

Research and Innovative Technology Administration

HORIZONS

Innovation for a Nation on the Move



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Cover photo courtesy of Agata Urbaniak



Volpe Center

Transmission tower at Hilla, Karbala province in Iraq.

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Iraq Railroad Reconstruction: A Success Story

Every day, American men and women are working closely with Iraqis to build stability and peace; to construct roads, rails, and airports; and to forge ties of friendship, understanding, and respect that will last lifetimes.¹

– Transportation Secretary Mary E. Peters

The Research and Innovative Technology Administration's (RITA's) Volpe National Transportation Systems Center is proud to be part of a major endeavor for the Iraqi Republic Railways (IRR) that is regarded as a noteworthy achievement among Iraq Reconstruction efforts focused on transportation. A large-scale upgrade to the Iraqi railway-communications system spearheaded by the Volpe Center is nearing completion, an effort that Transportation Secretary Mary Peters has already hailed as having "helped get passenger train service back up and running between Baghdad and Basra."¹ A new, centrally controlled and highly secure communications capability is at the heart of the system

By 2003, Iraqi railways had been torn apart by decades of neglect and recent sectarian violence. With bridges and signaling in disarray and no reliable means of communication among trains or between trains and stations, instructions for train movements were often delivered by taxi. This situation contributed to several head-on collisions and severely limited the number of trains that could operate with any degree of safety. Resumption of normal railway service is regarded as an economic necessity in Iraq, supporting international commerce. With its potential to transport massive amounts of cargo, stimulate the



At work on the Iraqi Republic Railways

Volpe Center

economy, provide employment, and improve the quality of life of Iraqi citizens, it was easy to identify a fully functioning railway system as an important component of an Iraqi recovery.

Providing a system to dispatch, control, and track trains was a top priority; it had become clear that conventional signaling was not a realistic option, and a decision was made to pursue installation of a state-of-the-art Communications-Based Train Control (CBTC) system. The system requires use of a digital microwave radio communications network (DMRCN) consisting of microwave radio

base stations, transmission towers, telecommunications equipment shelters, and auxiliary power systems. The DMRCN will serve as the railway's backbone communications link for both voice and data transmission and will be an essential component of the CBTC for IRR.

The Volpe Center identified requirements for the microwave communications system, developed a detailed statement of work that included engineering specifications for the DMRCN system, managed contract awards and the procurement of equipment, and oversaw microwave communications system installa-

¹ From "Air Traffic and Transportation Progress in Iraq" in *Welcome to the Fast Lane: The Official Blog of the U.S. Secretary of Transportation*, May 29, 2008.

tion. The initial network consists of 33 sites, running from the Syrian border through Baghdad to the port facility at Umm Qasr. Umm Qasr is Iraq's primary port and is also the key rail-transport link for imports and exports, making it vital for freight movements. The DMRCN project, which is funded at \$41 million, is the largest fixed-price procurement in the Volpe Center's history. The project combines the latest CBTC-system technology with reliable microwave radio technology over 1,000 kilometers of track. The interoperability of the two technologies was verified as part of the contract.

When completed, the IRR will host the longest CBTC/microwave-based control system in the world, providing computer-aided dispatching of trains from the Central Control Office in Baghdad. Authorization for trains to occupy tracks between stations will be conveyed automatically and displayed on a screen in the cab of the locomotive. A global positioning system (GPS) tracking device on each locomotive will provide location information to the train dispatcher.

By midsummer of 2008, 27 of the 33 microwave towers had been constructed, and 20 communication shelters were being installed and the microwave alignment verified. The project is scheduled for completion in the fall of 2008, at which time IRR will be able to communicate between the Baghdad dispatching office and all locomotives and stations along the north-south right-of-way.

Successful accomplishment of all stages of this large scale, highly visible undertaking has drawn on the Volpe Center's unique combination of project management and acquisition expertise, along with its decades of experience with railroad

equipment and its understanding of new communications technologies and their application to transportation systems. Because Volpe Center staff had previously faced the challenges of working in Iraq, they brought an ability to adapt their methods to meet the needs of an ever-changing environment. Along the way, they have established good working relationships with U.S. Embassy personnel and Iraqi railroad managers and have worked effectively with the major U.S. contractor as well as with subcontractors from Turkey, Jordan, and Iraq.



Iraqi team inspects telecommunications equipment shelter at the Bagdad site

Training

In anticipation of completing the project, the Volpe Center has provided oversight to a CBTC training course for Iraqi personnel, which includes both dispatcher and computer instruction on the system. The Volpe Center is supporting the Iraq Transition Assistance Office by monitoring the training to ensure a cohesive approach in integrating the train-control system with the communications system.

Next Steps

With the implementation phase nearing completion, the Volpe Center team is developing a hand-over

strategy. The team has met with the USDOT Attaché and with representatives from the Iraq Transition Assistance Office, IRR, and the Iraq Ministry of Transportation, along with the contractors, to identify and resolve issues related to project acceptance and hand over, future operations and maintenance of the system, and the development of operating rules. The Volpe Center also may be involved in the initial transitional training and system operations and maintenance process. Once the system is up and running, many more trains will become operational.

This project is part of a larger effort to expand economic opportunity in Iraq with the goal of helping to offset the frustration and lack of hope that many Iraqis feel about their future. Despite unusual circumstances and many challenges, implementation of this project has been extremely successful due largely to the Volpe Center's careful planning, anticipation of problems, and close work with contractors, U.S. officials, and Iraqi personnel.

The work has been performed in support of the USDOT Attaché Office and U.S. Department of State's Iraq Transition Assistance Office, which is funded by the Iraq Relief and Reconstruction Fund (IRRF).

