

Minnesota Land Mobile Radio Interstate Interoperability Best Practices Guide



DRAFT January 22, 2020

SECB

STATEWIDE EMERGENCY COMMUNICATIONS BOARD

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Introduction

Most public safety events in Minnesota occur within a single jurisdiction without the need for public safety land mobile radio (LMR) interoperability. When LMR interoperability is needed, it is most often between Minnesota public safety entities and, with nearly all of them using a common radio system, interoperability is as simple as turning a knob to change a talkgroup on a radio. Thirty-five of Minnesota's eighty-seven counties, however, border another state or Canadian province and, when the need arises for interstate or international mutual aid, LMR interoperability takes on unique challenges.

The U.S. Department of Homeland Security's SAFECOM program developed a tool known as the *Interoperability Continuum* to provide guidance on how to best accomplish public safety LMR interoperability. It guides that interoperability is best achieved when leadership and communications professionals collectively endeavor to mature along each of five parallel and complimentary lanes of the continuum:

- Governance
- Standard Operating Procedures
- Technology
- Training and Exercising
- Usage

This Best Practices Guide addresses each of the five lanes of the Interoperability Continuum and aims to provide public safety leadership and technical staff guidance on how to best approach and achieve interstate public safety communications interoperability.

This guide is not meant to be an instruction manual for one-size-fits-all LMR interoperability. It is intended to encourage uniformity so that interoperability is not hampered by dissimilar procedures, technologies, training experiences, and use applications. It is intended to illustrate the pros and cons of different options and to steer decision makers to the options with the most success potential.

Scope

This Best Practices Guide is only a guide and does not establish policy.

This document focuses on voice-only, LMR interoperability between Minnesota and its interstate (and provincial) neighbors. It is geared toward LMR interoperability of local public safety entities. The intended audience for this guide is public safety leadership and communications personnel in the cities, counties, and Emergency Communications/Services Board (ECB/ESB) regions along Minnesota's border.

This guide is intended to serve all public safety disciplines. Although most ARMER participation is administered locally by the sheriff's department and the largest force of fulltime public safety personnel is typically law enforcement, this guide focuses on how to achieve interstate interoperability based on the circumstances of the incident, not the discipline.

While this Best Practices Guide was written for a Minnesota public safety communications audience, it is hoped that this guide will serve as a template for Minnesota's neighbors so that similar technologies and procedures for interstate interoperability emerge.

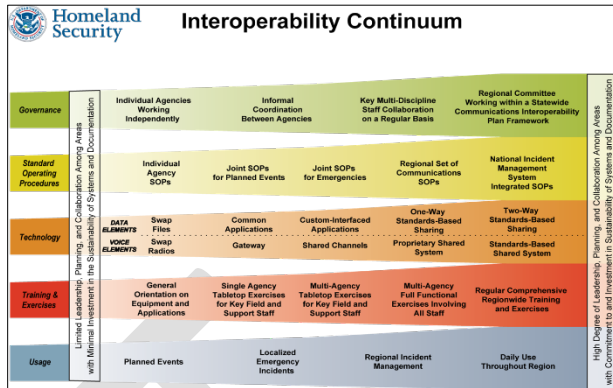
Throughout this document the term "interstate" is intended to be inclusive of the Canadian provinces of Manitoba and Ontario.

Interoperability Continuum

The US Department of Homeland Security's SAFECOM program recommends by way of its Interoperability Continuum that several parallel lanes be concurrently traveled to best achieve interoperability.

Five unique lanes are identified:

1. Governance
2. Standard Operating Procedures
3. Technology
4. Training and Exercising
5. Usage



Each avenue along the Continuum develops visually left to right, from least to most developed.

It is not necessary that an interoperability plan or interstate relationship achieve full maturity along each lane of the Continuum as there are a variety of constraints that challenge growth. A goal of this Best Practices Guide is to define options so that interstate interoperability may develop as far as realistically possible.

Foundational material used in the development of the *Minnesota Land Mobile Radio Interstate Interoperability Best Practices Guide* comes from the following SAFECOM documents.

- *Interoperability Continuum: A tool for improving emergency response communications and interoperability* (undated)
- *Operational Guide for the Interoperability Continuum: Lessons Learned from RapidCom* (undated)

Additional information about SAFECOM's Interoperability Continuum is available at the [DHS SAFECOM Resources website](#).

