Utah Communications Authority

Interoperability Division Strategic Plan

November 5, 2019

Section 1 - Introduction

Utah's emergency response personnel protect a diverse set of rural, suburban, and urban communities that have very different communications needs and resources. While the population of these communities ranges from less than 100 to more than 1,000,000, none of these public safety agencies can have all the resources they need to protect the lives and property of the residents and visitors they serve. Consequently, first responders depend on their peers from surrounding jurisdictions and the state to provide assistance (automatic and mutual aid) during normal operations and emergencies.

To allow first responders to communicate with one another, a variety of radio systems have been developed over the years, including a Motorola 800 MHz trunked system, a NEXEDGE VHF trunked system, and various VHF conventional systems. Each of these systems provides reliable communications for their users, but agencies face challenges when their users need to communicate with first responders on other systems.

The Utah Communications Authority, through its Interoperability Division, works to enhance and promote interoperable, emergency communications at the federal, state, regional, local, and tribal levels. To accomplish this goal, UCA has prepared this third phase of its strategic plan to guide the efforts of the Interoperability Division as it works with first responders to improve public safety communications in Utah.

In drafting this plan, UCA interviewed many of UCA's stakeholders to identify the strengths and limitations of communications interoperability in the state. Once this plan was prepared and reviewed by executive management, UCA's Public Safety and PSAP Advisory Committees were provided with a draft for comment and review. UCA considered each and every comment, suggestion, and proposal timely submitted by these committees. The information provided by these committees significantly influenced this strategic plan.

As required by the Utah Communications Authority Act, Utah Code Ann. §§63H-7a-101, *et seq.* (the Act), this plan will provide guidance for improving interoperability and will be reviewed at least annually with stakeholders to ensure the continued improvement and long-term viability of Utah's public safety communications systems in the coming years.

Section 2 - Interoperability Division Overview

UCA's Interoperability Division is responsible for promoting and enhancing interoperable and emergency communications for first responders throughout the state. By statute, the Interoperability Division must:

1) review and make recommendations to the executive director, for approval by the board, regarding:

   a) statewide interoperability coordination and FirstNet standards;
   b) technical, administrative, fiscal, technological, network, and operational issues for the implementation of statewide interoperability, coordination, and FirstNet;
   c) assisting public agencies with the implementation and coordination of the Interoperability Division responsibilities; and
   d) training for the public safety communications network and unified statewide 911 emergency services;

2) review information and records regarding:

   a) aggregate information of the number of service subscribers by service type in a political subdivision;
   b) matters related to statewide interoperability coordination;
   c) matters related to FirstNet including advising the governor regarding FirstNet; and
   d) training needs;

3) prepare and submit to the executive director for approval by the board:

   a) an annual plan for the Interoperability Division; and
   b) information required by the director to contribute to the comprehensive strategic plan described in §§63H-7a-206.

Additionally, the Executive Director of UCA is responsible for appointing a Statewide Interoperability Coordinator (SWIC) who shall:

1) promote wireless technology information and interoperability among local, state, federal, and other agencies;

2) provide a mechanism for coordinating and resolving wireless communication issues among local, state, federal, and other agencies;

3) improve data and information sharing and coordination of multijurisdictional responses;

4) consider opportunities to consolidate or improve interoperability of infrastructures and technologies;

5) evaluate current technologies and determine if they are meeting the needs of agency personnel in respective service areas;

6) create and maintain procedures for requesting interoperability channels; and

7) act as the FirstNet single point of contact for the authority.

Each of these duties is intended to support and enhance public safety communications in the state. To further focus its efforts, the Interoperability Division has adopted the Mission and Vision described below:

Mission

To promote effective interoperable communications, the Utah Communications Authority Interoperability Division will partner with local, tribal, state and federal public safety entities to develop communication resources, policies, procedures, training opportunities, and exercises for Utah's first responders.

Vision

A fiscally sustainable, interoperable, statewide voice and data network that enables first responders in Utah to effectively communicate across common or disparate systems during normal activities or during any type of event or disaster, as public safety personnel discharge their duties to protect the lives and property of Utah's residents and visitors.

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The following section provides an overview of the communications systems that are currently in place to support the state's EMS, fire and law enforcement personnel.

Section 3 - Overview of Existing Systems

Technology systems are an essential tool for public safety first responders in Utah. Over the years, a variety of state and local systems have been developed to provide 911 access to citizens and enhance real-time communications capabilities between dispatch and field personnel. This section provides a brief overview of the public safety radio, CAD, and 911 systems currently utilized in Utah.

3.1. VHF System

The framework of the state's VHF high-band system was initially developed in the 1970s to support the Utah Department of Transportation (UDOT) and the Utah Highway Patrol (UHP); the system was further developed throughout the 1980s and 1990s to eventually provide coverage throughout Utah for state users. In parallel, many local agencies developed their own VHF systems to address individual needs and worked with the state to provide interoperability among state and local users.

Today, UCA's VHF infrastructure supports what is estimated to be between 3,000 to 7,000 mobile and portable users from approximately 70 radio towers, primarily in the south eastern portion of the state.

