Utah Communications Authority

911 Strategic Plan

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Utah Communications Authority Strategic Plan, Phase II

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Section 1 - Introduction

It is the mission of the Utah Communications Authority's 911 Division (collectively "UCA" or the "911 Division") to support Utah's Public Safety Answering Points ("PSAPs") in their efforts to provide the highest quality and most cost-effective emergency 911 call delivery and dispatch system to the citizens of Utah, its emergency responders, and visitors to our State. The 911 Division's primary goal is for every 911 caller to receive consistent, high-quality service, no matter from where in the state a call is placed. Success will require the 911 Division and PSAPs to meet the challenges and changes necessary to embrace new technologies, leverage resources, remain fiscally accountable, and achieve industry accepted standards throughout the State.

To guide UCA and assist PSAPs in accomplishing this mission and these goals, UCA has prepared this second phase of its strategic plan. The purpose of this plan is to guide the efforts of the 911 Division as it works with local and state public safety stakeholders to implement a statewide Next Generation 911 ("NG911") system in Utah. In drafting this plan, the 911 Division relied heavily upon the experience and expertise of national organizations such as the Association of Public-Safety Communications Officials ("APCO"), the Department of Homeland Security's Office of Emergency Communications ("OEC"), the National Emergency Number Association ("NENA"), the National Fire Protection Association ("NFPA") the Federal Emergency Management Agency ("FEMA"), and others. In addition, this plan was developed with the assistance of PSAP Directors who provided input through a series of meetings held throughout the state. Additionally, meetings were held with the Utah Sheriff's Association, Utah Chiefs of Police Association, and Utah Fire Chief's Association and UCA considered each and every comment, suggestion, and proposal that was timely submitted by these groups. The information provided by these groups significantly influenced this strategic plan. More recently, UCA's Public Safety and PSAP Advisory Committees were provided with a draft for review and comment. UCA considered each and every comment, suggestion, and proposal that was timely submitted by these committees. As before, the information provided by these committees significantly influenced this strategic plan.

This plan will provide guidance for the expenditure of 911 funds in the Unified Statewide 911 Services Account, as required by the Utah Communications Authority Act, Utah Code Ann. §§63H-7a-101, *et seq.* (the "Act"), and will be reviewed at least annually with stakeholders to ensure the continued improvement and long-term viability of Utah's 911 system in the coming years.

Section 2 - Overview of 911 and NG911 Trends

The 911 system is one of the most essential elements of public safety services in the United States. Since the first 911 call was made in Haleyville, Alabama in 1968, 911 systems have been the essential link between people in need and the emergency medical, fire, and law enforcement resources that can save lives and protect property.

2.1. Enhanced 911

The first 911 systems simply provided a three-digit number for reporting emergencies to emergency personnel. In the early 1970s, the ability to identify the location and telephone number of the calling party was added to the 911 system, which provided public safety dispatchers with more accurate information about the caller. At that time, commercial cell phones did not exist and all telephones were permanently wired in fixed locations, which made 911 technology relatively simple and straightforward.

As cell phones entered the market and became a staple of society, providing location information with 911 calls became more difficult. To maintain the effectiveness of the 911 system, the Federal Communications Commission ("FCC") required cell phone carriers to provide location information with 911 calls in two phases. Phase I of wireless E911 requires that carriers, within six months of a PSAP request, implement the technology required to report the location of the cell tower used by a cellular caller. Phase II requires that carriers, within six months of a PSAP request, implement the technology required to report the location of the caller within 50-300 meters. The FCC has created benchmarks to drive carriers toward improving location accuracy technology to provide dispatchable cellphone locations.[1] With these initiatives, the PSAP's ability to locate cellular 911 callers is improving, but challenges, such as indoor and vertical location identification, remain.

2.2. Next Generation 911

As cell phones have evolved, carriers have added the ability to send text messages, photos, videos, and live stream video. Unfortunately, traditional E911 systems were built using analog technology for traditional voice phone calls and are not equipped to receive the multimedia information that a modern cell phone can transmit and other cutting-edge information like biomedical data generated by wearable technology or other data collected and transmitted by our everyday devices.

PSAPs need a modern, digital, Internet Protocol-based NG911 system to receive this content rich data, and states need to upgrade their 911 infrastructure to support its transmission and routing. NG911 systems no longer rely on individual point-to-point copper telephone lines but are built around packet-switched, fault tolerant, broadband networks. Emergency services will be greatly improved with the implementation of NG911 as it will provide a faster, more resilient system that allows voice, photos, videos, text messages, and other data to flow seamlessly from the public to the 911 network and,

ultimately, to first responders. The high availability architecture will also provide continuity of operations by permitting the rerouting of calls from one PSAP to another in the event that a man-made or natural disaster compromises PSAP operations.

States and local authorities across the country are in the process of transitioning to NG911. This transition is characterized by the deployment of Emergency Service Internet Protocol Networks which are private IP networks designed to support the delivery of 911 calls. Concurrently, PSAPs are replacing their analog call handling equipment with digital call handling equipment. In order to support 911 calls that still originate on traditional analog phone lines, ESInets use an interface that converts the analog voice call, along with its originating location and routing information, into a digital format. During this transition, call routing is still dependent on legacy data contained within the circuit-based 911 system. Ultimately, to truly take advantage of NG911, Utah and its PSAPs need to adopt a fully digital, IP-based system which relies upon geospatial location services (discussed below), and which accepts and utilizes the plethora of data available through today's "internet of things."

Section 3 - Existing 911 Environment in Utah

3.1. UCA's 911 Division Overview

The Act states that one of UCA's purposes is to "provide administrative and financial support for statewide 911 emergency services; and establish and maintain a statewide public safety communications network for state agencies, public safety agencies and public safety answering points" in Utah. While UCA does not provide 911 services directly, it is charged with developing minimum standards and best practices for PSAPs in the state and with coordinating the implementation of the unified statewide 911 Emergency Services IP network ("ESInet") and 911 call processing equipment, among other responsibilities. This section further describes the environment in which the 911 Division currently operates.

