Public Safety Communications Subcommittee

2021 ANNUAL REPORT

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

OCTOBER 26, 2021

Submitted By:

David Hayes	Jeff Vaughn	Todd Holzwarth
Chair, PSCS	Vice Chair, PSCS	Secretary, PSCS
Louisville Police Department	Douglas County Sheriff's Office	East Grand County Fire Department
922 West Via Appia Way	4000 Justice Way	P.O. Box 2967
Louisville, Colorado 80027	Castle Rock, Colorado 80104	Winter Park, Colorado 80482

CONTENTS

EXECUTIVE SUMMARY

For the past 8 years, the Public Safety Communications Subcommittee 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 man-made 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. Colorado's diverse land mass ranging from high mountain peaks to low valleys and open plains all pose unique coverage requirements. Due to this diverse land mass, no one system can be deployed. The public safety communications network is **a system-of-systems, built through many partnerships** between state, county and local owners.

> 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 2021Annual Report of the Public Safety Communications Subcommittee (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*, highlight **recent accomplishments** of this statutorily formed group, and **make 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 Public Safety Communications Subcommittee (PSCS) made several recommendations as a part of the statutory requirements. **Many** of the recommendations **were not considered**, thus they will again be included in this report, as they are necessary to obtain an accurate picture of the state of public safety communications in Colorado. Those recommendations are again presented in this document:

1) A Funding stream must be identified for all public safety radio
2) The *Business Plan and Needs Assessment* that was only partially completed in 2015 **must** be funded and completed for a **complete picture of all systems,** not just the Digital Trunked Radio System (DTRS), which included;

a. Coverage gaps
b. System capacity
c. Ownership
d. Governance

Without a governance model, as well as a complete business plan and needs assessment that can be accepted by ALL of the sovereign systems across Colorado coupled with an adequate funding stream, the life of public safety communication systems for both daily operability and critical situation interoperability will be jeopardized and public safety will not be able to provide the best service for the safety of the citizens of Colorado and for first responders.

In 2018 many of the above concerns were again 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 **not just one system**, it is a mesh of systems (system-of-systems) owned by many. **All systems** must be considered when looking at the overall status in Colorado, not just the DTRS.

The PSCS has and continues to voice and address the concerns expressed from **across the state**, but if the collective voice is not heard and the collective needs assessment and business plan are not finalized, progress will 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, but early on, recognized the need for sustainment and interoperability with all radio systems operating within the state. In the 2013 annual report submitted to the Joint Budget Committee, it was the CCSA's recommendation that the 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 replaced by the Public Safety Communications Subcommittee (PSCS) through SB 14-127. The Executive Director of Public Safety is now the lead State employee as a 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 also reviewed the prepared Business Plan and the Needs Assessment as outlined in legislation[1], then accepted the prepared documents as presented by the consultants who prepared them. However, the subcommittee did take exception to several portions of the documents. One main exception was that both documents were to be an account of current and future **public safety needs**. Both documents only addressed **one large system in Colorado**; the DTRS and did not fully address **ALL** 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.

It is the position of the PSCS that completion of the Needs Assessment and Business Plan to include ALL systems in Colorado is required, and warranted in order to obtain a full and complete picture of the state of public safety communications in Colorado to assist with the goal of governance and to meet the initial goals of Senate Bill 14-127.

[1] CRS § 24-33.5-716, as amended

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)
- System Upgrade Assurance (SUA) program (Software)
- Acquisition of additional interoperability resources (e.g. Inter Subsystem Interface [ISSI])
- Repair and replacement of an aging microwave backhaul system
- Repair and replacement of aging radio tower sites
- Hardware and software upgrades necessitated by improvements in technology (e.g. repeaters and consoles)
- Shortage of trained Radio Technicians and Support Staff
- Training on constantly changing technology

ACCOMPLISHMENTS

In 2020, Colorado Governor Jared Polis directed the Governor's Office of Information Technology (OIT) to "Reimagine IT." Internal reviews determined that the Colorado Public Safety Communications Network (PSCN) and the Digital Trunked Radio System (DTRS) were 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 (CCNC), OIT and Colorado Department of Public safety (CDPS), to develop a recommendation for which state agency would be best suited to administer 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, the DTRS Steering Committee solicited feedback and recommendations to administer the DTRS.

