

# Wyoming

## CONNECTED VEHICLE PILOT DEPLOYMENT PROGRAM

Photo Source: USDOT

Interstate 80 (I-80) runs 402 miles along the southern edge of Wyoming and is a vital east-west connector for freight and passenger travel in the country. The corridor averages more than 32 million tons of goods per year (at 16 tons per truck). The truck volume is 30 to 55 percent of the total annual traffic stream and comprises as much as 70 percent of the seasonal traffic stream.

Several high-profile crashes, affecting both commercial vehicles and private vehicles, have occurred along I-80 in Wyoming that resulted in fatalities, extended closures, and significant economic loss. One such incident occurred in April 2015, during which icy roads and low visibility from blizzard conditions contributed to a “domino” style chain reaction pileup with more than 65 vehicles. Wyoming’s notorious winds result in some of the nation’s most severe blowing-snow events and greatest concentrations of vehicle blow overs. In the 10-year period from 2006 to 2016, there were 1,237 reported blow overs, with more than 30 this past year.

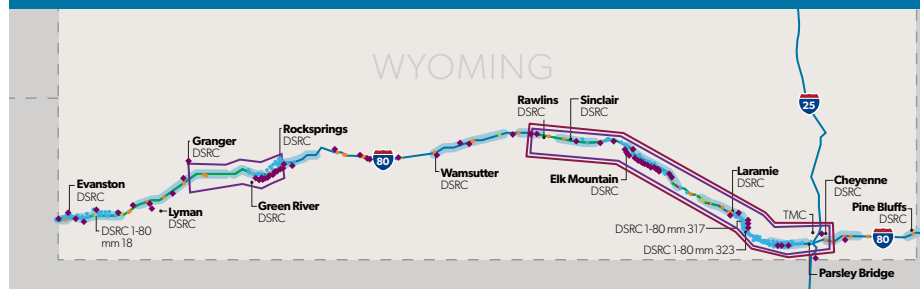
### Connected Vehicle Pilot Deployment Program

The Connected Vehicle Pilot Deployment Program was launched in September 2015 to deploy, test, and operationalize cutting-edge mobile and roadside technologies and to enable multiple connected vehicle applications. Sponsored by the Intelligent Transportation Systems (ITS) Joint Program Office (JPO), the USDOT awarded cooperative agreements to three agencies:

- New York City Department of Transportation
- Tampa Hillsborough Expressway Authority
- Wyoming Department of Transportation (WYDOT).

### Wyoming I-80 Corridor – Connected Vehicle Map

Photo Source: USDOT



#### LEGEND

- |                                |                              |  |   |
|--------------------------------|------------------------------|--|---|
| High Profile Wind Warning Area | WyoLink—Signal Strength Good | I-80 Wyoming   | WiFi Locations (9 within 500ft of I-80) |
| AVL/Tablet Snow Plows          | Spotty                       | Possible Locations Roadside DSRC (Going into/out of each town off I-80 for supporting VSL Application. These include locations with mm labels) | VSL Devices (136 on I-80)               |
| STIP Areas 2015–2018           | Unreliable                   | Truck Parking (55 on I-80)   | RSU Devices (75 on I-80)                |

From October 2015 to September 2016, there were more than 1,600 crashes on I-80, resulting in 18 fatalities and 271 injuries. During this same time, roads were closed to all vehicles for over 1,500 hours. The societal impact of these crashes topped \$865 million.

Stay updated on the Wyoming Connected Vehicle Pilot



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## Wyoming Connected Vehicle Pilot

To improve driver safety along the corridor, the Wyoming Connected Vehicle Pilot will use dedicated short-range communications (DSRC) based applications that leverage vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) connectivity to support a flexible range of services such as advisories, roadside alerts, and dynamic travel guidance for freight and passenger travel.

## Approach

WYDOT leads this pilot and will develop systems that support the use of connected vehicle technology and applications along the 402 miles of I-80 in Wyoming. V2V and V2I applications will enable communication with drivers for alerts and advisories regarding various road conditions. Information from these applications is made available directly to vehicles equipped to receive the messages or through WYDOT's existing traveler information sources.

Data collected from the equipped vehicles not only support in-vehicle applications but also enable better traffic and incident management along the I-80 corridor. Conditions reported from connected vehicles will enable better setting of variable speed limits along the corridor. Integration with existing transportation management center (TMC) resources, such as construction, parking, and road condition reporting, enable transmission of timely situational awareness alerts to the equipped vehicle.

## Partners

To ensure a successful pilot, WYDOT has brought together a team of stakeholders including freight partners who will provide the



equipped vehicles. Freight partners also include fleet dispatch centers who use existing WYDOT traveler information services (e.g., the commercial vehicle operator portal). In addition, WYDOT is working closely with other stakeholders including trucking associations, other pilot sites, and the USDOT to ensure that the pilot deployment is interoperable and replicable in other parts of the country. WYDOT will also be supported by a technical team of subcontractors and vendors that will provide system development and integration services.