Legislative Environment

In 1997, the Utah Communications Agency Network ("UCAN") was created as an independent agency by the Utah State Legislature to provide statewide, two-way, public safety radio coverage for first responders throughout Utah. UCAN's initial focus was to develop an 800 MHz radio system to cover the Wasatch Front region for the 2002 Winter Olympics. Over the years, the system has expanded to provide coverage throughout much of Utah and now supports approximately 50,000 mobile and portable radios.

In the 2014 General Session of the Utah State Legislature, House Bill 155 consolidated UCAN with the Utah 911 Committee, which was established in approximately 2004 to drive the implementation of Phase II 911 services, and renamed the combined organization, the Utah Communications Authority. With this consolidation, UCA was also given the responsibility to provide administrative and financial support for 911 emergency services on a statewide basis.

In 2015, House Bill 343 amended the Act and the Emergency Telephone Service Law to create the 911 Division within UCA and tasked the division with implementing a statewide public communications network for emergency services. A companion bill, Senate Bill 237, authorized UCA to commission a performance audit and study of the 911 emergency response systems throughout Utah, which was completed in 2016. In 2016, House Bill 380 amended the Act and required UCA to create and adopt a Strategic Plan with input from its Divisions.

In 2017, Senate Bill 198 modified the composition of the UCA board as well as the collection and distribution of the 911 emergency service charge, as discussed more fully in the next section. Senate Bill 198 also required that UCA's comprehensive, multiyear strategic plan be reviewed annually in consultation with the Regional Advisory Committees and the Operations Advisory Committee created by Senate Bill 198. This second phase of UCA's Strategic Plan was originally developed in accordance with these requirements.

In 2019, Senate Bill 154 repealed the operations advisory committee and regional advisory committees in favor of one Public Safety Advisory Committee and one PSAP Advisory Committee. Senate Bill 154 also placed the chair people of these committees on Utah Communications Authority board as non-voting members. Senate Bill 154 also raised the Unified Statewide 911 emergency service charge for each access line in the state and increased the rates collected on pre-paid telephones. The purpose of these fee increases was to permit UCA to procure and implement a statewide, NG911 ESInet and statewide NG911 phone system for PSAPs. The 2019 revisions to UCA's Strategic Plan were developed with the assistance of these new Advisory Committees, in accordance with the Act as amended at the relevant time.

UCA's 911 Division Funding

Beginning on July 1, 2019, the Utah State Tax Commission started collecting emergency service charges of $0.96 for each telecommunications access line, the distribution of which is $0.71 to local PSAPs (based on an allocation formula found in Utah Code Ann. §69-2-302), $.01 to the Utah Automated Geographic Reference Center ("AGRC") and $0.24 to the 911 Division. Currently only PSAPs, not Dispatch Centers,[2] are to receive amounts collected through emergency service charges.

3.2. 911 in the State of Utah

The Utah 911 environment includes 31 non-federal PSAPs. Table 2 in Appendix A lists these PSAPs, along with the class of county in which they are located. The 31 PSAPs range in size, as measured by incoming calls and staffing. Additionally, among these PSAPs, service areas vary from remote to rural to urban. On average, the smallest PSAPs handle an average of four to six 911 calls per day, while the large PSAPs handle an average of more than 240 calls per day, with the largest PSAP representing that it handles upwards of 1,000 calls per day.

911 Operations and Staffing

PSAPs manage both 911 calls and administrative calls that come into the PSAP. Table 3 in Appendix A shows the incoming 911 calls as well as incoming and outgoing administrative calls for each PSAP. Administrative calls account for a large portion of call handling tasks since, with the exception of a few PSAPs, incoming and outgoing calls on administrative lines outnumber incoming calls on 911 lines.

Incoming 911 calls should be routed directly to the PSAP that will manage the emergency call.[3] However, for 11.81% of 911 calls in the state, the caller is transferred at least one time to another PSAP; four PSAPs transfer more than 20% of their 911 calls, while one PSAP transfers 31.3% of its 911 calls.

Dedicated staffing levels vary among PSAPs. Some PSAPs share staff with other

divisions (e.g., a jail) to ensure at least one person is available to cover phones, which creates the potential for staff attention to be diverted away from telecommunicator duties and raises questions about what certifications should be obtained by these dual-purpose individuals.

Hiring and retaining qualified telecommunicators is a challenge across the state. Factors such as a lack of training and support, lack of staffing, insufficient wages, passing background checks, and the mental and emotional demands of the telecommunicator position make recruitment and retention a problem for PSAPs across the state, regardless of their size.

Training also varies among and within PSAPs. Some telecommunicators are not certified by the Utah Department of Public Safety through its Peace Officer Standards and Training program ("POST Certified") nor have they received appropriate Emergency Medical Dispatch ("EMD") training. Telecommunicators are the first first-responder and EMD training is extremely important in that it provides, among other proficiencies, the skills and knowledge required to manage medical calls and provide emergency responder assistance over the phone before a licensed first responder, such as an Emergency Medical Technician ("EMT"), arrives on the scene. EMD training is a benefit to both the 911 caller as well as the telecommunicator, both of whom are participants in the medical emergency.

Finally, the presence and rigor of quality assurance programs to ensure that call taking services are delivered using consistently high standards varies among PSAPs.

911 Technological Architecture

CenturyLink, along with its subcontractor, West Safety Services Corporation, currently provides and maintains Utah's statewide ESInet. More than two-thirds of Utah's PSAPs are connected to the ESInet, either directly or through a multinode host (see Table 2). The remaining, circuit-based PSAPs will need to transition from the legacy technology, i.e., the selective router, and connect to an i3-compliant NG911 ESInet in the near future to complete the statewide NG911 network. Many PSAPs have formed regional networks in which two of the PSAPs connect to the ESInet directly (the "Multinode Hosts") and the remaining PSAPs connect to the ESInet by being connected remotely to the Multinode Hosts.