In 2021, the DTRS Steering Committee recommended the DTRS be administered by the Colorado Department of Public Safety as a new Public Safety Communications Division, reporting directly to the CDPS Executive Director. The complete report including other recommendations is included with this annual report.

During 2020, the PSCS continued its work begun in 2014. Under C.R.S. § 24-37.5-506 (2.5) (a) (I), funding has been set aside 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 and additional $3.7 million is to be appropriated and placed in the Public Safety Trust Fund for DTRS System Upgrade Assurance

In 2018, under House Bill 18-1325, an additional funding mechanism to address coverage gaps in the DTRS was appropriated. The funding was in the amount of $2 million for fiscal year 2018-

2019 and another $2 million in FY 1019-2020. The legislation also provided very specific guidance in how the funds were to be applied to fill coverage gaps.

It must be noted that overall $11.2 million funding, discussed above, was **only to upgrade, maintain and expand the state owned portion of DTRS** (one system of the system-of systems that is Public Safety Communications in Colorado).

The funds stated above do not address any other system, equipment belonging to other users, 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 through 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 the following:

- Continue to create partnerships with those other organizations and entities that represent a wide array of users.
- Maintain Outreach and Educational subcommittee to provide interoperability information to others.
- The committee receives regular updates from Next Generation 911 deployment and State Broadband activities.
- Promote cooperation between Local, Tribal, State, Federal and nongovernmental public safety agencies through an annual PSCS Public Safety Radio Summit put on by members of the PSCS to increase training and agency networking opportunities.
- Members of the PSCS participate in other communications oversight groups (i.e. FCC Region 7 Regional Planning Committees CCNC, RMHUG, PPRCN, MARCS, NCRCN, Evergreen Fire, etc.).

[2] CRS § 24-33.5.1614, as amended

- Continue to review and address recommendations in the Business Plan and a Needs Assessment. **These two documents will be living documents and will need updated on a continual basis.**
- Monitored new legislation relating to public safety communications, offering testimony as needed to the select committees.
- Prepared several "best practice" documents and dispersed them through the PSCS website.
- Several members of the PSCS also conducted presentations to various other public safety organizations across the state, which included, but was not limited to; County Sheriffs of Colorado, Colorado Chiefs of Police.
- The PSCS worked closely with the Statewide Interoperability Coordinator (SWIC) in updating the Statewide Communications Interoperability Plan (SCIP). The SCIP is a stakeholder driven, multi-jurisdictional, multi-discipline strategic plan for interoperable communications.
- Colorado maintained 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 2021.
- The sunset clause of the PSCS was eliminated to allow for public safety communications across the state to remain perpetual and sustainable to ensure the safety of our citizens and responders.
- Established working group with FirstNet to determine needs for our first responders.

In 2021, the PSCS held the seventh annual *PSCS Public Safety Radio Summit* (formerly known as the *Statewide Public Safety Radio Summit*), virtually. 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

In 2020 the PSCS added a 911 task force representative member to the Subcommittee and formulated regular briefings on public safety communications issues by a legislative

representative from the Colorado Municipal League. Continuing governance by collaborative efforts due to mutual goals for the success of Public Safety Communication is not ideal, however, neither would a single entity governing all systems be, no matter the funding source. Without a stream of funding provided with options for local control, the continuity of the continued PSCS director's joint guidance is imperative for statewide awareness, as well as communication, collaboration, and cooperation in the realm of Public Safety communications.

RECOMMENDATIONS

Public Safety interoperable communications is dependent on resolving some **continuing** key hurdles:

- Maintaining the Statewide Interoperability Coordinator (SWIC) position filled within the state government.
- **Agreements or processes to establish agreements, regarding the responsibilities of, usage, maintenance, ownership, and a sustainable funding source, 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.
- Fragile trust relationships between the different system owners regarding governance;
- Lack of radio coverage;
- Usage and loading concerns among the different systems;
- Training of users;
- 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
- **Workable governance model**

In 2015, the PSCS participated in developing the Public Safety Radio System-Wide Business Plan Report and the Public Safety Radio System-Wide Needs Assessment Report. A consultant was retained, Federal Engineering, Inc. to prepare the documents. The PSCS took exception to several aspects of the resulting plan and assessment, but presented it on face value as directed by the Legislature. There were several items that either generated discussion about possible future governance which result in the following initial recommendations by the PSCS Directors.