Governance

Successful LMR interstate interoperability requires cooperation at a local, regional, and state level. Governance provides a shared vision and framework for policies, processes, procedures, and conflict resolution. The Interoperability Continuum identifies the following benchmarks, from least to most developed:



1. Individual agencies working independently.
2. Informal coordination between agencies.
3. Key multidiscipline staff collaboration on a regular basis.
4. Regional committee working within a statewide communications interoperability plan framework.

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With no intervention, an agency will operate on the far left end of the spectrum as an individual agency working independently. Without governance, coordination, or collaboration with its neighbors and partners, LMR interoperability will be rudimentary at best.

Using the concept that interoperable public safety communication initiatives are locally executed, regionally driven, and state supported, governance bodies should formalize and regularly review plans and agreements related to resources, capabilities, and technologies necessary to support LMR interoperability.

Implementation of the following recommendations will position neighboring entities for successful public safety LMR interoperability.

Best Practice: Local Coordination

Local relationships and partnerships set the stage for developing informal practices and formal policies promoting strong interoperable interstate LMR communication capabilities.

Recommended Actions:

- Foster opportunities for developing relationships between departments within your own jurisdiction (e.g. fire service, public works, law enforcement, and emergency management all within one city or county).
- Provide opportunities for collaboration and developing relationships between neighboring agencies and leadership (e.g. first responders, management, and leadership from neighboring communities within and outside of Minnesota).
- Establish informal and formal agreements to support interoperable communications (e.g. Joint Powers Agreements and Memorandums of Understanding).
- Encourage familiarity with the emergency communications governance bodies of neighboring states.

Best Practice: Regional Collaboration

Regional governance structures support local interstate LMR interoperability initiatives. The governance process provides a framework for the planning and execution of shared objectives promoting interoperability. Minnesota has seven legislatively-established Emergency Communications/Services Board (ECB/ESB) regions providing regional leadership and mechanisms for collaboration.

Recommended Actions:

- Ensure regional boards, committees, and workgroups have diverse membership that is representative of the region's entities and public safety disciplines. Membership should include end users, dispatch personnel, senior leaders, elected officials, technical staff, and other key stakeholders.
- Maintain a regular meeting cadence with established agenda items, opportunities to engage stakeholders, accountability for action items, and meeting minutes.
- Identify regional priorities. Develop action plans with specific initiative and timelines. Maintain a realistic mission and scope.
- Identify funding mechanisms, and execution strategies to support LMR interoperability.
- Encourage familiarity with the emergency communications governance bodies of neighboring states and jurisdictions.

Best Practice: State Collaboration

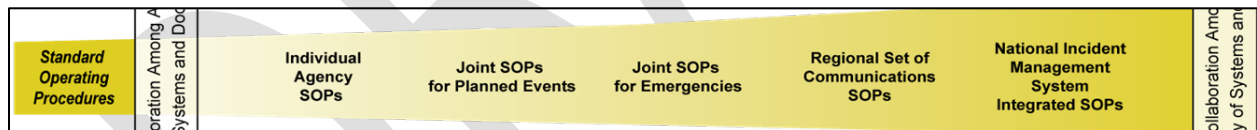
State governance structures support regional interstate LMR interoperability initiatives. The governance process provides a framework for the planning and execution of shared objectives promoting interoperability. Minnesota’s Statewide Emergency Communications Board (SECB) hosts several committees supporting public safety emergency communications. The Interoperability Committee’s mission includes strengthening interstate LMR interoperability capabilities.

Recommended Actions:

- Promote membership on SECB committees and workgroups that is representative of the diverse public safety stakeholder community.
- Encourage participation in SECB committee meetings and workgroups to ensure:
 - Regional and local needs are represented.
 - Regional/local awareness, understanding, and inclusion in statewide interoperability plans.
- Facilitate efforts for public safety entities to enter into formal written agreements for access to LMR systems of neighboring states and jurisdictions.
- Support outreach and education initiatives.

Standard Operating Procedures

Standard Operating Procedures (SOPs) take the form of written procedures, policies, or standards and aim to provide specific guidelines to ensure successful interoperable interstate LMR communications. SOPs provide significant benefits to interoperability initiatives at little financial cost. The Interoperability Continuum identifies the following benchmarks, from least to most developed:



1. Individual Agency SOPs
2. Joint SOPs for planned events
3. Joint SOPs for emergencies
4. Regional set of communications SOPs
5. National Incident Management System Integrated SOPs

Implementation of the following recommendations will position neighboring entities for successful public safety LMR interoperability.