911 calls originate from landlines/PBX systems, mobile phones, and VoIP devices and are routed via a selective router service either to the legacy circuit-based PSAP or, for IP-enabled PSAPs, to a gateway where they are then routed to the appropriate PSAP on the ESInet. Routing to PSAPs is based on the physical location of a landline call, the Phase I or Phase II location data for wireless calls, or the physical address provided by the customer that is associated with the IP address of a VoIP device.

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 supporting the transition from legacy circuit-based 911 systems to IP-based networks. Routing is still based on a selective router service and a Master Street Address Guide ("MSAG"), which is a tabular database connecting telephone numbers to physical locations. The interface translates location data and routing information from the selective router into the format required to send information over the IP telephony network. At present, Utah's current service contract for the RFAI network expires on March 31, 2020.

Additionally, today's RFAI, ESInet infrastructure permits the transmission of text-to-911 services, but does not support more advanced functionality, such as geo-based routing, streaming video, real-time text, and other data streams and services. Although text-to-911 services are available in parts of Utah, not all Utah PSAPs have implemented text-to-911. The resulting inconsistency from region to region can produce confusion and uncertainty for the public as a whole since a 911 user may not know if they can utilize text-to-911 services in their current location. Furthermore, the patchwork of text-to-911 availability also prevents large scale public education on the availability and benefits of text-to-911 services.

Utah needs to implement an i3-compliant, NG911 architecture that utilizes a vendor- agnostic network, manages the transmission of a myriad of data formats, and routes calls based on geospatial data, rather than the traditional data contained in legacy E911 systems.

Section 4 – Virtual Consolidation

Upon the request of UCAs governing board, the 911 Division investigated "Virtual Consolidation," sometimes referred to as "Functional Consolidation." This concept of virtual or functional consolidation is relatively new and, in states claiming to be engaged in virtual or functional consolidation, the term means sharing technology and functions while being located in different physical locations. Though not physically consolidated, a PSAP would be *virtually* consolidated, utilizing the same software to perform the same *functions*.

Shared Technology or Virtual Consolidation

In 2016, the Department of Homeland Security and Emergency Management ("HSEMD") performed a study for the state of Iowa related to this question of virtual consolidation. Among other things, this study stated, "[a]s technology evolved, the ability for PSAPs to share key systems with or without sharing physical space is now a reality. Participating agencies jointly procure or share through agreements key PSAP systems such as 9-1-1 answering equipment, CAD, ANI/ALI, logging recorders, GIS, and radio consoles. This is a Host/Remote configuration using redundant, reliable high-speed connectivity between shared services host location and each remote center"[4] This concept was consistent with the 2012 report of Michigan State 9-1-1 Committee to the Michigan State Legislature that in a virtual consolidation model, "PSAPs maintain separate physical locations but share common phone equipment, radio equipment, CAD and other public safety dispatch equipment over a secure managed network."[5]

This question has been posed and considered by UCA before. Though not widely accepted or adopted by UCA's Governing Board at the time, the Matrix Consulting Group performed a study for Utah in 2016 that defined functional consolidation as: "[t]he technological integration of IT and communications system of two or more PSAPs that share, preferably in real-time, key PSAP systems such as computer-aided dispatch (CAD), radio, 9-1-1 call answering equipment, or logging recorders. Although technology and ultimately important information is shared, each PSAP retains its existing independence, organizational structure, policies and procedures, etc., and remains in its own facility."

Each of these definitions draw a distinction between shared technology, such as a common CAD or a multi-node, and actual virtual consolidation. That distinction is the real-time sharing of all crucial 911 technologies. When PSAPs are truly functionally consolidated, a 911 caller will be routed to an available telecommunicator who may be physically located in any of the virtually consolidated physical locations. This telecommunicator will have access to the same CAD application(s), phone system, radio talk groups, etc., and will either be permitted to dispatch any and all relevant emergency services or will push CAD information to a dispatcher such that the caller does not have to be transferred. Such an environment permits physically separate PSAPs, managed as the relevant governing body desires, but provides the economies of scale that are sometimes realized through traditional

consolidation. These benefits can include better response times with a lower total staff count as physically separate but functionally consolidated PSAPs share human resources to meet call handling goals.

Co-Location

Functional consolidation can also be understood when contrasted against its stark opposite, co-location. This same Iowa study stated that "[a] co-location of PSAPs refers to sharing of physical space and, at times, critical PSAP technology such as CAD, 9-1-1 answering points, radio consoles, and logging recorders, while remaining completely separate entities. Governance for each department remains under its original organization as well." When Michigan addressed co-location, the State 9-1-1 Committee stated, "[a] co-location of PSAPs is the sharing of physical space by more than one PSAP and/or agency. In addition to sharing space, this may also include shared technology such as CAD, telephone systems, radios and recorders while remaining completely separate entities. An example would be a communications center that houses a city police dispatch and a city fire dispatch where the employees are employed by their respective agency and governance remain with that agency. This model can provide cost efficiencies by sharing physical space and technology while allowing agencies to keep administrative control."

As the 911 Division has often expressed, one of its primary goals is to assist PSAPs in providing the highest level of service to the 911 caller as is possible. Included in this is a goal of decreasing transfers of 911 calls. In the co-location context, much like the virtual consolidation environment discussed above, the measure of success is not whether or not telecommunicators are managed or employed by differing organizations but rather whether they are sharing the same technology and dispatch all relevant public safety personnel. Two PSAPs that are co-located within the same physical space but that are utilizing a different phone system, CAD, or radio system would be forced to transfer callers across the room in many circumstances and, from the standpoint of the 911 caller's experience, is no better than physically separate PSAPs. However, two PSAPs that are co-located, even if separately managed, which share, in real-time, all crucial 911 technologies, would achieve the same benefits of functionally consolidated PSAPs.

