



4201 East Arkansas Avenue  
Denver, CO 80222-3406

**DATE:** March 6, 2015

**TO:** Transportation Commission

**FROM:** Director, Division of Transportation Systems Management & Operations (TSM&O)

**SUBJECT:** I-70 Winter Operations Year-to-Date Performance Overview

#### Purpose

To inform the Transportation Commission on the current efforts and performance of I-70 Winter Operations between Vail and Golden.

#### Action

This is information only for the Commission.

#### Background

The winter of 2013-2014 experienced increased snowfall and multiple days with delays in excess of two and three hours between Frisco and Eisenhower Tunnel. From May through October, the Division of TSM&O and the Division of Highway Maintenance led an unprecedented effort with Region 1 and Region 3 staff to develop a Winter Operations plan for the 2015 winter season with the specific goals of improving safety, reducing closure time, and improving travel reliability.

Key focus areas of the Winter Operations Plan include Active Traffic Management (ATM), Winter Maintenance Operations, and Commercial Vehicle Management. Improvements for the 2015 winter season include expanded ramp metering and continuous flow metering, expanded Heavy Tow and Courtesy Patrol coverage, increased staffing and equipment readiness for maintenance, and improved systems for implementation of the Chain Law.

CDOT Maintenance Statewide has given to this effort by sending a supplemental crew of 20 snowplow drivers to the corridor every week through winter. Additionally, mid-range snowplows were replaced with tandem snowplows that are more appropriate and effective for operations in the mountain terrain. The Division of TSM&O also hired new personnel to manage operations with an I-70 Corridor Operations Manager, a dedicated employee to oversee all planning and execution of operational strategies, and an I-70 Highway Incident Manager, to patrol Friday-Monday and assist with incident quick clearance and management of major closures, and storm events.

#### Details

This winter has seen many successes as implementation of the Winter Operations Plan has helped to reduce crashes, delays, and closure time. There have also been new challenges that have given CDOT staff the opportunity to identify future operational projects and improvements to operational procedures.

Below is a summary of the progress of our top performance objectives. Objectives 1 and 2 are safety measures that are through the end of January 2015 due to the lag time in obtaining crash records from law enforcement. Objectives 3, 4, and 5 are current through March 1, 2015. A green traffic signal icon indicate that an objective is measuring at or exceeding its target for the current year-to-date performance; a yellow traffic signal icon indicates that an objective is below its target; but exceeding last winter's year-to-date performance, and a red traffic signal icon indicates an objective is below last winter's year-to-date performance. Snowfall comparison are also included to provide context for the performance comparison.



	Performance Objectives	Last Winter	This Winter Target	Last Winter YTD	This Winter YTD	% Change from same time last winter	
1.	Reduce injury and fatal crashes between Vail and C-470 (as of Jan 31, 2015)	258	237/-10%	113	82	-27%	
2.	Reduce weather related crashes between Vail and C-470 (as of Jan 31, 2015)	805	724/-10%	364	254	-30%	
3.	Reduce I-70 Closure Time between Vail and C-470 (as of Mar 1, 2015)	203 hours	162 hours/ -20%	141 hours	121 hours	-14%	
4.	Reduce number of hours of eastbound delay in excess of 75 min - all days Frisco to C-470 (normally 58 min free-flow travel time) (as of Mar 1, 2015)	28 hours	21 hours/ -25%	28 hours	21 hours	-25%	
5.	Reduce eastbound Sunday Planning Time Index* Frisco to C-470 (as of Mar 1, 2015)	1.69	1.52/-10%	2.44	1.99	-18%	

#### Snowfall Comparisons

Station	Total Snowfall (inches)		% Change
	2013-14 YTD*	2014-15 YTD*	
NOAA - Golden	63.5	76.5	20.5%
NOAA - Evergreen	35.7	30.6	-14.3%
NOAA - Georgetown	80.7	71.5	-11.4%
NOAA - Dillon	123.9	75.5	-39.1%
NOAA - Vail	151.2	116.9	-22.7%
NOAA - Edwards	84	52.8	-37.1%

\*YTD data is from October 1st thru March 1st

Average      -17.4%  
Median        -18.5%

#### Attachments

None





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DATE: March 6, 2015

TO: Transportation Commission

FROM: Director, Division of Transportation Systems Management & Operations (TSM&O)

SUBJECT: TSM&O Planning for Interstate 25 Corridor Operations

#### Purpose

To inform the Transportation Commission on the current efforts related to TSM&O operations planning on the Interstate 25 corridor in the Denver Metropolitan Region.