Best Practice: Develop Standard Operating Procedures

Written SOPs provide clear guidance ensuring that personnel are working in a consistent and coordinated manner. While state standards govern at a high level, regional and local SOPs will guide public safety personnel in the application and use of LMR capabilities to communicate effectively and promote interoperability.

Recommended Actions:

- Inventory and assess existing practices to guide development of SOPs.
- Establish workgroups to draft SOPs. Membership should include end users, dispatch personnel, senior leaders, elected officials, technical staff, and other key stakeholders.
- Ensure SOPs are understandable, applicable, and executable by the intended audience (e.g. clear, concise, plain language, and realistic).
- Ensure that SOPs are consistent and compliant with commonly recognized public safety communications best practices (e.g. National Incident Management System, Project 25, National Emergency Communications Plan, and SAFECOM).
- Develop SOPs for different circumstances (e.g. day-to-day operations, preplanned events, and emergencies).
- Develop SOPs that support interstate LMR interoperability for multiagency, multidiscipline, and multi-hazard responses.

Best Practice: Apply Standard Operating Procedures

Once developed, SOPs must be implemented and validated in an operational environment.

Recommended Actions:

- Educate personnel about SOPs (e.g. local, regional, state, and neighboring state).
- Make SOPs available and accessible to personnel.
- Incorporate SOPs into day-to-day operations.
- Test SOPs for effectiveness (e.g. training, exercising, and real world events).

Best Practice: Maintain Standard Operating Procedures

As part of the ongoing maintenance and continuous improvement process, SOPs must be reviewed and updated on a regular basis to ensure their validity and effectiveness. As technology and operational environments evolve, so must the SOPs.

Recommended Actions:

- Establish a process for the routine review of SOPs (e.g. frequency and scope). Test SOPs through tabletop exercises.
- Identify a process for the review of SOPs under special circumstances.
- Incorporate lessons learned through the After Action Report (AAR) process (e.g. real world events, training, and exercises).
- Engage stakeholders to ensure the SOPs are understandable, applicable, and executable.

Technology

Technology is the actual tool that provides the interoperable capability. The Technology lane of the Interoperability Continuum takes two parallel tracks: voice and data. Along the voice track (this guide does not address the data track), the Interoperability Continuum identifies the following benchmarks, from least to most developed:

Technology	Planning, and Collaboration, Sustainability of	DATA ELEMENTS	Swap Files	Common Applications	Custom-Interfaced Applications	One-Way Standards-Based Sharing	Two-Way Standards-Based Sharing	, Planning, and Content in Sustainability
		VOICE ELEMENTS	Swap Radios	Gateway	Shared Channels	Proprietary Shared System	Standards-Based Shared System	

1. Swapping radios
2. Gateway
3. Shared Channels
4. Proprietary Shared System
5. Standards-Based Shared System

There is no single technology that will address each scenario. We can, however, define technological options, provide specific guidance as how to configure those options, and define the types of scenarios for which the technological tool could be best used.

Inclusion of the following recommendations will position neighboring entities for successful public safety LMR interoperability.

Best Practice: General Guidance

There are a few items of general guidance that are universal to all technological best practices.

Recommended Actions:

- Address the most vulnerable technology gaps first. Differentiate between need-to-have and nice-to-have.
- Drive vendors to meet the needs of public safety.
- Before making a technology purchase, consult with neighbors, regional governance, and state resources to learn about other’s experiences and to find common interests. When possible, share purchasing power.
- Identify funding for technology. These needs include the initial purchase, ongoing sustainment, maintenance, enhancement, and replacement costs.
- Pair technologies to a need. As an example, a quickly evolving law enforcement vehicle pursuit will benefit from a radio patch but will see no value from a supply of cache radios but a multiagency response to a large fire may find tremendous value in cache radios.

Best Practice: Implement Cache Radios

Cache radios are an example of “swapping radios.” While rudimentary on the Interoperability Continuum, portable radio caches serve as solid and established interoperability tools. Cache radios programmed with interoperability resources (simplex interoperability channels or state radio system resources) can be deployed and provide end users with radio communications specific to their duty and need.

