Needs Assessment and Business Plan Report

September 2015

COLORADO
Division of Homeland Security
& Emergency Management
Department of Public Safety

Interoperable Communications in Colorado:
a Systems of Systems

- State Digital Trunked Radio System (DTRS)
- Denver Metro
- Front Range Communications Consortium (FRCC)
- Pikes Peak Regional Communication Network (PPRCN)
- Individual Local Systems
- Federal Wildland Fire Units
- Amateur Radio Emergency Services (ARES)

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Digital Trunked Radio System Overview

- DTRS is a statewide voice radio system that enables direct communication between public safety agencies across jurisdictional and regional boundaries.

- Consists of 215 radio tower sites connected to one of 5 zone controllers distributed across the state

- Connections via microwave or other telecommunications circuit called backhaul

- DTRS is a system of systems with approximately 50% owned by the state and 50% owned by various counties and municipalities.

- Over 75,000 subscriber radios from more than 1,000 local, regional, tribal, state and federal agencies; only 18% of these users are from state government

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Public Safety Communications Impact on Wildland Fire Incidents

- State Emergency Communications – State-run fires rely heavily on DTRS for coordination of DHSEM, DFPC, CSP, other state agencies such as CDOT etc.

- Also allow the Incident Command structure to communicate with the CO National Guard - 10 helicopters with DTRS capability.

- In Federal-run events – Communications for attacking the fire are almost exclusively VHF. However, the peripheral activities are still handled in large part by the State and local agencies on DTRS (traffic control checkpoints, evacuations, etc).

Needs Assessment and Business Plan

SB 14-127

- Acknowledged that public safety communications are a vital aspect of efficient and effective disaster emergency management.

- Noted that solutions for long-term funding, technology upgrades and network compatibility are elusive.

- Certain areas of the State suffer from critical gaps in radio system coverage and urgently need to be built out.

- Directed the Division of Homeland Security and Emergency Management to conduct a Needs Assessment and Business Plan Study on current and future needs of the Statewide Digital Trunked Radio System.

