

COLORADO OFFICE OF THE STATE AUDITOR



GOVERNOR'S OFFICE OF INFORMATION TECHNOLOGY

PUBLIC SAFETY RADIO COMMUNICATIONS SYSTEM



JUNE 2019

PERFORMANCE AUDIT

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June 24, 2019

DIANNE E. RAY, CPA

STATE AUDITOR

Members of the Legislative Audit Committee:

This report contains the results of a performance audit of the Governor's Office of Information Technology. The audit was conducted pursuant to Section 2-3-103, C.R.S., which authorizes the State Auditor to conduct audits of all departments, institutions, and agencies of state government, and Section 2-7-204(5), C.R.S., which requires the State Auditor to conduct annual performance audits of one or more specific programs or services in at least two departments for purposes of the SMART Government Act. The report presents our findings and conclusions.



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REPORT HIGHLIGHTS



PUBLIC SAFETY RADIO COMMUNICATIONS SYSTEM PERFORMANCE AUDIT, JUNE 2019

GOVERNOR'S OFFICE OF INFORMATION TECHNOLOGY

Our audit found that the Governor's Office of Information Technology (OIT) has reasonable processes in place to carry out its responsibilities for managing Colorado's statewide Digital Trunked Radio System (DTRS or System) and related funding. OIT manages DTRS consistent with statute and in a manner that helps ensure that users have reliable public safety radio communications. We did not identify gaps or deficiencies in the OIT internal controls that we reviewed.

KEY FACTS AND CONCLUSIONS

- OIT monitors DTRS communications and functionality in real-time, maintains state-owned equipment, upgrades software, programs radios, and inventories all DTRS assets. Local agencies purchase and maintain their equipment and radios. Users reported to us that OIT does a good job of managing DTRS and coordinating with public safety agencies and System co-owners.
- OIT executes Memoranda of Understanding (MOUs) with DTRS users and owners to outline responsibilities, help protect the System and state assets, and help ensure user and owner cooperation. All 20 sampled MOUs were complete and reflected users' responsibilities such as to maintain equipment and give OIT 180-days' notice to withdraw from DTRS.
- OIT documentation and our walk-throughs showed that OIT's contract monitoring helps ensure that work on DTRS is timely and aligns with contract requirements. For example, OIT engineers accompany contractors at DTRS sites to observe and verify the work performed.
- OIT has taken steps to improve DTRS such as by executing a \$56 million contract for equipment upgrades, which improves radio communication coverage. As of February 2019, roughly 93 percent of the state has DTRS radio coverage.
- In a sample of payments totaling \$15.5 million that OIT made for DTRS in Fiscal Years 2018 and 2019, spending followed applicable statutory and contract requirements.

The audit report contains no recommendations.

BACKGROUND

- Public safety agencies and first responders, such as police, fire, and emergency medical services use public safety radio communication systems to respond to calls for service.
- DTRS is the primary voice communications system for about 1,100 state, local, and tribal public safety agencies and first responders. In 2018, DTRS supported about 101,000 radios and an average of 8.9 million calls per month.
- Ownership of DTRS assets is shared by the State (55 percent) and local agencies and governments (45 percent). Assets include land, buildings on radio tower sites, towers, and equipment.
- OIT is the state agency responsible for working with other DTRS owners and users to maintain the System's infrastructure.
- In Fiscal Years 2016 to 2019, OIT spent about \$71 million in state funds to manage, maintain, and upgrade DTRS.



CHAPTER 1

OVERVIEW

Public safety agencies and first responders, such as police, fire, and emergency medical service providers use public safety radio communications systems to respond to calls for service. Radio systems operate by transmitting voice communications from a user through a radio channel, or designated frequency, to a transmitter located on a radio tower, which in turn relays the message to other users on the same frequency. These systems can provide public safety agencies and first responders with consistent and reliable voice communications.

There are two types of public safety radio systems—conventional systems and shared digital trunked systems. A conventional radio system requires users to manually select the radio channel they want, and users can only communicate with each other when all users are (1) on the same channel, (2) within a certain distance of each other, and (3) within a certain distance of the same radio tower. A digital trunked radio system is more advanced than a conventional system in that it uses computers called zone controllers in different geographic areas to connect radio traffic from all towers in the zone and connect all zones to one another, and automatically assigns talk groups to open frequencies, or channels, on an as-needed basis; each user's radio is programmed to access talk groups based on the user's business need (e.g., dispatch, traffic stops, fire, first responder). Talk groups use frequencies efficiently, allowing a large number of talk groups to share a small number of frequencies.

Digital trunked radio systems are optimal for interoperability, which is the ability of agencies that use different radio systems to communicate with each other, because they facilitate communications during emergencies that affect large geographic areas and that require responses from multiple public safety agencies. The radios can be configured to allow members of the same talk group to communicate with one another, even though they are not within the coverage area of the same radio tower, which allows users to communicate over greater distances and more diverse terrains, compared to a conventional system. A digital trunked system is also technologically advanced because it operates on a higher radio frequency and has redundancies to prevent the loss of coverage if one tower goes offline.