Recommended Actions:

- Maintain awareness of cache radio resources available within Minnesota and in neighboring states. Learn and know the process to request cache radios.
- Train and exercise with cache radio resources.
- Deploy cache radios in preplanned events and emergencies.

Examples:

- Minnesota maintains at thirty ARMER cache radios in each of its seven Emergency Communications/Services Board regions.
- Some agencies maintain a small supply of cache radios that are readily available for deployment.

Best Practice: Implement Dispatch Console Patching

Patching of disparate radio systems is the preferred technology for quickly evolving situations where the end user should not have to take his/her focus off of the event to change radio channels or when time does not allow for that (e.g. law enforcement vehicle or foot pursuits and officer-needs-help situations). It is also sometimes the only option available in the short term. Patching, however, has specific operational, geographical, and technical challenges that must be considered. To overcome these challenges, agencies must ensure that end users and dispatch personnel have a solid understanding of the limitations and consequences of patching technology.

Recommended Actions:

- Identify the ideal patching technology for the circumstances and implement the technology. Consider that the patching capabilities may differ based on jurisdictional dispatch capabilities.
- Ensure SOPs are developed to successfully guide the application of the technology.
- Ensure dispatchers are thoroughly trained to successfully utilize the technology.

Examples:

- Utilize dedicated “crosswalk” talkgroups for the dedicated purpose of patching disparate radio systems.
- Utilize VHF repeater sites programmed with national interoperability channels for the purpose of patching to 800 MHz ARMER resources.

Best Practice: Implement Conventional Interoperability Channels

Within each radio band exists several simplex interoperability channels. When the end users' radio technology is compatible, the end users may access shared radio channels. The advantage of using simplex interoperability channels is that they are exceptionally dependable for short-range, local communications as they operate *antenna-to-antenna* independent of radio system infrastructure. A disadvantage of using simplex interoperability channels is that they are not typically available in dispatch centers so use of these channels is not easily monitored. Additionally, in their elemental, simplex format they are not repeated so their range is limited.

Recommended Actions:

- Program all available interoperability channels rather than a select few.
- Ensure radios are correctly programmed with conventional interoperability channels (e.g. frequencies, tone-coded squelch, and proper names).
- Identify the technological capabilities and the programming in neighboring jurisdictions.
- Identify the circumstances to implement the use of conventional interoperability channels.
- Ensure SOPs are developed to successfully guide the application of the technology.
- Ensure end users are thoroughly trained to successfully utilize the technology.

Examples:

- Minnesota ARMER standard require that all subscriber radios are programmed with 800 MHz National Interoperability Channels (8TACs) and VHF-capable radios are programmed with a full complement of VHF interoperability channels.

Best Practice: Seek Formal Participation on the Neighboring System

Participation on another's radio system achieves the highest degree of interoperability on the technology lane of the Interoperability Continuum. Minnesota's governance and standards allow for public safety entities from neighboring states to become Interoperability Participants on ARMER. Similarly, Minnesota's neighbors may have procedures providing for participation on their state and local system.

Recommended Actions:

- Determine if your subscriber radio equipment is technologically compatible with the neighbor's radio system. When purchasing new subscriber radio equipment, consider technology that is compatible with neighboring radio system.
- Determine the process to become a participant on the neighbor's system.
- Determine cost to make your existing equipment compatible with neighboring jurisdiction's LMR system.

Examples:

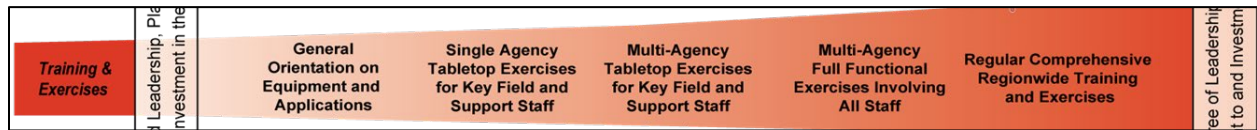
- Worth County, Iowa is an Interoperability Participant on ARMER and Freeborn County, Minnesota is an Interoperability Participant on ISICS (Iowa Statewide Interoperable Communications System). Under this arrangement, users from each jurisdiction have the talkgroups resources of their neighbor programmed into their radios.

