

# FHWA R&T Now

*A news update of research, technology, and development from the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA)*

**November/December 2016**

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## **POLICY & PARTNERSHIPS**

### **TRB and FHWA to Review Highway Research**

In December, FHWA leadership involved with research and technology demonstration and deployment will participate in a meeting of the Research and Technology Coordinating Committee (RTCC), FHWA's official research and technology (R&T) advisory committee. Turner-Fairbank Highway Research Center (TFHRC) leadership will offer coordination and guidance on presentations focused on Fixing America's Surface Transportation (FAST) Act implementation, Every Day Counts, the R&T Performance Evaluation Program, R&T deployment, the 2017 Modal Research Plan, disruptive innovation, and the 2018 FHWA Strategic Implementation Plan.

The Transportation Research Board (TRB) convenes the RTCC twice yearly to provide continuing guidance and advice on FHWA's R&T program and makes broad-based research priority recommendations with an emphasis on FHWA's annual research program plans and budgets. Committee membership is drawn from top officials in State departments of transportation (DOTs), as well as university and private-sector research organizations, local government officials, highway suppliers, contractors and consultants, environmental and highway safety specialists, and highway users.

For more information, contact John Moulden, 202-493-3470, [john.moulden@dot.gov](mailto:john.moulden@dot.gov).

### **FHWA Publishes Evaluation Report on its R&T Program**

FHWA recently published an evaluation of its R&T program. "FHWA Research and Technology Evaluation Program Summary Report" (Publication Number: FHWA-HRT-16-071) summarizes 16 evaluations being conducted by the Volpe National Transportation Systems Center on behalf of FHWA's Office of Corporate Research, Technology, and Innovation Management. Summaries for completed projects include initial findings as well as background on each project.

The evaluations are grouped into two waves. The first wave consists of six retrospective evaluations and four prospective evaluations. The second wave consists of six evaluations, all prospective. The report provides more detail about evaluations that are closer to completion. Many of the evaluations leverage both qualitative data (e.g., document review, semistructured interviews) and quantitative data (e.g., website statistics) to trace the diffusion of FHWA R&T recommendations, track the adoption of those recommendations, and determine the impact of adoption.

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To access the report, visit

[www.fhwa.dot.gov/publications/research/randt/evaluations/16071/index.cfm](http://www.fhwa.dot.gov/publications/research/randt/evaluations/16071/index.cfm)

For more information, contact John Moulden, 202-493-3470, [john.moulden@dot.gov](mailto:john.moulden@dot.gov).

## EXPLORATORY ADVANCED RESEARCH

### EAR Program Sponsors TRL Assessment Workshop

FHWA's Exploratory Advanced Research (EAR) Program recently sponsored a workshop on conducting Technology Readiness Level (TRL) Assessments for highway research and development. The workshop aimed to help highway researchers prepare for conducting technology readiness assessments on research projects and employ assessment results to shape ongoing and/or future research and technology deployment.

TRLs are a metric for measuring technology maturity, and a useful shorthand for communicating research results and thinking critically about next steps, future tests, and additional development. The workshop familiarized FHWA staff responsible for research, development, and technology deployment with the TRL scale and encouraged discussion about how this is relevant to highway research projects. Several sample assessments were presented and participants discussed the benefits and limitations of this work and how results can be used. FHWA made related training available to State DOTs through a TRB webinar.

A recorded version is available at [www.trb.org/ElectronicSessions/Blurbs/173937.aspx](http://www.trb.org/ElectronicSessions/Blurbs/173937.aspx).

For more information, contact David Kuehn, 202-493-3414, [david.kuehn@dot.gov](mailto:david.kuehn@dot.gov).

## INFRASTRUCTURE

### Commercialized Version of RABIT Undergoes Final Validation Testing

A commercialized version of FHWA's RABIT Bridge Deck Assessment Tool is undergoing final validation testing. FHWA, in collaboration with Rutgers University, developed the RABIT Bridge Deck Assessment Tool to rapidly detect and document in near real-time three of the most common deterioration types in concrete bridge decks: rebar corrosion, delamination, and concrete degradation. The tool can collect high-quality research data on the condition of concrete bridge decks.



**FHWA's RABIT Bridge Deck Assessment Tool rapidly detects and documents rebar corrosion, delamination, and concrete degradation.**

The information collected by RABIT helps bridge owners make data-driven decisions to maintain, preserve, and manage their bridge infrastructure assets. Last year, FHWA deployed its prototype RABIT Bridge Deck Assessment Tool to assess and document the deck condition of all six lanes of the National Park Service's Arlington Memorial Bridge.

For more information, contact Robert Zobel, 202-493-3024, [robert.zobel@dot.gov](mailto:robert.zobel@dot.gov).