COLORADO'S PUBLIC SAFETY RADIO COMMUNICATIONS SYSTEM

As of March 2019, the statewide Digital Trunked Radio System (DTRS or System) in Colorado is the primary voice communications system for about 1,100 state, local, and tribal public safety agencies and first

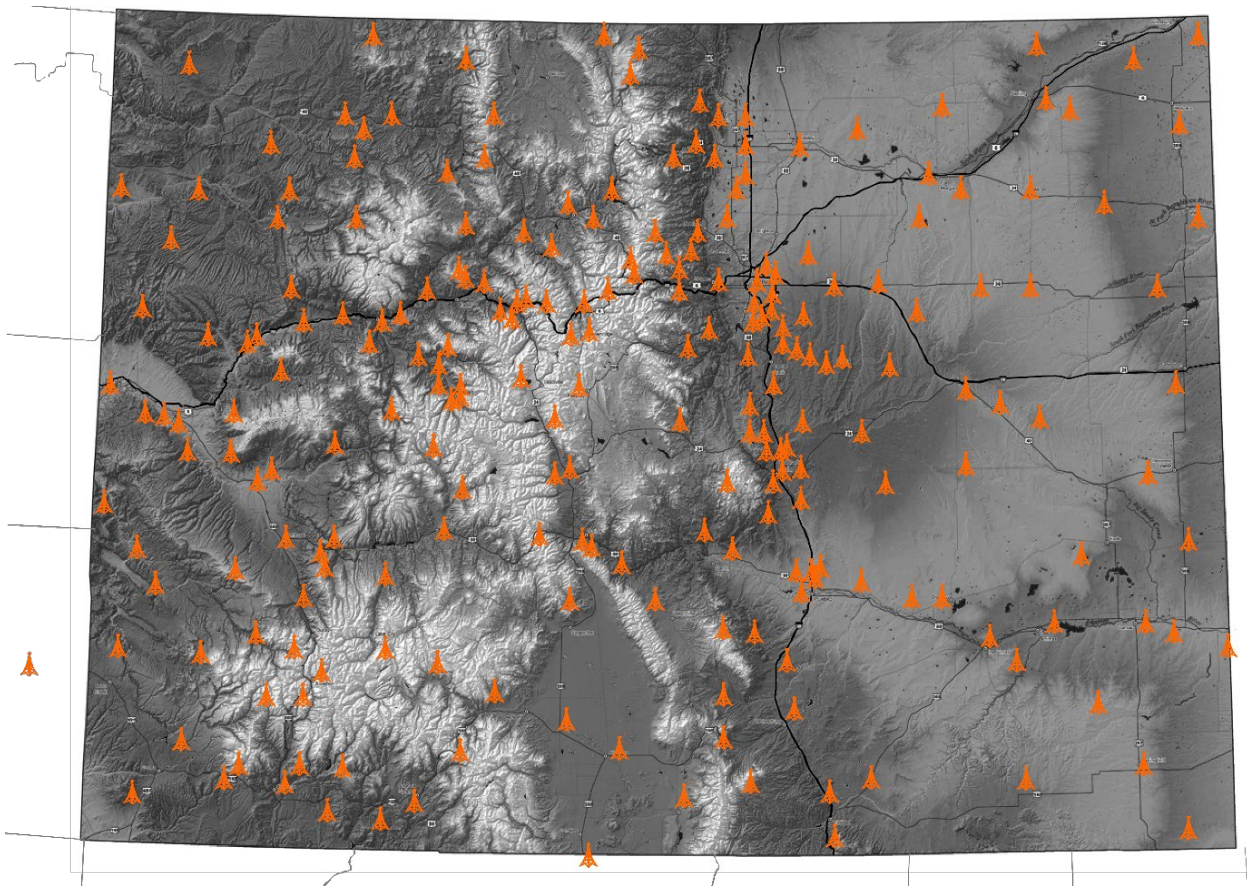
responders in the state. Entities that use DTRS for their day-to-day public safety communications are state agencies, including the State Patrol within the Department of Public Safety, the Departments of Corrections and Transportation, and the Department of Natural Resources' Division of Parks and Wildlife; as well as institutions of higher education; local police, fire, emergency medical service providers, and school districts; and the Regional Transportation District. DTRS is also used by Denver International Airport for radio interoperability during emergencies. In 2018, DTRS supported about 101,000 radios and handled an average of 8.9 million calls per month statewide.

