15 October, 2013

The Honorable John Hickenlooper
Governor, State of Colorado
136 State Capitol
Denver, CO 80203

and

The Colorado Joint Budget Committee
136 State Capitol
Denver, CO 80203

The Consolidated Communications System Authority (CCSA), established through HB 12-1224, has been seated, developed Bylaws, created three (3) committees and has met monthly since our first meeting on 1 November, 2012. The Directors are taking on the task of the CCSA to "advise the Governor and the General Assembly on the development, maintenance, upgrade, and other operation of the system" head on in the three committees of Education and Outreach; Financial Sustainability; and Technical Sustainability; established early in 2013. Countless hours of volunteer time has been poured into the thoughts, discussions, presentations, considerations and documentation you will be presented. All at the cost and on the time of the Directors, members, guests and the agencies they represent. To that end we are submitting to you the 2013 Annual Report for the Colorado Statewide Digital Trunked Radio System (DTRS), with a message for the Administration and all the elected officials of Colorado to know that the DTRS is at a crossroads - and serious and difficult decisions lie ahead.

Annual investments must be made to maintain and sustain this public safety lifeline, as the prospect for a Nationwide Public Safety Broadband Network (NPSBN) is years away and the possibility of this resource providing reliable mission critical voice capabilities is still a dream.

The CCSA, as tasked, researched and evaluated future funding sources and alternatives to not only maintain, but also upgrade the DTRS as needed for the foreseeable future. Since its inception the DTRS has not charged users a fee to operate on the system and this continued ability to operate at no cost to many agencies and political jurisdictions has created a sense of entitlement regarding State and local radio communications. This is a misconception and an issue that must be dealt with as part of an overall funding scheme. There are no miracle funding cures that do not have shortfalls and potential discomfort for elected officials asking constituents for money through fees or taxes, and a multifaceted income model will need to be developed and instituted.
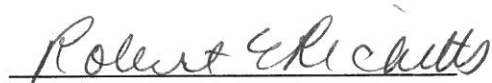
Continued financial support of the system software upgrade is extremely high on the list of short-term necessities. A lack of continued support will most certainly result in degraded or diminished wireless

communication capabilities that local and regional public safety organizations rely on to accomplish their missions. Through creation of partnerships with the Colorado Statewide Interoperability Executive Council (SIEC), Consolidated Communications Network of Colorado (CCNC), and researching funding mechanisms we have found two issues that need to be addressed. Because of the amount of disparate land mobile radio (LMR) systems there is a need for a supported and funded SIEC. Based on the amount of money estimated to keep the DTRS updated and functional, a statewide funding source is the most feasible. To gain the support of all constituents, agencies, and jurisdictions there has been a stated desire to have the CCSA report on all public safety/service LMR systems in Colorado. We urge the Joint Budget Committee (JBC) and the members of the House and Senate to address these immediate monetary and legislative requirements in the Fiscal Year (FY) 2014 budget cycle.

Some additional future public safety communications related challenges that have been identified include:
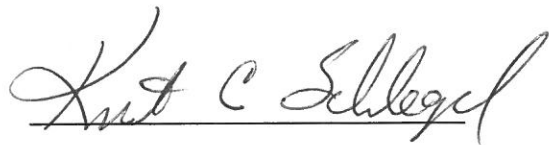
- Consideration of funding support for the CCSA
- Plan for and complete the Federal Communications Commission's (FCC) proposed narrowbanding requirement for 700 MHz frequencies
- The development and implementation of a National Public Safety Broadband Network (NPSBN), which will initially provide enhanced data transmission capabilities for first responders
- The legislation that established the CCSA (House Bill 12-1224) assigned certain obligations, but limited its scope to the DTRS. The CCSA Board unanimously recommends that the legislation be revised to give CCSA those same roles; namely to solicit and accept funds to support operations, represent users, advise the executive and legislative branches of Colorado government on interoperable public safety communications, and deliver an annual report on needs and funding options for **ALL** public safety communications systems in Colorado.