Analog Conventional Channels

UCA's VHF system continues to utilize the same basic technology (analog, FM radio) that was deployed in the 1970s, which has proven reliable and cost effective for many users. All of the state's VHF channels operate on analog, conventional base stations and repeaters, which are relatively inexpensive and easy to deploy. Historically, conventional user equipment (mobile and portable radios) for the system has been much less expensive than the radios required for the 800 system, making it difficult for many rural users to justify migrating to the 800 system, even when it is available to them. However, the transition to the P25 system, discussed more fully below, should decrease the costs of the end user equipment on the 800 system.

Interoperability Channels

The VHF system also incorporates national interoperability channels into the network to support communications between agencies that do not otherwise share common radio channels. These channels can be programmed into any VHF user radio and can serve as a common "meeting place" for VHF users. There are a limited number of these channels available, but they can be used to effectively coordinate operations where the interoperability channels have been deployed.

3.2. NEXEDGE VHF System

Emery County operates and maintains a VHF trunking system using Kenwood's proprietary NEXEDGE technology that covers Carbon and Emery Counties. This system has many of the advanced trunking features of a Project 25 (P25) system, such as digital transmission and multiple talk groups, but costs less than a corresponding standards-based P25 system. Unfortunately, NEXEDGE and P25 use different technologies, so NEXEDGE and P25 radios are not compatible with one another at this time. Carbon County officials have indicated to UCA the expectation that in the future, the NEXEDGE system can be upgraded to be compatible with the statewide P25 system being installed by UCA.

3.3. 800 MHz Trunked System

A substantial portion of public safety wireless voice communications in the state takes place on the UCA 800 MHz trunked system (the "800 system"), which has been deployed over the past two and a half decades. This system was initially planned in the mid to late 1990s to improve interoperability among public safety agencies, alleviate channel congestion, and provide economies of scale for radio users. The 800 system has been very reliable and greatly enhanced the communications capabilities of its users.

Motorola SmartZone/OmniLink System

The foundation of UCA's 800 system is currently a proprietary Motorola SmartZone OmniLink 800 MHz trunked radio system that was originally developed to provide communications capabilities along the Wasatch Front. The system was initially planned to cover Davis, Morgan, Salt Lake, Utah and Weber Counties: Summit and Wasatch Counties were added after Salt Lake was selected to host the 2002 Winter Olympics. Tooele County requested and was consequently added to the system as well. The Olympics provided significant funding to expand coverage and traffic handling capacity beyond what was initially planned.

From the original eight-county footprint, the system has been expanded to provide coverage in almost every county in Utah. A concerted effort has been made to provide 800 coverage on most of the major highways in the state and today the system supports more than 50,000 mobile and portable radios from more than 119 radio sites.

P25 System

Motorola has discontinued, or will discontinue in the near future, support for a significant number of the original components of the existing 800 trunked radio infrastructure; consequently, replacement parts to support the system are becoming increasingly difficult to obtain. As the 800 system continues to age, failures of the system may become more

common and users of the system will begin to experience more frequent and prolonged communications outages. Repairs of the system will be more difficult and costs to maintain the system will rise.

To address these issues, UCA needs to replace the current proprietary trunked system with a standards-based, P25 trunked radio system. The P25 standard has been widely adopted by local, county, tribal, state, and federal agencies, and is recommended by the US Department of Homeland Security (DHS).

By replacing UCA's proprietary 800 system with a standards-based, P25 system, Utah's first responders will be in the mainstream of public safety communications and will enjoy the benefits of an effective and reliable radio system for decades to come.

In 2018, UCA, with the assistance of the Utah State Division of Purchasing and an independent consulting firm, published a request for proposals to upgrade the existing proprietary radio system to a P25 radio network. In the spring of 2019, after an extensive review process, the RFP was awarded to the Harris Corporation, now known as L3Harris Technologies following its merger with L3 Communications. In July of 2019, this upgrade process began and, at present, it is expected to take just under five (5) years to complete.

The recently signed contract with L3Harris secured many benefits to UCA and the users of the new system. Some of these benefits include:

- Up to 65% off the retail price of mobile and portable end user radios;

- Extensive factory training for UCA technicians;

- 3 years of full warranty starting after the system has been installed and approved; and

All available software and firmware upgrades and updates at the time of acceptance and again at the end of the warranty period.

800 MHz Conventional Channels

In portions of the state where there are a limited number of users, conventional 800 system channels have been deployed to provide basic communications capability for 800 system users. These conventional channels can be deployed more economically than a trunked channel, yet still provide a way for users of the 800 system to communicate with one another, though with fewer advanced features. The limitations of these conventional channels make them unsuitable to be the only communications solution in areas where significant radio traffic can be expected.

800 MHz Interoperability Channels

Like the VHF system, the 800 system has incorporated national interoperability channels (NPSPAC channels) into the network to support conventional, non-trunked communications and provide limited backup capabilities for the trunked system. These interoperability channels are deployed at approximately 25 radio sites throughout the state.

3.4. CAD Systems

Computer Aided Dispatch (CAD) systems help public safety dispatchers manage incoming calls for service and match them to law enforcement, fire, and emergency medical service resources. Examples of functionality supported by a CAD system include:

- 911 call taking, including address verification and duplicate call identification;

- Dispatching, including unit recommendations;

- Resource management (ambulances, fire trucks, law enforcement units, etc.), including mobile messaging and status updates;

- Incident management, including information updates and call dispositions; and

- Mapping and automatic vehicle location (AVL).