Key Personnel

James Lamond of the Rail and Transit Systems Division leads the Volpe Center effort and is actively involved in project reviews and troubleshooting as needed. Other key Volpe Center participants are Fred Mottley of the Rail and Transit Systems Division and Orin Cook and Dan Leone of the Acquisition Division. 🔄

RITA Supports U.S. Priorities with China

President Bush's emphasis on maintaining strong and mutually beneficial U.S.-China economic relations and addressing economic challenges and opportunities between the two countries has presented RITA with an important supporting role within the Department of Transportation. As the Strategic Economic Dialogue (SED) between the two nations has turned to transportation-related topics, both RITA's Bureau of Transportation Statistics (BTS) and the Volpe Center have assumed ongoing roles in support of these Cabinet-level discussions.

At the recent SED meeting in Annapolis, the two nations announced a Transportation Forum that will initially focus on Infrastructure Development and Innovative Finance, Transportation Technologies, and Supply Chain Logistics. The Volpe Center has been tasked with

preparing an overarching study of these topics as they affect transportation and trade between the two nations. The study is being coordinated between the two nations, and is expected to be adopted at the next SED meeting in Beijing in December 2008. The study will frame the joint topics and enable the new Transportation Forum to set goals for improving transportation between China and the United States by identifying chokepoints and infrastructure needs to support the ever-expanding trade relationship. The continuing Forum will increase cooperation in aviation, maritime, and surface transportation while expanding existing infrastructure and trade development efforts by many of DOT's modal administrations.

At the same time, BTS is continuing work with the Ministry of Transport, Department of Planning, on sharing transportation data and statistics between the two nations under a Memorandum of Cooperation (MOC) it signed with China in 2004. The MOC has been revitalized over the past year in ways that hold promise for the program's potential impact. On April 18, 2008, RITA hosted a meeting at which RITA

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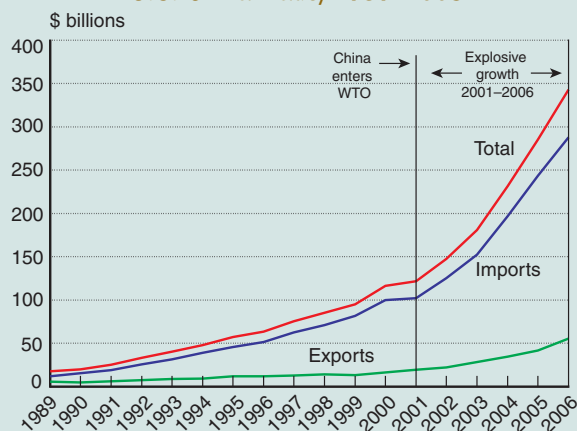


Paul Fris/SXC

BTS Examines U.S./China Freight Trade

Growth in the trade of goods between the United States and China over the last two decades has affected the U.S. transportation system in many ways, among them a notable increase in traffic at air cargo hubs and seaports. The highway and rail infrastructure that supports the movement of cargo to and from these facilities has also been affected.

U.S.-China Trade, 1989–2006



A recent special report from the Bureau of Transportation Statistics (BTS), *U.S. – China Trade Growth and America's Transportation System*, narrates the dramatic nature of that growth and its transportation system impact through a new examination of data and trends. The report goes beyond statistics on volume and value growth to tell a larger story about some of the geographic shifts and logistical strategies being employed to help traded goods flow smoothly to their end markets.

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Improving Operational Safety—Confidential Close Call Reporting

Some of life's greatest lessons come when we learn from our mistakes, and in transportation, where safety is of paramount importance, that maxim is all the more true. That's the philosophy that brought about a unique collaborative project between the Federal Railroad Administration (FRA) and RITA's Volpe Center and Bureau of Transportation Statistics (BTS). The Volpe Center/BTS team is involved in a major demonstration program for FRA designed so railroad employees can voluntarily and confidentially report "close call" events or unsafe conditions that could have resulted in an accident but did not.

The Confidential Close Call Reporting System (C3RS) was created to analyze operational safety and develop methods and tools to help railroads better identify hazards and manage risk. The unique project approach teams the Volpe Center's expertise in human factors, human-systems integration, and program evaluation with BTS's expertise in data collection and analysis and an additional critical component—BTS' statutory authority to protect the confidentiality of information collected for statistical purposes.

Analyzing Close Calls

Accidents occur when the barriers designed to protect the system fail. Often there are a series of preceding "close calls," which can act as warnings about the unsafe conditions. Information from close call reports can help identify safety hazards. Using this information, the carrier can develop corrective actions that prevent accidents. Studying "close calls" will help identify new and existing sources of risk, allowing an organization to develop corrective actions to prevent these sources of risk from turning into mishaps or minimize their consequences. This proactive approach enables transportation safety specialists to better manage risk, save lives, protect equipment, and preserve the environment.

Federal Railroad Administration—Confidential Close Call Reporting System (C3RS)

This FRA sponsored program demonstrates the value of implementing a reporting system that encourages employees to disclose safety-critical information. The Volpe Center/BTS team is supporting FRA in the development, implementation, and evaluation of a first-of-its-kind confidential, voluntary system for reporting and analyzing close calls in the U.S. railroad industry—the Confidential Close Call Reporting System (C3RS).

It requires building trust with railroad employees to encourage them to voluntarily submit reports.



This system is being systematically implemented and evaluated. The Volpe Center's lessons learned team is collecting information about the system performance for the purpose of improving its effectiveness and documenting the outcome for the stakeholders.

The primary stakeholders in this effort are federal agencies, railroad carriers, and railroad labor organizations. One of the key challenges in moving the program forward involved building trust between stakeholders at the local and national level. Building trust empowers stakeholders to take ownership of the system and use it to develop and implement corrective actions that contribute to safer railroad operations.

The pilot for this program began at the nation's largest rail yard in North Platte, Nebraska, where Union Pacific employees began reporting "close calls" in February 2007. A second railroad—Canadian Pacific (CP)—began participating in April 2008. Approximately 2,500 Union Pacific employees and 350 Wisconsin-based Canadian Pacific employees can report "close call" incidents without fear of sanction or penalty from the railroad or the federal government. The FRA is actively working to solicit two additional railroads to participate in the demonstration project. In addition, the Bush Administration has requested \$1.2 million in its proposed fiscal year 2009 budget to operate and expand this program.