We remain available to provide further information or testimony as needed regarding the current financial needs of the DTRS and look forward to working closely with the CCNC, the JBC, the Colorado House and Senate, and the Governor's office to brainstorm, identify, and develop ongoing funding scenarios in order to ensure that the DTRS remains a viable and effective public safety wireless interoperable communications tool. Respectfully submitted on behalf of the CCSA,

Robert E. Ricketts

CCSA Chair

Kurt C. Schlegel

CCSA Vice Chair

Consolidated Communications System Authority (CCSA)

2013 Annual Report:

Operational & Capital Infrastructure Needs and Potential Funding Sources for the Colorado Statewide Digital Trunked Radio System

Date: October 4, 2013

Submitted by:

Robert E. Ricketts	*Kurt C. Schlegel*
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On behalf of the CCSA Board of Directors

Table of Contents

1. **Executive Summary**

Mission critical interoperable communications is essential for safe and effective public safety response to daily calls for service as well as for large-scale natural or man-made incidents. The Colorado Digital Trunked Radio System (DTRS) is a two-way land mobile radio (LMR) network that serves state, local, federal, and tribal public safety and first responder agencies across the state of Colorado. This report is based on discussions with DTRS owners, users, vendors, and providers-of-service and describes both short term operational and capital infrastructure needs as well as the need for a reliable and sustainable funding stream to maintain and sustain the DTRS network.

The DTRS presently has a number of infrastructure upgrades and maintenance needs that exist because, since its inception, a true business plan has never been developed nor has a reliable funding stream been identified to ensure its viability and success. The following list contains the DTRS' highest maintenance and sustainment priorities:

- o Regular LMR equipment maintenance
- o Motorola System Upgrade Assurance (SUA) program
- o Acquisition of additional interoperability resources (e.g. Inter Subsystem Interface [ISSI])
- o Repair and replacement of an aging microwave backhaul system
- o Repair and replacement of aging radio tower sites
- o Hardware upgrades necessitated by improvements in technology (e.g. repeaters and consoles)
- o Radio Technicians and Support Staff (consists currently of a staff of 46 full time employees [FTE])

The need also exists for personnel support to provide a strong governance body as well as a point of coordination to develop, implement, and coordinate a reliable and robust statewide interoperability program. Until now the State has primarily relied on Federal grant dollars to support a Statewide Interoperability Executive Council (SIEC) and a Statewide Interoperability Coordinator (SWIC). Since the taxpayer funded grant programs that had been used to pay for these are no longer available, it is imperative that the State of Colorado continues to support and fund the SIEC and SWIC for the State of Colorado. In addition, the Consolidated Communications System Authority (CCSA) has no identified funding stream to support its operations (e.g. outreach and educational materials, postage, etc.). Since this is a volunteer group that is tasked with specific duties in support of the DTRS, a minimal operating budget is needed to continue the work that has been initiated.

The DTRS' sustainability is dependent on resolving the current lack of:
- o Leadership, direction, and a "champion" sponsoring State agency
- o A process for planning the operations & technical architecture/expansion of the network that is comprehensive, inclusive (of agencies from the State and from metropolitan and rural counties and municipalities), and constrained to State and local budget realities; and
- o Agreements, or processes to establish agreements, regarding the responsibilities of DTRS ownership, usage, maintenance, and funding.

Some significant improvements to the DTRS have begun as an outcome of the investments made in 2013 budget process by the State of Colorado and by local government owners. To continue these improvements and to meet the other needs that have been described above, immediate action and a reliable source of funding is needed to sustain the DTRS' value to the public safety community and to eliminate its vulnerabilities.

2. Introduction and 2012/2013 Accomplishments

2.1 Introduction to DTRS

The infrastructure of the DTRS is comprised of:

Figure 1 - DTRS Coverage (see footnote 2)