Local agencies in Utah have their own individual CAD systems, which maintain a list of the local requests for emergency services, along with the resources available to service those requests. Local CAD systems can be interfaced to one another to provide situational awareness of incidents and resources to partner agencies outside the local jurisdiction. To the greatest extent possible, UCA encourages CAD vendors to permit the sharing of data between their systems. Further, UCA encourages agencies to select CAD vendors who do permit the sharing of CAD data and encourages such agencies to share data. Given that emergency response often crosses borders, the public and first responders are best served with CAD data that can be shared amongst neighboring agencies.

3.5. 911 Systems

Utah has a statewide Emergency Services IP network ("ESInet") that supports 911 services throughout the state relying on a transitional technology (not NG911). More than two-thirds of Utah's PSAPs are connected to the ESInet, either directly or through a multinode host. The remaining, circuit-based PSAPs will need to transition from the legacy technology, i.e., the selective router, and connect to an i3-compliant Next Generation 911 ("NG911") ESInet in the near future to complete the statewide NG911 network.

Utah's current ESInet relies on transitional technology, known as Request for Assistance Interface (RFAI), to route calls to IP-enabled PSAPs on the ESInet. The RFAI technology, though not actually NG911, represents an intermediate step in supporting the transition from legacy circuit-based 911 systems to IP-based networks.

To assist PSAPs in making the transition to NG911, UCA is in the process of procuring a statewide contract for an i3 compliant, NG911 ESInet and core services. In addition, UCA is also in the process of procuring a statewide contract for i3 compliant Customer Premise Equipment ("CPE") and Logging Recorder System. The intent is to provide a centralized Hosted CPE that will connect UCA provided CPE through geographically diverse servers to the UCA's ESInet.

The introduction of a Hosted CPE Solution will reduce equipment and maintenance costs and enhance intrastate and cross border interoperability.

Section 4 - Overview of Current Interoperability Environment in Utah

The DHS SAFECOM Interoperability Continuum (Figure 1) identifies a framework for assessing the interoperability capabilities of an organization in governance, use of Standard Operating Procedures ("SOPs"), technology, training and exercises and system usage. Agencies with systems and operations on the right side of the Continuum are practicing the highest degree of interoperability, while those on the left side of the Continuum have limited interoperability.

Figure 1: SAFECOM Interoperability Continuum
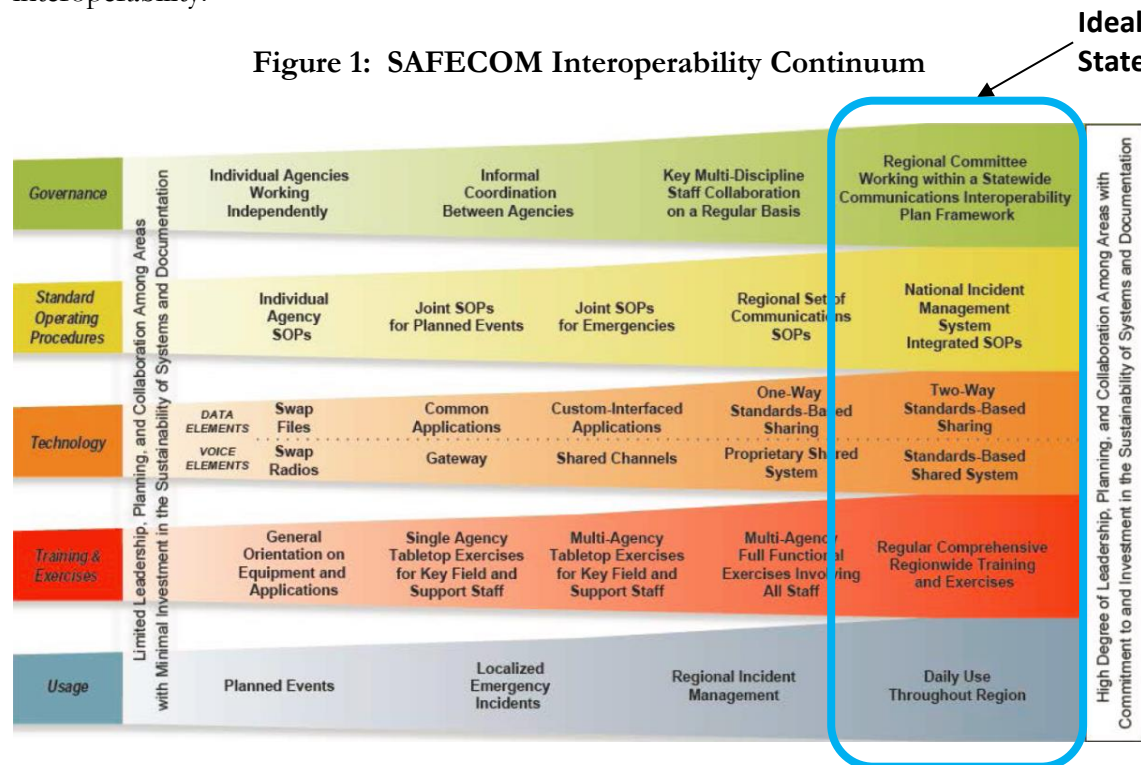
In this section, we review the current interoperability environment in Utah and benchmark the state against the SAFECOM Continuum.

