

# WYOMING DOT CONNECTED VEHICLE PILOT

IMPROVING SAFETY AND TRAVEL  
RELIABILITY ON I-80 IN WYOMING



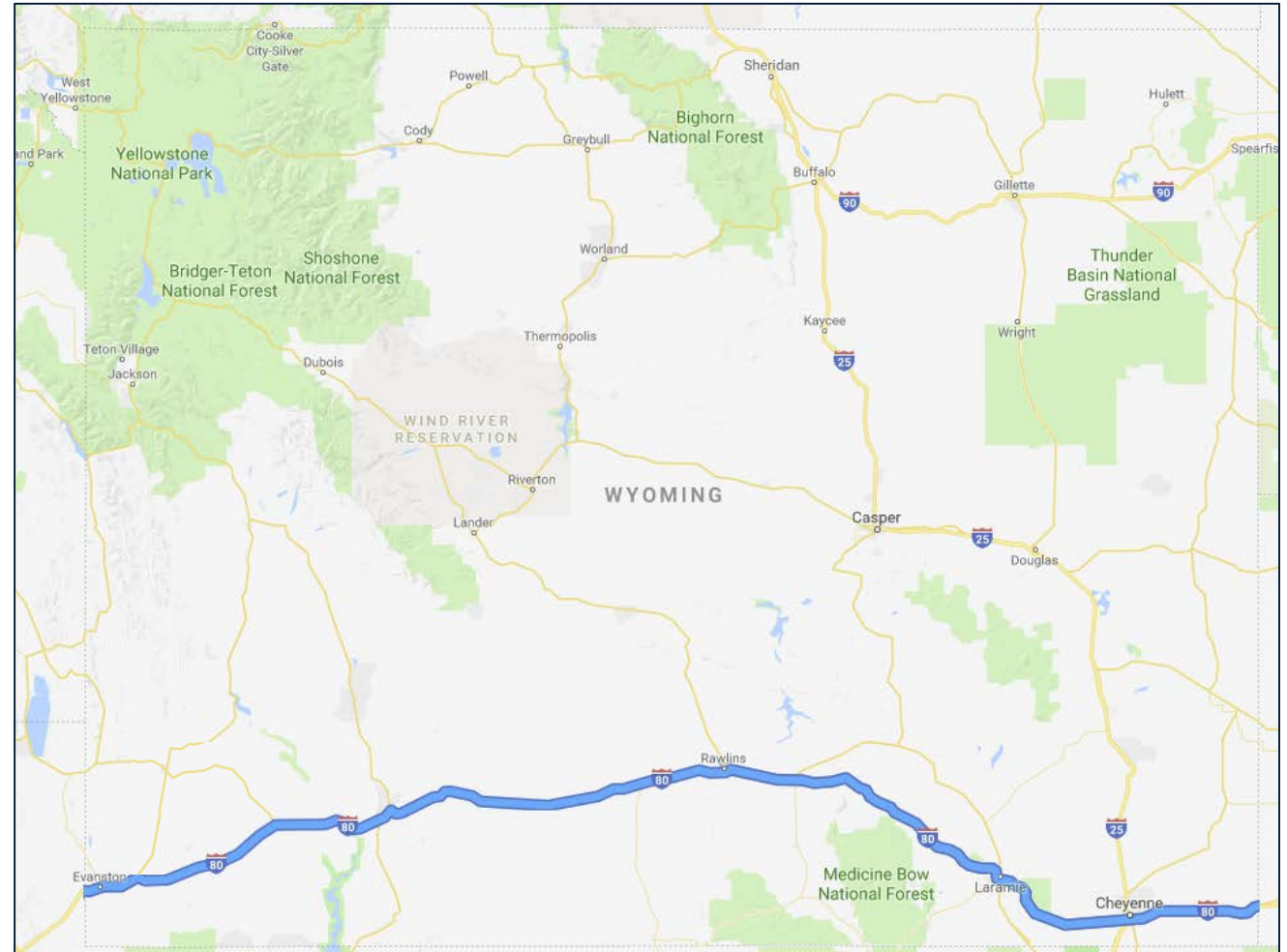
**Tom DeHoff, WYDOT District 1 Engineer**