1. Radio sites that are spread out across the state and that house radio repeater equipment,
2. Master sites which control the operations of the radio sites,
3. Dispatch centers that interface to allow 9-1-1 dispatch positions to directly connect to the network, and
4. Backhaul links ("transport links") that interconnect the sites to each other and to the master sites and dispatch centers.
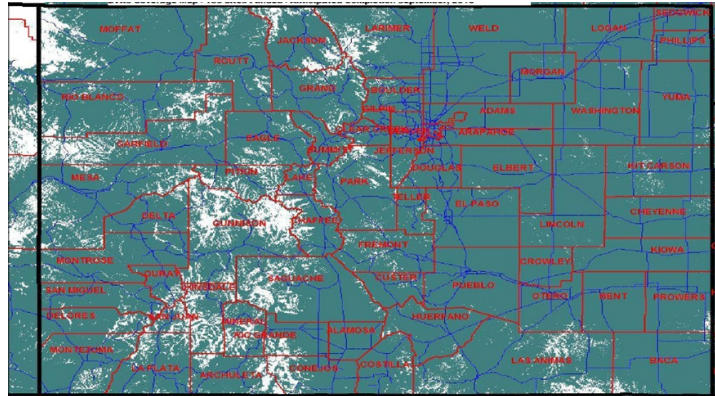
The technology used in the DTRS involves 700 megahertz (MHz) and 800MHz digital voice trunking as defined by the APCO/TIA[1] Project 25 standards for public safety voice communications. The primary vendor for the DTRS is Motorola Solutions, Inc., who markets this type of public safety radio system under the brand name of "ASTRO® 25". The backhaul links that provide the interconnections primarily use point-to-point microwave technology but also use optical fiber for some links. During a typical month, the DTRS facilitates approximately 8.3M calls between public safety users that operate in 95%[2] of the state that it serves (shown in green on the map to the right).

The ownership of the DTRS is diverse: the State of Colorado's Governor's Office of Information Technology (OIT) owns a significant amount of the equipment used in the network as do several municipalities and regional partnerships of municipalities including Adams, Arapahoe, Douglas, Jefferson and Weld Counties, the Northern Colorado Regional Communications Network (NCRCN), and the Pike's Peak Regional Communications Network (PPRCN). Additionally, numerous smaller municipalities and county governments own portions of equipment that is used in the network. For the most part, regardless of ownership, usage of the network is ubiquitously open to all authorized users[3], and statewide access is available to all user agencies independent of their jurisdiction[4].

The governance of the DTRS network occurs primarily in two organizations. The first is the Consolidated Communications Network of Colorado, Inc. (CCNC), a 501c(3) organization made up of participating user agencies. The CCNC operates with an Executive Board, a Board of Directors,

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[1] 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.

[2] 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.

[3] 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; ii) eligible under Title 47 of the Code of Federal Regulations (CFR) Part 90 Private Land Mobile Radio Services §90.20 Public Safety Pool, and iii) approved by the CCNC as described in this report.

[4] 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.

and a Technical/Operations Committee, the former to provide guidance to planning and use of the system, as well as to approve user agencies, and the latter to review and approve technical operations of the system including the addition of talkgroups.   The second is the CCSA which is a statutorily established entity tasked with:

1. Soliciting and accepting appropriations, grants, and other monies to support the DTRS network (of which there are few currently available)
2. Representing users of the DTRS regarding operational and technical aspects of the DTRS network
3. Advising the Governor and General Assembly on the development, maintenance, upgrade and operations of the DTRS, and
4. Producing annual reports to the Governor and the Joint Budget Committee (JBC)

2.2   DTRS Accomplishments: 2012/2013

Several improvements to the technology, governance, and funding of the DTRS were made in the period of October 2012 to October 2013, namely:

*   A system-wide upgrade to the DTRS' core operating system software is underway, the first such comprehensive upgrade since 2009. $3.726M, approximately one fourth of its total cost of $14.904M, was included in the 2013 Long Bill.
*   The CCNC and CCSA hold regular strategy and planning meetings. The CCNC has focused on the DTRS' shorter-term operational issues while the CCSA focused on establishing its priorities and formed the following three internal subcommittees:
    o   Finance
    o   Technology
    o   Outreach and Education
*   The 2013 Long Bill also funded the hiring of external engineering/consulting firms to prepare a plan to update the extremely aged network of microwave links that connect various components of DTRS infrastructure. A report is expected to be complete in 2014 that will describe a strategy for replacing the DTRS microwave backbone in order to improve overall network performance and reliability.