Developing the system required close coordination between railroad labor representatives, railroad managers, FRA employees, and RITA staff. As of September 2008, over 1,000 close calls have been reported. The system is helping FRA to meet its goal of significantly improving operational safety and was identified as an important element in the DOT Secretary's Action List for 2007 and is also a key element in the National Rail Safety Action Plan.

For more information on this work, please contact Jordan Multer at the Volpe Center: Jordan.Multer@dot.gov, 617-494-2573. 🌐

Innovation Roundtable Explores Advanced Wireless Communication to Meet the Nation's Congestion Reduction and Safety Goals

On Thursday, May 22, 2008, the U.S. Department of Transportation (USDOT) met with top technology, communications, and mobility experts to explore how to leverage advanced telecommunications technologies to achieve measurable reductions in vehicles



DROUU

crashes and congestion. Deputy Secretary of Transportation, Vice Admiral Thomas J. Barrett, and RITA Administrator, Paul R. Brubaker, hosted the landmark Innovation Roundtable on Advanced Wireless Communication for the Transportation Network.

Each year the United States loses more than 43,000 citizens on the nation's highways and experiences more than 6 million traffic accidents. The total economic cost is in excess of \$250 billion per year in hospital bills, repairs, lost work, insurance payments, and rehabilitation. According to the Texas Transportation Institute, the average American loses an average of 38 hours a week sitting in traffic and Americans collectively waste three billion gallons of fuel each year due to congestion.

Vice Admiral Barrett noted that USDOT's "enterprise approach" to

innovation is focused on "getting experts to the table to share information...in order to spur innovation and entrepreneurial creativity." The assembled group of 40 leading academics, industry representatives, and state and local government officials discussed how to enable internet and communications technologies to better allow vehicle-to-vehicle, vehicle-to-infrastructure, and infrastructure-to-engineer communications.

RITA Administrator Brubaker noted that USDOT must experience "an opening of the aperture" to allow for the use of advanced technologies, rather than limiting the focus to existing technologies.

Harnessing and rapidly deploying these emerging communications technologies will lead to fewer crashes on our roadways and result in overall improvements in the

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Safetrip-21 Update

Safetrip-21, Innovation for a Nation in Motion, is a new initiative of the United States Department of Transportation (USDOT) Research and Innovative Technology Administration (RITA). It is designed to explore the application of Intelligent Transportation Systems (ITS) technologies that transfer information on traffic and travel options to and from vehicles to reduce congestion and increase safety, mobility, efficiency, and convenience.

RITA is partnering with transportation agencies, ITS technology suppliers, and the university research community to conduct field operational tests of Vehicle Infrastructure Integration (VII) concepts to obtain user feedback that will help USDOT better focus longer term VII research and development (R&D). This all has great implications in terms of generating practical solutions to traffic management organizations seeking cost-effective innovations to mitigate traffic risks

while maximizing operational efficiencies.

In addition to the traditional VII focus on automobile travel, Safetrip-21 seeks to assess ITS technologies that can make public transit a more convenient option. Safetrip-21 will assess both the viability and performance of advanced traveler information technologies. And, given the growing interest in road-pricing policies to alleviate congestion, another goal

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Conferences Put the Spotlight on University Transportation Centers

A University Transportation Centers (UTC) Program innovation instituted in recent years is the sponsorship of an annual conference to bring together the UTC community, USDOT and other government agencies, industry, and state and local governments to discuss a particular technology or transportation issue. The purpose of these Spotlight Conferences is to allow university researchers to learn the breadth of university work in a particular area and, more importantly, inform USDOT of the innovations that are being realized. In 2006, the first Spotlight Conference focused on “Radio Frequency Identification Technologies in Transportation.” In 2007, the topic was “Freight Transportation: Congestion and System Performance.”

This year (October 27-28, 2008) the Spotlight focus will be on the “Impact of Changing Demographics on the Transportation System.” This topic encompasses a variety of

demographic changes that are likely to affect the U.S. transportation system over the coming decades, including aging issues, changes in ethnicity, shifts in the rural/urban/suburban/exurban population balance and the effect on mobility and transportation safety, and workforce issues associated with changing demographics. The Transportation Research Board (TRB) will be used to organize and host the meeting, as it has for the past several years.

As with all the Spotlight Conferences, this event will encourage interaction and synergies among universities, government, private interests, and TRB committees; identify key knowledge gaps; develop a research agenda; inform transportation policy; and identify promising initiatives for university research.

As is customary following its conferences, TRB will write, develop, and publish a final report of results from the event. The publication

will be a TRB “E-Circular,” which will be distributed throughout government, academic, and private sector transportation communities in both hard copy and in a web-based format. It will also be indexed through TRB’s Transportation Research Information Service, which is available to the global transportation community. The report will focus on demographic research activities being conducted by the UTCs, as well as how that research supports USDOT initiatives and enhances the movement of people. Specifically, the report will serve as an information base of USDOT-supported universities conducting demographic-related research, development, and technology for use by USDOT and other U.S. government agencies, the academic community, and private sector.

