

### WYOMING CONNECTED VEHICLE PILOT TO MANAGE ROAD WEATHER IMPACTS

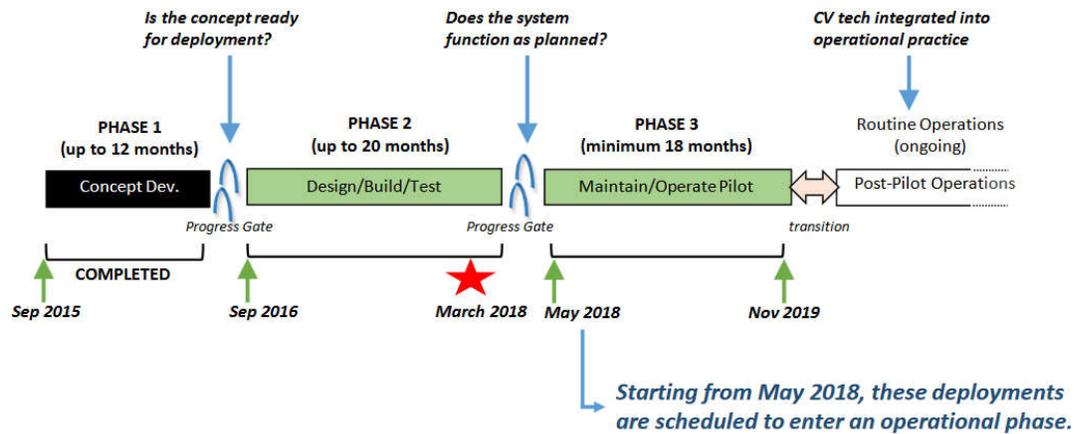
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Road weather affects transportation systems by reducing traveller mobility and decreasing safety. The state of Wyoming, in the high western plains of the United States, is an area where these impacts are acutely felt. To improve safety and to decrease the frequency and duration of weather-related road closures in this region, the U S Department of Transportation (USDOT) selected the 402-mile (650 kilometre) Wyoming Interstate-80 corridor in the fall of 2015 as one of three Connected Vehicle (CV) Pilot Deployment sites. The Wyoming CV Pilot looks at the use of connected vehicle technology as a way to mitigate road weather impacts, particularly those impacts to freight vehicles that rely on the I-80 corridor to move goods between the mid-west and western coastal areas of the US.

Connected vehicle technology uses dedicated short-range communication (DSRC) to transmit data between vehicles (V2V), between vehicles and the road infrastructures (V2I), and between vehicles and mobile devices (V2X). The Wyoming pilot involves deployment of both V2V and V2I applications in approximately 400 connected vehicles that frequently travel the corridor. The project also involves back office applications to improve traveller information on current conditions. One of these new applications is in partnership with the National Center for Atmospheric Research (NCAR) to use a USDOT program called Pikalert<sup>®</sup> to leverage Road weather information system (RWIS) and atmospheric data, weather forecasts and mobile data from connected vehicles to provide better real-time and forecasted weather conditions for travellers on the corridor. In addition to CV-equipped vehicles, the system will provide information that is expected to be more timely and accurate to all road users through existing traveller information systems such as their website, mobile phone application, and roadside signs.

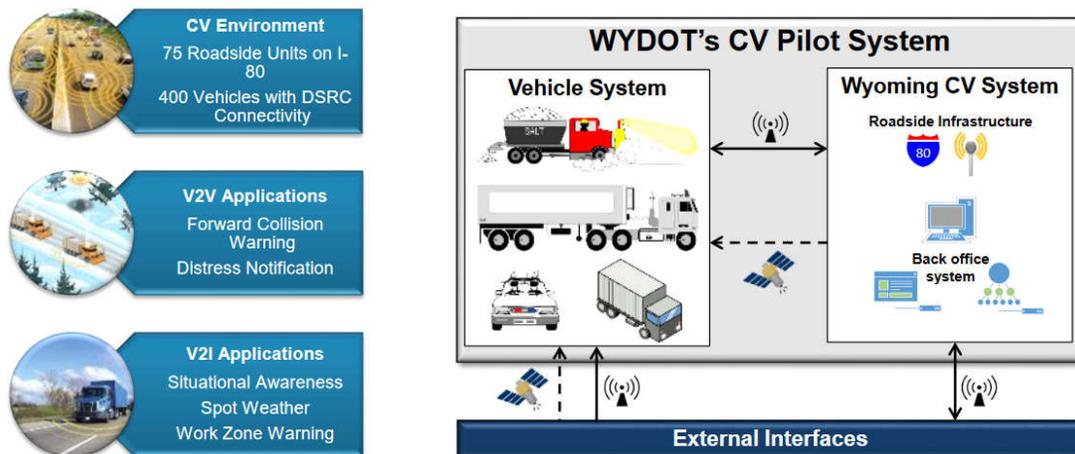
The project was selected for funding in September of 2015. The first twelve months was used on system engineering to fully develop the concept of operations and to draft a system deployment plan. The project is current wrapping up 18-months of Phase 2 with the deployment of roadside and vehicle equipment along with all the data systems to support the project. The winter of 2018-2019 will be the primary review of the system in operations.



Source: USDOT, 2015

**Fig. 1.** Project Timeline.

The Wyoming CV Pilot has five main connected vehicle applications. Forward Collision Warning issues an alert to drivers if there is a threat of front-end collisions with another connected vehicle in their travel lane and direction. The system does not take control of the vehicle but provides timely alerts to drivers of the impending collision. This application is a concern for snowplows and highway patrol vehicles on the corridor who may be traveling slower than other drivers. I2V Situational Awareness is an application that provides relevant road condition information including weather alerts, speed restrictions, vehicle restrictions (such as no lightweight vehicles due to severe winds), parking, incidents, and road closures. Information is broadcast from roadside units and picked up by passing vehicles but in-vehicle units display the information based on geographic location of the vehicle so that the warnings and alerts are spatially relevant to the driver. Work zone warning is the main non-winter application that provides information to vehicle approaching a work zone such as reduces speeds, lane shifts, and lane closures. Spot impact warning is an application that enables localized road condition information to be broadcast from roadside units to connected vehicles. The last application in the Wyoming CV Pilot is distress notification, which allows connected vehicles to communicate distress status that requires assistance from others. Given the remoteness of the corridor and the long distances between services, this notification is critical and can greatly speed emergency response to incidents.



Source: WYDOT, 2017

**Fig. 2.** Wyoming CV Pilot Components

A primary purpose of a pilot deployment project is to bridge the barriers between research applications and agency deployable technology. To meet this objective, the project has engaged in extensive project documentation and outreach. Additional information can be found on the project site at <https://wydotcwp.wyroad.info/> and on the USDOT site at <https://www.its.dot.gov/pilots/>.

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References:

1. Gopalakrishna, D. V. Garcia, A. Ragan, T. English, S. Zumpf, R. Young, M. Ahmed, F. Kitchener, N. Ureña, E. Hsu. **2015**, *Connected Vehicle Pilot Deployment Program Phase 1, Concept of Operations*. USDOT FHWA-JPO-16-287.
2. Gopalakrishna, D. V. Garcia, A. Ragan, T. English, S. Zumpf, R. Young, M. Ahmed, F. Kitchener, N. Ureña, E. Hsu. **2015**, *Connected Vehicle Pilot Deployment Program Phase 1, Comprehensive Pilot Deployment Plan*. USDOT FHWA-JPO-16-297.