DTRS OWNERSHIP AND ADMINISTRATION

Ownership of DTRS is shared by the State and local public safety agencies. The System was originally started in the late 1990s when some local counties, including Douglas and Arapahoe, sought to make local radio systems compatible across county lines. In the early 2000s, the State began partnering with local governments and federal agencies to replace disparate and obsolete radio systems with DTRS radios and promote interoperability. As of June 2019, the State owns about 55 percent of total DTRS assets, which includes the land where there are state-owned radio towers, buildings on tower sites, the towers, and equipment such as zone controllers, transmitters, and microwave dishes; while local public safety agencies and governments in Colorado own the remaining 45 percent of DTRS assets.

EXHIBIT 1.1 shows the over 240 tower sites across the state with DTRS equipment.

EXHIBIT 1.1. MAP OF DTRS TOWER SITES



SOURCE: Office of the State Auditor analysis of the Governor's Office of Information Technology tower site map.

The Governor's Office of Information Technology (OIT) is the state agency responsible for maintaining the State's telecommunications network, which includes DTRS public safety radio communications, in consultation with local, state, and federal entities [Section 24-37.5-502(1), C.R.S.]. OIT works with the other DTRS owners to maintain components of DTRS infrastructure to benefit the entire System, and ensures that the System complies with Federal Communications Commission (FCC) regulations such as that DTRS is used for public safety purposes only. OIT purchases software and some equipment to enable public safety agencies to use the System, and manages the technical aspects of DTRS, including system monitoring, installation and maintenance of state-owned equipment, software updating, and radio programming for both state agency and some local agency users. Local governments purchase and maintain their equipment and radios.

OIT employs about 50 full-time equivalent staff (FTE) for public safety radio communications related to DTRS. These staff include engineers and electronics specialists licensed by the FCC, who install, maintain, and repair DTRS equipment (e.g., computer hardware components, heating and cooling units, alarm systems, and backup power systems) at the tower sites that the State is responsible for maintaining; analysts who monitor DTRS in real-time using an electronic system that notifies them of any issues with functionality; and project managers who oversee equipment installation and maintenance.

OIT coordinates with local, state, and federal public safety entities by participating in the Consolidated Communications Network of Colorado (CCNC or Network), a nonprofit organization outside of state government that reviews and approves applications from new users requesting System access and oversees best practices and training for DTRS users. One OIT staff serves on the Board of Directors and other committees of the Network. An OIT staff also serves on the Public Safety Communications Subcommittee (Subcommittee) within the Department of Public Safety, which is a stakeholder group of local public safety agencies, some of which use DTRS. The Subcommittee advises the Department of Public Safety on radio communication matters and presents an annual report to the General Assembly with recommendations to improve communications among users of all radio systems.

DTRS FUNDING

State funding for DTRS comes from the General Fund and annual fees that OIT charges each state agency and institution of higher education that uses DTRS [Sections 24-37.5-112(1) and 24-37.5-506, C.R.S.]. The monies are deposited into the Public Safety Communications Trust Fund, the Capital Construction Fund, and the Information Technology Revolving Fund, which is OIT's main operating fund. In Fiscal Years 2016 through 2019, as of April 2019, OIT spent \$71.46 million to manage, maintain, and upgrade DTRS, as summarized in EXHIBIT 1.2.

**EXHIBIT 1.2. PUBLIC SAFETY RADIO COMMUNICATIONS
STATE EXPENDITURES FOR DTRS (IN MILLIONS)
FISCAL YEARS 2016 THROUGH 2019, AS OF APRIL 2019**

	2016	2017	2018	2019	TOTAL
IT and equipment purchases, rental, and maintenance	\$7.77	\$8.74	\$7.55	\$4.44	\$28.50
Personnel and personal services	5.31	4.50	5.69	3.88	19.38
Construction	0.01	0	11.16 ¹	7.36	18.53
Other ²	0.63	0.77	1.66	0.97	4.03
Purchase, rental, and maintenance of land and buildings	0.13	0.18	0.19	0.52	1.02
TOTAL EXPENDITURES	\$13.85	\$14.19	\$26.25	\$17.17	\$71.46

SOURCE: Office of the State Auditor analysis of financial data from the Colorado Operations Resource Engine (CORE).

¹ The increase in expenditures in Fiscal Year 2018 was primarily for a capital project to upgrade and replace DTRS infrastructure, including construction of towers.

² "Other" includes depreciation, travel expenses, delivery charges, energy-related costs, dues and memberships, office supplies, and other miscellaneous costs.

DTRS VENDORS

OIT contracts with different vendors to provide equipment, goods, and services related to DTRS. For example, when OIT staff do not have the expertise to perform improvements on DTRS, such as installing or repairing certain equipment, OIT contracts for these services. OIT has multiyear contracts with two main vendors:

- **MOTOROLA.** OIT has a 10-year contract (Fiscal Years 2016 through 2025) totaling \$34 million with Motorola to replace legacy radio equipment; upgrade tower site equipment; expand the System into new areas of the state; and provide system upgrades, security updates, and technical support.
- **AVIAT, U.S., INC. (AVIAT).** OIT has a 5-year contract (Fiscal Years 2016 through 2020) with Aviat totaling \$56 million for capital construction to replace and upgrade microwave radio equipment throughout the state, as discussed later in the report. In 2016, OIT's decision to award the contract to Aviat was appealed to the Office of the State Controller which upheld OIT's decision, citing that the contract was awarded in the best interest of the State, in compliance with procurement statutes.

