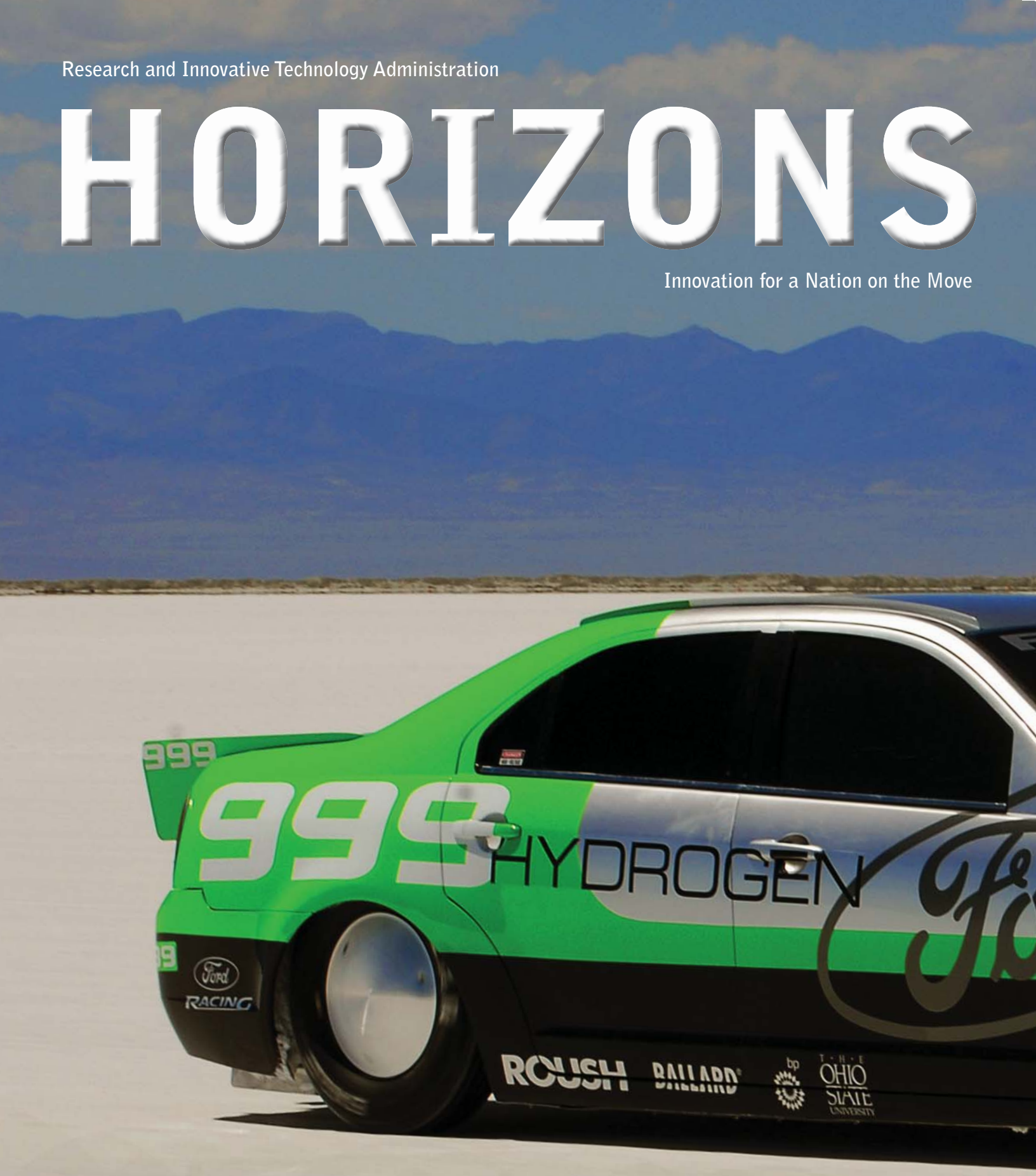
Research and Innovative Technology Administration

HORIZONS

Innovation for a Nation on the Move



U.S. Department of Transportation
Research and Innovative Technology Administration

May/June 2008

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On the cover: Ford Fusion Hydrogen 999. Photo courtesy of Ford Motor Company®.