More information on the UTC Spotlight Conferences may be found at: <http://www.trb.org/calendar/default.asp> 🌐

Utah Transit a True "FrontRunner" with WiFi Aboard

On April 28, 2008, the Utah Transit Authority (UTA) began full service of the FrontRunner commuter rail line, from Ogden along a 38 mile route south to Salt Lake City. A major feature of this new commuter rail line is onboard WiFi service along the entire route. This is the most significant application of WiFi technology on a commuter rail line in this country, and is among the leaders in the world. The Utah Transportation Center (UTC), at Utah State University, played a significant role in assisting UTA in meeting its goal of having a functioning WiFi system on board

the FrontRunner system on the opening day of service. The objective was to provide UTA with expertise in examining solutions for the wireless data link and in evaluating commercially developed systems for mobile WiFi application. Funding for this project was \$50,000, provided wholly by the Utah Transportation Center. Chris Winstead, Ph.D., of the Electrical and Computer Engineering Department within the College of Engineering at Utah State University, was the lead investigator on this project. 🌐

TTI Website a Unique Resource on Transportation Funding Options

As our nation's transportation demand continues to grow, elected officials at all levels of government are faced with difficult decisions on how to adequately fund the maintenance and expansion of the nation's transportation systems. Where does a policy maker go for the information and data needed to form the basis for these funding decisions? Thanks to Tina Geiselbrecht, Associate Transportation Researcher at Texas Transportation Institute, such a resource now exists on the World Wide Web. With funding from the University Transportation Center for Mobility (UTCM), Geiselbrecht has produced a concise, user-friendly web site called "A Guide to Transportation Funding Options," or TFO, for leaders and policy makers. TFO describes the array of transportation funding options that are or may be available for use throughout the country. The TFO site describes each funding option and, where possible, offers links to projects that are utilizing a particular type of funding. The web site is accessible via the UTCM home page, <http://utcm.tamu.edu>. Phase 1 of the project includes funding for highways; it is anticipated that subsequent phases will focus on additional modes of surface transportation. It is expected that another UTCM project will provide significant information in the fall for mass transit funding options. 🔄



TTI Webpage <http://utcm.tamu.edu>

your national transportation library

Online Resources

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.

National Transportation Library (NTL) Integrated Search System provides an in-tandem search of the NTL Digital Repository (full-text digital resources and digitized documents) and TRIS Online, a cooperative product of TRB and the NTL. 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 System can be found at <http://ntlsearch.bts.gov>.

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>.

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.

TSI Builds State-of-the-Art Hangar for Crash Investigation Training

In keeping with its vision to provide state-of-the-art and industry-leading training, RITA's Transportation Safety Institute (TSI) is turning heads in the world of aircraft investigation training with the construction of a new aviation safety training facility that will offer unprecedented access to hands-on training materials for students learning the precision art of crash investigation. Construction of the new hangar facility is planned in multiple phases, with Phase I delivering a 5,000 square foot steel building that has already allowed TSI to acquire and protect new training aids used in both classroom and field exercises.

TSI is internationally recognized for its training and remains on the cutting-edge of global aviation safety through best practices, new technologies, and up-to-date teaching techniques. The Aviation Safety program at TSI trains nearly 2,000 aviation safety professionals from Federal, state, local, and international governments; private industry; and the military each year. Still, said TSI Aviation Safety division manager Chris Lawrence, "you just can't get an F-100 engine up an elevator and through a classroom door. The new facility opens up the opportunity for more interaction with

training aids, especially the really large ones, that will ultimately support instruction that's less theoretical and more meaningful preparation for the field."

The project is a partnership between TSI and the Federal Aviation Administration's (FAA) Office of Accident Investigation, a major TSI sponsor. The concept was first presented to the FAA in 2003. Taking the project from concept to reality, however, proved to be a challenge. Success meant obtaining concurrence and coordination of efforts of multiple federal agencies and private industry. After months of calculations, fact gathering, and intense research, TSI was able to refine the concept and convince stakeholders of the enormous potential and added benefits the new facility would provide to the aviation community. A building site was selected on the Mike Monroney Aeronautical Center in Oklahoma City, OK. Initial construction bids for the overall project came in at an alarming \$2.2 million, with a \$500,000 estimate for initial phase alone. After expanding the field of potential contractors and employing a phased approach for construction, phase one construction for the facility was reduced to a much more manageable \$170,000.

The new training facility will benefit students of about 10 TSI Aviation Safety courses in the near term. For example, TSI's Basic Aircraft Accident training course, as well as a similar one in Basic Helicopter Accident investigation, is a detailed 8-day course of study that has until now been held primarily in a classroom building with two excursions to the TSI accident investigation training laboratory. The new facility promises to transform that teaching format. Students can now look forward to a more hands-on training experience, with the ability to incorporate more diagramming skills, to make more immediate connections between course content and tangible examples.

The next phase will see the construction of an outdoor awning to link the hangar
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RITA Hosts Memorial Week Transportation Innovation Tour

Tour Highlights Cutting-Edge ITS Technologies, Alternative Fuels Research, Nanotechnology, and More

The U.S. Department of Transportation's Research and Innovative Technology Administration (RITA) hosted Members of Congress and staff for a Transportation Innovation Tour during Memorial Day week—May 27 through Friday, May 30, 2008.

During the tour, which included stops in Albany, San Francisco, Sacramento, Minneapolis, and Detroit, participants joined top researchers from industry, academia, and government who are advancing Intelligent Transportation Systems (ITS) technologies, alternative fuels research, nanotechnology applications for the transportation system, and other leading-edge research being conducted at sites across the country.

Participants were given an opportunity to drive hydrogen-powered and other alternative fueled vehicles, test the latest crash-avoidance technologies and real-time traffic information and navigation systems, tour one of the nation's leading nanotechnology research centers, and meet with innovators who are finding 21st century solutions to the challenges facing our nation's transportation system.

The tour kicked off at State University of New York (SUNY)-Albany Nanotechnology Complex where participants learned about the university's work in a variety of areas, including nanotechnology innovation & commercialization, energy & environmental technology application, sustainable nanotechnology ecosystems, and traffic light technology.

The next stop was University of California Partners for Advanced Transit and Highways (PATH) in Richmond, CA, where participants had a first-hand experience with an array of cutting edge intelligent transportation technologies such as Automated Bus Docking, Curve



OverSpeed, Left Turn Assist, and Onboard Monitoring Systems. Later that afternoon, the tour entourage visited the California Fuel Cell Partnership (CAFCP) in West Sacramento, CA, where they had an opportunity to learn more about, and drive, fuel cell vehicles.

