Quick Notes about the Meeting

- **Please add your agency affiliation to your name**. (Right click on your name and "Rename" to include agency)
- Everyone has the ability to unmute and/or show video, if we're hearing feedback, you may be muted.
- Feel free to use the chat box.

….and now quick introductions!

Agenda Snapshot

SMART Grant Discussion

Informational Briefings

RTOT Set Aside Projects

CV Project Updates

Partner Agency Updates and Other Matters

Next Meeting

October 3, 2023

SMART Grant Discussion

Emily Lindsey, DRCOG

Kalie Fallon, DRCOG

2023 Strengthening Mobility and Revolutionizing Transportation (SMART) Grant

Information about the SMART Grant program is available here.

DRCOG requests that all SMART grant requests in the Denver region be submitted for Transportation Advisory Committee (TAC) review at the September 25, 2023 meeting for information and discussion – *not approval*.

If requested, DRCOG will provide letters of support for any project consistent with the 2050 Metro Vision Regional Transportation Plan.

Please submit this form to Cam Kennedy - ckennedy@drcog.org by 5:00pm MST on September 14, 2023.

Agency:

Contact:

Project Name:

Project Type:

Project Description:

Total Project Cost:

SMART Grant Funding Request:

				Regional Transportation Operations and Technology Set-Aside Draft Recommendations Federal Funding by Fiscal Year					
Agency	Project Name	Project Description	Total Federal Funds Requested	FY 2024	FY 2025	FY 2026	Total	Weighted Average Score (0 - 5)	Comments
Aurora	Traffic Management Center	Construction project to deploy a new traffic management center at the North Satellite facility. Development of a concept of operations will precede design and construction.	$ 1,101,000			$ 1,101,000	$ 1,101,000	2.476	Full allocation of funds is contingent on completion of appropriate Concept of Operations document.
Louisville	Signal Technology Upgrade	Procurement of upgraded traffic signal cabinets, uninterruptible power supplies, video-based intersection detection and emergency preemption detection at select intersections across Louisville.	$ 545,000	$ 545,000			$ 545,000	2.355	Louisville must specify locations of all equipment listed in estimate.
Longmont	Smart Signals to Schools	Procurement of video-based intersection detection and traffic cameras for 39 intersections. Longmont resources will deploy and configure these devices.	$ 1,580,000	$ 445,560	$ 445,560		$ 891,120	2.352	Allocation adjusted. This set-aside is directed to projects on the DRCOG Regional Roadway System. The 24 intersections located on this system are recommended for funding (accounting for 21% match). Construction engineering and indirect not allowed; equipment procurement project.
Jefferson County	Traffic Camera System	Procurement of combined traffic camera/intersection detection system for 12 intersections. Jefferson County resources will deploy and configure these devices.	$ 248,000		$ 248,000		$ 248,000	2.349	
CDOT R4	US 287 Traffic Signal Equipment and Detection Expansion	Procurement of controllers, communications equipment, uninterruptible power supplies, and traffic cameras for 8 intersections on US-287. CDOT R4 resources will deploy this equipment. Construction project to deploy intersection detection at 7 intersections along US-287.	$ 103,850	$ 5,400			$ 5,400	2.312	Allocation adjusted. Equipment procurement only; construction costs not allowed. Application requesting equipment already deployed; no additional functionality beyond existing identified. Traffic cameras allowed for 2 intersections that are gaps in coverage.
Denver	V2X Communication devices (RSU) Expansion	Construction project to expand deployment of connected vehicle roadside units along Colfax Ave and Sheridan Blvd. Additionally, data collected by these devices will be used to automated traffic signal performance measure-related (ATSPM) capabilities.	$ 1,700,000	$ 850,000	$ 850,000		$ 1,700,000	2.308	Full allocation of funds is contingent on completion of appropriate Concept of Operations document. Additionally, coordination with regional ATSPM is a requirement.
Boulder	Communications Network and Signal System Performance Enhancement	Procurement of signal controllers, communications equipment, and advanced detection for 37 intersections. Procurement of traffic cameras for 34 intersections. Boulder resources will deploy and configure these devices. Procurement and configuration of a software module for Boulder's existing traffic signal system to provide automated traffic signal performance measure (ATSPM) capabilities.	$ 1,204,000	$ 602,000	$ 602,000		$ 1,204,000	2.299	
Aurora	Communications Infrastructure Improvements	Construction project to deploy fiber backbone communications between Aurora Municipal Center and North Satellite facility. Utilizing the backbone, the project will interconnect (fiber and radio) 31 signals crossing I-225 to its existing traffic signal system.	$ 736,000			$ 736,000	$ 736,000	2.296	
Littleton	Broadway Signal Interconnect (Phase 2)	Construction project to expand traffic signal interconnect (fiber) for 15 intersections on Broadway and select crossing streets. The project also deploys controllers, cabinets, communications equipment, intersection detection, traffic cameras, and travel time monitoring devices.	$ 2,963,000		$ 328,000	$ 2,635,000	$ 2,963,000	2.286	Allocation adjusted. Recommend combining FY26 and FY27 requested funds in FY26.