RITA staff photo

in every issue

RITA Hosts Hydrogen Drive 2008 in Sacramento

On Monday, March 10, RITA Administrator Paul R. Brubaker hosted Hydrogen Drive 2008 in Sacramento, California. The event highlighted the U.S. Department of Transportation's (DOT) commitment to a clean transportation future and to leading edge technologies like hydrogen fuel cells that can make that future a reality.

The event was held at the California Fuel Cell Partnership—a collaboration of 33 organizations, including auto manufacturers, energy providers, fuel cell technology companies, and government agencies working together to advance the commercialization of fuel cell vehicles. Hydrogen and fuel cell vehicle technology are a central part of a long-term strategy for air quality, climate protection, and energy diversity. Hydrogen Drive 2008 was attended by representatives from federal, state, and local government; industry; and academia. RITA hosted the hands-on event at which invited guests from around the country had a chance to ride AC Transit's fuel cell bus, drive fuel cell vehicles, learn how to fuel a car with hydrogen at a station in West Sacramento, and strategize about how to advance the deployment and commercialization of hydrogen vehicles and infrastructure.

California Fuel Cell Partnership

This event came at a time when gasoline prices in the United States had reached an all-time high.

"We're bringing together some of the best minds in the country to figure out how we jumpstart the Hydrogen Economy," said Administrator Brubaker. "Now is the time to make it a viable technology."

Cars that use fuel cells rely on hydrogen to run, and produce water as exhaust. "The vehicles are now here," Brubaker explained. "Now the long pole in the tent from our perspective is really the fueling infrastructure." Since 2003, the federal government has pumped about $1.2 billion into fuel cell technology. There are currently 24 hydrogen fueling stations in the state of California, with 10 more planned.

Shad Balch, a General Motors spokesman, said there are approximately 100 Equinox fuel cell vehicles on the road right now in Los Angeles, New York City, and Washington, D.C. "They're in the hands of the average, everyday driver," he said. "We're loaning them in return for their candid feedback."

Brubaker reported that U.S. automakers have "stepped up to the plate and spent billions of dollars developing these vehicles." He said the goal now is to "find a way to jumpstart the deployment of the infrastructure."

guest column

US Transportation Secretary Mary E. Peters: Innovation for a Nation on the Move

Today, congestion is choking our cities, clogging our highways and airways, and complicating our lives. There are countless examples of how gridlock is taxing our economy, our environment, and our way of life. We must develop 21st century solutions to these 21st century mobility challenges.

USDOT

The Department is committed to helping state and local governments find fresh and innovative ways to reduce gridlock. And I believe that one of the most promising options for combating out-of-control congestion is to incorporate technology and invest in innovation. This is exactly the kind of approach we are embracing as part of our Congestion Initiatives.

The Department's Research and Innovative Technology Administration (RITA) has taken the lead in finding cutting-edge solutions to congestion. And while there is no technological silver bullet that will solve our transportation challenges, the technologies and leading-edge approaches that exist today are just the beginning when it comes to reducing both congestion and our reliance on gasoline to fuel our lives.

We are actively working to improve safety and reduce congestion using technology like collision avoidance and lane departure warning systems. We also are exploring innovative technologies to provide commuters with the real-time traffic information needed to plan their morning commute. Using this information, transportation managers can also plan better and take action to prevent problems from arising, instead of trying to manage from one crisis to the next.

And, we're advancing new technologies to help price the use of the transportation system's peak periods to help cut rush hour gridlock. In fact, there are few ideas that hold more promise to reverse, not simply just slow, the growth of traffic tie-ups. We have seen this concept used in major cities around the world and along individual roadways in the United States. However, we have yet to see a broad demonstration here.

