



At right: Drivers review the appropriate vehicle formation for collecting data for a speed harmonization test drive. Test drives involve three equipped vehicles and up to three probe vehicles.

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## HRDO Begins Data Collection on I-66 for Speed Harmonization Field Experiment

On April 27, 2014, FHWA's Office of Operations Research and Development (HRDO) deployed four microwave radar detection trailers on Interstate 66 (I-66), eastbound between Route 7 and Fairfax Drive. The goal of the study is to begin preliminary data collection and algorithm testing for FHWA's Office of Research and Development's speed harmonization field experiment. Speed harmonization is a method by which speeds of vehicles approaching a bottleneck are slightly decreased in order to smooth traffic flow, reduce stop and go traffic, and slow the onset of major congestion.

Researchers will calculate an optimal speed and use a remote server at Turner-Fairbank Highway Research Center (TFHRC) to broadcast it to three vehicles in live traffic on I-66 eastbound during the evening peak period. The vehicles are equipped with connected and automated vehicle technologies. The experiment is scheduled to take place over six days during a test window from May 20 to July 18, 2014.

During data collection, the project team has been conducting test runs with the three equipped vehicles and up to three "probe vehicles" to measure the impact of adjusted speeds on traffic, both upstream and downstream. As a result, researchers are testing variations of the algorithm to measure performance under different operational conditions. Preliminary results demonstrate viable communication between infrastructure and vehicle to achieve speed harmonization. To learn more, contact Joe Bared at [joe.bared@dot.gov](mailto:joe.bared@dot.gov), or Dan Dailey at [dan.dailey.ctr@dot.gov](mailto:dan.dailey.ctr@dot.gov).



*These equipped vehicles are prepped for a speed harmonization test drive.*

## MARK YOUR CALENDARS

**July 15-17**  
Automated Vehicles  
Symposium  
San Francisco, CA

**August 10-13**  
ITE Annual Meeting  
Seattle, WA

**September 7-11**  
ITS World Congress  
Detroit, MI



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## HRDO Director Presents at IEEE Intelligent Vehicles Symposium

On June 10, 2014, HRDO Director Joe Peters delivered a plenary session presentation at the Institute of Electrical and Electronics Engineers (IEEE) Intelligent Vehicles Symposium in Dearborn, Michigan. Peters' presentation, "Pathways to Automation: The Role of Vehicles and Infrastructure in a Future Transportation Environment," focused on the role connected automation plays in advancing mobility, safety, and environmental benefits to the transportation system and travelers, beyond what automation alone can provide.

Peters discussed ongoing HRDO research and development efforts related to connected automation, including projects focused on speed harmonization, automated "Eco-GlidePaths" at intersections, and truck platooning. Over 300 participants attended the session from the public and private sectors and academia. For more information, contact Joe Peters at [joe.peters@dot.gov](mailto:joe.peters@dot.gov).



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## HRDO Prepares Guidance on Bottleneck Treatments

In coordination with FHWA's Office of Operations (HOP), HRDO is developing a draft report on defining and identifying congestion and bottlenecks and screening bottleneck countermeasures. The report, which is geared toward States and metropolitan planning organizations (MPOs), will include an analysis of the causes of congestion in order to refine the existing "congestion pie chart." In addition, the report will analyze the effects of five bottleneck solutions: increased acceleration lane lengths in merge sections; dynamic junction control on freeways; dynamic lane use groupings at signalized intersections; dynamic hard shoulder running for improved merge performance between interchange terminals; and reducing lane widths to add a travel lane in multilane freeway sections. The analysis tools being developed under this project will help agencies identify congestion and bottlenecks on their roadways, understand the causal composition of congestion, and predict short-term occurrences of bottlenecks. For more information, contact Joe Bared at [joe.bared@dot.gov](mailto:joe.bared@dot.gov), or Neil Spiller at [neil.spiller@dot.gov](mailto:neil.spiller@dot.gov).

