

An integrated systems approach to interagency and intermodal transportation issues of importance to the nation.

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U.S. Department of Transportation
Research and Innovative
Technology Administration
Volpe National Transportation
Systems Center



The Volpe Center's Demonstration and Deployment Office brings together an understanding of transportation systems and project management expertise to facilitate the development, deployment, and operations of large-scale integrated worldwide systems including traveler and freight transportation systems. (Photo courtesy of Charles McCarthy)

Developing, Demonstrating, and Deploying Large-Scale Systems

The Volpe Center's Office of Demonstration and Deployment Programs has proven expertise in developing and deploying large-scale, complex systems in many arenas and for many agencies across the transportation modes. Many of the projects undertaken by the Office of Demonstration and Deployment are global and multiyear; they range from information technology (IT) deployment to new-hardware installation to security systems design.

Project managers and technical experts in a variety of disciplines collaborate to develop and implement an integrated strategy to meet clients' goals. As part of the Department of Transportation (DOT), Center staff understand federal requirements, including our client's system acquisition processes, the complex regulatory requirements, and the needs of different stakeholders.

The Volpe Center's broad perspective includes research and development, a pragmatic application of advanced system technologies, systems engineering, system implementation, institutional factors, economics, and strategic planning.

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Letter from the Director:

Customer Satisfaction and Success

We listen to our customers and respond to their input



The Volpe Center's technical expertise was cited by customers as the number one reason for seeking us out.

We at the Volpe Center are committed to our customers' satisfaction. High-quality work and responsiveness to customers' needs are central to our culture. Customer-satisfaction surveys provide an important measure of our success and also a tool to enable us to improve.

In FY 2006, the Volpe Center initiated a third round of customer satisfaction interviews for all active projects. We received a nearly sixty percent response rate. The survey was designed to obtain candid customer perceptions on our current products and services and to provide a benchmark for comparing the results of future surveys. Such feedback allows us to act on suggestions for both project-specific and Center-wide improvements.

We were gratified to discover that, overall customer satisfaction, on a 10-point scale, approached 8 at the senior level and exceeded 8 at the project-manager level. It is clear that our customers highly value our technical expertise and accessibility to quality staff.

The interviews also provided us with an opportunity to identify how we can better meet our customers' needs. They expressed the desire for more frequent and effective reporting about the progress and costs of their projects. We will place increased emphasis on ensuring that these concerns are addressed.

Finally, customer surveys provide a measure of customer success, reflecting how well the Center is helping to solving customers' strategic concerns. Nearly all of our customers provided examples of how the Volpe Center has contributed to their success.

The customer satisfaction survey is only one step toward our mission of increasing our understanding of our customers and enhancing our effectiveness. The effort continues on a day-to-day, project-by-project basis, as each and every Volpe Center employee strives to provide customers with the products and services that they need and have come to expect from us.

This is an ongoing structured process, but we also welcome informal feedback from our customers.

A handwritten signature in black ink that reads "Curtis J. Tompkins". The signature is fluid and cursive, with a long horizontal stroke at the end.

Curtis J. Tompkins

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Developing, demonstrating, and deploying large-scale systems

■ Deploying large-scale systems

We deploy both large- and small-scale systems, from information technology to physical security systems. We apply a systems approach and couple it with our broad project management experience and our understanding of the technical complexities and logistical challenges involved in operational system deployment.

■ Implementing large-scale infrastructure modernization

As a federal entity, we help our clients to implement new business processes and technologies on a global scale. We upgrade system components and carry out large-scale infrastructure modernization.

■ Providing support 24/7 for critical missions

Our project teams provide rapid-response technical support—around the clock, seven days a week—for the mission-critical systems of federal, state, and local government agencies, including emergency support, help desk, and operations.

■ Providing life-cycle system support

We help our customers to validate and articulate needs and support system development from conception through implementation and maintenance. While maintaining a holistic view of the client's enterprise, our multidisciplinary staff brings the right skills to each phase of a system's life cycle.

■ Employing best practices

Using a knowledge-based approach to new products and systems, our development teams follow best practices that ensure quality computing services and real IT efficiencies. Our goals are to continually improve processes, to reduce the number of defects, and to offer a user-based approach to evolving requirements.

■ Offering integrated support to federal, state, and local government

The Center works closely with state and local governments to provide vital transportation, public safety, and security products and services to their constituents.



U.S. CAPITOL COMPLEX SECURITY. The Volpe Center was responsible for the design, development, integration, and deployment of a new physical security system for the U.S. Capitol complex. (iStockphoto.com)

Customers of the
Office of Demonstration
and Deployment

U.S. DOT

Office of the Secretary of
Transportation
Federal Aviation Administration
Federal Motor Carrier Safety
Administration
Federal Transit Administration
Office of the Inspector General
Maritime Administration
National Highway Traffic Safety
Administration
Pipeline and Hazardous Materials
Safety Administration
Saint Lawrence Seaway
Development Corporation

Other Federal

National Aeronautic and Space
Administration

U.S. Capitol Police

U.S. Department of Health and
Human Services

Centers for Disease Control and
Prevention

U.S. Department of Defense

Defense Threat Reduction Agency
Technical Support Working Group
U.S. Air Force

U.S. Army

U.S. Navy

U.S. Department of Homeland
Security

U.S. Coast Guard

State and Local

City of Boston, Massachusetts

Massachusetts Bay Transporta-
tion Authority (MBTA)

American Public Transportation
Association

International

United Kingdom Ministry
of Defence

Royal Air Force

Deploying large-scale systems: *From information technology to physical security systems*

Design, deploy, and maintain information technology

FMCSA Information Technology Systems. The primary mission of the Federal Motor Carrier Safety Administration (FMCSA) is to reduce crashes, injuries, and fatalities involving large trucks and buses. FMCSA relies on dozens of information technology (IT) systems to help it achieve its mission. The Volpe Center has played a key role in defining, developing, implementing, maintaining, and operating information systems for FMCSA headquarters, its field offices, and state partners. Many systems are hosted at the Volpe Center.