The DTRS' technology was used in 2013 to provided daily-use radio communications to over 1,000 local, State, Federal, and tribal agencies and 60,000 public safety users in those agencies. It also played a key role in providing mission critical interoperable radio communications (communications between users of different agencies) in incidents and events including:

*   Black Forest Fire and supporting operations to provide command and operational communications to local El Paso County agencies, Federal Military agencies, State agencies including the National Guard, and interfaced with the Federal Type I team after it's arrival in Colorado.
*   The Aurora Theater Shooting in which DTRS was used to relay conversations between agencies using the City of Aurora's radio system (which is distinct from DTRS) and numerous other agencies that were called on to provide assistance during and after the incident

- The 2012 Pro Cycle bicycle race in which DTRS was the primary method of communications for public safety officials serving the statewide, multi-stage, 581-mile, seven-day-course that drew 135 of the world's top cyclists and over one million spectators.

3. The State of the System: Recommendations for 2014 & Beyond

3.1   Current State & Recommendations: DTRS Equipment & Technology

The LMR technology currently in use is slated to be enhanced in 2014 through a system-wide upgrade to the core operating system software as well as through other improvements to the DTRS infrastructure. While the core system software upgrade is essential to maintaining public safety interoperability in the State, the following needs must be addressed to ensure the long-term reliability and technical sustainability of the DTRS.

- The Core Operating System Software upgrade that will be implemented in 2013 and 2014[5] is being funded over four (4) years. Continued funding for the balance of its cost (approximately $11.178M, the remaining three fourths of the $14.904M) must be provided in future Long Bills. Once funding for this specific upgrade of the core operating system software is completed, ongoing funding will be required to procure future upgrades on a regular basis – this is offered by Motorola as part of their SUA program.
- The manufacturer's support for two critical components of DTRS infrastructure, the Motorola CENTRACOM Elite dispatch consoles and the Motorola QUANTAR radio base stations, will end by 2017. Some have already been upgraded however a replacement plan and dedicated funding will be required to replace end-of-life equipment.
- The initial upgrades to the microwave backbone – those that are immediately required to replace the oldest and most likely to fail connections (site-to-site and site-to-switch) must start in 2014 based on the findings of the engineering/consulting firm's report.
- Strengthen or replace radio towers that are owned by the State of Colorado that have failed, or are expected to fail, structural inspections.
- As comprehensive as the DTRS is, it is not the only public safety radio system in the State of Colorado. While the DTRS is a statewide system some agencies do not use it as their primary radio system. These agencies include, but are not limited to, the City and County of Denver, the City of Arvada, the City of Lakewood, the Front Range Communications Consortium (FRCC) that includes public safety agencies in Adams & Weld counties, and others (referred to as "non-DTRS" systems in this report). As both DTRS and non-DTRS systems mature in their technology, they can be interconnected via hardware connections that provide limited interoperability.

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[5] The DTRS' current operating system software is currently at Motorola's Astro® 25 version 7.09 and this upgrade will convert it to version 7.14. This upgrade will address several issues including continued virus protection, support for current (non-obsolete) dispatch center interfaces, support for narrowbanded 700MHz channels (which are a Federal mandate by 2017), support for expanded quantities of channels and users, and other fixes, protections, and improvements.

Based on the DTRS' current status the following infrastructure needs must be addressed and a sustainable funding source defined in order to ensure reliable and interoperable public safety communications:

- Secure approximately $11.178M in funding over FY's 2014, 2015, and 2016 (approximately $3.726M per year) for the balance of the core operating software upgrade[6].
    - NOTE: A similar annual amount will also required on an ongoing basis beyond 2016 for a SSA to ensure that the DTRS is maintained at a current level of core operating software.
- Secure funding over FY's 2014 and 2015 to upgrade the Motorola QUANTAR radio base stations owned by the State of Colorado
- Secure funding in FY 2014 to begin the replacement of the least reliable microwave links used by the DTRS.
- Secure additional funding over FY's 2015-2018 (approximately $5M per year) to complete the replacement of unreliable microwave links used in the DTRS.
- Secure funding in FY 2014 to add the feature to the DTRS that will allow better/more reliable method of interconnection to outside (non-DTRS) systems including to the master sites of agencies that are expected to separate their infrastructure from the DTRS (see below).