In 2016, the PSCS recommended that the Business Plan and Needs Assessment document be funded and completed for **ALL SYSTEMS** across Colorado so that there is an entire snapshot of the status of public safety communications across the state.

The PSCS will continually recommend that these documents be completed for all systems in Colorado.

FINANCIAL

Technology, even in LMR and communications is ever evolving and therefore a need exists for a replacement and upkeep cycle (sustainment). How do we, as a State, fund or set aside funding for the sustainment cycle keeping public safety communications current so that the best possible service is provided to our citizens? Here are some recommendations that were presented in the CCSA 2013 and in the 2014, 2015, 2016, 2017 and 2018 PSCS Annual Reports and are still viable options:

- **Reallocation of an existing tax set to sunset**

The State of Colorado has some ongoing as well as some "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 such a fund, or combination of 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, such a fund 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, Lottery Funds**
- **Redirection of Marijuana Tax Funds**
- **Statewide Retail Sales Tax**
- **Fee on In-State Vehicle Registrations**
- **Traffic Ticket Surcharge or Additional Criminal Fines**
- **Gasoline 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, 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. We recommend that the statute be modified so that funds would be available to all systems with a process of applying for the funds.**

The PSCS will continue to work with all its partners and all levels of government to develop strategies that meet the needs of the public safety communications 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 Work Group is chaired by the Vice-Chair of PSCS, Mr. Bob Ricketts and is expected to have recommendations by the third quarter of 2020.

GOVERNANCE

The governance of communications systems takes several approaches. Some 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), work with other surrounding agencies and systems to promote interoperability. Many of these partnerships have been identified previously in this report, but as is demonstrated here, there is no one guiding path yet established. Through the assistance of the ECD/ICTAP in 2016, we now have recommendations on ways to proceed with creating a workable governance structure.

OVERALL GOVERNANCE CHALLENGES AND RECOMMENDATIONS

PSCS POSITION WITHIN THE GOVERNMENT ORGANIZATIONAL STRUCTURE[3]

One glaring aspect of the governance recommendation is that the PSCS is buried deep within the overall state structure as a subcommittee, under an advisory committee under a state department. With that, there is an issue with communications barriers that tend to lead to

[3] Ibid; pp 11-12

communications failures through the various levels of government in order for the PSCS to be productive.

ECD/ICTAP recommends that the PSCS should be elevated directly subordinate to the Colorado Department of Public Safety or the Department of Homeland Security/Emergency Management. (See Figure 1) **Since the PSCS is tasked with public safety communication matters, we would support the move to DPS instead of DHSEM, with the ability to report directly to the Executive Director of the Department of Public Safety. We would recommend that the SWIC also be elevated directly under the DPS to work closely with the PSCS.**