Assistance UCA Can Provide

Any discussion of functional consolidation or co-location must be accompanied by the clear and obvious statement that UCA believes and understands that the provision of 911 services is a question of local control. No portion of this preceding section should be construed as a directive from UCA for any PSAP to consolidate, physically, functionally, or otherwise. However, the assignment to consider the role that functional consolidation can play in Utah is likely not an exclusively academic endeavor. We know that PSAPs share the 911 Division's goal of improving 911 service. We also know that many police, fire, and medical agencies have a great deal invested into their PSAPs and, understandably,

are reluctant to turn such services over to a neighboring jurisdiction. To the extent functional consolidation is something PSAPs are considering, UCA is happy to provide whatever insight and counsel it might be called upon to provide. As is addressed elsewhere in this document, UCA is in the process of procuring a statewide phone system for PSAPs which should help standardize one crucial PSAP technology. In addition, UCA's Radio Division is willing to help PSAPs configure radio channels and talk groups to permit functional consolidation as well.

Section 5 - Future Environment

Utah's 911 system is currently in a transitional phase, shifting from the legacy, analog technology to modern, digital, IP-based technology. As the FCC's Task Force on Optimal Public Safety Answering Point Architecture noted, the ultimate goal is to have all PSAPs served by an i3 standards-based system that handles not only voice, but also other data streams such as text, pre-recorded and live streaming video, geo-location services, and other types of data that are currently available, or will be available in the future. While some PSAPs have taken steps toward transitioning to an i3-compliant, NG911 architecture, others will need to upgrade their customer premise equipment ("CPE") and be connected to an i3-compliant, NG911 ESInet in order for Utah to achieve an NG911 system. Originating service providers also need to play a role in the transition to an i3-compliant, NG911 system by providing Session Initiation Protocol ("SIP") interfaces and location information during call initiation.

5.1. 911 Network

The backbone of an NG911 system is the ESInet, a dedicated emergency IP network that permits information to be transferred from a 911 caller to a PSAP. PSAPs are then able to relay the received information, either electronically or verbally, to first responders in the field. NENA established the standard protocol for an i3-compliant, NG911 ESInet, which is an open standard that has been adopted by a large number of hardware and software providers. The standard is non-proprietary, which provides greater interoperability. An i3-compliant ESInet also fosters a more streamlined service as it relies on a single converged network rather than multiple separate networks. As previously noted, in addition to voice, text, and video, an i3-compliant ESInet allows for additional inputs from sources like telematics, sensors, alarms, wearable technology, etc. One of the most foundational elements of an i3-compliant ESInet is its ability to route 911 calls to the proper PSAP (and provide pinpoint location information to first responders) based on the GPS location of the 911 caller, a technology known as geospatial routing.

Utah is currently utilizing an ESInet that relies on RFAI to deliver analog 911 calls and associated data to IP-based CPE. RFAI is a transitional IP-based architecture that does not support the majority of the previously mentioned data streams and sources and is not considered NG911. The service contract for the RFAI is reaching the end of its term and, prior to its completion, UCA intends to procure an ESInet that utilizes the latest technology, i.e., an i3-compliant, NG911 ESInet and Core Services.

5.2. Hosted Call Handling

UCA is also in the process of procuring a statewide contract for i3-compliant CPE. At present, many PSAPs are individually connected to the ESInet, a configuration that requires a large amount of "backroom" equipment and services for each PSAP. Other PSAPs have

formed multi-nodes, effectively sharing this "backroom" equipment and their connection to the ESInet. The most efficient NG911 systems rely upon a larger hosted network where no single PSAP has to purchase and maintain "backroom" equipment. UCA intends to provide a centralized solution where UCA provides a statewide CPE contract and connects that CPE, through geographically diverse servers, to UCA's ESInet. For purposes of this document, these geographically diverse servers and their network connections to the i3-compliant, NG911 Core Services, will be referred to as Hosted CPE. Utilizing a Hosted CPE will support common features across Utah and reduce equipment and maintenance costs. As part of the implementation of this new state-wide ESInet/CPE solution, UCA intends to adopt rules utilizing the Utah Administrative Rulemaking Act, to address this equipment, including issues relating to PSAP expansion and growth.

5.3. NG911 Data Streams

The latest technology of today can, and should, be utilized in the provisioning of 911 services. One of the initial adoptions of new technology can be seen in the ability of some PSAPs to accept text-to-911 calls. Not only does this technology make 911 more available to users such as those who are deaf or hard of hearing, but it also provides avenues for requesting help when a voice call may be impractical or impossible, such as during a domestic abuse situation or a kidnapping. Additionally, being able to receive pictures and videos may help telecommunicators and first responders better understand the circumstances of a 911 call and better assist those in need. In the future, the 911 Division expects that 911 calls will include live video streams and feedback from any number of sources, including biomedical information from wearable technology, crash analytics from vehicles, sensors on bridges alerting the presence of flood waters or structural integrity issues, and a whole host of other data sources and streams. Though these additional data streams can present new challenges such as requiring additional telecommunicator impact training and additional data storage demands, the benefits of this technology to first responders and the public as a whole are expected to far outweigh its costs. The first step in being ready for any of this technology is the implementation of an i3-compliant, NG911 ESInet and core services. This must be followed very closely by a public education campaign that communicates the availability and appropriate use of such technologies. If these enhanced calling features are not ubiquitous and available throughout Utah, it will be challenging for both 911 callers and PSAPs to utilize the technology. The 911 Division expects all of Utah's PSAPs to adopt the latest available technology as quickly as possible.

5.4. Emergency Call Tracking System

All PSAPs have access to the ECaTS reporting solution. PSAP-level reporting provides important intelligence metrics such as time-to-answer, call duration, and other performance-related indicators, which provide for enhanced training and operational improvement opportunities. Other features that are currently available are the dashboard displays of performance indicators and tools to identify and repair the improper routing of wireless calls, that are highly beneficial to PSAPs.

5.5. Redundancy, Reliability and Cyber Security in the NG911 Network

The U.S. Department of Homeland Security Office of Emergency Communications ("OEC") has identified Cyber Security as an important area of concern as NG911 systems are deployed throughout the United States:[6]

> The potential cyber risks to a NG911 system do not undermine its tremendous benefits. Nevertheless, cyber risks do present a new level of exposure that PSAPs must understand and actively manage as a part of a comprehensive risk management program. Past events have proved 911 systems are attractive targets for cyber-attacks. For example, attackers have disrupted the availability of traditional 911 systems with Telephone Denial of Service (TDoS) attacks that use auto-dialers to overwhelm PSAP phone lines and cause congestion. Location-based records and databases that support NG911 are of interest to cyber criminals, data miners, and even nation-states wanting to access and exploit that information.

