Public Safety Communications Subcommittee

2023 ANNUAL REPORT

State of and Potential Funding Sources for Public Safety Communications in the State of Colorado

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EXECUTIVE SUMMARY

For the past nine (9) years, the Public Safety Communications Subcommittee (PSCS) has been the only collaborative voice, addressing all Public Safety Communications entity's operability, interoperability, legislative, governance, and mission critical issues in the State of Colorado. Mission critical voice and interoperable communications are essential for safe and effective public safety response from daily calls for service, as well as for large-scale natural or manmade incidents. The State of Colorado and local governmental entities deploy numerous two-way land mobile radio (LMR) systems that serve state, local, federal, and tribal public safety and first responder agencies. The Colorado statewide Digital Trunked Radio System (DTRS) has several locally owned, managed and governed LMR systems for public safety communications. These locally or regionally owned LMR systems are interconnected to the statewide DTRS infrastructure and are considered a 'system-of-systems', built through many partnerships between state, county and local government owners. Colorado's diverse land mass ranging from high mountain peaks to low valleys and open plains all pose unique coverage challenges and requirements. Due to this diverse land mass, no single system can be effective in satisfying the needs of all public safety first responders.

> A system-of-systems encompasses multiple public safety radios systems owned by a variety of governmental entities that are interconnected and/or shared thus forming a larger and broader system for first responders.

The 2023 Annual Report of the PSCS will give a brief overview of where Colorado currently is in attempting to solve issues surrounding the large and complex matrix of what is referred to as the *Statewide Public Safety Radio System,* which truly encompasses the several LMR systems providing mission critical communications to all levels of government in Colorado. It is the intent of this report to highlight recent accomplishments of this statutorily formed group, suggest recommendations based on the extensive knowledge and expertise of the directors on the PSCS, working groups, along with other partners and experts from around the State of Colorado.

Over the past several years, the PSCS made several recommendations as a part of the statutory requirements. Some of the recommendations included in previous PSCS Annual Reports have not been addressed and may be included in this report. All of the recommendations in this report may

be necessary to obtain an overall picture of the state of public safety communications in Colorado. Those recommendations are again presented in this document:

- A reliable funding source should be identified in support of all public safety radio systems to address:
- Coverage gaps
- System capacity
- Ownership
- Governance
- All Hazards Regions Communications projects

In 2018 many of the above concerns were expressed by users during facilitated discussion sessions conducted by the U.S. *Department of Homeland Security –Emergency Communications Division's Interoperable Communications Technical Assistance Program (ECD/ICTAP)* at the annual radio summit. The overarching themes from the user community were:

- Funding
- Training
- Coverage
- Capacity
- Formalized Agreements
- Standard Operating Procedure Updates

Public safety communications in Colorado is a mesh of systems (system-of-systems) owned by many. When assessing overall public safety communications on a statewide basis, all systems should be considered.

The PSCS continues to voice the concerns expressed from across the state. If the collective voice is not heard, progress may not be made.

HISTORY

In 2012 the Consolidated Communications Systems Authority (CCSA) was formed by HB 12-1224 to create a funding and sustainment mechanism that would meet the needs of the users of the Colorado Digital Trunked Radio System (DTRS). The CCSA's original focus was only with the DTRS. The need for sustainment and interoperability with all radio systems operating within the state was recognized and called out early in the process. In the 2013 annual report submitted to the Joint Budget Committee, it was the CCSA's recommendation that HB 12-1224 be amended to include all public safety communications systems, so that true statewide public safety interoperable and mission critical communication would be supported through a statewide funding mechanism. In 2014 the CCSA was legislatively replaced with the Public Safety Communications Subcommittee (PSCS), a subcommittee of the Homeland Security and All Hazards Senior Advisory Committee (HSAC) created and defined through SB 14-127. The Executive Director of Public Safety serves as the state champion for all of public safety interoperable communications. The PSCS membership is statutorily designated and has representation from across Colorado from the leading public safety organizations and state agencies. The common goal is operable and interoperable communications at all levels of government and across all jurisdictional boundaries.

In 2015, the PSCS reviewed the prepared Business Plan and the Needs Assessment as outlined in legislation[1]. The prepared documents were accepted, as presented by the consultants who prepared them. The PSCS did take exception to several portions of the documents. The primary exception was that both documents were to be an account of current and future public safety needs. Both documents addressed only the single largest system in Colorado, the DTRS, and did not fully address all of the public safety radio systems in Colorado. The PSCS has worked diligently in its short existence to work on the prescribed duties and responsibilities. We will continue to work on all aspects of the legislation for the benefit of public safety, the visitors and citizens across Colorado.