AUDIT PURPOSE, SCOPE, AND METHODOLOGY

We conducted this performance audit pursuant to Section 2-3-103, C.R.S., which authorizes the State Auditor to conduct audits of all departments, institutions, and agencies of the state government, and Section 2-7-204(5), C.R.S., the State Measurement for Accountable, Responsive, and Transparent (SMART) Government Act. The audit was conducted in response to a legislative request that raised concerns about OIT's procurement and contract monitoring for DTRS. Audit work was performed from November 2018 through May 2019. We appreciate the assistance provided by OIT's management and staff during this audit.

We conducted this audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The key objectives of the audit were to evaluate how OIT manages DTRS and administers funds to ensure reliable System performance, and the extent to which OIT complies with applicable requirements when funding DTRS projects and monitoring related contracts. The scope of the audit did not include a review of OIT's procurement processes related to issuing requests for proposals and selecting vendors because the Office of the State Auditor completed separate evaluations of OIT's processes in those areas in *HB17-1361 Evaluation Report: Evaluation of State IT Resources* (November 2018) and in *HB18-1421 Evaluation Report: Procurement Process for Major Information Technology Projects* (March 2019).

To accomplish our audit objectives, our audit work included:

- Reviewing applicable statutes and OIT policies and procedures related to its responsibilities for DTRS.
- Interviewing management and staff from OIT and the Department of Public Safety, including State Patrol; staff from the Departments of Natural Resources and Transportation; and members of the Network and the Subcommittee. This included observing Network and Subcommittee meetings.
- Analyzing OIT's expenditures and revenues for DTRS for Fiscal Years 2016 through 2019, and its DTRS assets as of April 2019, using information from the Long Bill, the Colorado Operations Resource Engine (CORE), budget documents, and OIT's database of DTRS assets.
- Evaluating OIT's process for calculating fees charged to state agencies and institutions of higher education for DTRS services.
- Reviewing (1) OIT's plans and processes for increasing DTRS coverage in Colorado, (2) historical System coverage maps, (3) OIT performance plans, (4) DTRS annual reports, (5) OIT's disaster recovery plan for DTRS for Fiscal Year 2019, (6) information on the types of DTRS projects OIT funded in Fiscal Years 2014 through 2025, and (7) documentation on the expertise of OIT staff who monitor and maintain the System.
- Conducting walk-throughs of the system that monitors DTRS operations and performance in real-time.

We relied on sampling techniques to support some of our audit work as follows:

- A random, nonstatistical, sample of 20 Memoranda of Understanding (MOUs) that OIT executed with users and owners of

DTRS to understand whether the MOUs include provisions that help ensure that the System is maintained and state assets are protected.

- A nonstatistical sample of 13 payments totaling \$15.5 million that OIT made for DTRS in Fiscal Years 2018 and 2019, as of January 2019, out of the total \$35.5 million that OIT spent on DTRS in those years. The sample included payments from the Public Safety Communications Trust Fund, Capital Construction Fund, and the Information Technology Revolving Fund for various DTRS projects funded during the period. For each sample, we reviewed supporting documentation that OIT had on file, including vendor contracts and invoices for goods and services, and OIT's documentation of its contract monitoring, to evaluate OIT's processes for ensuring that funds are spent and vendors complete work on DTRS in accordance with applicable requirements.

The results of our nonstatistical samples cannot be projected to the population. However, the sample results are valid for confirming internal controls over MOUs and payments for System projects, and along with the other audit work performed, provide sufficient, reliable evidence as the basis for our conclusions.

We planned our audit work to assess the effectiveness of those internal controls that were significant to our audit objectives. Our conclusions on the effectiveness of those controls, as well as specific details about the audit work supporting our conclusions are in the remainder of this report. OIT reviewed a draft of this report, and we have incorporated OIT's comments into the report where relevant.



CHAPTER 2

ADMINISTRATION OF THE DIGITAL TRUNKED RADIO SYSTEM

As the state agency charged with maintaining the State's telecommunications network, which includes the statewide Digital Trunked Radio System (DTRS or System) that is used for public safety radio communications, the Governor's Office of Information Technology (OIT) works collaboratively with local, state, and federal entities [Section 24-37.5-502(1), C.R.S.]. For example, OIT executes Memoranda of Understanding (MOUs) with state and local entities that participate in DTRS, provides services to state agencies that use the System and charges them service fees, and works with the Federal Communications Commission to ensure that DTRS complies with applicable federal regulations.