3.2   Current State & Recommendations: DTRS Governance and Funding

The state of governance and funding for the DTRS are uncertain and both need investment and action to avoid jeopardizing the sustainability of the DTRS' long-term operations. Of the two governance organizations previously described, the CCNC's primary focus is to make recommendations on short-term operational issues but it lacks the mandate and authority to make binding decisions regarding the overall plan for the DTRS' design or its funding model. The CCSA has statutory authority to define the DTRS' operational and capital infrastructure needs and to seek out potential funding options, however it has no authority to assess fees or levy taxes. The leaders and membership of both organizations are volunteers representing public safety, telecommunications, as well as officials from State and local governments and agencies.

The sustainability and future potential of the DTRS is jeopardized by the lack of:

- A committed source of reliable funding for operations, maintenance, sustainment, and on-going capital improvements
- Staff that are dedicated solely to working collaboratively with DTRS users and owners to plan DTRS technical enhancements and to administer DTRS governance and funding issues.

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[6] The total amount of the core operating system software upgrade may actually decrease before the upgrade is completed. This is because local infrastructure owners have been given the option to directly purchase their portion of the upgrade (i.e., the software that resides on the portion of infrastructure they directly own). At the time of the writing of this Report, it is not known which or how many local owners will make such commitments. [Local owners were given the choice by the State of Colorado OIT to accept the State's purchase of their portion of the upgrade and commit to continuing to interconnect their infrastructure components to the DTRS for a period of five (5) years or to separately and independently fund their portion of the upgrade and avoid any such connection commitment.] The State of Colorado OIT has stated that any such decrease will be deducted from the final (2016) installation of the upgrade purchase.

The strong negative impact that the lack of statewide funding and planning has had on the DTRS cannot be understated. There are current system owners who have either made the decision to break away from the DTRS and purchase their own infrastructure, and there are more that are weighing their options and may eventually choose the same path to communications independence and reliability. While this may provide a greater sense of security (e.g. local control over funding and planning) for local governments and agencies it will have a negative impact on overall system coverage, capacity, and interoperability. Most importantly it will be a financial loss for the taxpayers of Colorado due to the fact that public safety communications infrastructure will be duplicated in numerous locations instead of sharing expensive assets. While it may not be feasible to consider that all users of the DTRS could or should migrate to use the DTRS it is in the best interest of the customer, i.e. the taxpayer, that the DTRS be developed as the best technology solution to public safety interoperable communications at the best cost per user possible, thereby enticing local agencies to participate in this "system of systems".

Therefore, in addition to the technical needs summarized in Section 3.1, this report calls for the following governance and funding needs to be addressed:

- A reliable and sufficient source of funding is required to maintain and sustain the DTRS' operations.
- Funding and charters should be established and maintained for a SIEC and a SWIC with the expressed and dedicated purposes of creating and implementing long-term plans for the:
    - Technical and financial stability of statewide public safety communications, and
    - Coordination of the methods of interconnection between the DTRS and non-DTRS LMR systems for reliable interoperability. Staff and associated entities may be organizationally aligned within the OIT but should be accountable to the users and owners of public safety communications systems in the State.
- The legislation that established the CCSA (House Bill 12-1224) gave it the obligations summarized in Section 2.1, but limited its scope to the DTRS. The CCSA Board unanimously recommends that the legislation be revised to give CCSA those same roles; namely to solicit and accept funds to support operations, represent users, advise the executive and legislative branches of Colorado government on interoperable public safety communications, and deliver an annual report on needs and funding options for ALL public safety communications systems in Colorado.

4. Method for Determining and Expressing the DTRS' Needs and Costs

4.1 Method for Determining/Expressing Needs

To gather the list of needs included in this Report, the CCSA drew primarily upon two sources:

1) The CCSA Technical Committee that includes representatives from the State of Colorado's OIT and the Colorado State Patrol as well as various local (county-level and municipal-level) agencies from both populous and rural regions of the State. The representatives of the CCSA Technical Committee were charged with addressing needs for all DTRS owners and users.

2) The results of the CCSA 2012 Annual Report regarding the DTRS' Operational & Capital Infrastructure needs which utilized a substantial outreach campaign (including telephone and in-person interviews as well as a broadly distributed on-line survey) and which identified many long-term needs that remain unaddressed and unfunded.