**Suzie Roseberry, WYDOT ITS Developer**

**Vince Garica, WYDOT GIS/ITS Program Manager**

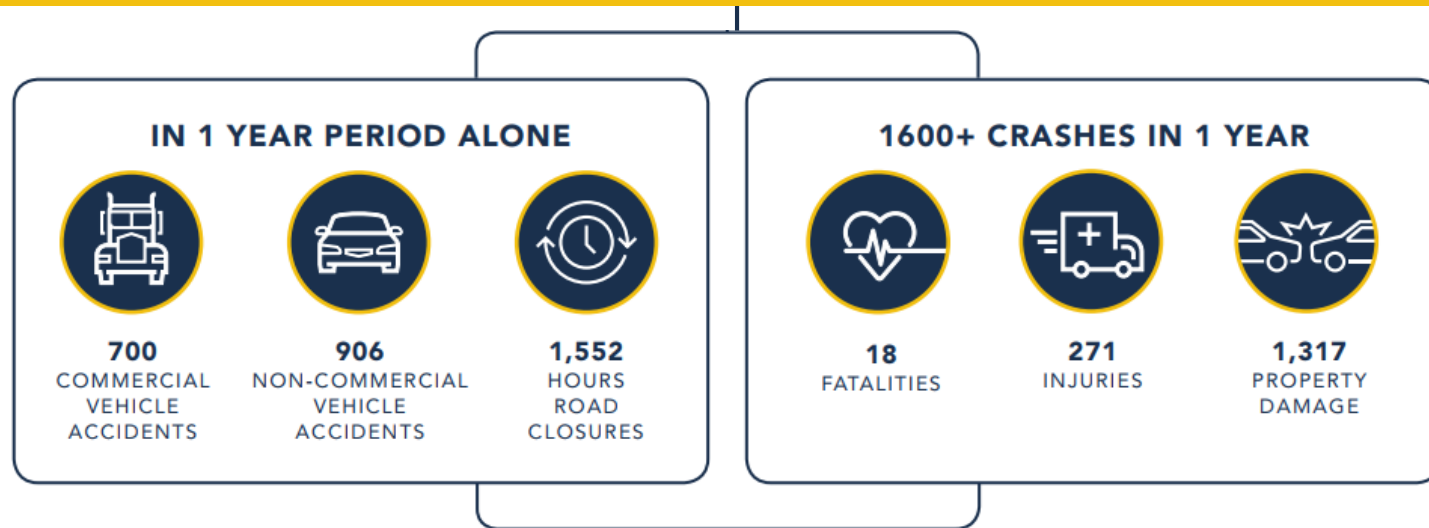
# Project Area

- Runs 402 miles along Wyoming's southern border
- More than 32 million tons of freight per year
- Truck volume is 30-55% of the total traffic stream on an annual basis
  - Seasonal peaks as high as 70%



# Why Interstate 80

## On I-80 in Wyoming



### GOAL

Reduce crashes and crash severity on I-80.

# CV Pilot Deployment



## 75 ROADSIDE UNITS

Receive and broadcast messages using DSRC technology along sections of I-80. The units will be installed at locations along the corridor based on identified hotspots.



## 400 INSTRUMENTED FLEET VEHICLES

Equipped with DSRC-connected onboard units that broadcast basic safety messages, share alerts and advisories, and collect environmental data through mobile weather sensors.



## WYDOT TRAVELER INFORMATION

The data collected by fleets and roadside units gives drivers in Wyoming improved travel information through services like the Wyoming 511 app and the commercial vehicle operator portal (CVOP).

# CV Pilot On-the-Road Applications

## WHAT DOES CONNECTIVITY MEAN?

### EN-ROUTE HAZARD AWARENESS

Using Dedicated Short Range Communication (DSRC) capability between vehicles and roadside infrastructure to provide new applications to support driver awareness.