4.1. Governance

SAFECOM states:

> "A common governing structure for solving interoperability issues will improve the policies, processes, and procedures of any major project by enhancing communication, coordination, and cooperation, establishing guidelines and principles, and reducing any internal jurisdictional conflicts. This group should consist of local, tribal, state, and federal entities as well as representatives from all pertinent

public safety disciplines within an identified region. A formal governance structure is critical to the success of interoperability planning."

As a statewide organization created to develop shared public safety communications systems, the UCA executive team and its Board are committed to using their resources to improve interoperability whenever and wherever practicable.

To help streamline this effort, SB154 repealed the operational advisory committee and the regional advisory committees and created the Public Safety and PSAP advisory committees. These committees will advise UCA on:

a) The authority operations and policies;

b) The radio network division and interoperability division strategic plans;

c) The operation, maintenance, and capital development of the public safety communications network;

d) The authority's administrative rules relative to the radio network division and the interoperability division;

While UCA provides an essential framework for providing interoperable communications leadership, the public safety advisory and PSAP advisory committees have just recently been established and individually are in the process of determining how they will coordinate their efforts with those of UCA. As shown below, the current "Informal Communication Coordination Between Agencies" places the governance between local agencies on the moderate to low portion of the Continuum.

| Governance | Individual Agencies Working Independently | Informal Coordination Between Agencies | Key Multi-Discipline Staff Collaboration on a Regular Basis | Regional Committee Working within a Statewide Communications Interoperability Plan Framework |

Current Governance Interoperability: Moderate to Low

4.2.   Standard Operating Procedures

SAFECOM states:

> *"Standard operating procedures (SOPs) are formal written guidelines or instructions for incident response. SOPs typically have both operational and technical components."*

While some individual agencies have established Standard Operating Procedures (SOPs) for interoperability, we are not aware of any regional or statewide SOPs that have been developed for communications interoperability within Utah other than those relating to regional, operation, and event talkgroups announced by UCA. Unfortunatley, operations that involve multiple agencies are usually conducted on an ad-hoc basis with local dispatchers making real-time decisions on the resources that will be used to support communications interoperability. These include single agency channels or talkgroups that can be shared with others, regional talkgroups or mutual aid channels, and patches between talkgroups or channels.

The lack of established procedures places Utah on the far left of the Continuum, with limited SOP guidance currently in place.

UCA, with the assistance of the Cyber and Security Infrastructure Agency (CISA) will be facilitating a statewide communications interoperability plan (SCIP) workshop where strategic goals will be discussed and put into place to establish emergency communications SOP's

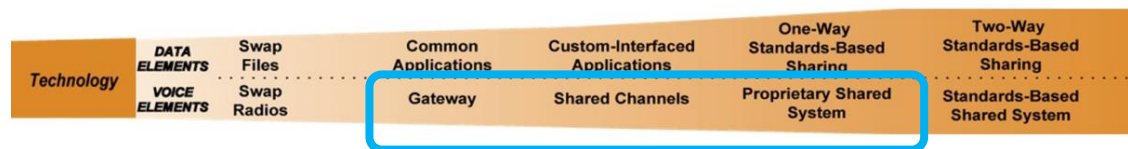

Current SOP Interoperability: Low

4.3. Technology

SAFECOM states:

> *"Technology is a critical tool for improving interoperability, but it is not the sole driver of an optimal solution. Success in each of the other performance metrics is essential to its proper use and implementation, and should drive technology procurement. Technology is highly dependent upon existing infrastructure within a region. Multiple technology solutions may be required to support large events."*

Utah's various state and local public safety users operate throughout the Interoperability Continuum. Exclusive users of the UCA 800 MHz SmartZone OmniLink system as well as users of the NEXEDGE VHF system operate on "Proprietary Shared Systems," which places them towards the right side of the Continuum (higher degree of interoperability) when they interact with other users of the same system. Users of conventional and NEXEDGE VHF systems who utilize designated VHF conventional channels to communicate are in the center of the Continuum as they utilize "Shared Channels". Users

communicating between the VHF and 800 systems find themselves further to the left (limited degree of interoperability) as they utilize a variety of interoperability methods that include "Gateways" and "Swapped Radios".

To improve interoperability, some users have deployed multiband mobile and portable radios that make it possible to operate on both UCA's VHF and 800 systems, but the multiband radios currently in use will not work on the NEXEDGE system. The three disparate systems in use in Utah continue to present ongoing interoperability challenges for the state's first responders.

