



Photo Source: USDOT

Connected Vehicle Pilot Deployment Program: **WYOMING**



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 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 45-vehicle “domino” style chain reaction pileup. 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.

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.

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.

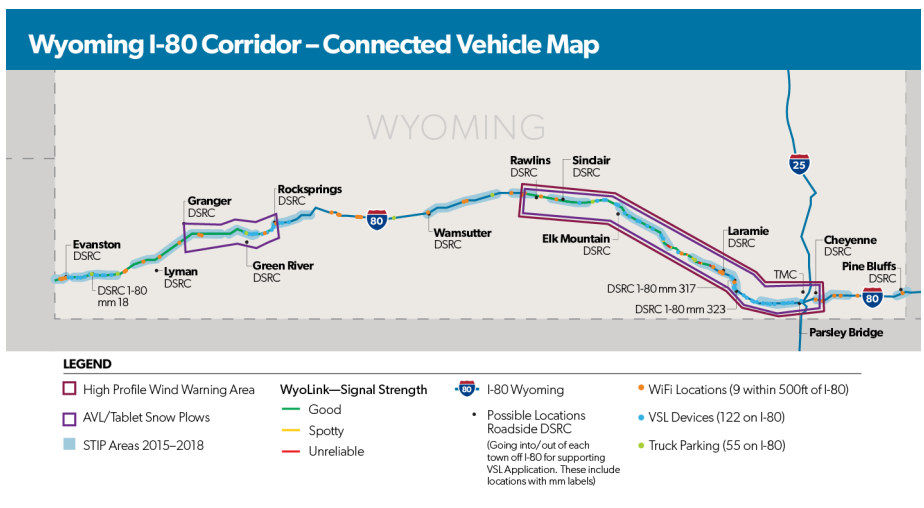
Connected Vehicle Pilot Deployment Program

Sponsored by the U.S. Department of Transportation (USDOT) Intelligent Transportation Systems Joint Program Office, the Connected Vehicle Pilot Deployment Program is a national effort to deploy, test, and operationalize cutting-edge mobile and roadside technologies and enable multiple connected vehicle applications.

In early September 2015, the USDOT awarded three cooperative agreements collectively worth more than \$45 million to three sites for the regional connected vehicle pilots:

- New York City, New York
- Wyoming
- Tampa, Florida.

The locations were selected in a competitive process to go beyond traditional vehicle technologies to help drivers better use the roadways to get to work and appointments, relieve the stress caused by bottlenecks, and communicate with pedestrians on cell phones of approaching vehicles.



U.S. Department of Transportation



Photo Source: USDOT

On November 19, 2016, at 9:00 am, with roads already icy, a highway patrol trooper was in his vehicle attending to the scene of an accident. A tractor-trailer driving toward the accident scene lost control on the icy roads and collided with the parked vehicle, causing another accident.

Approach

The Wyoming Department of Transportation (WYDOT) leads this pilot. WYDOT 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.



Photo Source: USDOT

Deployment by the Numbers

The Wyoming Connected Vehicle Pilot is deploying:

- **75 roadside units (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 onboard units (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.

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's 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

