

# VOLPE HIGHLIGHTS

## Track Upgrades to Support High-Speed Rail

Since the passage of the American Recovery and Reinvestment Act (ARRA) in 2009, the Federal government has made available more than \$10 billion to promote U.S. High-Speed Intercity Passenger Rail (HSIPR) service. In support of the Federal Railroad Administration



Pan Am Railways Locomotive coupled to FRA T-18 railcar with deployable gage restraint measurement system developed by the Volpe Center for the FRA.

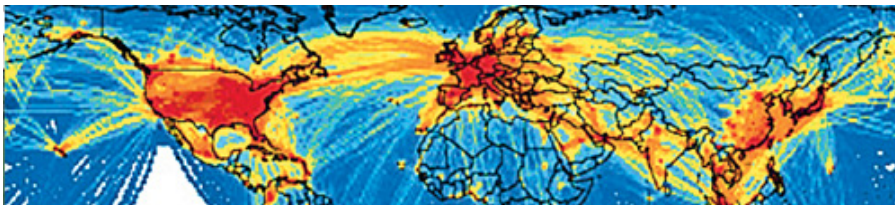
(FRA), rail engineers from the Structures and Dynamics Division of the Physical Infrastructure Systems Center of Innovation have been developing and utilizing state-of-the-art inspection equipment to assure that the existing rail infrastructure owned by Amtrak, various state authorities and the freight railways can accommodate the sometimes different physical standards required by high-speed passenger service as compared with freight service.

*Story continues on page 4*

### In this issue

- 1 Track Upgrades to Support High-Speed Rail
- 1 Environmental Impacts of Aviation Tool
- 1 Visit Volpe at TRB
- 2 Nationwide Truck Safety System Launched
- 2 Integrated Vehicle Based Safety System
- 3 Vehicle Miles Travelled Forecasting Tool
- 3 Volpe at U.S./China Transportation Forum
- 4 Quiet Pavement and Traffic Noise Modelling Research

## Tool on Track to Analyze Complex Environmental Impacts of Aviation



The Volpe Center, in support of the FAA, is leading the design, development and maintenance of the AEDT, which calculates noise, fuel burn and emissions from commercial aircraft.

The close of 2010 marks a milestone in the development of the Aviation Environmental Design Tool (AEDT): the completion of the first year-long stakeholder testing period. In support of the Federal Aviation Administration (FAA) Office of Environment and Energy (AEE), the Volpe Center has led the development, integration and testing of three beta versions of AEDT. Volpe's Environmental and Energy Systems Center of Innovation released versions incrementally last year. Each version was evaluated by a Design Review Group made up of consultants, industry, government and academia stakeholders. The phased beta testing accelerated the integration of upgrades, driving the tool's growing functionality.

Development will continue internally and culminate in the first public release of AEDT in early 2012. The project contributes to a suite of tools that the FAA is developing to provide comprehensive impact and cost and benefit analyses to inform aviation environmental policy decisions. AEDT specifically will enable the analysis of interdependencies among aviation fuel burn, noise and engine emissions, ultimately supporting the mitigation of the environmental impacts of aviation. Jonathan Koopman serves as the Volpe Center's project lead on AEDT.

## Visit Volpe at TRB!

Are you heading to TRB in January? Stop by Volpe demos at the RITA Booth, 3303-3305:

- Listen to the exhibit hall through **specialized acoustic headphones** used in researching quieter cars and the safety of blind pedestrians
- Find out about the Commuter Choice Survey tool DOT is implementing and **opportunities for mitigating your organization's greenhouse gas emissions**
- Connect with our librarian about the **extensive collection of transportation resources** available through the Volpe Center's Technical Library and Information Center
- Learn how the new FMCSA initiative--**Compliance, Safety, Accountability**, supported by Volpe, is helping to improve motor carrier safety management practices
- Check out our video and raw data collection from 850,000 miles of passenger vehicle and heavy truck drivers to see what we might learn about **Driver Distraction, Fuel Economy, and Crash Warning Systems**

## FMCSA Launches Revised Truck Safety System Nationwide

Photo courtesy of Pittsburgh Post-Gazette



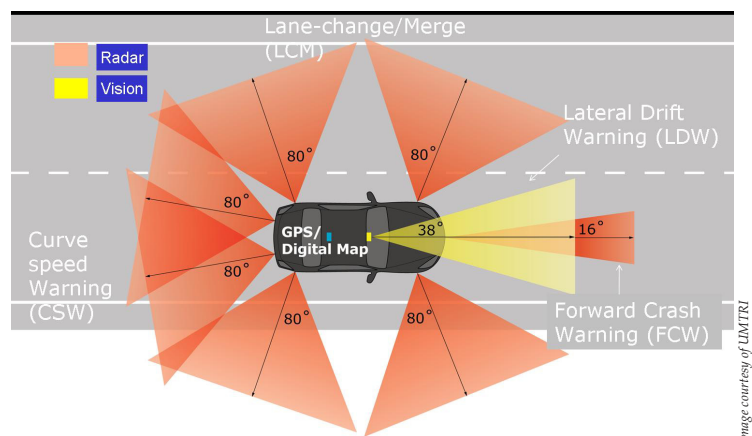
The Volpe Center provides significant technical, research and project management support and assistance to the Federal Motor Carrier Safety Administration (FMCSA) in developing and implementing their major truck safety programs, which allow them to work with industry and state safety enforcement agency partners to reduce commercial motor vehicle crashes, fatalities, and injuries. Currently, this is a major responsibility of the Volpe Center's System Measurement and Analysis Division, led by Nancy Kennedy.