Though there are the varying shapes and sizes of systems across the State of Colorado, they all face similar issues and priorities:

- Regular Land Mobile Radio (LMR) equipment maintenance and replacement (Hardware)

[1] CRS § 24-33.5-716, as amended

- HB14-1203 System Upgrade Assurance (SUA) program (Software)-scheduled for renewal in 2025
- Acquisition of additional interoperability resources
- Repair and replacement of aging radio tower sites
- Hardware and software upgrades necessitated by improvements in technology (e.g. repeaters and consoles)

SUCCESS STORIES

Boulder County - Public safety services throughout our nation depend on reliable LMR two-way radio communications dedicated to law enforcement, fire services, and EMS rescue services. These systems are built to be very reliable and resilient to all sorts of disasters, man-made and natural, as well as providing communications for everyday emergencies. Boulder County is no different. In the past 10 years, Boulder County has endured a 100-year flood, a mass shooting and several major wildland fires including the very destructive Marshall Fire. Throughout all these incidents the Boulder County VHF conventional radio system and the statewide digital trunking radio system (DTRS) played an integral part in allowing first responder agencies to provide mission critical services with little or no downtime in service. Nearly all other forms of electronic communications cannot make this claim, especially in the mountainous terrain of Boulder County where cellular service is non-existent.

It is critical that public safety LMR systems be properly funded not only for maintenance but for future upgrades, replacement, and expansion of coverage to provide service *anywhere* services are needed. With the integration of robust LTE technologies such as FirstNet, dedicated communications can remain available to public safety services without the fear of system failure which would likely result in the loss of life, property, and destruction of our environment.

FRCC – Adams/Weld: The FRCC system owned by Adcom911 and Weld County, with participating partners of City of Thornton, Broomfield, Federal Heights, UNC, and Westminster (in 2024) we have added the TDMA feature to the majority of our radio sites. This feature allows us to have two simultaneous conversations on each voice channel at a site. While a few million dollars were spent on upgrading to this feature, it allows us to keep expanding our system (e.g., Westminster

joining) without encountering busies. This is crucial to our first responders, who may be in a critical or life-threatening situation when they need to transmit. Since implementing this feature we rarely see a busy event on the system.

Arvada Public Safety Communications System - Arvada Police continues to invest heavily in Land Mobile Radio, as its functionality remains a critical part of the delivery of public safety.
While losing a radio is very rare, Arvada did have a portable radio taken from the PD and end up in the wrong hands. The radio was used to monitor PD voice traffic, and the suspect actually keyed the radio and said "shots fired, officer down". While this was false, this type of abuse that results in compromised communications is a serious risk.
Audio traffic Encryption protects the public's personal information from scanners, and GPS location to the radio will provide the ability to track a radio in the field. Both of these examples are amazing features that greatly improve the effectiveness of public safety radio, and first responder functionality over all.

The City and County of Denver (CCD) P25 Phase 2 Radio System cutover was in March of 2019, providing P25 radio operations for the CCD, including public safety, public services, and other miscellaneous partners in the metro Denver area. The system consists of a 4-site simulcast system with an ASR site that can also operate as a backup site. The system has over sixteen thousand primary and interoperability user IDs allowed to operate and interoperate on the system as needed. The majority of users are primarily CCD agencies, the remaining users from surrounding agencies utilize the system for interoperability with Denver when needed.
The Denver system has ISSI links to the regional ISSI hub hosted by Lakewood and Arvada and a direct connection with the City of Aurora. The regional hub has additional connections to State of Colorado and DIA to provide coverage for the Metro Denver interoperability talk groups. The City and County of Denver is in the process of diversifying geographically the system components to provide for greater resiliency.
As Denver being the capital of Colorado with a population of over 750,000 and impact from the surrounding counties, combined to over 3.2 million people, we are the focus to host many planned events and experience many unplanned events. Examples of events that require city resources and outside agency support that impact the radio system are:

- Sports Championship Celebrations for the Denver Nuggets, Colorado Avalanche and Denver Broncos.
- Major sporting events like the MLB All Star Game
- Major Political meetings like the Summit of Eight, Democratic National Convention, Presidential Visits
- Major events that include motorcade support, festivals, natural disasters, riots, protests, and crime sprees

In 2022 the CCD radio system processed 19,887,812 transmissions with almost 653,499 (3.3%) being for interoperability with 2023 being projected at over 20 million transmissions.
The CCD Electronic Engineering Bureau Team is continually reviewing and strengthening resilience, refreshing the core hardware and software to enhance capabilities, efficiencies, capacity, reliability, and safety. Ongoing funding is necessary to manage and maintain the system to continue to provide these critical services to Denver and other agencies within the NCR continues to be challenging.