Additionally, OEC encourages PSAPs to adopt a security first perspective, stating, "[c]ybersecurity has become an integral part of mission function and operations for NG911 systems. Working with others within the NG911 community, government, industry, and academia to establish consistent standards, policies, procedures, interoperability and implementation guidance for NG911 deployments is crucial."[7] UCA agrees that Cyber Security is an essential element in the implementation of the statewide NG911 system.

5.6. Continuity of Operations

Continuity of Operations ("COOP") planning is a critical function for emergency operations. As the 911 environment evolves, so must PSAP COOP plans. FEMA's model for contingency and disaster planning outlines four phases of planning: mitigation, preparedness, response and recovery. NENA also provides robust guidance for preparing COOP plans. All PSAPs should have a COOP plan and should provide an updated copy of that plan to the 911 Division so that, in the event of an emergency, all interested parties will know where to turn for a copy of the COOP plan, if necessary. Ideally, PSAPs will work with the 911 Division to ensure that their plan is in compliance with FEMA and NENA standards and are not in conflict with other COOP plans across the State. Regular exercises should be conducted to ensure that the plans remain current and effective.

5.7. GIS: Ongoing Data Maintenance

An essential element of NG911 is geospatial call routing, which sends 911 calls to the proper PSAP based on the coordinates of the caller's actual geographic location. Geospatial call routing is an improvement over the traditional 911 call routing process, which bases 911 call routing on tabular lists of address ranges or the approximate location of the cell tower

receiving the cell call.

For NG911 call routing to operate properly, operational processes need to be put in place to maintain a high level of synchronization between each PSAP's MSAG, the automatic location identification database (the "ALI Database"), and the geographic information system ("GIS") data sets compiled by Utah's AGRC. In addition to the previously addressed technological upgrades, UCA's 911 Division, AGRC, and PSAPs will need to work together to synchronize and validate these data sources. Furthermore, i3 standards provide for policy routing rules that may be customized by PSAPs to update their desired call routing. Like geospatial call routing, policy routing rules need to be included in the NG Core Services contract and made available so that PSAPs are aware of any potential routing conflicts.

After the implementation of geospatial routing, ongoing data maintenance will be required and PSAPs will need to assume a primary role in resolving errors within these data sources. The 911 Division, in conjunction with AGRC, will need to develop and propose a statewide policy for maintaining GIS quality metrics.

5.8. Location Validation Function/Location Information Server

The Location Validation Function ("LVF") leverages GIS data to ensure that calls from addresses are being routed to the proper PSAP. NENA provides that "[a] civic address is considered valid if it can be located within the database uniquely, is suitable to provide an accurate route for an emergency call and adequate and specific enough to direct responders to the right location."[8] LVF will pave the way for PSAPs to implement a Location Information Server ("LIS"), which is an IP originating network that provides locations of endpoints. These technically complex aspects of an i3-compliant, NG911 ESInet are critical and will permit legacy technologies such as the MSAG and selective routers to ultimately be eliminated.

5.9. Intrastate Interoperability Framework

In alignment with the vision of a seamless, statewide, public safety operation, the proposed i3-compliant, NG911 ESInet will allow PSAPs to incorporate future technologies as they become available, while still maintaining a high, and hopefully increasing, level of interoperability. The introduction of a Hosted CPE solution, i3 ESInet, geospatial routing, and other NG Core Services offers the potential to dramatically improve the landscape of emergency response throughout the state. Furthermore, these technologies hold the promise of greater interoperability, both within the state and with our public safety partners in neighboring states.

Section 6 - Strategic Issues

The 911 Division has identified four strategic issues to prioritize and address in order to meet its mission of supporting PSAPs in providing the highest quality and most cost-effective 911 call delivery system. First, and foremost, Utah needs to transition to an i3-compliant, NG911 architecture. This transition will facilitate more efficient management of 911 calls and will allow accommodation of IP-based data transmissions that characterize current and future communications modalities. UCA will support this transition by procuring an i-3 complaint, NG911 ESInet, Core Services, and CPE for Utah's PSAPs who choose to participate in this statewide 911 system.

6.1. Transitioning to an i3-Compliant, NG911

UCA, through the 911 Division, has a legislative mandate to monitor and coordinate the implementation of the 911 emergency services network. Recognizing national trends and the benefits that NG911 technology can provide to callers and first responders, as well as understanding the future demand that citizens will have for the processing and utilization of multiple streams and methods of data, UCA's ultimate goal is for Utah to implement an i3-compliant, NG911 architecture. An i3-compliant, NG911 system, in its simplest form, allows 911 calls to be routed based on geographic data and provides for the transmission of IP-based communications modalities, including voice calls, text messages, photos, videos, and other forms of data. Components of an i3-compliant, NG911 system include, at a high level, NG911 Core Services, supporting technology, network components to provide secure gateways, and i3-compliant CPE at the PSAP level.

Transitioning to an i3-compliant, NG911 system will require procuring additional and different technology and services, developing geospatial call routing policies and protocols, developing new GIS administrative processes, and learning new skills at both the state and local levels. New capabilities will be possible with an i3-compliant, NG911 system and implementers will need policies, procedures, and training to handle, for example, the increase in the amount and types of information and data received and the effects of that data on telecommunicators.

6.2. 911 Funding

Currently, each PSAP contracts independently with commercial entities for CPE upgrades and maintenance, as well as for text-to-911 capabilities. The 911 Division, and its predecessor, the 911 Committee, historically has paid a high percentage of the upgrade and maintenance costs for many PSAPs. Every five to seven years PSAPs have been forced to negotiate to upgrade their equipment and/or renegotiate their maintenance, each with varying degrees of success and market power. To facilitate the provision of cost-effective equipment and services, UCA is situated to use its position as a statewide agency to lower the overall cost of CPE across the state. A single statewide contract should also improve

the level and quality of warranties and vendor services for all PSAPs.