Our audit evaluated how OIT manages DTRS and associated funding. Our work did not identify gaps or deficiencies in the OIT controls we reviewed. Overall, we found that OIT has reasonable processes in place to carry out its responsibilities related to DTRS. The remainder of this chapter provides detail on the work we conducted and our conclusions.

SYSTEM MANAGEMENT AND OVERSIGHT

Public safety agencies in Colorado that want to use DTRS must submit an application to the Consolidated Communications Network of Colorado (CCNC or Network) to request access. Network members, including those who are OIT staff, evaluate each application with respect to the applicant's business need to access the System, whether the addition of the new user will negatively affect the System, and the extent to which the applicant owns a tower or other equipment that can be used to connect to DTRS.

OIT executes MOUs with DTRS users to outline responsibilities, such as equipment maintenance, tower site access, and software upgrades; to help ensure cooperation among users and owners; and to help protect the System and state assets. OIT executes two types of MOUs, as follows:

- **SITE SHARING MOUs** with each entity that owns a DTRS tower site or equipment. Site sharing MOUs promote cost sharing by allowing the State, and local and federal governments to share site or tower resources and responsibilities. For example, under its site sharing MOU with the Montrose Fire Protection District, the State owns and is responsible for all System equipment housed in the District while the District is responsible for maintaining the propane generator, replacing solar batteries, and providing power for the equipment.

- Software MOUs with DTRS users that are meant to ensure that OIT can install and update DTRS software, as needed.

On a daily basis, OIT monitors communications traffic on DTRS, the status of all towers in the System, and all radios connected to DTRS, including those used by local and federal agencies. OIT maintains an inventory of all DTRS assets, such as buildings, towers, generators, and radio transmitters, which the State and local agencies own. When OIT contracts with a vendor, such as to repair state assets, OIT tracks the contract information in a database and has processes to monitor the contractors for adherence to the contract provisions.

In 2014, the General Assembly passed Senate Bill 14-127, which declared that there was a “pressing need to address public safety radio communications in the state” and that there were areas in the state that “suffer critical gaps in radio system coverage and urgently need to be built out.” This bill authorized the State to conduct a public safety radio communications needs assessment, which was completed in 2015. The needs assessment recommended that the State expand, improve, and modernize radio communications.

WHAT AUDIT WORK WAS PERFORMED AND WHAT WAS THE PURPOSE?

We assessed how OIT manages DTRS, including maintaining, monitoring, and improving the System’s functionality, to ensure that it is continuously available to public safety user agencies in Colorado. We reviewed OIT’s involvement in the Network, observed a Network meeting, and interviewed Network members. We also reviewed a sample of 20 MOUs that OIT executed with current users of DTRS and reviewed documentation of OIT’s contract monitoring for Fiscal Years 2018 and 2019, including OIT staff logs of tower site visits. Finally, we conducted interviews with OIT staff and walk-throughs of the system that monitors DTRS operations and performance. The purpose of our work was to evaluate OIT’s processes for assessing and maintaining DTRS performance.

WHAT DID OUR AUDIT WORK FIND?

Overall, we found that OIT manages DTRS consistent with statute, operates DTRS in a manner that helps ensure that users have reliable public safety radio communications, and has taken steps to upgrade DTRS equipment and expand coverage. In addition, the state and local DTRS users we interviewed reported to us that OIT is doing a good job of managing the System and coordinates with public safety agencies and system co-owners to operate DTRS effectively. Specifically, we found:

OIT helps approve new DTRS users. In Calendar Year 2018, OIT actively participated in the Network by helping to review and approve 34 applications for new DTRS users. OIT also coordinated with all new users to help them install equipment and software needed to connect to DTRS.

MOUs contain provisions to protect the State. Based on our review of the sample of MOUs, we found that the MOUs were complete and consistently reflected the following users' responsibilities:

- Site sharing MOUs included numerous requirements such as that the user maintains the site and equipment and gives OIT a 180-day notice if the user wants to withdraw from DTRS and terminate the MOU. According to OIT, the purpose of the notice period is to allow the State enough time to assess the impact of the loss of a user that owns a tower site and locate or construct an alternate site to avoid a gap in public safety radio coverage in that area.
- Software MOUs included requirements that the user: (1) provide radio equipment that is compatible with DTRS software, (2) allow OIT to install DTRS software on the users' radios, and (3) authorize OIT to access tower sites owned by the user to update software, as needed. These MOUs also require the user to reimburse OIT if the user leaves the System after OIT provides software upgrades during the term of the agreement, which generally spans about 8 years.

OIT MONITORS DTRS IN REAL TIME. We found that OIT staff monitor DTRS in real time. An electronic system notifies them of events such as a

security alarm or equipment problem at a tower site, including the significance of problems, and the appropriate OIT staff or local officials visit the site to address the problem. OIT staff are also able to remotely disable DTRS radios that have been lost or compromised. OIT reported to us that by summer 2019, it will have increased capability to monitor DTRS through new software that will provide more detailed information about any problems on the tower sites and with the equipment.