I believe that when you combine new approaches to pricing highway systems with expanded commuter transit services, commitments from employers to expand work schedule flexibility, an expansion of real-time traffic information, and other successful operational strategies, we can provide swift relief from congestion, better quality of life for our citizens, and new opportunities for businesses to keep the American economy moving.

check it out at www.rita.dot.gov!

RITA's website, www.rita.dot.gov, brings together an exciting collection of program information on innovative transportation research and portals to RITA and DOT-wide programs, university research, statistical databases, training information, and a wide network of libraries and transportation knowledge assets.

Looking for regular updates on news from RITA? Consider scrolling to the bottom of our home page and signing up for our RSS (Really Simple Syndication) feeds. RSS is an XML-based Web-content syndication format used to deliver constantly updated headline feeds to readers. RITA's RSS feeds deliver press releases and other information of interest to stakeholders in RITA and the U.S. Department of Transportation.

Introducing Safe Trip–21: Technology Solutions to Improve Transportation Safety and Reduce Congestion

Improving safety and reducing congestion continue to be key DOT goals. As traffic on our roads and in our cities has increased, congestion has become a growing problem; travelers and freight spend more time and consume more fuel because of congestion-related delays. Combine with this the fact that nearly 43,000 people die on the nation's roadways each year and the need for innovative solutions that transcend traditional approaches to effect change is clear.

RITA staff photo

Technological advances can play an important role in both safety and congestion reduction. Intelligent Transportation Systems (ITS) continue to evolve, using electronics, navigation systems, communications, and information processing to improve the efficiency and safety of surface transportation.

A new RITA initiative, known as SafeTrip-21, is designed to improve safety and reduce congestion by identifying and harnessing existing technology and adapting it for transportation needs. SafeTrip-21 will solicit information about technological applications that are both oriented toward DOT goals (safety, mobility, environmental stewardship, energy independence, and security) and ready for testing and integration into a field-test environment. RITA's Volpe Center is using its experience in the areas of ITS and system development and deployment to lead the effort.

(continued on p. 11)

CD Compendium: Best of Emergency Transportation Operations, ITS Public Safety

The U.S. Department of Transportation's (DOT) Intelligent Transportation Systems (ITS) Joint Program Office has released a CD ROM that shares a robust collection of tools and information from the ITS Public Safety Program and the Emergency Transportation Operations (ETO) Initiative.

The ETO Initiative was launched by the ITS Public Safety Program in 2004 to improve the speed and effectiveness of response and management of major incidents. The Initiative has focused on practical tools, procedures, and information that can be used to actively manage and expedite the safe progress of an evacuation. The newly released "Best of Emergency Transportation Operations, ITS Public Safety" CD-ROM contains collaborative input from across the Department's modal offices, and is organized in the following functional areas:

- **Public Access to Emergency Services** – Opportunities to reduce deaths and injuries from emergencies exist through better communications technologies.
- **Enhanced Information Sharing** – Public safety can be improved when information is shared across organizations and jurisdictions.

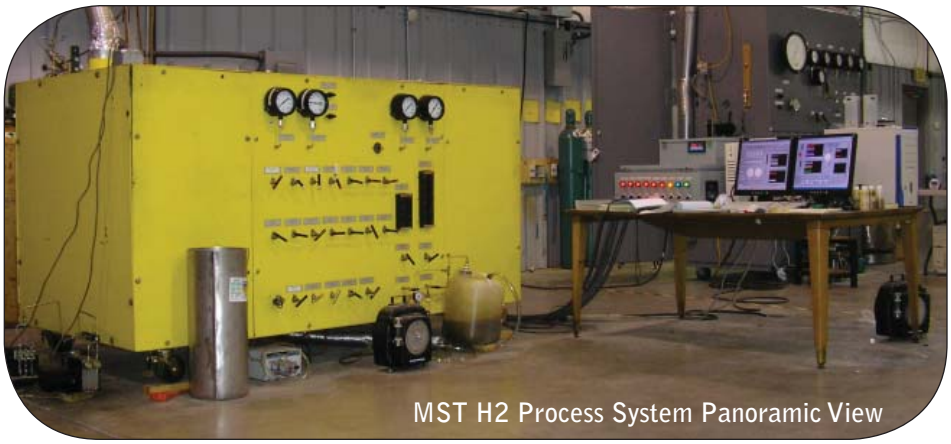
(continued on p. 12)