With the recent changes from SB154 the revenue generated from the $.25 emergency service charge, of which $.24 is provided to UCA, is expected to be sufficient to fund an i3 complaint, NG911 ESInet, Core Services, and statewide CPE, complete with network connections from Utah's PSAPs to the hosted servers. Per Utah Code Ann. §63H-7a-304, "[t]he authority may not expend funds from the Unified Statewide 911 Emergency Service Account collected through the 911 emergency service charge; or collected through the prepaid wireless 911 service charge revenue distributed on behalf of a PSAP that chooses not to participate in the: public safety network; and the 911 emergency service which is a unified statewide communication system that provides a user with direct access to a public safety answering point by dialing or accessing 911." Accordingly, while participation in the statewide 911 system is voluntary, the economic incentives for doing so are significant for Utah's PSAPs. It is also anticipated that any dispatch centers will be permitted access to UCA's ESInet and Core Services, however, UCA will not be providing CPE or network connections for these dispatch centers. The dispatch centers will, however, be able to purchase CPE equipment under the contract negotiated by UCA and its selected vendor.

6.3. Supporting the Provision of Consistent Quality 911 Service across the State of Utah

Every 911 caller in Utah should expect to receive the same high-quality service regardless of where in the state the call is placed from. The 911 Division, with the participation of Utah's PSAPs, established minimum standards and best practices for PSAPs. In January of each year, UCA's 911 Division will send a questionnaire to the PSAPs in Utah to permit these PSAPs to self-report their compliance with these minimum standards and best practices and offer comments and explanations. Once UCA has compiled all PSAPs 911 Center Performance Reports, the 911 Division will report PSAPs' progress in complying with these minimum standards and best practices, as well as offer suggestions on how to improve, where appropriate.

6.4. Decommissioning Selective Routers

About one-third of Utah's PSAPs rely exclusively on legacy, circuit-based routing technology for call routing. As long as some PSAPs and carriers rely on the legacy technology, PSAPs will continue to need selective routing services to ensure accurate 911 call delivery. PSAPs that are connected to the ESInet and paying for IP-based routing technology are also paying the telephone companies for legacy selective routing services. Once all PSAPs are connected to an i3-compliant, NG911 ESInet, selective router services will be decommissioned and PSAPs will no longer pay for legacy services. At present, the anticipated date for the decommissioning of selective router services is March 31, 2021.

Section 7 - Strategic Goals

UCA has identified three strategic goals for its 911 Division that will address the strategic issues outlined in Section 6 and provide direction for accomplishing its mission. This section describes each goal along with specific objectives that the 911 Division will meet to accomplish that goal.

7.1. Transition to a Statewide i3-Compliant NG 911 System

UCA will transition to a statewide, NG911, vendor-agnostic architecture that is compliant with i3 standards. Moving to an i3-compliant, NG911 system will require a combination of additional and different technologies, services, protocols, and skills at the state and local levels.

Objective 1: Develop a high-level conceptualization of the statewide NG911 system

While the specific architecture of a technical system or its components is best developed in cooperation with the selected system provider, the 911 Division previously articulated a need to develop a high-level conceptualization of the system in order to determine a procurement strategy and develop a request for proposals ("RFP"). The 911 Division has achieved this goal. Currently, the statewide ESInet architecture includes multinode hosts and standalone PSAPs. The new, high-level conceptualization is a state or nationwide NG911, i3 complaint, ESInet and Core Services. Connected to this ESInet will be state-owned/licensed, NG911, i3 complaint CPE with geodiverse servers capable of serving all of the PSAPs in Utah. This solution will also include logging of 911 communications for those PSAPs desiring to utilize this function.

Objective 2: Develop a procurement strategy

The 911 Division is in process of procuring an i3-compliant, NG911 ESInet and Core Services; Hosted CPE; end user CPE equipment; logging system; and other system components. The procurement strategy to be deployed is an RFP that strictly complies with the Utah Procurement Code.

Objective 3: Replace aging CPE

The 911 Division anticipates entering into a contract with a qualified vendor as a result of the procurement process referenced above. This RFP will include new NG911, i3-compliant, CPE for all Utah PSAPs to be installed in reverse order of the age of existing PSAP equipment. It is anticipated that these installations will begin in the summer of 2020. Initially this equipment will be connected to UCA's existing RFAI ESInet to be transitioned to the NG911, i3-compliant ESInet upon its installation. In the interim, PSAPs should work with CPE maintenance providers to extend maintenance agreements on existing.

Objective 4: Prepare for GIS-based routing

AGRC is in the process of developing the GIS database that will be used for GIS-based call routing. To utilize geolocation services, including geospatial routing, Utah will have to implement an i3-compliant, NG911 ESInet and will need to have in place the call routing rules, policies, procedures, services, and supporting technology for NG911 call routing components. In addition, Utah will need to have reconciled the legacy location validation and routing database to the GIS-based database and have in place a process to coordinate timely updates to the state GIS database. The 911 Division will facilitate the development of rules, policies, and procedures by coordinating efforts both among PSAPs, and between PSAPs and the vendors providing the technology to support geospatial call routing. Additionally, the 911 Division provided AGRC with the PSAP data that AGRC will need to reconcile the legacy and GIS databases.

Objective 5: Coordinate with PSAPs for transition planning

In accordance with the legislative mandate stated in Utah Code Ann. §63H-7a-302, the 911 Division will assist PSAPs in "implementing and coordinating the unified statewide 911 emergency services network." As demonstrated throughout this plan, the 911 Division and UCA intend to procure an NG911, i3-compliant, ESInet, Core Services, and CPE for PSAPs in Utah. As noted above, UCA will adopt the appropriate rules to address the management of this contract, including PSAP growth. On their part, PSAPs may need new standard operating procedures to handle NG911 media, including incoming and originating phone calls, video, images, text, and other forms of data. Finally, PSAPs will need training to address new functions, capabilities, and requirements of NG911 equipment, as well as training to address cybersecurity issues.