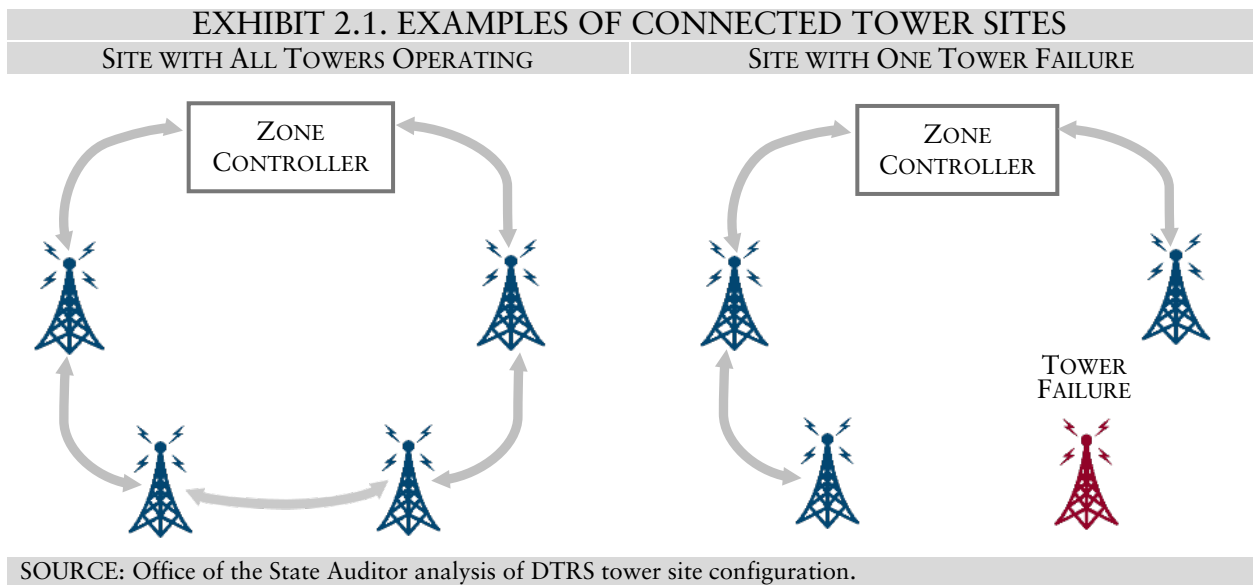
In addition, we confirmed that OIT has implemented a disaster recovery plan for DTRS, as recommended in our prior performance audit of the System in 2007. OIT's disaster recovery plan and business continuity plan for DTRS specify communication protocols and procedures in the event of an emergency.

OIT STAFF FOLLOW CONTRACT MONITORING PROCESSES. Based on our review of OIT's contract monitoring documentation, we found that OIT staff consistently follow the established contract monitoring processes to help ensure that work is performed in a timely manner and according to contract requirements. For example, OIT staff engineers located throughout the state accompany contractors when they are working at DTRS sites to observe the work being performed and verify that the equipment functions properly after the work is performed. Both parties sign off on documents validating that the work is completed. Our work related to OIT's controls over payments to vendors and expenditures for DTRS projects is discussed in the next section.

OIT HAS TAKEN STEPS TO IMPROVE DTRS AND ADDRESS COVERAGE GAPS. OIT responded to the 2015 needs assessment by: (1) executing the \$56 million Aviat contract in 2016 to perform DTRS equipment upgrades in different areas of the state over a 5-year period, and (2) reviewing and approving local government projects to add new tower sites or upgrade existing sites, as described below.

- **5-YEAR CONTRACT FOR DTRS UPGRADES.** In five areas of the state, Aviat is upgrading DTRS equipment to improve coverage, which is connecting tower sites in loops or rings, as shown in EXHIBIT 2.1. These upgrades reduce the likelihood of coverage loss by creating

redundancies in the flow of radio traffic if one site goes offline within the loop.