The following day, the tour participants were off to

Minnesota and the University of Minnesota ITS Institute, where they learned more about the university's Intelligent Vehicles Program and its HumanFIRST Laboratory.

The final day of the tour was spent in the Detroit metropolitan area, where participants concluded their vigorous schedule by visiting the Crash Avoidance Metrics Partnership (CAMP), the Vehicle Infrastructure Integration Consortium (VIIC), and the University of Michigan Transportation Research Institute (UMTRI), where they observed Cooperative Intersection Collision Avoidance System for Violations and VIIC demonstrations as well as learned more about Integrated Vehicle-Based Safety System (IVBSS).

The following staff members attended: Max Coffman, Senate Appropriations Committee; Shira Bergstein, Senate Commerce Committee; Suzanne Newhouse, Senate Commerce Committee; Jackie Schmitz, House Committee on Transportation and Infrastructure; Alex Herrgott, Senate Committee on Environment and Public Works; Tind Ryen, House Science and Technology Committee; David Quinalty; U.S. Senator John Ensign; Ryan Bowley; U.S. Congressman Henry Brown, Jr.; Katy Dawson; U.S. Congressman Russ Carnahan; Steven Carlson; and U.S. Congressman Michael Capuano. 🔄

Small Business Innovation Research (SBIR) Program: New Strategic Direction Provides New Opportunities

During the past year, the U.S. Department of Transportation's (USDOT's) Small Business Innovation Research (SBIR) program has undergone a number of changes designed to provide greater opportunities for the small business community to address high priority national transportation goals. RITA has set a new strategic direction for the program, one that places a heightened emphasis on proposals that would provide cost-effective,

multimodal solutions to the nation's most pressing transportation challenges. In addition, for the first time ever, the USDOT SBIR program will now accept requests for proposals twice a year, another strategy to provide greater opportunities to small businesses nationwide.

Congress established the SBIR Program to stimulate technological innovation, utilize small business to meet federal research and development needs, encourage participation by minority and disadvantaged businesses in technological innovation, and increase private sector commercialization of innovations derived from federal research and development. SBIR invites the small business community to submit innovative proposals in response to topics

that address the research needs of USDOT. Since 1982, the Volpe Center has managed the program on behalf of the Office of the Secretary of Transportation's Office of Small and Disadvantaged Business Utilization.

In fiscal year 2009, the first solicitation will take place in February and the second one will occur in September. Examples of SBIR topics from the past year include "Low Cost Bridge Structural Monitoring Technology/Turning Structural Monitoring Data into Decision-Making Information," "Development of Tools for In-field Pipeline Repairs," "In Motion Rail Temperature Measurement Unit," and "Motorcycle Detection, Classification, and Characterization."

A process is currently being developed to allow two or more DOT
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Carl Dwyer

ITS happenings—Advanced Wireless Communication

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performance of the transportation system. Such efforts will lead to improved situational awareness including dynamic rerouting and improvements in signal timing and synchronization based on real time and evolving traffic and weather conditions. Tolling and fees for all modes of transit can also be enabled through existing and developing mobile electronic devices and bridges, roads, rails, and other critical infrastructure can be remotely monitored.

In discussing the importance of open platforms and systems to enable these innovative applications, Robin Chase, of Meadow Networks, asserted that such openness "could be a magnet of opportunity for the business realm" and private sector partners. David P.

Reed, of the Massachusetts Institute of Technology, noted that advanced wireless communications technologies are "progressing extremely rapidly and this has serious implications for the business ecosystem."

This roundtable is part of the Research and Innovative Technology Administration's continuing efforts to bring diverse communities together to discuss challenges and strategies for solving the nation's toughest transportation challenges and enable needed innovations. Future roundtables and strategic outreach will explore appropriate business models for enabling these technologies in the transportation sector. For further information, contact Ellen Bell at the Volpe Center: Ellen.Bell@dot.gov, 617-494-2491 ☎

The New DNA of the Automobile

by: Larry Burns, Vice President, Research & Development and Strategic Planning
General Motors Corporation



Despite technology advances that have steadily improved vehicle efficiency, power, emissions performance, and safety, our automobiles have the same DNA as those built 100 years ago. Almost all of today's cars and trucks are mechanically driven, powered by the internal combustion engine, and energized by petroleum.

For the most part, they also are controlled mechanically and operate as stand-alone devices.

As General Motors (GM) embarks on its second hundred years, our company is focused on fashioning a new DNA that will allow us to reinvent the automobile. We will use this DNA to create electrically driven vehicles powered by electric motors, energized by electricity and hydrogen, controlled electronically, and connected to other vehicles and the infrastructure.

GM believes adoption of a new DNA is absolutely critical to the future of our industry. From what we know about the market and the universal aspiration for automobiles, by 2020 there could be more than a billion vehicles on the planet. To put this in perspective, if we were to park all the vehicles end-to-end around the earth, they would circle the globe 125 times.

Our challenge, clearly, is to make personal mobility sustainable.

One of the most important steps toward realizing this goal is to reduce the automobile's 96% dependence on oil. There is no single "silver bullet" solution to achieving energy independence. It will require a wide range of technologies, some that we are implementing now and others that we are readying for the future. In 2009, GM will once again lead the U.S. industry with 18 models achieving 30 mpg or better on the highway. We will add to the three million E85 flex-fuel vehicles that we have built in the U.S. And we will increase our hybrid offerings to nine models. In addition, we will continue our development of battery-electric and fuel cell-electric vehicles. These vehicles have the potential to provide substantial increases in efficiency, zero emissions, and petroleum-free operation. They also promise to drive the growth of diversified and, ultimately, cleaner energy sources.