ACCOMPLISHMENTS

In 2020, Colorado Governor Jared Polis directed the Governor's Office of Information Technology to "Reimagine IT." Internal reviews determined that the Colorado Public Safety Communications Network (PSCN) and the Digital Trunked Radio System (DTRS) were perhaps not ideally administered by OIT. Executive leaders from OIT and the Department of Public Safety (CDPS) appointed a steering committee composed of members of the Public Safety Communications Subcommittee (PSCS), Consolidated Communications Network of Colorado, Inc. (CCNC), OIT and the Colorado Department of Public Safety (CDPS) to develop a recommendation for which state agency would be best suited to administer the PSCN and the DTRS.

The DTRS Steering Committee solicited feedback and recommendations for the administration of the DTRS through engagement with numerous state department executive leaders, as well as partner radio system infrastructure owners and local, regional and state agency stakeholders.

In 2021 the DTRS Steering Committee formally recommended the PSCN and DTRS be moved to and administered by the Colorado Department of Public Safety as a new Public Safety

Communications Division, reporting directly to the CDPS Executive Director. The recommendation to move the PSCN and DTRS to CDPS was supported by the state with the understanding the Office of Public Safety Communications (OPSC) would be created under the Department of Homeland Security and Emergency Management (DHSEM) as a new division, with the OPSC reporting directly to the DHSEM Director. Transition of the PSCN/DTRS to the OPSC/DTRS was completed June 30, 2023 in compliance with HB22-1353.

During 2022, the PSCS continued its work begun in 2014. Under C.R.S. § 24-37.5-506 (2.5) (a) (I), funding has been appropriated from fiscal year 2013-2014 and each fiscal year thereafter until 2024-2025 fiscal year in the amount of $3.5 million to be placed into the Public Safety Trust Fund for use by the Governor's Office of Information Technology (OIT) to replace legacy DTRS equipment and hardware. In addition, beginning in the 2017-2018 fiscal years and continuing until the 2024-2025 fiscal year an additional $3.7 million is to be appropriated and placed in the Public Safety Trust Fund for DTRS System Upgrade Assurance (SUA). HB14-1203 funds for the DTRS software upgrades are provided to all participating local government infrastructure owners to upgrade all RF resources and connected dispatch center console and call logging recording equipment.

It should be noted that overall $11.2 million funding, discussed above, was appropriated to upgrade, maintain and expand the DTRS. Funds appropriated for the DTRS system software upgrades are also distributed to all state owned and participating locally owned DTRS transmitters at state and local tower sites, as well as the software upgrades to all participating local dispatch centers for the software upgrades to their dispatch consoles and logging recorder equipment. It should also be noted that the DTRS is the only statewide system providing seamless interoperability to all public safety agencies wishing to utilize the DTRS, either as a primary means of communications or for interoperability only with first responders utilizing an alternate system.

In 2018, the PSCN (now OPSC) proposed to the Joint Budget Committee (JBC) a pilot program to address coverage gaps in the DTRS. The JBC sponsored and passed HB18-1325, appropriating $2M dollars in FY19 and an additional $2M dollars in FY20 as a funding mechanism to address coverage gaps in the DTRS. HB18-1325 defined very specific guidance in the application and award process for how the funds were to be utilized, and it required local government agency engagement in utilizing these designated funds. This pilot program was proven to be extremely successful in that nearly a dozen DTRS sites were added in areas across the state with a limited amount of funding.

Local governments have repeatedly asked if such a program for addressing coverage gaps might again be considered by the general assembly in the future.

Although the statewide DTRS is available to all public safety agencies statewide and at no cost to the agency, with the exception of the statewide and system-wide software upgrades mentioned above, the funds stated above do not address any other system or interoperability interface equipment in the state. All other parts of the system are maintained by the individual owners and are subject to their annual appropriations. This disparity in consistent funding has in the past lead to potential points of failure by agencies not being able to maintain portions of the system at the same or near same level of operational performance.