Missouri S&T Converts Crude Beer into Hydrogen

Missouri University of Science and Technology (Missouri S&T) recently announced a novel and robust process for converting ethanol into hydrogen—E-H2 technology. This new process, developed by Missouri S&T's National University Transportation Center, uses bio-based feedstock, specifically crude beer derived from agricultural ethanol, to produce hydrogen for fuel cells and power generation applications as well as transportation fuel. This research supports the transition of our nation's economy from one dependent on fossil fuels to one based upon renewable hydrogen.

The E-H2 process has several distinct advantages over existing technologies. It is a compact, energy-efficient process that eliminates the costly and energy intensive steps needed to produce ethanol, and it has the potential to improve safety by substantially reducing the need to distribute and transport dangerous flammable and corrosive chemicals.

In addition, ethanol boosts the economic development of agricultural communities, adds value to agricultural products, helps clean America's air, and strengthens national security by moving America toward energy independence. Hydrogen has a high energy content by mass, burns cleanly, is abundantly available in compound forms, and is also renewable. By using a bio-based feedstock, more specifically agricultural ethanol and its crude beer, to produce hydrogen, the E-H2 process provides a direct link between the ethanol economy and the hydrogen economy.



Missouri S&T

MST H2 Process System Panoramic View

The DOT grant supporting this research was awarded to the National University Transportation Center at the Missouri University of Science and Technology (Missouri S&T), where John Myers, Ph.D. (jmyers@mst.edu), is the interim director. The principal investigator for this project is Sunggyu Lee, Ph.D. (Leesu@mst.edu), of the Department of Chemical and Biological Engineering at Missouri S&T in Rolla, Missouri.

Southwest Region UTC Examines Mexican Border Truck Safety

The Southwest Region University Transportation Center (Region VI), headquartered at the Texas Transportation Institute in the Texas A&M University System, recently reported the results of a detailed safety study of trucks crossing the U.S.-Mexico border into the State of Texas. The results of this study shed new light on the public debate over the desirability of allowing Mexican trucks into the United States, and concerns that motor carriers from Mexico would not comply with U.S. motor carrier safety laws.

The Texas Department of Public Safety (DPS) was made responsible for insuring truck compliance at the state border and in 2002 began operating border safety inspection facilities (BSIFs) at the eight largest truck border crossings.

At the Texas BSIF facilities, DPS personnel look for observable safety violations with the driver, ▶

tractor, and trailer, and either permit the truck to leave the facility or send the truck to the secondary inspection bay. The secondary inspection determines if the truck should be placed out of service.


Entrance to the El Paso Border Safety Inspection Facility

Robert Harrison

Data on all trucks that undergo the secondary inspection are compiled by DPS. In 2006, there were over 3.2 million northbound truck crossings into Texas, most passing through the BSIFs, where commissioned and civilian employees inspected over 111,000 trucks.

The Southwest Region UTC analyzed BSIF data from northbound vehicles domiciled in both countries and was also able to compare data from similar trucking operations on either side of the border. Their analysis indicates that Mexican truck safety was superior in many cases to that of U.S. carriers. In fact, the Mexican vehicle out-of-service rate was better at six of the eight facilities studied, based on their analysis of a substantial BSIF database that now exceeds 400,000 truck inspection records.

The principal investigator for this project, Robert Harrison (harrison@mail.utexas.edu), was assisted by Jason West (jrwest@mail.utexas.edu). Both are at The University of Texas at Austin, Center for Transportation Research (CTR).