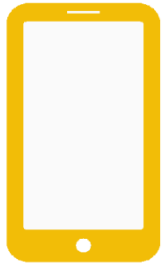
#### VEHICLE TO VEHICLE

- Forward collision warning
- Distress notification

#### VEHICLE TO INFRASTRUCTURE

- Alerts and advisories
- Road weather warnings
- Work zone warnings

# ALL DRIVERS



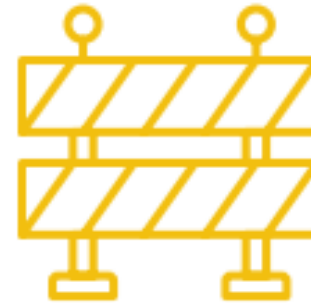
**MORE  
ACCURATE  
EN ROUTE  
ALERTS**



**BETTER  
PRE-TRIP &  
FORECASTED  
INFORMATION**



**TIMELY  
NOTIFICATIONS**



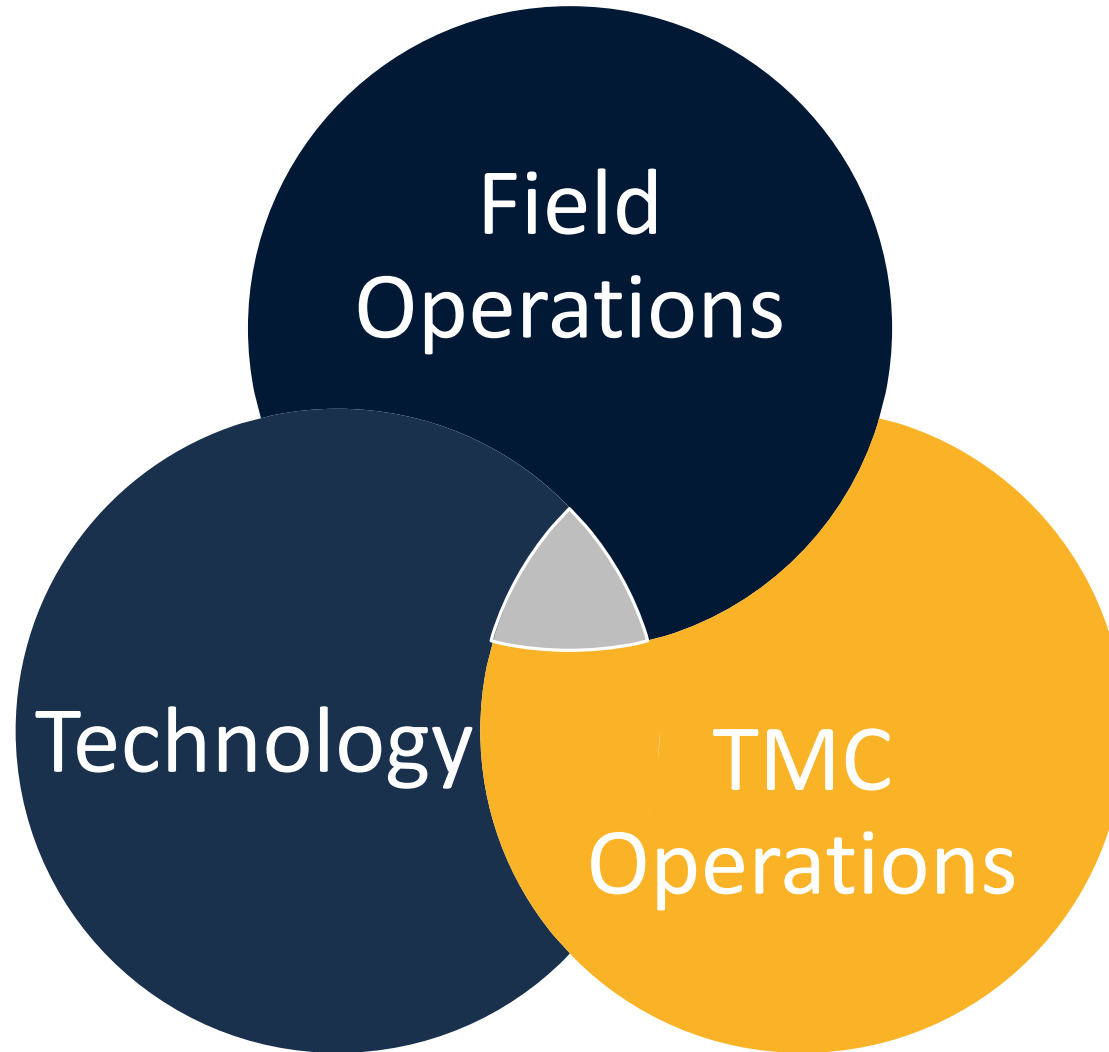
**FASTER  
ROADSIDE  
UPDATES**



**IMPROVED  
INFORMATION  
SHARING**

# CV Pilot Operational Integration

---





# Impact on TMC Operations

---



# Incorporating CV Applications into the TMC



www.wyroad.info Wed Oct 10 2018 08:11:45 AM

Copyright © 2018 State of Wyoming. All rights reserved.



# CV Operations: TMC Integration

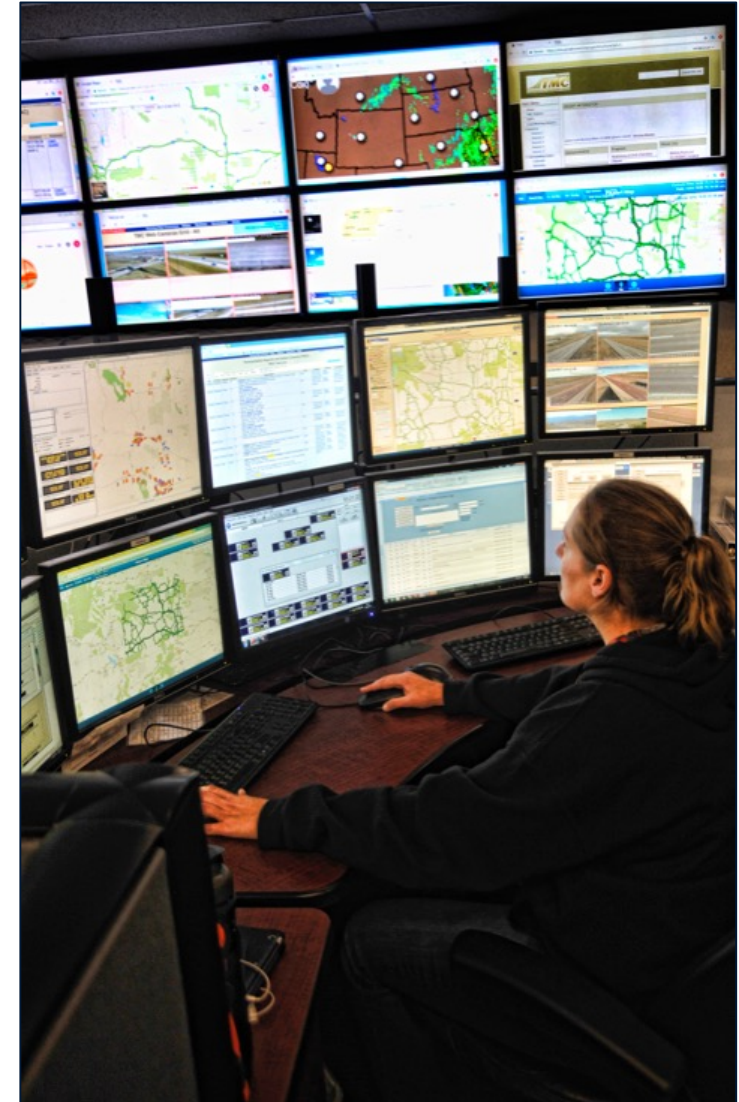


## ➤ Statewide TMC

- Operates 24/7
- Operators:
  - Monitor ITS field devices
  - Update public information systems
  - Dispatch maintenance employees