FMCSA IT systems ensure that the industry and the state agencies responsible for carrier enforcement have accurate, accessible data to properly address motor carrier safety issues ranging from inspection reports to vehicle, driver, and company safety histories. We have helped FMCSA to develop web-based tools to provide access to statistics and analysis as well as tools to monitor, track, and store enforcement information. We have also developed websites that provide carrier information to the public and applications

Examples of FMCSA Systems Developed by the Volpe Center

Analysis and Information Online (A&I): Provides descriptive statistics and analyses on commercial vehicle, driver, and carrier safety. (<http://ai.fmcsa.dot.gov>)

Electronic Document Management System (EDMS): Used for storage and retrieval of essential FMCSA documents.

Enforcement Management Information System (EMIS): Used to monitor, track, and store information related to FMCSA enforcement actions.

Motor Carrier Management Information System (MCMIS): Captures data from field offices.

Data Transfer Safety and Fitness Electronic Records (SAFER): Displays carrier information available to the public. (<http://www.safersys.org>)

Query Central (QC): Retrieves safety compliance and enforcement data from multiple sources.

Hazardous Materials Package Inspection Program (HMPIP): Both field and central systems collect and store information used to record compliance problems with hazardous material packages. ■

that support field inspectors as they address compliance issues for hazardous materials. We also provide critical operational and technical support for enforcement officers.

The knowledge gained from these deployable technologies helps FMCSA to reduce crashes, injuries, and fatalities and deliver a program that contributes to a safe and secure commercial transportation system.

Design and deploy physical security systems

The Volpe Center's experience in developing security systems extends back to the early 1970s. We have designed and implemented systems for many federal government facilities, including the Department of State headquarters, the U.S. Capitol, the Department of Treasury's Bureau of Engraving and Printing, and the DOT. Responding to increasingly sophisticated and emerging technologies, the Center has introduced integrated security systems that use "open architecture" and combine features such as access control, intrusion detection, closed-circuit television (CCTV), and digital video recording. Our security teams have in-depth knowledge of the operational requirements of transportation organizations as well as of transportation and security technologies. The Center's experience with physical security systems has been invaluable in helping the nation to address increasing concerns with transportation system security. We understand that policies, procedures, and training are critical components of system deployment. Each system is tailored for the client's needs.

DOT Headquarters Security System. The new DOT headquarters in Washington, D.C., is the first cabinet-level building to be designed and constructed in the nation's capital in more than 30 years. The Volpe Center is designing, procuring, and installing a security system for the 1.35-million-square-foot facility. The objective is to implement an integrated security system that is compatible with Homeland Security Presidential Directive-12 (HSPD-12), which directs all federal agencies to establish more uniform standards for issuing government identity credentials. The system integrates a systems and command, control and monitoring center; CCTV; digital video recording; and IP-based access control. It complies with guidelines that direct all federal agencies to provide the capability for a common identification card that will allow employees and contractors to gain access to federally controlled facilities and computers.



PORT OF NORFOLK, VIRGINIA. Volpe Center teams have visited more than 22 ports domestically and internationally to collect information and provide guidance on logistics and operations and on physical and informational systems security. (Photo courtesy of William Baron)

Boston's Silver Line. As the City of Boston's only bus rapid transit line, the recently opened Silver Line makes a significant contribution to the city's transportation system by providing easy access to Logan International Airport. The Volpe Center team

designed, developed, and implemented an integrated security system for the Silver Line, including access control, intrusion detection, and CCTV. An automated vehicle screening system ensures that only Silver Line buses and other authorized vehicles can enter the dedicated tunnel. The system was designed so that it can be expanded systemwide. In addition to increasing security, the improved situational awareness provided by the new system benefits safety and operations management.

Boston's Emergency Operations Centers. The Volpe Center is currently developing operational concepts and integrating technologies supporting the City of Boston Mayor's Office of Emergency Preparedness for nine emergency operations centers within the metropolitan area. On the basis of site surveys and analysis, the Volpe Center presented designs that have been endorsed by the mayor's office and its municipal partners and, over the next several months, it will procure and install the equipment. The Volpe Center team will provide training to emer-

gency management personnel on how to use the new decision-support technologies. The Center is developing standard operating procedures (SOPs) for facilities that will provide guidance on how to respond to events in their own jurisdiction and how to coordinate across jurisdictions. This builds on our previous experience with design and implementation of facility security upgrades and command centers as well as emergency preparedness, and on our ability to coordinate major acquisitions.

Implementing large-scale infrastructure modernization

The Volpe Center can assist clients with the effective, timely acquisition and sustainment of information systems and the support of those systems throughout their life cycles. Our teams are recognized for delivering solutions tailored to customers' evolving needs. We help clients to identify requirements and maintain a continuous dialogue about evolving needs.