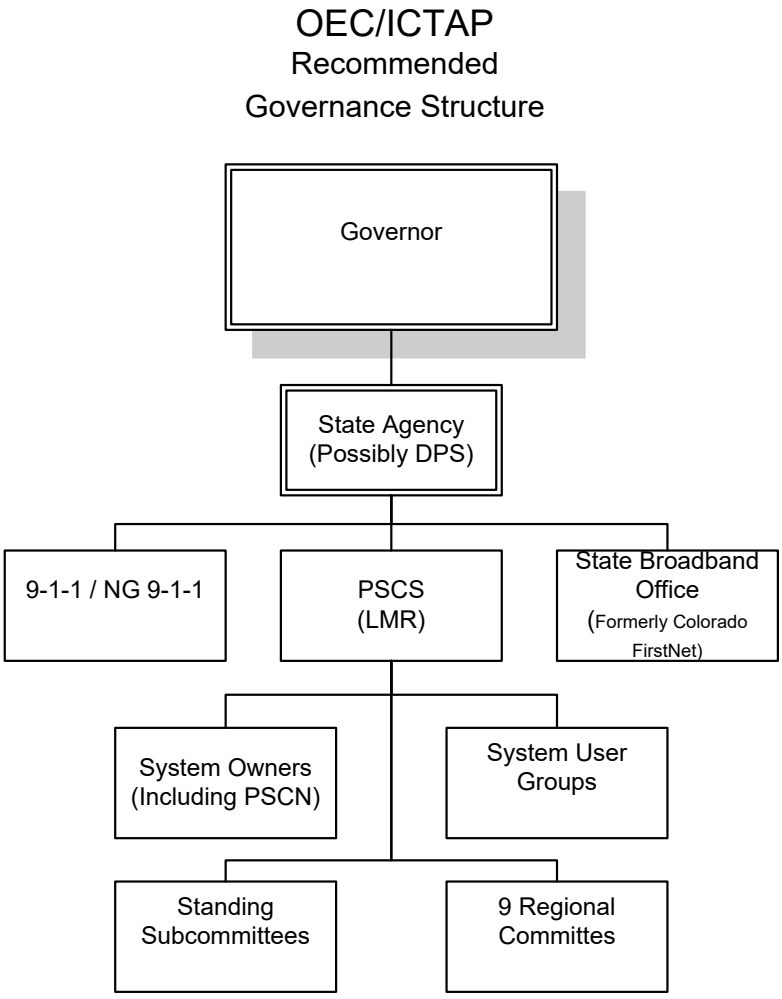

Figure 1

SPARSE AND DISCONNECTED STRUCTURE[4] AND COMMUNICATIONS PATHWAYS BETWEEN PSCS, 9-1-1 AND FIRSTNET COLORADO[5]

In Colorado, there are four distinct public safety communications groups in three separate state departments. These groups are:

- PSCS – Department of Public Safety/Division of Homeland Security & Emergency Management
- State Broadband Office (formerly FirstNet Colorado) – Governor's Office of Information Technology
- Public Safety Communications Network - Governor's Office of Information Technology
- 9-1-1 Task Force – Department of Revenue – Public Utilities Commission

The ECD/ICTAP recommends that they be placed under one umbrella. At this time the PSCS does not see that as a viable option due to the time it would take for each state department to weigh in on relinquishing the groups.

CONTINUITY[6]

The PSCS supports the recommendation to maintain the existence of the PSCS for as long as the need is there; amend the legislation as needed rather than dismantling the group and recreating it

REPRESENTATION OF RADIO SYSTEMS[7]

The PSCS is intended to represent **ALL** public safety communications within Colorado, and not just those on specific systems. The perception across Colorado is that the PSCS is too focused on the Digital Trunked Radio System (DTRS) and not enough on issues facing other systems. The PSCS recognizes this and has taken steps even before the Governance Technical Assistance document was prepared to integrate representation from other systems.

[4] Ibid; p12
[5] Ibid; p. 12
[6] Ibid; p.13
[7] Ibid; pp. 13 -14

One main issue still present was that when the *Business Plan* and *Needs Assessment* was conducted as a part of legislation, **it only focused on the DTRS** and only identified the owners and needs of that one system. Due to time constraints imposed by the legislature and the overall complexity of the project, all that could be addressed was the DTRS and not what was intended in the legislation.

The Business Plan and the Needs Assessment needs to be funded and completed for **ALL SYSTEMS** across Colorado so that there is an entire snapshot of the status of public safety communications across the state.

The PSCS recommends funding the completion of the Business Plan and Needs Assessment to include the remaining systems and owners in Colorado.

CLARITY OF RESPONSIBILITIES[8]

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.
- That the Public Safety Communications Network within OIT has responsibilities.
- That numerous user groups and multi-system groups (CCNC, FRCC, MARC, etc.) have their responsibilities.
- That the individual system owners have their responsibilities.