#### Action

This is information for the Commission.

#### Background

In a November 2011 study published by the Texas Transportation Institute (TTI) the corridor within the Denver Metropolitan Region was determined to be most congested roadway in Colorado. Additionally, the study provided data for 328 corridors in metropolitan areas throughout the United States. The daily congestion seen along the Interstate 25 corridor fell into the highest 33% of all corridors in the study and ranked as the most unreliable freeway in the State.

#### Details

The Division of TSM&O and Region 1 is developing a plan to identify and implement projects and programs to increase safety, mobility and reliability along the I-25 corridor. This plan will be developed with extensive stakeholder input and consist of the following phases:

##### Phase IA: Data collection and current conditions assessment

- o Safety assessments of crash pattern locations
- o Courtesy Patrol Lane Clearance Data
- o Bottleneck location identification and evaluations
- o Origin-destination studies
- o Maintenance operations
- o Impacts of new managed lanes
- o Detailed analysis of traffic data
- o First responder data
- o Economic impact data
- o Access management
- o Road user costs
- o TDM efforts by various agencies
- o Customer satisfaction surveys
- o Existing ITS infrastructure

##### Phase IB: Implement quick-win projects (ability to implement in less than a year)

- o Enhanced Traffic Incident Management Staffing & Assets
- o Ramp Meter Expansion and Enhancements
- o Bottleneck Mitigation projects
- o Safety Improvements
- o Work Zone Management Improvements
- o Improved Traffic Signal Coordination



- Improved Traveler Information
- Maintenance Operations (led by Division of Highway Maintenance)
- Traffic Management Center enhancements for improved management

Phase IC: Develop Wildly Important Goal and Lead-Lag measures using 4DX system

- Identify lowest performing I-25 segments with highest opportunity for improvement
- Focus efforts and investment to address the problems that most effect the wildly important goal

Phase IIA: Develop plans and identify and prioritize projects

- Creation of a robust traffic model for the corridor
- Develop an Active Traffic Management architecture
- Develop safety improvement projects
- Further ramp meter expansion projects

Phase IIB: Implement long-term projects (ability to implement within 1 to 3 years)

- Phase IIC: Performance measures to evaluate benefits of improvements and to identify changes to congestion and safety

The Division of TSM&O will provide periodic updates to the Commission on the progress of this effort throughout 2015.

Attachments

None



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DATE: March 6, 2015

TO: Transportation Commission

FROM: Director, Division of Transportation Systems Management & Operations (TSM&O)

Subject: Connected Vehicle (CV) Pilot Program

#### Purpose

To inform the Transportation Commission on the current efforts of TSM&O in developing a proposal for the USDOT Connected Vehicle Pilot Program.

#### Action

This is information for the Commission.

#### Background

USDOT through the Joint Program Office (JPO) is seeking Agencies participation in the Connected Vehicle (CV) Pilot Program; CV is an advanced technology of wireless communications with the objectives of improving safety, mobility and reliability.

- What is Connected Vehicle (CV)?
  - The next generation of ITS which offers the most advanced technology for highways and traffic systems to date (vehicle to vehicle communications - V2V)