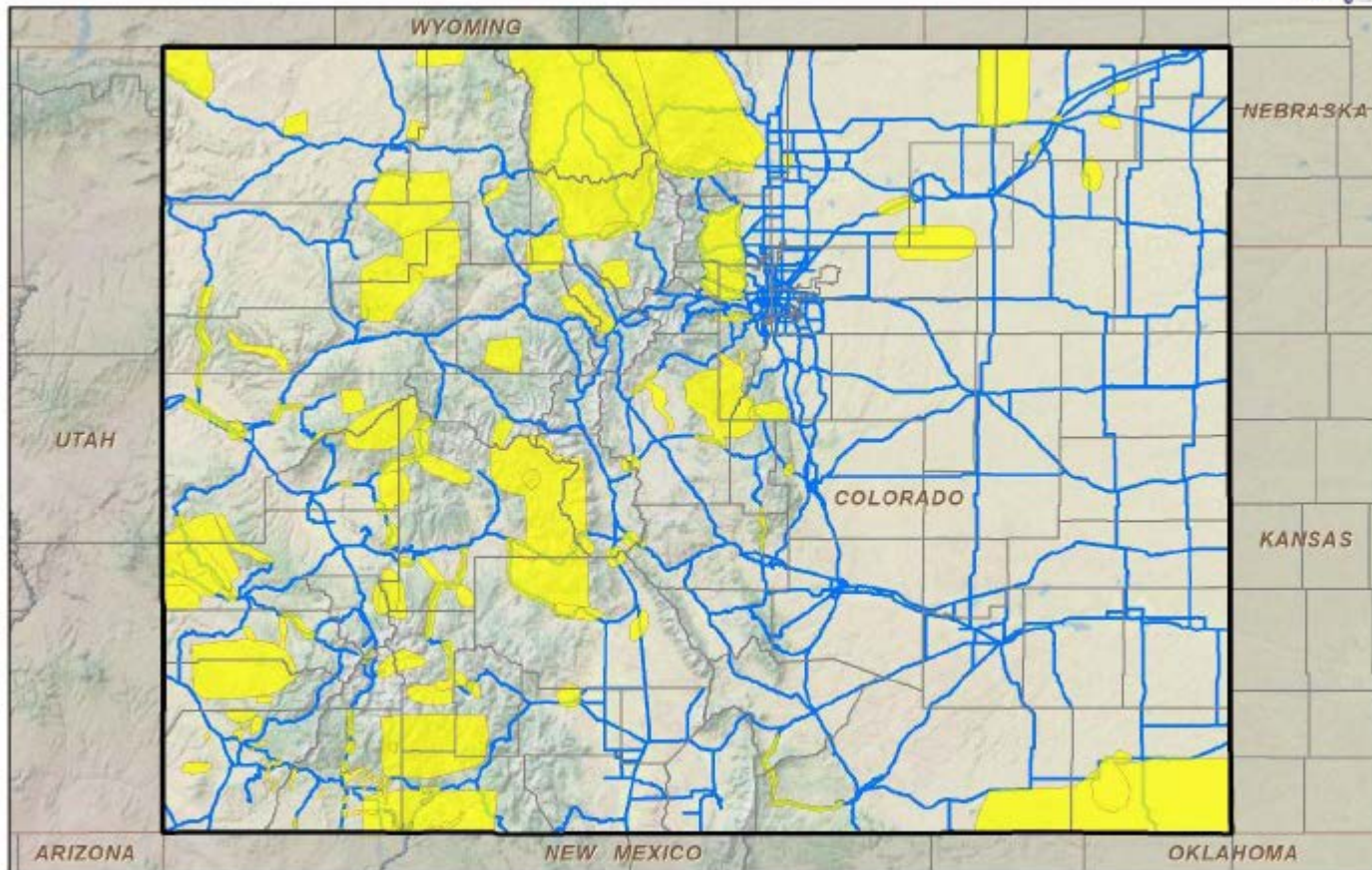- DHSEM Contracted with Federal Engineering, Inc. to conduct the study from January 2015 through June 2015.

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Needs Assessment and Business Plan Findings

Coverage:

- Intended to be about 95% across 95% of the **highways** in the state.

- Coverage workshops showed it to actually be 79% statewide with about 73% in the western portion of the state and 84% in the eastern portion.

- Federal Engineering recommended 109 new radio sites costing approximately $115,976,000.*

- Recommended improvements target highway coverage at 90% statewide (87% in the western half of the state and 93% in the eastern portion).