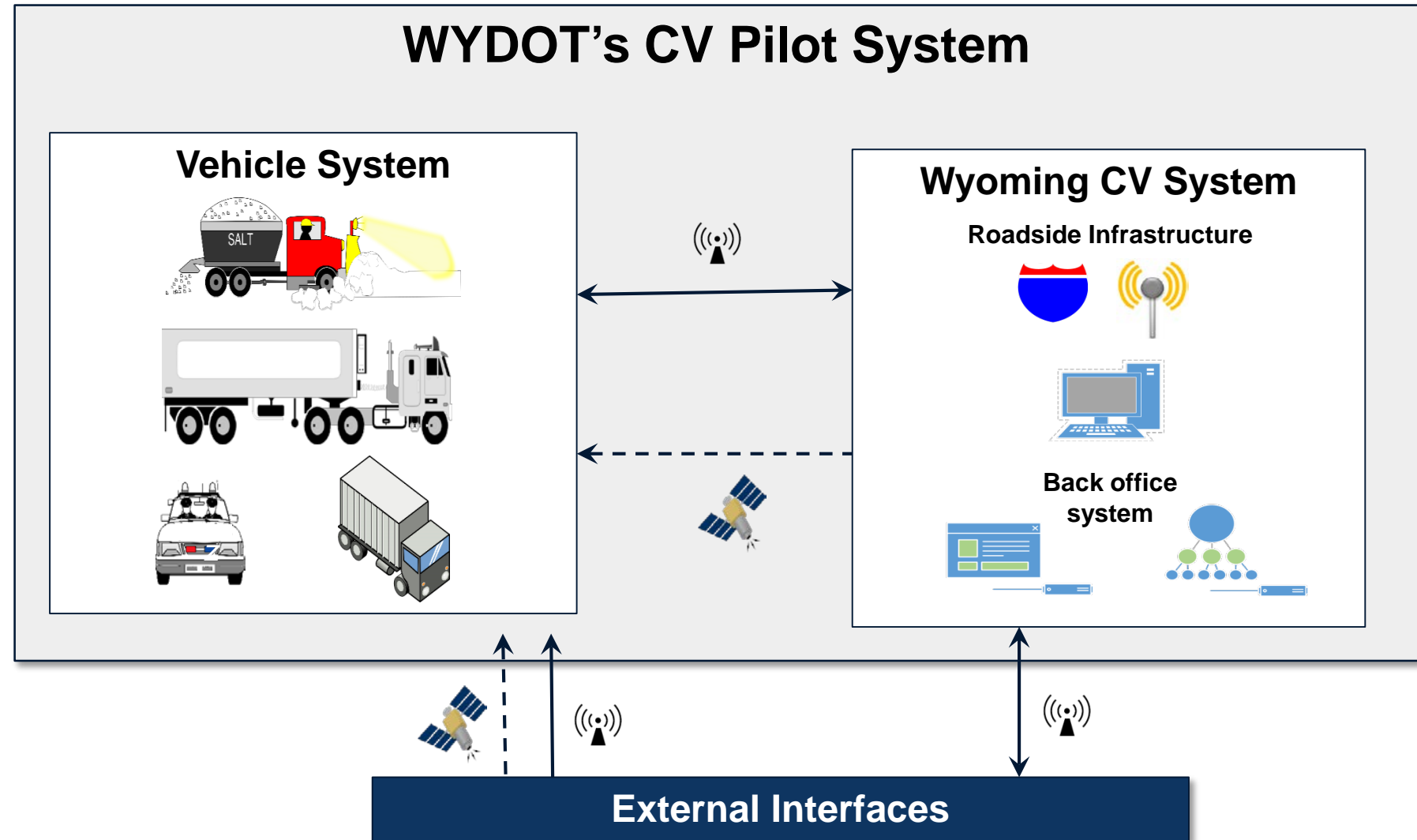
## ➤ Responsibilities continue to grow, staffing levels don't

- Every new project is viewed through the lens of minimizing the impact to operators



# Connected Vehicle Pilot: Integration

- Pikalert enables CV data to be processed into actionable information
- Alerts are sent to operators who update information system
- TIMs send the information back to CVs
- Other, traditional ITS systems are updated
- Data is made available to third-parties, including Sirius XM



# Incorporating CV Applications into the TMC

- Focus on extending existing systems rather than building new ones
- Built TRAC to manage information sent to the TMC as part of a project to outfit snowplows with tablets to improve road condition reporting
  - Now a central hub for activity management
  - Patrol CAD incidents, Pikalert suggestions, Text/email/voice transcriptions, Mobile Reports, Call before you dig management, etc.