Thornton	Travel Time Monitoring Expansion	Procurement of travel time monitoring devices for 23 intersections to expand Thornton's existing travel time monitoring system. Thornton resources will deploy and configure these devices.	$ 101,200	$ 101,200			$ 101,200	2.274	
Superior	Traffic Safety and Climate Resilience	Procurement and deployment of an upgraded traffic signal system shared by Superior and Louisville to improve monitoring capabilities and signal coordination. This project also procures pedestrian buttons and intersection detection for 2 intersections. Superior resources will deploy and configure these devices.	$ 99,300	$ 99,300			$ 99,300	2.247	
CDOT R4	CO 7 Traffic Signal Equipment and Detection Expansion	Procurement of controllers, communications equipment, uninterruptible power supplies, and traffic cameras for 8 intersections on CO-7. CDOT R4 resources will deploy this equipment. Construction project to deploy intersection detection at 7 intersections along CO-7.	$ 327,850		$ 232,100		$ 232,100	2.170	Allocation adjusted. Equipment procurement only; construction costs not allowed. Application requesting equipment already deployed; no additional functionality beyond existing identified. Traffic cameras allowed for 3 intersections that are gaps in coverage.
Aurora	Traffic Signal Equipment Upgrade	Procurement of 42 uninterruptible power supplies and intersection detection for 42 intersections. Aurora resources will deploy these devices at 74 intersections.	$ 1,021,000		$ 1,021,000		$ 1,021,000	2.168	
CU Denver	Enhancing Traffic Analytics with LIDAR	Deployment of 6 LIDAR devices at intersections along Colfax Ave and Federal Blvd. Additionally, this project will test the accuracy and effectiveness of this technology against other data collection methods.	$ 254,127					2.028	Not recommended. The application focuses on technology evaluation. The application was not clear how the deployment translates into operations improvements. The application did not reflect a clear and active partnership with the City and County of Denver which is responsible for signal operations on the project roadways. The project may be more applicable to other DRCOG, state and federal funding programs.

				Regional Transportation Operations and Technology Set-Aside Draft Recommendations Federal Funding by Fiscal Year						
Agency	Project Name	Project Description	Total Federal Funds Requested	FY 2024	FY 2025	FY 2026	Total	Weighted Average Score (0 - 5)	Comments
Denver	Traffic Responsive Signal System	Procurement, deployment, and configuration of a software module for Denver's existing traffic signal system to provide traffic responsive signal control based on data provided by Denver's existing arterial travel time monitoring system.	$ 320,000					1.932	Not recommended. This application scored in lower quarter of applications. Applicant made no provision to develop a concept of operations or coordinate this project with CDOT R1 and Lakewood as noted at the letter of interest forum.
RTD	Virtual Guide Application for Access-a-Ride Pilot	Procurement and deployment of an app/software and support services to provide virtual guidance to paratransit customers with visual, hearing and cognitive difficulties for a period of 4 years.	$ 2,986,047					1.848	Not recommended. This application scored in the lower quarter of applications. This traveler information project/service has limited direct operations benefits to the region. This could be a valuable project, but is more applicable for the Human Services Transportation Set-Aside funding program.
Castle Rock	Dynamic Message Sign Deployment	Construction project to deploy three dynamic message signs in Castle Rock and on CDOT ROW to display traveler information messages to approaching drivers to encourage drivers to avoid dangerous and congested conditions.	$ 640,000					1.642	Not recommended. This application scored in lower quarter of applications. Application does not satisfy primary intent of the traveler information initiative in the Regional Transportation Operations and Technology Strategic Plan - process to coordinate traveler information between jurisdictions.
Denver	Dynamic Message Sign Expansion	Construction project to deploy 6 dynamic message signs across Denver to display traveler information messages to approaching drivers indicating anticipated or ongoing roadway disruptions.	$ 2,483,700					1.470	Not recommended. This application scored in lower quarter of applications. The application does not satisfy the primary intent of the traveler information initiative in the Regional Transportation Operations and Technology Strategic Plan - process to coordinate traveler information between jurisdictions.
Denver	Downstream Count Expansion	Construction project to deploy 37 vehicle count stations across Denver.	$ 857,704					1.131	Not recommended. This application scored in lower quarter of applications. Vehicle count stations are not a Regional Transportation Operations and Technology Strategic Plan priority.
			$ 19,271,778	$ 2,648,460	$ 3,726,660	$ 4,472,000	$ 10,847,120		