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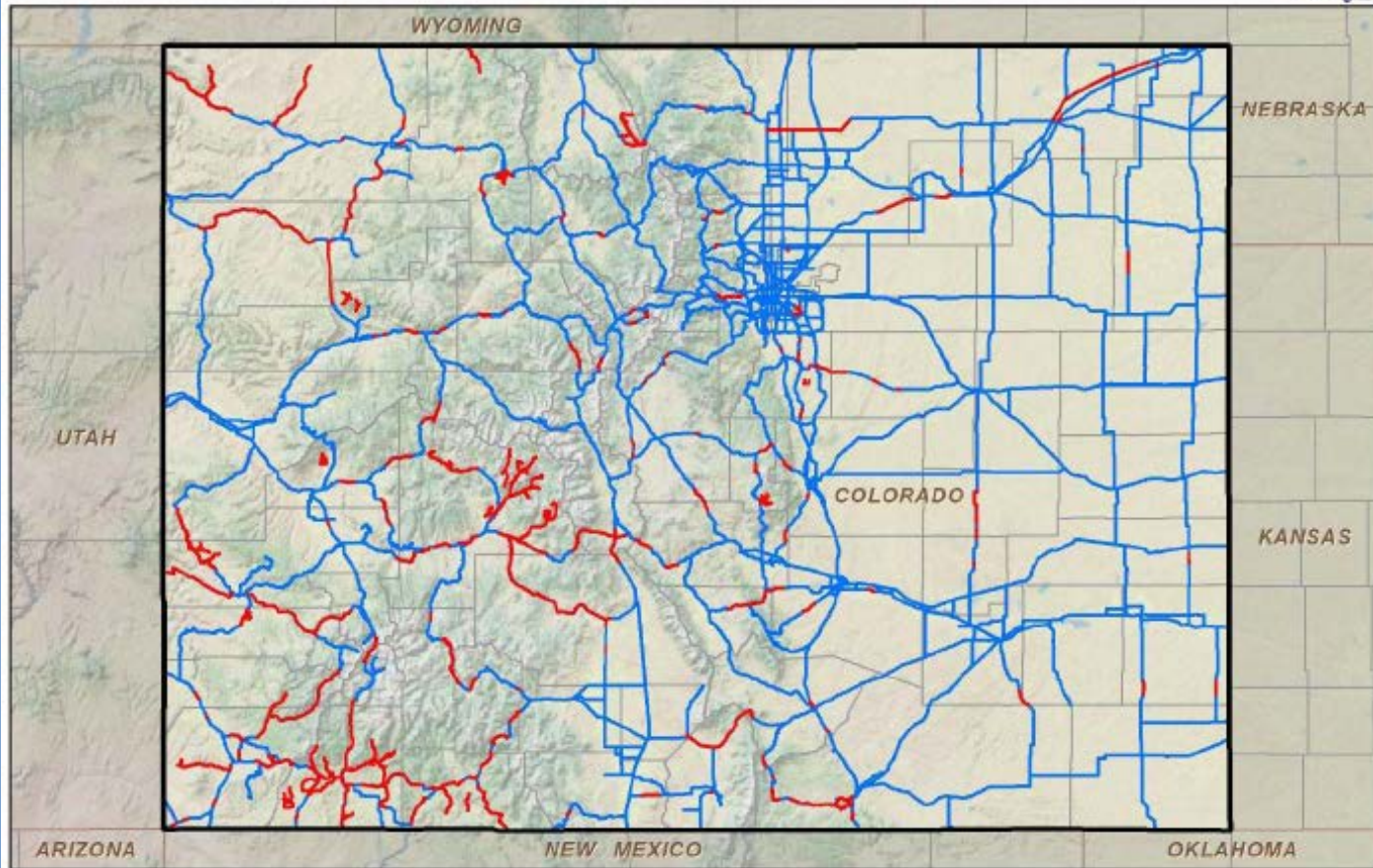
Map 2a: DTRS - Areas Identified by Users as Having "Spotty Coverage"

Colorado Border
Reported areas of "spotty" coverage
Highways in Colorado
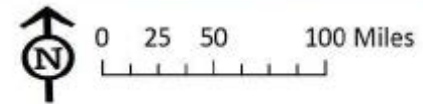
0   25   50   100 Miles

Map 3c: Colorado Highway Map with Areas Identified by Users as Having "No Coverage"

Colorado Border
Roadways in reported areas of "no coverage" including dropped calls
Highways in Colorado