The PSCS has several specific purposes and duties as specified in legislation[2]. This report is intended to summarize the progress made on those duties and purposes.

The PSCS continues to promote interoperable communications across the State of Colorado by:

- Continuing to create partnerships with organizations and entities that represent a wide variety of public safety communication users.
- Maintaining an Outreach and Educational subcommittee to provide interoperability information, training and networking opportunities to public safety entities and stakeholders. The Outreach and Education subcommittee arrange and host the PSCS Annual Summit. The 'Summit' is fully funded by our primary radio vendors and it is offered to our attendees at no charge. The Summit typically attracts between 150 and 200 attendees from across the state. The committee distributes a post-Summit survey that is largely returned with complimentary comments.
- Including Next Generation 911 and State Broadband updates on PSCS monthly meeting agendas.
- Members of the PSCS participating in other communications oversight groups such as FCC Region 7 Regional Planning Committees, CCNC, PPRCN, MARC, Evergreen Fire, etc..
- Monitoring new legislation related to public safety communications and having members offer testimony as needed to the select committees.
- Prepare "best practice" documents and sharing them through the PSCS website.

[2] CRS § 24-33.5.1614, as amended

- Members of the PSCS provide presentations to various public safety organizations across the state, including, but not limited to the County Sheriffs of Colorado and Colorado Chiefs of Police.
- The PSCS works closely with the Statewide Interoperability Coordinator (SWIC) to update the Statewide Communications Interoperability Plan (SCIP). The SCIP is a stakeholder driven, multi-jurisdictional, multi-discipline strategic plan for interoperable communications.
- Colorado OPSC supports and maintains a dedicated SWIC position as a full-time staff member and leverage the position to build relations not only within all the regions in Colorado, but nationally, as well. The SWIC has played a vital role in assisting the PSCS to accomplish many objectives in 2022/23.
- Establishing working group with FirstNet to determine needs for our first responders.
- The OPSC continues to increase capacity at many sites and has added DTRS coverage in areas of the state previously not covered. These efforts improve reliability for all DTRS users by reducing the "system busies" from thousands per month to hundreds per month and increasing DTRS coverage in areas where coverage was not previously available.
- The North Central All Hazards Region (NCR) published a Consolidation Sturdy RFP that has been awarded to Federal Engineering for a report due to the NCR in 2024.

In 2020 the PSCS added representatives from the 911 Task Force and the Colorado Municipal League to the subcommittee to provide regular briefings on public safety communications related issues.

In 2023, the PSCS held the ninth annual *PSCS Public Safety Radio Summit* (formerly known as the *Statewide Public Safety Radio Summit*). The Summit was held in a hybrid format, offering in-person attendance, as well as attendance virtually for those unable to physically attend. The Summit is traditionally a day and a half training session that is focused on bringing public safety practitioners from both the public and private sectors to learn, network and share information. The Summit is coordinated by the PSCS Education and Outreach Working Group and is fully paid for by sponsor donations from major competing radio manufacturers and a non-profit organization.

RECOMMENDATIONS

Public Safety interoperable communications is dependent on resolving some continuing key hurdles including, but not limited to:

- Assist local governments in establishing agreements and recommending processes to establish agreements between agencies with reference to usage, maintenance, ownership, and sustainable funding, for interoperable communications for public safety no matter what system is used;
    - There are several *Memorandum of Understandings* (MOU) in place and *Letters of Cooperation*, but there are virtually no *Intergovernmental Agreements* between various system owners and the state.
- Protecting fragile relationships between the different system owners regarding governance;
- Addressing the lack of radio coverage, especially in rural and underserved areas;
- Modeling and addressing usage and loading concerns among the different systems;
- Ensuring delivery of consistent and quality training to radio system users state-wide from paid full-time staff to volunteer agencies;
- Funding for expansion of coverage around the State.
    - This has been partially addressed by a state-funded grant program to expand coverage of the DTRS only.
- Resource allocations for interoperable communications; and
- Establishing a radio system governance model.