**Transportation Reports and Action Console (development)**  
**TRAC Task List**

Create new Task   Update Now   Last updated 2015-03-16 13:29:38

PK	Priority	Source	District	Description	Link	Created	Claimed	Completed	On Complete URL
<a href="#">24023</a>	Emergency	Plow	0	<b>10-50: Crash Ambulance Requested at <a href="#">41.620591/-106.241334</a></b> Plow license plate: H 0080, Operator ID: alragan, Dept: 1035	N/A	2015-03-16 10:17:32 by alragan	<a href="#">Claim 24023</a>	<a href="#">Complete 24023</a>	DELETE <a href="https://trac.trac_dev@wtidbd01.gisits.local:84">https://trac.trac_dev@wtidbd01.gisits.local:84</a>
<a href="#">24035</a>	High	Plow	1	<b>10-13: Cheyenne - I-80 West Upper</b> Conditions: 8-1, 9-1 DMS: D000033 at I-80 WB 336.1 (Buford) Laramie Upper, D002833 at I-80 WB 341 (Remount), D000035 at I-80 WB 343.7 (Harriman) Cheyenne Upper, D000034 at I-80 EB 341.6 (Harriman) Cheyenne Lower Reported by plow: H 0080, operator ID: alragan	N/A	2015-03-16 10:14:30 by alragan	<a href="#">Claim 24035</a>	<a href="#">Complete 24035</a>	null
<a href="#">24022</a>	Medium	Plow	0	<b>10-41: Operator on duty at <a href="#">0.000000/0.000000</a></b> Plow license plate: H 0080, Operator ID: alragan, Dept: 1035	N/A	2015-03-16 10:14:08 by alragan	<a href="#">Claim 24022</a>	<a href="#">Complete 24022</a>	null
<a href="#">24034</a>	Medium	Plow	1	<b>10-7: Out of service Cheyenne - I-25 North - Southbound at Reference Marker <a href="#">12.5</a></b> Plow license plate: H 0241, Operator ID: sprettyman, Dept: 2033	N/A	2015-03-13 14:11:56 by sprettyman	<a href="#">Claim 24034</a>	2015-03-16 07:33:05 by thr X	null
<a href="#">24033</a>	Medium	Plow	1	<b>10-8: In service</b>	N/A	2015-03-	<a href="#">Claim</a>	2015-03-16	null

# Incorporating CV Applications into the TMC

It's a new language, so we made a translation guide

55120	Medium	SSA_APPLIC	0	<b>Road Condition Suggestions</b> <b>WY 270 between Guernsey and the Niobrara/Platte Cty Line</b>					<a href="#">Link</a>	2018-09-17 13:23:56 by SSA_APPLICATION
				<b>Location</b>	<b>Direction</b>	<b>Pikalert Nowcast</b>	<b>Current Posted</b>	<b>Pikalert Suggestions</b>		
				500.02 - 523.32	Both	<b>Precip:</b> light rain; none <b>Pavement:</b> dry; wet <b>Visibility:</b> normal <b>Blowover:</b> normal	<b>Precip:</b> <b>Pavement:</b> 81 <b>Visibility:</b> <b>Blowover:</b> <b>Other:</b> 91	<b>Precip:</b> add 93 <b>Pavement:</b> add 82 <b>Visibility:</b> <b>Blowover:</b>		
55119	Medium	SSA_APPLIC	0	<b>Road Condition Suggestions</b> <b>WY 450 between Mile Marker 54, Eastbound Closure Gate and WY 59</b>					<a href="#">Link</a>	2018-09-17 12:35:40 by SSA_APPLICATION
				<b>Location</b>	<b>Direction</b>	<b>Pikalert Nowcast</b>	<b>Current Posted</b>	<b>Pikalert Suggestions</b>		
				54.25 - 66.22	Both	<b>Precip:</b> light rain; none <b>Pavement:</b> dry; wet <b>Visibility:</b> normal <b>Blowover:</b> normal	<b>Precip:</b> <b>Pavement:</b> 81 <b>Visibility:</b> <b>Blowover:</b> <b>Other:</b> 91	<b>Precip:</b> add 93 <b>Pavement:</b> add 82 <b>Visibility:</b> <b>Blowover:</b>		

# Incorporating CV Applications into the TMC

TMC will collect Performance Measures from Pikalert

We have all routes in the State configured to use Pikalert

If Pikalert suggestions prove reliable, this could revolutionize our road reports

**Pikalert Action Reporting**

TRAC task id: 117776

**Road Condition Suggestions**

*I-80 East - (I 80 between Arlington and Exit 279, Cooper Cove Rd)*

District	Location	Direction	Pikalert Nowcast	Current Posted	Pikalert Suggestions
1	272.06 - 280.9	Eastbound	<b>Precip:</b> none <b>Pavement:</b> dry <b>Visibility:</b> normal <b>Blowover:</b> normal	<b>Precip:</b> 92 <b>Pavement:</b> 835 <b>Visibility:</b> <b>Blowover:</b> <b>Other:</b>	<b>Precip:</b> add 91, remove 92 <b>Pavement:</b> add 81, remove 83, remove 85 <b>Visibility:</b> <b>Blowover:</b>