0   25   50   100 Miles

Map 5a: DTRS Mobile Talk-Out Coverage with Covered (Green) and Uncovered (Blue) Highways
Existing 700/800MHz P25 System, Talk-Out to Mobile Coverage; Minimum of 95% Reliability for DAQ 3.4
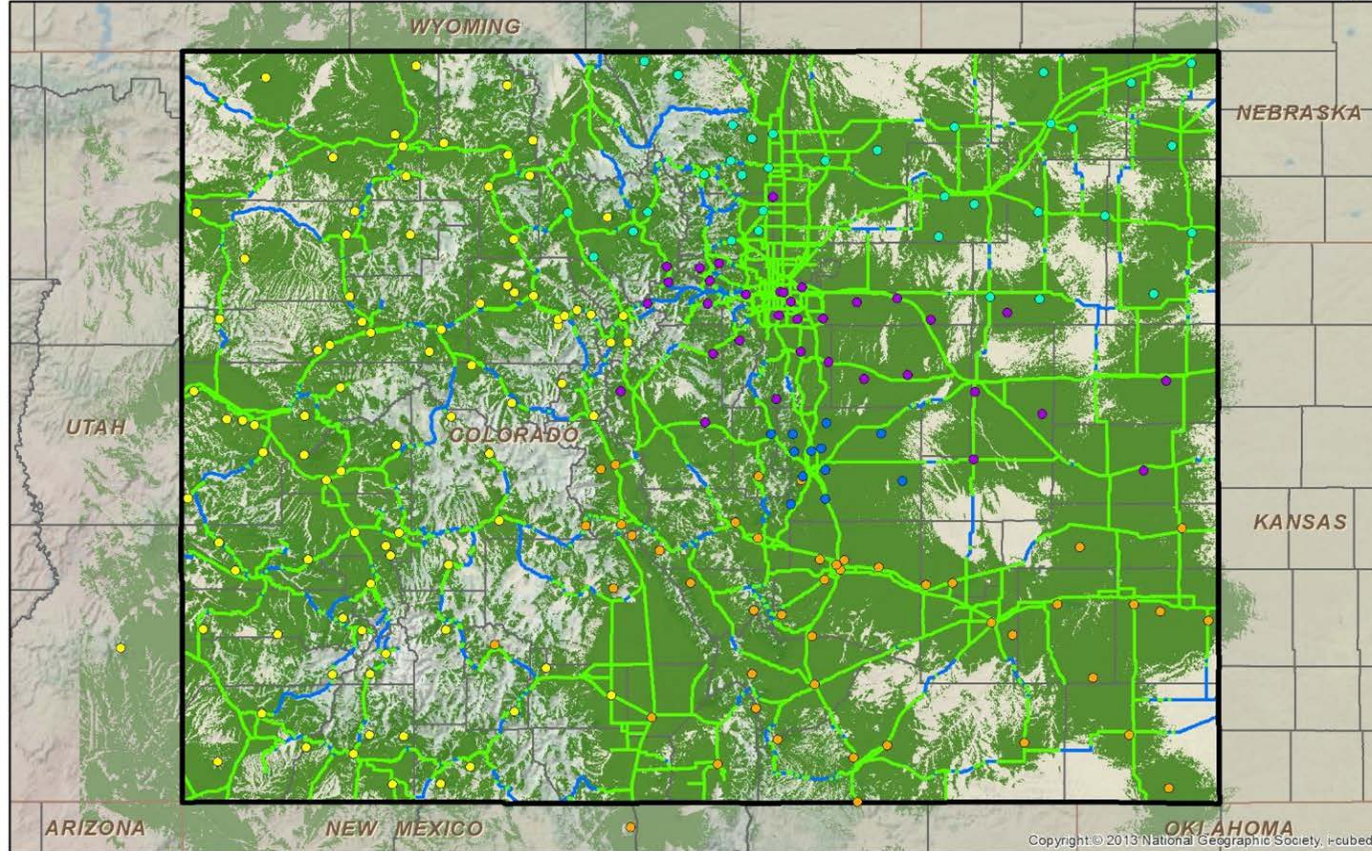
Radio Sites
- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 6