CDOT CV Program Update

Heather Pickering-Hilgers, Technical Project Manager
Office of Innovative Mobility

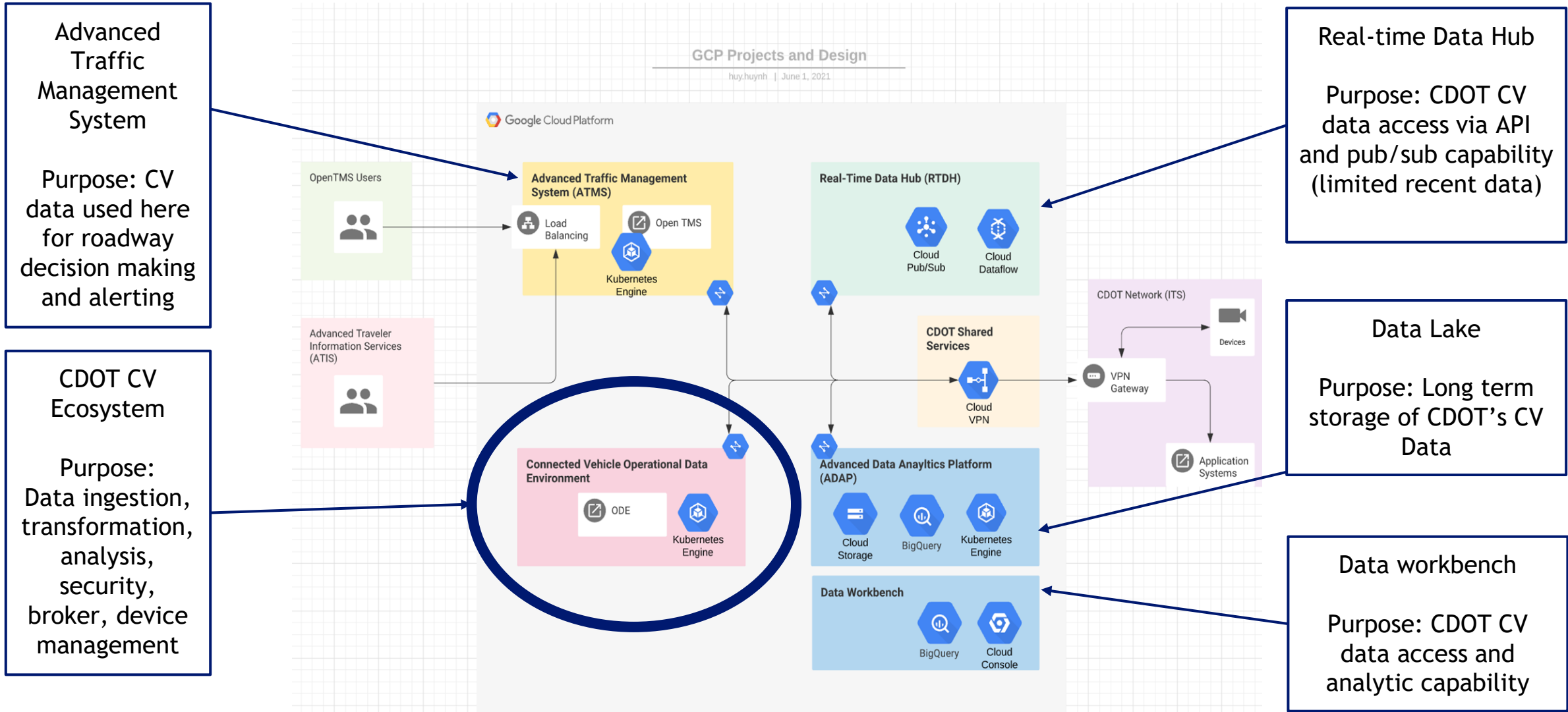# Connected Vehicle Program at CDOT

2019 - 2021
- CV system moved internal to CDOT
- Fully functional, open source ecosystem - leveraged system built by WyDOT and other state DOTs
- Greater system capacity (scaling, data mgt, device mgt, latency, flow, troubleshooting)
- Increased staff capability
- Workforce Development

2015 - 2019
- CV system completely external to CDOT
- Little control/access to our devices and data
- Little opportunity to improve capacity
- System changes = cumbersome and time consuming
- $$$