National Airspace System (NAS) upgrade. The Center's continuing support for NAS improvements exemplifies synergy between engineering and project management skills. In a major effort to make Department of Defense (DoD) air-traffic control (ATC) facilities interoperable with Federal Aviation Administration (FAA) ATC facilities, the team is replacing DoD's terminal radars, voice-switching systems, and automation systems as well as consolidating several existing informational displays into a single unit. While each component is critical individually, together they create a dramatic, positive difference for air-traffic controllers all over the world.



THE MBTA SILVER LINE IN BOSTON. Boston's newest transit service—the Silver Line—provides improved service from sections of Boston to the downtown area and to Logan Airport. The project, one of the Federal Transit Administration's showcase projects for bus rapid transit (BRT), uses advanced bus technology, with many features that enhance safety, comfort, and convenience for riders and has resulted in dramatically increased ridership. The Volpe Center has played a key role in designing and implementing a security system for the Silver Line. (Photo courtesy of William Baron)

Providing support 24/7 for critical missions and large-scale systems

NHTSA's Crash Data Collection Programs. The Volpe Center provides operational support to the field staff of NHTSA's crash data collection programs—the National Automotive Sampling System (NASS) and the Crash Injury Research and Engineering Network (CIREN). Since 1986, NASS Primary Sampling Units (PSUs) have been established at 60 locations across the country and CIREN centers have been established at eight trauma centers in major research and teaching hospitals throughout the country. Data on actual crashes are collected and analyzed, and this knowledge is used by engineers and manufacturers to design safer vehicles and by physicians and researchers to improve the treatment of accident victims.

The Electronic Data System (EDS)—the automated system that supports both NASS and CIREN—was developed and is being updated, enhanced, and maintained by the Volpe Center. The Center also hosts that system and the centralized repository for all NASS/CIREN data. The repository provides a common database into which the PSUs and trauma centers can add actual injury case data. After sanitization and quality checks are performed, the Volpe Center and NHTSA make the data in the repository available through a website to researchers throughout the United States.

CIREN centers have been established at eight trauma centers in major research and teaching hospitals. Data on actual crashes are collected and analyzed.

Providing life-cycle system support—responding to user requirements

Aviation Safety Systems. The Federal Aviation Administration (FAA) depends on inspections and robust information systems to identify safety problems with air operators, aircraft, air agencies, and air personnel. The Center is participating in FAA's multiyear System Approach for Safety Oversight (SASO) program, aimed at redesigning the oversight processes of the Flight Standard Service (AFS) and the U.S. aviation industry in order to achieve the highest level of safety and efficiency. The functionality of the several aviation safety systems, developed by the Volpe Center, will be incorporated into this program (see sidebar).

As the SASO program develops, the current suite of AFS information systems and decision-support tools will be redesigned and integrated to better meet the information requirements of new system safety-based business processes. SASO will analyze,

Volpe Center-Developed Aviation Safety Systems

Safety Performance Analysis System (SPAS): Accommodates inspectors' information needs by highlighting potential problem areas, using safety performance measures, and providing timely, reliable access to existing data.

Air Transportation Oversight System (ATOS): Supports inspectors' surveillance of major air carriers in order to identify safety trends and correct root problems.

Flight Standards Automation Subsystem (FSAS): Compiles automated information systems used by AFS to plan, record, and track aviation surveillance, certification, and other safety-related activities.

Flight Standards Information Management System (FSIMS): Provides FAA with a web-based electronic library of aviation safety-related publications and a portal to other related documents.

Enforcement Information System (EIS): Maintains data on FAA enforcement actions against airlines, pilots, mechanics, and other certificated aviation personnel and entities. ■

Maritime Domain Awareness is currently defined by the U.S. Department of Homeland Security as “the effective understanding of anything associated with the global maritime environment that could impact the security, safety, economy, or environment of the United States.”

assess, and, when necessary, reengineer current AFS business processes in order to incorporate state-of-the-art system safety practices. These changes will elevate AFS and the aviation industry to a national standard of system safety by implementing a comprehensive set of world-class system safety practices. The new practices will emphasize the proactive identification and evaluation of aviation risk factors and enable AFS to efficiently focus its oversight efforts on the highest-risk areas. In addition, AFS's new processes will support a more collaborative relationship with aviation certificate holders and empower them with greater responsibility for safety management within their organizations.

Maritime Domain Awareness (MDA). Since the 1990s, the Volpe Center has played a critical role in developing and applying advanced technologies that have made it possible for mariners to detect the presence and determine the position of other vessels quickly and accurately, regardless of weather or location. The Maritime Safety and Security Information System (MSSIS), developed by the Center for the U.S. Navy, provides a networked capability to gather and disseminate information about commercial vessels. The system has enabled the Navy to extend its MDA capabilities to include information about commercial vessels equipped with automatic identification system (AIS) transponders. MSSIS collects and disseminates real-time data derived from AIS about vessel movements.

The Center currently supports this capability in Europe, the Mediterranean, and Africa. Our technical assistance has included network system and site design; hardware procurement; system deployment, installation, and integration; development of testing and evaluation plans; and overall program management. The Center is also assisting the U.S. Coast Guard in deploying the national AIS network throughout the United States.

Employing best practices

The Volpe Center's highly trained, certified project managers adhere to industry standards and employ best practices to respond to evolving business management processes. New wide-ranging project management experience enables us to undertake large-scale global technology upgrades and integration.