Covered Roads
Uncovered Roads
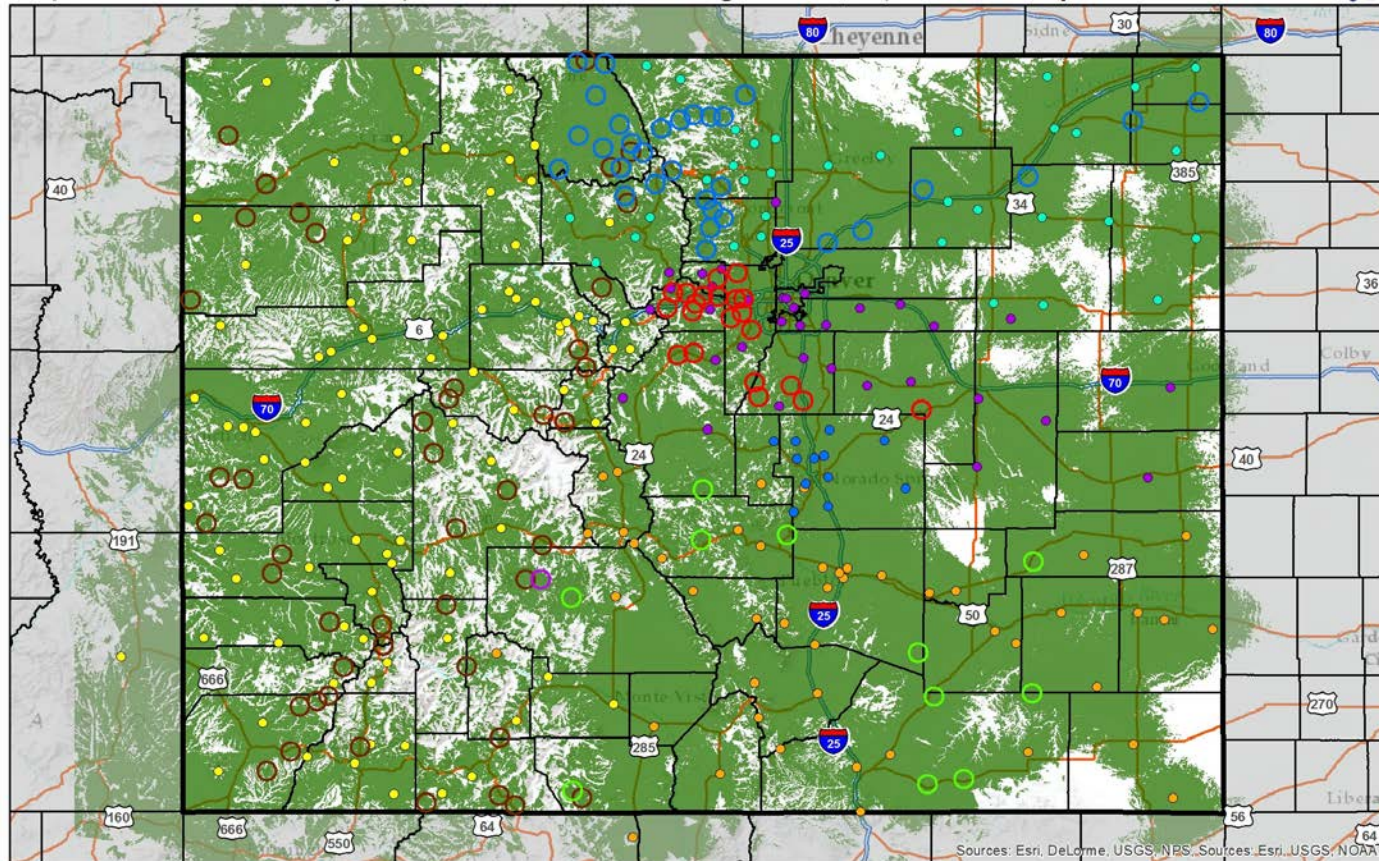Mobile Coverage >= 95% Reliability for DAQ 3.4
Colorado Border

0 25 50 100 Miles

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Colorado DTRS - Existing DTRS Sites and 4-mile Search Rings for potential new sites
700/800 MHz P25 Phase 1 system; Talk-Out to Mobile coverage >= DAQ 3.4; 95% Reliability