In 2007, GM's Chevrolet Sequel concept was the first electrically driven fuel cell vehicle to achieve 300 miles on one tank of hydrogen. During 2008, we have put more than 100 Chevrolet Equinox Fuel Cell vehicles into the hands of everyday drivers as part of Project Driveway, the largest-ever fuel cell market test. We also have announced our plan to bring the Chevrolet Volt to market in 2010. As an extended-range electric vehicle, the Volt's 16-kilowatt lithium-ion battery will provide up to 40 miles of all-electric driving. A small internal combustion engine will generate additional electricity using either gasoline or biofuel after the battery charge is depleted, extending the vehicle's range by several hundred miles.

Beyond substantial energy and environmental benefits, the electrification of the vehicle also is hastening the
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day when we have cars that don't crash and vehicles that can drive themselves.

GM is already the leader in vehicle telematics with our OnStar system. OnStar uses GPS and wireless technology to connect five million subscribers to capabilities such as turn-by-turn navigation and automatic crash notification. GM also has demonstrated a prototype vehicle-to-vehicle communications system that supports automated safety features like lane change alert, blind-spot detection, and forward collision warning with automatic braking. Last November, we teamed with Carnegie Mellon University and supplier partners to win the DARPA Urban Challenge, a competition for

autonomous vehicles. A Chevrolet Tahoe called "Boss" won the six-hour, 60-mile race by finishing 20 minutes ahead of the nearest competitor. "Boss" successfully negotiated the course while obeying all traffic rules and avoiding other cars and objects, all without any human control.

Vehicles like the Chevrolet Volt, Equinox Fuel Cell, Sequel, and "Boss" showcase the new DNA that GM is developing to reinvent the automobile for the 21st century. GM is working hard on virtually every technology front because we are totally committed to being part of the solution. We are convinced that we can make personal mobility sustainable, exciting for our customers, and affordable for the world. ♻️

new tools & training

New TSI Motorcycle Safety Course Helps State-Level Planners

While highway safety experts are celebrating record seat belt use and improved safety performance by drivers of passenger vehicles, the number and rate of motorcyclist deaths on U.S. roads are rising dramatically. According to the Federal Highway Administration (FHWA), motorcycle rider fatalities rose 115 percent between 1997 and 2005. During the same time, fatality numbers and rates for passenger car crashes dropped. In just one year, 2005, motorcycle crash-related fatalities increased by 13 percent (to 4,553), making motorcycle rider fatalities a significant contributor to the slight overall increase that year in the national highway fatality rate.



Helmut Gevert

Trends accompanying the rising motorcyclist death toll that are cited by FHWA include a dramatic increase in motorcycle ownership, particularly by riders over 40, along with changes in other factors such as motorcycle size and rider experience. The rate of increase in fatalities has outpaced the rate of increase in motorcycle regis-

trations among middle-aged riders. Per-vehicle-mile traveled in 2004, motorcyclists were about 34 times more likely than passenger car occupants to die in a motor vehicle traffic crash and 8 times more likely to be injured.

To reaffirm its commitment to motorcycle safety as a major component in comprehensive highway safety programs at the state and federal levels, the National Highway Traffic Safety Administration (NHTSA) has partnered with the National Traffic Safety Division of the Transportation Safety Institute (TSI) to develop and deliver a Motorcycle Safety Program Coordination training course.

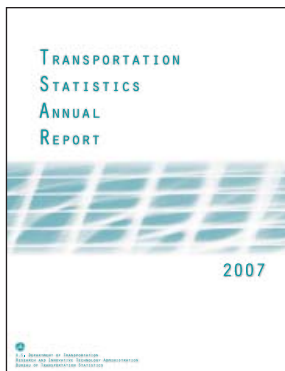
This course is intended to provide training to state highway safety office (SHSO) program personnel and NHTSA Regional Program Managers to enable them to better facilitate and support comprehensive motorcycle safety programs in their states or regions. Coordination of motorcycle safety programs requires a multipronged approach to reduce motorcycle-related crashes, injuries, and fatalities. Going beyond rider training and motorist awareness initiatives, this training delivers information on how to integrate and implement NHTSA's *Uniform Guidelines for State Highway Safety Programs, Highway Safety Program Guideline #3: Motorcycle Safety*.

Course content covers various aspects of motorcycle safety programming, such as a history of motorcycle safety in the United States, a discussion of NHTSA's

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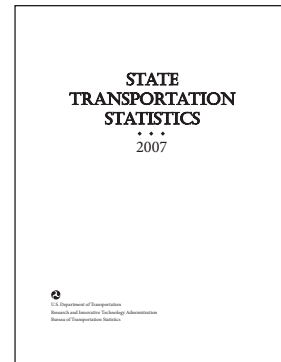
statistical news from the Bureau of Transportation Statistics

The *Transportation Statistics Annual Report* (TSAR), a congressionally mandated publication, provides a data overview of U.S. transportation issues. Each TSAR has two essential components: a review of the state of transportation statistics with recommendations for improvements and a presentation of the data. The data are grouped under headings that correspond to the U.S. Department of Transportation's strategic goals and the *Transportation Vision for 2030*. The discussion begins with context information about the extent and condition of the transportation system, vehicle characteristics, and traffic flows. In most cases, the data cover the 10 most recent years for which data are available. An appendix provides information on U.S. population, labor force, and economic conditions—variables that influence travel behavior and goods movement. Maps showing safety belt laws and use, per capita transportation revenues, and vehicle miles of travel (VMT) are also included in the appendix.



Find the TSAR at http://www.bts.gov/publications/transportation_statistics_annual_report/2007/

State Transportation Statistics (STS) are a series of reports highlighting major federal databases and other national sources related to each state's infrastructure, safety, freight movement and passenger travel, vehicles, economy and finance, and energy and the environment. Along with tables generated for each state, the reports describe databases and give information on access, formats, and contact points.



The 2007 edition of *State Transportation Statistics* is available at: http://www.bts.gov/publications/state_transportation_statistics/state_transportation_statistics_2007/index.html

BTS Special Report: *Opinions on Cell Phone Use on Airplanes, Congestion, and Telecommuting*

The annual *Omnibus Household Survey* (OHS), administered by BTS, asks respondents about their weekly travel habits, journey to work, opinions about the transportation system, and other related issues. This special report presents a few of the key findings from the November 2006 and 2007 surveys.