2022 - Current
- Operational in CDOT's systems
- Security enhancements and Intersection functionality
- Ready for 400+ RSUs
- RSU/OBU grant program
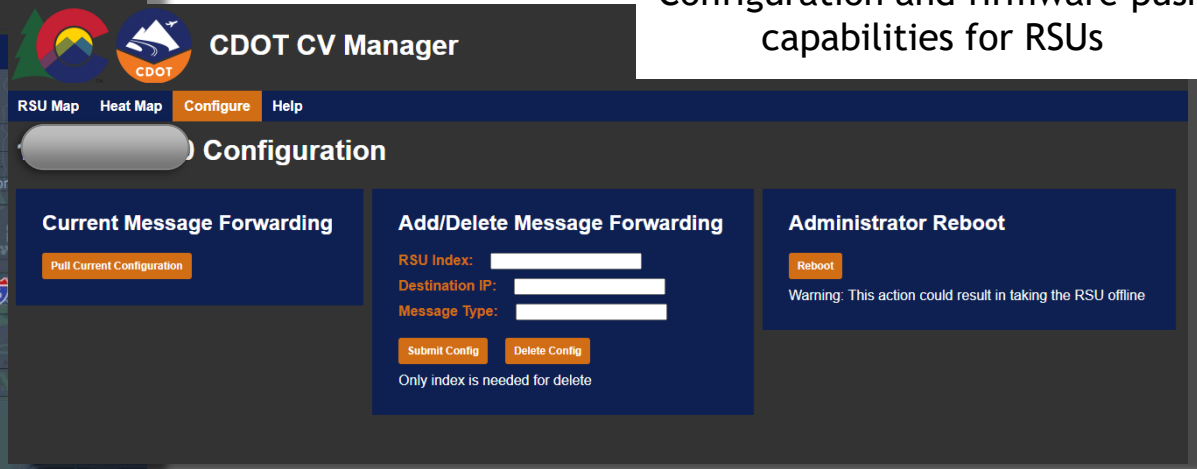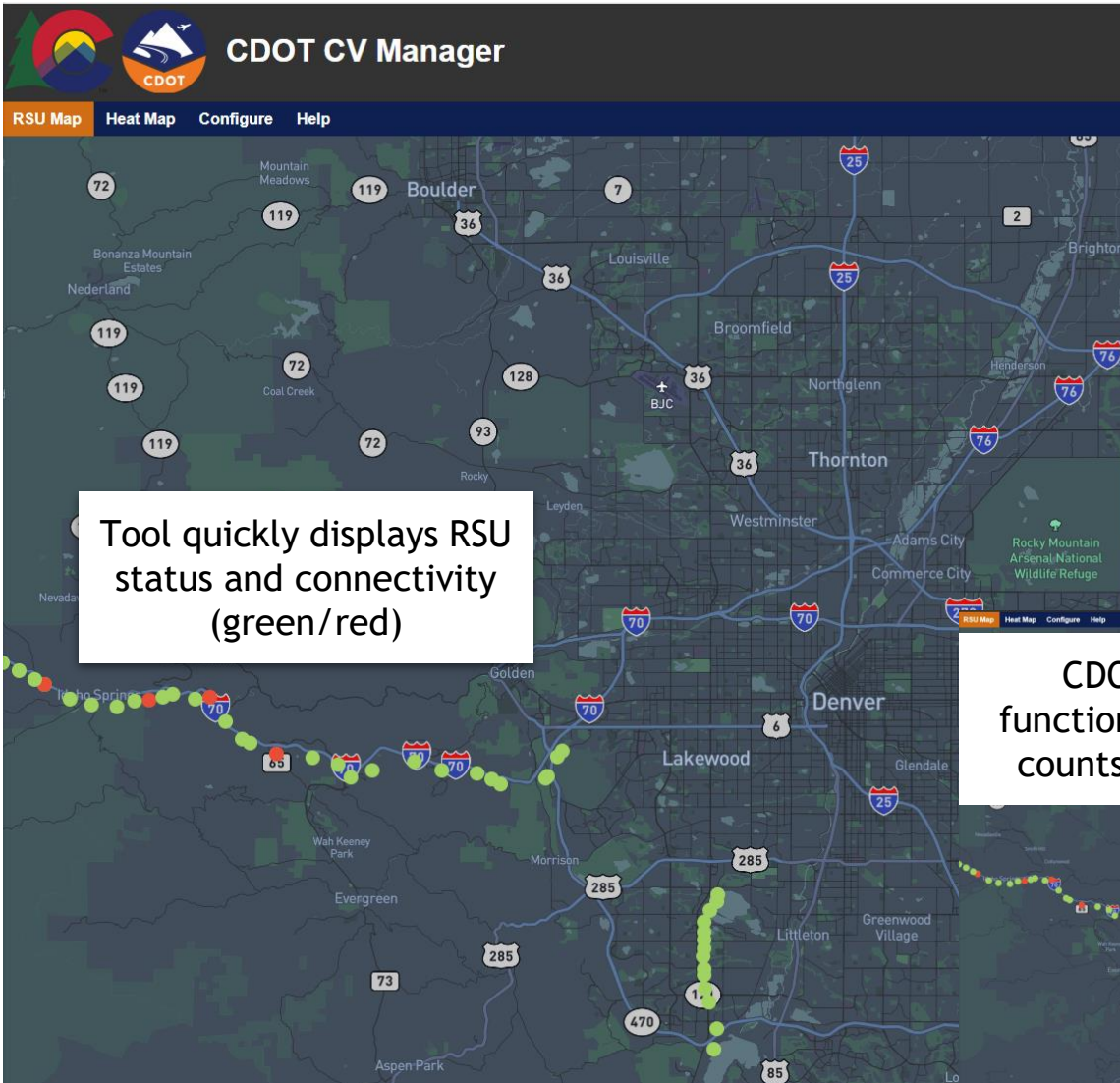- Data sharing
- Linkage and support to other CDOT programs

Advanced Traffic Management System

Purpose: CV data used here for roadway decision making and alerting

CDOT CV Ecosystem

Purpose: Data ingestion, transformation, analysis, security, broker, device management

Real-time Data Hub

Purpose: CDOT CV data access via API and pub/sub capability (limited recent data)

Data Lake

Purpose: Long term storage of CDOT's CV Data

Data workbench

Purpose: CDOT CV data access and analytic capability

GCP Projects and Design
huy.huynh | June 1, 2021

Google Cloud Platform

OpenTMS Users

Advanced Traffic Management System (ATMS)
Load Balancing
Open TMS
Kubernetes Engine

Advanced Traveler Information Services (ATIS)

Connected Vehicle Operational Data Environment
ODE
Kubernetes Engine

Real-Time Data Hub (RTDH)
Cloud Pub/Sub
Cloud Dataflow

CDOT Shared Services
Cloud VPN

Advanced Data Anayltics Platform (ADAP)
Cloud Storage
BigQuery
Kubernetes Engine

Data Workbench
BigQuery
Cloud Console

CDOT Network (ITS)
Devices
VPN Gateway
Application Systems

CV Manager Tool
(developed by the CV dev team)

