Interoperability Continuum

A tool for improving emergency response communications and interoperability

Homeland Security
Interoperability Overview

Emergency responders—emergency medical services (EMS), fire-maneuver personnel, and law enforcement officers—must share vital data or voice information across disciplines and jurisdictions to successfully respond to day-to-day incidents and large-scale emergencies. Many people assume that emergency response agencies across the Nation are already interoperable. In actuality, emergency responders often cannot talk to some parts of their own agencies—or to agencies in neighboring cities, counties, or states. Developed in partnership with input by the Department of Homeland Security’s (DHS) program, the Interoperability Continuum is designed to assist emergency response agencies and policy makers to plan and implement interoperability solutions for day-to-day communications. This tool identifies five critical success elements that must be addressed to achieve a sophisticated interoperability solution: governance, standard operating procedures (SOPs), technology, training and exercises, and range of interoperable communications. Jurisdictions across the Nation can use the Interoperability Continuum to track progress in strengthening interoperable communications.

To drive progress along the five elements of the Continuum and improve interoperability, emergency responders should observe the following principles:

- Gain leadership commitment from all disciplines (e.g., EMS, fire-rescue response, and law enforcement).
- Foster collaboration across disciplines through leadership support.
- Institute with policy makers to gain leadership commitment and resource support.
- Use interoperability solutions regularly.
- Plan and budget for ongoing updates to systems, procedures, and documentation.
- Ensure collaboration and coordination across all interoperability Continuum elements.

Interoperability Continuum Elements

Interoperability is a multi-dimensional challenge. To gain any portion of a region’s interoperability, progress in each of the five interoperable domains must be considered. For example, when a region procures new equipment, that region should plan and conduct training and exercises to make the best use of that equipment. Optimal interoperability is contingent on any agency’s and jurisdiction’s needs. The Continuum is designed as a guide for jurisdictions that are passing a new interoperability solution, based on changing needs or additional resources.

Governance

Establishing a common governing structure for achieving interoperability issues will improve the policies, procedures, and procedures of any major project by enhancing communication, coordination, and cooperation, establishing guidelines and principles, and reducing any internal jurisdictional conflicts. Governance structures provide the framework in which stakeholders can collaborate and make decisions that represent a common objective. It has become increasingly clear that the emergency response community that communication interoperability cannot be solved by any one entity, achieving interoperability requires a partnership among emergency response organizations across all levels of government. As such, a governing body should consist of local, tribal, state, and Federal entities as well as representatives from all pertinent emergency response disciplines within an identified region.

Individual Agencies Working Independently—A lack of coordination among responding organizations.

Informal Coordination Between Agencies—Along their own lines or agency level agreements that provide minimal incident interoperability.

Key-Multi-Discipline Staff Collaboration on a Regional Basis—a number of agencies and disciplines working together in a local area to provide interoperability.

Regional Committee Working within a Statewide Communications Interoperability Plan Framework—While disciplines/jurisdictions working together across a region pursuant to formal written agreements in defined within the larger scope of a state plan—promising optimal interoperability.

Standard Operating Procedures

Establish standard operating procedures—standard written guidelines or instructions for medical response—typically, have both operational and technical components. Standardized SOPs enable emergency responders to successfully coordinate and maintain interoperability among disciplines and jurisdictions.

Joint SOPs for Planned Events—The development of SOPs for planned events—this typically represents the first phase as agencies begin to work together to develop interoperability.

Joint SOPs for Emergencies/SOPs for emergency level response that are developed as agencies continue to pressure interoperability.
Regional Set of Communications SOPs—A region-wide communications SOPs for multi-agency/multi-discipline multi-agency-based responses serve as an integral tenet toward optimal interoperability.

National Incident Management System Integrated SOPs—Regional SOPs are aligned to conform with the elements of the National Incident Management System.

Technology

Technology is a critical tool for improving interoperability, but it is not the solution to all of an organization’s interoperability issues. The implementation of a data and voice communications technology is supported by strong governance and clear and effective SOPs. Technology solutions must be consistent throughout the frontlines and should address regional needs, existing infrastructures, cost, ease, and sustainability. The technologies described within the Continuum are not available in order to effectively support day-to-day operations or in large organizations. Many times, a combination of technologies is necessary to provide effective communications among emergency responders. Security and authentication challenges are present in such technology and must be considered in all implementation decisions.