### FHWA Participates in Joint Meeting with LTPP and LTBP Committees

FHWA staff from the Office of Research, Development, and Technology and the Office of Infrastructure Research and Development participated in a joint meeting with TRB's Long-Term Pavement Performance (LTPP) Committee and its Long-Term Bridge Performance (LTBP)



Committee. FHWA sponsors these committees as a forum for obtaining stakeholder input about the agency's two largest research programs. The committees met in a joint session to develop recommendations on investment priorities considered across the two programs.

FHWA is seeking input concerning options that committee members see and are willing to champion to leverage FHWA investments with other sources of funding, including (but not limited to) pooled fund opportunities.

For more information, contact Cheryl Richter, 202-493-3021, [cheryl.richter@dot.gov](mailto:cheryl.richter@dot.gov).

### Chemistry Lab Prepares Asphalt Samples

Researchers from TFHRC's Chemistry Laboratory recently packed 720 cans of asphalt samples, a preparation that took several months to accomplish. The lab is focusing its work on a waste residue known as Recycled Engine Oil Bottoms (REOB), what is left over from the recycling of used engine oil.



Researchers from TFHRC's Chemistry Lab recently packed 720 cans of asphalt samples.

The impact of REOB on pavement durability is not fully understood, but there is some evidence that using too much of it can have detrimental effects. There is also evidence that REOB has been used in asphalt mixtures without customers being informed, and without testing the impact it could have on pavement durability.

The lab is working to develop a reliable test method to analyze for REOB. This has not been easy since REOB is produced by several different companies and its composition varies widely.

TFHRC has developed a method that can accurately measure the REOB content of an asphalt binder. This part of the process, known as "round robin" testing, is to perfect the method and teach others how to do this complex analysis.

Over the past 5 years, the Chemistry Lab has tested 1,507 samples from 43 State and Federal agencies. Of the samples tested, 12 percent contained REOB—and many samples had REOB levels now known to be deleterious. Research participants include 10 State DOTs, one university, one paving contractor, and two independent testing laboratories.

For more information, contact Terry Arnold, 202-493-3305, [terry.arnold@dot.gov](mailto:terry.arnold@dot.gov).

## OPERATIONS

### RDE Adds More Data Environments for Download

The Research Data Exchange (RDE) has added a number of new data environments that are available to the public for free. The RDE is a web-based portal that provides access to archived and real-time multisource and multimodal data to support the development and testing of intelligent transportation system (ITS) related applications and transportation management operational strategies.

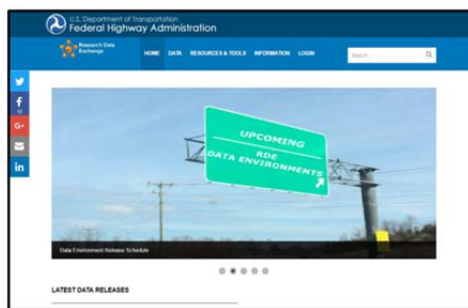
The following new data environments are now available for download:

- Intelligent Network Flow Optimization (INFLO) Simulation is a VISSIM simulation model for the U.S. 101 freeway corridor in San Mateo, CA. This model is used to assess the impacts of the INFLO Prototype Dynamic Speed Harmonization (SPD-HARM) application. This set of performance measure files was calculated based on the VISSIM outputs of 24 scenario runs of the SPD-HARM application. The models covered various market penetration rates, incident durations, and weather conditions.



- Seattle I-405 was generated by the Trajectory Conversion Algorithm Version 2.3 using the SAE J2735 Basic Safety Message (BSM) based on the I-405 corridor in Seattle, WA. This data environment was generated to provide data files for a variety of operational conditions, market penetrations, and communication strategies to examine the effectiveness of advanced analytical techniques in using connected vehicle data to predict congestion in a way that enables a transportation system manager to take steps to mitigate potential bottlenecks.

- Analysis, Modeling, and Simulation (AMS) San Mateo Testbed was used to model and simulate mobility applications including INFLO (queue warning, speed harmonization, and cooperative adaptive cruise control) and Multimodal Intelligent Traffic Signal Systems. Four baseline scenarios—combining different levels of demand, incident, and weather conditions—were used for testing the performance effects of these applications. They feature four types of datasets: Cluster Analysis Data, Calibration Data, Network Files, and Simulation Output.



**The RDE provides access to data to support the development and testing of ITS-related applications and transportation management operational strategies.**

- AMS Dallas Testbed was used to test several active transportation and demand management strategies, including dynamic shoulder lane, dynamic signal timing, dynamic routing, ramp metering, and dynamic priced parking. The Testbed is developed using the DIRECT (Dynamic Intermodal Routing Environment for Control and Telematics) software, which was developed by

researchers at Southern Methodist University and features four types of datasets: Cluster Analysis Data, Calibration Data, Testbed Files, and Simulation Results.