The Volpe Center assisted FMCSA in developing and implementing the Comprehensive Safety Analysis (CSA) 2010 Program over the past several years. The renamed Compliance, Safety Accountability program re-engineered the former enforcement and compliance process to provide a better view into how well large commercial motor carriers and their drivers are complying with safety rules, and to intervene earlier with those who are not. The first step in developing CSA involved a thorough assessment of the FMCSA compliance review process, followed by the development of the [Safety Measurement System \(SMS\)](#) to replace the previous SafeStat methodology. SMS uses all roadside inspection and crash data and a new interventions toolbox to deal efficiently and effectively with a wide variety of safety problems identified in the SMS.

Roll out nationwide began in December 2010, when CSA established a new enforcement and compliance [Operational Model](#) that will utilize FMCSA and its State enforcement partners more efficiently and effectively, making the roads even safer for everyone. The new CSA Operational Model has three major components: [Measurement](#), [Evaluation](#), and [Intervention](#). Under "Measurement," CSA measures safety performance by using inspection and crash results to identify carriers whose behaviors could reasonably lead to crashes. Under "Evaluation," CSA helps FMCSA and its state partners to correct high-risk behavior by contacting more carriers and drivers with interventions tailored to their specific safety problem, as well as a new proposed [Safety Fitness Determination \(SFD\)](#). Under "Intervention," CSA covers the full spectrum of safety issues: from how data is collected, evaluated, and shared to how enforcement officials can intervene most effectively and efficiently to improve safety on our roads.

## Volpe Center and NHTSA Join Partners in Concluding Five-Year Integrated Vehicle Based Safety System Program

The Integrated Vehicle Based Safety System (IVBSS) program is a five-year, \$32 million cooperative agreement under the Intelligent Transportation Systems (ITS) program to combine a set of crash warning subsystems into a single, integrated system to enhance the safety of both light vehicles and heavy trucks. The program started in November 2005 and held its final public meeting in October 2010. Final reports on the project's results are being prepared. IVBSS is managed by the National Highway Traffic Safety Administration (NHTSA) with ITS funding. The Volpe Center's Advanced Vehicle Technology Division, headed by Wassim Najm, PhD, provided key technical and program management support throughout the entire effort. Other partners include the University of Michigan Transportation Research Institute, Federal Motor Carrier Safety Administration, Visteon, Eaton, Honda, Takata, International, Battelle Memorial Institute, Michigan DOT, Con-way Freight and the National Institute of Standards and Technology.



Representation of IVBSS light vehicle sensor suite coverage.

IVBSS subsystems include Forward Collision Warning (FCW), Lateral Drift Warning (LDW), Lane Change/Merge Warning (LCM) and Curve Speed Warning (CSW), which all incorporate sophisticated suites of cameras, radars, Global Positioning System receivers, gyros, digital map data bases, and speed and motion sensors. Driver Vehicle Integration studies performed in the UMTRI driving simulator were followed by one year of Field Operational Tests by sixteen light vehicles and ten trucks outfitted with IVBSS systems. The key IVBSS contribution is to demonstrate that several of sophisticated subsystems can be successfully integrated together to work as a single unit in a vehicle to significantly enhance highway safety. Already several current vehicle models incorporate these subsystems, and more are on the way. Additional information about the IVBSS program is available from DOT at [www.its.dot.gov/IVBSS](http://www.its.dot.gov/IVBSS).

## New Vehicle Miles Travelled Forecasting Tool Assists Policy-Making



On behalf of the Federal Highway Administration (FHWA), Volpe Center economists recently completed the development of an econometric model that can be used to project the number of vehicle miles travelled (VMT) by passenger vehicles and freight trucks over a thirty year horizon. This forecasting model has been built to provide policy-making support and scenario analysis capabilities to the FHWA's Office of Highway Policy Information.

The vehicle miles travelled model offers insight into the factors that influence the demand for passenger and commercial vehicle travel in the U.S. Volpe economists Don Pickrell, David Pace, Rachel West and Garrett Hagemann determined that vehicle use was influenced by economic activity, income, demographic trends, the per-mile cost of operating vehicles, and roadway extent and capacity. The model also incorporates several factors that capture the influence of policy decisions on the demand for VMT: fuel tax rates, fleet fuel efficiency and the possible introduction of a VMT fee. These factors can be used by FHWA to understand the potential effects of changes in policy on future travel demand, fuel use, and wear and tear on the nation's highways. The model also allows FHWA analysts to examine how different economic outlooks (e.g., a high oil price forecast) may affect the demand for VMT.