Search Rings (~4 Mile Radius)
Zone 1
Zone 2
Zone 3
Zone 4
Zone 6

Radio Sites
Zone 1
Zone 2
Zone 3
Zone 4
Zone 6

Colorado Border
Mobile Coverage >= DAQ 3.4

This map depicts predicted coverage from DTRS' existing 215 sites and from locations within 109 "search rings" that represent unverified, unstudied areas in which additional radio sites may be located in order to enhance coverage.
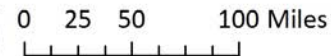
Sources: Esri, DeLorme, USGS, NPS, Sources: Esri, USGS, NOAA

N

0   25   50   100 Miles

Side By Side of 215-Site Map and Additional Search Rings

Needs Assessment and Business Plan Findings

Sustainable Funding:

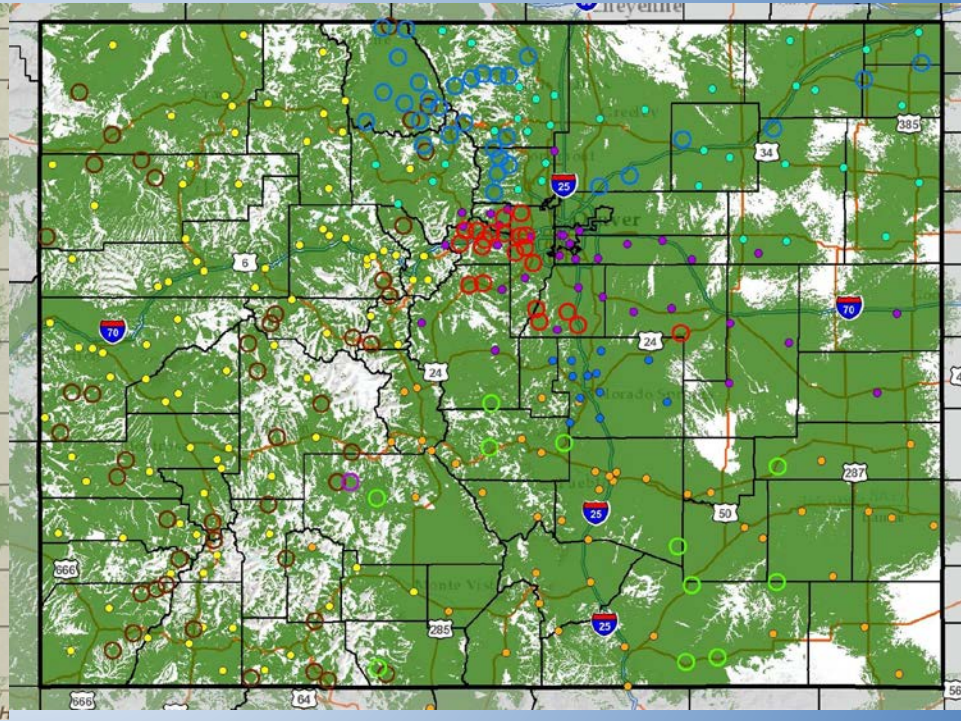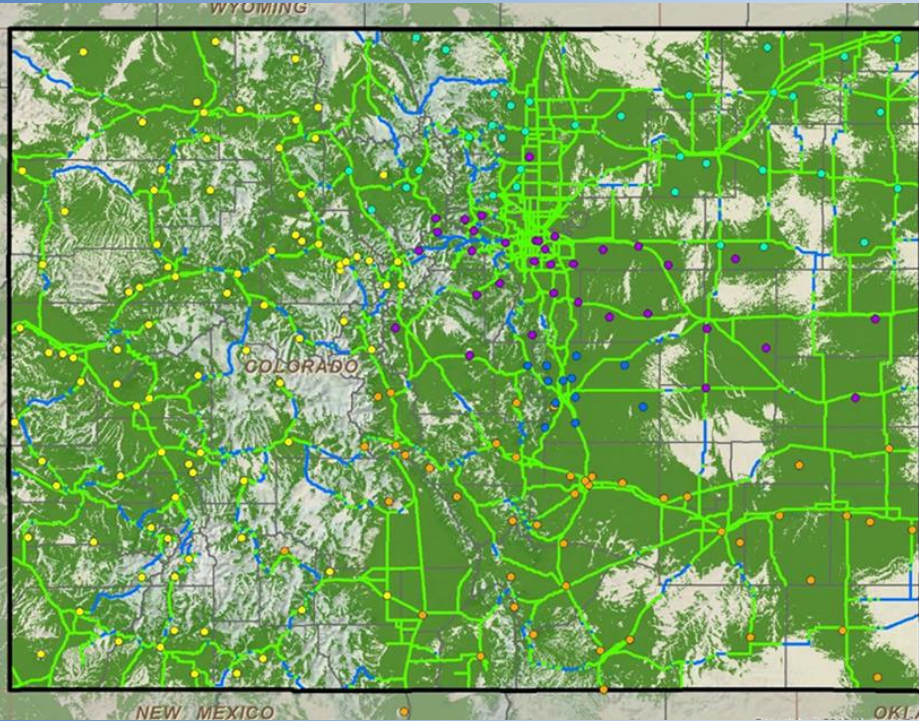- Equipment has known lifecycle limitations and software upgrade schedules.