Training and Exercising

Training and Exercising is an essential component to building proficiency and ensuring that the interoperability solution works and is understood. An effective training and exercise program helps build proficiency with communications equipment; improves awareness of policies, plans,

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and procedures; and develops response capabilities. The Interoperability Continuum identifies the following benchmarks, from least to most developed:



1. General orientation on equipment and applications
2. Single agency tabletop exercises for key field and support staff
3. Multiagency tabletop exercises for key field and support staff
4. Multiagency full functional exercises involving all staff
5. Regular Comprehensive region-wide training and exercises

Implementation of the following recommendations will position neighboring entities for successful public safety LMR interoperability.

Best Practice: Develop, Execute, and Maintain a Training and Exercising Plan

Training and exercising activities should incorporate a multiagency, multidiscipline, and multi-hazard responses approach. A comprehensive Training and Exercising Plan (TEP) will lay the foundation for a progressive, multiyear program which enables public safety entities to participate in a series of increasingly complex training and exercising activities. Each successive event should build upon the previous activity, promoting increased proficiency and capability.

The plan must consider the differing skills and requirements of a new employee, an experienced employee, as well as the need for specialized training.

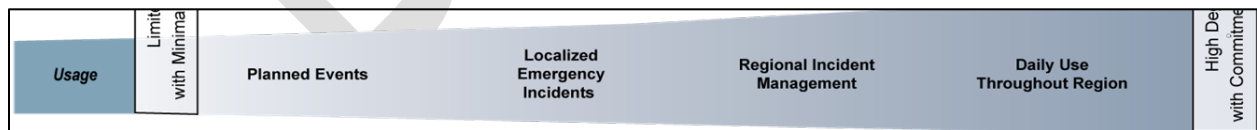
Recommended Actions:

- Establish a workgroup to develop a TEP.
 - Identify a champion to lead the workgroup and training and exercising initiatives.
 - Membership should include end users, dispatch personnel, senior leaders, elected officials, technical staff, subject matter experts (e.g. local emergency managers, Regional Planning Coordinators, Statewide Interoperability Coordinator, Regional Interoperability Coordinators, & Communications Unit personnel), and other key stakeholders.
 - Identify opportunities for collaboration. Consider atypical partners such as federal entities, airports, railroads, transit, public works, and utilities.
- Identify training and exercising needs.
 - Consider technology and operational needs.
 - Address known challenges and gaps.
 - Include lessons learned from After Action Reports and real world events.
 - As capabilities and skills improve so to should a TEP.
- Develop a training component to the TEP.
 - Develop curriculum based on identified needs.
 - Identify qualified instructors.
 - Train on a regular and realistic cadence.

- Ensure that the training plan is consistent and compliant with commonly recognized public safety communications best practices (e.g. SECB Standards, NIMS).
- Develop an exercise component to the TEP.
 - Develop exercise activities based on identified needs. Begin with fundamental drills and develop toward large-scale and complex events.
 - Identify qualified controllers and evaluators.
 - Exercise on a regular and realistic cadence.
 - Ensure that the exercising plan is consistent and compliant with commonly recognized public safety communications best practices (e.g. SECB Standards, Homeland Security Exercise and Evaluation Program, National Incident Management System).
- Identify funding mechanisms to support training and exercising activities.
 - Identify training and exercising needs in grant planning documents.
 - Develop justification documents for potential funding as it becomes available.
- Execute the plan.
 - Training and exercising activities should be offered at a variety of times to accommodate varying work schedules.
 - Create an After Action Report.
- Maintain the plan.
 - Review and update at regular intervals to ensure the plan meets current needs and priorities.
- Identify opportunities to provide interoperable communications training.
 - Provide short refreshers or skills building trainings as part of other meetings or training (e.g. law enforcement roll call or fire department drills).
 - Include interoperable communications training to new employees.
 - Provide in-depth training to newly-promoted employees.

Usage

The Usage lane of the Interoperability Continuum measures the effectiveness of an interoperability solution by whether and how it is actually used. The Interoperability Continuum identifies the following benchmarks, from least to most developed:



1. Planned events
2. Localized emergency incidents
3. Regional Incident Management
4. Daily use throughout region

Actual use is the litmus test of any interoperability tool. Does it get used as intended? Does it add value? Interoperability tools should not be put on a shelf and saved for a catastrophe that

hopefully will never happen. They should be tested through exercises and used routinely. It is by putting a resource through the paces that its weaknesses will be revealed, strengths will be known, and that users will gain confidence.

Implementation of the following recommendations will position neighboring entities for successful public safety LMR interoperability.