4.2 Method for Determining Costs

The operational and capital costs for maintaining the DTRS network were, for the most part, derived from one of the following three sources:

- From the agency that identified the need (who typically derived cost figures from vendor quotes, historical data, or estimates included in their future budgets)
- Direct quotes from vendors, or
- The information included in the 2010 "Digital Trunked Radio System Operational Cost Assessment" report that collected actual and estimated costs for a significant number of the costs involved in operating and maintaining the DTRS.

5. DTRS Funding

5.1 Estimated Sustainment and Maintenance Related Costs

Table #1: Estimated State Owned DTRS Capital Infrastructure Related Expenditures

Item	Amount	Date
State Owned Microwave Backhaul Replacement	$25,000,000.00	Over the next five (5) years; 2014 - 2018
State Owned DTRS Supporting Equipment (e.g. Quantar Repeaters, Transmitters)	$3,500,000.00	Over the next five (5) years; 2014 - 2018
State Owned Radio Tower Replacement / Hardening of Site(s)	$1,040,000.00	2014
	$1,040,000.00	2015
State Owned Radio Tower Replacement	$1,040,000.00	2016 and annually thereafter
ISSI Connectivity	$200,000.00	2014 and 2015

Table #2: Estimated Recurring Annual DTRS Governance and State Owned
Equipment Operation and Maintenance Costs

Item	Amount	Date
Funding for the SIEC	$ 10,000.00	Annually
CCSA Operating Expenses	$ 10,000.00	Annually
Funding for a SWIC (1 NEW Full Time Employee [FTE])	$117,000.00	Annually
State Owned DTRS Equipment Maintenance Budget	$1,116,350.00	Annually
Proposed SUA with Motorola	$3,500,000.00	Annually
Radio Technicians – 46 FTEs (existing positions) • 41 Radio Technicians • 5 Support Staff	$5,075,429.00	Annually
Total Estimated Annual Costs	$9,828,779.00	

5.2   Possible Statewide Funding Solutions for Interoperable Communications Infrastructure

Since the State's annual General Fund appropriations process is very fluid and dependent on a number of internal and external influences, the CCSA Board of Directors believes it best for long term operations and viability to work with the Governor, the Joint Budget Committee (JBC), and the State Legislature to devise and implement a statewide public safety communications funding plan that is independent of the State of Colorado's General Fund.

One of the first orders of business for the CCSA in 2012 was to form a Financial Sustainability committee. This group was tasked with developing the following list of possible funding sources that are being referred to the Governor and the State Legislature for further discussion and direction for future implementation.

> **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, the DTRS. 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 DTRS, however, to be considered viable, such a fund would need to align with DTRS goals 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**
> **Statewide Retail Sales Tax**
> **Fee on In-State Vehicle Registrations**
> **Traffic Ticket Surcharge or Additional Criminal Fines**
> **Gasoline Tax**

The process for establishing any additional revenue generating taxes or fees may be difficult and politically challenging, however the CCSA 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 the DTRS, as needed. There are no miracle funding cures and we suggest that a multifaceted income model be explored, developed, and instituted.

It's important to note that while public safety organizations and local governments that use the DTRS may generally support this course of action, public safety agencies and the population base of local governments that do not use the DTRS may very well be opposed to such efforts. Recognizing this fact the CCSA is recommending that the legislation that established the CCSA (HB-1224) be amended during the next Legislative session to include <u>ALL</u> Public Safety communications systems in Colorado. If accomplished, this will enable the CCSA to assist in achieving the common goal of establishing and maintaining a true statewide public safety, interoperable and mission critical communications capability in Colorado that is supported through a statewide funding mechanism.

6. Acronym List

APCO	Association of Public Safety Communications Officials
CCNC	Consolidated Communications Network of Colorado
CCSA	Consolidated Communications System Authority
DTRS	Digital Trunked Radio System
FRCC	Front Range Communications Consortium
FTE	Full Time Employee
ISSI	Inter Subsystem Interface
JBC	Joint Budget Committee
LMR	Land Mobile Radio
NCRCN	Northern Colorado Regional Communications Network
OIT	Governor's Office of Information Technology
PPRCN	Pikes Peak Regional Communications Network
SIEC	Statewide Interoperability Executive Council
SUA	System Upgrade Assurance
SWIC	Statewide Interoperability Coordinator