The model produces VMT forecasts for both passenger and commercial vehicles. The forecast information is presented at national and state geographic levels, as well as by vehicle type and roadway functional classification at the national level. The Volpe Center expects to issue a report to accompany the model that will be published on the FHWA website.

## Volpe Shares Disaster Assistance Expertise at U.S./China Forum

Volpe Center community planner Eric Plosky recently delivered a presentation on damage assessment and disaster recovery to the Disaster Assistance Working Group at the U.S./China Transportation Forum. This year's forum was held in Xi'an, China. Mr. Plosky attended at the invitation of the Chinese government and the Office of Intelligence, Security, and Emergency Response (S-60) within the Office of the Secretary of Transportation (OST). Other participants included the Director, Associate Director, and several staff of S-60, as well as representatives from the Federal Railroad Administration, the Federal Transit Administration, the U.S. Coast Guard, and the Nevada Department of Transportation. Chinese participants represented the national Ministry of Transport as well as other agencies of the central and provincial governments.



*The U.S. DOT delegation witnessed a firefighting demonstration at the Zhongnanshan Tunnel emergency command center in Shaanxi Province, China. The tunnel is the longest two-tube road tunnel in the world.*

Mr. Plosky's work is an extension of the critical support role that the Volpe Center has played in disaster recovery and response, on behalf of OST and the Federal Emergency Management Agency. The Volpe Center continues to receive recognition for its excellence in this area. Volpe Center staff member Terry Sheehan (a U.S. DOT Regional Emergency Transportation Representative) led a multimodal Emergency Response Team that recently received an award from U.S. Transportation Secretary Ray LaHood for their work in response to severe storms and flooding in New England.

This is the Volpe Center's second time participating at the U.S./China Transportation Forum. Freight Logistics and Transportation Systems Center of Innovation Director Michael Dinning participated in the forum held last year in Washington, DC.

## Quiet Pavement and Traffic Noise Modeling Research

Federal Highway Administration (FHWA), the National Park Service (NPS), and several state Departments of Transportation are interested in mitigating the negative impact of motor vehicle noise from roads and highways. The Volpe Center's Environmental and Energy Systems Center of Innovation, directed by Gregg Fleming, has been assisting these and other agencies in developing measurement and modeling tools and techniques for quiet pavement and tire noise research. The Center's staff also provides technical oversight of pilot noise reductions programs, collects tire and pavement noise data, and undertakes detailed data analysis.



Volpe researchers set up acoustic equipment to measure wayside noise in Death Valley.



Vehicle outfitted to gathering TNM noise data in real-world conditions.

The Volpe Center has developed and maintains the Traffic Noise Model (TNM) for the FHWA Office of Natural and Human Environment to use in data analysis. The National Park Service is also a major sponsor of this research, and the Center has assisted the NPS Natural Sounds Program and other initiatives to measure, model and mitigate highway-related noise emissions. The Center also supports the NPS Air Tour Management Plan, which seeks to mitigate the impact of noise from commercial aviation on National parklands. In the past year alone the Center has quantified the effects of meteorological conditions, especially temperature, on highway sound levels; and Center staff participated in On-Board Sound Intensity (OBSI) comparison studies of noise on several highways near Charlotte, NC as well as in real-world noise measurements on highways at Death Valley National Park in California.

## High Speed Rail *(continued from page 1)*

Volpe Center engineers Ted Sussmann and John Choros recently met with officials of Pan Am Railways to discuss the results of a test of the characteristics of the company's track between Portland and Brunswick, ME as part of a proposal to extend Amtrak's "Downeaster" passenger service from Boston, MA along the Maine coast. This test, using the gage restraint measurement system the Center developed for the FRA, was the first evaluation of its type on an existing rail track being considered for HSIPR service. Lack of reliable physical data on existing track is commonly encountered in the HSIPR program. The track condition measurements from the Pan Am study are being used to determine any necessary physical upgrades the existing track may require to accommodate HSIPR service. FRA plans to augment this process with other recently-developed systems, such as ground penetrating radars and vertical track deflection measurements. The next evaluation, of Amtrak's Vermonter line, is planned for 2011. FRA hopes these results will become the basis for measuring existing track for future high-speed extensions, thus saving money by taking advantage of the nation's existing track inventory where possible.

As part of the HSIPR program, the Volpe Center also provides technical oversight to the FRA for physical improvement projects, meets with foreign rail delegations to share information on high-speed passenger rail, and assists FRA in reviewing ARRA grant proposals.

### Volpe Center Information

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Visit the Volpe Center at: [www.volpe.dot.gov](http://www.volpe.dot.gov)

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