## HRDO Develops Draft Report on Active Traffic Management on I-66 for the Virginia Department of Transportation

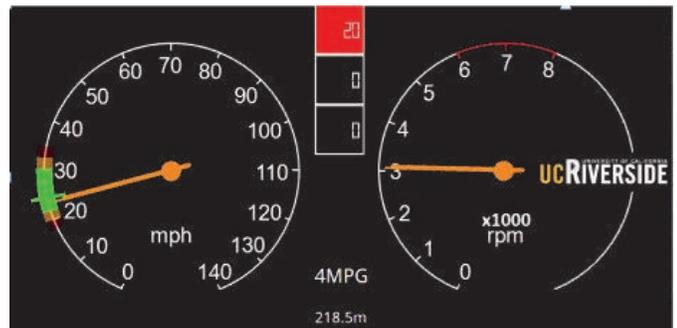
In coordination with HOP staff and Kris Milster of the Florida Division Office, HRDO has completed a draft report detailing the application of the new Highway Capacity Manual methodology for operational analysis of the I-66 Active Traffic Management (ATM) application. The draft report includes details of data collection and calibration efforts as well as an analysis of eastbound operations on I-66 for comparing current conditions to projected post-implementation conditions. Preliminary estimates of the impact of the queue warning system indicate average travel time and vehicle-hours delay reductions of up to 7 percent. The project team used the FREEVAL-ATDM tool to conduct the analysis. For more information, contact Michael Maness at [michael.maness.ctr@dot.gov](mailto:michael.maness.ctr@dot.gov), or Joe Bared at [joe.bared@dot.gov](mailto:joe.bared@dot.gov).

## HRDO Kicks off Project to Demonstrate Automated Eco-GlidePath

HRDO recently kicked off a project that will improve upon a "GlidePath" proof-of-concept application that was developed in 2012 under the Applications for the Environment: Real-Time Information Synthesis (AERIS) Program by the University of California, Riverside (UCR). Saxton Laboratory staff supported the proof of concept testing, which was conducted at TFHRC's Intelligent Intersection.

The UCR-developed algorithm processes signal phase and timing information from a traffic signal controller to calculate optimal speed trajectories for a research vehicle approaching a signalized intersection. Proof of concept tests evaluated the algorithm's performance. The speed guidance was transmitted over-the-air and displayed in the vehicle (as shown on the right) to allow the driver to minimize fuel consumption. Using this application, the tests conducted at TFHRC reduced fuel consumption in research vehicles by up to 18 percent. This promising outcome has encouraged FHWA to pursue additional research, which began in mid-June 2014.

Under the new project, the proof of concept algorithm will be adapted for use in a research vehicle equipped with systems to control the brake and throttle modules, enabling full-range speed control, independent of the vehicle's cruise control system. This will allow for automated longitudinal vehicle control below 25 miles per hour, which will enable the research team to test the hypothesis that automating the application will reduce the burden on the driver and minimize driver distraction. A demonstration of the application is scheduled for spring 2015. For more information, contact Osman Altan at [osman.altan@dot.gov](mailto:osman.altan@dot.gov).



*For the 2012 Eco-GlidePath proof of concept demonstration, drivers adjusted their speed to stay within the "green" zone (shown on the left). The current project will automate this process.*

## HRDO Hosts DOE and AASHTO at TFHRC

On March 18, 2014, leaders from the Department of Energy (DOE) visited TFHRC to learn more about how connected automation can improve fuel economy and reduce emissions. HRDO Director Joe Peters gave an overview of connected automation and ITS JPO Director Ken Leonard introduced USDOT's Automation Program. The HRDO Team then led a tour of the Saxton Laboratory and gave presentations on recent research accomplishments and current connected automation projects, including two Exploratory Advanced Research Program truck platooning projects.

On March 27, 2014, members of AASHTO's Standing Committee on Research (SCOR) visited the Saxton Laboratory to learn about ongoing research projects. The HRDO Team discussed projects such as guidance for alternative intersections and bottleneck treatments, speed harmonization, the virtual data access framework, and partial automation for truck platooning.