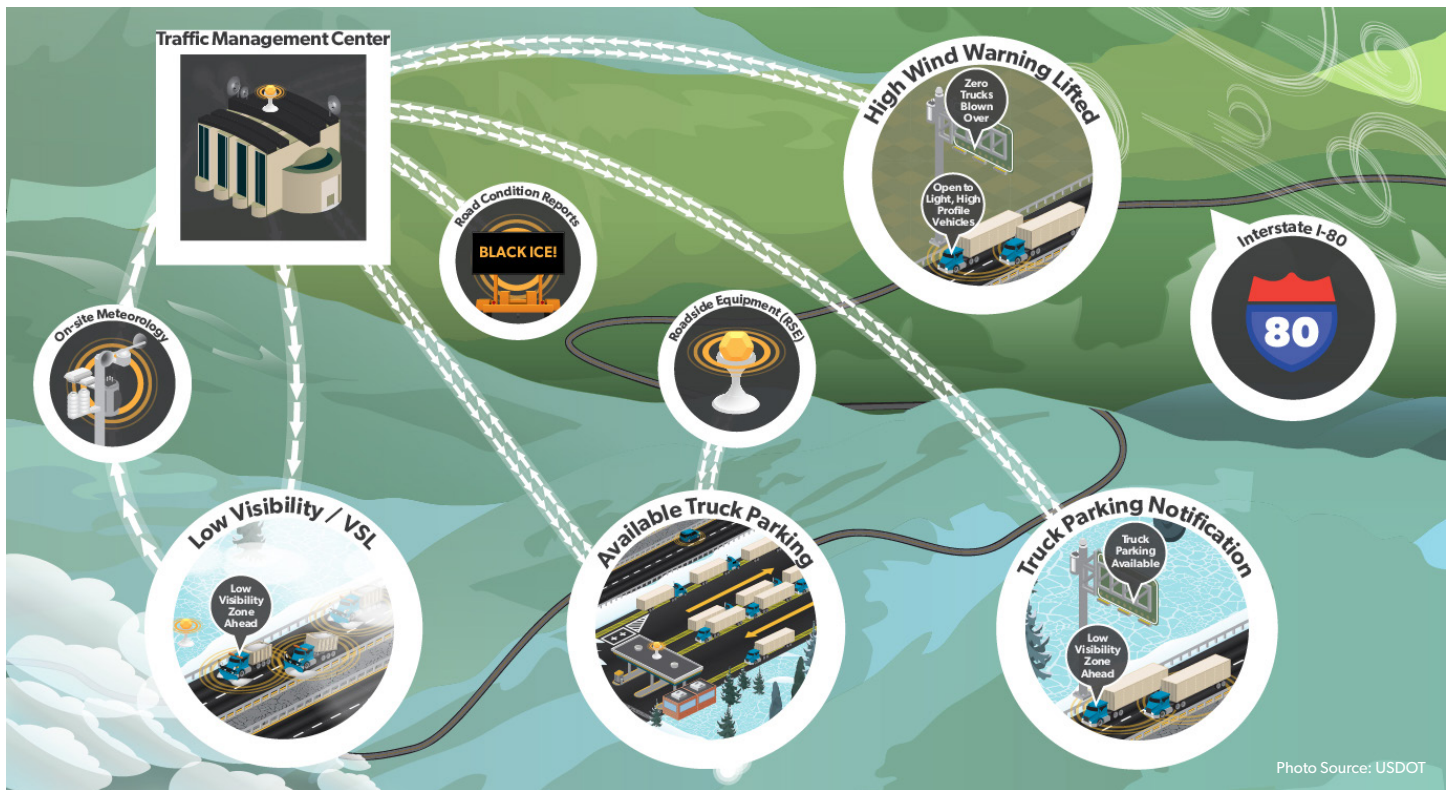


Photo Source: USDOT

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.

Testing will begin on WYDOT fleet vehicles (highway patrol vehicles, snowplows, and other partner vehicles) in the fall/winter of 2017 to 2018. The pilot will expand to testing with commercial vehicles in the fall/winter of 2018 to 2019.

For more information, please visit http://www.its.dot.gov/pilots/pilots_wydot.htm or contact:

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Ready to bring the transportation revolution to your community?

Discover best practices from connected vehicle leaders and early deployers.



Connected vehicle technologies are already being deployed around the country from major cities in Florida and New York to the highways of rural Wyoming. If you are interested in using these revolutionary technologies, visit the Connected Vehicle Pilot Deployment Program's website. This comprehensive website contains FREE up-to-date resources for connected vehicle deployment.

- Updates from the Connected Vehicle Pilot locations
- Pre-recorded webinars showing how other communities are deploying the technology
- Sample deployment concepts
- In-depth planning documents from the sites that can assist you in planning for your community
- Fact sheets you can share with your colleagues
- Other vehicle-to-infrastructure deployment resources

www.its.dot.gov/pilots



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