For more information on this research and the DOT UTC program, please visit www.utc.dot.gov. Each of these studies has been discussed in more detail in recent issues of the UTC Spotlight, a new monthly publication you can find at: http://utc.dot.gov/. The views presented in these UTC research summaries are those of the authors and not necessarily the views of the Research and Innovative Technology Administration or the U.S. Department of Transportation.

technology transfer

Federal Laboratory Consortium Offers Rich Tools Online

The Federal Laboratory Consortium (FLC) for Technology Transfer (T2) is the nationwide network of federal laboratories that provides the forum to develop strategies and opportunities for linking laboratory mission technologies and expertise with the marketplace. The FLC provides a host of training materials online including those listed below:

- T2 Training DVD Set—Fundamentals, Intermediate, and Advanced
- T2 Training Resource Database—Courses available online, classroom etc.
- T2 Mechanism Database—Compendium of T2 mechanisms utilized by federal agencies
- T2 Desk Reference—Overview and history of federal technology transfer
- T2 Legislation and Policy Handbook—principal T2 statutory and presidential executive order policies
- T2 ORTA Handbook—Guide for setting up a new T2 office

These tools, courses and guidelines can be found at: http://www.federallabs.org/education/.

For additional information on the FLC and its resources, please contact FLC's Education and Training Chair, Lynn Murray, of the Volpe Center at: MurrayL@volpe.dot.gov.

across the department

DOT Releases Study of Potential Environmental Impacts on Transportation Infrastructure in U.S. Central Gulf Coast

On March 12, 2008, DOT released a study on the potential impacts of climate changes and land subsidence, the natural sinking of an area's land mass, on transportation infrastructure in the U.S. Gulf Coast region. The release is phase one of a three-part study.

"This study provides transportation planners in the Gulf Coast region with valuable information that will assist them as they make decisions for the future," said U.S. Secretary of Transportation Mary E. Peters.

The Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: Gulf Coast Study, Phase I, provides an assessment of the vulnerabilities of transportation systems in the region to potential changes in weather patterns and related impacts, as well as the effect of natural land subsidence and other environmental factors in the region. The area examined by the study includes 48 contiguous counties in four states, running from Galveston, Texas to Mobile, Alabama.

Based on 21 simulation models and a range of emissions scenarios, the study found that potential changes in climate over the next 50 to 100 years could disrupt transportation services in the region. Twenty-seven percent of major roads, 9 percent of rail lines, and 72 percent of area ports are at or below 4 feet in elevation and could be vulnerable to flooding due to future sea level rise and natural sinking of the area's land mass. The study is designed to help state and local officials as they develop their transportation plans and make investment decisions. Federal transportation officials will continue to work closely with state and local planners as they incorporate the study into their planning processes.

Subsequent phases of the study will focus on risks and adaptation strategies involved in planning, investment, design, and operational decisions for infrastructure in the Gulf Coast region and nationwide. The study was performed in partnership with the U.S. Geological Survey and state and local researchers, and is one of 21 "synthesis and assessment" reports produced as part of the U.S. Climate Change Science Program.

The study is available online at http://climate.dot.gov/publications/impact_of_climate_change/.

statistical news

New Rule Will Require Expanded Reports from Airlines on Time Passengers Spend on the Tarmac

On May 16, 2008, Secretary Mary Peters issued a final rule to require airlines to report new and more complete data on the time passengers spend on the tarmac. The Secretary noted that in the past airlines sometimes did not have to disclose how long aircraft were delayed after leaving the gate.

"Passengers should know whether it will take as long for their flight to get to the runway as it will to land at their destination," the Secretary said.

The new rule will require airlines to provide complete on-time and tarmac delay data about flights that may depart from a gate more than once, flights that are cancelled after having left the gate, and flights that are diverted to another airport. The data will be collected and made available to the public by RITA's Bureau of Transportation Statistics (BTS).