## Applications

The Wyoming Connected Vehicle Pilot will deploy the following applications on participating vehicles:

- **Forward Collision Warning (FCW)** – This V2V communication-based safety feature issues a warning to a driver if there is an impending front-end collision with another connected vehicle ahead in the same travel lane and direction on both straight and curved geometry roadways. FCW will help drivers avoid or mitigate front-to-rear vehicle collisions in the forward path of travel. The system does not take control of the vehicle to avoid an impending collision.
- **Infrastructure-to-Vehicle (I2V) Situational Awareness** – This application enables relevant downstream road condition information including weather alerts, speed restrictions, vehicle restrictions, road conditions, incidents, parking, and road closures to be broadcast from an RSU and received by the connected vehicle. This step is important for mitigating the short range and sparse placement of RSUs along the corridor.
- **Work Zone Warning** – This application extends the I2V Situational Awareness application and provides information to approaching vehicles about conditions at a work zone ahead. The approaching vehicles receive information about work zone activities that could present unsafe conditions, such as obstructions in the vehicle's travel lane, lane closures, lane shifts, speed reductions, or vehicles entering/exiting the work zone.
- **Spot Weather Impact Warning** – Similar to situational awareness, this application enables relevant road condition information, such as fog or icy roads, to be broadcast from an

RSU and received by a connected vehicle. This application, however, is distinct from situational awareness in that it provides more localized information (i.e., at the segment level instead of area wide or region wide).

- **Distress Notification** – This application enables connected vehicles to communicate a distress status when the vehicle’s sensors detect an event that might require assistance from others or the vehicle’s operator manually initiates a distress status.

## Benefits

The Wyoming pilot is being deployed to improve the safety, mobility, and productivity of the travelers of I-80 in Wyoming. Through connected vehicle pilot technology, WYDOT hopes to reduce the number and the severity of weather-related incidents (including secondary incidents) in the corridor. Other anticipated benefits include:

- Automatically collect road weather information from equipped snow plows and trucks to give travelers better, more timely warnings about adverse road conditions
- Provide drivers with information directly in their vehicles about safe travel speed, detours, parking, and the presence of maintenance and emergency vehicles, so drivers can make informed and safe decisions
- Provide fleet management centers with current and forecasted road conditions to help them make better travel decisions to increase efficiency and productivity
- Support the use of V2V and V2I communication to give drivers information about road conditions and posted speeds, especially in variable speed limit zones, to encourage compliance with posted speed limits.

## Deployment by the Numbers

The Wyoming Connected Vehicle Pilot is deploying:

75

RSUs that can receive and broadcast messages using DSRC along various sections of I-80. RSUs will be installed at locations along the interstate based on a statistically driven approach to identify hotspots and subsequently target RSU locations upstream of that location.

400

vehicles, a combination of fleet vehicles and commercial trucks, with OBUs that are expected to be regular users of I-80. Of these 400 vehicles, at least 150 would be heavy trucks. OBUs will have the functionality to broadcast Basic Safety Messages (BSM) Part I and will include a human-machine interface to share alerts and advisories to drivers of these vehicles. A portion of the equipped vehicles will have additional capabilities, such as transmitting BSM Part II and collecting environmental data through mobile weather sensors.

For more information, visit <https://www.its.dot.gov/pilots/index.htm> or contact:

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# Connected Vehicle Pilot Deployment Program

## Connected Vehicle Pilot Interoperability Testing

In the summer of 2018, the pilots successfully achieved a major milestone in paving the way for a nationwide deployment by demonstrating the connected vehicle devices and equipment are interoperable, meaning they can operate as designed anywhere in the country, regardless of where they were built.

Over the course of four days at the Turner-Fairbank Highway Research Center (TFHRC), a federally owned and operated national research facility in McLean, Virginia, the three Connected Vehicle Pilot sites conducted an interoperability test to demonstrate whether a vehicle with an onboard device from one site was able to receive messages from the OBU and RSUs of another site in accordance with the key connected vehicle interfaces and standards. A test of this nature and scope, involving three deployment sites and six device vendors, had never been done before.

Results of the testing indicated successful, interoperable transfer of V2V messages between the OBUs from different vendors, four of which used DSRC and one used a combination of DSRC and satellite communications. Additionally, equipment from each vendor demonstrated the successful transfer of messages between RSUs and each site's OBUs.

## 6 Things to Know About the Connected Vehicle Pilots



### New Wireless Technology Is Being Tested

- Vehicle and pedestrian applications
- Wireless devices
- Standards
- Interoperable technology

### All Types of Travelers Are Involved in the Tests

Testing is taking place in commuter traffic, in congested city centers, in crosswalks, and on rural roads



### The Pilots' Results Will Transform Transportation

A connected infrastructure can improve the safety, mobility, and efficiency of trucks, cars, buses, pedestrians, traffic signals, work zones, and trolleys

### Other Communities Can Replicate the Pilots' Success

Through sharing and collaboration, communities nationwide can follow the successes of the Connected Vehicle Pilot sites



### The Data Is Free for Public Use

Detailed reports from each Connected Vehicle Pilot will be published and available for anyone to access for free

### Connected Vehicles Could Be in Your Community in the Next Decade

The goal is to create a national system of interoperable connected vehicles and infrastructure



For more information, visit the Connected Vehicle Pilot Deployment Website: <https://www.its.dot.gov/pilots/index.htm> or contact:

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