In looking at the responsibilities across Colorado, we find that systems are diverse in how they interact with other systems, from the standpoint of responsibilities. There are some existing agreements, some *Memorandums of Understanding (MOU)* and some general partnership documents. But what appears to be lacking are actual *Intergovernmental Agreements (IGA)* when it comes to the sharing of resources among the diverse system and infrastructure owners. Lack of documented agreements leads to lack of clarity of responsibilities. There are also two new major radio systems operating in the metro area. The first one, Metro Area Radio Cooperative

[8] Ibid; p.14

(MARC) serves Arvada Police, West Metro Fire, and Wheat Ridge Police. The second system is Motorola which serves the City and County of Denver and Aurora.

The PSCS has continued to take the lead to make headway in addressing the clarity of responsibilities and how they intertwine across the state. The PSCS has struggled in this area as there is no clear governance model in place; no clear guidance as to whether the state can enter into Intergovernmental Agreements with other owners; and no complete *Business Plan* and *Needs Assessment* for all systems.

STAKEHOLDER IDENTIFICATION[9]

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.

As previously mentioned, the *Business Plan* and *Needs Assessment* were intended to accomplish this, **but failed to complete it** by not including ALL systems across Colorado. In order to fully identify the stakeholders, the PSCS recommends that funding to complete the Business Plan and Needs Assessment be set aside to identify all stakeholders.

It should also be noted that with the lack of administrative support for the PSCS the majority of 2017 as well as the lack of a SWIC (finally hired in late August, 2017), have hindered the PSCS in moving forward in this area as well.

STAKEHOLDER ENGAGEMENT AND AWARENESS[10]

The PSCS since its inception has been actively disseminating information to stakeholders through various means, but apparently it may not be reaching the intended audience.

The PSCS maintains a website where the committee's documents are readily accessible. Through a partnership with CCNC, notifications are sent via the CCNC mail server that reaches over 700 recipients. Attempts have been made to engage stakeholders from across Colorado. However, without participation from stakeholders, the PSCS can only do so much.

[9] Ibid; pp 14-15
[10] Ibid; pp15-16

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

- Continuing to draft documents clarifying responsibilities of the identified interoperable communications groups.
- Actively disseminate materials to as many stakeholders as possible.
- Consider creating training that includes detailed information on the governance structure of interoperable communications in Colorado.

PERCEIVED LACK OF TRUST[11]

There still is a perceived lack of trust across all levels of government across Colorado. There are bridges that need to be mended due to historical information that has influenced these feelings.

Cooperation and trust are key to governance, especially when there is a lack of written agreements. Trust takes time to build and limited headway has been made in a short period of time. There still is a considerable amount of work to be done.

The PSCS in its current role of coordinating interoperable communications in Colorado can only do so much. As previously stated, the lack of a strong governance model, a lack of formal agreements, and a lack of disparate funding only fuels the trust factor.

Partnerships and letters of cooperation are only good when the parties embrace full cooperation and communication.

REGIONAL STRUCTURE DISCONNECTED FROM PSCS[12]

The 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.

The PSCS welcomes and encourages participation from each of the All Hazard regions as well as any other interested organization. Under the current legislation, the PSCS can increase or decrease its membership as needed (except for those specified in legislation). Should an All Hazard Region designate a representative that actively will participate to represent their region, they may be considered for the Board.

[11] Ibid; p. 16
[12] Ibid; pp. 16-17

The PSCS recommends that the All Hazard Regions actively participate in the PSCS so that each region is represented.

The PSCS will continue to review and discuss the recommendations of the business plan; the needs assessment and the governance assessment and makes the following comments:

- It is imperative the governance and membership structure is well suited for the PSCS. The PSCS will look at ways to implement the regionalization of interoperable communications as recommended in the governance assessment and the business plan.
- The PSCS recommends that at this time, the CCNC not be absorbed by the PSCS. Rather, the PSCS will continue its partnership with CCNC and discuss how the two entities can complement each other.
- The PSCS has taken ownership of the SCIP and will work directly with the SWIC to update it regularly.
- Discussion has taken place regarding the organizational structure of Office of Information Technology and the Public Safety Communications Network (PSCN) team and their relationship with the SWIC**. The PSCS recommends that the Public Safety Communications Network should reside somewhere else within State Government. Since it is a public safety network, it might be better suited within the Department of Public Safety or at least the Office of Personnel Administration, but located at a level that reports directly to an executive director.** This will ensure an accountability to and communication with the many agencies and elected officials that use the system, but especially those that rely on this system for mission critical operations in the area of first responders for public safety. It should be noted that this was a recommendation of the Public Safety Radio System-Wide Business Plan and the PSCS Directors. Also noteworthy is the fact that the Department of Personnel and Administration administers most of the agreements for the PSCN team. This would follow a national trend to move radio systems out of Information Technology so that they receive the attention their criticality requires.
- Optimally, the PSCS should be removed as subcommittee of the HSAC and codified as a separate board with reporting responsibility directly to the State's Homeland Security Advisor and to the Joint Budget Committee.