- A consistent budget for enhancements, upgrades and maintenance will allow system owners to plan for these events and spread the costs out over time.

- Report outlines a number of potential revenue streams taken from examples employed by other states – Acknowledges that CO is a unique environment because of TABOR and a statutory prohibition user fees.

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Consolidated Governance:

- Report suggests governance structure have the following characteristics: Balanced Membership (local, state, federal, tribal agencies), Formal Authorization, Focus on Public Safety Communications, Regional Input, Effective Leadership, Funding.

- Statewide Interoperability Coordinator (SWIC) and Public Safety Communications Subcommittee (PSCS) should continue to have ownership of the Statewide Communications Interoperability Plan (SCIP).

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Interoperability Concerns:

- Topography prohibits DTRS from being the sole system throughout the state.

- SWIC and PSCS should have ownership of the Statewide Communications Interoperability Plan (SCIP) and manage the policies that ensure these other systems will be able to interoperate with DTRS.

- Report recommends the State develop a fund to assist agencies with the high cost of DTRS compatible radios.

Needs Assessment and Business Plan Findings

Interoperability Current State:

- Challenges include small independent VHF systems, disparate trunked systems, and Federal USFS VHF systems.

- Several projects/solutions have been accomplished or in the works: National Guard helicopters (10) have VHF and DTR capabilities including VHF interop channels and USFS frequencies.

- Inter-subsystem Interface (ISSI) links between Westminster and Adams County, Denver and FRCC, FRCC and DTR.

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Interoperability Current State:

- Linked Boulder VHF Fire channel to Network First Denver system, investigating same connection for Clear Creek/Gilpin Counties VHF system. Working on similar arrangement for Teller and Gunnison Counties.

- DHSEM has cache radios on DTR system to be sent out if needed.

- VHF FD brush trucks from larger departments often have VHF radios even if normally operate on DTR.

- USFS brings cache VHF radios for use by local agencies when on Type I or II fire.

Needs Assessment and Business Plan

DHSEM concurs with Federal Engineering on the need for:

- **Increased Coverage** - the DTRS will need dozens of new radio sites to meet coverage goals.

- **Sustainable Funding** – The Capital and Operational Expenditures for DTRS require a sustainable and regular funding stream.

- **Consolidated Governance** – Groups such as CCNC, PSCN etc. perform other necessary functions of managing the system of systems.

- **Attention to Interoperability** – The PSCS and the SWIC should continue to manage interoperability issues for Colorado. A funding stream should be developed to help agencies with a proven need to purchase and maintain equipment that is interoperable with the DTRS.

Thank You

Further analysis and recommendations will be included in the Public Safety Communications Subcommittee's annual report to the legislature in November.

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