The U.S. Department of Transportation's Intelligent Transportation Systems (ITS) Joint Program Office funds the RDE to help facilitate the advancement of research, development, planning, testing, and deployment of connected vehicle and traveler-related applications and ITS. Public agencies, service providers, researchers, application developers, and others are invited to visit the RDE website to explore the available data environments and resources.

For more information, contact Jon Obenberger, 202-493-3265, [jon.obenberger@dot.gov](mailto:jon.obenberger@dot.gov).

### **Saxton Lab Supports Testing of Technology Innovations**

The Saxton Transportation Operations Laboratory recently supported testing of several technology innovations on roadways that comprise the Cooperative Vehicle Highway Testbed at TFHRC.

As part of the connected vehicle research being done by Leidos, the Saxton lab conducted field tests of a virtual conflict monitor. A traffic signal controller has a malfunction management unit, or conflict monitor, in every signal cabinet to ensure that green signal indications are not displayed simultaneously for conflicting phases. In the connected vehicle environment, the signal statuses are sent wirelessly to mobile devices that use the information in decisionmaking applications. This project has developed a software system that will ensure that the wireless information is also free of conflicting information related to the signal phases.

FHWA's Office of Operations Research provided a project demonstration of connected vehicle advanced messaging concepts. The demonstration showcased ten vehicles driving a variety of mobility application scenarios transmitting triggered event data through



multiple message formats using both Dedicated Short Range Communications (DSRC) and cellular communications. Under the management of FHWA Operations Research and through funding provided by the ITS Joint Program Office, the Automobile Manufacturers (OEMs) Crash Avoidance Metrics Partnership (CAMP) and the Virginia Tech Transportation Institute (VTI) performed the demonstration.

Ultra Wideband (UWB) radar sensors were installed and tested at the Saxton lab. The tests included vehicles organized as closely-coupled platoons so that the capability of the sensors to monitor and support emerging cooperative adaptive cruise control applications (where vehicle streams can become much denser than is possible today) could be gauged. An EAR project enabled Honeywell Automation and Control Solutions Labs to develop the sensors (based on UWB radar technology) to identify and track vehicle paths on roadways. Although commercial sensors routinely measure vehicle passages and speeds and provide average measures over time intervals, future traffic management and control systems of connected and automated vehicles will require more detailed data (including speeds and locations of individual vehicles) that is generated more frequently and with very low latencies.

For more information about testing the virtual conflict monitor, contact Deborah Curtis, 202-493-3267, [deborah.curtis@dot.gov](mailto:deborah.curtis@dot.gov). For more information about the connected vehicle advanced messaging demonstration, contact Dale Thompson, 202-493-3270, [dale.thompson@dot.gov](mailto:dale.thompson@dot.gov). For more information about testing the UWB radar sensors, contact Bob Ferlis, 202-493-3268, [robert.ferlis@dot.gov](mailto:robert.ferlis@dot.gov).

#### **OSADP Offers Additional ITS Applications to Download**

The Open Source Application Development Portal (OSADP) has added a number of new ITS-related applications that are available for free to the public. The OSADP is a web-based portal that provides access to—and supports the

collaboration, development, and use of—open-source applications related to ITS. The new applications include the Vehicle to Infrastructure (V2I) Hub; the Dynamic Traffic Assignment (DTA) Lite Analysis, Modeling and Simulation (DTALite AMS); and Glidepath.

The V2I Hub takes in data from vehicles through basic safety messages and translates the data to a National Transportation Communications for ITS Protocol (NTCIP) that infrastructure components can understand; and vice versa. The V2I Hub is a message handler that acts as a translator and data aggregator/disseminator for infrastructure components of a connected vehicle deployment.

The DTALite AMS enables external users to embed their own simulation controls and traffic management strategies, such as adaptive ramp metering, signal control, and work-zone management. This code has Dynamic Mobility Applications built into it. These include Dynamic Transit Dispatch, Enable Advanced Traveler Information Systems, and Freight Advanced Traveler Information Systems.

Glidepath is a vehicle application that provides longitudinal control for a modified 2010 Ford Escape while it transits an intelligent, signalized intersection. The software's objective is to maximize fuel economy as the vehicle passes through the intersection by minimizing speed changes. It receives and interprets information about the signal operation through messages broadcast by the roadside infrastructure via a dedicated short range communication radio.

The U.S. Department of Transportation's Intelligent Transportation Systems Joint Program Office (ITS JPO) funds the OSADP to help facilitate advancement of the research, development, planning, testing, and deployment of connected vehicle and traveler-related applications and ITS. The OSADP features source code, software, applications, and resources (e.g., documentation, licenses, and data) to



support the use of, or further development of these ITS-related applications.