In 2007, there were 1,603 known instances of planes with a taxi-out time of more than three hours, and 270 such incidents from January to April of 2008. The expanded data reports will help the Department to work with the airline industry to identify the reasons for planes—and their passengers—being left on the runway for extended times, and to find a solution to the problem.

The new rule, as well as airline on-time, traffic, financial and employment data, can be found on BTS' website at www.bts.gov http://www.bts.gov/laws_and_regulations/docs/part234_4cy2008.html.

Volpe Center Employee Recipient of Federal 100 Award

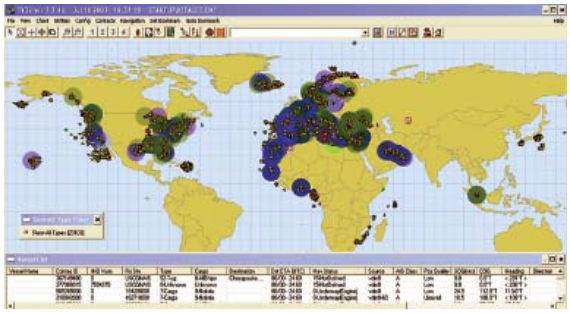

Volpe Center Photo

Henry Wychorski

Henry Wychorski, a senior electrical engineer and project manager in the Marine Systems Division of RITA's Volpe Center, was the recipient of a prestigious Federal 100 Award in March, in recognition of his role as an "agent of change" among other individuals from government, industry, and academia who have significantly influenced how the federal government buys, uses, or manages information technology. The award is sponsored by Federal Computer Week.

Wychorski leads the team that developed and demonstrated an ambitious commercial maritime traffic monitoring system, called the Maritime Security and Safety Information System (MSSIS), which tracks the movement of international maritime traffic in real time in the territorial waters of more than 30 countries in North America, Europe, the Middle East, and Asia.

The Volpe team of engineers and software developers worked closely with senior naval officers and science advisors in the U.S. Navy, U.S. Coast Guard, and NATO countries to design, develop, and make the system operational in 2007. While developing a global system of any kind is time consuming and expensive, Wychorski was able to use existing technology, combined with the strong willingness of foreign countries to participate, to build a low-cost, easily deployable, and expandable system that provides unprecedented information on international commercial vessel movements, all through an internet-based, password-protected system.



TRB Annual Meeting Delegates Participate in Driver Status Monitor Demonstration

Transportation researchers, students, and policy makers from around the world had an opportunity to experience first-hand the progress and complexity of developing reliable driver monitoring technology when they participated in a unique demonstration project staged by the RITA/Volpe Center at the Transportation Research Board's (TRB's) 87th annual meeting in Washington, D.C., in January 2008.

The Driver Status Monitor (DSM) is one of a group of electronic safety devices being developed for crash avoidance in motor vehicles under the National Highway Traffic Safety Administration's (NHTSA) SAVE-IT Program (Safety Vehicles using adaptive Interface Technology). An experimental prototype of the DSM, developed by Delphi and Electronics and Safety, Inc., was demonstrated in the RITA exhibit at TRB, where Volpe Center staff tested the DSM for the first time to explore how the device responded to individuals with different facial shapes, hats, facial jewelry, and eyeglasses with various tints.

The DSM has numerous exciting potential applications and can overcome challenges in existing technology. For example, in motor vehicles, devices such as Lane Departure Warning and Forward Collision Warning systems generate substantial numbers of nuisance warnings that drivers tend to shut off to avoid receiving unnecessary warnings. The DSM is primarily intended to reduce unneeded warnings from the other systems so that drivers won't disable them. More than 100 people participated in the demonstration, yielding valuable data that may enhance the DSM's ability to recognize and relocate facial features.