Added by SSA\_APPLICATION at 2018-10-19 20:13:15.090

Cameras:  
Sensors:

**Information systems updated**

- WTI
- DMS
- VSLs

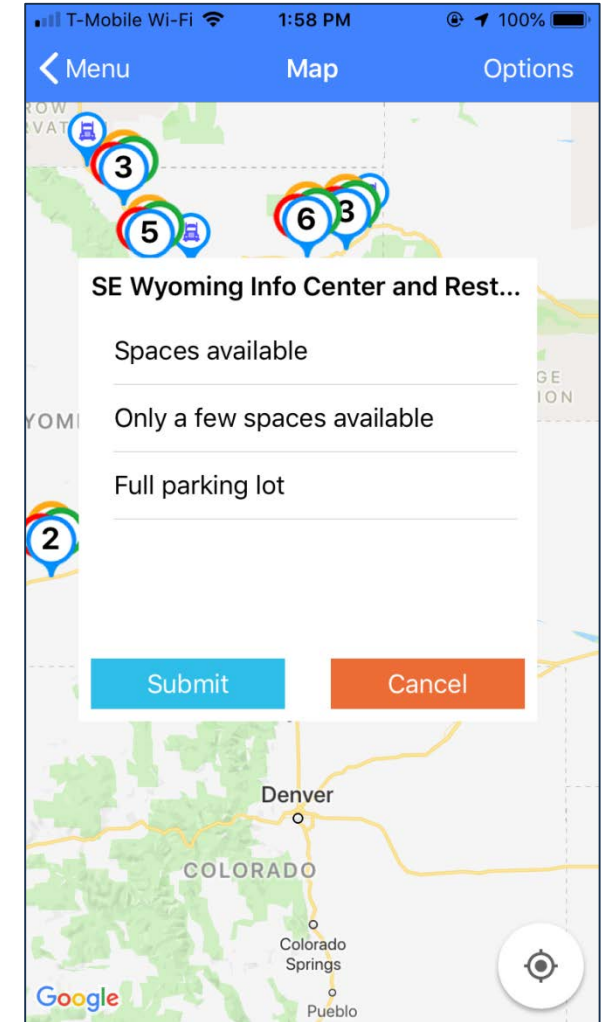
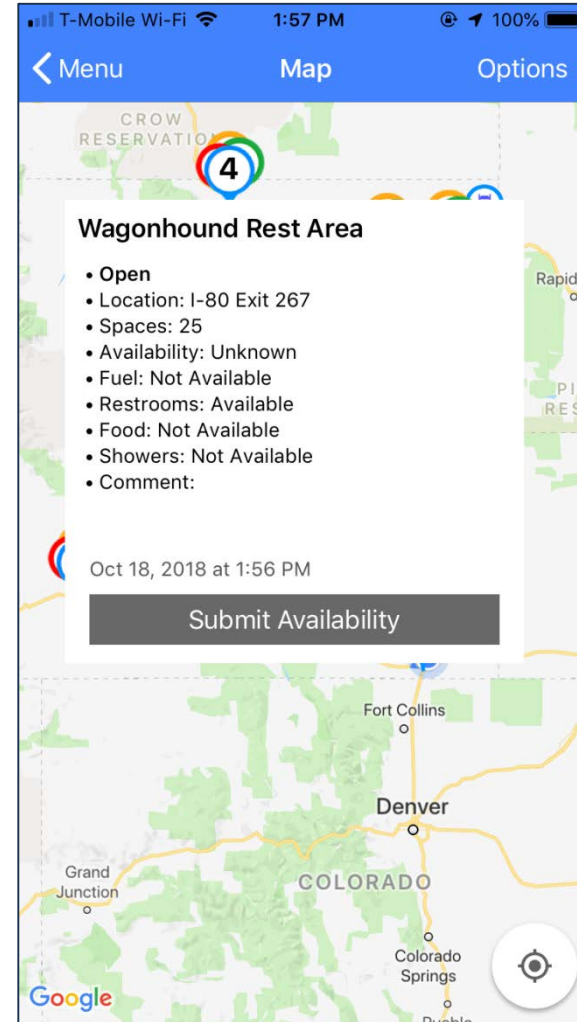
**Information systems not updated because**

- Conflicting report from the field
- Conflicting report from camera/sensor
- Other report took precedence (Closure, etc.)
- Uncertain about accuracy/unable to get confirmation
- Other