Data Elements

SOPs—SOPs define the standards that are used to plan and conduct emergency response within an identified region. As agencies continue to promote interoperability, SOPs are developed as agencies continue to promote interoperability. Effective SOPs require a comprehensive approach to developing written guidelines or standard operating procedures (SOPs) for emergency level response. SOPs for emergency level response often require multi-agency/multi-discipline response. Effective SOPs are developed based on the needs of emergency responders and are not shared, resulting in uncoordinated procedures between agencies. For example, when a region procures new equipment, that region should plan and conduct equipment training for first responders. This plan provides the framework in which stakeholders can collaborate and work across a region pursuant to formal written agreements that provide minimal incident interoperability. These agreements improve the policies, processes, and procedures by enhancing communication, coordination, and training among participating agencies and jurisdictions. Technologies should not be confined to the frontlines and should address regional needs, existing infrastructures, cost, ease, and sustainability. The technologies described within the Continuum are not available in order to effectively support day-to-day operations as well as large-scale events. Many times, a combination of technologies is necessary to provide effective communications among emergency responders. Security and authentication challenges are present in such technology and must be considered in all implementation decisions.

Voice Elements

Two-Way Standards-Based Sharing—Two-way standards-based sharing allows for multi-agency/multi-discipline multi-agency-based response. For example, when a region procures new equipment, that region should plan and conduct equipment training for first responders. This plan provides the framework in which stakeholders can collaborate and work across a region pursuant to formal written agreements that provide minimal incident interoperability. These agreements improve the policies, processes, and procedures by enhancing communication, coordination, and training among participating agencies and jurisdictions. Technologies should not be confined to the frontlines and should address regional needs, existing infrastructures, cost, ease, and sustainability. The technologies described within the Continuum are not available in order to effectively support day-to-day operations as well as large-scale events. Many times, a combination of technologies is necessary to provide effective communications among emergency responders. Security and authentication challenges are present in such technology and must be considered in all implementation decisions.

Interoperability Continuum

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<td>Common Applications</td>
<td>The use of common proprietary applications requires agreements among agencies to purchase and use the same or compatible applications and common terminology (e.g., time stamps) in shared data. This collaborative effort increases access to information, improves user functionality, and permits real-time information sharing between agencies. However, the use of common proprietary applications requires strong governance to coordinate operations and maintenance among multiple independent agencies and users, which can be expensive and challenging. Therefore, state and Federal partners should work together to support these efforts.</td>
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Multi-agency/multi-discipline plans are developed and practiced when specialists are called Communications Unit Leaders. These leaders adapt to the situation. Within the Incident Command System, incidents that require an expert at the helm who can immediately address the risk of the unexpected—those critical and unprecedented events that emerge. Tabletops should address data and/or voice communications interoperability and focus on effective information flow. As agencies and disciplines begin working together to develop multi-agency tabletop exercises for key field and support staff—Regional Incident Management—optimal interoperability involves equipment familiarization and an understanding of Proprietary Shared Systems and Standards-Based Shared Channels—Continued from Technology - Voice Elements the technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies. Technology works and responders are able to effectively communicate during emergencies.
Sustainability
Communications interoperability is an ongoing process, not a one-time investment. Once a governing body is set up, it must be prepared to meet on a regular basis, drawing on operational and technical expertise to plan and budget for continual updates to systems, procedures, and training and exercise programs. If regions 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 regions 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.

National Frameworks
As an evolving tool, the Interoperability Continuum supports the National Preparedness Strategy and aligns with national frameworks including, but not limited to, the National Response Framework, the National Incident Management System, the National Emergency Communications Plan, and the National Communications Baseline Assessment. To maximize the Interoperability Continuum’s value to the emergency response community, SAFECOM will regularly update the tool through a consensus process involving practitioners, technical experts, and representatives from local, tribal, state, and Federal agencies.

SAFECOM is a communications program of the Department of Homeland Security. SAFECOM provides research, development, testing and evaluation, guidance, tools, and templates on interoperable communications-related issues to local, tribal, state, and Federal emergency response agencies. The Office of Emergency Communications (OEC) supports SAFECOM’s development of grant guidance, policy, tools, and templates, and provides direct assistance to local, tribal, state, and Federal practitioners. The Office for Interoperability and Compatibility (OIC) supports SAFECOM’s research, development, testing and evaluation, standards, and tools such as reports and guidelines. OEC is an office within the Directorate for National Protection and Programs. OIC is an office within the Science and Technology Directorate.

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