Technology	DATA ELEMENTS	Swap Files		Common Applications	Custom-Interfaced Applications	One-Way Standards-Based Sharing	Two-Way Standards-Based Sharing
	VOICE ELEMENTS	Swap Radios		Gateway	Shared Channels	Proprietary Shared System	Standards-Based Shared System

Current Technology Interoperability: Moderate

4.4. Training and Exercises

SAFECOM states:

> *"Proper training and regular exercises are critical to the implementation and maintenance of a successful interoperability solution. Proper training and exercises are dependent on the use of operating procedures and agreed upon technologies. In absence of these agreements, training is limited to radio use within the department and multi-jurisdictional exercises are not feasible."*

User training for new personnel is currently conducted internally by their respective agency. Since few SOPs are in place, orientation training does not typically cover interoperability methods and policies. Additionally, few agencies conduct in-service radio training for their personnel once they are deployed to the field. This can result in challenges as new equipment is deployed and changes are made to the systems. For example, agencies have deployed multi-band radios to improve interoperability, but users indicate that they have not been trained on how to properly use the radios. Users also indicated that they have "more channels than they know what to do with" and that it is "too confusing for them to operate their radios." Regular exercises to validate operations and communications plans are not currently being conducted in Utah and users do not have the opportunity to practice or train with their radios outside of actual duty. This limits their ability to utilize the various communications resources that are available and can impact their ability to communicate effectively during an incident.

In an effort to help educate users about the UCA radio networks and familiarize them in the use of their end user radio equipment, UCA, this year began offering a twice a year radio training seminar. The first seminar was held in May 2019, the next seminar will be held during the UCA stakeholder meeting in November. This training is open to anybody wishing to attend.

The Communications Unit ("COMU"), as a structure within incident command, can provide expertise and coordination during incidents. While many public safety personnel have had training for the National Incident Management System ("NIMS"), few first responders in Utah have completed and been certified in Communications Unit Leader ("COML") training.

These factors put Utah on the low to mid end of the Training and Exercises element of the Continuum.

Current Training and Exercises Interoperability: Low

4.5.   Usage

SAFECOM states:

> "*Usage refers to how often interoperable communications technologies are used. Success in this element is contingent upon progress and interplay among the other four elements on the Interoperability Continuum.*"

By necessity, most of the public safety agencies in Utah have some form of interoperability with surrounding agencies. Users of the 800 system have the highest potential degree of interoperability as they operate daily on the same system with the ability to access the same talkgroups. 800 system radios can contain any talkgroup on the system, but some users indicate that they have difficulty accessing talkgroups other than their own, due to the complexity of the radio programming configuration and their lack of training.

Users of the VHF system have the ability to talk to other VHF users if they have the appropriate channels programmed into their radios. Individual agency channels can be used for interoperability, as can mutual aid channels that are deployed specifically to support communications between different agencies.

There are three primary public safety radio systems used in Utah: the Motorola 800 MHz trunked system, the NEXEDGE VHF trunked system and the VHF conventional system. While the systems themselves are incompatible one with another, there are a number of ways for users on one system to communicate with users on another system, including the use of console patches, radio swapping and multiband radios. However, the complexity of these solutions limits their use. In multi-jurisdictional situations, consolidated public safety answering points often act as a facilitator for ad-hoc interoperability, determining the channel(s) or talkgroup(s) where multi-agency communications take place and enabling console patches as needed. For larger and longer events, mobile communications trailers and gateway devices can be deployed to provide interoperability.

Utah public safety users that operate primarily on a single system for both their day-to-day and interoperability needs do not need to communicate across systems and operate on the right side of the Usage spectrum. Users that are required to communicate across systems and technologies must use more complex techniques and operate lower on the Usage spectrum.

Current Usage Interoperability: Moderate

Section 5 - Future Interoperability State and Recommendations

SAFECOM describes the challenges that Utah still faces with its public safety communications network:

> "Emergency responders - emergency medical services (EMS), fire-rescue personnel, and law enforcement officers - need to 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 - let alone communicate with agencies in neighboring cities, counties, or states."

In an ideal state, all public safety users would shift to the far-right of the Continuum (see previous Figure 1) by operating on a single, ubiquitous "Standards-Based Shared System" that would provide seamless, effortless, and integrated communications across the entire public safety user community. While this is hypothetically the ideal state, UCA understands that the existing VHF and 800 systems will remain in place for the foreseeable future.

This section describes the strategic initiatives to be undertaken by the UCA Interoperability Division beginning in 2019/2020. Each item has been identified as an essential task to strengthen interoperable communications throughout the State of Utah. The tasks were derived from guidance issued by DHS, and input from the UCA Board, UCA staff and the Advisory Committees. The initiatives are organized into the five critical success elements addressed on the Interoperability Continuum: Governance, SOPs, Technology, Training and Exercises, and Usage.

5.1. Governance

SAFECOM states:

> "Establishing a common governing structure for solving interoperability issues will improve the policies, processes, 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 to the emergency response community that communications 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."

UCA has a highly detailed and prescribed governance structure at the statewide and regional level as required by the Utah Communications Authority Act, Utah Code Ann. §§63H-7a. While the governance structure is highly prescribed, it is still in its infancy. The public safety and PSAP advisory committees are beginning the process of understanding their role both in general and specifically as it relates to interoperability at the local and regional levels. Once the governance structure for these committees are fully understood and implemented, Utah will have the highest level of governance interoperability.

Objective 1: Work with Public Safety and PSAP Advisory Committees to establish their role and function regarding interoperability in their regions

The Interoperability Division should work with Public Safety and PSAP advisory committees to define their role regarding interoperability in their respective regions. As representatives of local public safety practitioners, committee members possess the knowledge and understanding of the unique operational requirements of the users whom they represent, and the availability of local resources and the operational challenges that exist within their regions.