FMCSA COMPASS. By employing best practices in modernizing and streamlining business processes, the Center has provided leadership in supporting FMCSA's development of COMPASS, a program that will help the agency to reach its goal of reducing highway fatalities due to truck and bus accidents. COMPASS will optimize many of FMCSA's business processes and improve the agency's IT functionality.

COMPASS is an FMCSA-wide initiative transforming the way that the agency does business. This system will provide a single source for safety information and data and will incorporate substantial data quality improvements to better facilitate intelligent decision making. The ultimate goal of COMPASS is to use IT to improve the agency's ability to save lives.

Offering integrated support to federal, state, and local government

State and local agencies have a growing role in implementing the nation's transportation policies and systems, and the Volpe Center has a growing role in integrating services and information provided by all levels of government. A key component of our support is the ability to determine and help implement the right systems for each level of government to facilitate the sharing of information, processes, and resources. The Center establishes effective partnerships that offer seamless integration.



U.S. DOT PHMSA State Pipeline Processing System (SPPS). The Pipeline and Hazardous Materials Safety Administration (PHMSA) Office of Pipeline Safety (OPS) is authorized to reimburse a state agency up to 50 percent of the actual cost of carrying out its pipeline safety program, including expenditures for personnel and equipment. The Volpe-developed SPPS streamlined the integration of grants.gov (mandated for grant processing throughout the federal government) for the state pipeline safety grant program. SPPS provides a central, standardized input and tracking system for a successful cooperative relationship with 52 state pipeline safety offices. In addition to developing the system and providing enhancements, the Volpe Center team operates the system, conducts training for both federal and state employees, and provides help-desk support to the states.

PIPELINE SAFETY. With more than 2.3 million miles of pipelines in the U.S., the Pipeline and Hazardous Materials Safety Administration depends on partnerships with the states to ensure pipeline safety. The Volpe Center is developing systems that streamline this partnership. (iStockPhoto.com)

A collaborative approach

The Center can utilize innovative contracting vehicles to facilitate novel partnerships between government, industry, and research institutions. Ongoing collaborative relationships with a wide network of private organizations, government agencies, and major institutions of higher learning, such as MIT, means that the Center can apply the best minds available to solving problems at all levels of government.

Conclusion: *Understanding transportation system complexities*

A systems approach to transportation issues involves analyzing and defining the factors that affect transportation systems and implementing solutions that incorporate a life-cycle approach to problem solving. We have a deep understanding of the transportation system, its technologies and disciplines, and the responsibilities, perspectives, and objectives of the industry. This understanding informs our comprehensive approach: improving the transportation system, one component at a time, keeping in mind the whole as we work on the parts. ■

Mobility

Reduced Congestion—New Enhanced Traffic Management System release helps reduce airport ground delay

As the number of air passengers increases every year, reducing aviation congestion while meeting projected demands on the national airspace system is critical. Congestion is now being approached in a systematic way that encompasses the entire airspace. The Enhanced Traffic Management System (ETMS)—a Volpe Center-developed system—supports the Federal Aviation Administration’s (FAA) efforts to improve the reliability and predictability of air travel and thus increase air system

capacity. ETMS integrates real-time flight and weather data from multiple sources, presenting information graphically in a highly adaptable format and enabling more efficient, predictable, and equitable management of air traffic in congested airspace.

ETMS Version 8.3 was deployed with new functionality that will help to reduce airport ground delays and provide new capabilities to air traffic managers. During normal operations, the early and late arrivals of aircraft at airports is balanced. But if there are significantly more late arrivals than early arrivals, this may mean that available arrival slots are unused. A key component of this release is the introduction of a process called adaptive compression, which enables traffic flow managers to make maximum use of available capacity.

Adaptive Compression is particularly important during lengthy Ground Delay Programs (GDPs), such as during winter operations at Chicago’s O’Hare airport in which GDPs frequently run 10 to 12 consecutive hours during a day. Delays at O’Hare create ripple effects throughout the entire U.S. air traffic

AIRPORT CONGESTION: As demand for air transport increases, more passengers are delayed. The Volpe Center is supporting FAA’s efforts to reduce airport ground delay. (iStockphoto.com)



system. Over the course of a lengthy GDP, airspace users adjust their demand through substitutions, cancellations, and revisions. Open slots develop over time, and the slots can go unused (e.g., unused capacity) unless the list of arrival flights is compressed. Adaptive Compression is an automated process designed to use all available slots, thus maximizing capacity utilization. This ETMS release also includes a new user Preference Set function. Preference Sets are a productivity tool for traffic managers designed to increase efficiency by reducing the time it takes a traffic manager to set up the Traffic Situation Display on their computer at the start of each shift. This enhancement can reduce the time needed to set up a workstation at the beginning of a shift, from perhaps 15 minutes to about 2 minutes. This release was deployed to over 80 FAA sites in the U.S. as well as to the following international sites: Great Britain, Eurocontrol, Mexico, Canada, Central America, and Chile. ■

Volpe Center Contributes to Transportation Research Board Annual Meeting

The Transportation Research Board's 2007 Annual Meeting took place in Washington, D.C., January 21–25, 2007. The Volpe Center was well represented in this diverse group of researchers, academics, administrators, and others from government and industry. The meeting's theme was "Transportation Institutions, Finance, and Workforce—Meeting the Needs of the 21st Century." Volpe Center staff presided over conference sessions, committee meetings, and workshops, and gave a number of presentations. Papers from this conference are on the 2007 TRB 86th Annual Meeting: Compendium of Papers CD-ROM, available for purchase at http://www.trb.org/news/blurb_detail.asp?id=7286.