South Korean Transportation Officials Turn to TSI for Safety and Security Training

TSI

When Byeong Ho Ahn, Director of South Korea's Department of Transportation and Safety, and some of his staff attended a few classes at RITA's Transportation Safety Institute (TSI) in 2005, he was so impressed by the high quality of the training and the professionalism of its instructors that he told TSI he wanted to bring the whole 4-week experience home with him.

Responsible for all railway safety manager and inspector training for the Korean Railroad Corp. (KRC), Byeong Ho pursued an arrangement between the Ministry of Construction and Transportation of the Republic of Korea and the U.S. Department of Transportation to enable his top staff to complete courses in Transit Rail System Safety, Transit Rail Incident Investigation, Transit System Security, and Effectively Managing Transit Emergencies. TSI's first training there took place in Seoul in late 2006, followed by another session in Daejon, South Korea, in the spring of 2007. Competition for the highly publicized TSI training was tough, as several hundred applicants vied for the limited number of slots available, including a number of high-ranking officials of the government rail organization.

TSI takes pride in its ability to customize its training to meet any customer's needs. The arrangement between the South Korean ministry and TSI is just one example of the unique and flexible approach TSI offers every day as a cost recovery organization within RITA.

Based in Oklahoma City, Oklahoma, TSI was established in 1971 to help DOT modal administrations accomplish their mission-essential training requirements. Now a part of RITA, TSI is committed to developing and providing premier, worldwide safety, security, and environmental training, products, and/or services for both the public and private sectors in the areas of transit, aviation, pipeline, motor carrier, highway safety, hazardous material, and risk management.

To learn more, visit www.tsi.dot.gov or call TSI at (405) 954-3153.

your national transportation library

Transportation Tools, Tips, and Resources

RITA's National Transportation Library (NTL) is a digital library offering a variety of tools to help you find these and other transportation reports on a multitude of topics, whether they are publications of the U.S. DOT or housed in the digital libraries of state DOTs, various universities or library consortia, including the Transportation Research Information Service (TRIS) Online. So why not start out at the NTL home page at http://ntl.bts.gov/ and explore some of the possibilities? Below are just a few of the tools you can find at the NTL:

Custom Google Search Tools: This Google-powered search engine enables targeted searching of specific websites (e.g., all state DOT websites). Transportation librarians created the custom searches, which are all accessible through the NTL (http://ntl.bts.gov/faq/statedot.html).

ITS happenings—SafeTrip-21

(continued from p. 5)

The SafeTrip-21 initiative began when RITA sent a formal Request for Information in December 2007 to transportation technology companies and researchers worldwide, looking for applicable and viable approaches to mitigate congestion and improve safety through new technology. The SafeTrip-21 initiative began when a formal Request for Information went out in December 2007 from RITA to transportation technology companies and researchers worldwide, looking for applicable and viable approaches to mitigate congestion and improve safety through new technology. Based on the responses selected, RITA's Volpe Center entered into a cooperative agreement with the California Department of Transportation (CALTRANS) to establish the first SafeTrip-21 field test site—the San Francisco Bay Area.

CALTRANS' partners include the Metropolitan Transportation Commission (MTC), the University of California-Partners for Advanced Transit and Highways (PATH), the California Center for Innovative Transportation (CCIT), Nokia, Inc., NAVTEQ, Santa Clara Valley Transportation Authority, and Nissan.

Technological applications selected for SafeTrip-21 will be featured at the 2008 ITS World Congress in New York City in November 2008. Attendees will be given a unique hands-on opportunity to use the new technologies and see their initial operational capabilities in the real-world setting of the streets of New York. Next, the actual field tests and evaluations will take place from December 2008 to December 2009 to assess and measure the ability of these technologies to yield near-term transportation safety and efficiency benefits, and contribute to solving long-term transportation problems.

SafeTrip-21 builds on the DOT's Vehicle Infrastructure Integration (VII) program by providing an accelerated deployment and testing environment for technologies that are already being considered for their applicability in the transportation arena. The overall VII initiative seeks to deploy advanced vehicle-to-vehicle and vehicle-to-infrastructure communications that can keep vehicles from leaving the road and enhance their safe movement through intersections.