Public Safety and PSAP advisory committee responsibilities include working with local agencies and PSAPs to develop proposed local and regional interoperability guidelines including regional interoperability plans, Tactical Interoperable Communications Plans (TICPs), standard operating procedures, and policies that, if adopted, would codify regional operations. These regional plans could be incorporated into statewide plans maintained by the Interoperability Division.

Objective 2: Establish working groups for cross-border interoperability with neighboring states

Interoperability with neighboring states has been consistently identified as one of the most significant challenges faced by the public safety responders in communities that border an adjacent state.

The Interoperability Division should establish formal working groups with the states of Arizona, Colorado, Idaho, Nevada, New Mexico, and Wyoming. Each state should have an

individual working group comprised of local and state public safety responders, communications center managers, and technical subject matter experts from each state as well as representatives from the appropriate advisory committee. Each working group should be chaired by a member of the UCA Interoperability Division.

The mission of each working group would be to identify the operational use cases for both day-to-day and major operations, the operation and technological resources required to meet the requirements as defined in each use case, and the challenges in meeting those requirements. Local advisory committees should incorporate these requirements into regional interoperability plans as well as any applicable standard operating procedures and policies.

5.2. Standard Operating Procedures

SAFECOM states:

> *"Standard operating procedures—formal written guidelines or instructions for incident response—typically have both operational and technical components. Established SOPs enable emergency responders to successfully coordinate an incident response across disciplines and jurisdictions. Clear and effective SOPs are essential in the development and deployment of any interoperable communications solution."*

Standard Operating Procedures	Individual Agency SOPs	Joint SOPs for Planned Events	Joint SOPs for Emergencies	Regional Set of Communications SOPs	National Incident Management System Integrated SOPs

Objective 3: Revisit requirements for interoperability talk groups at the local, regional and statewide level, and simplify interoperability talk group assignments

Initially, UCA intended on providing sufficient capacity to handle large scale incidents at the local and regional level and to enhance interoperability by providing end-users with access to as many resources as possible. Public safety practitioners voiced concern that the large number of interoperability talkgroups combined with the large number of locally assigned operational talkgroups has made subscriber radio templates overly complex.

In conjunction with the P25 Upgrade of the statewide radio network, UCA is reviewing available usage data for the existing talk groups to determine the utilization of each of the designated interoperability resources. It is also reviewing the lessons learned by other operators of statewide communications systems to determine if any best practices from similar operators can be leveraged. It is UCA's intention that with the deployment of the

new P25 system there will be the implementation of a new fleet map which, among other things, takes into consideration the ease-of-use for field and communications center personnel.

Objective 4: Establish guidelines for statewide and regional interoperability talkgroups

During the stakeholder interviews it was determined that various processes are in place for the usage, assignment and activation of UCA interoperability resources. Existing guidelines and processes vary from region to region and may not be clearly documented or documented at all.

As part of the above referenced revamping of the UCA fleet map, UCA will be considering its existing written and unwritten policies regarding the usage, request, and assignment of designated communications interoperability resources across the state and publishing updated guidance which takes into account the desire for uniform direction and the unique operational requirements of local public safety agencies.

Objective 5: Develop regional Tactical Interoperable Communications Plans

During the stakeholder outreach interviews, it was determined that TICPs do not exist. While TICPs are optional, they are valuable tools for interoperable communications. TICPs are designed to allow urban areas, counties, regions, states, territories, tribes, or federal departments and agencies to document interoperable communications governance structures, technology assets, and usage policies and procedures. TICPs typically define the breadth and scope of interoperable assets available in the area; determine how those assets are shared and how their use is prioritized; and develop the steps individual agencies should follow to request, activate, use and deactivate each asset[1].

The Interoperability Division should encourage and support the Public Safety and PSAP advisory committees to develop TICPs for their respective regions. At the request of the advisory committees, the Division can request Technical Assistance from CISA ECD to help develop TICPs.

Objective 6: Revise the Statewide Communications Interoperability Plan

The Utah Statewide Communications Interoperability Plan (SCIP) was last updated in 2016 and was based on the Department of Homeland Security's National Emergency Communications Plan (NECP) as published in 2014. At that time, the plan was updated to

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[1] https://www.dhs.gov/emergency-communications-guidance-documents-and-publications.

include strategic goals and initiatives essential to improving daily operations and disaster response. DHS is currently in the process of revising the NECP and plans to release an updated version in the fall of 2019.

The 2019 revision of the NECP will include many new and revised goals to address recent advances in technology and infrastructure, continuity of communications, cybersecurity and data management issues. The interoperability Division is currently working with CISA ECD to revise the 2016 SCIP. After the workshop, the SCIP will be revised based on any newly published guidelines and goals contained in the 2019 NECP. Additionally, the SCIP update should reflect current and planned UCA investment areas such as NG911 and the P25 mission critical voice upgrade.