Presentations

Mr. Michael G. Dyer of the Marine Systems Division presented "**Planning for Public-Private Ferry System Partnerships.**"

Mr. Gregg G. Fleming of the Environmental Measurement and Modeling Division presented two papers: "**Reduced Vertical Separation Minimum**" and "**Systems Approach to Aviation Environmental Resource Management.**"

Ms. Melissa M. Laube of the Service and Operations Planning Division presented "**System Planning for Quality Transit Projects.**" Coauthoring the paper with Ms. Laube were Mr. William M. Lyons of the Planning and Policy Analysis Division and Mr. Darin Allan of the Federal Transit Administration.

Ms. Mary Lee and Dr. Joyce Ranney of the Human Factors Division presented "**Investigation Best Practices: Interim Findings from Evaluation of Canadian Pacific Railway's Investigation of Safety-Related Occurrences Protocol.**"

Mr. Charles McCarthy of the Infrastructure Protection and Operations Division presented "**Asia and Pacific Perspectives on Container and Vessel Tracking.**"

Hard copies of TRB papers are also available from the Volpe Center's library. Contact volpetrc@volpe.dot.gov.



Dr. Don H. Pickrell of the Economic and Industry Analysis Division and Dr. Darren Timothy of the Federal Highway Administration presented "**National Surface Transportation Policy and Revenue Study Commission.**"



Dr. Don H. Pickrell of the Economic and Industry Analysis Division and Dr. Jack Wells of the Office of the Secretary of Transportation presented "**DOT's Congestion Initiative: Economics of Urban Partnerships.**"

Mr. Terrence M. Sheehan of the Service and Operations Planning Division and Mr. Clay Schofield of the Cape Cod Commission presented "**Transit in Paradise: The Outer Cape Cod 'Flex' Transit System, Development to Implementation.**"

Mr. David Tyrell of the Structures and Dynamics Division coauthored "**Development of Crash Energy Management Specification for Passenger Rail Equipment.**"

Dr. Michelle Yeh and Dr. Jordan Multer of the Human Factors Division presented "**Traffic Control Devices and Barrier Systems at Grade Crossings: A Literature Review.**"

THE OUTER CAPE COD "FLEX" TRANSIT SYSTEM. The Volpe Center has provided planning support for the Cape Cod Transit Task Force and the Cape Cod National Seashore that has identified the need for alternative transportation services for better public transportation access for Seashore visitors and between the Outer Cape Cod communities. Based on this information, Cape Cod Commission and Volpe Center staff developed route recommendations for local and express service between Provincetown and Harwichport. Called "The Flex," it is a hybrid service that incorporates a traditional transit bus service (with a defined route, schedule, and bus stops) and a "route deviation" concept that allows the bus to serve areas up to three-quarters of a mile from the defined route. This "route deviation" allows the service to reach more people and more places they want to go. For more details on The Flex, see <http://www.theflex.org/>. (Photo courtesy of Terry Sheehan)

Workshops

At the workshop on **Innovation in Air Traffic Flow Management**, Volpe Center staff presented the following papers:

- Dr. Eugene P. Gilbo of the Traffic Flow Management Division presented "**Airport Congestion Management.**"
- Mr. Rick Oiesen of the Traffic Flow Management Division presented "**Airspace Congestion Management.**"

Dr. Joyce Ranney of the Human Factors Division and Dr. Michael Coplen and Dr. Thomas Raslear of the Federal Railroad Administration presided over the workshop on **Proactive Risk Management Safety Approaches for Managing Human-Factors-Caused Accidents in the Railroad Industry: Alternatives to Compliance.**

Poster Sessions

Mr. Gregg G. Fleming of the Environmental Measurement and Modeling Division, Dr. Brian Y. Kim of Wyle Laboratories Inc., and Dr. Roger L. Wayson of the University of Central Florida copresented a poster session on **Component Verification and Sensitivity Analyses of Traffic Air Quality Simulation Model.**

Dr. Douglass B. Lee of the Economic and Industry Analysis Division presided over a poster session on **Transportation Economics**, sponsored by the Transportation Economics Committee.

Mr. William M. Lyons of the Planning and Policy Analysis Division presided over a poster session on **Transit Management and Allocation of Resources**, sponsored by the Transit Management and Performance Committee.

Dr. Alan Rao of the Rail and Transit Systems Division presented a poster session on **Safety Standards for High-Speed Rail Transportation.** Details of the session are at http://www.trb.org/am/ip/assembly_detail.asp?id=9052&e=186. The paper presented (coauthored

by Dr. Thomas Tsai, formerly of the Federal Railroad Administration) has also been published in the TRB's Transportation Research Record series.

Sessions Chaired

Ms. Anya A. Carroll of the Rail and Transit Systems Division presided over the **Highway Rail Grade Crossing Committee** Annual Meeting and moderated the session, "Safety at Private Highway-Rail Grade Crossings," sponsored by the committee.

Dr. Douglass B. Lee of the Economic and Industry Analysis Division presided over the **Transportation Economics Committee** meeting.