The 911 Division will assist PSAPs by coordinating efforts to identify the tasks and projects required to transition to the i3-compliant, NG911 environment and provide guidance in the completion of such tasks and projects. Further, the 911 Division can bring its expertise and experience to assist in the development of standard operating procedures and policies and ensure that these procedures and policies consistently meet the needs of the public. These efforts will be conducted in close coordination with the PSAP Advisory Committee.

Objective 6: Transition away from Selective Routers for 911 Call Routing

UCA recognizes the importance to local PSAPs of eliminating the need to pay for duplicated services and will prioritize the decommissioning of selective router services, as discussed above.

7.2. Support the Provision of Consistent and Quality Service to all 911 Callers in Utah

Objective 1: Minimum standards and best practices for PSAPs

Per the legislative mandate from Utah Code Ann. §63H-7a-302, the 911 Division, with the assistance of Utah's PSAPs, developed minimum standards and best practices for PSAPs.

The minimum standards and best practices include minimum technical, administrative, fiscal, network, and operational standards for PSAPs. The minimum standards and best practices are geared toward creating a 911 environment in the State of Utah where every caller receives the same high quality 911 service regardless of where in the state, they place their call from. Since the passing of the Phase II 911 Strategic Plan in April 2018 the PSAPs have made great strides in achieving the goals set forth in the established minimum standards and best practices.

UCA procured statewide training that would train the PSAPs in the areas that were set forth by the established minimum standards and best practices. UCA plans to work closely with the PSAPs to procure statewide training that will continue to educate them in areas that have been set forth in the minimum standards and best practices. In addition, UCA hopes that the concept of functional consolidation discussed in this strategic plan may be further developed and deployed to assist PSAPs in the provision of high-quality services and achievement of the minimum standards and best practices.

Objective 2: Leverage Statewide Purchasing Power to Lower Overall Costs

UCA intends to leverage state purchasing power and negotiate a contract or contracts for the benefit of all PSAPs for the provision of a statewide, i3-compliant, NG911 system. This solution is intended to procure end user CPE equipment; CPE maintenance; i3-compliant, NG911 Core Services and Hosted CPE. Since the passage of SB154 in 2019 legislation, the 911 Division intends to expend funds in the Unified Statewide 911 Services Account to pay 100% of the costs, as discussed more fully below.

Objective 3: Act as a repository for information

In conjunction with developing minimum standards and best practices, the 911 Division is developing a library of resources for PSAPs to assist them in meeting the minimum standards and implementing the best practices in order to standardize the provision of services across the state. Examples of resources include sample training programs, training course providers, and standard operating procedures from other PSAPs. The 911 Division can also act as a repository for sharing information between PSAPs. PSAPs are encouraged to submit their training programs, course providers, and standard operating procedures to the 911 Division so that they can be made available to all PSAPs.

Objective 4: Provide PSAP performance reports

As a way of measuring accomplishment of consistent and quality service as well as compliance with the minimum standards and best practices, the 911 Division will create an annual "911 Center Performance Report," utilizing tools at its disposal and results from a self-reporting questionnaire issued to PSAPs. Every January, the 911 Division will distribute this self-reporting questionnaire to PSAPs. This questionnaire will cover the published minimum standards and best practices as set by UCA, and request that PSAP personnel accurately respond regarding their compliance during the previous year. The information obtained through these questionnaires, coupled with other data compiled by the 911 Division, will be available to PSAPs in the first quarter of each year for the prior calendar year.

7.3. Leverage Statewide Purchasing Power to Reduce and Control costs

With the goal of equalizing and decreasing the cost of end user CPE for PSAPS, UCA will leverage its position as a statewide agency by negotiating statewide contracts for i3-compliant, NG911 system equipment and services. One of the benefits of this plan will be the leveling of expenses coupled with more certainty regarding future expenses.

Section 8 – Utah 911 Standards and Best Practices

Utah's citizens and visitors depend on 911 calls to be answered quickly and professionally so that fire, law enforcement, and medical emergency responders can be dispatched in a competent and expeditious manner. This requires not only modern, state-of-the-art, public safety, technology systems, but also well trained PSAP personnel who are available when needed. The public expects that PSAPs provide a superior level of service, regardless of the geographic location of the PSAP or the fiscal resources of the local community, and the public deserves this level of service.

Utah Code Ann. §63H-7a-302 requires the 911 Division to develop minimum technical, administrative, fiscal, network, and operational standards and best practices for PSAPs. During 2019, the 911 Division met with all PSAPs and established proposed minimum standards and best practices, revising previously published and approved versions of the same. These minimum standards and best practices were subsequently adopted by UCA's Governing Board and published on UCA's website, www.uca911.org under the 911 Division tab. The 911 Division recognizes that, from time to time, it may be appropriate to amend these standards. Such an amendment should be proposed to UCA's Governing Board either by its advisory committees or by others with the following information: (1) current language; (2) proposed language; (3) reason/justification for the change, including any citations to authority; (4) a list of PSAPs supporting the change; and (5) a list of PSAPs opposing the change.

8.1. Use of Funds in the Unified Statewide 911 Emergency Service Account

Under Utah Code Ann. §63H-7a-304, UCA is to "expend funds in the Unified Statewide 911 Emergency Service Account in accordance with the authority strategic plan ...." Below, this plan sets forth, in detail, the utilization of these funds.

As previously noted and addressed, the 911 Division will implement the following: (1) i3-compliant, NG911 ESInet and Core Services; (2) i3-complaint, NG911 hosted CPE; and (3) a network connecting PSAPs to the Hosted CPE. Between now and the date i3-compliant, NG911 ESInet and Core Services are implemented, the 911 Division, with the oversight and approval of UCA's Executive Director and Governing Board, intends to expend funds in the Unified Statewide 911 Emergency Service Account to reimburse PSAPs for CPE maintenance expenses. More specifically, CPE maintenance expenses will be reimbursed pursuant to currently existing contracts with maintenance vendors. Maintenance expenses under any new contract will be reimbursed at no more than 105% of the prior year's annualized maintenance cost. Absent extreme emergency circumstances, as determined by UCA's Governing Board upon the recommendation of the 911 Division Director and UCA's Executive Director, UCA's 911 Division will not reimburse PSAPs for the purchase of any *new* CPE equipment.