5.3. Technology

SAFECOM states:

> *"Technology is a critical tool for improving interoperability, but it is not the sole driver of an optimal solution. Successful implementation of data and voice communications technology is supported by strong governance and is highly dependent on effective collaboration and training among participating agencies and jurisdictions. Technologies should meet the needs of practitioners on the frontlines and should address regional needs, existing infrastructure, cost vs. benefit, and sustainability. The technologies described within the Continuum must be scalable in order to effectively support day-to-day incidents as well as large-scale disasters. Many times, a combination of technologies is necessary to provide effective communications among emergency responders. Security and authentication challenges are present in each technology and must be considered in all implementation decisions."*

Technology	DATA ELEMENTS	Swap Files	Common Applications	Custom-Interfaced Applications	One-Way Standards-Based Sharing	Two-Way Standards-Based Sharing
	VOICE ELEMENTS	Swap Radios	Gateway	Shared Channels	Proprietary Shared System	Standards-Based Shared System

Objective 7: Expand coverage and usage of VHF and 800 MHz non-Federal interoperability channels

Based on the requirements developed with the advisory committees and the cross-border working groups, the Interoperability Division should determine if additional coverage for non-Federal interoperability channels in the VHF and 700/800 MHz spectrums would enhance interoperability between responders.

The non-Federal interoperability channels have been designated specifically for interoperability between public safety responders at the national level. Coverage would be

beneficial not just in urban and suburban areas, but also in more rural areas where requesting assistance from first responders outside of the normal area of operation is likely.

Additionally, as recommended by DHS, all subscriber units should be programmed for operation on all applicable non-Federal interoperability channels for the band capabilities of each radio. These channels can provide additional capacity while operating at incidents across the state, and can enhance interoperability when responding to incidents outside the state.

Objective 8: Continue to monitor the FirstNet program

Regarding the relationship between the FirstNet LTE system and public safety LMR systems, FirstNet itself has stated:

> *"First responders currently use land mobile radio (LMR) networks for mission critical voice communications. When the nationwide public safety broadband network (NPSBN) is launched, it will not replace their LMR systems. The network is expected to initially transmit data, video, and other high-speed features, such as location information and streaming video, as well as non-mission critical voice. Public safety entities will continue to use LMR networks for their mission critical voice needs."* [2]

In the coming years, the LTE system may provide an improvement over the commercial data services that are currently being utilized by public safety users, but at this time and for the foreseeable future, an upgraded LMR system is the only viable alternative for mission critical voice services in Utah. In order to be prepared for the future of mission critical communications, UCA should continue to monitor the development of the FirstNet program.

The existing SCIP includes an outreach and information sharing goal, which contains an education plan to share information with stakeholders regarding FirstNet and other emerging technologies. In order to develop a FirstNet education plan, the Interoperability Division should continue to monitor the FirstNet program closely. This continued effort will include continued participation as a stakeholder in the development of FirstNet, and the monitoring of FirstNet news, press releases, blogs, events, newsletters and fact sheets among other resources.

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[2] http://www.firstnet.gov/network/lmr.

Objective 9: Participate in the planning, configuration, and deployment of the P25 upgrade

At this time, UCA has selected and signed a contract with L3 Harris for its P25 trunked statewide public safety radio communications network. UCA has also selected an implementation consultant to assist the Authority with this deployment. While the consultant will play an instrumental role in the deployment by providing technical and managerial leadership throughout the upgrade project, the UCA Interoperability Division should be apprised of the planning, configuration, and deployment of the system and, as appropriate, provide input regarding the interoperability needs of public safety.

Objective10: Participate in the identification, planning, configuration and deployment of applicable standards for public safety technology

The Interoperability Division, in conjunction with the Radio and 911 Divisions, should assist in the process of identifying technical and operational industry standards which could provide beneficial guidance to local public safety agencies.

Technical standards should be made available to local and state agencies as they procure mission critical software and hardware solutions. These standards would help ensure that interoperability is not compromised at the state and local level by the procurement of solutions which do not conform to industry standards. Technical standards include, but are not limited to, an NG911 ESInet, common CAD connections and interfaces, common phone systems, and other data sharing technologies and policies, and mission critical voice communications devices.

Operational standards could be a resource for the Public Safety and PSAP Advisory Committees as they develop local and regional interoperability plans. These standards would ensure that plans are consistent from region to region while maintaining the individuality that is required to support the unique operations of each local agency. Operational standards would include standards published by APCO, NENA, NFPA, DHS and other national public safety agencies and organizations. Specific areas would include channel naming conventions for interoperability channels, minimum training standards for COMU personnel and operational best practices.

5.4. Training and Exercises

SAFECOM states:

> *"Implementing effective training and exercise programs to practice communications interoperability is essential for ensuring that the technology works and responders are able to effectively communicate during emergencies."*

Training & Exercises	General Orientation on Equipment and Applications	Single Agency Tabletop Exercises for Key Field and Support Staff	Multi-Agency Tabletop Exercises for Key Field and Support Staff	Multi-Agency Full Functional Exercises Involving All Staff	Regular Comprehensive Regionwide Training and Exercises

Objective 11: Develop a comprehensive multi-year exercise schedule

The Division should work with the Public Safety and PSAP Advisory Committees and the CISA ECD to develop a multi-year exercise schedule. Only regular usage and exercises will validate interoperability plans and ensure that interoperable communications capabilities and assets are functioning as expected. Exercises provide a valuable feedback mechanism to ensure that plans are executable and practical. Exercises can take many forms such as seminars, workshops, table-tops, games, drills, and functional and full-scale exercises.