Bureau of Transportation Statistics
Special Report

July 2008

Opinions on Cell Phone Use on Airplanes, Congestion, and Telecommuting—From the 2006 and 2007 Omnibus Household Survey

by Jane Jones

The annual *Omnibus Household Survey* (OHS), administered by the U.S. Department of Transportation's Bureau of Transportation Statistics (BTS), asks respondents about their weekly travel habits, journey to work, opinions about the transportation system, and other related issues. The report here is one of the key findings from the November 2006 and 2007 surveys.

- although nearly half of the 18- to 34-year-old survey respondents would allow to flight cell phone use if deemed safe, less than 30% of respondents age 65 or older allowed for airplane.
- about 2 out of 5 U.S. workers who reported their commute as moderately to very congested also reported that congestion had gotten worse over the 12 months preceding the survey.
- less than 3 of 10 workers who had they could telecommute weekly do.
- the majority of workers use their personal vehicle to commute alone to work.
- about 2 out of 5 public transit passengers used transit at least 3 days a week, and
- over 60 percent of all passengers were satisfied with the amount of time taken to get through security check points.

FINDINGS: Cell Phones in Flight

All survey respondents, whether they had flown or not, were asked whether they thought passengers should be allowed to use cell phones on board flight if there were no issues with the phone interfering with aircraft communication systems. On this question there was clearly not a consensus. While about 4 out of 10 U.S. workers (38% of people in 2006 and 34% percent in 2007) said that passengers should definitely or probably be allowed to use the phone, slightly less than half (46 percent in 2006 and 45.2 percent in 2007) said that they definitely or probably should not be used. The remaining 12 percent from each survey said that they weren't sure.

Those U.S. workers 65 years old or older were much less likely to support use of cell phones on aircraft than were younger respondents, and were most likely to say that cell phones definitely should not be used on board an aircraft.

Table 1. Opinions on Allowing Cell Phone Use on Aircraft if No Safety Issues Exist, 2006 vs. 2007 (percent holding opinions)

	2006	2006	2007	2007
	n=10,000	n=10,000	n=10,000	n=10,000
2007 Omnibus Household Survey				
Definitely should allow	38.1	37.4	34.6	32.1
Probably should allow	22.1	21.4	19.4	16.8
Probably should not allow	22.1	22.9	23.9	25.8
Definitely should not allow	17.7	18.3	22.1	25.3
2006 Omnibus Household Survey				
Definitely should allow	32.2	25.1	25.0	19.9
Probably should allow	19.1	20.1	19.1	16.7
Probably should not allow	23.2	25.2	25.0	29.1
Definitely should not allow	25.5	29.6	30.9	38.3

NOTE: All respondents. Percentages may not sum to 100% due to rounding.

new tools & training—Motorcycle Safety

(continued from p. 14)

Highway Safety Program Guideline #3 dealing with motorcycle safety, discussions of problem identification in highway safety programs, identifying program resources and stakeholders, and proper implementation and coordination of comprehensive motorcycle safety programs.

The first pilot offerings of the course took place July 22–24, 2008, and during the first week of September at TSI in Oklahoma City. The pilot course participants stated emphatically this course meets the needs of the people who are eager to establish motorcycle safety programs. As a result of these two successful pilot

courses, TSI will offer this course four times to state and NHTSA highway safety program managers and four times to U.S. Air Force traffic safety managers in Oklahoma City during fiscal year 2009. Please contact National Traffic Safety Division at (405) 954-3112 for dates.

Michael Jordan, of NHTSA's Safety Countermeasures Division, was the lead developer for the course, working in conjunction with Alyson Coyle, course manager for TSI's Traffic Safety Division. Jordan and Coyle are both avid motorcycle enthusiasts and bring years of riding experience to the development of this course. 🍷

ITS happenings—Safetrip-21

(continued from p. 7)

is to facilitate convenient electronic payment options. These measures increasingly will benefit individual travelers, including commuters and businesses, as well as boost the performance of the national transportation system.

A key component of SafeTrip-21 is providing travelers with the information they need to arrive at their destinations safely and with minimum delay. This includes information about traffic congestion ahead, roadwork zones, weather conditions, sharp curves in the road, and merging traffic that will make travel safer and improve mobility.

SafeTrip-21 seeks to accelerate implementation of ITS technologies that contribute toward transportation goals expressed by the US DOT's long-term vision for the Nation's transportation system. The program therefore seeks to expose the public, decision makers, and stakeholders to the benefits of VII concepts in real-world travel settings.

By bringing innovative technologies into an operational setting, SafeTrip-21 will enable travelers to not only experience the initial benefits of VII today but also provide a glimpse as to what is in store for the future. In addition, USDOT can use the results of these near-term activities to modify systems that the Department will introduce over the long term.

SafeTrip-21 at the ITS World Congress and Beyond

USDOT will showcase selected technology applications at the 15th World Congress on ITS in New York City in November 2008, where ITS leaders, policymakers, and other industry professionals from more than 70 countries will gather. Attendees will have the opportunity to see SafeTrip-21 technologies in an interactive setting that demonstrates operational capabilities.

The formal SafeTrip-21 field tests and evaluations will take place from December 2008 to December 2009. The testing will focus on assessing and measuring the abilities of these technologies to yield near-term safety and efficiency benefits, as well as to contribute to solving long-term transportation problems. The field tests will provide an opportunity to see which applications work and which require further R&D.

The tests also will provide an opportunity to inform transportation decision makers about how the technologies work in the field and what safety and mobility benefits state departments of transportation might derive by providing the traveling public with improved traffic and transit information. 🍷

Learn More Online about Vehicle Infrastructure Integration

The VII Coalition, consisting of the U.S. Department of Transportation, light vehicle manufacturers, state and local governments, and their representative associations, was established to support VII research and determine the feasibility of widespread deployment of this promising set of transportation capabilities.