As previously noted, given that UCA is working toward the implementation of a statewide CPE equipment solution, it does not seem prudent, absent extreme emergency circumstances, to purchase new CPE until the statewide system is in place. Accordingly, the 911 Division does not intend to expend funds to reimburse PSAPs for new CPE at this time.

Section 9 - Conclusion

In summary, we believe that implementation of the recommendations outlined in this Strategic Plan will allow Utah to maintain modern, effective, and reliable 911 systems throughout the state for decades to come, place Utah at the forefront of utilizing advanced technologies to locate and assist 911 callers, help Utah's 911 callers receive a consistently high level of 911 service, and support local public safety telecommunicators and first responders throughout the state.

Appendix A – Utah PSAP Tables

Table 2: Utah PSAP Landscape

PSAP	County Class	Multi-node	Connected to RFAI ESInet	Text-to-911 Implemented
Beaver County SO	5	Dixie Area	Yes	Yes
Bountiful PD	2	Greater Wasatch	Yes	Yes
Central Utah 911	2,4	Utah County	Yes	Yes
Clearfield PD	2	Davis County	Yes	Yes
Davis County SO	2	Davis County	Yes	Yes
DPS-Box Elder	3	Stand Alone*	No	No
DPS-Cedar City	3	Dixie Area	Yes	Yes
DPS-Price	4	Stand Alone	Yes	Yes
DPS-Richfield	4,4,6	Stand Alone	Yes	Yes
DPS-Uintah Basin	3,4,6	Davis County	Yes	Yes
Emery County SO	5	Stand Alone*	No	No
Garfield County SO	5	Dixie Area	Yes	Yes
Grand County SO	5	Stand Alone*	No	No
Kane County SO	5	Dixie Area	Yes	Yes
Layton City PD	2	Davis County	Yes	Yes
Logan PD	2	Stand Alone	Yes	Yes
Millard County SO	4	Stand Alone	No	No
Orem City	2	Utah County	Yes	Yes
Pleasant Grove PD	2	Utah County	Yes	Yes
Provo City PD	2	Utah County	Yes	Yes
Rich County SO	6	Stand Alone	Yes	No
Salt Lake City 911	1	Greater Wasatch	Yes	Yes
San Juan County SO	4	Stand Alone*	No	No
Sanpete County SO	4	Stand Alone	No	No
Springville City PD	2	Utah County	Yes	Yes
St. George PD	2	Dixie Area	Yes	Yes
Summit County SO	3	Summit/Wasatch*	No	No
Tooele County SO	3	Stand Alone	Yes	Yes
VECC	1	Greater Wasatch	Yes	Yes
Wasatch County SO	3	Summit/Wasatch*	No	No
Weber Area 911	2,4	Greater Wasatch	Yes	Yes

*It is anticipated that these agencies will be joining the Davis County Multi-node within six months.

Appendix A – Utah PSAP Tables

Table 3: Utah Public Safety Answering Point 2018 Calls

PSAP	911 Calls	Administrative Calls	911 Calls Transferred Out
Beaver County SO	3,049	13,414	477
Bountiful PD	20,586	78,662	2,260
Central Utah 911	66,770	213,856	9,986
Clearfield PD	11,201	43,643	2,304
Davis County SO	33,050	102,248	3,455
DPS-Box Elder	16,296	52,537	432
DPS-Cedar City	15,771	66,434	17
DPS-Price	6,363	81,645	0
DPS-Richfield	7,593	63,643	186
DPS-Uintah Basin	16,276	109,746	55
Emery County SO	4,189	119	533
Garfield County SO	2,448	373	94
Grand County SO	4,741	26,241	80
Kane County SO	4,615	24,103	25
Layton City PD	18,352	85,728	2,243
Logan PD	23,505	111,747	1
Millard County SO	5,290	491	1,657
Orem City	26,736	124,623	2,671
Pleasant Grove PD	7,578	39,666	2,115
Provo City PD	28,551	122,986	2,421
Rich County SO	1,651	12,068	54
Salt Lake City 911	160,147	563,673	15,334
San Juan County SO	6,628	19,459	0
Sanpete County SO	5,477	36,328	449
Springville City PD	7,970	49,018	1,161
St. George PD	48,808	158,804	305
Summit County SO	20,267	92,291	345
Tooele County SO	21,992	91,444	0
VECC	255,451	678,553	60,743
Wasatch County SO	8,594	31,734	332
Weber Area 911	84,692	293,247	1,794
Total	**944,637**	**3,388,524**	**111,529**

Endnotes

1Federal Trade Commission. (2015). In the Matter of Wireless E911 Location Accuracy Requirements. PS Docket No. 07-144. Retrieved from https://goo.gl/jAG2Bk

2 Utah Code Ann. § 63H-7a-103, § 63H-7a-304.

3 National Emergency Number Association (NENA) Technical Committee Chairs. (2008). NENA Standard for Enhanced 9-1-1 (E9-1-1) Default Routing Assignments and Functions. (NENA 03-008). Retrieved from https://www.nena.org/resource/resmgr/Standards/NENA_03-008_E9-1-1_Default_A.pdf

4 Department of Homeland Security and Emergency Management report for the state of Iowa 2016. Retrieved from https://www.homelandsecurity.iowa.gov/documents/911/911_IowaConsolidationStudy_DEC2016.pdf

5 Michigan's State 9-1-1 Committee report to their legislature 2012. Retrieved from https://www.michigan.gov/documents/msp/NES_Paper_2012_379975_7.pdf

6 Department of Homeland Security Office of Emergency Communications. (2016). Cyber Risks to Next Generation 911. Retrieved from https://goo.gl/p9jmkG.

7 Ibid.

8 NENA Data Management Committee, Provisioning & Maintenance of GIS Data to ECRF/LVFs Working Group. (2017). NENA Standards for the Provisioning and Maintenance of GIS DATA to ECRFs and LVFs (NENA-STA-005.1.1-2017). Retrieved from https://goo.gl/L3ZuAG.