The exercise schedule should be based on best practices and available guidelines including the DHS Exercise and Evaluation Program. Exercises typically work best when they build on knowledge obtained during previous exercises. For example, a Table-Top Exercise (TTX) would build on the knowledge gained during a previous workshop or seminar, and a functional exercise would build on a TTX.

Objective 12: Train and qualify COMU personnel

One of the key roles of the Interoperability Division is to manage and provide guidance for the State's NIMS Incident Command System (ICS) COMU program by training and certifying key unit members. A NIMS/ICS COMU is tasked with managing the operational and technical aspects of incident communications.

COMUs are typically staffed based on need and their positions are filled on an as needed basis. Positions include:

- Communications Unit Leader (COML)
- Communications Technician (COMT)
- Incident Communications Center Manager (INCM)
- Radio Operation (RADO)

- Technical Specialist (THSP)

DHS has established standard training curricula for COMU positions, which include COMLs and COMTs. Training consists of a CISA ECD approved instructor led classroom portion and the practical application of learned skills by completing a defined set of tasks established at the statewide level. The completion of the defined tasks is typically reviewed by a Peer Review Committee (PRC) that is responsible for reviewing and recommending individuals for sign-off. There are currently a large number of agency personnel across the state that have taken the academic training portion of the COML and COMT positions but have not yet completed the practical application requirements.
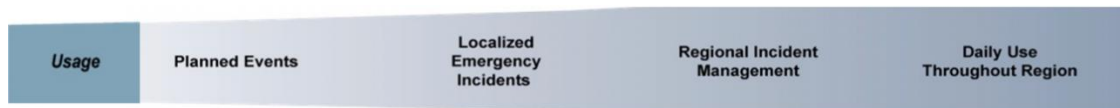
Objective 13: Establish a formal COML/COMT certification process and a PRC

The Interoperability Division should establish a formalized process to certify COML and COMT personnel using guidelines that have been published by the National Council of Statewide Interoperability Coordinators (NCSWIC) Planning, Training and Exercise Committee, and the SAFECOM COMU. Additionally, the Interoperability Division should work with the UCA board to appoint a Peer Review Committee consisting of personnel qualified to review and recommend individuals for certification.

5.5. Usage

SAFECOM states:

> *"Usage refers to how often interoperable communications technologies are used. Success in this element is contingent upon progress and interplay among the other four elements on the Interoperability Continuum."*

Usage	Planned Events	Localized Emergency Incidents	Regional Incident Management	Daily Use Throughout Region

Objective 14: Encourage adoption of recommended standards

While the UCA Interoperability Division does not have any statutory authority to force local agencies to adopt industry standards, best practices, or internally developed interoperability guidelines, the Division and the advisory committees should encourage the widest possible adoption of identified interoperability standards across the state.

Objective 15: Establish recommendations for regular testing of interoperability resources at the local level

The Division should establish written recommendations for the regular testing of interoperability resources at the local, regional and state levels. Regular usage and scheduled testing of interoperability resources will ensure that interoperability resources are ready to meet the day-to-day scheduled and unscheduled needs of the public safety first responder community. Having interoperability resources is of no use if responders and communications center personnel are not familiar with the processes and procedures for the activation of and use of available resources. Regular and frequent usage and testing of the interoperability resources will ensure that the use of interoperable communications resources will become second nature to all personnel.

Section 6 - Conclusions

In summary, we believe that implementation of the recommendations outlined in this Strategic Plan will ensure that UCA maintains modern, effective and reliable communications systems throughout Utah for decades to come. This should directly improve the effectiveness and safety of local and regional field personnel and enhance the delivery of public services to the citizens of Utah. We look forward to working with UCA's stakeholders to make this plan a reality.

Glossary of Acronyms

APCO	Association of Public-Safety Communications Officials
AVL	Automatic Vehicle Location
CAD	Computer Aided Dispatch
CISA	Cyber and Infrastructure Security Agency
COMLs	Communications Unit Leaders
COMTs	Communications Technicians
COMU	Communications Unit
DHS	Department of Homeland Security
DTS	Department of Technology Services
ECD	Emergency Communications Division
EMS	Emergency Medical Services
EOC	Emergency Operations Center
ESInet	Emergency Services IP network
FirstNet	First Responder Network Authority
GIS	Geographical Information System
ICS	Incident Command System
INCM	Incident Communications Center Manager
LMR	Land Mobile Radio
MSAG	Master Street Address Guide
NCSWIC	National Council of Statewide Interoperability Coordinators
NECP	National Emergency Communication Plan
NENA	National Emergency Number Association
NFPA	National Fire Protection Association
NG911	Next Generation 911
NIMS	National Incident Management System

NPSBN	Nationwide Public Safety Broadband Network
OEC	Office of Emergency Communications
P25	Project 25
PRC	Peer Review Committee
PSAC	Public Safety Advisory Committee
PSAP	Public Safety Answering Point
RADO	Radio Operation
RFAI	Request for Assistance Interface
SCIP	State Communications Interoperability Plan
SERT	State Emergency Response Team
SOPs	Standard Operating Procedures
SWIC	Statewide Interoperability Coordinator
THSP	Technical Specialist
TICPs	Tactical Interoperable Communications Plans
TTX	Table-Top Exercise
UCA	Utah Communications Authority
UDOT	Utah Department of Transportation
UHP	Utah Highway Patrol