RITA is proud to sponsor a new website, www.vehicle-infrastructure.org, that offers interested stakeholders more background on VII and its potential applications, coalition member activities, available research, and international activities.

RITA happenings—TSI Crash Investigations

(continued from p. 10)

to the TSI lab, and to display and protect large training aids, such as airplanes, helicopters and their respective engines. The final phase will provide an on-site state-of-the-art classroom. Completion of all phases will result in a premier hands-on aircraft accident investigation training laboratory, commonly referred to as the “boneyard,” for a realistic training experience. TSI anticipates completion of the entire project by October 2009, but Lawrence said that TSI has already received calls from universities seeking to use this facility as a model for their own boneyards.

Based in Oklahoma City, OK, TSI was established in 1971 to help DOT modal administrations accomplish their mission-essential training requirements. 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 aviation, highway safety, hazardous material transport, motor carrier, transit, and risk management.

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

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

technology transfer—Small Business Innovation

(continued from p. 12)

jointly fund a topic, making it easier for them to address pressing multimodal topics. A DOT multimodal working group has been established to better address issues regarding the development of multi-modal topics and the issuance of two annual solicitations.

The DOT SBIR program office continually seeks ways to streamline the solicitation process. Presently, all proposals can be submitted electronically to the Volpe

Center website. For more information about the DOT SBIR program, please go to <http://www.volpe.dot.gov/sbir/index.html>, or contact Joseph Henebury, SBIR Program Director, at 617-494-2712. 📞

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



BTS Posts New Airline Fuel Cost and Consumption Web Page

The Bureau of Transportation Statistics unveiled an Airline Fuel Cost and Consumption web page in July. The page leads users to five different areas:

- Preliminary summary data on the industry’s most recent monthly fuel costs and consumption.
- Tables with fuel cost and consumption numbers since 2000. Numbers are available for the industry, individual airlines and groups of carriers by month, year and year-to-date.
- Summary industry fuel cost and consumption numbers from 1977 through 1999.
- Cost and efficiency measurements.
- An explanation of the several BTS databases that include fuel cost and consumption numbers.

The page can be reached from the BTS home page www.bts.gov by clicking on the link for Airline Fuel Cost and Consumption.

across the department — U.S. Priorities with China

(continued from p. 5)

Administrator Paul Brubaker and Director General Dong Xuebo came to agreement on amendments to the MOC and on a 2008 Work Plan to develop joint data definitions and collection procedures for common transportation statistics between the United States and China. The delegations also discussed other topics of interest to China's Ministry of Transport, including Intelligent Transportation Systems (ITS), transportation technologies and information networks, the National Transportation Library, and logistics and supply chain management. The two sides will come together again to share results of this common work in January 2009 in Washington, DC.

In May, RITA coordinated a meeting on transportation technologies and training with visitors from the Chinese Academy of Transport Sciences (CATS), an academic arm of the Ministry of Transport. RITA's

Office of Research, Development, and Technology provided updates on projects being conducted under RITA's Remote Sensing Program; the Federal Transit Administration (FTA) and the Transportation Research Board (TRB) provided information on elements of their programs of interest to the CATS team. CATS has begun implementing lessons learned from RITA's Remote Sensing Program for emergency services management, such as managing traffic in response to earthquakes and avalanches. CATS is leading Chinese research into sustainable energy and transportation options for their rapidly growing systems and is confronting the problems of moving people and goods to and from rural China and the expanding urban and suburban areas. Further information exchanges on transportation science and technology to address these issues in transit, roads, and rail are expected in the future. 🌐

across the department — U.S./China Freight Trade

(continued from p. 5)

In particular, growing air trade with China in the southwest and Great Lakes regions of the United States and the increase in water trade at west coast ports

have put an even greater demand on the transportation infrastructure serving these areas. The addition of work shifts at busy sea ports, the use of variable highway tolls to manage freight traffic, shifting trade flows among entry and exit points, and changing domestic trade routes can all be at least partly attributed to the marked increase in U.S.-China trade.

That same trade growth has had a significant impact on U.S. ports outside the Pacific region. Increasing congestion at west coast ports is leading to a shift in U.S.-China trade routes. More Chinese imports are entering the United States at ports in the Southeast as trade routes through the Panama and Suez canals become more competitive, and significant infrastructure changes promise to affect trade routes as well. For example, the current widening of the Panama Canal will allow larger vessels to navigate the canal than those currently using it, effectively doubling the Canal's capacity and likely facilitating a shift in trade-related traffic from congested west coast ports to less crowded ones in the Southeast.

To see the full report on this topic and other recent Special Reports from BTS, visit http://www.bts.gov/publications/bts_special_report. 🌐

Table 1: Top 10 Commodities Traded Between the United States and China in 2006 Compared to 1998 Trade in Those Commodities (\$ millions)

Commodity	1998 total trade	2006 total trade	Percent change
Electrical machinery	14,522	75,083	417%
Boilers and other mechanical appliances	10,335	69,970	577%
Toys, games and sports equipment	10,604	20,943	98%
Furniture and lamps	3,993	19,483	388%
Footwear	8,038	13,948	74%
Clothing, not knitted or crocheted	3,814	11,868	211%
Plastics	2,519	10,180	304%
Iron and steel	1,197	8,763	632%
Clothing, knitted or crocheted	1,862	8,020	331%
Assorted instruments	2,906	7,728	166%

SOURCE: U.S. Exports of Merchandise and U.S. Imports of Merchandise DVDs, U.S. Census Bureau, Department of Commerce, Suitland, MD, 1999-2007.

U.S. Imports & Exports of Merchandise DVDs and FT 920 U.S. Merchandise Trade: Selected Highlights, U.S. Census Bureau, Department of Commerce, Suitland, MD, 1990-2007.