#### Details

- Funding?
  - Phase 1= 0 % match \$1M grant; Phase 2 and 3 = estimated \$10M @ 20% match
- Define the Scope of Work and each Phase duration
  - Phase 1 represents the production of the Pilot's architecture and Concept of Operations
  - *If CDOT's proposal is accepted*, Phase 1(Concept of Operations and Design) duration is 12 months starting September 2015 end September 2016
  - Phase 2 (Design/Build) duration is 20 months starting January 2017 end August 2018
  - Phase 3 (Operate and Maintain) duration is 18 months starting August 2018 end April 2020
- What is the location of the Pilot?
  - CDOT TSM&O has selected the I-70 west corridor as our proposed Pilot site; MP 250 to MP 178 due to its unique challenges with safety, weather, and travel reliability.
- When did USDOT release the RFP for the Pilot and when is the response due?
  - RFP released January 30, 2015, with our proposal submittal deadline of March 27, 2015.
- Describe the project:
  - The CDOT CV Pilot Program must be a needs-based focus with the determination of needs developed in collaboration with CDOT, the I-70 Corridor Coalition, DIA, Colorado Motor Carriers Association, and public input.
  - USDOT requires strict performance measures and performance evaluation, therefore, CDOT is proposing to utilize its historical corridor data as the baseline.
  - The CV Team shall be built of industry leading consultants and integrators and several local firms currently under contract with CDOT
- CDOT objectives:
  - The enhancement of existing traffic management systems
  - CV creates "big" data that in turn improves operational planning and decision making
  - CV eliminates the latency in advance traveler information systems (ATIS) through V2V
  - Pre-warn drivers of upcoming hazards; black ice, rock falls, too fast for a curve, etc.
  - Reduce crashes, in particular rear end and side swipes and resulting road closures
  - Reduce delay through harmonization of the traffic flow and improved decision making

#### Attachments

None



**DATE:** March 11, 2015  
**TO:** Transportation Commission  
**FROM:** Mark Imhoff, Director, Division of Transit and Rail  
**SUBJECT:** Bustang Status Update

Purpose

The purpose of this memo is to provide a briefing to the Transportation Commission on the status of the Bustang Implementation.

Action

This memo is informational only; no action.

Background

The January 2015 Quarterly Status Report for the Interregional Express Bus (Bustang) identified four critical path items that have potential risk to affect the opening day for Bustang service:

- OIT Gateways clearance.
- Fare collection equipment procurement, programming, integration and testing.
- Agreements with local entities.
- Park and ride improvements.

Details

While significant progress has been made, the above items continue to comprise the critical path. We have work teams assigned to each item, continue to press for quick resolution, and monitor on a daily basis. Opening day will not be set until these items are resolved, or we have eliminated the associated risk. The remainder of this Status Report is devoted to the recent accomplishments, followed by a status of the four critical path items.

**Recent Accomplishments:**

- Buses:
  - All buses accepted, titled and licensed.
  - All buses wrapped with Bustang livery.
- Contract operator - Horizon Coach Lines:
  - All milestones have been met to date.
  - Actively recruiting and hiring drivers.
  - Operating schedules have been road tested and finalized.
  - Bustang web site and mobile app are ready to go live; date is driven by launch date.
- Fare collection equipment:
  - 10 fareboxes delivered from Colorado Springs Mountain Metro.
  - 10 scanners procured and scheduled for delivery March 19.
  - 4 additional fareboxes (built in scanners) scheduled for delivery first week of April.
  - Install fareboxes on buses by the end of April.
  - Testing and integration by mid-May.
- WiFi:
  - Sprint scheduled for installation - by the end of April.



- Radio communication:
  - Utilizing the statewide Digital Trunked Radio System (DTRS); statewide public service network for two-way radio communication. Bustang will be a "talk group" on the statewide network; includes the CDOT Orange Fleet, State Patrol and all police and fire departments in the state.
  - DTRS radios delivered March 5.
  - Installation and base station construction - week of March 16.
- Local InterGovernmenta Agreements (IGA's):
  - 10 of 15 access and maintenance agreements are with the local for the 2nd (and hopefully final) review.
    - The US 34/Loveland Park and Ride mainenance agreement is being reworked for a three-way agreement to include the mall.
    - The Monument Park and Ride maintenance agreement is being reworked for a three-way agreement to include El Paso County.
    - The 27th Street and West Glenwood agreements (2) required more coordination with RFTA prior to being started - there are no issues.
    - Harmony Road Park and Ride - see below.
- Park and Rides:
  - I-70 Corridor - complete.
  - Woodmen Road - IFB to be issued by Region 2 week of March 16/to be completed by end of April.
    - Resurface, stripe, ped access
    - Package Includes installation of bus shelters for Tejon, Monument and Loveland.
  - Harmony Road Park and Ride - see below.
- Communications Plan:
  - Completed all Bustang presentations to governmental entities - well received and the public is very engaged.
  - Bustang Maiden Voyage and ambient advertising campaign is ready to go; driven by launch date.
  - Highway Horses were installed along I-25 at Monument Park and Ride (3/10) and Harmony Road Park and Ride (3/9) - see photos attached.
  - Communications with local transit partners is increasing to support their customer interests in Bustang.