FINANCIAL

Technology, even in LMR and communications is ever evolving and therefore a need exists for a replacement and upkeep cycle (sustainment). The challenge becomes how do we, as a State, establish current and future funding mechanisms for the sustainment of public safety communications equipment to ensure the best possible service is provided to our citizens and first responders? The following possibilities were suggested in the Consolidated Communications System Authority (CCSA) 2013 Annual Report and have been included in every PSCS Annual Report since that time. Some of the suggested possibilities may still be viable options:

- Reallocation of existing taxes set to sunset

  The State of Colorado has some active and "sun-setting" funds that could be made available and repurposed for capital improvements to, and ongoing maintenance of, public safety communications infrastructure. The repurposing of these funds, may be among the most viable of options to provide for the ongoing maintenance and sustainment of the infrastructure of all public safety communication systems. However, to be considered viable, funds would need to align with the goals of the PSCS and to the benefits it provides to public safety agencies and ultimately the citizens and industries that consume public safety services.

- Redirection of existing or new Colorado Lottery funds
- Redirection of marijuana tax funds
- Statewide retail sales tax
- Fee on Colorado vehicle registrations
- Traffic summons surcharge or additional criminal fines
- Gasoline or other fuel tax

Other funding options recommended in the business plan include:

- Grant programs, such as the Colorado Wireless Interoperability Network (CWIN) or reuse of the Mining Trust Fund

The process for establishing any additional revenue generating taxes or fees may be difficult and politically challenging. However, the PSCS recommends that the Colorado Legislature begin work to establish a dedicated and reliable funding source that will generate sufficient funds to sustain, maintain, and upgrade all public safety communications systems, statewide, as needed. The current Public Safety Trust Fund established under C.R.S. §24-37.5-506, as amended, only addresses one governmental entity and only one system, the DTRS. The DTRS is currently the only public safety communications system providing operability to all participating public safety agencies and statewide interoperability for all agencies desiring the use of the DTRS for such interoperability. We recommend that the statute be modified so that funds would be available to

all systems statewide through an application process to the State by local agencies and radio system owners.

The PSCS will continue to work with all its partners at all levels of government to develop strategies that meet the needs of the public safety communication system owners. To this end, the PSCS has established a Financial Sustainment and Improvement Working Group, which was established to identify potential funding sources. This working group is chaired by the PSCS Vice-Chair Mr. Jeff Vaughn.

GOVERNANCE

The governance of communications systems across Colorado varies from system to system. Some systems are governed by individual governmental entities, such as a municipality or county. Others form partnerships where the various owners of infrastructure come together to manage their respective system(s) and work with other surrounding agencies and systems to promote interoperability. Many of these partnerships have been identified previously in this report, but there is no one guiding path statewide that has been established.

Clarity of Responsibilities

In Colorado, responsibility for public safety communications varies from small self-owned (cities/towns/counties) systems to large multi-jurisdictional systems. This can be a challenge to clearly define responsibilities.

The PSCS recognizes:

- the PSCS has several statutorily named responsibilities.
- the Office of Public Safety Communications within DHSEM has statutory responsibilities.
- that numerous user groups and multi-system groups such as Consolidated Communications Network of Colorado, Inc.(CCNC), Front Range Communications Consortium (FRCC), and Metro Area Radio Cooperative (MARC) have their own responsibilities.
- that individual system owners have their responsibilities.

When evaluating public safety radio owner responsibilities and challenges across Colorado, we found that radio systems are diverse in how they interact with other systems. While there are some existing agreements between radio system owners in the form of *Memorandums of Understanding (MOU)* and some general partnership documents, *Intergovernmental Agreements (IGA)* are lacking when it comes to the sharing of resources among the diverse system and infrastructure owners.

STAKEHOLDER IDENTIFICATION

Defining all of the stakeholders across Colorado is a daunting task, but not an insurmountable one. Identifying interoperable communications governance bodies; developing a master list throughout the state, starting at the regional level; and then maintaining the list to ensure the dissemination of information are goals that can be obtained.

STAKEHOLDER ENGAGEMENT AND AWARENESS

The PSCS since its inception has been actively disseminating information to stakeholders through various means. It appears our outreach efforts are not always reaching the intended audience; that being our public safety agencies across the state.

The PSCS maintains a website where the committee's documents are readily accessible. Through a partnership with CCNC, notifications are distributed via the CCNC email server that reaches over 600 recipients. We recognize that not all agencies, radio system owners and policy level administrators in Colorado receive these communications. Over the years, multiple attempts have been made to engage all stakeholders from across Colorado. However, without participation from stakeholders, the PSCS efforts are hindered.