SafeTrip-21 will show how technology can enhance the travel experience, and will leverage transportation technology specialists from private industry, research organizations, and state and local governments who together will demonstrate that significant advances in solving transportation problems do not have to require large infrastructure investments.

The program is a true reflection of DOT Secretary Mary E. Peters' focus on "finding real transportation solutions that make travel safer, improve the performance of our transportation systems so that they operate more efficiently and serve us better, and apply advanced technologies and contemporary approaches to today's transportation challenges."

The ***Transportation Research Thesaurus (TRT)*** is an internationally used set of standard, or controlled, terms for transportation concepts, topics, methods which, in addition to keywords, are used to search and retrieve information. The TRT (available at http://ntlsearch.bts.gov/tris/trt.do) can also be used to organize websites and catalog data sets.

Transportation Research Information Service (TRIS) Online, a subset of TRIS, is a specialized transportation database that contains over 535,000 citations and abstracts of technical reports, books, journal articles, and other transportation research with some links to full-text. TRIS includes international research and is available from online subscription services. TRIS Online, comprising most of TRIS and all U.S. research, is provided free online by the National Transportation Library and can be accessed at http://ntl.bts.gov/tris.

NTL's Integrated Search provides an in-tandem search of the NTL Digital Repository (full-text digital resources and digitized documents) and TRIS Online. The NTL Digital Repository includes statistical, technical, research, and policy documents
provided by federal, state, local, tribal, and other government agencies and can be searched full text. The NTL Integrated Search can be found at http://ntlsearch.bts.gov.

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ITS happenings—ITS Public Safety

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- **Evacuation Management and Operations** – New tools and processes help agencies plan for and manage evacuations.
- **Transportation Operations During Biohazard Situations** – Comprehensive and actionable understanding of the role of transportation during a biohazard situation allows communities to better plan for, respond to, and recover from such situations.
- **Preparedness and Response** – To safely, efficiently, and effectively manage incidents and emergencies, a wide range of activities, programs, and systems are required to be developed and implemented prior to the event.
- **Planned Special Events** – Local agencies are implementing new approaches to plan, coordinate, and manage traffic, thereby advancing the current practice of planned special events.

Details about the ITS Public Safety Program and ETO initiative, along with downloadable materials on the above topics, are available online at http://www.its.dot.gov/its_publicsafety/index.htm.

The ITS Public Safety Program was initiated in 2000 to increase transportation safety and mobility through new and dynamic partnerships linking the transportation and public safety communities at the Federal, State, regional, local, and tribal levels. This program is a collaborative effort between RITA, the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), and the Federal Transit Administration (FTA).

Your National Transportation Library—Transportation Tools, Tips, and Resources

(continued from p. 11)

Transportation Libraries Catalog (TLCat) is a combined library catalog for over 35 transportation libraries representing federal, state DOT, association, and university library collections throughout the country. With one search, users can locate resources locally and nationally. To borrow materials found in the catalog, contact your local library. TLCat is available free from the NTL at http://ntl.bts.gov/link.html.

Sources of Information in Transportation (SIT) is a collection of topical bibliographies, each divided into the following sections: basic references, statistical sources, standards, periodicals, conference proceedings, indexing/abstracting databases, dictionaries and glossaries, and electronic resources. Each bibliographic reference is annotated and contains links to additional information or the resource where appropriate. SIT is available at http://ntl.bts.gov/ref/biblio/index.html

TranStats is an online database for disseminating intermodal transportation data in a format suitable for analysis. The free public website at http://www.transtats.bts.gov allows users to search for transportation data sets, explore data, and download specific data from tables. It is most useful for Bureau of Transportation Statistics' data on airlines, border crossings, and ferries.

If, after you have completed your online search you cannot find exactly what you need or need further assistance finding information, please contact NTL's reference staff at Librarian@bts.gov for prompt service.