Best Practice: Promote Daily Use of Interoperability Tools Throughout Region

Through daily use of interoperability tools competence is gained, confidence is developed, and weaknesses are identified. Usage is the ultimate goal of the interoperability tool.

Recommended Actions:

- Ensure the stakeholders are aware of the interoperability resources available to them.
- Empower dispatchers, training officers, COMU-trained personnel, and key staff to encourage use of interoperability tools.

Best Practice: Create Processes for Providing Feedback on the Effectiveness of the Interoperability Tool

The effectiveness of the tool must be assessed to know that it is achieving its intended purpose, to identify areas for improvement, and to plan for financial resources that may be necessary to improve interoperability.

Recommended Actions:

- Identify and document gaps in interstate interoperability for future corrective actions.
- Create AARs from real world events.
- Promote opportunities for informal feedback.
- Discuss lessons learned with all involved. Include end users, dispatchers, technical personnel, and administrators.

Conclusion

The *Minnesota Land Mobile Radio Interstate Interoperability Best Practices Guide* strives to provide public safety command and technical staff guidance on how to best achieve interstate public safety LMR interoperability.

This guide should in no way serve as an instruction manual for one-size-fits-all policy on LMR interoperability. There are far too many obstacles and details to possibly address every variable. By keeping each the five lanes of the Interoperability Continuum—Governance, Standard Operating Procedures, Technology, Training and Exercising, and Usage—in front of mind and in consideration of the concepts presented in this guide, uniform and viable interstate LMR interoperability with our neighbors is achievable.

In addition to progression along the five elements of the Interoperability Continuum, jurisdictions and governing bodies should focus on planning, conducting education and outreach programs, and maintaining an awareness of the specific issues and barriers that affect a particular region's movement towards increased interoperability. For example, many jurisdictions face difficulties

related to political issues and the relationships within and across emergency response disciplines. Public safety communications leaders should help to work through these challenging conflicts as well as set the stage for their commitment to the interoperability effort. Additionally, leaders must be willing to commit the time and resources necessary to ensure the sustained success of any interoperability effort.

Communications interoperability is an ongoing process, not a one-time investment. Interoperability concerns should be addressed on a regular basis, drawing on operational and technical expertise to plan and budget for continual updates to technology, procedures, and training and exercise programs. If jurisdictions expect emergency responders to use interoperable equipment on a daily basis, supporting documentation and the installed technology must be well-maintained with a long-term commitment to upgrades and the eventual replacement of equipment. Lastly, an interoperability program should include both short- and long-term solutions. Early successes can help motivate jurisdictions to tackle more time-consuming and difficult challenges. It is critical, however, that short-term solutions do not inappropriately drive the planning process, but function in support of a long-term plan.

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Resources

This Best Practice Guide is not your only resource in your quest for viable interstate LMR interoperability. Minnesota's public safety community should lean on the following resources for assistance:

Emergency Communication/Services Board Regions

- [Regional Governance and Committees](#)
- [Shared Regional Website \(Northwest, Northeast, Central, Southwest, South Central, and Southeast\)](#)
- [Metropolitan Emergency Services Board](#)
- [Local and Regional Emergency Managers](#)

State of Minnesota

- [Minnesota Department of Public Safety division of Emergency Communication Networks](#)
- [Statewide Emergency Communications Board](#)
- [Statewide Interoperability Coordinator](#)
- [Regional Interoperability Coordinators](#)
- [Communications Unit Personnel](#)
- [Homeland Security and Emergency Management Regional Planning Coordinators \(RPCs\)](#)
- [DPS ECN Homeland Security Information Network \(HSIN\) site](#)