Dr. Don H. Pickrell of the Economic and Industry Analysis Division presided over the following sessions:

- **Reducing Congestion with Integrated Programs of Pricing and Investment**, sponsored by the Transportation Economics Committee and the Congestion Pricing Committee.
- **Technical Issues in Transportation Economics**, sponsored by the Transportation Economics Committee.

Dr. Stephen Popkin of the Human Factors Division presided over **Railroad Human Factors Issues, Part 2**, sponsored by the Railroad Operational Safety Task Force.

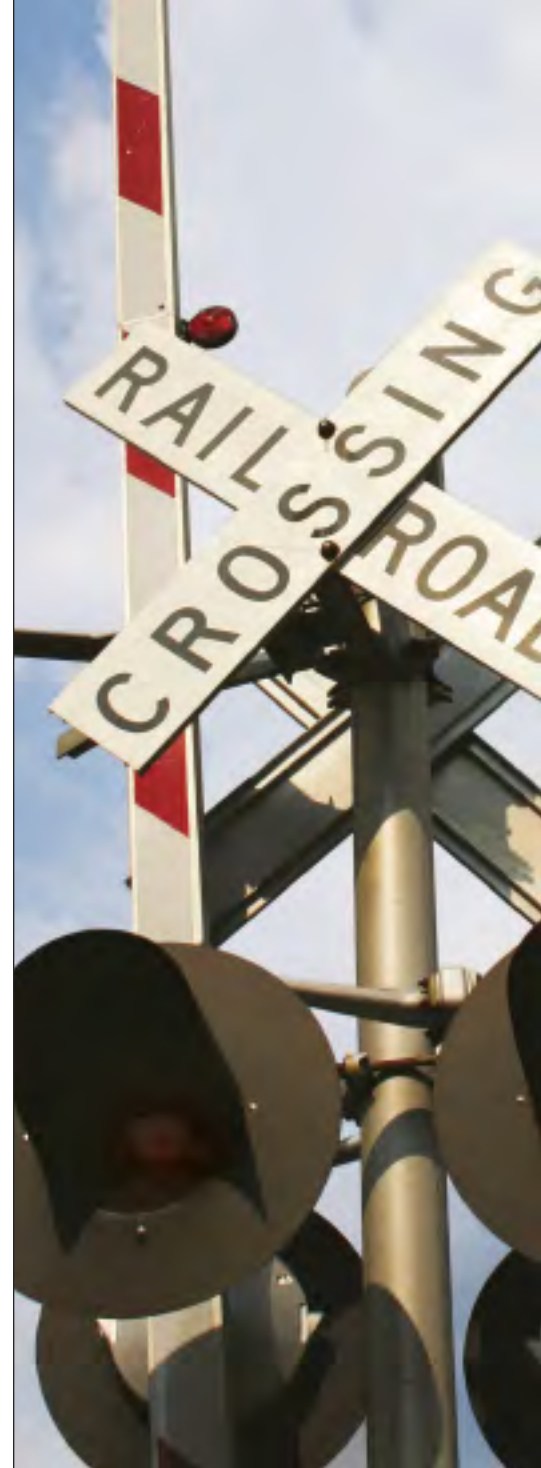
Mr. Gary T. Ritter of the Service and Operations Planning Division presided over the **Federal Land Agencies and the Statewide and Metropolitan Transportation Planning Processes** session, sponsored by the Transportation Needs for National Parks and Public Lands Committee, the Statewide Multimodal Transportation Planning Committee, the Transportation Planning for Small and Medium-Sized Communities Committee, and the Transportation Programming, Planning, and Systems Evaluation Committee.

Dr. Judith L. Rochat of the Environmental Measurement and Modeling Division presided over the **Highway Noise and Vibration Subcommittee**, sponsored by the Transportation-Related Noise and Vibration Committee.

Dr. Theodore R. Sussmann of the Structures and Dynamics Division and Mr. Donald Plotkin of the Federal Railroad Administration presided over **Railway Heavy-Axle-Load Substructure Design and Maintenance**, sponsored by the Railroad Track Structure System Design Committee and Railway Maintenance Committee. ■

Published and Presented

Pre-crash Scenario Typology. Dr. Wassim Najm of the Advanced Safety Technology Division presented "Pre-crash Scenario Typology" at an annual research and development meeting held by Honda and the National Highway Traffic Safety Administration (NHTSA) in Washington, D.C., September 6, 2006. Dr. Najm's presentation described a novel pre-crash scenario typology to identify intervention opportunities for advanced vehicle technologies to prevent crashes and to estimate their potential safety benefits. Pre-crash scenarios refer to vehicle movements and critical events that occur immediately prior to a collision. The purpose of establishing this pre-crash scenario typology is to have a common foundation that NHTSA and the automakers can use to prioritize the crash areas that need to be addressed and to project societal benefits from crash prevention.