The PSCS recognizes this and continues to pursue following items as priorities:

- Actively disseminate materials to as many stakeholders as possible.
- Consider partnering with organizations such as the Cybersecurity and Infrastructure Security Agency (CISA) to provide training and outreach to agencies and radio system owners on the governance structure of interoperable communications.
- Continue to provide user training through the annual Radio Summit.

PERCEIVED LACK OF TRUST

Cooperation and trust are key to governance, especially when there is a lack of written agreements.

The PSCS in its current role of coordinating interoperable communications in Colorado will continue to promote open communication and transparency.

The Homeland Security Advisory Committee (HSAC), of which the PSCS is a subcommittee, is based upon a structure of nine (9) All-Hazard Regions across Colorado. The PSCS, by statute has a different structure, but includes portions of each of the All-Hazard regions.

CONCLUSION

Public Safety/First Responders need to be able to communicate with each other no matter what system they use, what manufacturer they select, or what frequency band they choose to operate on. This is the true bottom line facing the complex system of systems we have in Colorado.

As we move forward, the PSCS makes the following summary of recommendations to the Executive Director of the Colorado Department of Public Safety and Colorado legislature:

- A funding stream should be considered for all public safety radio systems.
- The Colorado Legislature needs to support a new analysis of all public safety communications networks across the state in order to have a complete picture of all systems in the state, including the VHF, UHF, and other systems. The analysis must include:
    - Coverage gaps
    - System capacity
    - Ownership
    - Governance

A summary of the overarching themes from the user community were:

- Funding
- Training
- Coverage

- Capacity
- Formalized Agreements
- Standard Operating Procedure Updates

The PSCS is committed and continues to work within the limits established to provide guidance, coordination and promote interoperable communications throughout the State.

APPENDIX A

TECHNICAL BACKGROUND AND DEFINITIONS

INFRASTRUCTURE

The infrastructure of public safety communications is comprised of:

- Radio sites (aka radio towers) that are spread out across the state and that house radio transmitter equipment,
- Master sites which control the operations of the radio sites,
- Dispatch centers that interface to allow radio console positions to directly connect to the network, and
- Backhaul links ("transport links") that interconnect the sites to each other and to the master sites and dispatch centers.
- Interfacing equipment that connects disparate radio systems.

TECHNOLOGY

The technology used in public safety communications involves VHF, UHF, 700 MHz and 800 MHz analog and digital voice trunking as defined by the APCO/TIA[3] Project 25 standards for public safety voice communications. One key note to this is that not all public safety communications are up-to-date with the Project 25 (P25) standard. The standard is a recommended set of standards that provide for interoperability between different systems and different manufacturers.

[3] APCO is the Association of Public Safety Communications Officials, International and TIA is the Telecommunications Industry Association that adopted P25 in its Suite 102 of standards.

BACKHAUL AND INTERCONNECTIONS

The backhaul links that provide the interconnections primarily use point-to-point microwave technology, fiber optic cable and even telephone line (T-1) for some links. During a typical month, the DTRS system alone facilitates approximately 8.3M calls between public safety users that operate in *95%*[4] of the state that it serves.

OWNERSHIP

The ownership of public safety communications systems is extremely diverse and made up of the owners of system infrastructure and joint partnerships.

For the most part, regardless of ownership, usage of the network for interoperability is ubiquitously open to all authorized users[5] and statewide access is available to all user agencies independent of their jurisdiction[6].

[4] The State of Colorado's advertised "baseline" coverage criteria for DTRS are 95% coverage reliability to a mobile (vehicle-mounted) radio on state highways. Local governments have provided many enhancements to these criteria and many have their own "baseline" criteria.

[5] Authorized users must be: i) from a public safety and public service agency from a State, Tribal, County, and Local government; federal agencies; special districts; and EMS provider; and ii) eligible under Title 47 of the Code of Federal Regulations (CFR) Part 90 Private Land Mobile Radio Services §90.20 Public Safety Pool. Access to an individual system is dependent upon approval of the manager/owner of the system.

[6] Exceptions to this statement do exist wherein, by explicit agreement; certain owners allow visiting, out-of-jurisdiction users to access selected statewide mutual aid channels and talkgroups instead of those users' home talkgroup

INTEROPERABILITY VERSES OPERABILITY

Interoperability and operability often become intertwined with each other and at times can become misconstrued. This then tends to lead to a misconception that there are system issues and we cannot communicate with other public safety agencies.