The visits from DOE and SCOR are part of HRDO's ongoing efforts to engage Federal and State partners in operations research efforts.



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## USDOT Coordinates with Department of Education on Accessible Transportation Research

On May 19, 2014, the U.S. Department of Transportation (USDOT) met with the U.S. Department of Education's National Institute on Disability and Rehabilitation Research (NIDRR). The purpose of the meeting was to brief John Tschida, the new NIDRR Director and Interagency Committee on Disability Research Chairman, on USDOT's Accessible Transportation Technologies Research Initiative (ATTRI) and to discuss collaborative plans between the two agencies over the next couple of years. The ATTRI is a collaborative effort involving FHWA, the Federal Transit Administration, the Intelligent Transportation Systems (ITS) Joint Program Office (JPO), NIDRR, and other Federal agencies. For more information about the ATTRI, contact Mohammed Yousuf at [mohammed.yousuf@dot.gov](mailto:mohammed.yousuf@dot.gov).

## ATTRI Launches Online National Dialogue

From May 15 to June 6, 2014, USDOT's ATTRI launched a national online dialogue to seek feedback from stakeholders regarding accessible transportation technology research trends and activities, specifically "mobility and transportation technology preferences and needs from riders who have disabilities." The dialogue was facilitated through a Web page that allowed various users to submit comments. For example, one user noted a need for better information on "availability of known surface and street parking spaces, including accessibility information and barriers for those with disabilities, for communication to mobile applications."

The information gathered during the dialogue will be analyzed by Easter Seals and presented to an expert panel or focus group, which will review the results and provide further feedback to the ATTRI team. The draft report on the national online dialogue will be available in June or July 2014. For more information about ATTRI, contact Mohammed Yousuf at [mohammed.yousuf@dot.gov](mailto:mohammed.yousuf@dot.gov), or visit the National Online Dialogue Web site at <http://nationalonlinedialoguetadt.ideascale.com/>.



*ATTRI explores how connectivity can assist disabled travelers through mobile applications, such as those that help blind pedestrians safely cross streets.*

## HRDO Upgrades the Saxton Lab SMART Garage

HRDO is in the process of upgrading the high-bay SMART garage at the Saxton Transportation Operations Laboratory, located at TFHRC. To date, upgrades have included six bench work spaces with touchscreen monitors; dedicated, striped spaces for the connected automation research vehicle fleet; easily accessible, ceiling-mounted power; and an industrial grate to cover the vehicle pit area. Additional upgrades underway include a Fume-A-Vent exhaust system to support conducting experiments in the garage with idling vehicles, Wireless Fidelity connectivity to support vehicle system access, and a Global Positioning System repeater for indoor localized testing. These upgrades will enhance the testing activities that can be conducted in the garage. HRDO is targeting the official opening of the enhanced SMART garage for late 2014. For more information, contact Taylor Lochrane at [taylor.lochrane@dot.gov](mailto:taylor.lochrane@dot.gov).



*Upgrades to the garage include new work benches and striped vehicle spaces.*

## Automated Vehicles Symposium

San Francisco, CA  
July 15-17, 2014

Sponsored by the Transportation Research Board (TRB) and the Association for Unmanned Vehicle Systems International (AUVSI), the Automated Vehicles Symposium is scheduled from July 15 to July 17, 2014 and will include 10 breakout sessions. In addition to partnering in the organization of the entire symposium, HRDO is playing a leadership role in the development and organization of the breakout session, "Near-Term Connected/Automated Technology Deployment Opportunities."

This session will consist of three panel discussions. HRDO's Bob Ferlis will moderate the first panel, which will focus on near-term connected vehicle and infrastructure technologies. The second panel, moderated by Texas Transportation Institute's Ginger Goodin, will focus on innovators who might be best situated to champion the early deployment of automated vehicle-highway technologies. HRDO Director Joe Peters will moderate the final panel, focused on the value proposition for early deployment. After the panels, Bob Ferlis will facilitate a closing, large group discussion that summarizes findings and conclusions.