TRAFFIC CONTROL DEVICES AND BARRIER SYSTEMS AT GRADE CROSSINGS. For the Federal Railroad Administration, the Volpe Center conducted a literature review of research examining driver behavior at grade crossings. The review will provide input for developing countermeasures to discourage dangerous driving behavior. (iStockphoto.com)

Reverse Manufacturing. Dr. Seamus McGovern of the Terminal and Surface Systems Division presented the paper “Computational Complexity of a Reverse Manufacturing Line” at the Sixth International Conference on Environmentally Conscious Manufacturing in Boston, Massachusetts, as part of the International Society for Optical Engineering’s (SPIE) OpticsEast 2006 Technical Event, October 1–4, 2006. The paper was coauthored by Dr. Surendra M. Gupta of Northeastern University and is published in Proceedings of the 2006 SPIE International Conference on Environmentally Conscious Manufacturing VI, Boston, Massachusetts, October 1–4, CD-ROM, 2006. (Paper No. 6385-01)



CONGESTION PRICING. Facing rising levels of congestion on U.S. roads, transportation economists are giving serious consideration to road pricing schemes. (iStockphoto.com)

Volpe Center staff presented papers at the **13th World Congress and Exhibition on Intelligent Transport Systems and Services** held in London, England, October 8–12, 2006. The papers are listed below:

- “A Driver Acceptance Framework for the Roadway Departure Crash Warning System” by Dr. David Yang of Noblis Systems and Dr. Bruce Wilson and Dr. Mary Stearns of the Human Factors Division.
- “Safety Assessment of a Rear-End Crash Avoidance System” by Dr. Wassim Najm of the Advanced Safety Technology Division.

Congestion Pricing. Dr. Don H. Pickrell of the Economic and Industry Analysis Division presented “Congestion Pricing: Background and Basics” at the National Surface Transportation Policy and Revenue Study Commission, Washington, D.C., October 18, 2006. http://www.surfacecommission.gov/Don%20Pickrell%20on%20pricing_1.ppt

Final Report on Rail Safety Gage-Widening Measurements. For the Federal Railroad Administration, Dr. Theodore Sussmann of the Structures and Dynamics Division and Mr. Narayana Sundaram of State University of New York produced a final report, *Development of Gage Widening Projection Parameter for the Deployable Gage Restraint Measurement System*. October 2006 (DOT/FRA/ORD-06/13) <http://www.fra.dot.gov/downloads/Research/ord0613.pdf>

Volpe Center provides academic and research support for the National Aeronautics and Space Administration’s **Next Generation Air Transportation System** (NGATS) projects. The primary goal of the NASA Airspace effort is to develop integrated solutions for a safe, efficient, and high-capacity airspace system. The Center has recently published several reports in support of this effort:

- *Review of Human-Automation Interaction Failures and Lessons Learned*, Dr. Thomas B. Sheridan and Dr. Eric Nadler of the Human Factors Division. October 2006 (DOT-VNTSC-NASA-06-01) <http://www.volpe.dot.gov/hf/docs/ha-failures-sheridan.doc>
- *Report on a Workshop on Human-Automation Interaction in NGATS*, Dr. Thomas B. Sheridan and Dr. Eric Nadler of the Human Factors Division and Dr. Kevin Corker of San Jose State University. October 2006 (DOT-VNTSC-NASA-06-02) <http://www.volpe.dot.gov/hf/docs/workshop-hai-sheridan.doc>
- *A Note on the Possibility of Instability in NGATS Upstream Flow Control to Airports*, Dr. Thomas B. Sheridan of the Human Factors Division. October 2006 (DOT-VNTSC-NASA-06-03) http://www.volpe.dot.gov/hf/docs/upstream_flow_control-sheridan.doc
- *Strategy for Optimum Acquisition of Information* (Technical Note), Dr. Thomas B. Sheridan of the Human Factors Division. October 2006 (DOT-VNTSC-NASA-06-04) http://www.volpe.dot.gov/hf/docs/optimum_acquisition-sheridan.doc

- *Final Report and Recommendations for Research on Human-Automation Interaction in the Next Generation Air Transportation System*, Dr. Thomas B. Sheridan and Dr. Eric Nadler of the Human Factors Division and Dr. Kevin Corker of San Jose State University. November 2006 (DOT-VNTSC-NASA-06-05) <http://www.volpe.dot.gov/hf/docs/hai-final-sheridan-1204.doc>

Logistics Expertise. The Volpe Center's logistics expertise goes beyond national boundaries. The Center is now assisting the United Kingdom's Ministry of Defence in becoming more flexible in its air logistics capacity and thus more effective in the demanding expeditionary war environment of the 21st century. Mr. Jack Krumm of the Integrated Transportation Business Enterprise Division was the project manager and technical leader for a study that resulted in process re-engineering recommendations regarding future Royal Air Force (RAF) air logistics capability. These recommendations were included in the Strategic Movements Review report and were recently accepted by the RAF Deputy Chief of Staff, who ordered their implementation. Their implementation will result in a cost-effective consolidation of U.K. Strategic Airlift, from approximately 24 disparate bases to a centralized operation at Brize-Norton RAF Base. The RAF sponsor described the Center's report and recommendations as groundbreaking and said that they could become a template for other elements of the RAF facing similar challenges.

Aviation Safety Oversight Decisions. Mr. Larry Berk of the Safety Information Systems Division presented the paper "Aviation Safety Oversight Aided by Decision Analysis" at the Annual Conference of the Institute for Operations Research and the Management Sciences (INFORMS) held in Pittsburgh, Pennsylvania, November 5–8, 2006. Coauthored by Dr. James Hallock of the Safety Information Systems Division, Mr. Berk's presentation described the Volpe Center's research on introducing techniques to the Federal Aviation Administration (FAA) Flight Standards Service for constructing and revising surveillance plans.