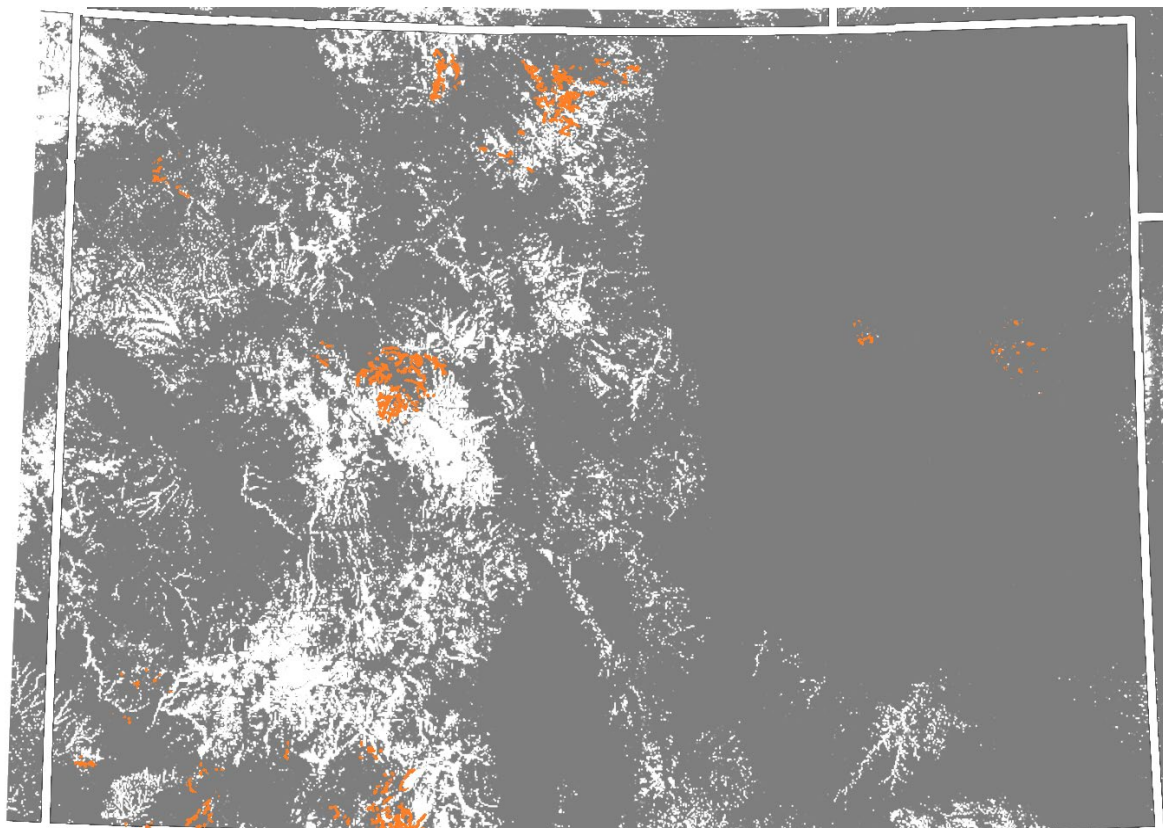
OIT reported that it is on track to complete all five phases by the end of Fiscal Year 2020. As of April 2019, equipment upgrades had been completed as follows:

- ▶ Phase 1–Denver Metro, 100 percent
 - ▶ Phase 2–Northeast Colorado, 85 percent
 - ▶ Phase 3–Southeast, 97 percent
 - ▶ Phase 4–Southwest, 65 percent
 - ▶ Phase 5–West, final design phase, 3 percent.
- Projects to add new tower sites or upgrade existing tower sites. Pursuant to House Bill 18-1325, OIT is receiving appropriations in Fiscal Years 2019 and 2020 to work with local governments that use DTRS to upgrade tower sites and develop new sites [Section 24-37.5-506, C.R.S.]. OIT receives and evaluates project proposals from local governments seeking funding assistance to add or upgrade tower sites. We reviewed OIT documentation, and as of April 2019, found that OIT had received seven proposals and had approved four of them for a total of about \$1.1 million in assistance. OIT has implemented a process to evaluate the proposals to ensure that it only

approves those that meet requirements for site readiness, including having: (1) electrical power, (2) a tower that can support the installation of DTRS equipment, (3) the ability to be connected to other sites, (4) an equipment building or shelter, and (5) leases or permits that will allow OIT to access the site. Three of the seven proposals OIT has received as of April 2019 were not approved because they did not fully comply with all the requirements.

EXHIBIT 2.2 shows the radio coverage areas as of February 2019, which includes roughly 93 percent of the state, according to OIT. The gray areas represent coverage that existed prior to 2015; the orange areas represent new coverage added since 2015; and the white areas show where there is reduced or no radio coverage.

EXHIBIT 2.2. DTRS COVERAGE MAP



SOURCE: Office of the State Auditor analysis of OIT's coverage maps.

- Gray represents the areas with coverage as of 2015.
- Orange represents areas where new coverage has been added since 2015.
- White represents areas with reduced or no radio coverage.

MANAGEMENT OF DTRS FUNDING

OIT's annual budget includes state funding for DTRS, which is subject to the annual budget request process. The budget for DTRS capital projects, such as state land purchases, buildings, equipment, and building construction, is approved by the Capital Development Committee, which also prioritizes funding for projects [Sections 24-30-1301 and 2-3-1304, C.R.S.].