Configuration and firmware push capabilities for RSUs

Tool quickly displays RSU status and connectivity (green/red)

CDOT CV Manager Tool functionality includes message counts (BSM, TIM, SRM, SSM)
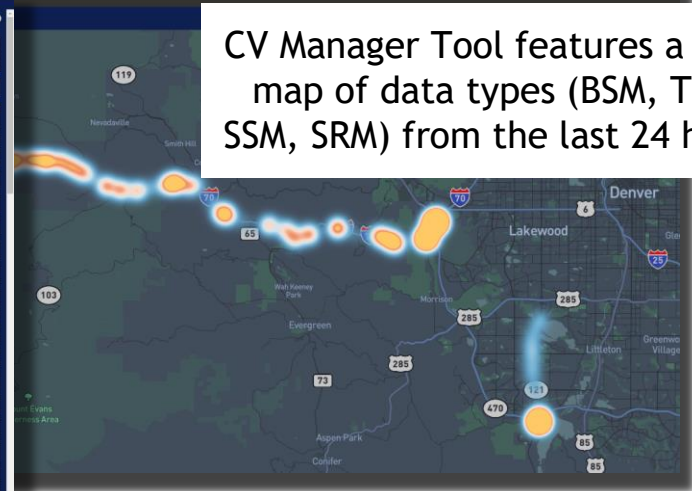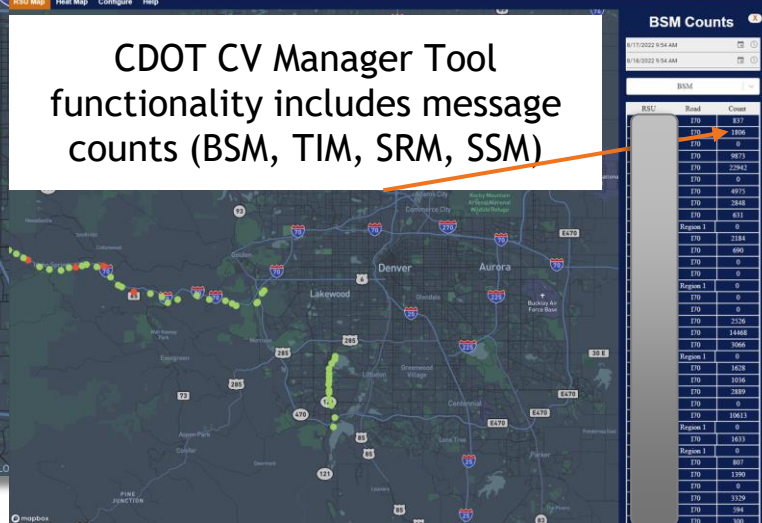
CV Manager Tool features a heat map of data types (BSM, TIM, SSM, SRM) from the last 24 hours

Communicating Worker's Presence

ABS events to detect spot weather

Traffic signal priority for snowplow operation

CV data analysis use case of Harsh Braking in equipped vehicles - notebooks and visualizations constructed by the team for this use case

CV Data Analysis + Visualization

CV data analysis use case of active emergency vehicles location and leveraging cloud connected data sources

Visualizations below show emergency vehicles' location. Data to be published in RTDH for consumption

Past and Current Projects:

I-70 Mountain Corridor Deployment
- Completed in December 2022

Region 1 Connected Snowplow Signal Priority
- Piloted in Winter 2022/2023

Main Focus: USDOT 2018 BUILD Grant
- 455 miles of CV units (dark blue sections to the right)
- 319 miles of fiber (magenta sections to the right)
- I-70 RSU Refresh

Future Projects:

OBU Refresh
- Slated to start in 2024

Wolf Creek Pass
- Curve Speed Warning

BUILD CV Radios
Installed CV Radios
BUILD Fiber

Thank you!

Questions and Discussion

Heather Pickering-Hilgers, PMP
Technical Project Manager for Mobility Technology
heather.pickeringhilgers@state.co.us

Other Matters

Type in the chat box or chime in (just unmute yourself).