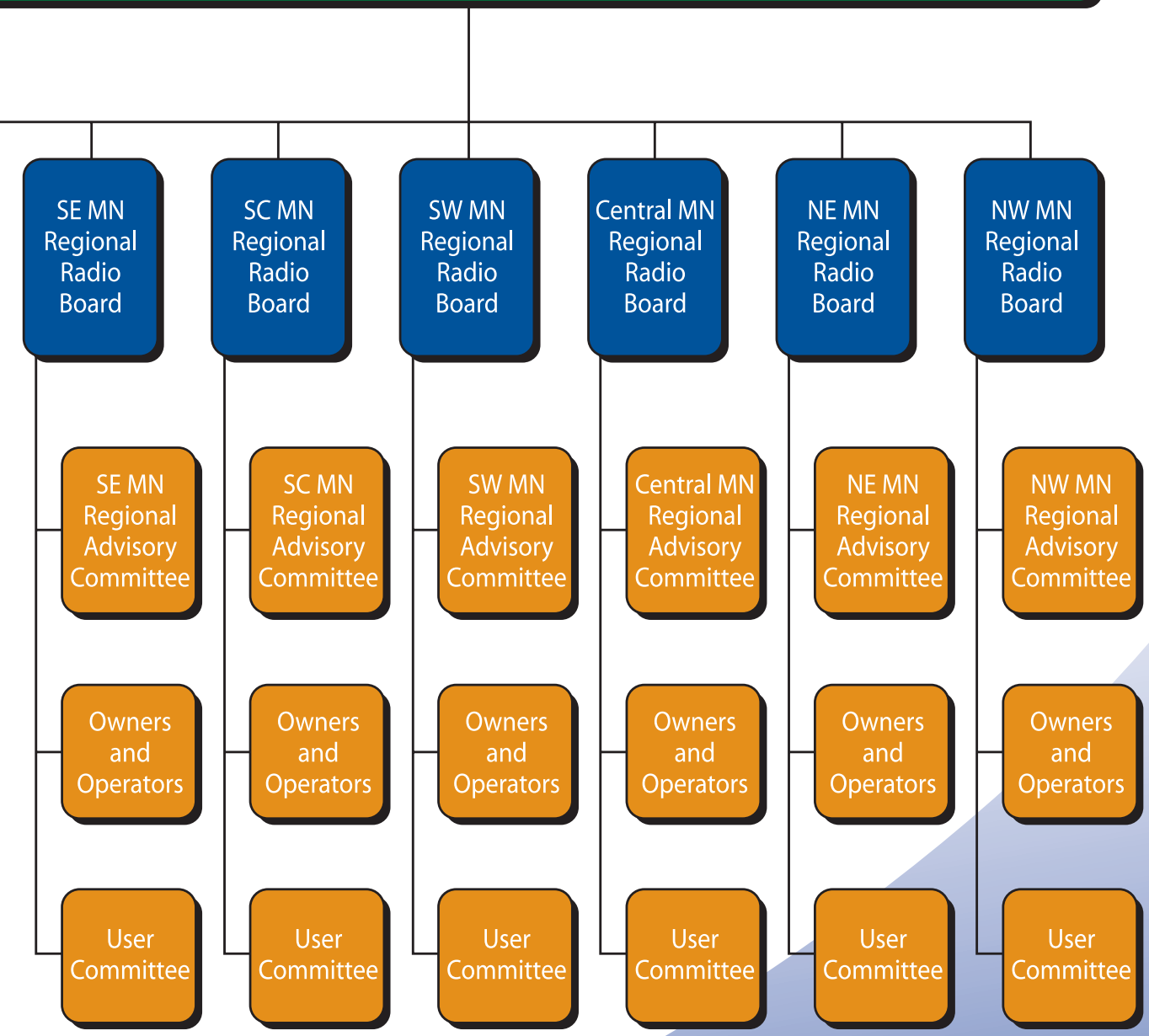
Resolving communications interoperability gaps is fundamentally changing how emergency services are delivered across Minnesota – and the success to-date as well as future success is only possible with the continued support of Minnesota's state and local elected officials.

Milestones and financial updates are available regularly on the Emergency Communication Networks website at: ecn.dps.mn.gov – Click on ARMER and ARMER Build Out Status Updates.


Legislative Committee
Operations and Technical
Steering Committee
Finance Committee
Integrated Public Warning System (IPAWS) Committee
Interoperability Committee
MESB Metro Radio Board
Radio Technical Operations Committee
Interop Sub-Committee
EMS and Hospitals Communi-cations Subcommittee
Emergency Management/Public Health Best Practices Work Group
Public Works Best Practices Work Group
Interoperability Work Group
Grants Work Group
Strategic Technical Reserve Work Group
Fire Best Practices Work Group
Law Enforcement Best Practices Work Group
Dispatch Best Practices Work Group

Statewide Radio Board

(Statewide Interoperability Executive Committee)



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