



NOW AVAILABLE:

- Additional RSEs with Signal Phase and Timing (SPaT) and Geometric Intersection Description (GID).
- Test Bed expansion beyond Michigan into California, Florida, and New York. These expansion test beds will be available for those planning demonstrations at ITS World Congress.

Using the Test Bed

- The U.S. DOT will provide limited assistance.
- Equipment may be loaned at the U.S. DOT's discretion.
- Data will be provided at no charge.
- Users must pay the costs of drivers if drivers are required to conduct their tests.

The Vehicle-to-Vehicle and Vehicle-to-Infrastructure Technology Test Bed – Test Bed 2.0: Available for Device and Application Development

The Test Bed is currently available for anyone to use in testing their safety, mobility and environmental applications, services, and components in an environment using the latest technology standards and architecture consistent with the United States Department of Transportation's (U.S. DOT) Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) research program. The Test Bed is supported by the Intelligent Transportation Systems Joint Program Office within the Research and Innovative Technology Administration.

The Test Bed provides the capabilities for people to test applications that will have the potential to save lives and provide continuous real-time connectivity among users.

Safety applications will have the potential to reduce crashes through advisories and warnings. For instance, vehicle operators may be advised of a school zone, sharp ramp curve, or slippery patch of roadway ahead.

Mobility applications will provide a connected, data-rich travel environment based on information transmitted anonymously from thousands of vehicles that are using the transportation system at a particular time, which can help transportation managers monitor and manage transportation system performance.

Environment applications will provide travelers with real-time information about traffic congestion and other travel conditions to help them make more informed decisions that may result in taking alternate routes or public transit. This can help make their trip more fuel-efficient and eco-friendly.

The Test Bed with roadside equipment (RSE) in Oakland County, Michigan, is centered in the cities of Novi, Farmington, Farmington Hills, and Livonia with expansion into Southfield. The RSE installation covers 45 square miles, comprising 75 Center-Line miles made up of 32 Interstate and Divided Highway and 43 Arterial miles. The ongoing Michigan expansion will cover an additional 6 Arterial Center-Lane miles.

Current Test Bed Capabilities

The V2V and V2I Technology Test Bed provides the V2V and V2I communication system that others can utilize to test and demonstrate traveler services through applications that interface within this framework. For example, the V2V and V2I Technology Test Bed includes a number of features that support in-vehicle signage (the display of messages to drivers), including:

- » • **OBE** that stores messages that should be displayed when a vehicle enters a geographic area and tracks the vehicle's position to display messages at appropriate locations.
- » • **RSEs** that broadcast vehicle messaging data to vehicles and OBE that receives the data and adds new messages to the list of messages that should be displayed.
- » • Back office servers that receive requests to post in-vehicle messages from other applications and transmit those messages to the appropriate RSE.

There are many ways that V2V and V2I applications could use these in-vehicle signage features to provide traveler services. For example, a traveler information application could use these features to provide congestion information to drivers. If an incident occurs, this type of application could transmit information about that incident to the V2V and V2I Technology Test Bed back office servers that would then push that information to appropriate RSE and, from there, to OBE-equipped vehicles. The vehicles could then display information about the incident if the vehicle was in the vicinity of the incident.



Other support features provided by the V2V and V2I Technology Test Bed include:

- » • **Probe Data Services.** The OBE can determine vehicle position and record information from vehicle sensors, then transmit this information anonymously through RSE and back office servers to agencies that subscribe to receive that information.
- » • **Signal Phase and Timing (SPaT) Services.** The RSE can be integrated with a traffic signal controller and transmit signal phase and timing data to OBE-equipped vehicles.
- » • **V2I Communication Services.** The OBE can connect through a RSE to the Internet to receive or transmit data to other systems while connected.
- » • **V2V Communication Services.** The OBE can broadcast basic safety messages (BSM) to other vehicles and receive those broadcasts from other vehicles; however the V2V and V2I Technology Test Bed does not support V2V safety application testing.
- » • **Tolling Transaction Services.** Additional tolling transaction hardware can be connected to a RSE and the RSE provides a communication link between this additional hardware and an OBE-equipped vehicle.
- » • **OBE application hosting.** Additional applications can be installed on the OBE and integrated with the DSRC communications. These applications can reach back through the network to reach internal and external components for added functionality.
- » • **RSE application hosting.** Additional applications can be installed on the RSE and integrated with the DSRC communications. These applications can reach back through the network to reach internal and external components for added functionality.

THE NEXT GENERATION OF TEST BEDS WILL EMPHASIZE:

- **A common design architecture.**
- **Interoperable components and shared back office services.**
- **Working security processes.**
- **Implementation of a revised System Architecture.**

To learn more about the Test Bed, contact:

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New York State Department of Transportation
Road Commission for Oakland County
Vehicle Infrastructure Integration Consortium
Wayne County



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