Operability, as it relates to public safety communications, means the equipment used by a particular entity function on a day-to-day basis without failing or losing communications with those on the same system.

Interoperability, again as it relates to public safety communications, means the equipment can interconnect or be used to communicate with an entity on another system or in another area of the state, or across state lines.

Public safety communication must first be operable before it can be interoperable. Adequate equipment must be maintained and serviceable. An ongoing sustainment plan should be developed to fund the required maintenance, replacement and upgrades to equipment to ensure operability. Ideally, there must not be coverage gaps in communications. However, if coverage gaps do exist they should be minimal. Operability must be the starting point for any entity that provides services to the public. They must be able to communicate within their respective jurisdictions, regardless of size or terrain.

Once operability is achieved, entities are then able to look at interoperability. Interoperability needs to be achieved so that we, as public safety providers of all disciplines, (Law Enforcement, Fire, Emergency Medical Services, etc.) can communicate with one another in times of crisis in a mutual, coordinated effort to protect the public.

Interoperability may be achieved by interconnecting the various systems, forming partnerships, sharing resources and infrastructure. Sounds easy, but it is not. Agreements need to be formed, ground rules on usage need to be established, equipment needs to be sustained, and training of personnel needs to be ongoing and up-to-date.

The basic key elements, as outlined by the National Public Safety Telecommunications Council (NPSTC) are as follows:

Direct or Talk Around: This mode of communications provides public safety with the ability to communicate unit-to-unit when out of range of a wireless network OR when working in a confined area where direct unit-to-unit communications is required.

Push-to-Talk (PTT}: This is the standard form of public safety voice communications today - the speaker pushes a button on the radio and transmits the voice message to other units. When the speaker is done speaking, they release the Push-to-Talk switch and return to the listen mode of operation.

Full Duplex Voice Systems: This form of voice communications mimics that in use today on cellular or commercial wireless networks where the networks are inter-connected to the Public Switched Telephone Network (PSTN).

Group call: This method of voice communications provides communications from one-to-many members of a group and is of vital importance to the public safety community.

Talker Identification: This provides the ability for a user to identify who is speaking at any given time and may be compared to caller ID available on most commercial cellular systems today.

Emergency Alerting: This indicates that a user has encountered a life-threatening condition and requires access to the system immediately. The user activates the emergency alert and alarms notification is sent to the users dispatch center, and the radio is given the highest level or priority on the system.

Audio Quality: This is a vital ingredient for mission critical voice. The listener must be able to understand without repetition, can identify the speaker, can detect stress in a speaker's voice, and be able to hear background sounds as well, without interfering with the prime voice communications.[7]

[7] Mission Critical Voice Communications Requirements for Public Safety, National Public Safety Telecommunications Council, Broadband Working Group

APPENDIX B

ACRONYM LIST

APCO	Association of Public Safety Communications Officials
CCNC	Consolidated Communications Network of Colorado, Inc.
CCSA	Consolidated Communications System Authority
C.R.S.	Colorado Revised Statutes
DHS	Department of Homeland Security
DTRS	Digital Trunked Radio System
ECD	Emergency Communications Division, U.S. Dept. of Homeland Security
FCC	Federal Communications Commission
FIRST NET	First Responder Network Authority
FRCC	Front Range Communications Consortium
ICTAP	Interoperable Communications Technical Assistance Program
ISSI	Inter RF Subsystem Interface
JBC	Joint Budget Committee
LMR	Land Mobile Radio
MARC	Metro Area Radio Cooperative
MCV	Mission Critical Voice
MHz	Megahertz
NG-911	Next Generation 911
NPSTC	National Public Safety Telecommunications Council

OEC	Office of Emergency Communications; Renamed ECD (2018)
OIT	Governor's Office of Information Technology
P25	APCO's Project 25 Standards
PPRCN	Pikes Peak Regional Communications Network
PSCN	Public Safety Communications Network – now OPSC Office of Public Safety Communication
PSCS	Public Safety Communication Subcommittee
SUA	System Upgrade Assurance
SWIC	Statewide interoperability Coordinator
TIA	Telecommunications Industry Association
UHF	Ultra High Frequency
VHF	Very High Frequency

APPENDIX C

PSCS DIRECTORS-PLEASE SEE ATTACHED