For more information, visit the symposium Web site: [www.automatedvehiclessymposium.org](http://www.automatedvehiclessymposium.org).



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## FHWA and AASHTO Present on the National Connected Vehicle Field Infrastructure Footprint Analysis

FHWA and the American Association of State Highway and Transportation Officials (AASHTO) recently delivered presentations on the National Connected Vehicle Footprint Analysis at three events:

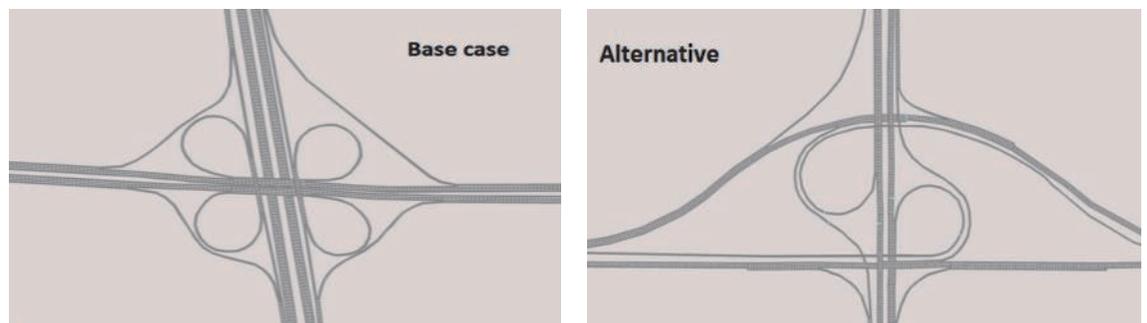
- The AASHTO Subcommittee on Systems Operations and Management Annual Meeting in Nashville, TN on May 6, 2014.
- The T3 Webinar on the National Connected Vehicle Field Infrastructure Footprint Analysis on May 22, 2014.
- The Cooperative Transportation Systems Pooled Fund Study and AASHTO Connected Vehicle Working Group Meeting on May 29, 2014.

The Footprint Analysis is a joint effort between FHWA and AASHTO intended to develop a deployment footprint and plan that will describe the need for connected vehicle infrastructure, the form that the infrastructure should take, where and when the infrastructure should be deployed, and the cost, organizational, and institutional implications of deploying the infrastructure. The analysis will result in a policy foundation for a connected vehicle environment.

The presentations were aimed at raising awareness about the Footprint Analysis among stakeholders and gathering their feedback. Each event was well-received and brought together about 50 to 100 participants. Participants included representatives from State DOTs, counties, and original equipment manufacturers (OEMs). Input and comments received from stakeholders will be incorporated in the Footprint Analysis final report, which will be published this summer. For more information about the National Connected Vehicle Field Infrastructure Footprint Analysis, contact Ben McKeever at [ben.mckeever@dot.gov](mailto:ben.mckeever@dot.gov).

## HRDO Welcomes Professional Development Program Researcher

On July 7, 2014, Christopher Melson will start a 4 to 5 month assignment at HRDO under FHWA's Professional Development Program (PDP). Mr. Melson will work on two research projects. The first is a study and technical paper on one-sided interchanges. As part of this effort, Mr. Melson will conduct a simulation to determine optimum lengths of speed change lanes for exceptional left-side and on- and off-ramps for one-sided interchanges. This innovative type of directional interchange will reduce lane requirements and can be built on one side of a freeway crossing. The second project, which will be determined jointly by HRDO and HOP, may focus on dynamic traffic assignment (DTA). Mr. Melson, who is currently working at the Madison Wisconsin Division, completed a thesis on DTA. For more information, contact Joe Bared at [joe.bared@dot.gov](mailto:joe.bared@dot.gov).



The figure to the left above depicts a traditional "clover leaf" interchange design. This figure can be compared to the figure on the right, a one-sided interchange design.