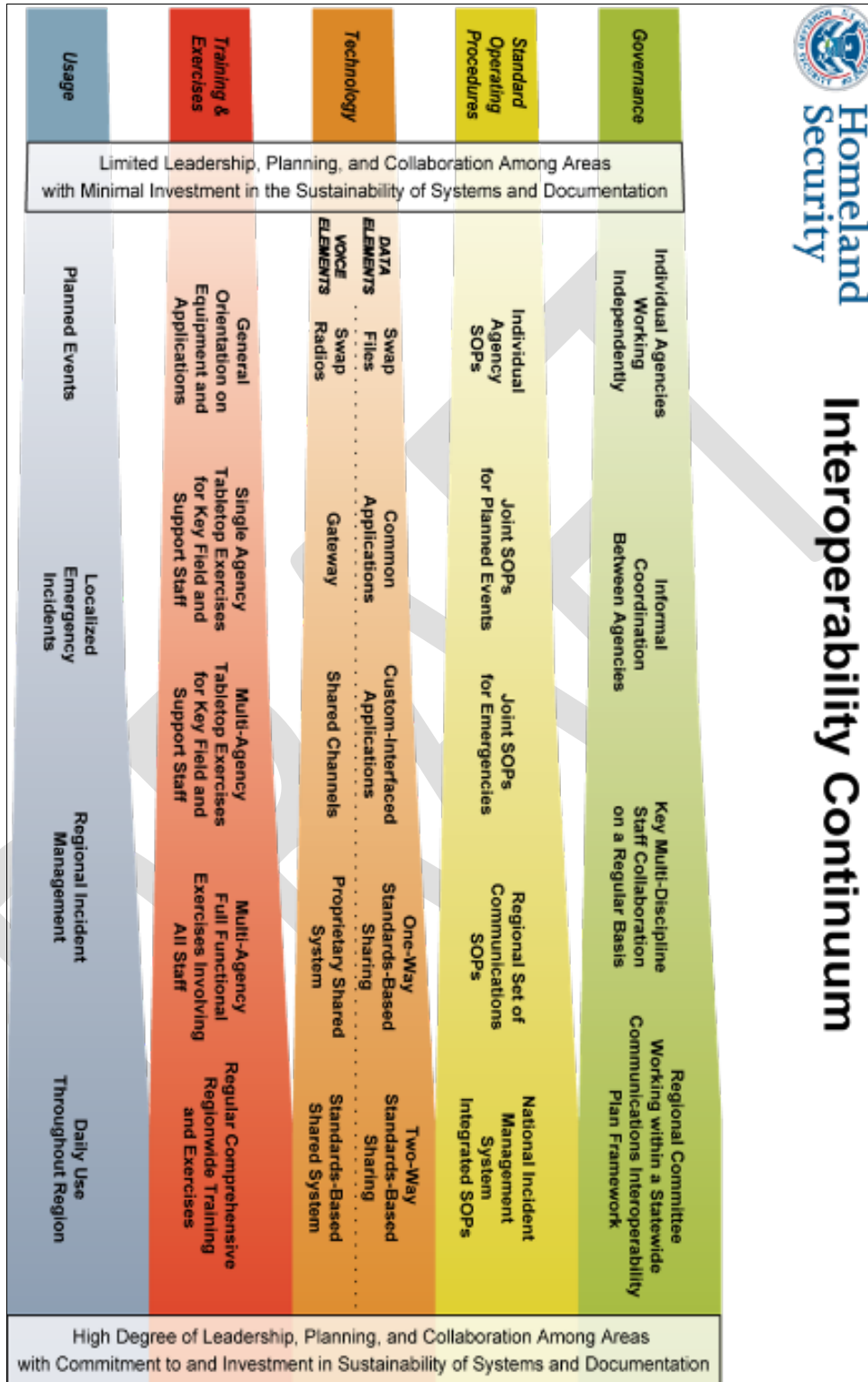
US Department of Homeland Security

The US Department of Homeland Security (DHS) Cybersecurity and Infrastructure Security Agency (CISA) supports public safety communications interoperability through a variety of organizations, programs, and publications. As examples:

- [Government Emergency Telecommunications Service \(GETS\)](#)
- [National Emergency Communications Plan \(NECP\)](#)
- [National Security Telecommunications Advisory Committee](#)
- [National Council of Statewide Interoperability Coordinators \(NCSWIC\)](#)
- [Interoperable Communications Technical Assistance Program \(ICTAP\)](#)
- [National Coordinating Center for Communications](#)
- [SAFECOM](#)
- [Telecommunications Service Priority \(TSP\)](#)
- [Wireless Priority Service \(WPS\)](#)
- [SHARed RESources \(SHARES\) High Frequency \(HF\) Radio Program](#)

The [DHS CISA ECD website](#) provides a wealth of information and resources about each of the above examples and its other emergency communication programs.

APPENDIX A



Revision History

Version	Date	Changes
1		Original version. Approved by SECB.

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Statewide Emergency Communications Board ● secb.dps.mn.gov

Emergency Communication Networks ● ecn.dps.mn.gov