**Critical Path items:**

- OIT Gateways clearance (see below).
- Fare collection equipment procurement, programming, integration and testing.
  - All equipment on site - early April.
  - Install, Integrate and testing - mid-May.
- Agreements with local entities.
  - Expected execution of all agreements (possible exception Fort Collins/Harmony Road) - end of April.
- Park and ride improvements.
  - All with planned completion (possible exception Harmony Road) - end of April.

**OIT Gateway clearance.** The Governor's Office of Information Technology (OIT) must give final approval to all software and data transfer elements. This process can be complicated when software, for example, is utilized by more than one state department; efficiency and software support are driving considerations. The Bustang IT components are unique in the state system (not used by other state departments), or piggybacking on current CDOT equipment, thus simplifying the approval process. The OIT Gateway process has been broken into two phases; (1) required for opening day, and (2) required, but not necessary for opening day:



- Phase 1 -Service is launched with Radios (Digital Trunked Radio System), Fare Collection solution, and WiFi.
- Phase 2 - Develop and execute an IGA with RTD on the INIT Intelligent Transportation System (ITS) without a near term deadline impacting service launch.

In addition, the Bustang CDOT/OIT Project Team developed a strategy to expedite the OIT gating process:

- Request a "local" gating process instead of the normal "Executive" gating process.
  - The local gating process involves delegating the approval to the "local" CDOT/OIT Team.
  - The local/CDOT OIT team has agreed, if delegated authority, to approve gate 1 passage (Governance), and to a "green light" to proceed with gates 2,3 &4 to follow (administrative gates only and have no impact on the service launch date).
  - Justification - Off the shelf technology; no personal information is passed through the encrypted WiFi; software/hardware affect no other State Agency.
  - The "local' gating process would be used for both Phase 1 & Phase 2.
  - This request was provided to the OIT Executive Committee on February 26, 2015, with a meeting seeking approval set for March 13.

#### **Harmony Road Park and Ride:**

The one local agreement that is of significant concern is the IGA between CDOT and the City of Fort Collins for a parking management plan for the 251 space Harmony Rd. Park and Ride. After months of plan development and encouragement from the Fort Collins staff their City Council is not in favor of charging a fee for long term parking. The issue for CDOT is that two commercial airport shuttle operators, Super Shuttle and Green Ride, operate service out of the Harmony Road Park and Ride; their combined 39 trips/day often overflow the current capacity. The parking management plan was to reserve 150 spaces for free day use (Bustang and vanpools), and designate 101 spaces for long term pay parking managed by the City.

We are in deliberations with Region 4, the City of Fort Collins and the shuttle providers to analyse options. Region 4 and the City of Fort Collins are now exploring a possible expedited expansion of of 100-120 spaces into an adjacent parcel consistent with the Record of Decision of the North I-25 EIS. Even with an expanded facility, a parking management plan to differentiate between day use and long term parking is needed to discourage excessive long term parking. A fall back solution would be to disallow the commercial carriers use of the Park and Ride in the short term, and until a long term solution can be found. This is a critical path item that effects service launch. Region 4 and DTR meet weekly on expansion status.

#### **Establish Opening Day:**

The critical path items are progressing, items are being resolved/closed out, and the potential risk on open items is being reduced. The Communications Team needs six to eight weeks for outreach, advertising and implementation of the final elements of the communications plan. A status and evaluation of the entire program will occur the second week of April with the Senior Management Team, and an opening day will be set and announced to the Transportation Commission at the April Transit & Intermodal Committee meeting.

#### Next Steps

- Execute all Access/Maintenance agreements with the governmental entities
- Install and test the DTRS radios
- Deliver, install, and test fare collection solution.
- Deliver, install, and test WiFi both encrypted and public as well as the temporary AVL solution.
- User Acceptance Testing of the Bustang Express Bus system.
- Establish opening day date.





Harmony Road Park and Ride/ Fort Collins



Monument Park and Ride