# Incorporating CV Applications into the TMC

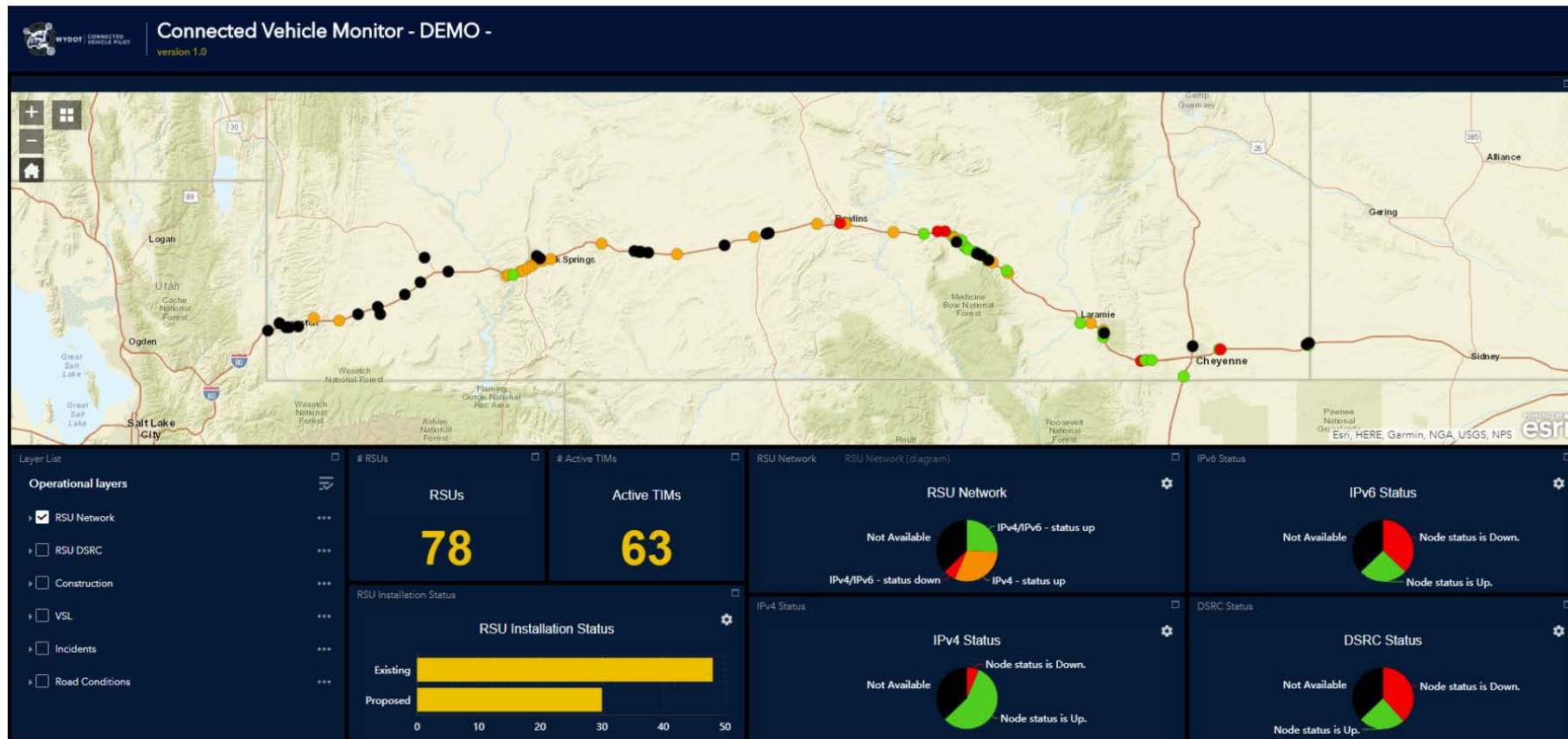


- Used existing systems to improve the CV Pilot
  - Truck parking information crowdsourced from WY 511 mobile app
  - This information is displayed to other users of the app and incorporated into truck parking TIMs



# Incorporating CV Applications into the TMC

- The TMC will use the CV Monitor to identify system problems and dispatch technicians