- The sunset clause of the current legislation should be totally eliminated as public safety communications across the state should remain perpetual and sustainable to ensure the safety of our citizens and responders.
- Representatives from the All Hazard Regions should actively participate in the PSCS.

CONCLUSION

Though there has been some progress made from 2013 to present day to begin to solve some of the issues facing public safety communications in Colorado, it has only just begun. 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 operate on. This is the true bottom line facing the complex system of systems we have here in Colorado.

Summary of recommendations presented in this document:

1) A Funding stream must be identified for all public safety radio
2) The *Business Plan and Needs Assessment* that was only partially completed in 2015 **must** be funded and completed for a **complete picture of all systems** not just what is often referred to as the DTRS, which included;
    a. Coverage gaps
    b. System capacity
    c. Ownership
    d. Governance

Summary of the overarching themes from the user community were:

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

Without a governance model, as well as a complete business plan and needs assessment that can be accepted by ALL of the sovereign systems across Colorado coupled with an adequate funding stream, the life of public safety communication systems for both daily operability and critical situation interoperability will be jeopardized and public safety will not be able to provide the best service for the safety of the citizens of Colorado and for first responders.

To that end the PSCS 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 repeater 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 megahertz (MHz) and 800 MHz analog and digital voice trunking as defined by the APCO/TIA[13] 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.

[13] 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.

MAJOR MANUFACTURERS

The major manufacturers for the public safety communications across Colorado include, but are not limited to:

- Motorola Solutions
- Harris Corporation
- EF Johnson Technologies
- Tait Communications
- Kenwood Communications

Most if not all of these manufacturers supply P25 capable equipment. The need as well as the expense is the issue for many agencies to transition to the P25 standard.

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, one system alone facilitates approximately 8.3M calls between public safety users that operate in *95%*[14] 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.

[14] 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.

For the most part, regardless of ownership, usage of the network for interoperability is ubiquitously open to all authorized users[15] and statewide access is available to all user agencies independent of their jurisdiction[16].

INTEROPERABILITY VERSES OPERABILITY

Interoperability and operability often become intertwined with each other and at times 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 that is used by a particular entity functions 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 must be developed to fund the required maintenance, replacement and upgrades to equipment to ensure operability. There must not be coverage gaps in communications, but if they do it has to be extremely 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 the operability is obtained, then entities are able to look at interoperability. Interoperability needs to be obtained so that we, as public safety providers of all

[15] 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.

[16] 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

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 obtained 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 on-going 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 they are 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 interconnected 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 could be equated 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 and is, therefore, given the highest level or priority.

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.[17]

[17] 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
CCSA	Consolidated Communications System Authority
C.R.S.	Colorado Revised Statues
DHS	Department of Homeland Security
DTRS	Digital Trunked Radio System
ECD	Emergency Communications Division, U.S. Dept. of Homeland Security
FCC	Federal Communications Commission
FIRSTNET	First Responder Network Authority
FRCC	Front Range Communications Consortium
ICTAP	Interoperable Communications Technical Assistance Program
ISSI	Inter Subsystem Interface
JBC	Joint Budget Committee
LMR	Land Mobile Radio
MARC	Metro Area Radio Cooperative
MCV	Mission Critical Voice
MHz	Megahertz
NCRCN	Northern Colorado Regional Communications Network
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
PSCS	Public Safety Communication Subcommittee
RMHUG	Rocky Mountain Harris Users Group
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