2006 ASME/International Mechanics Engineering Congress and Exposition. Volpe Center staff presented papers at the 2006 American Society of Mechanical Engineers (ASME) International Mechanical Engineering Congress and Exposition in Chicago, Illinois, November 6–8, 2006. The papers are listed below; some listings include web links. More information can be obtained from individual authors.

- "Residual Stresses in Passenger Car Wheels," Mr. Jeffrey Gordon and Dr. Benjamin Perlman of the Structures and Dynamics Division and Dr. Shuangqin Liu of Tufts University. IMECE2006-14526. <http://www.volpe.dot.gov/sdd/docs/integrity/imece2006-14526.pdf>
- "Dynamic Simulation of Train Derailments," Dr. David Jeong and Dr. Benjamin Perlman of the Structures and Dynamics Division and Mr. Chris Paetsch of Tufts University. IMECE2006-14607. <http://www.simspe.com/tankcars/IMECE2006-14607.pdf>
- "Engineering Analyses for Railroad Tank Car Head Puncture Resistance," Dr. David Jeong, Dr. Benjamin Perlman, and Ms. Yim Tang of the Structures and Dynamics Division, and Ms. Hailing Yu of CASE, LLC (a Volpe Center on-site contractor). IMECE2006-13212. <http://www.volpe.dot.gov/library/published/asmc-imece2006-13212-v2.pdf>
- "Passenger Equipment Suspension Performance," Mr. Brian Marquis of the Structures and Dynamics Division. IMECE2006-16396. <http://www.volpe.dot.gov/library/pp06.html>
- "Crush Analyses of Multi-Level Equipment," Mr. Eloy Martinez of the Federal Railroad Administration, Mr. John Zolock of the U.S. Department of Transportation, and Mr. David Tyrell of the Structures and Dynamics Division. IMECE2006-13214. http://www.volpe.dot.gov/sdd/docs/2006/rail_cw_2006_06.pdf
- "A Collision Dynamics Model of a Multi-Level Train," Ms. Michelle Priante, Dr. Benjamin Perlman, and Mr. David Tyrell of the Structures and Dynamics Division. IMECE2006-13537. http://www.volpe.dot.gov/sdd/docs/2006/rail_cw_2006_05.pdf

(continued from page 15)

- “Train-to-Train Impact Test of Crash-Energy Management Passenger Rail Equipment: Occupant Experiments,” Ms. Kristine Severson and Mr. Daniel Parent of the Structures and Dynamics Division. IMECE2006-14420. http://www.volpe.dot.gov/sdd/docs/2006/rail_cw_2006_08.pdf
- “A Train-to-Train Impact Test of Crash Energy Management Passenger Rail Equipment: Structural Results,” Mr. Eloy Martinez of the Federal Railroad Administration and Mr. David Tyrell, Ms. Karina Jacobsen, and Dr. Benjamin Perlman of the Structures and Dynamics Division. IMECE2006-13597. http://www.volpe.dot.gov/sdd/docs/2006/rail_cw_2006_07.pdf
- “Development of a Standard for New Passenger Car Wheel Designs,” Mr. Brandon Talamini, Mr. Jeffrey Gordon, and Dr. Benjamin Perlman of the Structures and Dynamics Division. IMECE2006-14735. <http://www.volpe.dot.gov/sdd/docs/integrity/imece2006-14735.pdf>

Drug and Alcohol Testing. Mr. Michael Redington and Ms. Eve Rutyna of the Rail and Transit Systems Division and Mr. Nathan Grace and Ms. Felicity Shanahan of CASE, LLC (a Volpe Center on-site contractor) coauthored “Drug and Alcohol Testing Results 2004 Annual Report,” the 10th annual report on the results of the Federal Transit Administration’s (FTA’s) Drug and Alcohol Testing Program. The report, published in November 2006, summarized the reporting requirements for calendar year 2004, the requirements of the overall drug and alcohol testing program, the results from the data reported for 2004, and the random drug and alcohol violation rates for 1995 through 2004.

<http://transit-safety.volpe.dot.gov/Publications/order/singledoc.asp?docid=520> ■

American Society for Engineering Management’s Best Dissertation Prize

Dr. Seamus M. McGovern of the Terminal and Surface Systems Division was awarded the prize for best dissertation by the American Society for Engineering Management (ASEM) at its 27th Annual Meeting in Huntsville, Alabama, October 25–28, 2006. The prize is given for the best 2005–2006 doctoral dissertation on engineering management. He received a doctorate in Industrial Engineering from Northeastern University.

Dr. McGovern’s dissertation, “Combinatorial Optimization Treatment of the Unary NP-Complete Disassembly Line Balancing Problem,” addresses product disassembly that takes place prior to remanufacturing, recycling, or disposal. An efficient disassembly line requires a mathematical approach to the disassembly line-balancing problem. This problem relates to determining the minimum number of workers to be assigned to disassemble a product in a feasible sequence, where it is desired that each worker have a similar amount of idle time and that hazardous and high-demand parts are removed early in the process.

Dr. McGovern’s work directly supports DOT’s Strategic Plan in the areas of Environmental Stewardship and Organizational Excellence. The research is highly relevant to manufacturers who strive for greater efficiency in recycling and remanufacturing their postconsumed products in response to more rigid environmental legislation, public awareness, economically minded drivers, and the need for more responsible manufacturing. His research was conducted under the guidance of Dr. Surendra M. Gupta, a recognized pioneer in the field of environmentally conscious manufacturing. ■

Volpe Center Highlights

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