OIT pays for operating expenses from the Public Safety Communications Trust Fund and Information Technology Revolving Fund, and for capital construction expenses out of the Capital Construction Fund. Some DTRS funding sources carry distinct spending requirements. For example, House Bill 14-1203 requires an annual appropriation of \$3.5 million in Fiscal Years 2014 through 2025 to the Public Safety Communications Trust Fund for "replacement of legacy radio equipment and hardware at radio tower sites" [Section 24-37.5-506(2.5)(a), C.R.S]. As another example, from Fiscal Year 2016 to Fiscal Year 2019, OIT received appropriations totaling \$42.5 million to the Capital Construction Fund for DTRS capital construction and maintenance projects approved by the Capital Development Committee [1 CCR 101-1, Rule 4-2(3.1.1.)].

WHAT AUDIT WORK WAS PERFORMED AND WHAT WAS THE PURPOSE?

Our audit assessed OIT's management and use of monies for DTRS to determine whether OIT follows relevant state statute, regulations, and procurement requirements. Specifically, we reviewed a nonstatistical sample of 13 of OIT's payment transactions for DTRS totaling \$15.5 million out of the total \$35.5 million that OIT spent on DTRS between July 2017 and January 2019. The sample included payments that were: (1) made from each of the three Funds described above; (2) paid to a variety of vendors; and (3) for a range of projects and expenses such as

construction services, personal services, equipment, and a real estate purchase. For each of the 13 sampled payments, we reviewed OIT's documentation supporting the payment, such as invoices, purchase orders, and associated contracts; accounting data in the Colorado Operations Resource Engine (CORE); and OIT's contract monitoring documentation. The majority of OIT's spending for DTRS in the sample (\$14.9 out of the \$15.5 million) was for multi-year contracts with Motorola and Aviat.

WHAT DID THE AUDIT WORK FIND?

Overall, we found that OIT spends funds for DTRS in line with applicable requirements, and has sufficient processes and controls for managing funds to help ensure that state resources are used efficiently and effectively, and that DTRS operates optimally statewide, as described below. For the sample we reviewed, we found that OIT's spending for DTRS was in line with applicable statutes, contract, and procurement requirements that were relevant to our audit objectives. We did not identify any improper or noncompliant payments. We found that the sampled payments:

- **ALIGNED WITH THE APPROVED APPROPRIATION AND APPLICABLE STATUTORY AND REGULATORY REQUIREMENTS.** For example, for three sampled payments that OIT made from the Public Safety Communications Trust Fund for software, hardware, and services to upgrade the System, we verified that the service or good met the statutory requirements restricting the funds to use for replacement of radio equipment at sites and software upgrades [Section 24-37.5-506(2.5)(a), C.R.S.].
- **ALIGNED WITH THE SCOPE OF WORK IN THE ASSOCIATED CONTRACTS AND/OR PURCHASE ORDERS.** For example, for one sampled payment of \$571,000 that OIT made for site equipment replacement, the payment was for multiple pieces of equipment, including transmitter components called "GTR8000," which were specified in the vendor contract.

- **COMPLIED WITH THE PROCUREMENT REQUIREMENTS.** Each sampled payment had a signed and current contract in place, when applicable, or an accurate and complete purchase order. OIT's documentation also demonstrated that management and staff who oversee DTRS spending and projects followed contract monitoring processes for ensuring that the work was performed prior to authorizing payment. For example, for two payments related to construction at sites, the OIT engineer verified that the vendor had performed the work before the program manager and the OIT controller authorized payment.

RADIO FEE SETTING

In Fiscal Years 2016 through 2019, the average fee per radio per month that OIT charged state agencies and institutions of higher education ranged from about \$37 to about \$50. In those years, OIT billed state agencies and institutions of higher education that used DTRS a combined average of about \$8.5 million annually for these fees.

OIT collects fees from state agencies and institutions of higher education that use OIT's services for DTRS through a cost recovery methodology whereby OIT estimates the overall cost of services for all agencies based on prior year costs, breaks the overall amount into a utilization unit of one radio per month, and then charges agencies proportionally based on the number of radios an agency has. For example, the total service cost budget for DTRS for Fiscal Year 2019 is \$9.2 million, and OIT expects state users to operate about 184,500 radios during the year, or about 15,400 radios per month on average, so the fee is set at approximately \$50 per radio per month, although the actual number of radios in use varies each month based on need. The Department of Public Safety is expected to operate about 37,440 radios, which is multiplied by the radio fee of \$50 per radio for a total service cost of about \$1.9 million. OIT bills agencies on a monthly basis based on estimated usage, reconciles actual utilization at year-end, and adjusts the agencies' invoices accordingly.

WHAT AUDIT WORK WAS PERFORMED AND WHAT DID THE WORK FIND?

We reviewed OIT's fee setting methodology and found that the radio fee amounts that OIT charged appeared reasonable based on OIT's service costs, and that the fee increases in recent years were based on increases in service costs. According to OIT, various factors contributed to increased service costs, such as depreciation of assets, increases for salary survey, and other increases to operating costs for infrastructure upgrades. For example, the increase in Fiscal Year 2019 was due in large part to the microwave upgrade capital project that created additional annual service costs of approximately \$1 million and 10 FTE.