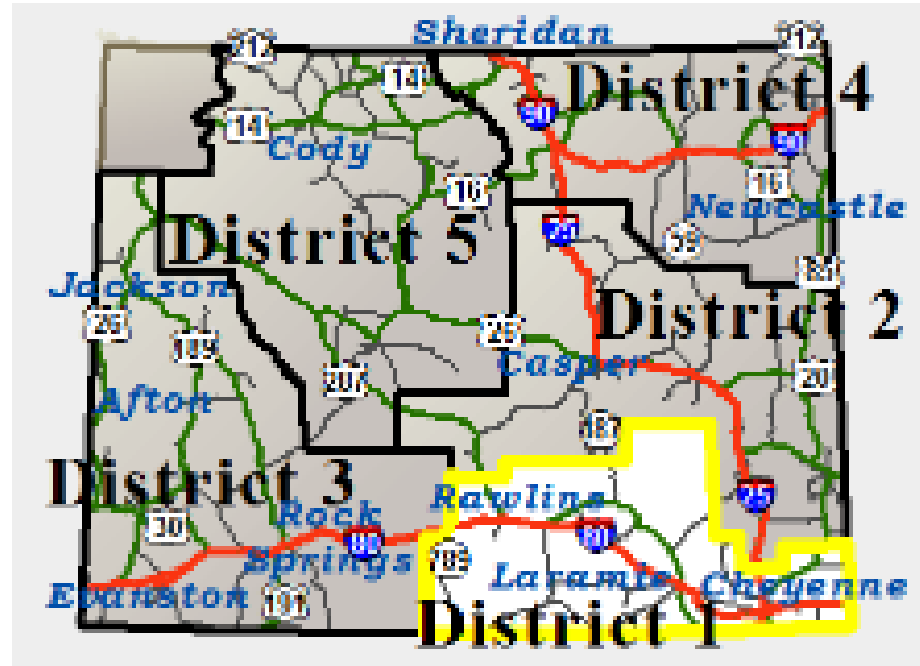




# Impact on Field Operations

# CV Applications and Field Personnel

- Tom DeHoff, District Engineer, District 1 in southeast Wyoming
- Responsibilities
  - Traffic
  - Construction
  - Equipment
  - Maintenance
- Relationship with the Highway Patrol
- Relationship with TMC



# CV Applications and Field Personnel

- Top Priority – Safety of personnel
  - Stripping and other traffic operations – Traffic
  - Workzone safety – Construction crews
  - Maintenance – Summer and winter activities



Every year snow plows are hit in spite of flashing lights around the plow to make them visible

# CV Applications and Field Personnel

## ➤ Roadway Safety

- Few crashes and less severe crashes result in fewer deaths and fewer road closures
- Fewer crashes mean WYDOT Employees remain out of harm's way.



# CV Applications and Field Personnel

- Snow plows are complex
- Cabs are filled with technology
  - Spreader Controllers
  - Wing plow operations
  - Road Condition Reporting Tablet

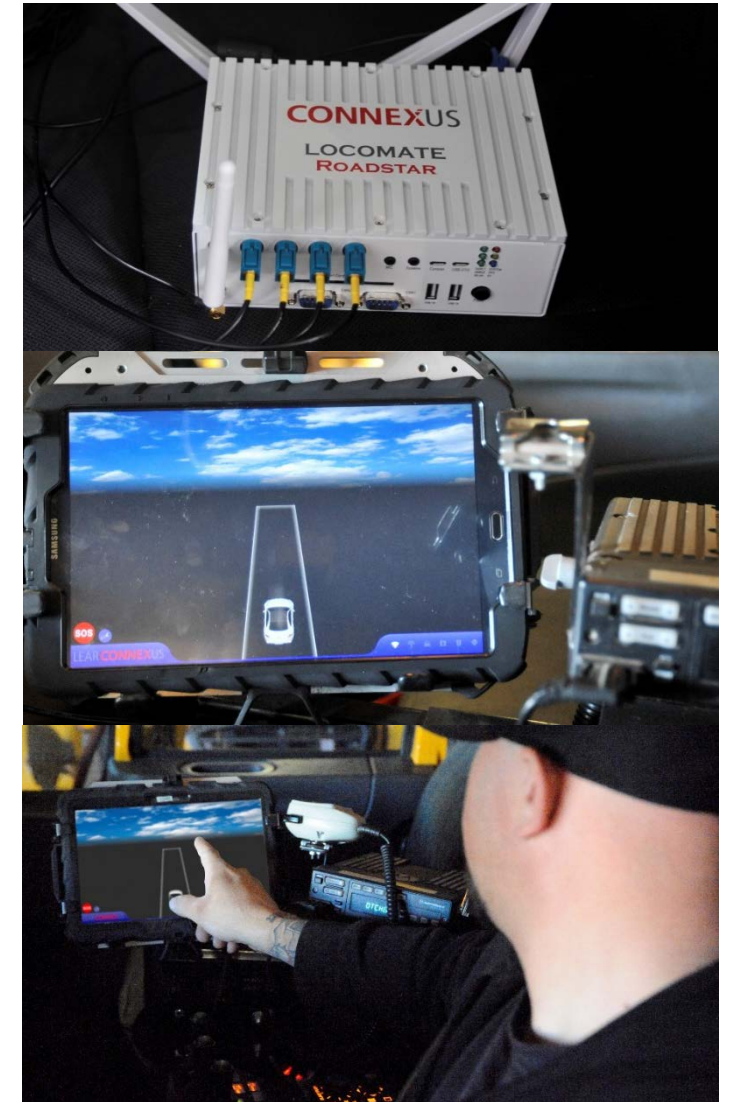


Android-based tablet allows for a single device to perform many functions

# CV Applications and Field Personnel

## ➤ Field buy-in

- Must be based on success
- If technology works, personnel are happy to adapt and adopt
- Field personnel are patient but failure will kill concept





# CV Applications and Field Personnel

---



## ➤ Long-term vision

- Every employee and every vehicle have technology - much like the spread of cell phones
- All devices, again like cell phones, can interoperate at a fundamental level
- Significant reduction in crashes, closures and fatalities

# Connected Vehicle Pilot



## WYOMING DOT CONNECTED VEHICLE PILOT

IMPROVING SAFETY AND TRAVEL  
RELIABILITY ON I-80 IN WYOMING



visit the Wyoming Connected Vehicle Pilot website  
<https://wydotcwp.wyroad.info>

email  
[dot-cvpilot@wyo.gov](mailto:dot-cvpilot@wyo.gov)