Public agencies, service providers, researchers, application developers, and others are invited to visit the OSADP at <http://itsforge.net> and explore the use of these available applications and resources.

For more information about the OSADP, visit [www.itsforge.net/index.php/contact/contact-us](http://www.itsforge.net/index.php/contact/contact-us).

For more information, contact Peter Huang, 202-493-3484, [peter.huang@dot.gov](mailto:peter.huang@dot.gov).

## SAFETY

### TRB to Review FHWA's Safety Training and Analysis Center

A TRB team recently performed a review of FHWA's newly established Safety Training and Analysis Center (STAC). This marked the final step to establishing the STAC as a Secure Data Enclave (SDE). As an SDE, the STAC will be a site where researchers can access data that was collected during the Second Strategic Highway Research Program's Naturalistic Driving Study (SHRP2 NDS) and is administered by TRB under sponsorship from FHWA.

In coordination with Virginia Tech Transportation Institute (VTTI), STAC staff developed procedures and policies for secure remote data access and monitoring. This includes access to personally identifiable information that will be used for analytical purposes but not stored at the STAC. Beyond the use of an SDE, access to original SHRP2 NDS data requires executed data use license(s) for each individual research activity. A VTTI-controlled application program interface (API) will provide secure access to SHRP2 NDS data.

Once the STAC is confirmed as an SDE, VTTI will provide technical support and work with STAC personnel and information technology security staff at TFHRC to support researchers by

maintaining API and secure data access procedures.

For more information, contact Lincoln Cobb, 202-493-3313, [lincoln.cobb@dot.gov](mailto:lincoln.cobb@dot.gov).

### Webinars to Cover NDS Data and Roadway Information Database

FHWA's STAC will conduct a series of webinars for State DOT research managers and safety, operations, and planning staff to provide an introduction to SHRP2 NDS data and the Roadway Information Database (RID).

Webinar topics include SHRP2 NDS data covering driver and vehicle information (scheduled for November 30, 2016 from 1 to 2:30 p.m. eastern standard time (EST)); the SHRP2 RID (scheduled for December 14, 2016 from 1 to 2:30 p.m. EST); integration of driver, vehicle, and roadway data to support addressing research questions (scheduled for January 18, 2017 from 1 to 2:30 p.m. EST); and NDS and RID research and outreach opportunities (scheduled for February 8, 2017 from 1 to 2:30 p.m. EST).

Safety, operations, and planning researchers working with DOTs, TRB, FHWA, and other funding agencies will also benefit from these webinars.

To register, visit <https://collaboration.fhwa.dot.gov/dot/fhwa/W/C/default.aspx>, select the date of the webinar(s), and click on the registration box.

For more information, contact Charles Fay, 202-493-3336, [charles.fay@dot.gov](mailto:charles.fay@dot.gov).

## RECENT PERIODICALS

### Public Roads—November/December 2016

This issue includes: Targeting the Crosshairs; Keeping Climate Impacts at Bay in Boston; Wondrous Rides Through Nature's Wonders; The Road Is a Park, and the Park Is a Road; A Crown Jewel of Bikeways; and What Drives Highway Safety Improvements?



It is available online via  
[www.fhwa.dot.gov/publications/publicroads/16novdec/index.cfm](http://www.fhwa.dot.gov/publications/publicroads/16novdec/index.cfm).

For more information, contact Lisa Shuler,  
[lisa.a.shuler@dot.gov](mailto:lisa.a.shuler@dot.gov).

**Innovator: Accelerating Innovation for the American Driving Experience—  
November/December 2016**

This issue includes: Nation's First Highway Innovation Showcase Recognizes Pennsylvania; Regional Models of Cooperation: Thinking Beyond Borders; Delaware Reaps Benefits of High-Friction Surface Treatments; Best Practices Streamline Environmental Documents and Project Delivery; Traffic Incident Management Training Reaches Milestone; States Innovate!; and Events.

The issue is available online via  
<http://www.fhwa.dot.gov/innovation/innovator/issue57/3dIssue/>

For more information, contact Julie Zirlin,  
[Julie.Zirlin@dot.gov](mailto:Julie.Zirlin@dot.gov).

**LINKS**

Turner-Fairbank Highway Research Center:  
[www.fhwa.dot.gov/research/](http://www.fhwa.dot.gov/research/)

Resource Center:  
[www.fhwa.dot.gov/resourcecenter/](http://www.fhwa.dot.gov/resourcecenter/)

National Highway Institute:  
[www.nhi.fhwa.dot.gov/home.aspx](http://www.nhi.fhwa.dot.gov/home.aspx)

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[FHWA\\_Now@fhwa.dot.gov](mailto:FHWA_Now@fhwa.dot.gov).

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